

Alternative Production plant for LTO100

For further information, please contact your regional Vishay office.

CONTACT INFORMATION

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Description of Change: Through strategic diversification of our manufacturing sites, we are poised to meet growing customer demands while upholding the utmost standards of quality. This expansion enables Vishay to respond swiftly to market changes. Our unwavering commitment to delivering top-notch products and services underscores our dedication to effectively meeting the evolving needs of our customers.

Reason for Change: Alternative Production plant in order to increase production capacities

Expected Influence on Quality/Reliability/Performance: None

Part Numbers/Series/Families Affected: LTO100*

Vishay Brand(S): Vishay Sfernice

Time Schedule:

Start Shipment Date: Thu Aug 1, 2024

Sample Availability: 06/03/2024

Product Identification: LTO100*

Qualification Data: AEC-Q200 report - LTO100 SHATIAN, PCN-Delta-Qualification-Matrix-ZVEI-5_0_16, PPAP LTO100

This PCN is considered approved, without further notification, unless we receive specific customer concerns before Mon Jul 15, 2024 or as specified by contract.

Issued By: Thomas Roure, thomas.roure@vishay.com

PPAP LTO100 – VISHAY

Benjamin MOLINS

Fixed Resistors Quality department

April, 12th, 2024

1. DESIGN RECORD



Power Resistor Thick Film Technology



LINKS TO ADDITIONAL RESOURCES



FEATURES

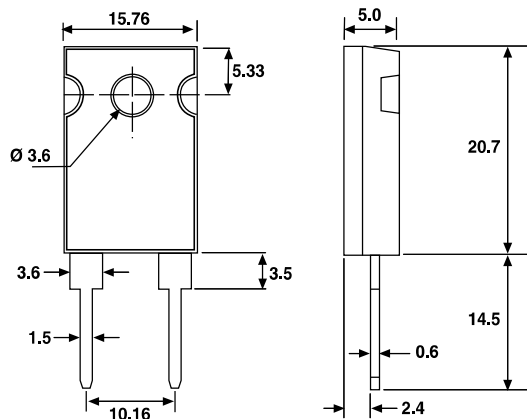
- 100 W at 25 °C case temperature heatsink mounted
- Direct mounting ceramic on heatsink
- Broad resistance range: 0.015 Ω to 1 M Ω
- Non inductive
- TO-247 package: compact and easy to mount
- Bended option available
- AEC-Q200 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT

LTO series are the extension of RTO types. We used the direct ceramic mounting design (no metal tab) of our RCH power resistors applied to semiconductor packages.

DIMENSIONS in millimeters



Note

- Tolerances unless stated: ± 0.3 mm

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE	RESISTANCE RANGE Ω	RATED POWER $P_{25\text{ }^{\circ}\text{C}}$ W	LIMITING ELEMENT VOLTAGE U_L V	TOLERANCE $\pm \%$	TEMPERATURE COEFFICIENT $\pm \text{ppm}/^{\circ}\text{C}$	CRITICAL RESISTANCE Ω
LTO 100	TO-247	0.015 to < 0.2	100	500	5, 10	350, 900	n/a
		0.2 to 1M	100	500	1, 2, 5, 10	200, 350	2.5 K

MECHANICAL SPECIFICATIONS

Mechanical Protection	Molded
Resistive Element	Thick film
Substrate	Alumina
Connections	Tinned copper
Weight	3.5 g max.
Mounting Torque	1 Nm

ENVIRONMENTAL SPECIFICATIONS

Temperature Range	-55 $^{\circ}\text{C}$ to +175 $^{\circ}\text{C}$
Climatic Category	55 / 175 / 56
Flammability	IEC 60695-11-5 Application time: $t_a = 10$ s Burning duration: $t_b < 30$ s



TECHNICAL SPECIFICATIONS	
Dissipation and Associated	Onto a heatsink
Power Rating and Thermal Resistance of the Component	100 W at +25 °C (case temp.) $R_{TH} (\theta_{JA})$: 1.5 °C/W Free air: 3.5 W at +25 °C
Temperature Coefficient	See Performance table ± 150 ppm/°C
Dielectric Strength MIL STD 202	3000 V _{RMS} - 1 min 10 mA max.
Insulation Resistance	$\geq 10^4$ M Ω
Inductance	≤ 0.1 μ H

PERFORMANCE		
TESTS	CONDITIONS	REQUIREMENTS
Momentary Overload	EN 60115-1 1.5 Pr/5 s $U_S < 1.5 U_L$	$\pm (0.5 \% + 0.005 \Omega)$
Load Life	EN 60115-1 1000 h Pr at +25 °C	$\pm (0.5 \% + 0.005 \Omega)$
High Temperature Exposure	AEC-Q200 rev. D conditions: MIL-STD-202 method 108 1000 h, +175 °C, unpowered	$\pm (0.25 \% + 0.005 \Omega)$
Temperature Cycling	AEC-Q200 rev. D conditions: JESD22 method JA-104 1000 cycles, -55 °C to +125 °C dwell time -15 min	$\pm (0.5 \% + 0.005 \Omega)$
Biased Humidity	AEC-Q200 rev. D conditions: MIL-STD-202 method 103 1000 h, 85 °C, 85 % RH	$\pm (1 \% + 0.005 \Omega)$
Operational Life	AEC-Q200 rev. D conditions: MIL-STD-202 method 108 2000 h, 90/30, powered, +125 °C	$\pm (0.5 \% + 0.005 \Omega)$
ESD Human Body Model	AEC-Q200 rev. D conditions: AEC-Q200-002 25 kV _{AD}	$\pm (0.5 \% + 0.005 \Omega)$
Vibration	AEC-Q200 rev. D conditions: MIL-STD-202 method 204 5 g's for 20 min, 12 cycles test from 10 Hz to 2000 Hz	$\pm (0.2 \% + 0.005 \Omega)$
Mechanical Shock	AEC-Q200 rev. D conditions: MIL-STD-202 method 213 100 g's, 6 ms, 3.75 m/s 3 shocks/direction	$\pm (0.2 \% + 0.005 \Omega)$
Terminal Strength	AEC-Q200 rev. D conditions: AEC-Q200-006 2 kgf, 60 s	$\pm (0.25 \% + 0.01 \Omega)$

SPECIAL FEATURES				
Resistance Values	≥ 0.015	≥ 0.1	≥ 0.2	≥ 20
Tolerances	5 %, 10 %		1 %, 2 %, 5 %, 10 %	
Typical Temperature Coefficient (-55 °C to +155 °C)	± 900 ppm/°C	± 350 ppm/°C	± 350 ppm/°C	± 200 ppm/°C

**CHOICE OF THE HEATSINK**

The user must choose according to the working conditions of the component (power, room temperature).

Maximum working temperature must not exceed 175 °C. The dissipated power is simply calculated by the following ratio:

$$P = \frac{\Delta T}{[R_{TH(j-c)}] + [R_{TH(c-h)}] + [R_{TH(h-a)}]} \quad (1)$$

P: Expressed in W

ΔT : Difference between maximum working temperature and room temperature

$R_{TH(j-c)}$: Thermal resistance value measured between resistive layer and outer side of the resistor. It is the thermal resistance of the component.

$R_{TH(c-h)}$: Thermal resistance value measured between outer side of the resistor and upper side of the heatsink. This is the thermal resistance of the interface (grease, thermal pad), and the quality of the fastening device.

$R_{TH(h-a)}$: Thermal resistance of the heatsink.

Example:

$R_{TH(c-h)} + R_{TH(h-a)}$ for LTO 100 power rating 10 W at ambient temperature +25 °C

Thermal resistance $R_{TH(j-c)}$: 1.5 °C/W

Considering equation (1) we have:

$$\Delta T = 175\text{ °C} - 25\text{ °C} = 150\text{ °C}$$

$$R_{TH(j-c)} + R_{TH(c-h)} + R_{TH(h-a)} = \frac{\Delta T}{P} = \frac{150}{10} = 15\text{ °C/W}$$

$$R_{TH(c-h)} + R_{TH(h-a)} = 15\text{ °C/W} - 1.5\text{ °C/W} = 13.5\text{ °C/W}$$

with a thermal grease $R_{TH(c-h)} = 1\text{ °C/W}$, we need a heatsink with $R_{TH(h-a)} = 12.5\text{ °C/W}$.

Single Pulse

These informations are for a single pulse on a cold resistor at 25 °C (not already used for a dissipation) and for pulses of 100 ms maximum duration.

The formula used to calculate E is:

$$E = P \times t = \frac{U^2}{R} \times t$$

with:

E (J): pulse energy

P (W): pulse power

t (s): pulse duration

U (V): pulse voltage

R (Ω): resistor

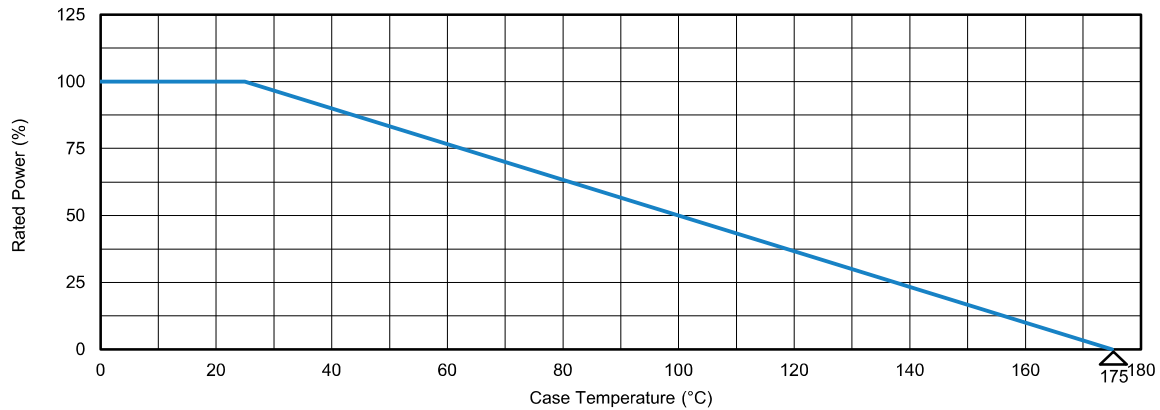
The energy calculated must be less than that allowed by the graph.



POWER RATING

The temperature of the case should be maintained within the limits specified.

To improve the thermal conductivity, surfaces in contact should be coated with a silicone grease and the torque applied on the screw for tightening should be around 1 Nm.

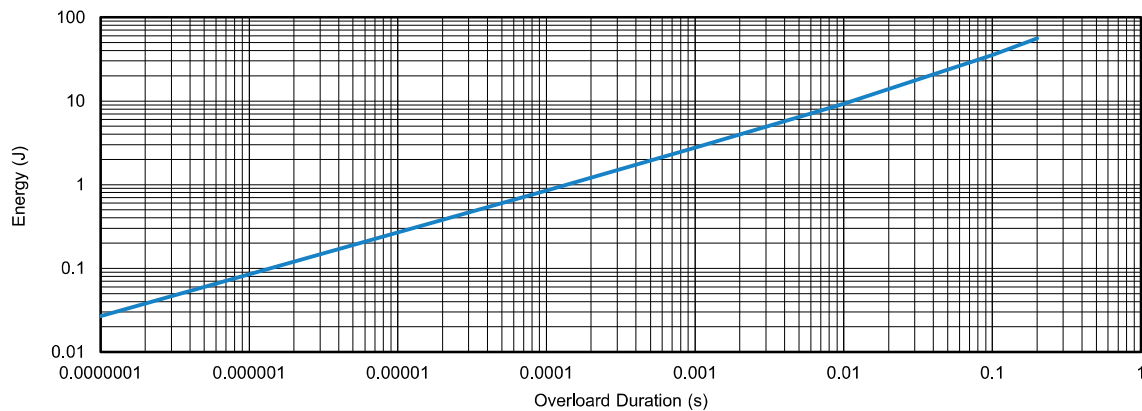


OVERLOADS

In any case the applied voltage must be lower than the maximum overload voltage of 750 V.

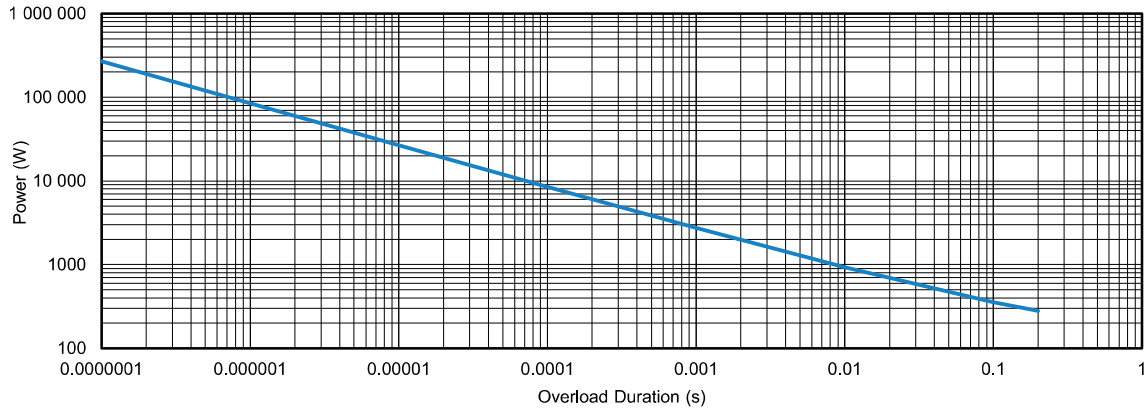
Accidental overload: The values indicated on the following graph are applicable to resistors in air or mounted onto a heatsink.

ENERGY CURVE

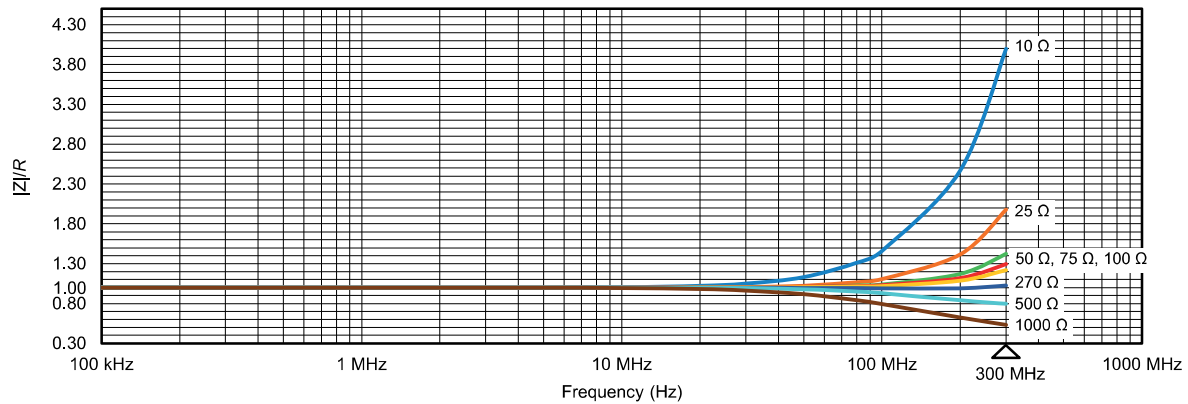




POWER CURVE



IMPEDANCE CURVE 10 Ω to 1 k Ω from 100 kHz to 300 MHz



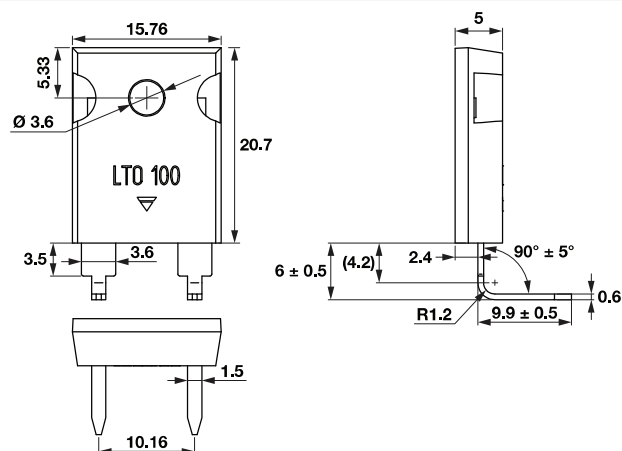
BENDING OPTIONS

LTO 100 TB7	LTO 100 TB8	LTO 100 TB9

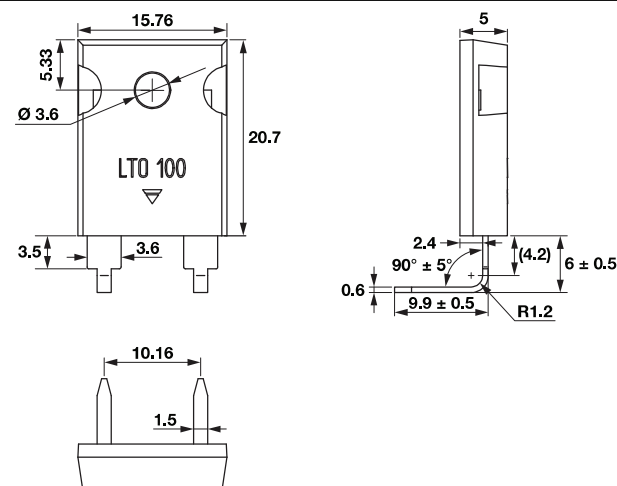


BENDING OPTIONS DIMENSIONS in millimeters

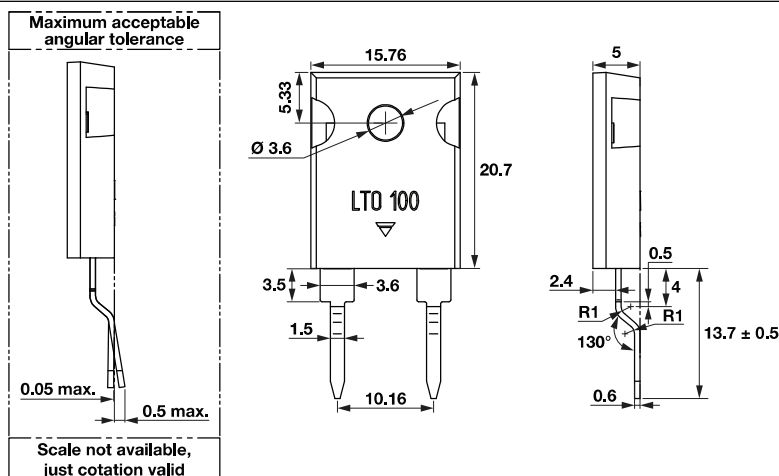
LTO 100 TB7



LTO 100 TB8



LTO 100 TB9



Note

- Tolerances unless stated: ± 0.3 mm



PACKAGING

Tube of 30 units

MARKING

Model, style, resistance value (in Ω), tolerance (in %), manufacturing date, Vishay Sfernice trademark.

ORDERING INFORMATION

LTO	100	F	2.7 k Ω	$\pm 1\%$	xxx	TU30	e3
MODEL	STYLE	CONNECTIONS	RESISTANCE VALUE	TOLERANCE	CUSTOM DESIGN	PACKAGING	LEAD (Pb)-FREE
				$\pm 1\%$ $\pm 2\%$ $\pm 5\%$ $\pm 10\%$	Optional on request: special TCR, shape, bended etc.		

GLOBAL PART NUMBER INFORMATION

L	T	O	1	0	0	F	2	7	0	0	0	J	T	E	3
GLOBAL MODEL	SIZE	LEADS	OHMIC VALUE				TOLERANCE		PACKAGING		LEAD (Pb)-FREE				
LTO	100	F = radial leads	The first four digits are significant figures and the last digit specifies the number of zeros to follow. R designates decimal point. 48R70 = 48.7 Ω 48701 = 48 700 Ω 10002 = 100 000 Ω R0100 = 0.01 Ω R4700 = 0.47 Ω 27000 = 2700 Ω = 2.7 k Ω				F = 1 % G = 2 % J = 5 % K = 10 %		T = tube Tube 30 pieces		E3 = pure tin				



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VISHAY SERNICE

www.vishay.com

Film Resistors

Application Note

Pulse Capabilities for Thick Film Power Resistors

By Yannick Tonnelier and Frederic Lovera

Vishay Sernice offers a wide range of thick film power resistors. Our resistors are able to dissipate from 5 W up to 1100 W with a large range of ohmic values (10 mΩ up to 1 MΩ).

The pulse capability of our resistors is a key specification for many customer applications.

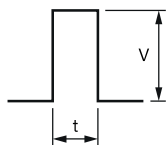
The energy curve in the datasheets shows the maximum energy that can be applied over a given period.

In this application note, we use the example of our LPS 800 resistor to explain a method to evaluate whether the resistor is appropriate for a given application. This method can be used for each resistor type using the corresponding pulse curve or limiting voltage from the corresponding datasheet.

If we take the following example:

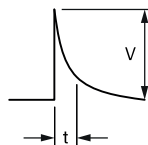
A capacity of 5 μF charged to 1140 V will be discharged through an LPS 800 80 Ω with a frequency of 100 Hz. The ambient temperature is 25 °C (see next page for the determination of the ambient temperature).

1. The maximum pulse voltage for LPS 800 indicated on the datasheet is 5000 V. This voltage is not exceeded by the discharge of the capacitor, so LPS 800 is compatible with this application.
2. Calculation of the energy stored by the capacitor for one pulse: represented below are the most common voltage curves and the formula used for each of them.



$$E = \frac{V^2 t}{R}$$

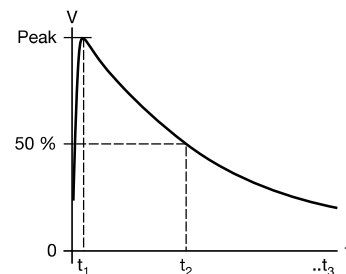
Square pulse



$$E = \frac{1}{2} \times C \times V^2$$

$$t = R \times C$$

Capacitor discharge



$$E = \left(\frac{1}{3} \times \frac{V^2}{R} \times t_1 \right) + \left(\left(\frac{V^2 \times \tau}{-2 \times R} \right) \times \left(e^{\frac{2 \times (t_3 - t_1)}{\tau}} - 1 \right) \right)$$

Lightning pulse

Unity:

E = Energy in J

t = Time in s

V = Voltage in V

R = Resistance in Ω

C = Capacity in F

Square pulse: A constant voltage V is applied to the resistor R during a period t.

Capacity discharge: A capacitor C is charged to a given voltage V and discharged into the resistor R.

Lightning pulse: The voltage rises up to V_{peak} and decreases at an exponential rate. This pulse is the pulse defined in the IEC 61000-4-5 with

t_1 = Time to peak voltage (s)

t_2 = Time to 50 % of peak voltage (s)

t_3 = Time to negligible voltage > 20 x t_2

τ = Exponential rate of decay = $-(t_2 - t_1)/\ln(0.50)$

In our example introduced above, we have C = 5 μF and V = 1140 V:

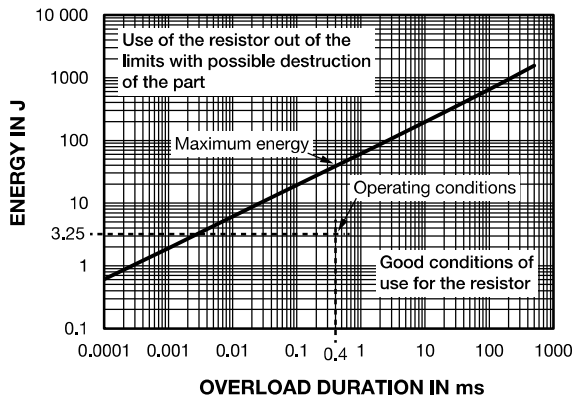
$$E = \frac{1}{2} C V^2 \Rightarrow E = \frac{1}{2} \times 5 \cdot 10^{-6} \times 1140^2 \Rightarrow E = 3.25 \text{ J}$$

$$t = RC \Rightarrow t = 80 \times 5 \cdot 10^{-6} \Rightarrow t = 400 \text{ μs}$$

We can now examine the energy curve of proposed use.

Pulse Capabilities for Thick Film Power Resistors

- Check of the chosen operating point on the energy curve of LPS 800:



Each point on the curve corresponds to a single test at 25 °C for the ambient temperature.

The operating conditions are in the zone corresponding to good conditions of use for the resistor.

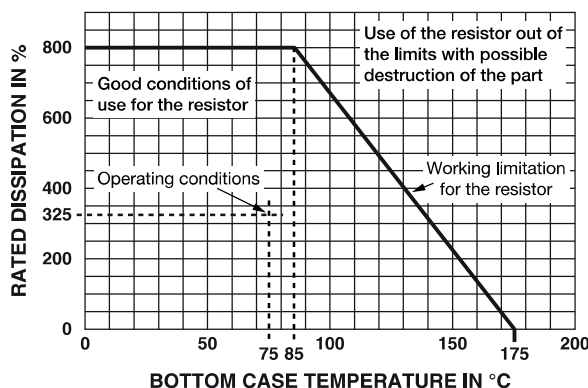
Now, we must calculate the average power dissipated by the component.

- Calculation of the average power dissipated LPS 800 for this example:

In case of multiple pulses applications, we need to use the formula linking the energy of the pulse and the frequency of repetition of this pulse ($f = 100$ Hz for this example):

- $P_{\text{average}} = E / t = E \times f \Rightarrow P_{\text{average}} = 3.25 \times 100 \Rightarrow P_{\text{average}} = 325$ W

- With the derating curve, we can see if LPS 800 can be used at 325 W with a case temperature, backside of the resistor, at 75 °C for example.



Note

- Our operating conditions are in the acceptable zone for the component. It remains for us to determine the size of the heatsink.

To define the size of our heatsink, we take the formula:

$$(R_{th(c-h)} - R_{th(h-a)})_{\text{max.}} = \frac{\Delta T}{P_{\text{average}}} - R_{th(j-c)} = \frac{T_{j \text{ max.}} - T_a}{P_{\text{average}}} - R_{th(j-c)}$$

$R_{th(j-c)}$ = Thermal resistance value measured between resistive layer and outer side of the resistor.

$R_{th(c-h)}$ = Thermal resistance value measured between outer side of the resistor and upper side of the heatsink. This is the thermal resistance of the interface (grease, thermal pad), and the quality of the fastening device.

$R_{th(h-a)}$ = Thermal resistance of the heatsink.

$T_{j \text{ max.}}$ = Temperature of the resistive element (maximum 175 °C for LPS 800).

T_a = Ambient temperature (determined by the measurement of the temperature of the junction without any power or the temperature of the water for a water cooling heatsink.)

Take the example of a thermal interface of 0.2 °C/W for the interface between the component and the heatsink.

$$R_{th(h-a) \text{ max.}} = \frac{T_{j \text{ max.}} - T_a}{P} - R_{th(j-c)} - R_{th(c-h)}$$

$$R_{th(h-a) \text{ max.}} = \frac{175 - 25}{325} - 0.112 - 0.2 = 0.15 \text{ °C/W}$$

In this example, we must therefore choose a heatsink with a $R_{th} \leq 0.15$ °C/W



CP15 from Lytron
(water cooling heatsink)



LA 14 from Fischer Elektronik
(air cooling heatsink with fan)

To avoid any damage to the resistor by excessive pulse loading, the specifics of the customer's application must be checked.

