

LSOP4, DC Input, Photo Transistor Coupler**Description**

The TCLT1002-ML series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic LSOP4 package.

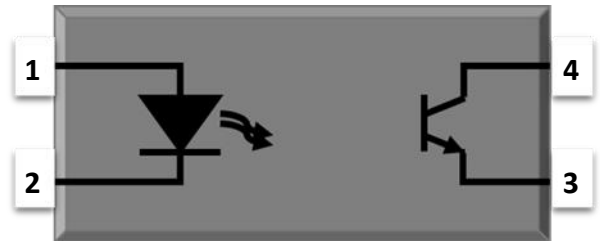
With the robust coplanar double mold structure, TCLT1002-ML series provide the most stable isolation feature.

Features

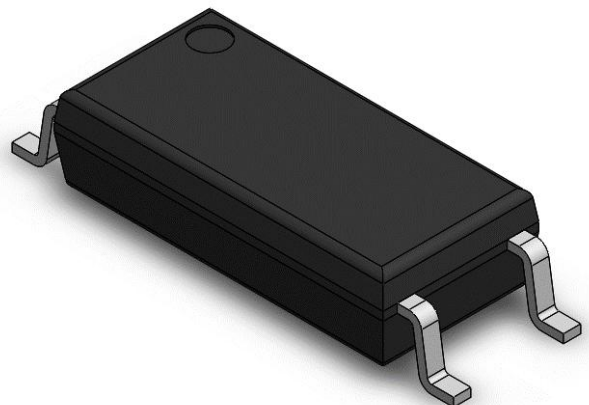
- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- RoHS & REACH Compliance
- Halogen free
- MSL class 1

Applications

- Switch mode power supplies
- Programmable controllers
- Household appliances
- Office equipment

SCHEMATIC**PIN DEFINITION**

1. Anode
2. Cathode
3. Emitter
4. Collector

PACKAGE OUTLINE

LSOP4, DC Input, Photo Transistor Coupler

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	VALUE	UNIT	NOTE
INPUT				
Forward Current	IF	60	mA	
Peak Forward Current	IFP	1	A	1
Reverse Voltage	VR	6	V	
Input Power Dissipation	PI	100	mW	
OUTPUT				
Collector - Emitter Voltage	VCEO	80	V	
Emitter - Collector Voltage	VECO	7	V	
Collector Current	IC	50	mA	
Output Power Dissipation	PO	150	mW	
COMMON				
Total Power Dissipation	Ptot	250	mW	
Isolation Voltage	Viso	5000	Vrms	2
Operating Temperature	Topr	-55~110	°C	
Storage Temperature	Tstg	-55~125	°C	
Soldering Temperature	Tsol	260	°C	

Note 1. 100μs pulse, 100Hz frequency Note 2. AC For 1 Minute,
R.H. = 40 ~ 60%

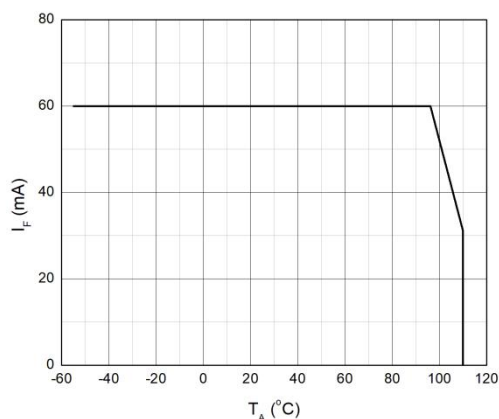
LSOP4, DC Input, Photo Transistor Coupler

ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C							
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT							
Forward Voltage	VF	-	1.24	1.4	V	IF=10mA	
Reverse Current	IR	-	-	10	μA	VR=6V	
Input Capacitance	Cin	-	30	250	pF	V=0, f=1kHz	
OUTPUT							
Collector Dark Current	ICEO	-	-	100	nA	VCE=20V, IF=0	
Collector-Emitter Breakdown Voltage	BVCEO	80	-	-	V	IC=0.1mA, IF=0	
Emitter-Collector Breakdown Voltage	BVECO	7	-	-	V	IE=0.1mA, IF=0	
TRANSFER CHARACTERISTICS							
Current	TCLT1002	CTR	80	-	140	IF=5mA, VCE=5V	
Transfer	TCLT1003		130	-	260		
Ratio	TCLT1004		200	-	400		
Collector-Emitter Saturation Voltage	VCE(sat)	-	0.1	0.3	V	IF=10mA, IC=1mA	
Isolation Resistance	RISO	10 ¹²	10 ¹⁴	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	CIO	-	0.4	1	pF	V=0, f=1MHz	
Cut-off Frequency	Fc	110	-	-	kHz	VCE=2V, IC=2mA RL=100Ω, -3dB	3
Response Time (Rise)	Tr	-	5	18	μs	VCE=2V, IC=2mA RL=100Ω	4
Response Time (Fall)	Tf	-	6	18	μs		4