See the following link:

www.vishay.com/resistors/pulse-energy-calculator/



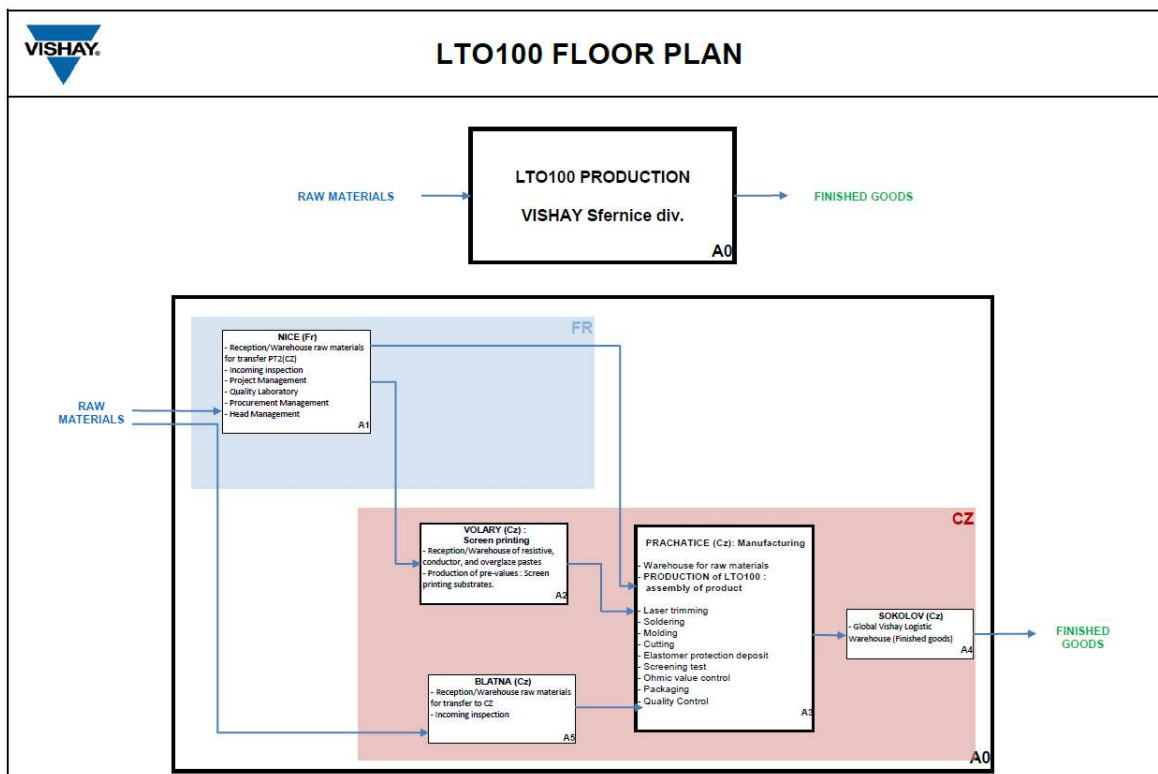
**Certificate of Design, Construction and Qualification (CDCQ)
Appendix 2 - AEC-Q200**

Supplier	VISHAY	Lead/terminal attachment method	Alloy SnAgCu Soldering by hot air (output assembly)
User P/N(s)	Example : LTO150 F 27000 J T E3 (refer to datasheet for more details)	Package outline drawing	NA
Supplier P/N(s)	Example : LTO150 F 27000 J T E3 (refer to datasheet for more details)	Flammability rating	UL-94 V0
Data sheet	Datasheet 50071	ESD characterization(s)	AEC-Q200 RED-D AEC-Q200-002 REV-B IEC 61000-4-2 HUMAN BODY MODEL ELECTROSTATIC DISCHARGE TEST Pass 25kV Air Discharge
Assembly Location	Czech republic	Lead/Termination material	Cu
Process Identifier	NA	Lead plating/coating	Ni / Sn
Final QC Facility Location	Czech republic	Construction cross section	NA
Family number	1N	Package Subcontractor(s)	NA
Technology description	Thick film technologie	Element composition	Refer to exposed view
All dimensions in millimeters	Refer to Datasheet 50071	Solvent exposure restriction	NA
Metallization material	Ni / Sn	Marking method	Laser
Number of active layers	1	Exceptions taken to AEC- Q200	Flame retardance: Deviation 4V increments Resistance to solvent: Deviation Solvent : 2-propanol (Isopropyl alcohol)
Electrode/Internal element attachment method	Alloy SnAgCu Soldering by hot air (output assembly)	Subassembly location	Czech republic
Thickness range	Sn 4-6 µm Ni 4-5µm	Insulation material	NA
Package material	Glass fiber and mineral filled linear PPS		

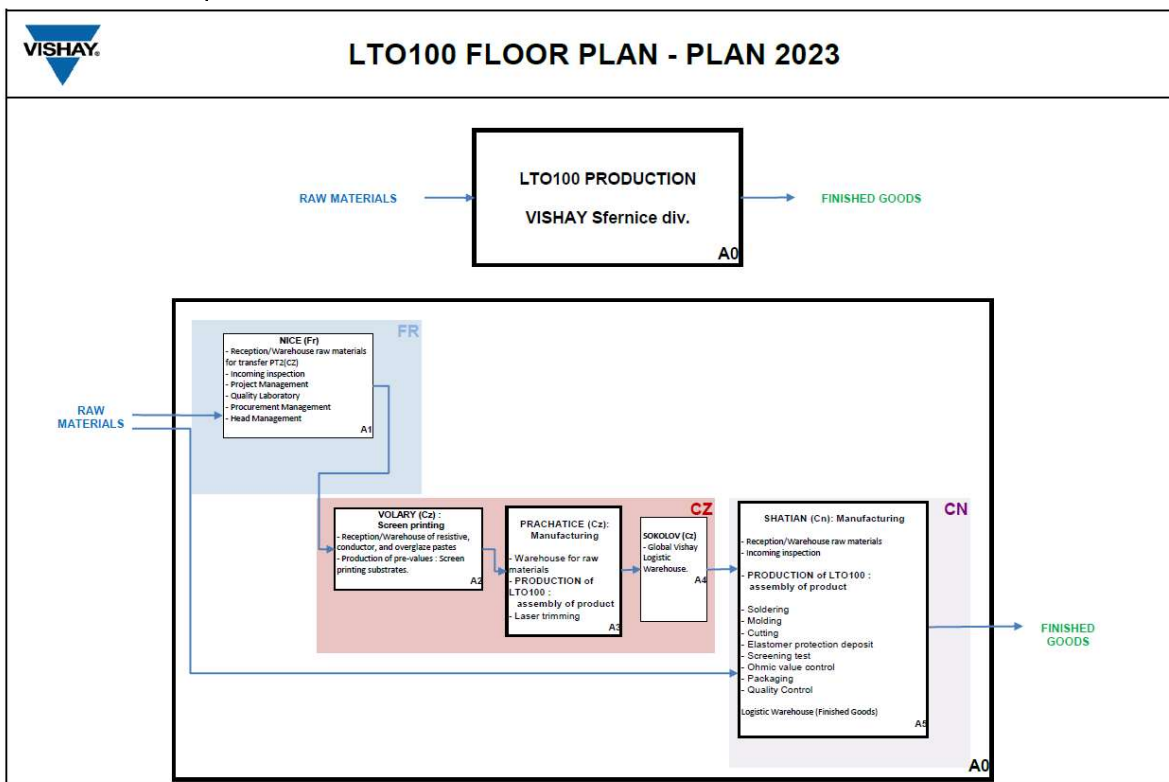
Completed by:	Date:	Certified by:	Title:	Date:
E. Guezguez	15/02/2018	A. Moulin	Q Engineer	15/02/2018

2. ENGINEERING CHANGE DOCUMENTS

Already existing floor plan



Additional floor plan after PCN



4. DFMEA



Failure Mode & Effect Analysis

☒ Design
☐ Process

Creation date 13/12/2016
Revision date 20/06/2017

Product O150-100-50-30-100H-150H : Power Resistor Thick Film Technology
Customer catalog

Vishay part number and revision LTO150-100-50-30-100H-150H
Customer specification number and revision NA

FMEA Team

	Name	Function
Asked by		
Animed by	E. Guezguez	R&D Engineer
Permanent Team	E.Guezguez	R&D Engineer
	A.Moulin	Quality Engineer
	D.Linzmajer	Industrial Engineer
Temporary Team	S.Guinet	R&D Engineer

Status on last revision

Total number of RPN	136	% of RPN unsolved	0%
Total number of KC	0		

Revision

	Revision					
Date	22/09/2016	15/11/2016	27/11/2017	27/04/2018	28/04/2019	12/11/2019
Total KC	0	0	0	0	0	0
Total RPN	131	131	131	131	132	132
Number of RPN with action	52	52	44	1	0	0
Percentage RPN solved	60%	60%	66%	99%	100%	100%

Approval

Project Leader	Elyes Guezguez
R&D or Manuf. Manager	Sebastien Guinet

Quality Engineer	Alexandre Moulin
Operational Manager	Abdallah Kamal

Diffusion list

Nice: Development engineer/ Operational director/ Quality engineer
Prachitice: Quality engineer / Development engineer.



Failure Mode & Effect Analysis

☒ Design
☐ Process

Creation date
Revision date

Product	150-100-50-30-100H-150H : Power Resistor Thick Film Techn
Customer	catalog

Vishay part number and revision	LTO1
Customer specification number and revision	

Maximum RPN without corrective action :	100
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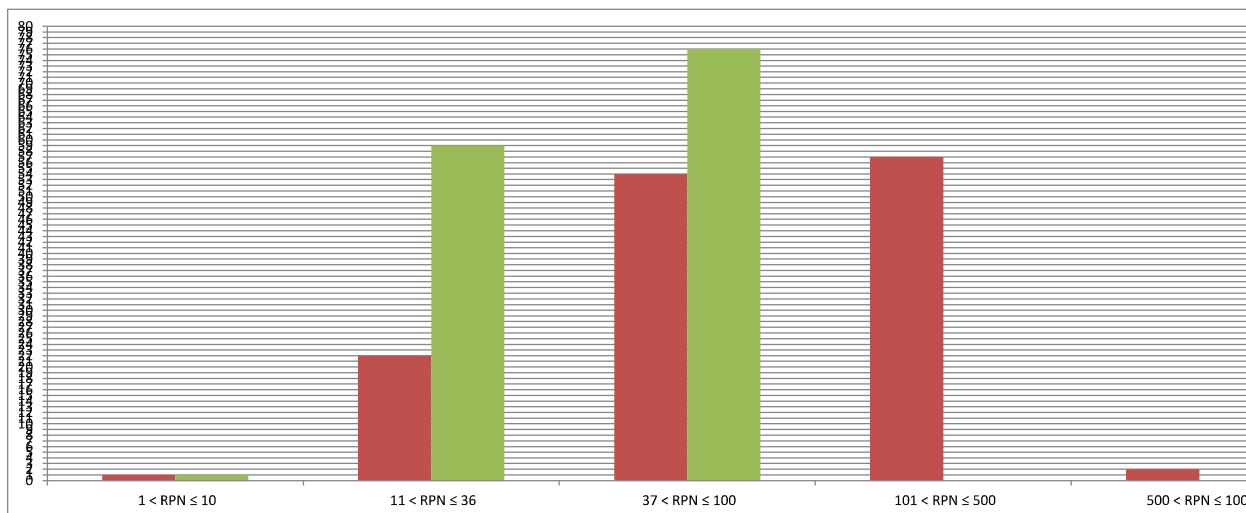
Follow-up until initial FMEA

Update meeting

Date	22/09/2016	15/11/2016	27/11/2017	27/04/2018	28/03/2019
Total KC	0	0	0	0	0
Total RPN	131	131	131	131	132
Number of RPN with action	52	52	44	1	0
Percentage RPN solved	60%	60%	66%	99%	100%

RPN Level

	1 < RPN ≤ 10	11 < RPN ≤ 36	37 < RPN ≤ 100	101 < RPN ≤ 500	500 < RPN ≤ 1000	TOTAL RPN
At initial	1	22	54	57	2	136
Actual	1	59	76	0	0	136





AMDEC PROCESS

Fichier :

LTO_DFMEA-L

Indice: [L](#)

Indice	DATE	NOM	ETAPE DE FABRICATION	DESCRIPTION DES
A	13/12/2004	V Zinc		Creation
B	01/09/2005	YT	all	update
C	06/07/2012	AMU+DLI	all	Changement et revue de la DFMEA avec nouveau format pour pa
D	22/09/2016	E Guezguez		LTO150 - Review of DFMEA with Function Matrix
E	15/11/2016	E Guezguez		Solder layer : prise en compte de la sortie ondulée
F	27/11/2017	E Guezguez		Close some actions
G	27/04/2018	E Guezguez		Close several actions following to the succes of the AEC-Q200 Qu
H	28/03/2019	A Moulin	Ceramic substrate	ICAR RF18011- Delph pulse on ceramic - Regroupement DFMEA
I	12/11/2019	A Moulin	all	KC2 added
J	25/01/2021	A Moulin	all	review DFMEA

6. PROCESS FMEA



Failure Mode & Effect Analysis

☐ Design
☒ Process

Product	Power Resistor LTO
Customer	

Vishay part number and revision
Customer specification number and revision

FMEA Team

Made by EGG
Reviewed by SG
Approved by AMU

	Name	Function
Asked by		
Animed by	D. Linzmajer / A.Moulin	R&D Engineer
Permanent Team	S. Guinet	R&D Engineer
	E Guezguez	R&D Engineer
	B Molins	Quality Engineer
	K. Kovar	Quality Engineer
Temporary Team	A. Beran	Production Manager
	L. Hoidekr, D. Linzmajer	R&D
	Z. Hron	Production manager deputy

Status on last revision

Total number of RPN	132	% of RPN
Total number of KC	0	

Revision

	Initial FMEA				Revision		
Date	05/05/2010	21/03/2011	20/05/2011	13/02/2012	12/07/2012	28/07/2012	
Total KC	0	0	0	0	0		
Total RPN	50	94	94	114	125		1
Number of RPN with action	2	2	2	0	0		
Percentage RPN solved	96%	98%	98%	100%	100%		10
Date	15/05/2017	10/10/2017	27/09/2018	09/01/2019	04/02/2019	28/03/2019	
Total KC	0	0	0	0	0		
Total RPN	122	197	93	97	94		9
Number of RPN with action	0	6	3	2	0		
Percentage RPN solved	100%	97%	97%	98%	100%		10
Date	01/06/2020	29/06/2020	11/11/2020	18/02/2021	24/11/2021	11/02/2022	
Total KC	1	1	1	1	1		
Total RPN	85	96	104	106	116		1
Number of RPN with action	0	0	1	3	4		
Percentage RPN solved	100%	100%	99%	97%	97%		9
Date	10/10/2023						
Total KC	2						
Total RPN	130						
Number of RPN with action	2						
Percentage RPN solved	98%						

Diffusion list

Nice: Development engineer/ Operational director/ Quality engineer
Prachitice: Quality engineer / Development engineer.



Failure Mode & Effect Analysis

- ☐ Design
- ☒ Process

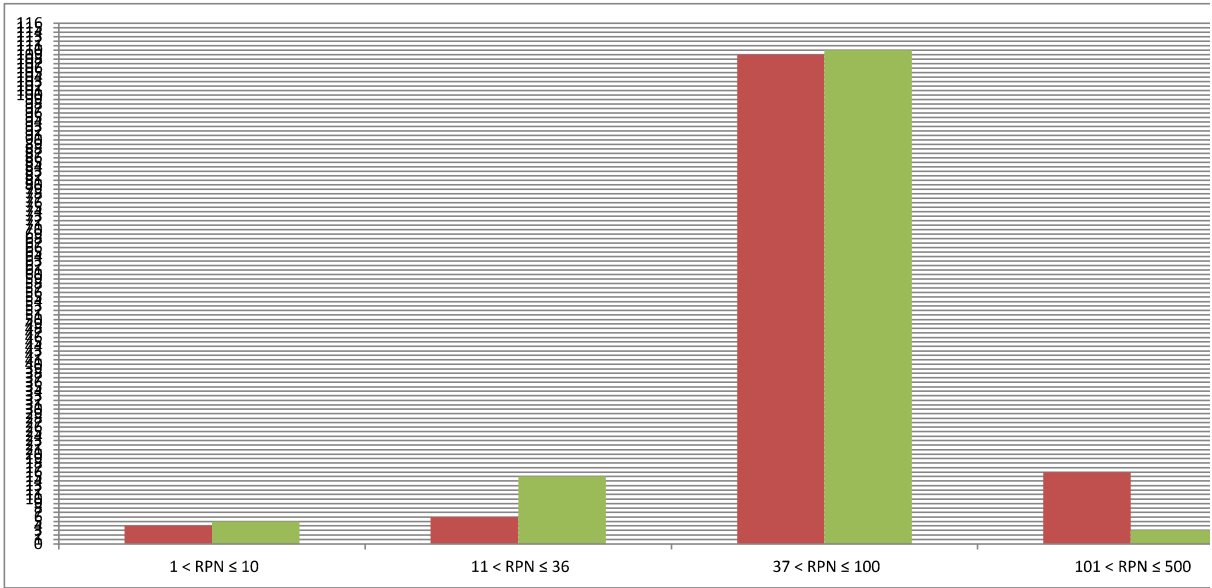
Product	Power Resistor LTO
Customer	

Vishay part number and i
Customer specification numbe

Maximum RPN without corrective action :	100
---	-----

RPN Level

	1 < RPN ≤ 10	11 < RPN ≤ 36	37 < RPN ≤ 100	101 < RPN ≤ 500	500 < RPN ≤ 1
At initial	4	6	109	16	0
Actual	5	15	110	3	0



	AMDEC PROCESS	Fichier : LTO_PFMEA Indice: Z	Creation date 05/05/2010 Revision date 10/10/2023
---	----------------------	--	---

Indice	DATE	NOM	ETAPE DE FABRICATION	DESCRIPTION DES EVOLUT
A	05/05/2010	DLI		Creation
B	21/03/2011	AMU	all	update before PPAP
C	20/05/2011	AMU+DLI	all	update - review of IPR
D	13/02/2012	YT-AMU	3.05	Update of RTV operation & add operation of control
E	12/07/2012	AMU+DLI	all	Update:New soldering process by hot air +Verification of packaging
F	28/01/2013	AMU	all	Add collums with operation number
G	20/06/2013	AMU	3.07	Laser marking: remove step 3,07 (stamping)
H	03/02/2015	AB,DLI,ZH,LHO,ctv	All	Review PFMEA
I	15/05/2017	AMU	3.06	Corrective action 8D 317001 molding operation
J	10/10/2017	DLI, EF, ZH, LHO, RL	2.04- 3.02 - 3.04 - 3.11	Double head soldering, automatic chip feeding, Integration of LTO 150, New form of LTO PFMEA, ROB1
K	27/09/2018	AMU	All	Review after internal audit, Separation of PFMEA for common processes DL4 & Screenprinting operation
L	09/01/2019	AB,ZH,LHO,EF, DLI	All	Periodic review, changes after customer audit
M	04/02/2019	AB,ZH,LHO,EF, DLI		cleaning after soldering in MBtech washing machine, RTV567 replacement of Q3
N	28/03/2019	AMU		ICARRF18011- laser pulse deph
O	16/09/2019	AMU		KC2 for Ohmic value
P	09/03/2020	DLI		Air flow verification + 8D320002-µ burrs on leads
R	01/06/2020	DLI		Trimming process TL replace ESI on LTO 100 and 150
S	29/06/2020	DLI, AB, LHO		Trimming process on LTO100 for TICO on TL1&2
T	11/11/2020	ZH, MK, KK, TS, AB, DLI, LHO		Deburring operation moved from TL lasers to DL4
U	18/02/2021	AB, DLI, LHO, KK		Review after certification audit
V	24/11/2021	EGG/AB, DLI, ZH, KK, LHO, MK	3.06&3.10&3.11&3.16	Review after customer returns - CAR... (mixer parts - one tube with different value), CAR321030 (bent le Add operation of depositing upper ceramic + pulse test only for LTO100H-LTO150H product
W	11/02/2022	AB, MKO, LHO, DLI, ZH, VCT, KKO	3.14	Review after 8D report (mixed parts on the ROB1)
X	06/06/2022	AB, MKO, LHO, DLI, KKO	3.04, 3.07, 3.09	Review after 8D report (metallic burrs), avoid molding form damage
Y	31/10/2022	DLI, KKO	3.09, 3.02	Poka Yoke implementation, chiped ceramic - action update
Z	10/10/2023	KK, MK, BM		Regular review - chiped ceramic

7. CONTROL PLAN



CONTROL PLAN

THICK FILM RESISTOR – POWER RESISTOR THICK FILM TECHNOLOGY

☐	Prototype	☐	Pilot lot	☒	Production	Main contact / phone:
Control plan n° CP-TA-003		Edition 22				
Product: LTO 30-50-100-150-100H-150H		Supplier ref. code:		Approbation customer technical service / date (if required)		
Supplier / Plant: VISHAY SA / Nice (FR)				Approbation customer quality service / date (if required)		
Main contact / phone: M. Benjamin MOLINS benjamin.molins@vishay.com				Other approbation / date (if required)		

VERIFICATION / APPROBATION SUPPLIER					
Position	Quality engineer Fr	Quality engineer Cz	Development engineer Fr	Development engineer Cz	Manufacturing engineer
Date	B.Molins 12/10/2023	10/10/2023	20/10/2023	12/10/2023	26/10/2023
Name		K. Kovář	S. Guinet	D. Linzmajer	Z. Hron
Signature					

HISTORY OF THE MODIFICATIONS			
Edition	Date	Name	Nature of the modification
01	March, 07 th 2011	A.MOULIN	Creation
02	February, 06 th 2012	A.MOULIN	RTV encapsulate deposition by robot.
03	June, 20 th 2013	A.MOULIN	Laser Marking
04	June, 04 th 2015	DLI, LHO, ZH, AB	Review chapter 3
05	Arch 15 th 2016	DLI, LHO, ZH, AB	DL4 (not deployed for the moment)
06	May 15 th 2017	AMU	8D 317001- fixation hole LTO100
07	Oct 10 th 2017	DLI, ZH, EF, LHO, AMU	Double head soldering + automatic chip feeding + LTO 150
08	Sep 27 th 2018	AB, ZH, DLI	Revision after internal audit, Separation of CP for common product
09	Jan 09 th 2019	AB, ZH, LHO, EF, DLI	Periodic review, changes after customer audit
10	Feb 4 th 2019	AB, ZH, LHO, EF, DLI	cleaning after soldering in MBtech washing machine + RTV5
11	March 27 th 2019	AMU	ICAR_RF18011: Pulse depth control during incoming + rework
12	May 31 th 2019	DLI	TICO record in annex 1 of FTTA5500 of visual control on 2 f
13	Sept 16 th 2019	AMU	KC2 ohmic value
14	March 09 th 2020	DLI/AMU	Measuring of speed of air flow / Burrs detections (8D 32000:
15	June 1 st 2020	DLI	Trimming process TL replace ESI on LTO 100 and 150, Rev
16	June 29 th 2020	DLI, AB, LHO	3.01a Trimming process on LTO100 for TICO on TL1&2+ re
17	February 18 th 2021	AB, DLI, LHO, ZH, KK, MK	Update after IATF audit, adding of process controls 3.02, 3.0



CONTROL PLAN

THICK FILM RESISTOR – POWER RESISTOR THICK FILM TECHNOLOGY

18	November 24 th 2021	AB, DLI, LHO, ZH, KK, MK, EGG, AMU	Add LTO100H-LTO150H control Review after customer returns - CAR... (mixer parts - one tu leads - DL4, dielectric station)
19	February 11 th 2022	AB, MKO, LHO, DLI, ZH, VCT, KKO	Review after 8D report (mixed parts on the ROB1)
20	June 06 th 2022	AB, MKO, LHO, DLI, KKO	Review after 8D report (metallic burrs), avoid molding form c
21	October 31.2022	DLI, KKO	Review after FMEA update - => NO modification needed
22	October 10 th 2023	KKO, MKO, BMO	Regular review – no actions needed

LIST OF DISTRIBUTION			
Plant	Position	Plant	Position
NICE	Development engineer	NICE	Quality engineer
NICE	Operational director	NICE	Quality control
NICE	Quality director		

8. MEASUREMENT SYSTEM

GR&R report for equipment (without operator influence)

产品名称: 物料编码: 仪器名称: 机身号: 分辨率:	LT0100		特性名称: 规格(SL): 规格下限(LSL): 规格上限(USL): 公差范围(T): 单位:		ohmic value																																																																																																																																																														
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	HIOKI RM3545 ohmmeter				50.500																																																																																																																																																														
	201134315				49.500																																																																																																																																																														
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			K1	0.8862	$\bar{R}$	0.0015																																																																																																																																																													
		K3	0.25	Rp	0.3184																																																																																																																																																														
注释:																																																																																																																																																																			
<table><tr><td>序号</td><td>测量-1</td><td>测量-2</td><td>和Sum</td><td>均值Xbar</td><td>极差R</td></tr><tr><td>1</td><td>49.9561</td><td>49.9506</td><td>99.907</td><td>49.953</td><td>0.0055</td></tr><tr><td>2</td><td>49.6816</td><td>49.6768</td><td>99.358</td><td>49.679</td><td>0.0048</td></tr><tr><td>3</td><td>49.7077</td><td>49.7044</td><td>99.412</td><td>49.706</td><td>0.0033</td></tr><tr><td>4</td><td>49.8213</td><td>49.8185</td><td>99.640</td><td>49.820</td><td>0.0028</td></tr><tr><td>5</td><td>49.6624</td><td>49.6605</td><td>99.323</td><td>49.661</td><td>0.0019</td></tr><tr><td>6</td><td>49.7296</td><td>49.7279</td><td>99.458</td><td>49.729</td><td>0.0017</td></tr><tr><td>7</td><td>49.7992</td><td>49.7972</td><td>99.596</td><td>49.798</td><td>0.0020</td></tr><tr><td>8</td><td>49.7534</td><td>49.7519</td><td>99.505</td><td>49.753</td><td>0.0015</td></tr><tr><td>9</td><td>49.9701</td><td>49.9687</td><td>99.939</td><td>49.969</td><td>0.0014</td></tr><tr><td>10</td><td>49.7664</td><td>49.7664</td><td>99.533</td><td>49.766</td><td>0.0000</td></tr><tr><td>11</td><td>49.7003</td><td>49.6998</td><td>99.400</td><td>49.700</td><td>0.0005</td></tr><tr><td>12</td><td>49.8327</td><td>49.8324</td><td>99.665</td><td>49.833</td><td>0.0003</td></tr><tr><td>13</td><td>49.732</td><td>49.7314</td><td>99.463</td><td>49.732</td><td>0.0006</td></tr><tr><td>14</td><td>49.8171</td><td>49.8168</td><td>99.634</td><td>49.817</td><td>0.0003</td></tr><tr><td>15</td><td>49.72</td><td>49.7201</td><td>99.440</td><td>49.720</td><td>0.0001</td></tr><tr><td>16</td><td>49.8985</td><td>49.8988</td><td>99.797</td><td>49.899</td><td>0.0003</td></tr><tr><td>17</td><td>49.9798</td><td>49.98</td><td>99.960</td><td>49.980</td><td>0.0002</td></tr><tr><td>18</td><td>49.7106</td><td>49.711</td><td>99.422</td><td>49.711</td><td>0.0004</td></tr><tr><td>19</td><td>49.8055</td><td>49.8058</td><td>99.611</td><td>49.806</td><td>0.0003</td></tr><tr><td>20</td><td>49.7847</td><td>49.7852</td><td>99.570</td><td>49.785</td><td>0.0005</td></tr><tr><td>21</td><td>49.6655</td><td>49.6658</td><td>99.331</td><td>49.666</td><td>0.0003</td></tr><tr><td>22</td><td>49.9686</td><td>49.9703</td><td>99.939</td><td>49.969</td><td>0.0017</td></tr><tr><td>23</td><td>49.8215</td><td>49.8234</td><td>99.645</td><td>49.822</td><td>0.0019</td></tr><tr><td>24</td><td>49.9715</td><td>49.9733</td><td>99.945</td><td>49.972</td><td>0.0018</td></tr><tr><td>25</td><td>49.7945</td><td>49.7967</td><td>99.591</td><td>49.796</td><td>0.0022</td></tr></table>						序号	测量-1	测量-2	和Sum	均值Xbar	极差R	1	49.9561	49.9506	99.907	49.953	0.0055	2	49.6816	49.6768	99.358	49.679	0.0048	3	49.7077	49.7044	99.412	49.706	0.0033	4	49.8213	49.8185	99.640	49.820	0.0028	5	49.6624	49.6605	99.323	49.661	0.0019	6	49.7296	49.7279	99.458	49.729	0.0017	7	49.7992	49.7972	99.596	49.798	0.0020	8	49.7534	49.7519	99.505	49.753	0.0015	9	49.9701	49.9687	99.939	49.969	0.0014	10	49.7664	49.7664	99.533	49.766	0.0000	11	49.7003	49.6998	99.400	49.700	0.0005	12	49.8327	49.8324	99.665	49.833	0.0003	13	49.732	49.7314	99.463	49.732	0.0006	14	49.8171	49.8168	99.634	49.817	0.0003	15	49.72	49.7201	99.440	49.720	0.0001	16	49.8985	49.8988	99.797	49.899	0.0003	17	49.9798	49.98	99.960	49.980	0.0002	18	49.7106	49.711	99.422	49.711	0.0004	19	49.8055	49.8058	99.611	49.806	0.0003	20	49.7847	49.7852	99.570	49.785	0.0005	21	49.6655	49.6658	99.331	49.666	0.0003	22	49.9686	49.9703	99.939	49.969	0.0017	23	49.8215	49.8234	99.645	49.822	0.0019	24	49.9715	49.9733	99.945	49.972	0.0018	25	49.7945	49.7967	99.591	49.796	0.0022	计算和评估 (重复性EV、零件变差PV、总变差TV、有效分辨率NDC、测量系统变差GRR) EV = K1 × $\bar{R}$ = 0.00129 PV = K3 × Rp = 0.079612 NDC = 1.414 × (PV/EV) = 87 TV = SQRT(EV²+PV²) = 0.079623 1) 公差比: 仅适用双侧公差 %R&R = %EV = 100*[EV/(T/6)] = 0.77% 2) 总变差比: 适用双侧公差或单侧公差 %R&R = %EV = 100*EV/TV = 1.62%	
序号	测量-1	测量-2	和Sum	均值Xbar	极差R																																																																																																																																																														
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18	49.7106	49.711	99.422	49.711	0.0004																																																																																																																																																														
19	49.8055	49.8058	99.611	49.806	0.0003																																																																																																																																																														
20	49.7847	49.7852	99.570	49.785	0.0005																																																																																																																																																														
21	49.6655	49.6658	99.331	49.666	0.0003																																																																																																																																																														
22	49.9686	49.9703	99.939	49.969	0.0017																																																																																																																																																														
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X	%R&R<10%: 测量系统状况良好			10%≤%R&R≤30% 测量系统可以接收, 但需改进		%R&R>30%: 测量系统必须改进																																																																																																																																																													
2) 总变差比:																																																																																																																																																																			
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警告! 型式研究 3 被认为是型式研究 2 的特殊情况, 仅用于没有操作影响的自动测量系统。																																																																																																																																																																			
分析日期	2023/9/20		分析人	Lydia Gao		确认人																																																																																																																																																													
备 注																																																																																																																																																																			

9. DIMENSIONAL RESULTS

METROLOGIC MEASUREMENT OF NICE

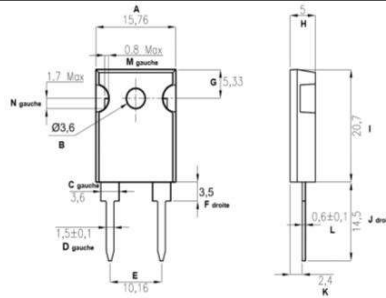
REPORT N° : PR 75738433

Date : 12/06/2023

TYPE OF TEST : Physical Dimension

Dimensions :

Performed: Metrology France



STANDARD : JESD22 Method JB-100

CONDITIONS : Verify physical dimensions

EQUIPMENT: Smartscope - Pied à coulisse - Comparateur

[illegible]

10. MATERIAL PERFORMANCE RESULTS



LABORATOIRES D'ESSAIS - NICE

RAPPORT N° : 2322101

Date : 31/08/2023

ORIGINAL EN BLEU A RETOURNER IMPERATIVEMENT AU LABORATOIRE D'ESSAI

Origine du rapport



Laboratoire



Division

OBJECTIF DE L'ESSAI :

Shatian factory Qualification for LTO100 production

SPECIFICATION DE REFERENCE :

DATA SHEET

TYPE D'ESSAIS :



SURVEILLANCE QUALITE / PROCESS



QUALIFICATION PRODUIT / PROCESS



DEVELOPPEMENT



SUITE A RETOUR OU COMMANDE CLIENT

PRODUITS TESTES :

LTO100 1 Ohm 5% DC 202320CN

LTO100 50 Ohms 1% DC 202320CN

LTO100 18 KOhms 5% DC 202320CN

RESULTATS :

Good Results

See Folio 2

RECOMMANDATIONS :

CONCLUSIONS :

Shatian factory Qualification for LTO100 production : OK

Fonctions	Noms	Date	Visa	Commentaires
Rédacteur	D.ORLANDO			
Vérificateur	C.MANASSERO			
Approbateur	B.MOLINS			



QUALITY TEST LABORATORY - NICE

REPORT N° : 23 22 101

DISTRIBUTION OF THE PARTS BY GROUP OF TESTS AND RESULTS

TEST DESIGNATION	SPEC.	SANCTION	SAMPLE	Size sample	Test Conditions	Défaults	Drift min	Drift mean
HIGH TEMPERATURE EXPOSURE	MIL-STD-202 Method 108	0.25% +/- 0u005	LTO100 1u 5% Lot : 1	77	175°C / 1000h	0	-0.0297	0.0291
HIGH TEMPERATURE EXPOSURE	MIL-STD-202 Method 108	0.25% +/- 0u005	LTO100 50u 1% Lot : 2	77	175°C / 1000h	0	-0.0563	-0.0334
HIGH TEMPERATURE EXPOSURE	MIL-STD-202 Method 108	0.25% +/- 0u005	LTO100 18k 5% Lot : 3	77	175°C / 1000h	0	-0.0910	-0.0327
TEMPERATURE CYCLING	JESD22 Method JA-104	0.5% +/- 0u005	LTO100 1u 5% Lot : 1	77	-55°C/+125°C 1000 cycles	0	0.1579	0.5248
TEMPERATURE CYCLING	JESD22 Method JA-104	0.5% +/- 0u005	LTO100 50u 1% Lot : 2	77	-55°C/+125°C 1000 cycles	0	0.0441	0.0739
TEMPERATURE CYCLING	JESD22 Method JA-104	0.5% +/- 0u005	LTO100 18k 5% Lot : 3	77	-55°C/+125°C 1000 cycles	0	0.0810	0.1326
BIASED HUMIDITY	MIL-STD-202 Method 103	1% +/- 0u005	LTO100 1u 5% Lot : 1	77	85°C / 85%HR 1000h	0	-0.0510	-0.0276
BIASED HUMIDITY	MIL-STD-202 Method 103	1% +/- 0u005	LTO100 50u 1% Lot : 2	77	85°C / 85%HR 1000h	0	-0.0595	-0.023
BIASED HUMIDITY	MIL-STD-202 Method 103	1% +/- 0u005	LTO100 18k 5% Lot : 3	77	85°C / 85%HR 1000h	0	-0.0276	0.0056
OPERATIONAL LIFE	MIL-STD-202 Method 108	0.5% +/- 0u005	LTO100 1u 5% Lot : 1	77	1w12 / 125°C 1000h	0	-0.0099	0.0893
OPERATIONAL LIFE	MIL-STD-202 Method 108	0.5% +/- 0u005	LTO100 50u 1% Lot : 2	77	1w12 / 125°C 1000h	0	0.0020	0.0210
OPERATIONAL LIFE	MIL-STD-202 Method 108	0.5% +/- 0u005	LTO100 18k 5% Lot : 3	77	1w12 / 125°C 1000h	0	-0.0654	-0.0256
PHYSICAL DIMENSION	JESD22 Method JB-100		LTO100 1u 5% Lot : 1	30	See attached file			
TERMINAL STRENGTH	AEC-Q200	0.25% +/- 0u01	LTO100 1u 5% Lot : 1	10	2.27 Kg / 60 s	0	-0.0204	-0.0001
TERMINAL STRENGTH	AEC-Q200	0.25% +/- 0u01	LTO100 50u 1% Lot : 2	10	2.27 Kg / 60 s	0	-0.016	-0.0072
TERMINAL STRENGTH	AEC-Q200	0.25% +/- 0u01	LTO100 18k 5% Lot : 3	10	2.27 Kg / 60 s	0	-0.0431	-0.0294

RESISTANCE TO SOLVENT	MIL-STD-202 Method 215		LTO100 50u 1% Lot : 2	6	In alcohol pure for 3 mn and brush 10 strokes over=> 3 times	0		
MECHANICAL SHOCK	MIL-STD-202 Method 213	0.2% +/- 0u005	LTO100 1u 5% Lot : 1	30	3 axes. 6 shock / axes 100g	0	-0.0202	0.0221
MECHANICAL SHOCK	MIL-STD-202 Method 213	0.2% +/- 0u005	LTO100 50u 1% Lot : 2	30	3 axes. 6 shock / axes 100g	0	-0.0320	-0.0077
MECHANICAL SHOCK	MIL-STD-202 Method 213	0.2% +/- 0u005	LTO100 18k 5% Lot : 3	30	3 axes. 6 shock / axes 100g	0	-0.0123	0.0098
VIBRATION	MIL-STD-202 Method 204	0.2% +/- 0u005	LTO100 1u 5% Lot : 1	30	10 / 2000Hz 5g 3 axes / 4H	0	0	0.0224
VIBRATION	MIL-STD-202 Method 204	0.2% +/- 0u005	LTO100 50u 1% Lot : 2	30	10 / 2000Hz 5g 3 axes / 4H	0	-0.0161	-0.0041
VIBRATION	MIL-STD-202 Method 204	0.2% +/- 0u005	LTO100 18k 5% Lot : 3	30	10 / 2000Hz 5g 3 axes / 4H	0	0.0112	0.0308
RESISTANCE TO SOLDERIND HEAT	MIL-STD-202 Method 210	0.2% +/- 0u005	LTO100 50u 1% Lot : 2	30	260°C / 10 s Sn / Ag	0	0.0100	0.0317
TEMPERATURE COEFFICIENT	AEC-Q200	350 PPM/°C	LTO100 1u 5% Lot : 1	30	-55°C / +155°C	0	0	
TEMPERATURE COEFFICIENT	AEC-Q200	200 PPM/°C	LTO100 50u 1% Lot : 2	30	-55°C / +155°C	0	108.6	
TEMPERATURE COEFFICIENT	AEC-Q200	200 PPM/°C	LTO100 18k 5% Lot : 3	30	-55°C / +155°C		98.8	

	QUALITY TEST LABORATORY - NICE						
REPORT N° :		23 22 101		Date :		22/08/2023	
TYPE OF TEST :		High temperature exposure		MIN :		-0.75 %	
				MAX :		0.75 %	
				R (Ω) =		1	
Norme : MIL-STD-202 Method 108		DR/R = +/-		0.25 %		DR/R = +/-	
				0.005		Ω	
CONDITIONS :		T° (°C) =		175			
		Equipment : HP34420 2 calibrated on 31/08/2022					
SAMPLES TEST DESIGNATION :				LTO100 1u 5% Lot : 1			
				PR : 75738727 BN : 202320CN			
				Qualification usine SHATIAN			

Measurement of cumulated drift (%)						
N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	500H	1000H
1	1	-0.3400	0.9966	0.0100	0.0000	0.0401
2	1	-0.0500	0.9995	-0.0100	-0.0100	0.0100
3	1	-0.3100	0.9969	0.0100	0.0301	0.0702
4	1	0.8600	1.0086	-0.0297	-0.0198	0.0198
5	1	-0.6300	0.9937	0.0101	0.0201	0.0403
6	1	-0.0400	0.9996	-0.0300	-0.0300	0.0100
7	1	-2.1200	0.9788	-0.0102	0.0000	0.0409
8	1	-0.2600	0.9974	-0.0100	0.0000	0.0401
9	1	-0.3800	0.9962	-0.0201	0.0000	0.0402
10	1	0.9100	1.0091	0.0000	0.0000	0.0297
11	1	-0.5000	0.9950	-0.0101	0.0000	0.0201
12	1	-0.7200	0.9928	-0.0101	0.0000	0.0504
13	1	0.2600	1.0026	-0.0100	-0.0100	0.0399
14	1	-0.6000	0.9940	-0.0101	-0.0101	0.0302
15	1	-0.8500	0.9915	0.0000	-0.0101	0.0202
16	1	-0.4600	0.9954	-0.0201	-0.0201	0.0201
17	1	-0.2600	0.9974	-0.0201	0.0100	0.0401
18	1	-0.4200	0.9958	-0.0201	0.0100	0.0402
19	1	-0.4200	0.9958	0.0100	0.0100	0.0502
20	1	0.9500	1.0095	-0.0198	-0.0198	0.0198
21	1	0.8300	1.0083	0.0099	0.0198	0.0595
22	1	-0.8800	0.9912	-0.0202	-0.0101	0.0101
23	1	0.8900	1.0089	-0.0496	-0.0396	-0.0297
24	1	-1.8300	0.9817	0.0102	0.0102	0.0815
25	1	-0.7600	0.9924	-0.0202	-0.0302	-0.0202
26	1	-0.0900	0.9991	-0.0500	-0.0500	-0.0100
27	1	-0.5500	0.9945	-0.0101	0.0000	0.0302
28	1	-1.8500	0.9815	-0.0102	-0.0204	0.0204
29	1	-0.4200	0.9958	0.0100	0.0000	0.0703
30	1	-0.2800	0.9972	-0.0100	0.0000	0.0401
31	1	0.8300	1.0083	-0.0099	-0.0198	0.0397
32	1	-0.3400	0.9966	0.0000	0.0000	0.0502
33	1	-0.4600	0.9954	-0.0201	-0.0201	0.0100
34	1	-0.4700	0.9953	0.0000	0.0000	0.0402
35	1	1.0000	1.0100	-0.0198	-0.0099	0.0000
36	1	-2.0100	0.9799	-0.0102	0.0000	0.0510
37	1	-1.0900	0.9891	0.0506	0.0607	0.1213
38	1	1.1100	1.0111	-0.0099	-0.0099	0.0198
39	1	-0.4100	0.9959	-0.0301	-0.0100	0.0402
40	1	-0.4200	0.9958	-0.0201	-0.0100	0.0201

**QUALITY TEST LABORATORY - NICE**

REPORT N° :

23 22 101

Date :

22/08/2023

TYPE OF TEST :

**High temperature
exposure**

MIN :

-0.75

%

MAX :

0.75

%

R (Ω) =**1**

Norme : MIL-STD-202 Method 108

DR/R = +/-

0.25

%

DR/R = +/-

0.005 Ω **CONDITIONS :**

T° (°C) =

175**Equipment** : HP34420 2 calibrated on 31/08/2022

SAMPLES TEST DESIGNATION :

LTO100 1u 5% Lot : 1**PR : 75738727 BN : 202320CN****Qualification usine SHATIAN****Measurement of cumulated drift (%)**

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	500H	1000H
41	1	0.7700	1.0077	0.0099	0.0198	0.0496
42	1	-0.4400	0.9956	-0.0201	-0.0100	0.0100
43	1	0.0000	1.0000	-0.0400	-0.0500	-0.0200
44	1	-2.2100	0.9779	0.0000	-0.0205	0.0409
45	1	-2.2200	0.9778	-0.0102	-0.0205	0.0205
46	1	0.8700	1.0087	-0.0198	-0.0297	0.0297
47	1	1.0500	1.0105	-0.0297	-0.0198	0.0297
48	1	-1.9900	0.9801	-0.0306	-0.0306	0.0204
49	1	0.9900	1.0099	-0.0594	-0.0594	-0.0297
50	1	-0.6800	0.9932	0.0101	0.0201	0.0604
51	1	-0.4200	0.9958	-0.0502	-0.0502	0.0000
52	1	-0.6000	0.9940	-0.0101	-0.0201	0.0302
53	1	-0.7300	0.9927	-0.0403	-0.0403	0.0000
54	1	-0.5200	0.9948	0.0000	0.0000	0.0402
55	1	-0.4000	0.9960	-0.0402	-0.0502	-0.0100
56	1	-2.1400	0.9786	-0.0204	-0.0307	0.0102
57	1	-0.3800	0.9962	-0.0100	0.0000	0.0402
58	1	-0.5700	0.9943	0.0000	-0.0101	0.0302
59	1	0.7000	1.0070	0.0894	0.0894	0.1390
60	1	-0.3300	0.9967	-0.0401	-0.0301	-0.0100
61	1	-0.4100	0.9959	-0.0502	-0.0602	0.0502
62	1	-1.7500	0.9825	-0.0204	-0.0102	0.0305
63	1	0.6800	1.0068	-0.0199	-0.0298	0.0099
64	1	-2.0900	0.9791	-0.0511	-0.0613	-0.0204
65	1	-0.4100	0.9959	-0.0100	-0.0100	0.0201
66	1	-0.3400	0.9966	0.0100	0.0100	0.0401
67	1	-2.0800	0.9792	-0.0204	-0.0306	-0.0102
68	1	-0.2500	0.9975	-0.0201	-0.0301	0.0000
69	1	-0.0700	0.9993	-0.0200	-0.0200	0.0300
70	1	-0.8300	0.9917	-0.0101	-0.0202	0.0202
71	1	-0.0900	0.9991	-0.0100	-0.0200	0.0100
72	1	0.8200	1.0082	0.0694	0.0694	0.0992
73	1	-1.0600	0.9894	0.0101	-0.0101	0.0404
74	1	-0.5800	0.9942	-0.0101	-0.0101	0.0302
75	1	-0.3600	0.9964	-0.0201	-0.0201	0.0301
76	1	-0.8500	0.9915	0.0000	0.0101	0.0504
77	1	-0.3200	0.9968	-0.0301	-0.0301	0.0100

Mean	-0.0119	-0.0105	0.0291
Min	-0.0594	-0.0613	-0.0297
Max	0.0894	0.0894	0.1390

VISUAL INSPECTION AFTER TEST (if required) :**SATISFACTORY**

	QUALITY TEST LABORATORY - NICE						
REPORT N° :		23 22 101		Date :		10/07/2023	
TYPE OF TEST :		High temperature exposure		MIN :		-0.26 %	
				MAX :		0.26 %	
						R (Ω) = 50	
Norme : MIL-STD-202 Method 108		DR/R = +/-		0.25 %		DR/R = +/-	
				0.005 Ω			
CONDITIONS :		T° (°C) = 175					
Equipment : HP34420 2 calibrated on 31/08/2022							
SAMPLES TEST DESIGNATION :				LTO100 50u 1% Lot : 2			
				PR : 75738433 BN : 202320CN			
Qualification usine SHATIAN							

Measurement of cumulated drift (%)						
N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	500H	1000H
1	50	-0.1480	49.926	-0.0481	-0.0421	-0.0120
2	50	-0.1040	49.948	-0.0360	-0.0420	-0.0260
3	50	-0.4020	49.799	-0.0542	-0.0522	-0.0361
4	50	-0.3040	49.848	-0.0522	-0.0542	-0.0401
5	50	-0.3100	49.845	-0.0582	-0.0542	-0.0441
6	50	-0.2600	49.870	-0.0401	-0.0662	-0.0461
7	50	-0.1860	49.907	-0.0541	-0.0541	-0.0361
8	50	-0.3620	49.819	-0.0381	-0.0442	-0.0281
9	50	-0.5120	49.744	-0.0523	-0.0623	-0.0563
10	50	-0.0600	49.970	-0.0560	-0.0620	-0.0520
11	50	-0.2300	49.885	-0.0481	-0.0561	-0.0441
12	50	-0.1880	49.906	-0.0561	-0.0621	-0.0521
13	50	-0.0760	49.962	-0.0420	-0.0580	-0.0340
14	50	-0.2780	49.861	-0.0461	-0.0582	-0.0401
15	50	-0.3540	49.823	-0.0542	-0.0602	-0.0381
16	50	-0.6160	49.692	-0.0543	-0.0523	-0.0221
17	50	-0.1440	49.928	-0.0541	-0.0541	-0.0361
18	50	-0.3080	49.846	-0.0481	-0.0602	-0.0502
19	50	-0.0660	49.967	-0.0440	-0.0500	-0.0340
20	50	-0.2400	49.880	-0.0561	-0.0561	-0.0441
21	50	-0.0720	49.964	-0.0400	-0.0460	-0.0280
22	50	-0.3340	49.833	-0.0542	-0.0241	-0.0060
23	50	-0.4560	49.772	-0.0502	-0.0522	-0.0261
24	50	-0.2900	49.855	-0.0542	-0.0642	-0.0501
25	50	-0.2200	49.890	-0.0641	-0.0621	-0.0481
26	50	-0.0600	49.970	-0.0580	-0.0460	-0.0220
27	50	-0.1880	49.906	-0.0321	-0.0521	-0.0421
28	50	-0.3140	49.843	-0.0361	-0.0502	-0.0201
29	50	-0.2580	49.871	-0.0441	-0.0622	-0.0461
30	50	-0.4220	49.789	-0.0442	-0.0542	-0.0422
31	50	-0.2800	49.860	-0.0341	-0.0542	-0.0341
32	50	-0.3540	49.823	-0.0522	-0.0642	-0.0421
33	50	-0.1760	49.912	-0.0321	-0.0421	-0.0220
34	50	-0.1860	49.907	-0.0361	-0.0381	-0.0301
35	50	-0.3500	49.825	-0.0622	-0.0602	-0.0462
36	50	-0.3860	49.807	-0.0402	-0.0663	-0.0522
37	50	-0.2420	49.879	-0.0261	-0.0301	-0.0241
38	50	-0.3640	49.818	-0.0422	-0.0522	-0.0341
39	50	-0.3600	49.820	-0.0542	-0.0522	-0.0401
40	50	-0.3400	49.830	-0.0442	-0.0462	-0.0281

	QUALITY TEST LABORATORY - NICE					
	REPORT N° :		23 22 101		Date : 10/07/2023	
TYPE OF TEST : High temperature exposure MIN : -0.26 % MAX : 0.26 % R (Ω) = 50						
Norme : MIL-STD-202 Method 108 DR/R = +/- 0.25 % DR/R = +/- 0.005 Ω						
CONDITIONS : T° (°C) = 175						
<u>Equipment</u> : HP34420 2 calibrated on 31/08/2022						
SAMPLES TEST DESIGNATION : LTO100 50u 1% Lot : 2 PR : 75738433 BN : 202320CN Qualification usine SHATIAN						

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	500H	1000H
41	50	-0.3740	49.813	-0.0542	-0.0482	-0.0381
42	50	-0.4100	49.795	-0.0382	-0.0442	-0.0281
43	50	-0.0480	49.976	-0.0420	-0.0280	-0.0040
44	50	-0.3160	49.842	-0.0441	-0.0502	-0.0381
45	50	-0.3440	49.828	-0.0502	-0.0562	-0.0401
46	50	-0.0620	49.969	-0.0280	-0.0300	-0.0100
47	50	-0.0700	49.965	-0.0460	-0.0420	-0.0180
48	50	-0.3160	49.842	-0.0562	-0.0522	-0.0461
49	50	-0.1820	49.909	-0.0421	-0.0541	-0.0441
50	50	-0.3140	49.843	-0.0482	-0.0582	-0.0421
51	50	-0.3480	49.826	-0.0161	-0.0381	-0.0181
52	50	-0.3420	49.829	-0.0261	-0.0482	-0.0401
53	50	-0.3660	49.817	-0.0401	-0.0462	-0.0341
54	50	-0.4140	49.793	-0.0442	-0.0502	-0.0361
55	50	-0.1180	49.941	-0.0280	-0.0360	-0.0300
56	50	-0.4860	49.757	-0.0301	-0.0362	-0.0201
57	50	-0.3280	49.836	-0.0482	-0.0441	-0.0381
58	50	-0.4020	49.799	-0.0462	-0.0502	-0.0321
59	50	-0.3740	49.813	-0.0422	-0.0482	-0.0422
60	50	-0.2860	49.857	-0.0321	-0.0501	-0.0401
61	50	-0.2260	49.887	-0.0421	-0.0220	-0.0140
62	50	-0.2820	49.859	-0.0301	-0.0521	-0.0321
63	50	-0.1740	49.913	-0.0120	-0.0421	-0.0280
64	50	-0.3020	49.849	-0.0441	-0.0502	-0.0361
65	50	-0.0740	49.963	-0.0420	-0.0420	-0.0240
66	50	-0.5900	49.705	-0.0463	-0.0422	-0.0322
67	50	-0.2840	49.858	-0.0521	-0.0120	0.0000
68	50	-0.1940	49.903	-0.0481	-0.0361	-0.0301
69	50	-0.2720	49.864	-0.0481	-0.0501	-0.0361
70	50	-0.6500	49.675	-0.0443	-0.0503	-0.0382
71	50	-0.4000	49.800	-0.0321	-0.0361	-0.0221
72	50	-0.2380	49.881	-0.0421	-0.0501	-0.0381
73	50	-0.2440	49.878	-0.0341	-0.0221	-0.0100
74	50	-0.3040	49.848	-0.0481	-0.0542	-0.0381
75	50	-0.1660	49.917	-0.0300	-0.0361	-0.0220
76	50	-0.2640	49.868	-0.0461	-0.0541	-0.0421
77	50	-0.5980	49.701	-0.0523	-0.0483	-0.0362

Mean	-0.0440	-0.0485	-0.0334
Min	-0.0641	-0.0663	-0.0563
Max	-0.0120	-0.0120	0.0000

VISUAL INSPECTION AFTER TEST (if required) :

SATISFACTORY

	QUALITY TEST LABORATORY - NICE						
REPORT N° :		23 22 101		Date :		22/08/2023	
TYPE OF TEST :		High temperature exposure		MIN :		-0.25 %	
				MAX :		0.25 %	
				R (Ω) =		18000	
Norme : MIL-STD-202 Method 108		DR/R = +/-		0.25 %		DR/R = +/-	
				0.005		Ω	
CONDITIONS :		T° (°C) = 175					
Equipment : HP34420 2 calibrated on 31/08/2022							
SAMPLES TEST DESIGNATION :				LTO100 18k 5% Lot : 3			
				PR : 75738726 BN : 202320CN			
Qualification usine SHATIAN							

Measurement of cumulated drift (%)						
N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	500H	1000H
1	18000	1.7178	18309.2	-0.0759	-0.0885	-0.0038
2	18000	0.2467	18044.4	-0.1164	-0.0831	-0.0709
3	18000	1.1383	18204.9	-0.0862	-0.0934	-0.0764
4	18000	-0.4328	17922.1	-0.0826	-0.0865	-0.0285
5	18000	0.0311	18005.6	-0.1094	-0.0983	-0.0811
6	18000	-1.1606	17791.1	-0.1023	-0.0882	-0.0354
7	18000	-0.4322	17922.2	-0.1166	-0.0898	-0.0301
8	18000	1.7239	18310.3	-0.0770	-0.0595	-0.0235
9	18000	-0.6811	17877.4	-0.1119	-0.0705	-0.0196
10	18000	0.9417	18169.5	-0.1145	-0.0853	-0.0699
11	18000	-1.5806	17715.5	-0.1073	-0.1022	-0.0395
12	18000	-0.5639	17898.5	-0.1190	-0.0805	-0.0006
13	18000	-0.1000	17982.0	-0.1118	-0.0873	-0.0551
14	18000	1.7983	18323.7	-0.1162	-0.0797	-0.0404
15	18000	0.9122	18164.2	-0.1101	-0.0897	-0.0105
16	18000	0.0550	18009.9	-0.1077	-0.0794	-0.0677
17	18000	-0.5344	17903.8	-0.1285	-0.0084	-0.0279
18	18000	-1.6756	17698.4	-0.1266	-0.1220	-0.0910
19	18000	1.6694	18300.5	-0.1235	-0.0951	-0.0443
20	18000	-0.5111	17908.0	-0.1094	-0.1011	-0.0637
21	18000	-1.2511	17774.8	-0.1210	-0.0411	-0.0349
22	18000	-0.4117	17925.9	-0.0999	-0.0842	-0.0134
23	18000	-0.6194	17888.5	-0.1029	-0.0783	-0.0307
24	18000	-0.4978	17910.4	-0.1139	-0.0826	-0.0676
25	18000	-0.2678	17951.8	-0.1159	-0.0189	0.0033
26	18000	-0.4222	17924.0	-0.1038	-0.0837	-0.0636
27	18000	0.2544	18045.8	-0.1208	-0.1175	-0.0637
28	18000	-0.4444	17920.0	-0.1066	-0.0809	-0.0631
29	18000	-0.1689	17969.6	-0.1286	-0.1119	-0.0812
30	18000	-0.4006	17927.9	-0.1166	-0.0892	-0.0480
31	18000	-0.3522	17936.6	-0.1154	-0.0117	0.0056
32	18000	-0.5411	17902.6	-0.1134	-0.1078	-0.0034
33	18000	-0.4817	17913.3	-0.1167	-0.0536	-0.0195
34	18000	-0.5494	17901.1	-0.1168	-0.0514	-0.0201
35	18000	-0.5917	17893.5	-0.1179	-0.1012	-0.0101
36	18000	-0.2439	17956.1	-0.1220	-0.1186	-0.0724
37	18000	0.1717	18030.9	-0.1098	-0.0893	-0.0516
38	18000	-0.8117	17853.9	-0.1271	-0.0252	-0.0241
39	18000	-1.8028	17675.5	-0.1143	-0.0685	-0.0747
40	18000	-0.2933	17947.2	-0.1254	-0.1137	-0.0568

		QUALITY TEST LABORATORY - NICE					
		REPORT N° :		23 22 101		Date : 22/08/2023	
TYPE OF TEST :		High temperature exposure		MIN :	-0.25 %	MAX :	0.25 %
						R (Ω) =	18000
Norme : MIL-STD-202 Method 108		DR/R = +/-		0.25 %	DR/R = +/-		0.005 Ω
CONDITIONS :		T° (°C) =		175			
<u>Equipment</u> : HP34420 2 calibrated on 31/08/2022							
SAMPLES TEST DESIGNATION :				LTO100 18k 5% Lot : 3			
				PR : 75738726 BN : 202320CN			
Qualification usine SHATIAN							

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	500H	1000H
41	18000	-0.7750	17860.5	-0.0963	-0.0784	-0.0202
42	18000	-0.8561	17845.9	-0.1087	-0.0981	-0.0773
43	18000	-0.1739	17968.7	-0.1007	-0.0740	-0.0579
44	18000	-1.5956	17712.8	-0.1033	-0.0621	-0.0412
45	18000	-0.4561	17917.9	-0.0999	-0.0910	-0.0313
46	18000	-0.4978	17910.4	-0.1195	-0.1011	-0.0123
47	18000	1.0094	18181.7	-0.1260	-0.0776	-0.0319
48	18000	-0.3861	17930.5	-0.0831	-0.0084	0.0067
49	18000	-0.1372	17975.3	-0.1124	-0.0801	-0.0095
50	18000	-0.8200	17852.4	-0.1008	-0.0650	-0.0532
51	18000	-0.3822	17931.2	-0.1166	-0.0809	-0.0212
52	18000	-1.9878	17642.2	-0.1253	-0.0125	-0.0057
53	18000	-0.5967	17892.6	-0.1174	-0.0788	-0.0156
54	18000	0.9961	18179.3	-0.1062	0.0088	0.0050
55	18000	1.6250	18292.5	-0.1257	-0.0197	-0.0022
56	18000	0.8767	18157.8	-0.1201	-0.0154	0.0022
57	18000	0.0328	18005.9	-0.1089	-0.0072	-0.0150
58	18000	1.6733	18301.2	-0.0858	-0.0454	-0.0044
59	18000	-0.4622	17916.8	-0.1122	-0.1027	-0.0380
60	18000	1.4072	18253.3	-0.0997	-0.0203	-0.0279
61	18000	-0.4106	17926.1	-0.1032	-0.0134	-0.0117
62	18000	-0.5239	17905.7	-0.0989	-0.0715	0.0006
63	18000	0.2878	18051.8	-0.1163	-0.0836	-0.0637
64	18000	-0.3711	17933.2	-0.1171	-0.0078	-0.0078
65	18000	-0.6956	17874.8	-0.1186	-0.0755	-0.0436
66	18000	1.1700	18210.6	-0.1115	-0.0879	-0.0653
67	18000	-0.3156	17943.2	-0.1165	-0.0908	-0.0507
68	18000	1.2850	18231.3	-0.1207	-0.0664	-0.0060
69	18000	-0.7217	17870.1	-0.1114	-0.0806	-0.0414
70	18000	-0.3222	17942.0	-0.1159	-0.0663	-0.0217
71	18000	1.0789	18194.2	-0.1160	-0.0440	-0.0605
72	18000	-0.6583	17881.5	-0.1169	-0.0062	0.0006
73	18000	1.0422	18187.6	-0.1177	-0.0627	-0.0165
74	18000	-0.0183	17996.7	-0.1234	-0.0772	-0.0233
75	18000	0.1956	18035.2	-0.1170	-0.0139	-0.0133
76	18000	1.0844	18195.2	-0.1105	0.0203	0.0291
77	18000	0.9678	18174.2	-0.1089	-0.0798	-0.0055

Mean	-0.1113	-0.0680	-0.0327
Min	-0.1286	-0.1220	-0.0910
Max	-0.0759	0.0203	0.0291

VISUAL INSPECTION AFTER TEST (if required) :

SATISFACTORY

	QUALITY TEST LABORATORY - NICE					
	REPORT N° :		23 22 101		Date : 24/07/2023	
TYPE OF TEST :		Temperature cycling		MINI : -1.0000 %	MAXI : 1.0000 %	
		R (Ω) =		1		
NORME :	JESD22 Method JA-104	DR/R = +/-	0.5 %	DR/R = +/-	0.005	Ω
CONDITIONS : Tmin (°C) = -55 Tmax (°C) = 125 Nb cycles = 1000 Cycle duration (mn) = 15/15 Equipment : HP34420 2 calibrated on 31/08/2022						
SAMPLES TEST DESIGNATION :				LTO100 1u 5% Lot : 1 PR : 75738727 BN : 202320CN Qualification usine SHATIAN		