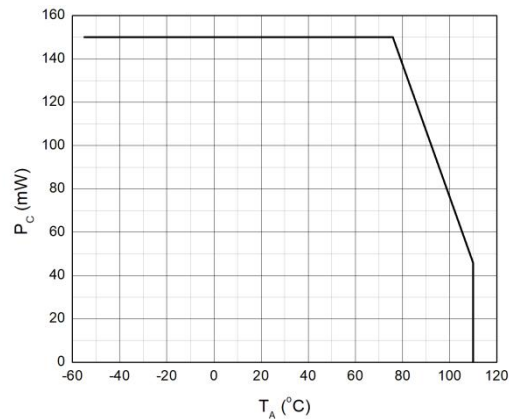
Note 3. Fig.12&13 Note 4.
Fig.14

CHARACTERISTIC CURVES

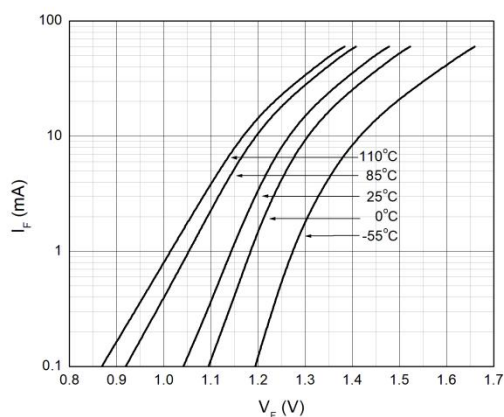
**Fig.1 Forward Current
vs. Ambient Temperature**



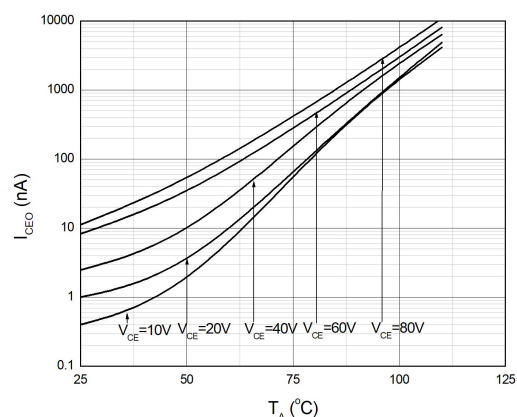
**Fig.2 Collector Power Dissipation
vs. Ambient Temperature**



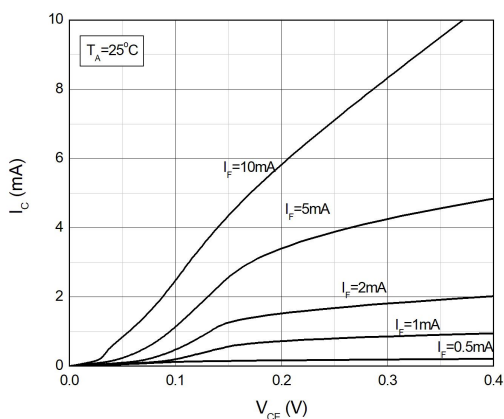
**Fig.3 Forward Current
vs. Forward Voltage**



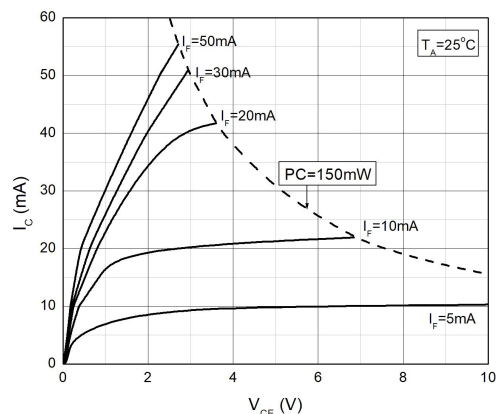
**Fig.4 Collector Dark Current
vs. Ambient Temperature**



**Fig.5 Collector Current
vs. Collector-emitter Voltage**



**Fig.6 Collector Current
vs. Collector-emitter Voltage**



CHARACTERISTIC CURVES

Fig.7 Normalized Current Transfer Ratio vs. Forward Current

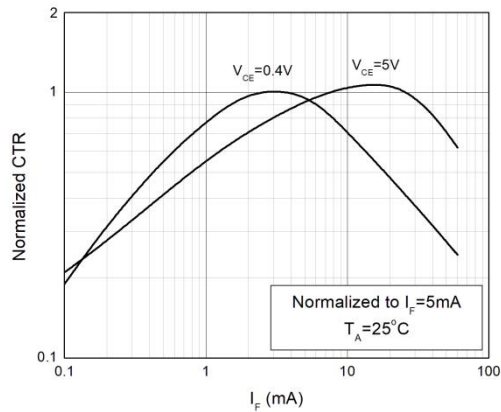


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

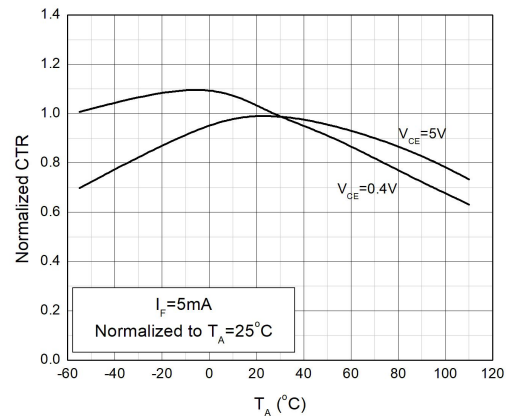


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

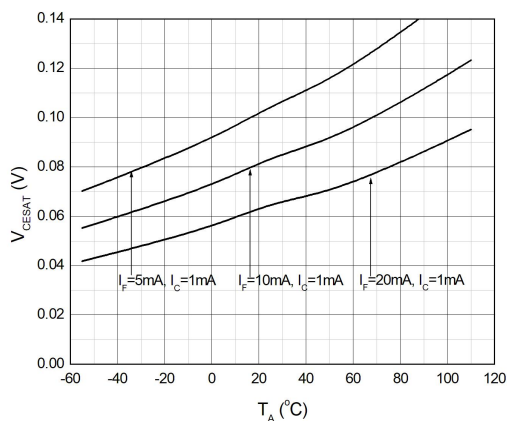


Fig.10 Switching Time vs. Load Resistance

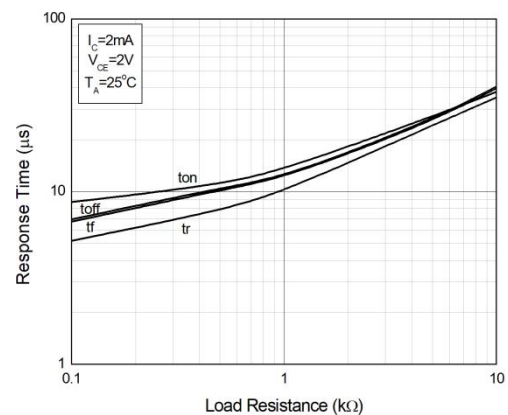
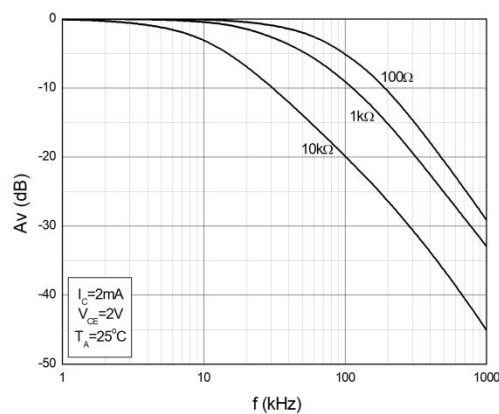