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250 cycles	500 cycles	1000 cycles
1	1	-0.3400	0.9966	0.1906	0.3713	0.4616
2	1	-2.1400	0.9786	0.1839	0.3883	0.6131
3	1	-0.3000	0.9970	0.1906	0.4012	0.5015
4	1	-2.1100	0.9789	0.1941	0.4393	0.5823
5	1	-1.8100	0.9819	0.1018	0.2648	0.4481
6	1	-0.7500	0.9925	0.1209	0.2418	0.3627
7	1	-0.8100	0.9919	0.1411	0.4033	0.6654
8	1	-1.8300	0.9817	0.1630	0.3056	0.4278
9	1	1.5700	1.0157	0.1083	0.3052	0.4234
10	1	-1.9800	0.9802	0.1020	0.2755	0.3775
11	1	0.9200	1.0092	0.1090	0.2279	0.3765
12	1	-0.5000	0.9950	0.1608	0.3317	0.5025
13	1	-0.1300	0.9987	0.1402	0.3204	0.4306
14	1	0.9200	1.0092	0.0793	0.1883	0.2874
15	1	-0.3200	0.9968	0.1505	0.3411	0.4615
16	1	0.9100	1.0091	0.1387	0.3072	0.4261
17	1	0.9400	1.0094	0.2080	0.3963	0.5845
18	1	-1.9400	0.9806	0.2040	0.4283	0.5609
19	1	-0.2600	0.9974	0.2105	0.5314	0.8021
20	1	-0.6100	0.9939	0.1509	0.4025	0.6238
21	1	2.1700	1.0217	0.1175	0.3034	0.4796
22	1	-1.9900	0.9801	0.1632	0.4285	0.7244
23	1	-1.8900	0.9811	0.1325	0.2956	0.4892
24	1	-0.5400	0.9946	0.1709	0.3217	0.5530
25	1	-0.3600	0.9964	0.1807	0.3011	0.4316
26	1	-2.1600	0.9784	0.1533	0.3884	0.5928
27	1	-2.2100	0.9779	0.1534	0.2863	0.4908
28	1	-0.5400	0.9946	0.2011	0.4927	0.8245
29	1	0.9800	1.0098	0.0495	0.2773	0.4555
30	1	-1.9400	0.9806	0.0408	0.2142	0.4181
31	1	-0.2100	0.9979	0.1002	0.3207	0.5111
32	1	-0.2600	0.9974	0.0602	0.2206	0.3309
33	1	-1.8500	0.9815	0.2038	0.4279	0.6011
34	1	-1.9200	0.9808	0.1020	0.2753	0.4180
35	1	-0.5800	0.9942	0.1609	0.3420	0.6136
36	1	-1.9500	0.9805	0.1326	0.3264	0.5099
37	1	-2.0000	0.9800	0.3163	0.5000	0.6327
38	1	1.5200	1.0152	0.0493	0.4236	0.6304
39	1	1.3400	1.0134	0.1776	0.3848	0.1579
40	1	-0.5700	0.9943	0.2313	0.4124	0.6638

		QUALITY TEST LABORATORY - NICE					
		REPORT N° :		23 22 101		Date : 24/07/2023	
TYPE OF TEST :		Temperature cycling		MINI : -1.0000 % R (Ω) = 1		MAXI : 1.0000 %	
NORME :		JESD22 Method JA-104		DR/R = +/- 0.5 % DR/R = +/- 0.005 Ω			
CONDITIONS :		Tmin (°C) = -55 Tmax (°C) = 125 Nb cycles = 1000 Cycle duration (mn) = 15/15					
		Equipment : HP34420 2 calibrated on 31/08/2022					
SAMPLES TEST DESIGNATION :				LTO100 1u 5% Lot : 1 PR : 75738727 BN : 202320CN Qualification usine SHATIAN			

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250 cycles	500 cycles	1000 cycles
41	1	-0.2500	0.9975	0.1203	0.4311	0.6917
42	1	-0.6600	0.9934	0.1208	0.2919	0.4228
43	1	1.7300	1.0173	0.0786	0.1573	0.4522
44	1	-0.5300	0.9947	0.0905	0.2312	0.5228
45	1	-1.9500	0.9805	0.1530	0.3570	0.4589
46	1	-0.3700	0.9963	0.1104	0.2509	0.3714
47	1	-0.9800	0.9902	0.1313	0.3434	0.5150
48	1	-0.2900	0.9971	0.1906	0.4012	0.6218
49	1	-0.3800	0.9962	0.0903	0.3413	0.6424
50	1	-1.7100	0.9829	0.1119	0.2645	0.4070
51	1	-1.7800	0.9822	0.1425	0.3462	0.5192
52	1	-0.8100	0.9919	0.1311	0.3125	0.4940
53	1	-0.7100	0.9929	0.1209	0.2719	0.4230
54	1	-0.5600	0.9944	0.1408	0.3520	0.5430
55	1	-0.2400	0.9976	0.1905	0.4511	0.6215
56	1	-2.0600	0.9794	0.1634	0.3880	0.6228
57	1	-0.8200	0.9918	0.1311	0.3428	0.5243
58	1	-0.2200	0.9978	0.1403	0.3307	0.4811
59	1	-0.8400	0.9916	0.2017	0.3832	0.5547
60	1	-2.2200	0.9778	0.1227	0.2454	0.3784
61	1	-0.6100	0.9939	0.0906	0.2415	0.5534
62	1	-0.4000	0.9960	0.1305	0.3815	0.5221
63	1	-0.2000	0.9980	0.1202	0.3908	0.6713
64	1	0.8100	1.0081	0.2381	0.4265	0.6051
65	1	-0.0500	0.9995	0.1901	0.3902	0.6103
66	1	-0.5400	0.9946	0.1508	0.3418	0.5027
67	1	0.7900	1.0079	0.1984	0.4266	0.4862
68	1	-0.4500	0.9955	0.1808	0.3616	0.5324
69	1	-0.4000	0.9960	0.1406	0.3414	0.4518
70	1	-1.9400	0.9806	0.1938	0.3365	0.5711
71	1	-0.5100	0.9949	0.1307	0.2814	0.4624
72	1	-0.1000	0.9990	0.2402	0.5105	0.6607
73	1	-0.0800	0.9992	0.1902	0.4103	0.5104
74	1	-0.3100	0.9969	0.2006	0.4614	0.6320
75	1	-0.2600	0.9974	0.2507	0.5113	0.6617
76	1	1.0100	1.0101	0.1683	0.3960	0.5742
77	1	-0.8400	0.9916	0.1008	0.3731	0.6858

Mean	0.1499	0.3492	0.5248
Min	0.0408	0.1573	0.1579
Max	0.3163	0.5314	0.8245

VISUAL INSPECTION AFTER TEST (if required) :

SATISFACTORY

COMMENTS (if necessary) :

REPORT N° :

23 22 101

Date :

27/06/2023

TYPE OF TEST :

Temperature
cycling

MINI :

-0.5100

%

MAXI :

0.5100

%

R (Ω) =

50

NORME :

JESD22 Method JA-104

DR/R = +/-

0.5

%

DR/R = +/-

0.005

Ω

CONDITIONS :

Tmin (°C) = -55

Tmax (°C) = 125

Nb cycles = 1000

Cycle duration (mn) = 15/15

Equipment : HP34420 2 calibrated on 31/08/2022

SAMPLES TEST DESIGNATION :

LTO100 50u 1% Lot : 2

PR : 75738433 BN : 202320CN

Qualification usine SHATIAN

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250 cycles	500 cycles	1000 cycles
1	50	-0.3558	49.822	0.0680	0.1102	0.0761
2	50	-0.2628	49.869	0.0569	0.0750	0.0590
3	50	-0.3854	49.807	0.0636	0.0938	0.0677
4	50	-0.3096	49.845	0.0698	0.1099	0.0758
5	50	0.0210	50.011	0.0550	0.0810	0.0630
6	50	-0.3734	49.813	0.0576	0.0656	0.0636
7	50	-0.3580	49.821	0.0602	0.0883	0.0743
8	50	-0.3980	49.801	0.0602	0.0863	0.0462
9	50	-0.4600	49.770	0.0623	0.1005	0.0603
10	50	-0.3720	49.814	0.0482	0.0582	0.0622
11	50	-0.5980	49.701	0.0825	0.1167	0.0724
12	50	-0.2640	49.868	0.0822	0.0822	0.0682
13	50	-0.2200	49.890	0.0762	0.0942	0.0581
14	50	-0.4020	49.799	0.0482	0.0582	0.0562
15	50	-0.2680	49.866	0.0682	0.0943	0.0682
16	50	-0.3940	49.803	0.0562	0.0964	0.0663
17	50	-0.3980	49.801	0.0763	0.0863	0.0643
18	50	-0.3360	49.832	0.0742	0.0963	0.0763
19	50	-0.6380	49.681	0.0725	0.1087	0.0785
20	50	-0.3080	49.846	0.0722	0.0903	0.0883
21	50	-0.6060	49.697	0.0684	0.0986	0.0865
22	50	-0.4060	49.797	0.1526	0.1928	0.1526
23	50	-0.1840	49.908	0.0902	0.1082	0.0862
24	50	-0.2840	49.858	0.0762	0.0842	0.0782
25	50	-0.2000	49.900	0.0621	0.0882	0.0581
26	50	-0.2580	49.871	0.0802	0.1003	0.0722
27	50	-0.4060	49.797	0.0683	0.1044	0.0743
28	50	-0.4760	49.762	0.0663	0.0804	0.0563
29	50	-0.2240	49.888	0.0762	0.1042	0.0722
30	50	-0.2620	49.869	0.0822	0.1023	0.0822
31	50	-0.2340	49.883	0.0441	0.0541	0.0441
32	50	-0.2520	49.874	0.0982	0.1003	0.0802
33	50	-0.4800	49.760	0.0583	0.0663	0.0523
34	50	-0.2800	49.860	0.0722	0.1003	0.0602
35	50	0.0800	50.040	0.0659	0.1059	0.0919
36	50	-0.3460	49.827	0.0642	0.0702	0.0743
37	50	-0.3760	49.812	0.0683	0.0803	0.0763
38	50	-0.3160	49.842	0.0482	0.0622	0.0622
39	50	-0.0040	49.998	0.0580	0.0560	0.0540
40	50	-0.1200	49.940	0.0641	0.0721	0.0701

		QUALITY TEST LABORATORY - NICE					
		REPORT N° :		23 22 101		Date : 27/06/2023	
TYPE OF TEST :		Temperature cycling		MINI : -0.5100 %		MAXI : 0.5100 %	
		R (Ω) = 50					
NORME :		JESD22 Method JA-104		DR/R = +/- 0.5 %		DR/R = +/- 0.005 Ω	
CONDITIONS :		Tmin (°C) = -55 Tmax (°C) = 125 Nb cycles = 1000 Cycle duration (mn) = 15/15					
		Equipment : HP34420 2 calibrated on 31/08/2022					
SAMPLES TEST DESIGNATION :				LTO100 50u 1% Lot : 2 PR : 75738433 BN : 202320CN Qualification usine SHATIAN			

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250 cycles	500 cycles	1000 cycles
41	50	-0.4840	49.758	0.0703	0.0663	0.0703
42	50	-0.3200	49.840	0.0642	0.0622	0.0682
43	50	-0.1320	49.934	0.0761	0.0881	0.0881
44	50	-0.3600	49.820	0.0682	0.0602	0.0703
45	50	-0.2820	49.859	0.0682	0.0501	0.0782
46	50	-0.2700	49.865	0.0602	0.0622	0.0562
47	50	-0.2660	49.867	0.0461	0.0662	0.0622
48	50	-0.2560	49.872	0.0561	0.0581	0.0642
49	50	-0.3300	49.835	0.0843	0.0803	0.0923
50	50	-0.2760	49.862	0.0562	0.0622	0.0582
51	50	-0.3400	49.830	0.0662	0.0763	0.0662
52	50	-0.3620	49.819	0.0843	0.0642	0.0743
53	50	-0.1400	49.930	0.0641	0.0661	0.0761
54	50	-0.2220	49.889	0.0942	0.0842	0.0862
55	50	-0.6960	49.652	0.0624	0.0644	0.0443
56	50	-0.3620	49.819	0.0923	0.0943	0.1004
57	50	-0.1540	49.923	0.0921	0.0741	0.0881
58	50	-0.3480	49.826	0.0863	0.0763	0.0883
59	50	-0.3360	49.832	0.0803	0.0662	0.0722
60	50	-0.4320	49.784	0.0783	0.0743	0.0824
61	50	-0.4220	49.789	0.0663	0.0823	0.0803
62	50	-0.0040	49.998	0.0820	0.0800	0.1060
63	50	-0.2700	49.865	0.0862	0.0582	0.0702
64	50	-0.3520	49.824	0.0582	0.0642	0.1004
65	50	-0.3180	49.841	0.0562	0.0542	0.0662
66	50	-0.4320	49.784	0.0683	0.0542	0.0703
67	50	-0.3920	49.804	0.0562	0.0703	0.0763
68	50	-0.4080	49.796	0.0643	0.0703	0.0623
69	50	-0.3040	49.848	0.0481	0.0602	0.0542
70	50	-0.4320	49.784	0.0643	0.0703	0.0703
71	50	-0.2080	49.896	0.0862	0.0922	0.0922
72	50	-0.3260	49.837	0.0823	0.0903	0.0943
73	50	-0.3820	49.809	0.0823	0.0823	0.0883
74	50	-0.4420	49.779	0.0723	0.0783	0.0824
75	50	-0.4120	49.794	0.0562	0.0703	0.0763
76	50	-0.3140	49.843	0.0722	0.0762	0.0883
77	50	-0.3380	49.831	0.0702	0.0863	0.0943

Mean	0.0701	0.0813	0.0739
Min	0.0441	0.0501	0.0441
Max	0.1526	0.1928	0.1526

VISUAL INSPECTION AFTER TEST (if required) :

SATISFACTORY

COMMENTS (if necessary) :

	QUALITY TEST LABORATORY - NICE						
REPORT N° :		23 22 101		Date :		24/07/2023	
TYPE OF TEST :		Temperature cycling		MINI :		-0.5000 %	
				R (Ω) =		18000	
NORME :		JESD22 Method JA-104		DR/R = +/-		0.5 %	
				DR/R = +/-		0.005 Ω	
CONDITIONS :		Tmin (°C) = -55 Tmax (°C) = 125 Nb cycles = 1000 Cycle duration (mn) = 15/15					
Equipment : HP34420 2 calibrated on 31/08/2022							
SAMPLES TEST DESIGNATION :				LTO100 18k 5% Lot : 3 PR : 75738726 BN : 202320CN Qualification usine SHATIAN			

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250 cycles	500 cycles	1000 cycles
1	18000	-0.5028	17909.5	0.0430	0.0960	0.0810
2	18000	-0.3267	17941.2	0.0713	0.1332	0.1377
3	18000	-0.1661	17970.1	0.0774	0.1319	0.1163
4	18000	-0.5500	17901.0	0.0760	0.1240	0.1089
5	18000	-1.5861	17714.5	0.0672	0.1332	0.1287
6	18000	-0.3056	17945.0	0.0752	0.1215	0.1232
7	18000	1.2344	18222.2	0.1718	0.2535	0.2486
8	18000	1.1194	18201.5	0.0857	0.1456	0.1511
9	18000	-1.3806	17751.5	0.0637	0.1380	0.1222
10	18000	-0.8933	17839.2	0.0493	0.1138	0.1155
11	18000	1.0967	18197.4	0.0802	0.1478	0.1374
12	18000	-1.0267	17815.2	0.0909	0.1493	0.1375
13	18000	-0.5333	17904.0	0.0905	0.1569	0.1419
14	18000	-0.8778	17842.0	0.0807	0.1474	0.1429
15	18000	-0.8522	17846.6	0.0773	0.1238	0.1541
16	18000	1.6717	18300.9	0.0694	0.1164	0.1295
17	18000	-0.3794	17931.7	0.0887	0.1606	0.1444
18	18000	-0.6372	17885.3	0.0665	0.1202	0.1303
19	18000	0.1500	18027.0	0.0777	0.1137	0.1276
20	18000	-0.2883	17948.1	0.0552	0.1254	0.1131
21	18000	-0.1417	17974.5	0.0812	0.1230	0.1179
22	18000	-0.5767	17896.2	0.0838	0.1358	0.1319
23	18000	-0.5144	17907.4	0.1156	0.1497	0.1340
24	18000	-0.5656	17898.2	0.0721	0.1481	0.1492
25	18000	-0.2328	17958.1	0.0735	0.1342	0.1297
26	18000	-1.5483	17721.3	0.0920	0.1433	0.1394
27	18000	1.7456	18314.2	0.0797	0.1239	0.1136
28	18000	-0.4622	17916.8	0.0770	0.1440	0.1312
29	18000	-0.5033	17909.4	0.0614	0.1351	0.1200
30	18000	1.5083	18271.5	0.0925	0.1582	0.1439
31	18000	1.7911	18322.4	0.1146	0.1545	0.1550
32	18000	-0.7239	17869.7	0.0789	0.1477	0.1337
33	18000	-0.6306	17886.5	0.0615	0.1107	0.1029
34	18000	-0.8489	17847.2	0.0644	0.1020	0.1238
35	18000	-0.6789	17877.8	0.0811	0.1320	0.1298
36	18000	-0.4878	17912.2	0.0860	0.1357	0.1239
37	18000	1.2178	18219.2	0.1273	0.1663	0.1542
38	18000	1.6967	18305.4	0.1235	0.1639	0.1486
39	18000	1.1339	18204.1	0.0972	0.1736	0.1582
40	18000	-0.5033	17909.4	0.0860	0.1446	0.1217

		QUALITY TEST LABORATORY - NICE									
		REPORT N° :		23 22 101		Date :		24/07/2023			
TYPE OF TEST :		Temperature cycling		MINI :		-0.5000 %		MAXI :		0.5000 %	
				R (Ω) =		18000					
NORME :		JESD22 Method JA-104		DR/R = +/-		0.5 %		DR/R = +/-		0.005 Ω	
CONDITIONS :		Tmin (°C) =		-55							
		Tmax (°C) =		125							
		Nb cycles =		1000							
		Cycle duration (mn) =		15/15							
						Equipment :		HP34420 2		calibrated on 31/08/2022	
SAMPLES TEST DESIGNATION :				LTO100 18k 5% Lot : 3							
				PR : 75738726 BN : 202320CN							
				Qualification usine SHATIAN							

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250 cycles	500 cycles	1000 cycles
41	18000	-0.5094	17908.3	0.0704	0.1284	0.1150
42	18000	-0.8972	17838.5	0.0460	0.1020	0.0897
43	18000	0.1639	18029.5	0.0804	0.1342	0.1192
44	18000	1.0583	18190.5	0.0819	0.1363	0.1143
45	18000	-0.4372	17921.3	0.0988	0.1579	0.1255
46	18000	1.1550	18207.9	0.0681	0.1390	0.1197
47	18000	-0.6044	17891.2	0.0900	0.1587	0.1448
48	18000	-0.3022	17945.6	0.0802	0.1315	0.1170
49	18000	0.9144	18164.6	0.0826	0.1431	0.1250
50	18000	-0.4428	17920.3	0.0831	0.1546	0.1395
51	18000	1.6872	18303.7	0.1060	0.1579	0.1437
52	18000	1.5806	18284.5	0.0788	0.1296	0.1187
53	18000	-0.5056	17909.0	0.0681	0.1362	0.1268
54	18000	-0.5094	17908.3	0.0782	0.1279	0.1279
55	18000	-0.6672	17879.9	0.0755	0.1538	0.1298
56	18000	-0.4711	17915.2	0.0871	0.1608	0.1395
57	18000	-0.5133	17907.6	0.0854	0.1502	0.1390
58	18000	-0.2172	17960.9	0.0796	0.1448	0.1336
59	18000	1.3683	18246.3	0.1058	0.1573	0.1502
60	18000	0.0872	18015.7	0.0860	0.1554	0.1388
61	18000	-0.3561	17935.9	0.0892	0.1399	0.1422
62	18000	-0.6111	17890.0	0.0945	0.1532	0.1358
63	18000	-0.7700	17861.4	0.0817	0.1327	0.1081
64	18000	0.8522	18153.4	0.1124	0.1631	0.1564
65	18000	-0.5583	17899.5	0.1034	0.1676	0.1453
66	18000	0.9361	18168.5	0.0941	0.1365	0.1266
67	18000	1.5106	18271.9	0.0985	0.1417	0.1237
68	18000	-0.6239	17887.7	0.1286	0.1705	0.1677
69	18000	-0.0072	17998.7	0.0906	0.1383	0.1289
70	18000	1.6922	18304.6	0.0852	0.1333	0.1409
71	18000	-0.1239	17977.7	0.0996	0.1413	0.1196
72	18000	-0.3878	17930.2	0.1182	0.1612	0.1478
73	18000	-0.8661	17844.1	0.0717	0.1339	0.1250
74	18000	-0.5783	17895.9	0.1045	0.1503	0.1229
75	18000	-1.8728	17662.9	0.0815	0.1676	0.1529
76	18000	0.9417	18169.5	0.0936	0.1657	0.1514
77	18000	-0.3600	17935.2	0.0730	0.1182	0.1048

Mean	0.0852	0.1423	0.1326
Min	0.0430	0.0960	0.0810
Max	0.1718	0.2535	0.2486

VISUAL INSPECTION AFTER TEST (if required) :

SATISFACTORY

COMMENTS (if necessary) :

QUALITY TEST LABORATORY - NICE

REPORT N° : **23 22 101** **Date :** **22/08/2023**

TYPE OF TEST : **BIASED HUMIDITY** **MIN :** **-1.5000** **%** **MAX :** **1.5000** **%**
Pn/10 (W) = **0.35** **UL (V) =** **500** **R (Ω) =** **1**

NORME : **AEC-Q200** **DR/R = +/-** **1** **%** **DR/R = +/-** **0.005** **Ω**

CONDITIONS : **U (V) =** **0.59** **=>** **U (V) =** **0.59** **T (°C) =** **85**
P (W) = **0.35** **HR (%) =** **85**

Equipment : HP34420 2 calibrated on 31/08/2022

SAMPLES TEST DESIGNATION : **LTO100 1u 5% Lot : 1**
PR : 75738727 BN : 202320CN
Qualification usine SHATIAN

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	1000H
1	1	-0.4800	0.9952	0.0201	-0.0100
2	1	-0.7900	0.9921	-0.0302	-0.0302
3	1	-0.2500	0.9975	-0.0401	-0.0401
4	1	-0.4200	0.9958	-0.0100	-0.0100
5	1	-0.6000	0.9940	-0.0302	-0.0302
6	1	0.5800	1.0058	-0.0298	-0.0398
7	1	-1.9400	0.9806	-0.0204	-0.0102
8	1	-2.0600	0.9794	-0.0511	-0.0408
9	1	0.8400	1.0084	-0.0298	-0.0198
10	1	-2.1100	0.9789	-0.0306	-0.0306
11	1	-0.3200	0.9968	-0.0301	-0.0201
12	1	-0.3100	0.9969	0.0100	0.0100
13	1	-0.1200	0.9988	-0.0300	-0.0300
14	1	-0.4000	0.9960	-0.0402	-0.0301
15	1	-2.0700	0.9793	-0.0306	-0.0204
16	1	-1.8700	0.9813	-0.0306	-0.0306
17	1	-0.6600	0.9934	-0.0403	-0.0302
18	1	-1.8600	0.9814	-0.0408	-0.0306
19	1	-0.3800	0.9962	-0.0301	-0.0201
20	1	1.5700	1.0157	-0.0591	-0.0492
21	1	-0.4000	0.9960	-0.0602	-0.0502
22	1	-1.9400	0.9806	-0.0204	-0.0102
23	1	0.9700	1.0097	-0.0198	-0.0099
24	1	0.8600	1.0086	-0.0397	-0.0297
25	1	-0.7800	0.9922	-0.0302	-0.0202
26	1	-0.0800	0.9992	-0.0300	-0.0200
27	1	-0.3500	0.9965	-0.0201	-0.0201
28	1	0.9200	1.0092	-0.0396	-0.0396
29	1	0.9500	1.0095	-0.0297	-0.0297
30	1	-2.0800	0.9792	-0.0306	-0.0204
31	1	0.8800	1.0088	-0.0496	-0.0397
32	1	0.8000	1.0080	-0.0298	-0.0397
33	1	-0.6600	0.9934	-0.0201	-0.0201
34	1	-0.3200	0.9968	-0.0301	-0.0201
35	1	-0.8900	0.9911	-0.0404	-0.0303
36	1	-1.8800	0.9812	-0.0408	-0.0204
37	1	0.9200	1.0092	-0.0297	-0.0297
38	1	-0.1300	0.9987	-0.0300	-0.0300
39	1	0.1400	1.0014	-0.0100	-0.0100
40	1	-0.5900	0.9941	-0.0402	-0.0302

	QUALITY TEST LABORATORY - NICE						
REPORT N° :		23 22 101		Date :		22/08/2023	
TYPE OF TEST : BIASED HUMIDITY MIN : -1.5000 % MAX : 1.5000 % Pn/10 (W) = 0.35 UL (V) = 500 R (Ω) = 1							
NORME :		AEC-Q200		DR/R = +/-		1 % DR/R = +/- 0.005 Ω	
CONDITIONS : U (V) = 0.59 => U (V) = 0.59 T (°C) = 85 P (W) = 0.35 HR (%) = 85							
Equipment : HP34420 2 calibrated on 31/08/2022							
SAMPLES TEST DESIGNATION :				LTO100 1u 5% Lot : 1 PR : 75738727 BN : 202320CN <b style="color: red;">Qualification usine SHATIAN			

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	1000H
41	1	-2.1200	0.9788	-0.0306	-0.0306
42	1	0.8500	1.0085	-0.0496	-0.0297
43	1	-0.3800	0.9962	-0.0301	-0.0201
44	1	-0.4300	0.9957	-0.0402	-0.0301
45	1	-2.0000	0.9800	-0.0408	-0.0306
46	1	1.5200	1.0152	-0.0591	-0.0197
47	1	-0.4600	0.9954	-0.0703	-0.0502
48	1	0.7600	1.0076	-0.0496	-0.0496
49	1	0.1100	1.0011	-0.0599	-0.0300
50	1	-0.5500	0.9945	-0.0402	-0.0302
51	1	-0.0700	0.9993	-0.0400	-0.0300
52	1	0.9200	1.0092	-0.0297	-0.0396
53	1	-0.5000	0.9950	-0.0201	-0.0101
54	1	-0.4800	0.9952	-0.0502	-0.0402
55	1	-2.1600	0.9784	-0.0409	-0.0307
56	1	-0.3100	0.9969	-0.0301	-0.0201
57	1	-0.5500	0.9945	-0.0402	-0.0201
58	1	-0.1700	0.9983	-0.0200	-0.0100
59	1	-2.0500	0.9795	-0.0408	-0.0306
60	1	0.8500	1.0085	-0.0297	-0.0297
61	1	-0.4900	0.9951	-0.0502	-0.0402
62	1	-0.5900	0.9941	-0.0402	-0.0201
63	1	0.8400	1.0084	-0.0397	-0.0496
64	1	-0.2300	0.9977	-0.0702	-0.0501
65	1	-2.2400	0.9776	-0.0511	-0.0307
66	1	-0.7200	0.9928	-0.0504	-0.0403
67	1	-1.9500	0.9805	-0.0408	-0.0306
68	1	-0.4400	0.9956	-0.0502	-0.0402
69	1	-2.2200	0.9778	-0.0307	-0.0205
70	1	-0.4000	0.9960	-0.0402	-0.0201
71	1	-0.4800	0.9952	-0.0301	-0.0201
72	1	-0.4500	0.9955	-0.0301	-0.0201
73	1	-1.8700	0.9813	-0.0306	-0.0204
74	1	-0.1400	0.9986	-0.0200	-0.0100
75	1	1.5400	1.0154	-0.0591	-0.0394
76	1	-1.8900	0.9811	-0.0408	-0.0510
77	1	0.9500	1.0095	-0.0297	-0.0099

Mean	-0.0355	-0.0276
Min	-0.0703	-0.0510
Max	0.0201	0.0100

VISUAL INSPECTION AFTER TEST (if required) :

SATISFACTORY

COMMENTS (if necessary) :

QUALITY TEST LABORATORY - NICE

REPORT N° : **23 22 101** **Date :** **25/07/2023**

TYPE OF TEST : **BIASED HUMIDITY** **MIN :** **-1.0100** **%** **MAX :** **1.0100** **%**
Pn/10 (W) = **0.35** **UL (V) =** **500** **R (Ω) =** **50**

NORME : **AEC-Q200** **DR/R = +/-** **1** **%** **DR/R = +/-** **0.005** **Ω**

CONDITIONS : **U (V) =** **4.18** **=>** **U (V) =** **4.18** **T (°C) =** **85**
P (W) = **0.35** **HR (%) =** **85**

Equipment : **HP34420 2** calibrated on 31/08/2022

SAMPLES TEST DESIGNATION : **LTO100 50u 1% Lot : 2**
PR : 75738433 BN : 202320CN
Qualification usine SHATIAN

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	1000H
1	50	-0.3720	49.814	-0.0100	-0.0341
2	50	-0.5440	49.728	-0.0080	-0.0261
3	50	-0.6200	49.690	-0.0080	-0.0262
4	50	-0.4080	49.796	0.0000	-0.0201
5	50	-0.2200	49.890	-0.0080	-0.0200
6	50	-0.3020	49.849	-0.0140	-0.0301
7	50	-0.4220	49.789	0.0020	-0.0161
8	50	-0.2660	49.867	-0.0100	-0.0301
9	50	-0.3140	49.843	-0.0060	-0.0221
10	50	-0.2900	49.855	-0.0040	-0.0181
11	50	-0.6860	49.657	-0.0020	-0.0181
12	50	-0.2160	49.892	-0.0160	-0.0321
13	50	-0.1500	49.925	-0.0100	-0.0320
14	50	-0.2520	49.874	-0.0201	-0.0301
15	50	-0.2920	49.854	-0.0100	-0.0281
16	50	-0.2620	49.869	-0.0020	-0.0160
17	50	-0.4340	49.783	-0.0080	-0.0201
18	50	-0.3360	49.832	-0.0100	-0.0301
19	50	-0.6140	49.693	-0.0161	-0.0342
20	50	-0.1580	49.921	-0.0040	-0.0180
21	50	-0.4120	49.794	-0.0040	-0.0241
22	50	-0.4200	49.790	-0.0040	-0.0281
23	50	-0.1400	49.930	-0.0060	-0.0220
24	50	-0.4460	49.777	-0.0040	-0.0181
25	50	-0.6400	49.680	-0.0181	-0.0342
26	50	-0.3820	49.809	-0.0100	-0.0261
27	50	-0.4120	49.794	-0.0080	-0.0201
28	50	-0.4480	49.776	-0.0100	-0.0281
29	50	-0.4600	49.770	-0.0020	-0.0221
30	50	-0.0880	49.956	-0.0040	-0.0160
31	50	-0.5480	49.726	-0.0040	-0.0201
32	50	-0.2060	49.897	-0.0060	-0.0240
33	50	-0.3620	49.819	-0.0080	-0.0261
34	50	-0.4200	49.790	-0.0100	-0.0241
35	50	-0.2300	49.885	-0.0160	-0.0401
36	50	-0.2660	49.867	-0.0080	-0.0201
37	50	-0.4500	49.775	-0.0080	-0.0221
38	50	-0.1840	49.908	-0.0040	-0.0120
39	50	-0.5100	49.745	-0.0060	-0.0201
40	50	-0.3760	49.812	-0.0020	-0.0161