Fig.11 Frequency Response



LSOP4, DC Input, Photo Transistor Coupler

TEST CIRCUITS

Fig.12 Test Circuits of Response Time

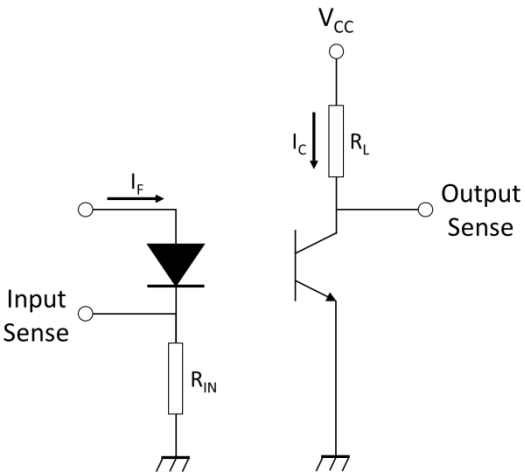


Fig.13 Curves of Response Time

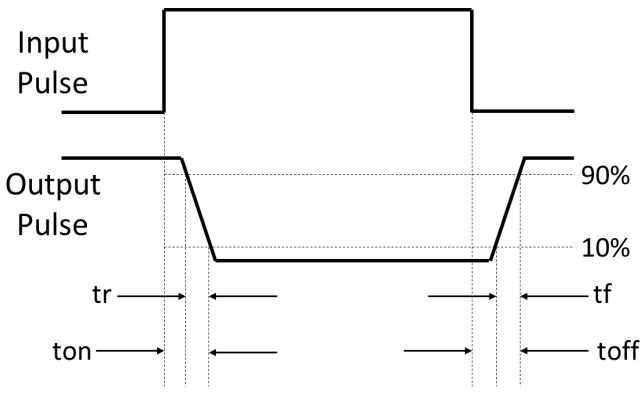
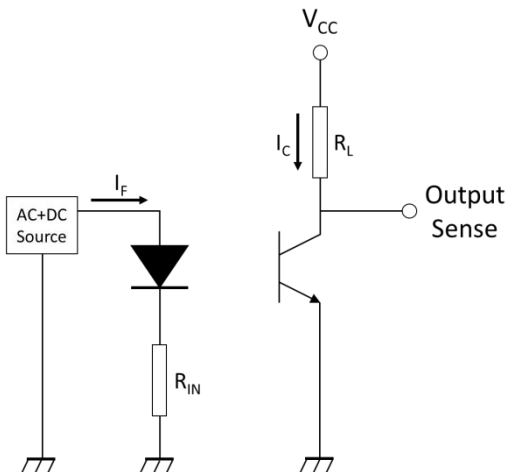
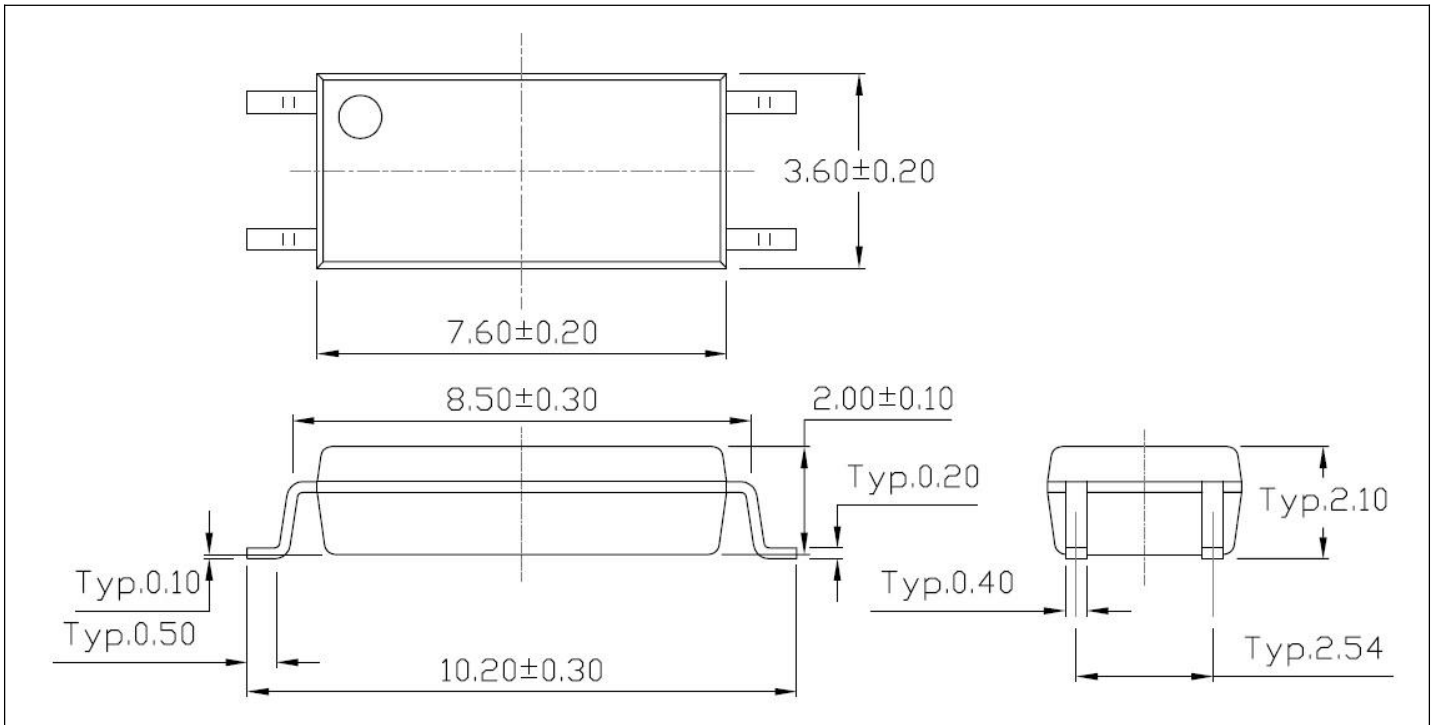