	QUALITY TEST LABORATORY - NICE						
REPORT N° :		23 22 101		Date :		25/07/2023	
TYPE OF TEST : BIASED HUMIDITY MIN : -1.0100 % MAX : 1.0100 % Pn/10 (W) = 0.35 UL (V) = 500 R (Ω) = 50							
NORME :		AEC-Q200		DR/R = +/-		1 % DR/R = +/- 0.005 Ω	
CONDITIONS : U (V) = 4.18 => U (V) = 4.18 T (°C) = 85 P (W) = 0.35 HR (%) = 85							
Equipment : HP34420 2 calibrated on 31/08/2022							
SAMPLES TEST DESIGNATION :				LTO100 50u 1% Lot : 2 PR : 75738433 BN : 202320CN <b style="color: red;">Qualification usine SHATIAN			

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	1000H
41	50	-0.5360	49.732	0.0000	-0.0201
42	50	-0.6120	49.694	-0.0141	-0.0322
43	50	-0.4260	49.787	-0.0100	-0.0261
44	50	-0.4020	49.799	-0.0080	-0.0181
45	50	-0.4860	49.757	-0.0121	-0.0281
46	50	-0.4460	49.777	-0.0060	-0.0221
47	50	0.7600	50.380	0.0099	-0.0595
48	50	-0.2740	49.863	0.0000	-0.0140
49	50	-0.2420	49.879	-0.0040	-0.0180
50	50	-0.2780	49.861	0.0181	-0.0060
51	50	-0.1500	49.925	-0.0060	-0.0240
52	50	-0.2600	49.870	-0.0060	-0.0180
53	50	-0.0560	49.972	-0.0020	-0.0120
54	50	-0.3200	49.840	-0.0060	-0.0221
55	50	-0.2400	49.880	-0.0060	-0.0180
56	50	-0.0820	49.959	0.0020	-0.0160
57	50	-0.2860	49.857	-0.0040	-0.0221
58	50	-0.0440	49.978	-0.0060	-0.0200
59	50	-0.3320	49.834	-0.0040	-0.0241
60	50	-0.2500	49.875	-0.0040	-0.0261
61	50	-0.3220	49.839	0.0000	-0.0181
62	50	-0.1080	49.946	-0.0060	-0.0240
63	50	-0.4200	49.790	-0.0060	-0.0201
64	50	-0.2920	49.854	0.0060	-0.0160
65	50	-0.2760	49.862	-0.0060	-0.0221
66	50	-0.2560	49.872	-0.0080	-0.0261
67	50	-0.4300	49.785	-0.0040	-0.0221
68	50	-0.4640	49.768	-0.0040	-0.0221
69	50	-0.5020	49.749	0.0020	-0.0241
70	50	-0.4160	49.792	-0.0100	-0.0281
71	50	-0.1940	49.903	0.0020	-0.0120
72	50	-0.4320	49.784	-0.0060	-0.0161
73	50	-0.3560	49.822	-0.0181	-0.0201
74	50	-0.4640	49.768	-0.0100	-0.0281
75	50	-0.6480	49.676	0.0081	-0.0141
76	50	-0.3340	49.833	-0.0020	-0.0221
77	50	-0.2680	49.866	-0.0080	-0.0261

Mean	-0.0058	-0.0230
Min	-0.0201	-0.0595
Max	0.0181	-0.0060

VISUAL INSPECTION AFTER TEST (if required) :

SATISFACTORY

COMMENTS (if necessary) :

**QUALITY TEST LABORATORY - NICE****REPORT N° :****23 22 101****Date :****22/08/2023**

TYPE OF TEST : **BIASED HUMIDITY** MIN : **-1.0000** % MAX : **1.0000** %
Pn/10 (W) = **0.35** UL (V) = **500** R (Ω) = **18000**

NORME : **AEC-Q200** DR/R = +/- **1** % DR/R = +/- **0.005** Ω

CONDITIONS : U (V) = **79.37** => U (V) = **79.37** T (°C) = **85**
P (W) = **0.35** HR (%) = **85**

Equipment : HP34420 2 calibrated on 31/08/2022

SAMPLES TEST DESIGNATION :

LTO100 18k 5% Lot : 3

PR : 75738726 BN : 202320CN

Qualification usine SHATIAN

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	1000H
1	18000	1.3183	18237.3	0.0016	0.0285
2	18000	-0.2928	17947.3	-0.0128	0.0095
3	18000	1.3000	18234.0	0.0000	0.0302
4	18000	0.8739	18157.3	-0.0171	0.0061
5	18000	-0.5806	17895.5	-0.0028	0.0285
6	18000	-0.4811	17913.4	-0.0045	0.0162
7	18000	-0.4467	17919.6	-0.0117	0.0112
8	18000	-0.4439	17920.1	-0.0084	0.0190
9	18000	-0.3139	17943.5	-0.0028	0.0195
10	18000	-0.5156	17907.2	0.0039	0.0290
11	18000	-0.1544	17972.2	-0.0022	0.0200
12	18000	1.4572	18262.3	-0.0011	0.0208
13	18000	0.9111	18164.0	-0.0066	0.0160
14	18000	-0.9472	17829.5	-0.0067	0.0123
15	18000	-0.4472	17919.5	-0.0073	0.0134
16	18000	-0.1672	17969.9	-0.0189	0.0011
17	18000	-0.6472	17883.5	-0.0112	0.0073
18	18000	1.4500	18261.0	-0.0088	0.0082
19	18000	1.0217	18183.9	-0.0071	0.0132
20	18000	1.2061	18217.1	-0.0126	0.0027
21	18000	-0.9972	17820.5	-0.0056	0.0112
22	18000	-0.3111	17944.0	-0.0033	0.0150
23	18000	-0.3406	17938.7	-0.0178	0.0056
24	18000	-0.5128	17907.7	-0.0156	0.0028
25	18000	-0.5878	17894.2	-0.0134	0.0078
26	18000	-1.6822	17697.2	-0.0186	0.0011
27	18000	1.0672	18192.1	-0.0027	0.0143
28	18000	-0.4422	17920.4	-0.0045	0.0145
29	18000	0.0372	18006.7	-0.0117	0.0050
30	18000	-0.6067	17890.8	-0.0397	-0.0218
31	18000	-0.5022	17909.6	-0.0290	-0.0117
32	18000	-0.3839	17930.9	-0.0095	0.0112
33	18000	-0.6328	17886.1	0.0056	0.0240
34	18000	1.0322	18185.8	-0.0187	-0.0049
35	18000	-0.0656	17988.2	-0.0161	0.0017
36	18000	1.7533	18315.6	-0.0109	0.0060
37	18000	0.0356	18006.4	-0.0244	-0.0094
38	18000	-1.5528	17720.5	-0.0186	-0.0051
39	18000	-0.5689	17897.6	-0.0235	-0.0112
40	18000	1.7222	18310.0	-0.0344	-0.0218

	QUALITY TEST LABORATORY - NICE						
REPORT N° :		23 22 101		Date :		22/08/2023	
TYPE OF TEST : BIASED HUMIDITY MIN : -1.0000 % MAX : 1.0000 % Pn/10 (W) = 0.35 UL (V) = 500 R (Ω) = 18000							
NORME :		AEC-Q200		DR/R = +/-		1 % DR/R = +/- 0.005 Ω	
CONDITIONS :		U (V) = 79.37 => U (V) = 79.37 T (°C) = 85				P (W) = 0.35 HR (%) = 85	
Equipment : HP34420 2 calibrated on 31/08/2022							
SAMPLES TEST DESIGNATION :				LTO100 18k 5% Lot : 3 PR : 75738726 BN : 202320CN Qualification usine SHATIAN			

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	1000H
41	18000	0.1367	18024.6	-0.0227	-0.0111
42	18000	-0.4744	17914.6	-0.0145	0.0006
43	18000	0.9111	18164.0	-0.0039	0.0110
44	18000	-0.7094	17872.3	0.0000	0.0112
45	18000	-0.3833	17931.0	-0.0050	0.0117
46	18000	-0.8178	17852.8	-0.0168	0.0028
47	18000	1.2972	18233.5	-0.0016	0.0143
48	18000	-0.7500	17865.0	-0.0241	-0.0067
49	18000	0.9889	18178.0	-0.0160	0.0028
50	18000	-0.4350	17921.7	-0.0340	-0.0167
51	18000	0.8856	18159.4	-0.0220	-0.0072
52	18000	-0.9422	17830.4	-0.0056	0.0107
53	18000	0.0056	18001.0	-0.0094	0.0061
54	18000	-0.7100	17872.2	-0.0207	-0.0084
55	18000	1.1033	18198.6	0.0016	0.0192
56	18000	-0.7756	17860.4	-0.0095	0.0067
57	18000	-0.5567	17899.8	-0.0067	0.0101
58	18000	0.9811	18176.6	-0.0116	0.0039
59	18000	-0.8600	17845.2	-0.0263	-0.0134
60	18000	1.7611	18317.0	-0.0093	0.0055
61	18000	-0.3883	17930.1	-0.0284	-0.0156
62	18000	1.5744	18283.4	-0.0131	0.0011
63	18000	1.1067	18199.2	-0.0192	-0.0049
64	18000	-0.6367	17885.4	-0.0207	-0.0089
65	18000	-1.3261	17761.3	-0.0377	-0.0276
66	18000	-0.8972	17838.5	-0.0084	0.0045
67	18000	1.5811	18284.6	-0.0186	0.0038
68	18000	1.5544	18279.8	-0.0082	0.0077
69	18000	1.3739	18247.3	-0.0005	0.0126
70	18000	-0.5661	17898.1	-0.0073	0.0045
71	18000	-0.3039	17945.3	-0.0061	0.0089
72	18000	-0.4467	17919.6	-0.0173	-0.0011
73	18000	-0.5172	17906.9	-0.0101	0.0067
74	18000	0.9572	18172.3	-0.0105	0.0017
75	18000	-0.5572	17899.7	0.0034	0.0179
76	18000	-0.6417	17884.5	0.0067	0.0201
77	18000	-0.1389	17975.0	-0.0117	0.0022

Mean	-0.0119	0.0056
Min	-0.0397	-0.0276
Max	0.0067	0.0302

VISUAL INSPECTION AFTER TEST (if required) :

SATISFACTORY

COMMENTS (if necessary) :

**QUALITY TEST LABORATORY - NICE****REPORT N° : 23 22 101 Date : 22/08/2023**

TYPE OF TEST : OPERATIONAL LIFE MIN : **-1.0000** % MAX : **1.0000** %
Pn (W) = **1.12** U L (V) = **500** R (Ω) = **1**

Norme : MIL-STD-202 Method 108 DR/R = +/- **0.5** % DR/R = +/- **0.005** Ω

CONDITIONS : U (V) = **1.06** choice of mounting : **Series**
P (W) = **1.12** choice of support : **Welded**
T° (°C) = **125**

Equipment : HP34420 2 calibrated on 31/08/2022

SAMPLES TEST DESIGNATION : **LTO100 1u 5% Lot : 1**
PR : 75738727 BN : 202320CN

Qualification usine SHATIAN

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	500H	1000H
1	1	-1.9300	0.9807	0.0000	0.0102	0.0510
2	1	-2.0400	0.9796	0.0102	0.0817	0.1429
3	1	-0.2400	0.9976	-0.0200	0.0200	0.0702
4	1	-0.4500	0.9955	0.0000	0.0201	0.0804
5	1	-1.9000	0.9810	0.0204	0.0612	0.1325
6	1	-0.4400	0.9956	0.0100	0.0201	0.0804
7	1	-1.7000	0.9830	0.0407	0.0814	0.1424
8	1	-2.2500	0.9775	-0.0102	0.0102	0.1023
9	1	-0.5200	0.9948	0.0201	0.0603	0.1407
10	1	-0.4100	0.9959	0.0000	0.0100	0.0502
11	1	-0.5800	0.9942	0.0000	0.0201	0.0805
12	1	1.5300	1.0153	0.0295	0.0591	0.1280
13	1	0.8400	1.0084	0.0298	0.0496	0.1091
14	1	-0.7600	0.9924	0.0101	0.0302	0.0907
15	1	-0.5300	0.9947	0.0101	0.0302	0.0704
16	1	-2.0500	0.9795	-0.0306	0.0102	0.0408
17	1	-1.9500	0.9805	-0.0306	-0.0102	0.0204
18	1	-0.8200	0.9918	-0.0202	0.0202	0.0706
19	1	0.8900	1.0089	-0.0099	0.0198	0.0595
20	1	1.5900	1.0159	0.0295	0.0492	0.0689
21	1	0.8700	1.0087	0.0099	0.0496	0.0892
22	1	0.7600	1.0076	-0.0099	0.0099	0.0695
23	1	-0.6400	0.9936	0.0000	0.0000	0.0302
24	1	-1.8400	0.9816	-0.0102	0.0204	0.0917
25	1	-0.3700	0.9963	-0.0401	-0.0100	0.0502
26	1	1.4000	1.0140	0.0394	0.0789	0.1282
27	1	0.9500	1.0095	0.0099	0.0594	0.1288
28	1	-0.5900	0.9941	0.0101	0.0302	0.0604
29	1	-0.7200	0.9928	0.0504	0.1410	0.2317
30	1	0.9200	1.0092	0.0099	0.0495	0.1189
31	1	-0.0600	0.9994	0.0100	0.0200	0.0600
32	1	-0.5800	0.9942	0.0000	0.0302	0.1006
33	1	-1.9400	0.9806	0.0000	0.0102	0.0714
34	1	1.4800	1.0148	-0.0197	0.0099	0.0690
35	1	1.5100	1.0151	0.0296	0.1576	0.2364
36	1	-0.3800	0.9962	0.0000	0.0502	0.1104
37	1	-0.7100	0.9929	0.0101	0.1108	0.1914
38	1	-0.2300	0.9977	0.0100	0.0501	0.1002
39	1	-0.6100	0.9939	0.0000	0.0302	0.0805
40	1	-2.0600	0.9794	0.0000	0.0102	0.0511

**QUALITY TEST LABORATORY - NICE**REPORT N° : **23 22 101** Date : **22/08/2023**

TYPE OF TEST : OPERATIONAL LIFE MIN : **-1.0000** % MAX : **1.0000** %
Pn (W) = **1.12** U L (V) = **500** R (Ω) = **1**

Norme : MIL-STD-202 Method 108 DR/R = +/- **0.5** % DR/R = +/- **0.005** Ω

CONDITIONS : U (V) = **1.06** choice of mounting : **Series**
P (W) = **1.12** choice of support : **Welded**
T° (°C) = **125**

Equipment : HP34420 2 calibrated on 31/08/2022

SAMPLES TEST DESIGNATION : **LTO100 1u 5% Lot : 1**
PR : 75738727 BN : 202320CN
Qualification usine SHATIAN

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	500H	1000H
41	1	-0.6000	0.9940	-0.0101	0.0000	0.0302
42	1	0.0600	1.0006	-0.0100	0.0300	0.1299
43	1	-2.0500	0.9795	-0.0204	0.0102	0.0510
44	1	0.9800	1.0098	-0.0198	-0.0198	0.0099
45	1	-1.9200	0.9808	0.0306	0.0510	0.0816
46	1	0.7900	1.0079	0.0397	0.0695	0.1191
47	1	-2.0700	0.9793	-0.0204	0.0204	0.0613
48	1	-0.1600	0.9984	0.0000	0.0200	0.0701
49	1	-0.4700	0.9953	-0.0301	0.0100	0.0703
50	1	-1.4300	0.9857	0.0101	0.0710	0.1319
51	1	-0.3300	0.9967	0.0000	0.0201	0.0602
52	1	-1.4600	0.9854	0.0406	0.0710	0.1522
53	1	-1.8000	0.9820	0.0204	0.0204	0.0407
54	1	-0.6400	0.9936	0.0000	0.0101	0.0403
55	1	-0.3900	0.9961	0.0000	0.0402	0.0803
56	1	-0.6800	0.9932	-0.0101	0.0101	0.0403
57	1	-0.1500	0.9985	-0.0100	0.0000	0.0300
58	1	-0.5000	0.9950	0.0704	0.0905	0.1307
59	1	-0.9800	0.9902	0.0000	0.0101	0.0505
60	1	-0.4900	0.9951	0.0100	0.0703	0.1608
61	1	-1.7000	0.9830	0.0102	0.0407	0.0814
62	1	-0.0500	0.9995	0.0200	0.0500	0.1401
63	1	-0.8500	0.9915	0.0101	0.0706	0.1210
64	1	-0.6200	0.9938	0.0101	0.0302	0.0805
65	1	0.9200	1.0092	-0.0297	-0.0297	-0.0099
66	1	-0.7700	0.9923	-0.0101	0.0202	0.1008
67	1	-0.4400	0.9956	-0.0301	-0.0201	0.0000
68	1	-1.0800	0.9892	0.0101	0.0404	0.0809
69	1	-2.1700	0.9783	-0.0102	0.0102	0.0511
70	1	-0.8900	0.9911	0.0202	0.0404	0.0908
71	1	-0.4900	0.9951	0.0000	0.0402	0.1206
72	1	-0.4700	0.9953	-0.0100	0.0100	0.0703
73	1	-1.2600	0.9874	-0.0203	0.0203	0.1114
74	1	-0.4700	0.9953	0.0402	0.0603	0.0904
75	1	-1.8800	0.9812	0.0510	0.0917	0.1936
76	1	-2.0400	0.9796	0.0102	0.0510	0.0919
77	1	-1.6100	0.9839	0.0203	0.0610	0.1220

Mean	0.0049	0.0358	0.0893
Min	-0.0401	-0.0297	-0.0099
Max	0.0704	0.1576	0.2364

VISUAL INSPECTION AFTER TEST (if required) :**SATISFACTORY**

**QUALITY TEST LABORATORY - NICE****REPORT N° : 23 22 101 Date : 03/08/2023**

TYPE OF TEST : OPERATIONAL LIFE MIN : **-0.5100** % MAX : **0.5100** %
Pn (W) = **1.12** U L (V) = **500** R (Ω) = **50**

Norme : MIL-STD-202 Method 108 DR/R = +/- **0.5** % DR/R = +/- **0.005** Ω

CONDITIONS : U (V) = **7.48** choice of mounting : **Series**
P (W) = **1.12** choice of support : **Welded**
T° (°C) = **125**

Equipment : HP34420 2 calibrated on 31/08/2022

SAMPLES TEST DESIGNATION : LTO100 50u 1% Lot : 2
PR : 75738433 BN : 202320CN

Qualification usine SHATIAN

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	500H	1000H
1	50	-0.3340	49.833	-0.0080	0.0100	0.0020
2	50	-0.4760	49.762	0.0000	0.0181	0.0362
3	50	-0.5200	49.740	-0.0040	0.0141	0.0060
4	50	-0.6400	49.680	0.0020	0.0221	0.0081
5	50	-0.5860	49.707	0.0040	0.0201	0.0201
6	50	-0.5240	49.738	0.0101	0.0302	0.0221
7	50	-0.2840	49.858	0.0040	0.0241	0.0120
8	50	-0.3540	49.823	0.0060	0.0261	0.0161
9	50	-0.1460	49.927	-0.0020	0.0240	0.0100
10	50	-0.4240	49.788	-0.0020	0.0221	0.0100
11	50	-0.3840	49.808	-0.0100	0.0141	0.0040
12	50	-0.4260	49.787	-0.0040	0.0221	0.0261
13	50	-0.4400	49.780	-0.0080	0.0121	0.0121
14	50	-0.4040	49.798	0.0020	0.0261	0.0100
15	50	-0.6540	49.673	0.0060	0.0282	0.0141
16	50	-0.2620	49.869	0.0020	0.0281	0.0120
17	50	-0.4360	49.782	-0.0060	0.0161	0.0201
18	50	-0.3560	49.822	-0.0040	0.0201	0.0040
19	50	-0.3280	49.836	-0.0080	0.0161	0.0020
20	50	-0.2420	49.879	-0.0020	0.0221	0.0060
21	50	-0.3860	49.807	-0.0080	0.0141	0.0040
22	50	-0.3420	49.829	-0.0080	0.0181	0.0040
23	50	-0.2920	49.854	0.0000	0.0261	0.0140
24	50	-0.4280	49.786	0.0080	0.0321	0.0181
25	50	-0.3540	49.823	-0.0120	0.0100	0.0241
26	50	-0.2980	49.851	0.0040	0.0261	0.0080
27	50	-0.3320	49.834	0.0120	0.0361	0.0201
28	50	-0.3140	49.843	0.0040	0.0321	0.0321
29	50	-0.5640	49.718	0.0040	0.0282	0.0302
30	50	-0.3640	49.818	0.0000	0.0241	0.0301
31	50	-0.1520	49.924	0.0000	0.0220	0.0341
32	50	-0.4140	49.793	0.0080	0.0341	0.0542
33	50	-0.6580	49.671	-0.0141	0.0141	0.0181
34	50	-0.3240	49.838	-0.0020	0.0261	0.0301
35	50	-0.1920	49.904	-0.0080	0.0160	0.0200
36	50	-0.3980	49.801	0.0040	0.0301	0.0321
37	50	-0.4320	49.784	0.0100	0.0362	0.0382
38	50	-0.3440	49.828	-0.0060	0.0181	0.0261
39	50	-0.3880	49.806	0.0000	0.0241	0.0261
49	50	-0.4080	49.796	0.0040	0.0281	0.0321

**QUALITY TEST LABORATORY - NICE**REPORT N° : **23 22 101** Date : **03/08/2023**

TYPE OF TEST : OPERATIONAL LIFE

MIN : **-0.5100** % MAX : **0.5100** %Pn (W) = **1.12** U L (V) = **500** R (Ω) = **50**

Norme : MIL-STD-202 Method 108

DR/R = +/- **0.5** % DR/R = +/- **0.005** Ω**CONDITIONS :**U (V) = **7.48**

choice of mounting :

Series

P (W) = **1.12**

choice of support :

Welded

T° (°C) = **125****Equipment** : HP34420 2 calibrated on 31/08/2022

SAMPLES TEST DESIGNATION :

LTO100 50u 1% Lot : 2

PR : 75738433 BN : 202320CN

Qualification usine SHATIAN**Measurement of cumulated drift (%)**

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	500H	1000H
41	50	-0.3620	49.819	-0.0060	0.0181	0.0221
42	50	-0.2600	49.870	-0.0120	0.0241	0.0301
43	50	-0.3740	49.813	-0.0080	0.0261	0.0341
44	50	-0.5480	49.726	-0.0241	0.0121	0.0161
45	50	-0.5240	49.738	-0.0080	0.0281	0.0342
46	50	-0.4320	49.784	-0.0161	0.0181	0.0221
47	50	-0.3700	49.815	-0.0261	0.0080	0.0120
48	50	-0.1000	49.950	-0.0160	0.0160	0.0180
49	50	-0.5560	49.722	-0.0201	0.0221	0.0241
50	50	-0.4200	49.790	-0.0121	0.0221	0.0261
51	50	-0.4700	49.765	-0.0141	0.0201	0.0301
52	50	-0.4000	49.800	-0.0281	0.0060	0.0100
53	50	-0.4540	49.773	-0.0201	0.0121	0.0161
54	50	-0.5860	49.707	-0.0141	0.0161	0.0201
55	50	-0.2900	49.855	-0.0060	0.0301	0.0361
56	50	-0.4760	49.762	-0.0181	0.0181	0.0221
57	50	-0.4020	49.799	-0.0261	0.0120	0.0141
58	50	-0.2500	49.875	-0.0261	0.0201	0.0241
59	50	-0.2920	49.854	-0.0241	0.0181	0.0221
60	50	-0.3220	49.839	-0.0201	0.0221	0.0221
61	50	-0.7020	49.649	-0.0262	0.0222	0.0242
62	50	-0.4000	49.800	-0.0221	0.0281	0.0301
63	50	-0.4680	49.766	-0.0261	0.0141	0.0201
64	50	-0.3260	49.837	-0.0060	0.0401	0.0421
65	50	-0.4100	49.795	-0.0341	0.0080	0.0120
66	50	-0.1400	49.930	-0.0340	0.0120	0.0160
67	50	-0.2120	49.894	-0.0401	0.0120	0.0401
68	50	-0.3080	49.846	-0.0261	0.0201	0.0241
69	50	-0.4960	49.752	-0.0301	0.0181	0.0301
70	50	-0.4400	49.780	-0.0201	0.0261	0.0281
71	50	-0.2340	49.883	-0.0140	0.0301	0.0321
72	50	-0.2360	49.882	-0.0241	0.0221	0.0241
73	50	-0.3560	49.822	-0.0321	0.0141	0.0201
74	50	-0.3740	49.813	-0.0120	0.0361	0.0422
75	50	-0.4180	49.791	-0.0382	0.0040	0.0100
76	50	-0.3720	49.814	-0.0381	0.0100	0.0141
77	50	-0.4160	49.792	-0.0442	0.0020	0.0020

Mean	-0.0108	0.0208	0.0210
Min	-0.0442	0.0020	0.0020
Max	0.0120	0.0401	0.0542

VISUAL INSPECTION AFTER TEST (if required) :**SATISFACTORY**

**QUALITY TEST LABORATORY - NICE****REPORT N° : 23 22 101 Date : 22/08/2023****TYPE OF TEST : OPERATIONAL LIFE** MIN : **-0.5000** % MAX : **0.5000** %
Pn (W) = **1.12** U L (V) = **500** R (Ω) = **18000**Norme : MIL-STD-202 Method 108 DR/R = +/- **0.5** % DR/R = +/- **0.005** Ω**CONDITIONS :** U (V) = **141.99** choice of mounting : **Parallel**
P (W) = **1.12** choice of support : **Welded**
T° (°C) = **125****Equipment : HP34420 2 calibrated on 31/08/2022**SAMPLES TEST DESIGNATION : **LTO100 18k 5% Lot : 3**
PR : 75738726 BN : 202320CN
Qualification usine SHATIAN**Measurement of cumulated drift (%)**

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	500H	1000H
1	18000	-1.5606	17719.1	-0.0401	-0.0203	0.0051
2	18000	0.0794	18014.3	-0.0561	-0.0183	-0.0178
3	18000	-0.5739	17896.7	-0.0520	-0.0061	0.0000
4	18000	-0.5439	17902.1	-0.0637	-0.0307	-0.0263
5	18000	0.9283	18167.1	-0.0705	-0.0347	-0.0319
6	18000	-0.6550	17882.1	-0.0638	-0.0324	-0.0268
7	18000	-0.3656	17934.2	-0.0625	-0.0351	-0.0301
8	18000	-0.4417	17920.5	-0.0580	-0.0446	-0.0156
9	18000	-0.3483	17937.3	-0.0719	-0.0535	-0.0346
10	18000	-0.3328	17940.1	-0.0569	-0.0362	-0.0045
11	18000	-0.8650	17844.3	-0.0701	-0.0516	-0.0224
12	18000	-0.5689	17897.6	-0.0559	-0.0129	-0.0117
13	18000	-0.9233	17833.8	-0.0740	-0.0364	-0.0415
14	18000	-0.4317	17922.3	-0.0636	-0.0251	-0.0201
15	18000	-0.2211	17960.2	-0.0178	-0.0178	-0.0267
16	18000	0.0689	18012.4	-0.0600	-0.0305	-0.0289
17	18000	-0.0794	17985.7	-0.0523	-0.0211	-0.0256
18	18000	0.0678	18012.2	-0.0755	-0.0466	-0.0350
19	18000	-0.0078	17998.6	-0.0628	-0.0444	-0.0250
20	18000	0.0533	18009.6	-0.0861	-0.0650	-0.0483
21	18000	-0.9556	17828.0	-0.0768	-0.0572	-0.0275
22	18000	-0.6772	17878.1	-0.0498	-0.0112	-0.0185
23	18000	0.1122	18020.2	-0.0494	-0.0022	-0.0205
24	18000	0.1867	18033.6	-0.0649	-0.0316	-0.0349
25	18000	1.6539	18297.7	-0.0590	-0.0273	-0.0235
26	18000	1.2100	18217.8	-0.0587	-0.0187	-0.0236
27	18000	1.3611	18245.0	-0.0548	-0.0126	-0.0164
28	18000	-0.8028	17855.5	-0.0599	-0.0319	-0.0224
29	18000	0.0544	18009.8	-0.0772	-0.0577	-0.0472
30	18000	-0.5717	17897.1	-0.0536	-0.0279	-0.0168
31	18000	0.9939	18178.9	-0.0732	-0.0490	-0.0341
32	18000	-0.9583	17827.5	-0.0578	-0.0325	-0.0084
33	18000	1.1622	18209.2	-0.0483	-0.0176	-0.0110
34	18000	1.2044	18216.8	-0.0598	-0.0285	-0.0247
35	18000	-0.5533	17900.4	-0.0475	-0.0190	-0.0151
36	18000	-2.2078	17602.6	-0.0511	-0.0165	-0.0290
37	18000	1.4489	18260.8	-0.0537	-0.0252	-0.0219
38	18000	-0.0328	17994.1	-0.0572	-0.0267	-0.0283
39	18000	-0.5250	17905.5	-0.0626	-0.0397	-0.0302
40	18000	-0.5611	17899.0	-0.0620	-0.0419	-0.0302

**QUALITY TEST LABORATORY - NICE**REPORT N° : **23 22 101** Date : **22/08/2023**

TYPE OF TEST : OPERATIONAL LIFE

MIN : **-0.5000** % MAX : **0.5000** %
Pn (W) = **1.12** U L (V) = **500** R (Ω) = **18000**

Norme : MIL-STD-202 Method 108

DR/R = +/- **0.5** % DR/R = +/- **0.005** Ω**CONDITIONS :**U (V) = **141.99**

choice of mounting :

ParallelP (W) = **1.12**

choice of support :

WeldedT° (°C) = **125****Equipment** : HP34420 2 calibrated on 31/08/2022

SAMPLES TEST DESIGNATION :

LTO100 18k 5% Lot : 3**PR : 75738726 BN : 202320CN****Qualification usine SHATIAN****Measurement of cumulated drift (%)**

N°	R (Ω)	T=0 (%)	T=0 (Ω)	250H	500H	1000H
41	18000	1.6372	18294.7	-0.0536	-0.0208	-0.0142
42	18000	-0.9439	17830.1	-0.0740	-0.0499	-0.0365
43	18000	-0.0828	17985.1	-0.0706	-0.0500	-0.0100
44	18000	-0.0506	17990.9	-0.0623	-0.0428	-0.0222
45	18000	-0.6717	17879.1	-0.0604	-0.0336	-0.0241
46	18000	-0.4394	17920.9	-0.0558	-0.0257	-0.0195
47	18000	0.0167	18003.0	-0.0678	-0.0439	-0.0328
48	18000	0.1128	18020.3	-0.0622	-0.0300	-0.0339
49	18000	0.2333	18042.0	-0.0693	-0.0438	-0.0388
50	18000	-0.4978	17910.4	-0.0536	-0.0190	-0.0134
51	18000	-0.4700	17915.4	-0.0592	-0.0307	-0.0184
52	18000	-0.4850	17912.7	-0.0804	-0.0569	-0.0452
53	18000	-0.2589	17953.4	-0.0618	-0.0418	-0.0273
54	18000	-0.4094	17926.3	-0.0614	-0.0385	-0.0290
55	18000	-0.7394	17866.9	-0.0705	-0.0459	-0.0409
56	18000	-0.5667	17898.0	-0.0832	-0.0430	-0.0497
57	18000	0.2178	18039.2	-0.0654	-0.0360	-0.0305
58	18000	-1.3811	17751.4	-0.0659	-0.0377	-0.0383
59	18000	-0.6889	17876.0	-0.0492	-0.0229	-0.0073
60	18000	-0.4883	17912.1	-0.0636	-0.0430	-0.0290
61	18000	-0.8328	17850.1	-0.0627	-0.0426	-0.0269
62	18000	-0.6450	17883.9	-0.0470	-0.0268	-0.0123
63	18000	-0.5239	17905.7	-0.0659	-0.0475	-0.0324
64	18000	-0.7800	17859.6	-0.0633	-0.0386	-0.0258
65	18000	-0.6789	17877.8	-0.1001	-0.0783	-0.0654
66	18000	-0.2672	17951.9	-0.0668	-0.0440	-0.0351
67	18000	-0.3917	17929.5	-0.0764	-0.0469	-0.0374
68	18000	-0.1094	17980.3	-0.0506	-0.0206	-0.0106
69	18000	-0.6122	17889.8	-0.0682	-0.0380	-0.0291
70	18000	-0.7133	17871.6	-0.0733	-0.0425	-0.0397
71	18000	-0.5889	17894.0	-0.0509	-0.0229	-0.0173
72	18000	-0.4328	17922.1	-0.0575	-0.0273	-0.0223
73	18000	-0.8078	17854.6	-0.0521	-0.0252	-0.0179
74	18000	1.4022	18252.4	-0.0504	-0.0186	-0.0027
75	18000	-0.9494	17829.1	-0.0533	-0.0275	-0.0230
76	18000	-0.5961	17892.7	-0.0637	-0.0402	-0.0324
77	18000	-0.7250	17869.5	-0.0627	-0.0431	-0.0302

Mean	-0.0616	-0.0341	-0.0256
Min	-0.1001	-0.0783	-0.0654
Max	-0.0178	-0.0022	0.0051

VISUAL INSPECTION AFTER TEST (if required) :**SATISFACTORY**

METROLOGIC MEASUREMENT OF NICE

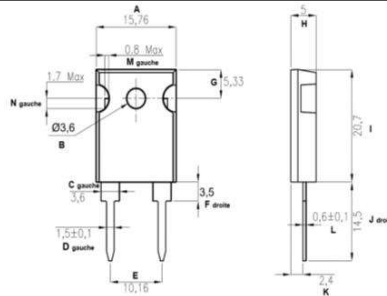
REPORT N° : 23 22 101

Date : 23/08/2023

TYPE OF TEST : Physical Dimension

Dimensions :

Performed: Metrology France



STANDARD : JESD22 Method JB-100

CONDITIONS : Verify physical dimensions

EQUIPMENT: Smartscope - Pied à coulisse - Comparateur

LTO 100 1u 5% Lot : 1 PR : 75738727 BN : 202320CN Qualification usine SHATIAN

		Dimensions (mm)									
		A	B	C gauche	C droite	D gauche	D droite				E
Nominal	+/- 0,3 (mm)	15.76	3.60	3.60	3.60	1.50	1.50	10.16	3.50	3.50	5.33
N° ---->	1	15.78	3.65	3.59	3.59	1.477	1.47	10.127	3.54	3.53	5.32
	2	15.76	3.61	3.60	3.59	1.479	1.48	10.108	3.56	3.56	5.32
	3	15.77	3.64	3.59	3.59	1.467	1.48	10.103	3.46	3.48	5.28
	4	15.77	3.64	3.60	3.58	1.466	1.49	10.114	3.48	3.52	5.30
	5	15.77	3.64	3.60	3.59	1.479	1.47	10.125	3.53	3.51	5.33
	6	15.76	3.65	3.59	3.60	1.480	1.48	10.102	3.50	3.49	5.29
	7	15.78	3.64	3.59	3.59	1.484	1.48	10.116	3.52	3.55	5.35
	8	15.76	3.65	3.59	3.59	1.470	1.50	10.105	3.52	3.49	5.31
	9	15.77	3.64	3.60	3.59	1.474	1.49	10.111	3.48	3.46	5.36
	10	15.79	3.62	3.59	3.59	1.470	1.49	10.117	3.58	3.53	5.30
	11	15.77	3.65	3.59	3.58	1.465	1.48	10.117	3.53	3.53	5.32
	12	15.77	3.65	3.59	3.59	1.475	1.48	10.118	3.51	3.51	5.34
	13	15.76	3.61	3.59	3.59	1.474	1.47	10.111	3.46	3.46	5.35
	14	15.77	3.64	3.60	3.59	1.469	1.49	10.122	3.53	3.52	5.29
	15	15.77	3.64	3.59	3.59	1.472	1.47	10.115	3.54	3.58	5.31
	16	15.76	3.63	3.59	3.59	1.485	1.48	10.102	3.51	3.55	5.32
	17	15.78	3.64	3.60	3.59	1.484	1.48	10.106	3.49	3.52	5.32
	18	15.78	3.63	3.60	3.59	1.482	1.49	10.099	3.51	3.54	5.29
	19	15.77	3.63	3.60	3.59	1.471	1.48	10.118	3.55	3.52	5.32
	20	15.78	3.63	3.60	3.58	1.477	1.49	10.104	3.52	3.54	5.28
	21	15.80	3.62	3.59	3.58	1.464	1.48	10.131	3.60	3.54	5.29
	22	15.79	3.61	3.60	3.59	1.471	1.49	10.118	3.58	3.53	5.29
	23	15.78	3.64	3.59	3.58	1.490	1.48	10.105	3.49	3.54	5.34
	24	15.77	3.65	3.60	3.59	1.490	1.49	10.095	3.51	3.56	5.33
	25	15.78	3.63	3.59	3.59	1.483	1.48	10.105	3.53	3.55	5.30
	26	15.77	3.66	3.59	3.58	1.455	1.49	10.111	3.49	3.50	5.31
	27	15.77	3.65	3.59	3.59	1.469	1.48	10.114	3.54	3.51	5.33
	28	15.77	3.66	3.59	3.60	1.486	1.47	10.107	3.48	3.49	5.31
	29	15.77	3.65	3.59	3.60	1.467	1.47	10.116	3.51	3.49	5.30
	30	15.76	3.66	3.60	3.59	1.479	1.48	10.114	3.48	3.50	5.29
	Max spec		16.06	3.90	3.90	3.90	1.60	1.60	10.46	3.80	3.80
Mini spec		15.46	3.30	3.30	3.30	1.40	1.40	9.86	3.20	3.20	5.03
Mean		15.77	3.64	3.59	3.59	1.48	1.48	10.11	3.52	3.52	5.31
Min		15.76	3.61	3.59	3.58	1.46	1.47	10.10	3.46	3.46	5.28
Max		15.80	3.66	3.60	3.60	1.49	1.50	10.13	3.60	3.58	5.36
Sigma		0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.03	0.03	0.02
Ppk		9.93	2.21	24.64	21.36	3.00	4.10	9.88	2.71	3.24	4.32
Pp		10.37	6.98	25.17	22.19	3.99	5.06	11.76	2.87	3.47	4.59
Nb failures		0	0	0	0	0	0	0	0	0	0

QUALITY TEST LABORATORY - NICE**REPORT N° :**

23 22 101

Date :

03/07/2023

TYPE OF TEST :	Terminal Strength	MIN :	-1.2500	%	MAX :	1.2500	%
		R (Ω) =	1				

NORME : AEC-Q200-006 DR/R = +/- 0.25 % DR/R = +/- 0.01 Ω

CONDITIONS: Force apply = 2.27 Kg

Duration(sec) = 60

Equipment : HP34420 2 calibrated on 31/08/2022

SAMPLES TEST DESIGNATION :

LTO100 1u 5% Lot: 1

PR : 75738727 BN : 202320CN

Qualification usine SHATIAN

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	After
1	1	0.9300	1.0093	-0.0099
2	1	-1.9100	0.9809	0.0204
3	1	-0.3000	0.9970	-0.0201
4	1	-0.3100	0.9969	0.0000
5	1	-2.1100	0.9789	-0.0102
6	1	-1.8800	0.9812	-0.0102
7	1	-2.0700	0.9793	0.0102
8	1	1.6800	1.0168	0.0295
9	1	-2.0100	0.9799	-0.0204
10	1	-0.5200	0.9948	0.0101

Mean	-0.0001
Min	-0.0204
Max	0.0295

VISUAL INSPECTION AFTER TEST (If required) :

SATISFACTORY

COMMENTS (if necessary) :

	QUALITY TEST LABORATORY - NICE						
REPORT N° :		23 22 101		Date :		02/06/2023	
TYPE OF TEST : Terminal Strength MIN : -0.2700 % MAX : 0.2700 % R (Ω) = 50							
NORME : AEC-Q200-006 DR/R = +/- 0.25 % DR/R = +/- 0.01 Ω							
CONDITIONS: Force apply = 2.27 Kg Duration(sec) = 60 Equipment : HP34420 2 calibrated on 31/08/2022							
SAMPLES TEST DESIGNATION :				LTO100 50u 1% Lot : 2 PR : 75738433 BN : 202320CN Qualification usine SHATIAN			

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	After
1	50	-0.4220	49.789	-0.0020
2	50	-0.2380	49.881	-0.0020
3	50	-0.3220	49.839	-0.0080
4	50	-0.0820	49.959	-0.0160
5	50	-0.6760	49.662	-0.0020
6	50	-0.4480	49.776	-0.0080
7	50	-0.3900	49.805	-0.0100
8	50	-0.4360	49.782	-0.0100
9	50	-0.3120	49.844	-0.0100
10	50	-0.1640	49.918	-0.0040

Mean	-0.0072
Min	-0.0160
Max	-0.0020

VISUAL INSPECTION AFTER TEST (If required) :

SATISFACTORY

COMMENTS (if necessary) :

QUALITY TEST LABORATORY - NICE

REPORT N° : **23 22 101** **Date :** **03/07/2023**

TYPE OF TEST : **Terminal Strength** **MIN :** **-0.2501** **%** **MAX :** **0.2501** **%**
R (Ω) = **18000**

NORME : **AEC-Q200-006** **DR/R = +/-** **0.25** **%** **DR/R = +/-** **0.01** **Ω**

CONDITIONS: **Force apply =** **2.27 Kg**
Duration(sec) = **60**

Equipment : **HP34420 2** **calibrated on** **31/08/2022**

SAMPLES TEST DESIGNATION : **LTO100 18k 5% Lot : 3**
PR : 75738726 BN : 202320CN
Qualification usine SHATIAN

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	After
1	18000	-0.4478	17919.4	-0.0273
2	18000	-0.0183	17996.7	-0.0322
3	18000	-0.5367	17903.4	-0.0374
4	18000	-0.8383	17849.1	-0.0263
5	18000	0.0106	18001.9	-0.0272
6	18000	1.2833	18231.0	-0.0269
7	18000	-0.4994	17910.1	-0.0262
8	18000	-0.1100	17980.2	-0.0239
9	18000	-0.5044	17909.2	-0.0235
10	18000	-0.7011	17873.8	-0.0431

Mean	-0.0294
Min	-0.0431
Max	-0.0235

VISUAL INSPECTION AFTER TEST (If required) :

SATISFACTORY

COMMENTS (if necessary) :

REPORT :

23 22 101

Date :

31/05/2023

TYPE OF TEST : RESISTANCE TO SOLVENT

Nb : 6

NORME : MIL-STD-202 Method 215

CONDITIONS : The sample in isopropyl alcohol at 99% pure;
Completely immersed for three minutes in the specified solution .
Brush ten strokes over.
Three times.

SAMPLES TEST DESIGNATION :

LTO100 50u 1% Lot : 2

PR : 75738433 BN : 202320CN

Qualification usine SHATIAN

VISUAL INSPECTION AFTER TEST :

SATISFACTORY

	QUALITY TEST LABORATORY - NICE							
	REPORT N° :				23 22 101	Date :		04/07/2023
TYPE OF TEST :		Mechanical Shock	MIN :	-0.7000	%	MAX :	0.7000	%
			R (Ω) =	1				
NORME :		MIL-STD-202 Method 213	DR/R = +/-	0.2	%	DR/R = +/-	0.005	Ω
CONDITIONS :		100 g - 3.75 ms - semi-sinusoidale Nb of axes = 3 Nb of shock = 18						
Equipment : HP34420 2 calibrated on 31/08/2022								
SAMPLES TEST DESIGNATION :			LTO100 1u 5% Lot : 1 PR : 75738727 BN : 202320CN Qualification usine SHATIAN					

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	After
1	1	-0.4700	0.9953	0.0100
2	1	-0.4800	0.9952	0.0201
3	1	-0.5800	0.9942	0.0201
4	1	-0.5100	0.9949	0.0101
5	1	0.7400	1.0074	0.0397
6	1	0.6500	1.0065	0.0298
7	1	-0.3300	0.9967	0.0301
8	1	1.6500	1.0165	0.0197
9	1	-0.4700	0.9953	0.0402
10	1	-0.4400	0.9956	0.0301
11	1	-0.4100	0.9959	0.0201
12	1	-0.1100	0.9989	0.0000
13	1	-0.2100	0.9979	-0.0100
14	1	-2.2700	0.9773	0.0205
15	1	-1.8300	0.9817	0.0204
16	1	0.9300	1.0093	0.0297
17	1	-0.6600	0.9934	0.0302
18	1	-1.8900	0.9811	0.0204
19	1	-0.5500	0.9945	0.0201
20	1	-1.8800	0.9812	0.0306
21	1	1.0700	1.0107	0.0099
22	1	-2.1900	0.9781	0.0716
23	1	-1.0800	0.9892	-0.0202
24	1	-0.0900	0.9991	0.0500
25	1	-0.2200	0.9978	0.0100
26	1	-0.3000	0.9970	0.0000
27	1	0.7100	1.0071	0.0397
28	1	-0.7700	0.9923	0.0302
29	1	1.6500	1.0165	0.0295
30	1	-0.8300	0.9917	0.0101

Mean	0.0221
Min	-0.0202
Max	0.0716

VISUAL INSPECTION AFTER TEST (if required) :

SATISFACTORY

COMMENTS (if necessary) :

	QUALITY TEST LABORATORY - NICE							
	REPORT N° : 23 22 101				Date : 05/06/2023			
TYPE OF TEST :		Mechanical	Shock	MIN : -0.2100 % R (Ω) = 50	MAX : 0.2100 %			
NORME :		MIL-STD-202 Method 213		DR/R = +/- 0.2 %	DR/R = +/- 0.005 Ω			
CONDITIONS :		100 g - 3.75 ms - semi-sinusoidale Nb of axes = 3 Nb of shock = 18						
		Equipment : HP34420 2 calibrated on 31/08/2022						
SAMPLES TEST DESIGNATION :				LTO100 50u 1% Lot : 2 PR : 75738433 BN : 202320CN Qualification usine SHATIAN				

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	After
1	50	-0.0380	49.981	-0.0320
2	50	-0.4100	49.795	0.0000
3	50	-0.3880	49.806	0.0000
4	50	-0.3100	49.845	0.0040
5	50	-0.5080	49.746	0.0060
6	50	-0.6200	49.690	-0.0121
7	50	-0.3760	49.812	-0.0040
8	50	-0.4980	49.751	-0.0020
9	50	-0.2280	49.886	-0.0020
10	50	-0.2380	49.881	-0.0080
11	50	-0.2840	49.858	0.0080
12	50	-0.0400	49.980	-0.0100
13	50	-0.3120	49.844	-0.0161
14	50	-0.3440	49.828	-0.0040
15	50	-0.1820	49.909	-0.0140
16	50	-0.4340	49.783	-0.0080
17	50	-0.2420	49.879	-0.0140
18	50	-0.3260	49.837	-0.0080
19	50	-0.2640	49.868	-0.0221
20	50	-0.5260	49.737	-0.0020
21	50	-0.3660	49.817	-0.0080
22	50	-0.5720	49.714	-0.0060
23	50	-0.1580	49.921	-0.0260
24	50	0.0220	50.011	-0.0020
25	50	-0.4880	49.756	0.0020
26	50	-0.4380	49.781	-0.0100
27	50	-0.3340	49.833	-0.0140
28	50	-0.5080	49.746	-0.0181
29	50	-0.2580	49.871	-0.0040
30	50	-0.3120	49.844	-0.0040

Mean	-0.0077
Min	-0.0320
Max	0.0080

VISUAL INSPECTION AFTER TEST (if required) :

SATISFACTORY

COMMENTS (if necessary) :

	QUALITY TEST LABORATORY - NICE			
REPORT N° :		23 22 101	Date : 04/07/2023	
TYPE OF TEST :	Mechanical Shock	MIN : -0.2000 % R (Ω) = 18000	MAX : 0.2000 %	
<u>NORME :</u> MIL-STD-202 Method 213		DR/R = +/- 0.2 %	DR/R = +/- 0.005 Ω	
<u>CONDITIONS :</u> 100 g - 3.75 ms - semi-sinusoidale Nb of axes = 3 Nb of shock = 18 <u>Equipment :</u> HP34420 2 calibrated on 31/08/2022				
SAMPLES TEST DESIGNATION :		LTO100 18k 5% Lot : 3 PR : 75738726 BN : 202320CN Qualification usine SHATIAN		

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	After
1	18000	-0.4711	17915.2	0.0061
2	18000	1.7094	18307.7	-0.0016
3	18000	-0.5133	17907.6	0.0061
4	18000	1.5483	18278.7	0.0088
5	18000	-0.7406	17866.7	0.0168
6	18000	-0.3889	17930.0	-0.0017
7	18000	-0.7839	17858.9	0.0123
8	18000	0.9122	18164.2	0.0050
9	18000	0.2444	18044.0	0.0000
10	18000	-0.2450	17955.9	0.0323
11	18000	1.0222	18184.0	0.0055
12	18000	0.8078	18145.4	0.0215
13	18000	-0.4767	17914.2	-0.0123
14	18000	-0.4294	17922.7	0.0218
15	18000	0.2978	18053.6	0.0111
16	18000	-0.3439	17938.1	0.0106
17	18000	0.1217	18021.9	0.0111
18	18000	-0.7083	17872.5	0.0246
19	18000	0.9861	18177.5	0.0011
20	18000	1.1461	18206.3	0.0450
21	18000	-0.5989	17892.2	0.0084
22	18000	-1.0322	17814.2	0.0062
23	18000	-0.5333	17904.0	0.0067
24	18000	0.0317	18005.7	0.0072
25	18000	-0.9644	17826.4	0.0140
26	18000	-0.6406	17884.7	0.0017
27	18000	-0.5372	17903.3	0.0134
28	18000	-0.5294	17904.7	-0.0006
29	18000	0.8294	18149.3	0.0116
30	18000	-1.5406	17722.7	0.0011

Mean	0.0098
Min	-0.0123
Max	0.0450

VISUAL INSPECTION AFTER TEST (if required) :

SATISFACTORY

COMMENTS (if necessary) :

	QUALITY TEST LABORATORY - NICE																																							
REPORT N° :		23 22 101	Date : 10/07/2023																																					
<table style="width: 100%; border: none;"> <tr> <td style="width: 20%;">TYPE OF TEST :</td> <td style="width: 20%;">VIBRATION</td> <td style="width: 10%;">MINI :</td> <td style="width: 10%;">-0.7000</td> <td style="width: 10%;">%</td> <td style="width: 10%;">MAXI :</td> <td style="width: 10%;">0.7000</td> <td style="width: 10%;">%</td> </tr> <tr> <td></td> <td></td> <td>R (Ω) =</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <table style="width: 100%; border: none;"> <tr> <td style="width: 20%;"><u>NORME :</u></td> <td style="width: 20%;">MIL-STD-202 Method 204</td> <td style="width: 10%;">DR/R = +/-</td> <td style="width: 10%;">0.2</td> <td style="width: 10%;">%</td> <td style="width: 10%;">DR/R = +/-</td> <td style="width: 10%;">0.005</td> <td style="width: 10%;">Ω</td> </tr> </table> <table style="width: 100%; border: none;"> <tr> <td style="width: 20%;"><u>CONDITIONS :</u></td> <td style="width: 20%;">Frequency (Hz) =</td> <td style="width: 60%;">10 à 2000</td> </tr> <tr> <td></td> <td>Amplitude (g) =</td> <td>5</td> </tr> <tr> <td></td> <td>Nb d'axes =</td> <td>3</td> </tr> <tr> <td></td> <td>Nb of hours (H) =</td> <td>4</td> </tr> </table> <u>Equipment</u> : HP34420 2 calibrated on 31/08/2022					TYPE OF TEST :	VIBRATION	MINI :	-0.7000	%	MAXI :	0.7000	%			R (Ω) =	1					<u>NORME :</u>	MIL-STD-202 Method 204	DR/R = +/-	0.2	%	DR/R = +/-	0.005	Ω	<u>CONDITIONS :</u>	Frequency (Hz) =	10 à 2000		Amplitude (g) =	5		Nb d'axes =	3		Nb of hours (H) =	4
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	PR : 75738727 BN : 202320CN																																							
	Qualification usine SHATIAN																																							

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	After
1	1	-0.6500	0.9935	0.0101
2	1	1.7000	1.0170	0.0492
3	1	0.9200	1.0092	0.0495
4	1	-1.9400	0.9806	0.0204
5	1	-0.4900	0.9951	0.0100
6	1	-0.4400	0.9956	0.0201
7	1	-0.4600	0.9954	0.0201
8	1	-0.4000	0.9960	0.0201
9	1	0.6600	1.0066	0.0397
10	1	-2.0000	0.9800	0.0204
11	1	-0.5800	0.9942	0.0201
12	1	-2.0600	0.9794	0.0102
13	1	-0.2700	0.9973	0.0201
14	1	0.8200	1.0082	0.0198
15	1	0.7800	1.0078	0.0496
16	1	-2.1900	0.9781	0.0307
17	1	-0.4200	0.9958	0.0100
18	1	-0.8300	0.9917	0.0101
19	1	-0.1300	0.9987	0.0300
20	1	-0.5100	0.9949	0.0201
21	1	-0.2000	0.9980	0.0200
22	1	-2.1300	0.9787	0.0307
23	1	-0.5800	0.9942	0.0101
24	1	-0.8200	0.9918	0.0302
25	1	-0.8400	0.9916	0.0303
26	1	-2.0700	0.9793	0.0204
27	1	-0.4800	0.9952	0.0100
28	1	1.5500	1.0155	0.0000
29	1	-2.0600	0.9794	0.0102
30	1	-0.7700	0.9923	0.0302

Mean	0.0224
Min	0.0000
Max	0.0496

VISUAL INSPECTION AFTER TEST (if required) :

SATISFACTORY

COMMENTS (if necessary) :

	QUALITY TEST LABORATORY - NICE																			
REPORT N° :		23 22 101	Date : 29/06/2023																	
<table style="width: 100%; border: none;"> <tr> <td style="width: 20%;">TYPE OF TEST :</td> <td style="width: 20%;">VIBRATION</td> <td style="width: 10%;">MINI :</td> <td style="width: 10%;">-0.2100</td> <td style="width: 10%;">%</td> <td style="width: 10%;">MAXI :</td> <td style="width: 10%;">0.2100</td> <td style="width: 10%;">%</td> </tr> <tr> <td></td> <td></td> <td>R (Ω) =</td> <td>50</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>					TYPE OF TEST :	VIBRATION	MINI :	-0.2100	%	MAXI :	0.2100	%			R (Ω) =	50				
TYPE OF TEST :	VIBRATION	MINI :	-0.2100	%	MAXI :	0.2100	%													
		R (Ω) =	50																	
<table style="width: 100%; border: none;"> <tr> <td style="width: 20%;"><u>NORME :</u></td> <td style="width: 20%;">MIL-STD-202 Method 204</td> <td style="width: 10%;">DR/R = +/-</td> <td style="width: 10%;">0.2</td> <td style="width: 10%;">%</td> <td style="width: 10%;">DR/R = +/-</td> <td style="width: 10%;">0.005</td> <td style="width: 10%;">Ω</td> </tr> </table>					<u>NORME :</u>	MIL-STD-202 Method 204	DR/R = +/-	0.2	%	DR/R = +/-	0.005	Ω								
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<u>CONDITIONS :</u> <table style="width: 100%; border: none; margin-top: 5px;"> <tr> <td style="width: 30%;">Frequency (Hz) =</td> <td>10 à 2000</td> </tr> <tr> <td>Amplitude (g) =</td> <td>5</td> </tr> <tr> <td>Nb d'axes =</td> <td>3</td> </tr> <tr> <td>Nb of hours (H) =</td> <td>4</td> </tr> </table> <u>Equipment</u> : HP34420 2 calibrated on 31/08/2022					Frequency (Hz) =	10 à 2000	Amplitude (g) =	5	Nb d'axes =	3	Nb of hours (H) =	4								
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SAMPLES TEST DESIGNATION :	LTO100 50u 1% Lot : 2																			
	PR : 75738433 BN : 202320CN																			
	Qualification usine SHATIAN																			

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	After
1	50	-0.2260	49.887	-0.0040
2	50	-0.1580	49.921	-0.0080
3	50	-0.4400	49.780	0.0000
4	50	-0.3400	49.830	0.0120
5	50	-0.1720	49.914	-0.0020
6	50	-0.2180	49.891	-0.0020
7	50	0.0040	50.002	-0.0060
8	50	-0.4260	49.787	-0.0100
9	50	-0.3020	49.849	-0.0080
10	50	-0.2520	49.874	-0.0020
11	50	-0.1800	49.910	-0.0040
12	50	-0.3480	49.826	-0.0100
13	50	-0.5120	49.744	-0.0101
14	50	-0.2440	49.878	-0.0100
15	50	-0.2000	49.900	-0.0040
16	50	-0.3020	49.849	0.0100
17	50	-0.2440	49.878	-0.0060
18	50	-0.1080	49.946	-0.0100
19	50	-0.4180	49.791	0.0040
20	50	-0.4420	49.779	-0.0020
21	50	-0.4220	49.789	-0.0040
22	50	-0.4180	49.791	0.0020
23	50	-0.3040	49.848	-0.0080
24	50	-0.4620	49.769	-0.0020
25	50	-0.3220	49.839	0.0020
26	50	-0.1800	49.910	-0.0160
27	50	-0.1780	49.911	0.0000
28	50	-0.3340	49.833	-0.0161
29	50	-0.3740	49.813	-0.0020
30	50	-0.1860	49.907	-0.0080

Mean	-0.0041
Min	-0.0161
Max	0.0120

VISUAL INSPECTION AFTER TEST (if required) :

SATISFACTORY

COMMENTS (if necessary) :

	QUALITY TEST LABORATORY - NICE			
REPORT N° :		23 22 101	Date : 10/07/2023	
TYPE OF TEST : VIBRATION MINI : -0.2000 % MAXI : 0.2000 % R (Ω) = 18000 <u>NORME :</u> MIL-STD-202 Method 204 DR/R = +/- 0.2 % DR/R = +/- 0.005 Ω <u>CONDITIONS :</u> Frequency (Hz) = 10 à 2000 Amplitude (g) = 5 Nb d'axes = 3 Nb of hours (H) = 4 <u>Equipment</u> : HP34420 2 calibrated on 31/08/2022				
SAMPLES TEST DESIGNATION :				
LTO100 18k 5% Lot : 3 PR : 75738726 BN : 202320CN <b style="color: red;">Qualification usine SHATIAN				

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	After
1	18000	-0.8722	17843.0	0.0297
2	18000	-0.4617	17916.9	0.0435
3	18000	0.0528	18009.5	0.0378
4	18000	0.4328	18077.9	0.0354
5	18000	-0.3456	17937.8	0.0262
6	18000	-0.6822	17877.2	0.0157
7	18000	-0.4861	17912.5	0.0251
8	18000	-0.3683	17933.7	0.0396
9	18000	-0.1233	17977.8	0.0339
10	18000	0.2633	18047.4	0.0227
11	18000	-0.4128	17925.7	0.0223
12	18000	-0.2556	17954.0	0.0267
13	18000	-0.5683	17897.7	0.0240
14	18000	-0.6733	17878.8	0.0112
15	18000	-0.4767	17914.2	0.0112
16	18000	-0.4950	17910.9	0.0324
17	18000	-0.5300	17904.6	0.0380
18	18000	0.1822	18032.8	0.0355
19	18000	-0.6911	17875.6	0.0481
20	18000	1.6144	18290.6	0.0350
21	18000	-0.2689	17951.6	0.0379
22	18000	-0.4167	17925.0	0.0245
23	18000	-0.7278	17869.0	0.0330
24	18000	-0.1122	17979.8	0.0367
25	18000	-0.6328	17886.1	0.0358
26	18000	-0.7317	17868.3	0.0319
27	18000	-1.4494	17739.1	0.0282
28	18000	-0.6367	17885.4	0.0302
29	18000	1.2217	18219.9	0.0346
30	18000	0.6817	18122.7	0.0364

Mean	0.0308
Min	0.0112
Max	0.0481

VISUAL INSPECTION AFTER TEST (if required) :

SATISFACTORY

COMMENTS (if necessary) :

REPORT :