Fig.14 Test Circuits of Frequency Response

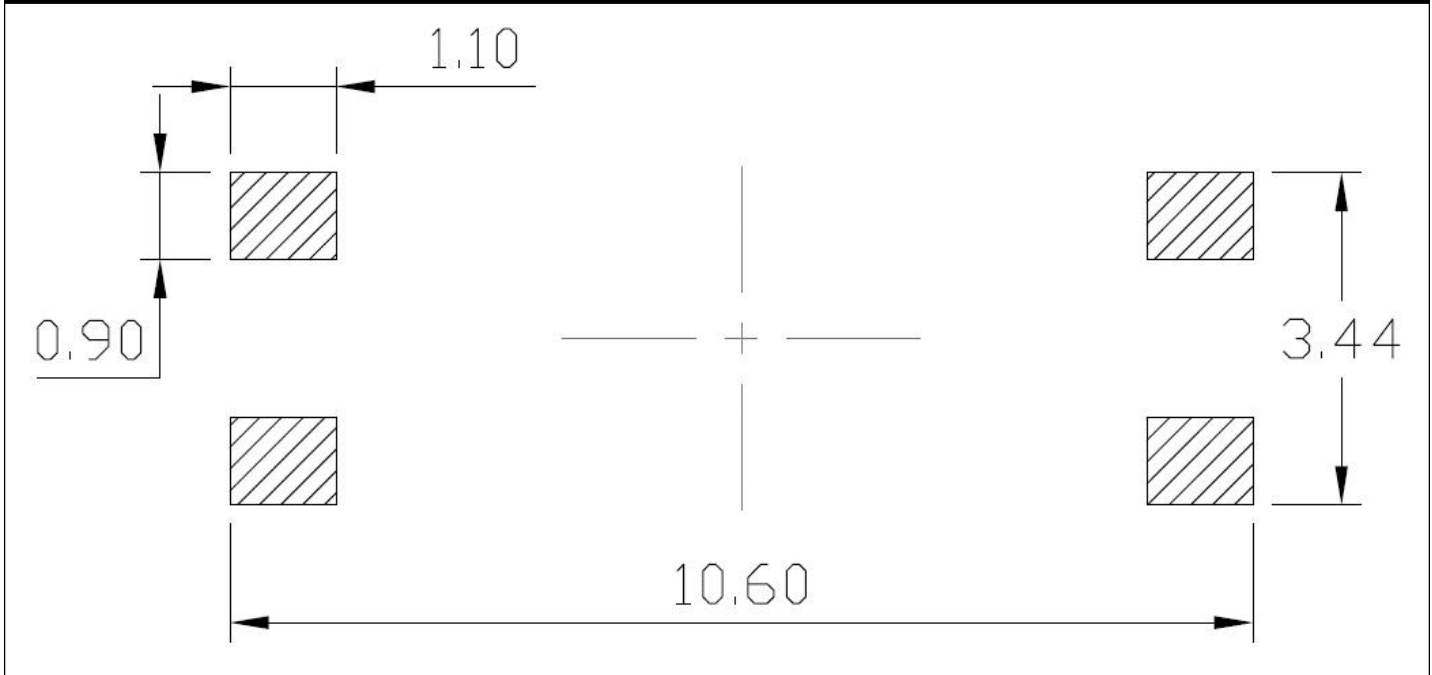


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

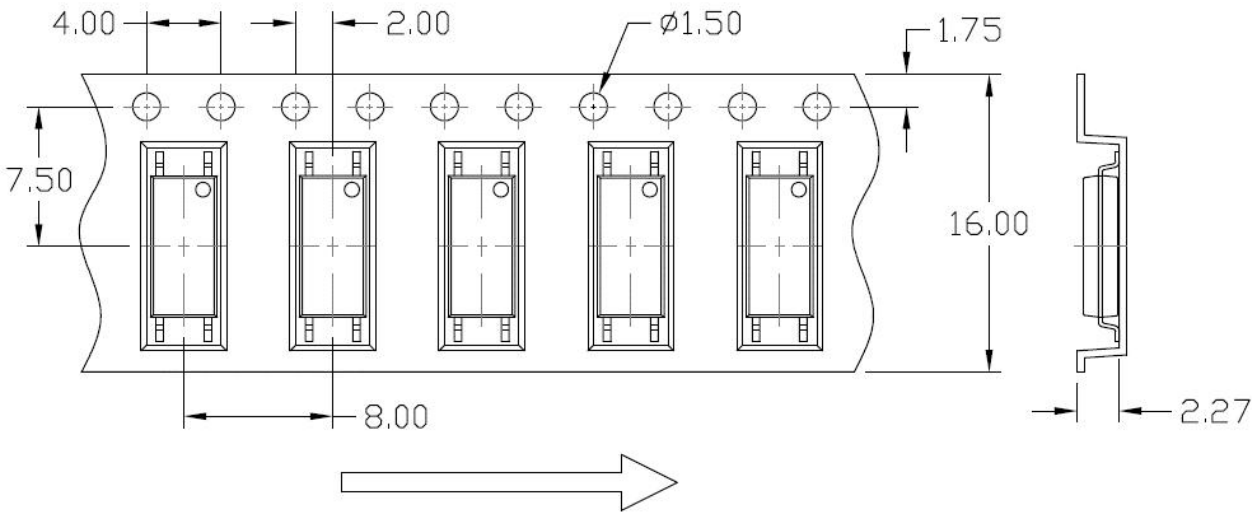