23 22 101

Date :

02/06/2023

TYPE OF TEST :

Resistance to
soldering heat

MIN : -0.2100 %
R (Ω) = 50

MAX : 0.2100 %

NORME : MIL-STD-202 Method 210

DR/R = +/- 0.2 %

DR/R = +/- 0.005 Ω

CONDITIONS :

T° bath (°C) 260

Alloy : Sn96.5Ag3Cu0.5

Time (s) : 10

Number of dipping : 1

EQUIPMENT:

HP 34420 2

Calibrated on 31/08/2022

SAMPLES TEST DESIGNATION :

LTO100 50u 1% Lot : 2

PR : 75738433 BN : 202320CN

Qualification usine SHATIAN

Measurement of cumulated drift (%)

N°	R (Ω)	T=0 (%)	T=0 (Ω)	After
1	50	-0.1560	49.922	0.0320
2	50	-0.4860	49.757	0.0342
3	50	-0.3020	49.849	0.0502
4	50	-0.3580	49.821	0.0301
5	50	-0.3620	49.819	0.0422
6	50	-0.3660	49.817	0.0341
7	50	-0.2080	49.896	0.0281
8	50	-0.2920	49.854	0.0261
9	50	-0.2220	49.889	0.0421
10	50	-0.3140	49.843	0.0261
11	50	-0.2000	49.900	0.0301
12	50	-0.3720	49.814	0.0381
13	50	-0.2980	49.851	0.0100
14	50	-0.1520	49.924	0.0441
15	50	-0.3180	49.841	0.0341
16	50	-0.3400	49.830	0.0442
17	50	-0.3820	49.809	0.0321
18	50	-0.3960	49.802	0.0301
19	50	-0.3920	49.804	0.0201
20	50	-0.3300	49.835	0.0301
21	50	-0.3240	49.838	0.0261
22	50	-0.2800	49.860	0.0261
23	50	-0.4060	49.797	0.0341
24	50	-0.2080	49.896	0.0321
25	50	-0.1520	49.924	0.0341
26	50	-0.3540	49.823	0.0201
27	50	-0.2200	49.890	0.0321
28	50	-0.4120	49.794	0.0281
29	50	-0.3480	49.826	0.0261
30	50	-0.3640	49.818	0.0341

Mean	0.0317
Min	0.0100
Max	0.0502

VISUAL INSPECTION AFTER TEST (If required) :

SATISFACTORY

COMMENTS (if necessary) :

TYPE OF TEST : CT (22/-55/22/155/22)

MIN : -350

MAX : 350

R (Ω) = 1

SAMPLES TEST DESIGNATION :

LTO100 1u 5% Lot : 1

PR : 75738727 BN : 202320CN

Qualification usine SHATIAN

EQUIPMENT : automatic post : HP3458 (calibrated on : 25/10/2022)

Measurement of CT (ppm/°C)										
N°	V(Ω)22°C	-54.8 °C	-40 °C	-10 °C	V(Ω)22°C	70 °C	125 °C	154.7 °C	200 °C	V(Ω)22°C
1	1.0096	72.4			1.0100			0.9		1.0092
2	1.0166	73.3			1.0170			4.6		1.0162
3	0.9932	72.0			0.9936			1.7		0.9929
4	1.0008	67.9			1.0011			0.0		1.0003
5	0.9948	72.2			0.9952			1.0		0.9944
6	0.9994	71.6			0.9998			1.6		0.9988
7	1.0168	73.4			1.0172			1.6		1.0163
8	0.9969	73.6			0.9973			2.3		0.9966
9	0.9982	69.7			0.9985			0.6		0.9979
10	0.9835	68.4			0.9839			1.4		0.9832
11	0.9975	73.7			0.9978			2.1		0.9971
12	0.9784	74.1			0.9788			2.0		0.9780
13	1.0107	77.0			1.0110			3.0		1.0103
14	0.9825	72.7			0.9829			2.0		0.9821
15	0.9985	65.8			0.9989			0.0		0.9982
16	0.9818	72.5			0.9823			1.9		0.9814
17	0.9948	71.3			0.9951			3.0		0.9945
18	0.9834	70.6			0.9837			2.0		0.9830
19	1.0116	67.9			1.0120			0.6		1.0113
20	0.9990	63.7			0.9994			0.3		0.9987
21	0.9939	75.1			0.9942			3.7		0.9937
22	0.9951	68.5			0.9954			1.4		0.9947
23	0.9962	75.2			0.9965			3.1		0.9959
24	0.9800	72.2			0.9804			3.4		0.9796
25	0.9997	72.4			1.0000			2.6		0.9993
26	0.9961	70.7			0.9964			2.5		0.9958
27	1.0021	66.4			1.0025			1.3		1.0018
28	1.0112	73.1			1.0115			2.6		1.0109
29	1.0115	71.4			1.0119			2.3		1.0111
30	1.0163	71.9			1.0167			2.4		1.0159

Mean		71.4						1.9		
Min		63.7						0.0		
Max		77.0						4.6		

**QUALITY TEST LABORATORY - NICE**REPORT N° : **23 22 101** Date : **31/05/2023**TYPE OF TEST : **CT (22/-55/22/155/22)**MIN : **-200**MAX : **200**R (Ω) = **50**

SAMPLES TEST DESIGNATION :

LTO100 50u 1% Lot : 2**PR : 75738433 BN : 202320CN****Qualification usine SHATIAN**EQUIPMENT : **automatic post : HP3458 (calibrated on : 25/10/2022)**

Measurement of CT (ppm/°C)											
N°	V(Ω)22°C	-54.9 °C	-40 °C	-10 °C	V(Ω)22°C	70 °C	125 °C	151.9 °C	200 °C	V(Ω)22°C	Curve
1	49.784	119.7			49.784			129.1		49.762	9.4
2	49.785	119.7			49.783			129.5		49.761	9.8
3	49.783	122.2			49.780			130.4		49.756	8.2
4	49.968	118.8			49.966			128.6		49.945	9.8
5	49.766	132.6			49.765			138.3		49.741	5.7
6	49.819	130.3			49.817			137.0		49.797	6.7
7	49.801	118.3			49.800			128.1		49.777	9.8
8	49.786	126.0			49.785			133.6		49.761	7.6
9	49.759	121.6			49.761			128.0		49.740	6.3
10	49.779	120.5			49.783			126.8		49.761	6.4
11	49.797	120.3			49.800			127.2		49.777	6.9
12	49.774	122.8			49.776			128.4		49.751	5.6
13	49.693	121.2			49.694			127.6		49.674	6.4
14	49.716	118.7			49.719			126.3		49.696	7.6
15	49.819	135.0			49.820			138.2		49.798	3.2
16	49.797	120.1			49.799			127.6		49.774	7.5
17	49.791	115.8			49.778			121.0		49.772	5.2
18	49.936	108.6			49.923			115.6		49.918	6.9
19	49.757	120.3			49.741			124.0		49.734	3.6
20	49.887	118.7			49.873			123.7		49.868	5.0
21	49.832	118.8			49.820			123.6		49.813	4.8
22	49.803	117.6			49.791			122.2		49.781	4.6
23	49.848	117.8			49.839			123.0		49.826	5.2
24	49.833	119.4			49.828			125.8		49.817	6.4
25	49.696	121.4			49.690			125.3		49.680	3.9
26	49.790	120.5			49.779			123.8		49.773	3.3
27	49.836	121.2			49.825			124.3		49.815	3.1
28	49.707	126.2			49.698			128.0		49.689	1.8
29	49.773	134.2			49.763			134.5		49.753	0.3
30	49.689	124.8			49.683			128.1		49.670	3.3

Mean		121.8						127.6		
Min		108.6						115.6		
Max		135.0						138.3		

**QUALITY TEST LABORATORY - NICE**REPORT N° : **23 22 101** Date : **30/06/2023**TYPE OF TEST : **CT (22/-55/22/155/22)**MIN : **-200**MAX : **200**R (Ω) = **18000**

SAMPLES TEST DESIGNATION :

LTO100 18k 5% Lot : 3**PR : 75738726 BN : 202320CN****Qualification usine SHATIAN**EQUIPMENT : **automatic post : HP3458 (calibrated on : 25/10/2022)**

Measurement of CT (ppm/°C)										
N°	V(Ω)22°C	-53.5 °C	-40 °C	-10 °C	V(Ω)22°C	70 °C	125 °C	154.7 °C	200 °C	V(Ω)22°C
1	17900.0	104.1			17903.0			123.1		17884.8
2	18030.7	107.9			18033.7			127.4		18014.9
3	17598.5	111.8			17601.6			130.6		17583.7
4	18025.4	110.5			18028.6			129.6		18010.1
5	18275.0	110.9			18278.7			132.0		18259.8
6	17908.7	113.2			17912.1			133.1		17895.3
7	17822.5	110.3			17826.0			129.8		17808.2
8	17981.8	111.0			17985.3			131.7		17965.9
9	17712.2	110.2			17716.9			129.6		17704.7
10	17910.3	104.4			17914.5			124.7		17900.0
11	17912.7	104.5			17915.1			124.2		17899.0
12	17885.4	103.8			17888.6			124.4		17876.2
13	17842.0	104.9			17845.8			126.3		17832.5
14	17814.9	107.2			17818.8			128.0		17806.1
15	18041.9	110.1			18045.9			131.2		18033.4
16	17821.3	105.2			17825.6			125.5		17809.3
17	18197.4	103.0			18191.1			123.4		18186.7
18	17921.8	98.8			17914.8			120.3		17912.5
19	18024.1	107.5			18016.3			128.5		18016.4
20	17909.1	101.3			17899.5			123.4		17901.9
21	18136.5	101.8			18129.9			123.5		18127.4
22	17902.8	101.8			17895.1			123.9		17893.2
23	18260.4	105.4			18252.7			126.0		18248.7
24	17899.7	99.0			17893.4			122.2		17891.1
25	17902.9	108.7			17900.3			123.6		17893.7
26	18274.7	109.0			18272.2			124.9		18264.1
27	17832.0	108.8			17828.7			124.2		17822.3
28	17881.3	106.1			17878.9			121.6		17871.9
29	17962.3	109.2			17960.4			124.6		17951.7
30	17816.6	106.6			17816.2			122.0		17806.6

Mean		106.6						126.1		
Min		98.8						120.3		
Max		113.2						133.1		



Reliability Test Laboratory
Columbus, Nebraska

Test Report Number

154292

Requested By:

BENJAMIN MOLINS

Test Specification

AEC-Q200 Rev.E

Internal

Evaluation

LTO100 50Ω ELECTROSTATIC DISCHARGE

Assigned Test Technician

KRISTI MARTENSEN

Report Prepared By Date Signed: Jun-06-23

KRISTI MARTENSEN

Report Reviewed by Date Signed: Jun-06-23

HANNAH JONES

The contents of this report are representative of the samples tested. The results of this report can only be reproduced in its entirety if permission has been given from the Vishay Columbus Reliability Test Laboratory.

Measurement uncertainty is available upon request.



Reliability Test Laboratory
Columbus, Nebraska

TEST REPORT INDEX
Test Report Number
154292

Date Report Prepared
Jun-06-23

VISHAY Style	Unit Value	Test Name	Page Number	Test Lab ID Number
LTO100	50.000 Ohms	Electrostatic Discharge	4	2323001001



Reliability Test Laboratory
Columbus, Nebraska

TEST REPORT SUMMARY

Test Report Number
154292

Date Report Prepared
Jun-06-23

Test Specification

AEC-Q200-E

Test Group: 17

Test Period:

Sub Group:

Characteristic:

Test Lab Group Number
23230010

Vishay Style: LTO100

Value: 50.000 Ohms

Customer Style:

Number of Units submitted: 15

Test Name: Electrostatic Discharge

Sequence No.: 01

Test Limits: $+(0.5\% + 0.005 \text{ Ohms}) : (-0.5\% - 0.005 \text{ Ohms})$

	Minimum % Delta R	Maximum % Delta R	Mean % Delta R	Std. Dev. % Delta R	CPK	Failures
6 Kv	-0.024	0.046	0.015	0.0146	100.000	0
12 Kv	-0.032	0.026	0.009	0.0134	100.000	0
16 Kv	-0.010	0.038	0.021	0.0118	100.000	0
25 Kv	-0.034	0.068	0.013	0.0202	100.000	0



Reliability Test Laboratory
Columbus, Nebraska

Date Report Prepared:

Electrostatic Discharge

Customer:
Specification: AEC-Q200-E
Group: 17
Period:
Characteristic:
Sub Group No:
Sequence No: 1

Quantity of Samples: 15
Vishay Style: LTO100
Customer Style:
Value: 50.000 Ohms
Tolerance: 5 %
Power Rating: 0.000 Watts
Samples Date Code:
Samples Lot Number:

Test Report No
Test Group Number
Requested By
Vishay Location

Start Date
Completion Date

Tested Per Paragraph No:

Test Limits: +(0.5 % + 0.005 Ohms) : (-0.5 % - 0.005 Ohms)

Test Data											
Sample Number	Initial Hrs.		6 Kv		12 Kv		16 Kv		25 Kv		
	Jun-05-23 13:32 Ohms	% Dev. from Nom.	Jun-06-23 07:22 Ohms	% Dev. from Ref.	Jun-06-23 07:48 Ohms	% Dev. from Ref.	Jun-06-23 08:21 Ohms	% Dev. from Ref.	Jun-06-23 08:47 Ohms	% Dev. from Ref.	
1	49.843	-0.314	49.831	-0.024	49.827	-0.032	49.838	-0.010	49.826	-0.034	
2	49.831	-0.338	49.836	0.010	49.838	0.014	49.840	0.018	49.835	0.008	
3	49.745	-0.510	49.754	0.018	49.754	0.018	49.756	0.022	49.751	0.012	
4	49.832	-0.336	49.841	0.018	49.839	0.014	49.848	0.032	49.841	0.018	
5	49.819	-0.362	49.830	0.022	49.825	0.012	49.833	0.028	49.826	0.014	
6	49.675	-0.650	49.687	0.024	49.688	0.026	49.694	0.038	49.685	0.020	
7	49.789	-0.422	49.798	0.018	49.795	0.012	49.805	0.032	49.799	0.020	
8	49.805	-0.390	49.815	0.020	49.811	0.012	49.815	0.020	49.812	0.014	
9	49.768	-0.464	49.777	0.018	49.774	0.012	49.782	0.028	49.777	0.018	
10	49.944	-0.112	49.949	0.010	49.948	0.008	49.950	0.012	49.945	0.002	
11	49.894	-0.212	49.894	0.000	49.892	-0.004	49.898	0.008	49.895	0.002	
12	49.833	-0.334	49.838	0.010	49.835	0.004	49.840	0.014	49.836	0.006	
13	49.763	-0.474	49.769	0.012	49.766	0.006	49.777	0.028	49.770	0.014	
14	49.795	-0.410	49.818	0.046	49.806	0.022	49.805	0.020	49.802	0.014	
15	49.659	-0.682	49.668	0.018	49.665	0.012	49.671	0.024	49.693	0.068	



Reliability Test Laboratory
Columbus, Nebraska

Test Report No: 154292
Test Group Number: 23230010
Sequence No: 1

Date Report Prepared: Jun-06-23

Quantity of Samples: 15

Electrostatic Discharge

	Initial Reading Jun-05-23 13:32 Ohms	% Dev. from Nom.	6 Kv Jun-06-23 07:22 Ohms	% Dev. from Ref.	12 Kv Jun-06-23 07:48 Ohms	% Dev. from Ref.	16 Kv Jun-06-23 08:21 Ohms	% Dev. from Ref.	25 Kv Jun-06-23 08:47 Ohms	% Dev. from Ref.			
Statistics of all Units Meeting Specification at Interval:													
Maximum:	49.944	-0.112	49.949	0.046	49.948	0.026	49.950	0.038	49.945	0.068			
Minimum:	49.659	-0.682	49.668	-0.024	49.665	-0.032	49.671	-0.010	49.685	-0.034			
Range:	0.285	0.570	0.281	0.070	0.283	0.058	0.279	0.048	0.260	0.102			
Mean:	49.7997	-0.4007	49.8070	0.0147	49.8042	0.0091	49.8101	0.0209	49.8062	0.0131			
StdDev: (σ):	0.0737	0.1473	0.0712	0.0146	0.0710	0.0134	0.0705	0.0118	0.0674	0.0202			
Mean+3 σ :	50.0206	0.0413	50.0205	0.0585	50.0172	0.0493	50.0216	0.0564	50.0085	0.0736			
Mean -3 σ :	49.5787	-0.8426	49.5935	-0.0292	49.5912	-0.0312	49.5987	-0.0146	49.6039	-0.0475			
Count:	15		15		15		15		15				
CPK:	100,000		100,000		100,000		100,000		100,000				

Incidental Data

General Information:

Reading Bridge Number: RRS4
PC Board Number: Discrete

Humidity:

Temperature:

Comments:

40

Equipment List

Equipment ID	Equipment Description
ESD3	ESD Simulator
RRS4	READING BRIDGE
F169	READING FIXTURE

Asset No.
3010497

METROLOGIC MEASUREMENT OF NICE

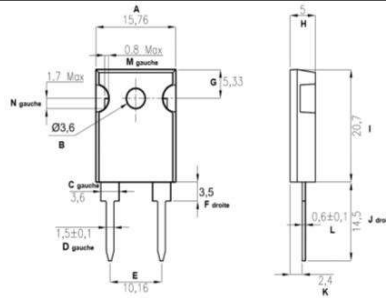
REPORT N° : PR 75738433

Date : 12/06/2023

TYPE OF TEST : Physical Dimension

Dimensions :

Performed: Metrology France



STANDARD : JESD22 Method JB-100

CONDITIONS : Verify physical dimensions

EQUIPMENT: Smartscope - Pied à coulisse - Comparateur

[illegible]

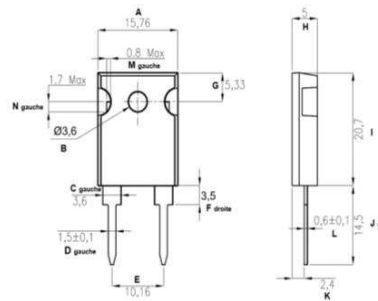
LABORATORY TESTS OF NICE

REPORT N° : PR 75738433

Date : 12/06/2023

TYPE OF TEST : Physical Dimension

Dimensions :



STANDARD : JESD22 Method JB-100

CONDITIONS : Verify physical dimensions

EQUIPMENT: Smartscope - Pied à coulisse - Comparateur

[illegible]

12. QUALIFIED LABORATORY DOCUMENTATION



Certificate of Registration

This certificate has been awarded to

Vishay Components (Huizhou) Co. Ltd. Shatian Branch.

Block C, Antaida Technology Park, Eastern Industrial Park, Shatian Town, Huiyang
Zone, Huizhou City, China

in recognition of the organization's Quality Management System which complies with

IATF 16949:2016

The scope of activities covered by this certificate is defined below

Design and Manufacture of Chip Resistor

Certificate Number 111738/B/0001/SM/En

A certificate number of 0001, confirms the Client has a single site Certified & the site is their Head Office or Main site in relation to the Certified scope with URS. A certificate number of 0002, or greater (e.g.: xxx/B/0002/UK/En) refers to a client that has more than one site certified with URS, as such, the following statement shall apply - 'The validity of this certificate depends on the validity of the main certificate'.

Date of Issue of Certification Cycle	Issue Number	Certificate Expiry Date	Certification Cycle
22 July 2022	2	21 July 2025	2
Revision Date	Revision Number	Original Certificate Issue Date	Scheme Number
22 July 2022	0	18 July 2021	0454298

For detailed explanation for the data fields above, refer to <http://www.urs-holdings.com/logos-and-regulations>

Issued by



On behalf of the Schemes Manager





Appendix to Certificate

Design and Manufacture of Chip Resistor

Support Location:

Vishay Israel Ltd.

3 Hakotser St, Beer Sheva, 8488991

Israel

Support Functions:

IT, Laboratory, Marketing, Product Design and R&D

...

Extended Manufacturing site:

Vishay Components (Huizhou) Co., Ltd. Longxi Branch

Floor 4, Block 408B, Surface Treatment Industrial Park

Longqiao Avenue, Longxi Street, Boluo County, Huizhou

Guangdong

P.R. China

Activities: Galvanic Coating

Certificate Number **111738/B/0001/SM/En**

A certificate number of 0001, confirms the Client has a single site Certified & the site is their Head Office or Main site in relation to the Certified scope with URS. A certificate number of 0002, or greater (e.g.: xxxx/B/0002/UK/En) refers to a client that has more than one site certified with URS, as such, the following statement shall apply - 'The validity of this certificate depends on the validity of the main certificate'.

Date of Issue of Certification Cycle	Issue Number	Certificate Expiry Date	Certification Cycle
22 July 2022	2	21 July 2025	2
Revision Date	Revision Number	Original Certificate Issue Date	Scheme Number
22 July 2022	0	18 July 2021	0454298

For detailed explanation for the data fields above, refer to <http://www.urs-holdings.com/logos-and-regulations>

Issued by



On behalf of the Schemes Manager





One of the World's Largest
Manufacturers
of Discrete Semiconductors and Passive Components

SFERNICE DIVISION

CERTIFICATIONS

Annex 2 – Quality Manual

Update list

Edition		Révision		Content
See archives for previous versions				
4		A	09/06/21	Update IATF16949 Blatna & Prachatice Update ISO/TS22163 Update ISO14001 (ONT & MCB) Update ISO45001 (ONT & MCB) Update ISO9001 (ONT & MEX) Delete OHSAS18001 for MCB Add ISO45001 for MCB
		B	21/09/21	Update ISO14001 NICE & HYERES Delete CECC
5	18/08/22	A	28/09/22	Adding ISO9001 for Attleboro
		B	15/10/23	Update ISO9001 and EN9100 for Vishay SA and MCB Update ISO9001 for Attleboro Update ISO14001 & 45001 for Czech Republic Update ISO45001 for Nice & Hyères



One of the World's Largest
Manufacturers
of Discrete Semiconductors and Passive Components

ISO 9001 Certifications



Bureau Veritas Certification

VISHAY

Il s'agit d'un certificat multi-site, le détail des sites est énumérés dans l'annexe de ce certificat

199 BLD DE LA MADELEINE - CS 71159
06003 NICE CEDEX 1 - FRANCE

Bureau Veritas Certification France certifie que le système de management de l'organisme susmentionné a été audité et jugé conforme aux exigences de la norme :

Standard

ISO 9001:2015

Domaine d'activité

DESIGN, MANUFACTURING AND SALES OF PASSIVE COMPONENTS FOR AERONAUTICS, AUTOMOTIVE, MILITARY, SPACE, RAILWAY AND INDUSTRIAL APPLICATIONS OF:

- VERY HIGH PRECISION AND HIGH FREQUENCY RESISTORS;**
- IGNITORS;**
- LINEAR AND ROTATIONAL TRANSDUCERS AND ENCODERS;**
- INDUCTORS AND TRANSFORMERS;**
- FIXED AND POWER RESISTORS;**
- POTENTIOMETERS AND TRIMMERS; CUSTOMERS SERVICE ACTIVITY FOR ALL VISHAY PRODUCTS (SOUTH OF EUROPE SALES ACTIVITY).**

Date de début du cycle de certification : 23 Juin 2023

Sous réserve du respect des dispositions contractuelles et des résultats positifs des surveillances réalisées, ce certificat est valable jusqu'au : 22 Juin 2026

Date d'expiration du cycle précédent : 22 Juin 2023

Date d'audit de certification/recertification : 03 Février 2023

Date originale de certification : 22 Juin 2011

Certificat n°: FR080932 -1

Affaire n°: 16276949

Date de révision : 23 Juin 2023

Samuel DUPRIEU - Président

Adresse de l'organisme certificateur : Bureau Veritas Certification France
Le Triangle de l'Arche - 9 Cours du Triangle - 92937 Paris La Défense

Des informations supplémentaires concernant le périmètre de ce certificat ainsi que l'applicabilité des exigences du référentiel peuvent être obtenues en consultant l'organisme.

Pour vérifier la validité de ce certificat, vous pouvez téléphoner au : + 33 (0)1 41 97 00 60.





BUREAU
VERITAS

Bureau Veritas Certification

Annexe

VISHAY

Standard

ISO 9001:2015

Domaine d'activité

Site	Adresse	Périmètre
VISHAY Fonction Centrale	199 BLD DE LA MADELEINE - CS 71159 06003 NICE CEDEX 1 FRANCE	DESIGN, MANUFACTURING AND SALES OF PASSIVE COMPONENTS FOR AERONAUTICS, AUTOMOTIVE, MILITARY, SPACE, RAILWAY AND INDUSTRIAL APPLICATIONS OF: - VERY HIGH PRECISION AND HIGH FREQUENCY RESISTORS; - IGNITORS; - LINEAR AND ROTATIONAL TRANSDUCERS AND ENCODERS; - INDUCTORS AND TRANSFORMERS; - FIXED AND POWER RESISTORS; - POTENTIOMETERS AND TRIMMERS; CUSTOMERS SERVICE ACTIVITY FOR ALL VISHAY PRODUCTS (SOUTH OF EUROPE SALES ACTIVITY).
RL 2	KASARENSKA 38301 PRACHATICE CZECH REPUBLIC	MANUFACTURING OF PASSIVE COMPONENTS FOR AERONAUTICS, AUTOMOTIVE, MILITARY, SPACE, RAILWAY AND INDUSTRIAL APPLICATIONS OF: - FIXED AND POWER RESISTORS
VISHAY MCB INDUSTRIE	RUE DE LA GRANDE NOE 53200 CHÂTEAU GONTIER FRANCE	DESIGN MANUFACTURING AND SALES OF PASSIVE COMPONENTS FOR AERONAUTICS, AUTOMOTIVE, MILITARY, SPACE, RAILWAY AND INDUSTRIAL APPLICATIONS OF: - LINEAR AND ROTATIONAL TRANSDUCERS AND ENCODERS; - FIXED AND POWER RESISTORS; CUSTOMERS SERVICE ACTIVITY FOR MCB VISHAY PRODUCTS (SOUTH OF EUROPE SALES ACTIVITY).

Certificat n°: FR080932 -1

Affaire n°: 16276949

Date de révision : 23 June 2023

Samuel DUPRIEU - Président

Adresse de l'organisme certificateur : Bureau Veritas Certification France
Le Triangle de l'Arche - 9 Cours du Triangle - 92937 Paris La Défense

Des informations supplémentaires concernant le périmètre de ce certificat ainsi que
l'applicabilité des exigences du référentiel peuvent être obtenues en consultant
l'organisme.

Pour vérifier la validité de ce certificat, vous pouvez téléphoner au : + 33 (0)1 41 97 00 60.

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sur www.cofrac.fr



Annexe VISHAY

Standard

ISO 9001:2015

Domaine d'activité

Site	Adresse	Périmètre
VISHAY S.A. ELECTRONIC .SR.O.	LUCNI 429 38451 VOLARY CZECH REPUBLIC	MANUFACTURING OF PASSIVE COMPONENTS FOR AERONAUTICS, AUTOMOTIVE, MILITARY, SPACE, RAILWAY AND INDUSTRIAL APPLICATIONS OF : - POTENTIOMETERS AND TRIMMERS
VISHAY SA ELECTRONIC SRO	ZAVOD, PIVOVARSKA 1220 38301 PARACHATICE CZECH REPUBLIC	DESIGN MANUFACTURING AND SALES OF PASSIVE COMPONENTS FOR AERONAUTICS, AUTOMOTIVE, MILITARY, SPACE, RAILWAY AND INDUSTRIAL APPLICATIONS OF: - LINEAR AND ROTATIONAL TRANSDUCERS AND ENCODERS; - FIXED AND POWER RESISTORS; CUSTOMERS SERVICE ACTIVITY FOR MCB VISHAY PRODUCTS (SOUTH OF EUROPE SALES ACTIVITY). MANUFACTURING OF PASSIVE COMPONENTS FOR AERONAUTICS, AUTOMOTIVE, MILITARY, SPACE AND INDUSTRIAL APPLICATIONS OF: - LINEAR AND ROTATIONAL TRANSDUCERS AND ENCODERS; - INDUCTORS AND TRANSFORMERS
VISHAY S.A. HYERES	71, CHEMIN DE LA MAUNIERE 83403 HYERES France	DESIGN AND MANUFACTURING OF PASSIVE COMPONENTS FOR AERONAUTICS, AUTOMOTIVE, MILITARY, SPACE, RAILWAY AND INDUSTRIAL APPLICATIONS OF: - INDUCTORS AND TRANSFORMERS; - POTENTIOMETERS AND TRIMMERS
VISHAY ELECTRONIC SRO BLATNA	PASTICKA 1096 38801 BLATNA FRANCE	MANUFACTURING OF PASSIVE COMPONENTS FOR AERONAUTICS, AUTOMOTIVE, MILITARY, SPACE, RAILWAY AND INDUSTRIAL APPLICATIONS OF: - LINEAR AND ROTATIONAL TRANSDUCERS AND ENCODERS - POTENTIOMETERS AND TRIMMERS

Certificat n°: FR080932 -1

Affaire n°: 16276949

Date de révision : 23 June 2023

Samuel DUPRIEU - Président

Adresse de l'organisme certificateur : Bureau Veritas Certification France
Le Triangle de l'Arche - 9 Cours du Triangle - 92937 Paris La Défense

Des informations supplémentaires concernant le périmètre de ce certificat ainsi que
l'applicabilité des exigences du référentiel peuvent être obtenues en consultant
l'organisme.

Pour vérifier la validité de ce certificat, vous pouvez téléphoner au : + 33 (0)1 41 97 00 60.





MANAGEMENT SYSTEM CERTIFICATE

Certificate no.:
CERT-08892-2006-AQ-HOU-ANAB

Initial certification date:
02 May, 1997

Valid:
09 June, 2021 – 08 June, 2024

This is to certify that the management system of

Vishay Spectrol

4051 Greystone Drive, Ontario, CA, 91761, USA

and the sites as mentioned in the appendix accompanying this certificate

has been found to conform to the Quality Management System standard:

ISO 9001:2015

This certificate is valid for the following scope:

Design and Manufacture of Precision Potentiometers, Position Sensing Devices and Thick Film Resistor Products.

Place and date:
Katy, TX, 17 June, 2021



For the issuing office:
DNV - Business Assurance
1400 Ravello Drive, Katy, TX, 77449-5164, USA

Sherif Mekkawy
Management Representative

Lack of fulfillment of conditions as set out in the Certification Agreement may render this Certificate invalid.