LSOP4, DC Input, Photo Transistor Coupler



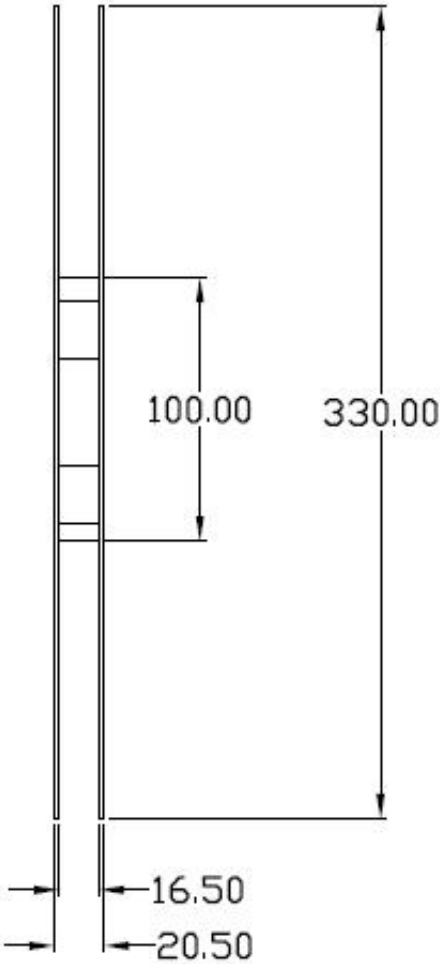
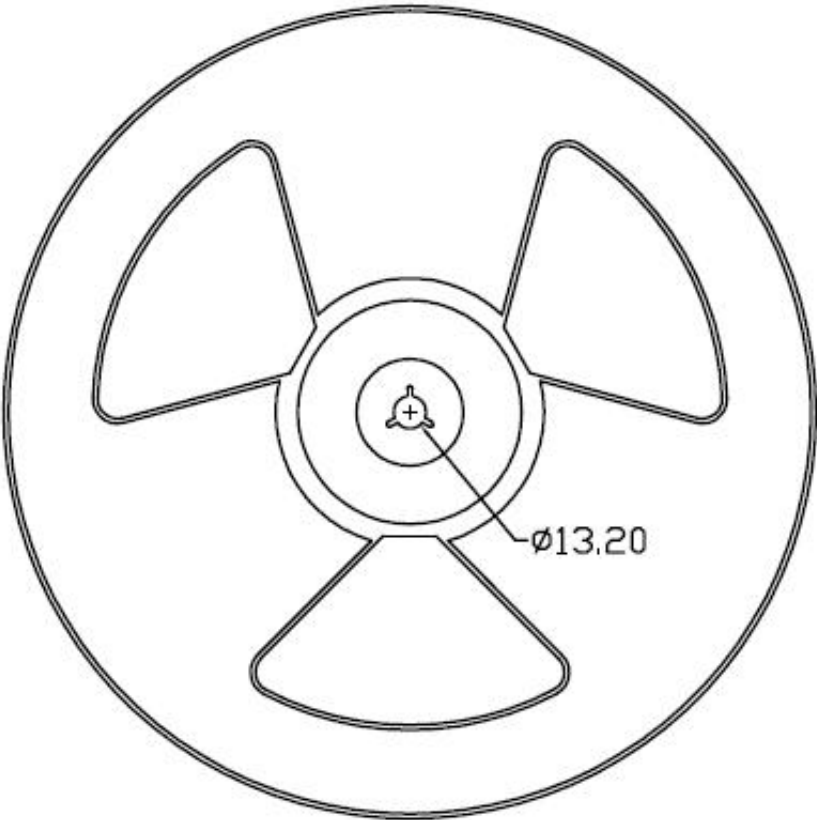
RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)



CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)



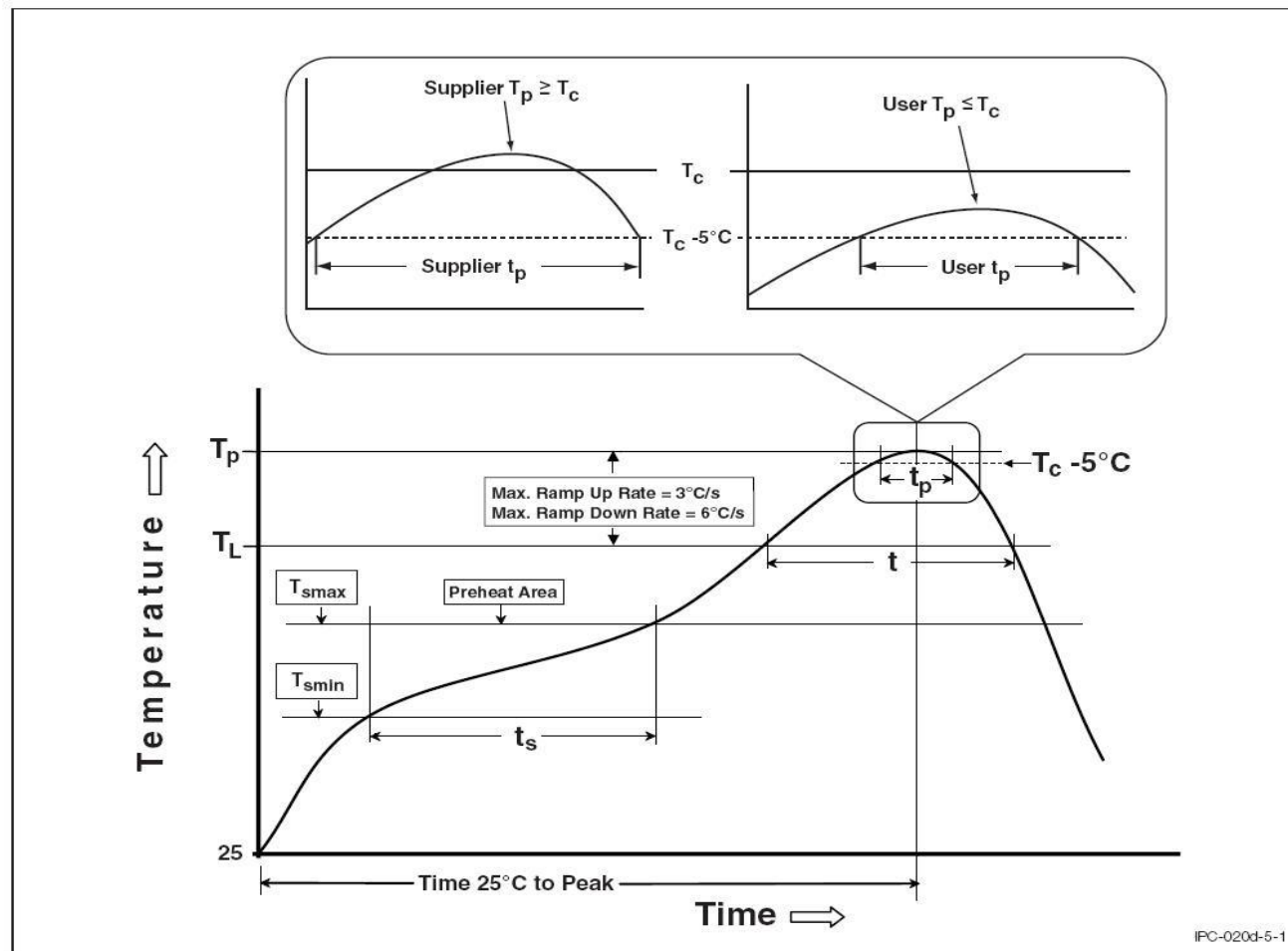
REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)