ACCREDITED UNIT: DNV Business Assurance USA Inc., 1400 Ravello Drive, Katy, TX, 77449, USA - TEL: +1 281-396-1000. www.dnv.com



Certificate no.: CERT-08892-2006-AQ-HOU-ANAB
Place and date: Katy, TX, 17 June, 2021

Appendix to Certificate

Vishay Spectrol

Locations included in the certification are as follows:

Site Name	Site Address	Site Scope
Vishay Spectrol	4051 Greystone Drive, Ontario, CA, 91761, USA	Design and Manufacture of Precision Potentiometers, Position Sensing Devices and Thick Film Resistor Products
Vishay Spectrol	Avenida Galaxia #36, BC 21210, Mexicali, Mexico	Manufacture Of Precision Potentiometers and Position Sensing Devices





America

CERTIFICATE

Certificate Registration No: 951 00 1288

The Certification Body of
TÜV SÜD AMERICA INC.

Certifies that the organization

Vishay Sprague, Inc. (d/b/a Vishay Barry)
60 Walton St
Attleboro, MA 02703 USA

for the scope

Design and Manufacture of Passive Components and Packaging using
Thick Film Screen Printing, Low Temperature Co-fired Ceramic (LTCC),
High Temperature Co-fired Ceramic (HTCC), Laser Machining, Vacuum
Brazing and Assembly

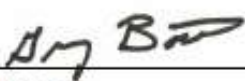
has established and applies a Quality Management System.

An audit was performed and has furnished proof that the requirements according to

ISO 9001:2015

are fulfilled.

The certificate is valid from September 29, 2023 until September 28, 2026
With a re-issue date on N/A


Greg Bates
Director Business Assurance America



TÜV SÜD America Inc • 401 Edgewater Place, Suite 500 • Wakefield, MA 01880 USA • www.TUVSUD.com

The validity of this certificate is contingent on the company maintaining its management system to the requirements of the indicated standard and is subject to regular monitoring by TÜV SÜD America.

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EN 9100 Certifications



Bureau Veritas Certification

VISHAY SFERNICE DIVISION

This is a multi-site certificate, the details of the sites are listed in the appendix of this certificate

199 BLD DE LA MADELEINE - CS 71159
06003 NICE CEDEX 1 - FRANCE

Bureau Veritas Certification certify that the Management System of the above organisation has been audited in accordance with the relevant Aerospace Supplier Quality system Certification Scheme EN9104-001:2013 and found to be in accordance with the requirements of the management system standard detailed below:

Standard

EN 9100:2018
AS 9100:D - JISQ 9100:2016

Scope of certification

DESIGN, MANUFACTURING AND SALES OF PASSIVE COMPONENTS FOR AERONAUTICS, MILITARY AND SPACE APPLICATIONS:

- VERY HIGH PRECISION AND HIGH FREQUENCY RESISTORS;
- LINEAR AND ROTATIONAL TRANSDUCERS AND ENCODERS;
- INDUCTORS AND TRANSFORMERS; CUSTOMERS SERVICE ACTIVITY FOR ALL VISHAY PRODUCTS (SOUTH OF EUROPE SALES ACTIVITY).

Certification structure: **Multiple Sites**

Certificate Issue Date: **30 June 2023**

Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on (Certification Expiry date): **29 June 2026**

Original certification date: **24 June 2011**

Certificate: **16276949-Rev0**

File number: **FR080933-1**

Date de révision : **23 June 2023**

Samuel DUPRIEU - Président

Local office: Bureau Veritas Certification France
Le Triangle de l'Arche - 9 Cours du Triangle - 92937 Paris La Défense

Further clarifications regarding the scope of this certificate the applicability of the management system requirements may be obtained by consulting the organization.
To check this certificate validity, please call + 33(0) 1 41 97 00 60.





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APPENDIX

VISHAY SFERNICE DIVISION

Standard

EN 9100:2018
AS 9100:D - JISQ 9100:2016

Scope of certification

Site	Adress	Scope
VISHAY SFERNICE DIVISION <i>Central Function</i>	199 BLD DE LA MADELEINE - CS 71159 06003 NICE CEDEX 1 FRANCE	DESIGN, MANUFACTURING AND SALES OF PASSIVE COMPONENTS FOR AERONAUTICS, MILITARY AND SPACE APPLICATIONS: - VERY HIGH PRECISION AND HIGH FREQUENCY RESISTORS; - LINEAR AND ROTATIONAL TRANSDUCERS AND ENCODERS; CUSTOMERS SERVICE ACTIVITY FOR ALL VISHAY PRODUCTS (SOUTH OF EUROPE SALES ACTIVITY).
VISHAY ELECTRONIC SRO PRACHATICE 1	ZAVOD, PIVOVARSKA 1220 38301 PARACHATICE CZECH REPUBLIC	MANUFACTURING OF PASSIVE COMPONENTS FOR AERONAUTICS AND SPACE APPLICATIONS: - LINEAR AND ROTATIONAL TRANSDUCERS AND ENCODERS; - INDUCTORS AND TRANSFORMERS
VISHAY MCB INDUSTRIE SAS CHATEAU- GONTIER	RUE DE LA GRANDE NOE 53200 CHÂTEAU GONTIER FRANCE	DESIGN MANUFACTURING AND SALES OF PASSIVE COMPONENTS FOR AERONAUTICS, MILITARY AND SPACE APPLICATIONS: - LINEAR AND ROTATIONAL TRANSDUCERS AND ENCODERS; CUSTOMERS SERVICE ACTIVITY FOR MCB VISHAY PRODUCTS (SOUTH OF EUROPE SALES ACTIVITY).
VISHAY SA HYERES	71 CHEMIN DE LA MAUNIERE 83403 HYERES FRANCE	DESIGN AND PLANNING FOR MANUFACTURING OF PASSIVE COMPONENTS FOR AERONAUTICS, MILITARY AND SPACE APPLICATIONS, OF : - INDUCTORS AND TRANSFORMERS

Certificate: : 16276949-Rev0

File number: FR080933

Date de révision : 23 June 2023

Samuel DUPRIEU - Président

Local office: Bureau Veritas Certification France
Le Triangle de l'Arche - 9 Cours du Triangle - 92937 Paris La Défense

Further clarifications regarding the scope of this certificate the applicability of the
management system requirements may be obtained by consulting the organization.
To check this certificate validity, please call + 33(0) 1 41 97 00 60.



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IATF 16949 Certifications



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Bureau Veritas Certification

Certificate of Approval

Awarded to

VISHAY ELECTRONIC spol.s r.o.

Paštická 1096, 38801, Blatná - Czech Republic

Bureau Veritas Certification certify that the Quality Management System of the above organisation has been audited and found to be in accordance with the requirements of

IATF 16949 - First Edition

and the applicable customer specific requirements



SCOPE

Design and manufacturing

PERMITTED EXCLUSION(S)

None

PRODUCT(S) DELIVERED

Electronic Transducers obtained by moulding, screen printing and assembly

Date Of Certification: 25-May-2021

Date Of Expiration: 24-May-2024

IATF Certificate N°: 401854

Bureau Veritas Certification Certificate N°: FRA-22625/2- IATF

Revision: 1





Appendix to the Certificate of Approval

Awarded to

VISHAY ELECTRONIC spol.s r.o.

Paštická 1096, 38801, Blatná - Czech Republic

REMOTE SUPPORT FUNCTION(S)

Name	Address	Scope
VISHAY ELECTRONIC spol.s r.o. (LOGISTIC CENTRE DR)	Bergmannova 399 CZ, 35604, Dolnu Rychnov - Czech Republic	Distribution, Warehousing, Logistic
VISHAY NICE	199, Boulevard De La Madeleine, 06003, Nice Cedex 1 - France	Contract Review, Supplier Management, Customer Service, Internal Audit Management, Management Review, Marketing, Quality System Management, Sales, Strategic Planning, Engineering, Laboratory, Process Design, Product Design, R&D, Testing, Production Equipment Development, Purchasing, Continuous Improvement
Vishay Electronic GmbH	Dr. - Felix-Zandman- Platz 1, 95100, Selb Germany	Sales, Contract Review

Date Of Certification: 25-May-2021

Date Of Expiration: 24-May-2024

IATF Certificate N°: 401854

Bureau Veritas Certification Certificate N°: FRA-22625/2- IATF

Revision:1






BUREAU
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Bureau Veritas Certification

Certificate of Approval

Awarded to

VISHAY ELECTRONIC spol.s r.o.

1143 Kasarenska, 38301, Prachatice - Czech Republic

Bureau Veritas Certification certify that the Quality Management System of the above organisation has been audited and found to be in accordance with the requirements of

IATF 16949 - First Edition

and the applicable customer specific requirements



SCOPE

Design and manufacturing

PERMITTED EXCLUSION(S)

None

PRODUCT(S) DELIVERED

Fixed resistors assembled

Date Of Certification: 25-May-2021

Date Of Expiration: 24-May-2024

IATF Certificate N°: 401424

Bureau Veritas Certification Certificate N°: FRA-22625/1- IATF

Revision:1

For Bureau Veritas Certification Holding, Le Triangle de l'Arche, 8 Cours du Triangle - 92800 Puteaux - France

[The official document is in English. Any translations of this document shall be used for reference only.]





Appendix to the Certificate of Approval

Awarded to

VISHAY ELECTRONIC spol.s r.o.

1143 Kasarenska, 38301, Prachatice - Czech Republic

REMOTE SUPPORT FUNCTION(S)

Name	Address	Scope
VISHAY NICE	199, boulevard de la Madeleine, 06003, Nice Cedex 1 - France	Continuous Improvement, Supplier Management, Customer Service, Internal Audit Management, Management Review, Marketing, Quality System Management, Sales, Strategic Planning, Engineering, Laboratory, Process Design, Product Design, R&D, Testing, Production Equipment Development, Purchasing, Contract Review
VISHAY ELECTRONIC spol. s r.o. (LOGISTIC CENTRE DR)	Bergmannova 399 CZ, 35604, Dolnu Rychnov - Czech Republic	Distribution, Warehousing, Logistic
Vishay Electronic GmbH	Dr.-Felix-Zandman-Platz 1, 95100, Selb Germany	Sales, Customer Service

Date Of Certification: 25-May-2021

Date Of Expiration: 24-May-2024

IATF Certificate N°: 401424

Bureau Veritas Certification Certificate N°: FRA-22625/1- IATF

Revision:1






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ISO-TS22163 Certification (IRIS)



C E R T I F I C A T E

awarded to

VISHAY MCB Industrie SAS
3, rue de la grande noé
53200, Château-Gontier
France

BUREAU VERITAS CERTIFICATION

confirms, as an IRIS Certification® approved certification body, that the Management System of the above organization has been assessed and found to be in accordance with the

IRIS Certification® Conformity assessment:2020 and based on ISO/TS 22163:2017

for the activities of Design and Development and Manufacturing
for the scopes of certification: 04 (Power system, drive unit), 19 (Single railway components)

Design, development and manufacturing for the products of analogical and digital motion and transducers, electrical resistors, electro-mechanical sub-assemblies and main conditioners

Certificate valid from: 06/04/2021

Certificate valid until: 05/04/2024*

Current date: 05/04/2021

Certificate-Register-No: FRA -IR - 000 1445

* Providing that the subsequent surveillance audits are successful before the validity date of the previous audit.

Certification body address: Le Triangle de l'Arche 8, cours du Triangle - CS 90096, 92937 Paris la Defense Cedex, France



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ISO 14001 Certifications

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Certificate CZ22/0084
Issue 1

The management system of

VISHAY ELECTRONIC spol. s r.o.

Address: Mlýnská 1096, 334 01 Přeštice, Czech Republic

has been assessed and certified as meeting the requirements of



ISO 14001:2015

for the following activities

Production of Passive Electronic Components

Certification is valid from 12 September 2022 until 11 September 2025
and remains valid subject to satisfactory surveillance audits
Recertification audit due before 28 August 2025
Certified since September 2005
Date of Issue: 12 September 2022

This is a multi-site certification
Additional site details are listed on the subsequent page

Mgr. Jan Chyba
Certification Manager

Authorised by

RNDr. Jan Chochlál
Managing Director



S 3231

SGS ICS Czech Republic, s.r.o.
K Hájem 1233/2 155 00 Praha 5 – Stodůlky, Česká republika
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Certificate CZ22/0084, continued

VISHAY ELECTRONIC spol. s r.o.

ISO 14001:2015

Issue 1



Additional Facilities:

Mlýnská 1095, 334 01 Přeštice, Czech Republic

Summary of Activities:

Production of Passive Electronic Components

Paštická 1243, 388 01 Blatná, Czech Republic

Summary of Activities:

Production of Passive Electronic Components

Riegrova 1231, 388 01 Blatná, Czech Republic

Summary of Activities:

Production of Passive Electronic Components

Paštická 1096, 388 01 Blatná, Czech Republic

Summary of Activities:

Production of Passive Electronic Components



Certificate CZ20/1050

The management system of

VISHAY ELECTRONIC spol. s r.o.

SGS

Masarykovo nám. 326, 334 01 Píseňice, Czech Republic

has been assessed and certified as meeting the requirements of

ISO 14001:2015

for the following activities

Production of Passive Electronic Components.

This certificate is valid from 12 September 2023 until 11 September 2026 and remains valid subject to satisfactory surveillance audits.
Issue 3. Certified since September 2005.

Certified activities performed by additional sites are listed on subsequent pages.

Authorised by
Mgr. Jan Chyba

Authorised by
RNDr. Jan Chochol

SGS ICS Czech Republic, s.r.o.
K Hájem 1233/2 155 00 Praha 5 – Stodůlky, Česká Republika
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Certificate CZ20/1050, continued

VISHAY ELECTRONIC spol. s r.o.

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ISO 14001:2015

Issue 3
Sites
VISHAY ELECTRONIC spol. s r.o. PT1-Pivovarská 1220, 383 01 Prachatice, Czech Republic Production of Passive Electronic Components.
VISHAY ELECTRONIC spol. s r.o. PT2-Kasárenská 1143, 383 01 Prachatice, Czech Republic Production of Passive Electronic Components.
VISHAY ELECTRONIC spol. s r.o. PT3-Nádražní ul., 383 01 Prachatice, Czech Republic Production of Passive Electronic Components.
VISHAY ELECTRONIC spol. s r.o. VOLARY-Luční 429, 384 51 Volary, Czech Republic Production of Passive Electronic Components.



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BUREAU VERITAS
Certification



VISHAY

Il s'agit d'un certificat multi-site, le détail des sites est énuméré dans l'annexe de ce certificat

199 BOULEVARD DE LA MADELEINE
06003 – NICE CEDEX 1, FRANCE

Bureau Veritas Certification France certifie que le système de management de l'organisme susmentionné a été audité et jugé conforme aux exigences de la norme :

Standard

ISO 14001:2015

Domaine d'activité

**CONCEPTION ET PRODUCTION DE COMPOSANTS
ELECTRONIQUES PASSIFS.**

**DESIGN AND PRODUCTION OF PASSIVE
ELECTRONIC COMPONENTS.**

Date d'entrée en vigueur : 30 août 2021

Sous réserve du fonctionnement continu et satisfaisant du système de management de l'organisme, ce certificat est valable jusqu'au : 12 juin 2024

Certificat n° : FR066840-1

Date: 09 septembre 2021

Affaire n° : 10148978

Laurent CROGUENEC - Président

Adresse de l'organisme certificateur : Bureau Veritas Certification France
Le Triangle de l'Arche - 9 Cours du Triangle - 92937 Paris La Défense

Des informations supplémentaires concernant le périmètre de ce certificat ainsi que l'applicabilité des exigences du système de management peuvent être obtenues en consultant l'organisme.
Pour vérifier la validité de ce certificat, vous pouvez téléphoner au : + 33 (0)1 41 97 00 60.



BUREAU VERITAS
Certification



ANNEXE VISHAY

Standard

ISO 14001:2015

Périmètre de Certification

SITE	ADRESSE	PERIMETRE
VISHAY S.A. DIVISION SERNICE - NICE	199 BOULEVARD DE LA MADELEINE 06003 – NICE CEDEX 1, FRANCE	CONCEPTION ET PRODUCTION DE COMPOSANTS ELECTRONIQUES PASSIFS. DESIGN AND PRODUCTION OF PASSIVE ELECTRONIC COMPONENTS.
VISHAY		
VISHAY	LA MAUNIERE 83400 – HYERES, FRANCE	

Certificat n° : **FR066840-1**

Date: **09 septembre 2021**

Affaire n° : **10148978**

Laurent CROGUENNEC - Président

Adresse de l'organisme certificateur : Bureau Veritas Certification France
Le Triangle de l'Arche - 9 Cours du Triangle - 92937 Paris La Défense

Des informations supplémentaires concernant le périmètre de ce certificat ainsi que l'applicabilité des exigences du système de management peuvent être obtenues en consultant l'organisme.
Pour vérifier la validité de ce certificat, vous pouvez téléphoner au : **+ 33 (0)1 41 97 00 60.**



**BUREAU
VERITAS**



BUREAU VERITAS
Certification



VISHAY MCB INDUSTRIE

RUE DE LA GRANDE NOE - 53200 CHATEAU GONTIER – France

Bureau Veritas Certification Holding SAS – UK Branch certify that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below
Standard

ISO 14001:2015

Scope of certification

DESIGN AND MANUFACTURING OF PASSIVE COMPONENTS FOR AERONAUTICS, AUTOMOTIVE, MILITARY, SPACE, RAILWAY AND INDUSTRIAL APPLICATIONS OF:

- LINEAR AND ROTATIONAL TRANSDUCERS AND ENCODERS**
- FIXED AND POWER RESISTORS.**

Original cycle start date: 20 April 2021
Expiry date of previous cycle: 11 March 2021
Certification / Recertification Audit date: 1 April 2021
Certification / Recertification cycle start date: 20 April 2021

Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on: 19 April 2024

Certificate No : FR065454 - Version 1
File No 9317850

Revision Date : 20 April 2021

Laurent CROGUENNEC – President
Signed on behalf of BVCH SAS UK Branch



Certification body address: 66 Prescott Street, London E1 8HG, United Kingdom.
Local office: Bureau Veritas Certification France : Le Triangle de l'Arche - 9 Cours du Triangle - 92037 Paris La Défense

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organisation.
To check this certificate validity please call + 33(0) 1 41 97 00 60.



MANAGEMENT SYSTEM CERTIFICATE

Certificate no.:
119154-2012-AE-USA-ANAB

Initial certification date:
28 June, 2012

Valid:
09 June, 2021 – 08 June, 2024

This is to certify that the management system of

Vishay Spectrol

4051 Greystone Drive, Ontario, CA, 91761, USA

has been found to conform to the Environmental Management System standard:

ISO 14001:2015

This certificate is valid for the following scope:

Design and Manufacture of Precision Potentiometers, Position Sensing Devices and Thick Film Resistor Products

Place and date:
Katy, TX, 02 June, 2021



For the issuing office:
DNV - Business Assurance
1400 Ravello Drive, Katy, TX, 77449-5154, USA

Shant Mehta
Management Representative

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.

ACCREDITED UNIT: DNV Business Assurance USA Inc., 1400 Ravello Drive, Katy, TX, 77449, USA - TEL: +1 281-396-1000. www.dnv.com



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ISO45001 Certifications

SGS

Certificate CZ22/0085
Issue 1

The management system of

VISHAY ELECTRONIC spol. s r.o.

Address: Mlýnská 1095, 334 01 Přestice, Czech Republic

has been assessed and certified as meeting the requirements of



ISO 45001:2018

for the following activities

Production of Passive Electronic Components

Certification is valid from 27 September 2022 until 26 September 2025
and remains valid subject to satisfactory surveillance audits

Recertification audit due before 28 August 2025

Certified since August 2019

Date of Issue: 12 September 2022

Organization was previously certified to OHSAS 18001:2007 since September 2010

This is a multi-site certification

Additional site details are listed on the subsequent page

Mgr. Jan Chyba
Certification Manager

Mgr. Jan Chodak
Managing Director



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SGS

Certificate CZ22/0085, continued

VISHAY ELECTRONIC spol. s r.o.

ISO 45001:2018

Issue 1



Additional Facilities:

Mlýnská 1095, 334 01 Přeštice, Czech Republic

Summary of Activities:

Production of Passive Electronic Components

Paštická 1243, 388 01 Blatná, Czech Republic

Summary of Activities:

Production of Passive Electronic Components

Riegrova 1231, 388 01 Blatná, Czech Republic

Summary of Activities:

Production of Passive Electronic Components

Paštická 1096, 388 01 Blatná, Czech Republic

Summary of Activities:

Production of Passive Electronic Components



Certificate CZ20/1051

The management system of

VISHAY ELECTRONIC spol. s r.o.

SGS

Masarykovo nám. 326, 334 01 Přeštice, Czech Republic

has been assessed and certified as meeting the requirements of

ISO 45001:2018

for the following activities

Production of Passive Electronic Components.

This certificate is valid from 18 September 2023 until 17 September 2026 and remains valid subject to satisfactory surveillance audits.
Issue 3. Certified since September 2017.

Certified activities performed by additional sites are listed on subsequent pages.



Authorised by
Mgr. Jan Chyba



Authorised by
RNDr. Jan Chochol

SGS ICS Czech Republic, s.r.o.
K Hájem 1233/2 155 00 Praha 5 – Stodůlky, Česká Republika
t +420 234 708 111 - www.sgs.com



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Page 1 / 2



Certificate CZ20/1051, continued

VISHAY ELECTRONIC spol. s r.o.

SGS

ISO 45001:2018

Issue 3
Sites
VISHAY ELECTRONIC spol. s r.o. PT1-Přívokarská 1220, 383 01 Prachatice, Czech Republic
Production of Passive Electronic Components. VISHAY ELECTRONIC spol. s r.o. PT2-Kasárenská 1143, 38301 Prachatice
Production of Passive Electronic Components. VISHAY ELECTRONIC spol. s r.o. PT3-Nádražní ul., 383 01 Prachatice, Czech Republic
Production of Passive Electronic Components. VISHAY ELECTRONIC spol. s r.o. VOLARY-Luční 429, 384 51 Volary, Czech Republic
Production of Passive Electronic Components.



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BUREAU
VERITAS

Bureau Veritas Certification



VISHAY S.A

199 BOULEVARD DE LA MADELEINE 06003 NICE CEDEX 1 - France

Il s'agit d'un certificat multi-site, le détail des sites est énuméré dans l'annexe de ce certificat
Bureau Veritas Certification Holding SAS - UK Branch certifie que le *Système de Management de l'Entreprise* susmentionnée a été évalué et jugé conforme aux exigences de la norme reprise ci-après

ISO 45001:2018

Domaine d'Activité

CONCEPTION ET PRODUCTION DE COMPOSANTS ELECTRONIQUES PASSIFS.

DESIGN AND PRODUCTION OF PASSIVE ELECTRONIC COMPONENTS.

Date de certification originale :	10 juillet 2020
Date d'expiration du cycle précédent:	09 juillet 2023
Date d'audit de certification / recertification:	10 mars 2023
Date de début du Cycle de Certification:	10 juillet 2023
Sous réserve du fonctionnement continu et satisfaisant du Système de Management de l'entreprise, ce certificat est valable jusqu'au:	09 juillet 2026

Numéro de Certificat: FR069077 Version: 1 Date d'émission: 29 juin 2023

Affaire n°: 10148978

Samuel DUPRIEU - Président
Signé au nom de BVCH SAS UK Branch

Adresse de l'organisme de certification: 5th Floor, 66 Prescot Street, London, E1 8HG, United Kingdom

Adresse de l'organisme certificateur : Bureau Veritas Certification France
Tour Alto - 1 Place Zaha Hadid - 92400 Courbevoie

Pour plus d'informations sur la portée et la validité de ce certificat, ainsi que sur l'applicabilité des exigences du système de management, veuillez appeler: + 33 (0)1 41 97 00 60.

UKAS Certificate Template Multi Site Rev.3.10



0008



BUREAU
VERITAS

Bureau Veritas Certification



VISHAY

ISO 45001:2018

Domaine d'Activité

Nom du site	Adresse du site	Périmètre
VISHAY S.A. DIVISION SFERNICE - NICE	199 BOULEVARD DE LA MADELEINE 06003 NICE CEDEX 1 France	CONCEPTION ET PRODUCTION DE COMPOSANTS ELECTRONIQUES PASSIFS.
VISHAY HYERES	LA MAUNIERE 83400 HYERES France	
VISHAY NICE	199 BOULEVARD DE LA MADELEINE 06003 NICE CEDEX 1 France	DESIGN AND PRODUCTION OF PASSIVE ELECTRONIC COMPONENTS.

Numéro de Certificat: FR069077

Version: 1

Date d'émission: 29 juin 2023

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UKAS Certificate Template Multi Site Rev.3.10



0008

BUREAU VERITAS
Certification



VISHAY MCB INDUSTRIE

RUE DE LA GRANDE NOE - 53200 CHATEAU GONTIER – France

Bureau Veritas Certification Holding SAS – UK Branch certify that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

Standard

ISO 45001:2018

Scope of certification

DESIGN AND MANUFACTURING OF PASSIVE COMPONENTS FOR AERONAUTICS, AUTOMOTIVE, MILITARY, SPACE, RAILWAY AND INDUSTRIAL APPLICATIONS OF:

- LINEAR AND ROTATIONAL TRANSDUCERS AND ENCODERS**
- FIXED AND POWER RESISTORS.**

Original cycle start date: 20 April 2021
Expiry date of previous cycle: 11 March 2021
Certification / Recertification Audit date: 1 April 2021
Certification / Recertification cycle start date: 20 April 2021

Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on: 19 April 2024

Certificate No : FR065452 - Version 1
File No 9317850

Revision Date : 20 April 2021

Laurent CROGUENNEC – President
Signed on behalf of BVCH SAS UK Branch

BUREAU VERITAS
Certification



0026



Certification body address: 66 Prescott Street, London E1 8HG, United Kingdom.
Local office: Bureau Veritas Certification France : Le Triangle de l'Arche - 9 Cours
du Triangle - 92037 Paris La Défense

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organisation.
To check this certificate validity please call + 33(0) 1 41 87 00 60.



MANAGEMENT SYSTEM CERTIFICATE

Certificate no.:
10000389714-MSC-ANAB-USA

Initial certification date:
07 September, 2020

Valid:
09 June, 2021 – 08 June, 2024

This is to certify that the management system of
Vishay Spectrol
4051 Greystone Drive, Ontario, CA, 91761, USA

has been found to conform to the Occupational Health and Safety Management System standard:
ISO 45001:2018

This certificate is valid for the following scope:

Design and Manufacture of Precision Potentiometers, Position Sensing Devices and Thick Film Resistor Products

Place and date:
Katy, TX, 02 June, 2021



For the issuing office:
DNV - Business Assurance
1400 Ravello Drive, Katy, TX, 77449-5164, USA

Sherif M. Elawady
Management Representative

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.

ACCREDITED UNIT: DNV Business Assurance USA Inc., 1400 Ravello Drive, Katy, TX, 77449, USA - TEL: +1 281-396-1000. www.dnv.com



Part Submission Warrant

Part Name LTO100-Power Resistor		Customer Part Number	
Shown on Drawing No.		Organization Part # LTO 100, all references	
Engineering Change Level NA		Dated NA	
Additional Engineering Changes NA		Dated NA	
Safety and/or Government Regulation ☐ Yes ☒ No		Purchase Order No. NA	Weight (kg) 0,035Kg
Checking Aid No. NA		Checking Aid Engineering Change Level NA	Dated NA
ORGANIZATION MANUFACTURING INFORMATION		CUSTOMER SUBMITTAL INFORMATION	
Vishay Components (Huizhou) Co. Ltd. Shatian Branch.			
Organization Name & Supplier/Vendor Code		Customer Name/Division	
Antaida Technology Park, Eastern Industrial Park, Shatian Town			
Street Address		Buyer/Buyer Code	
Huizhou City			
City	Region	Postal Code	Country
			China
		Application	
MATERIALS REPORTING			
Has customer-required Substances of Concern information been reported? ☐ Yes ☒ No ☐ n/a			
Submitted by IMDS or other customer format:			
Are polymeric parts identified with appropriate ISO marking codes? ☐ Yes ☒ No ☐ n/a			
REASON FOR SUBMISSION (Check at least one)			
☐ Initial Submission		☐ Change to Optional Construction or Material	
☐ Engineering Change(s)		☐ Supplier or Material Source Change	
☐ Tooling: Transfer, Replacement, Refurbishment, or additional		☐ Change in Part Processing	
☐ Correction of Discrepancy		☒ Parts Produced at Additional Location	
☐ Tooling Inactive > than 1 year		☐ Other - please specify below	
REQUESTED SUBMISSION DOCUMENTS			
☒ Certificate of compliance with the ROHS 2011/65/UE directive		☒ Design Approval	
☐ IMDS registration		☒ Process Flow Chart	
☐ Raw Material conformity		☒ Product FMEA	
☒ Functional Test		☒ Process FMEA	
☒ Dimensional Report		☒ Control Plan	
☐ Packaging instructions		☐ Process Capability	
☐ Appearance Report		☒ Test Equipment Capability (R&R)	
SUBMISSION RESULTS			
The results for ☒ dimensional measurements ☒ material and functional tests ☐ appearance criteria ☐ statistical process package			
These results meet all drawing and specification requirements: ☒ Yes ☐ NO (If "NO" - Explanation Required)			
DECLARATION			
I hereby affirm that the samples represented by this warrant are representative of our parts which were made by a process that meets all Production Part			
I also certify that documented evidence of such compliance is on file and available for review. I have noted any deviations from this declaration below.			
EXPLANATION / COMMENTS:			
Is each Customer Tool properly tagged and numbered? ☐ Yes ☐ No ☒ n/a			
Organization Authorized Signature		Date April, 12th, 2024	
Print Name Benjamin MOLINS		Phone No. +33(0)4 93 37 29 85	
Title Quality Engineer		Fax No.	
E-mail benjamin.molins@vishay.com			
Quality review: Signature + Date B. MOLINS 12/04/2024		Engineering review: Signature + Date	
FOR CUSTOMER USE ONLY (IF APPLICABLE)			
Part Warrant Disposition: ☐ Approved ☐ Rejected ☐ Other			
Customer Signature		Date	
Print Name		Customer Tracking Number (optional)	