LSOP4, DC Input, Photo Transistor Coupler

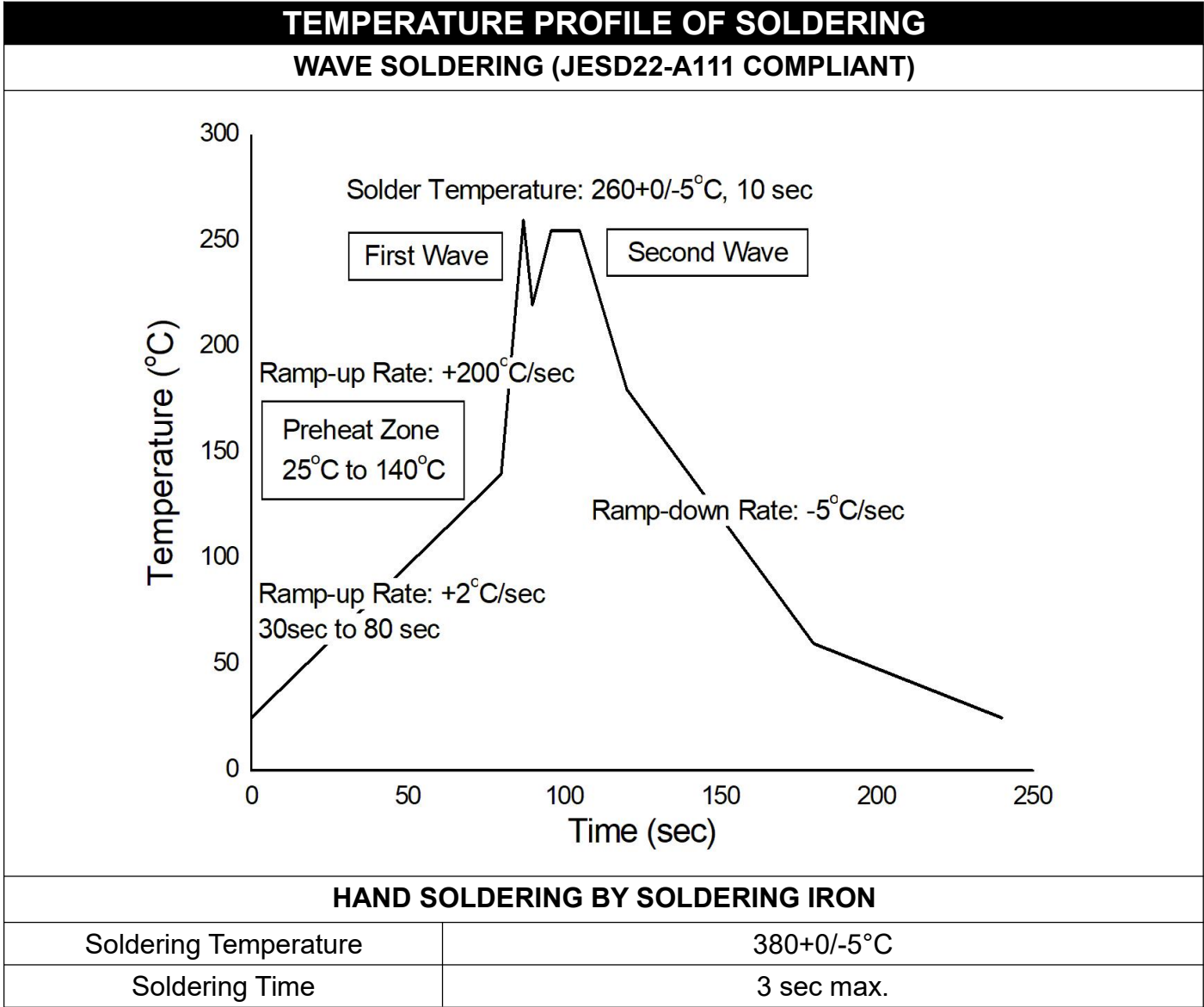
TEMPERATURE PROFILE OF SOLDERING

IR REFLOW SOLDERING



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	100	150°C
Temperature Max. (T _{smax})	150	200°C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds	60-120 seconds
Ramp-up Rate (t _L to t _P)	3°C/second max.	3°C/second max.
Liquidous Temperature (T _L)	183°C	217°C
Time (t _L) Maintained Above (T _L)	60 – 150 seconds	60 – 150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (t _P) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T _P to T _L)	6°C/second max	6°C/second max
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

LSOP4, DC Input, Photo Transistor Coupler



Note 5. One time soldering is recommended for all soldering method.
 Note 6. Do not solder more than three times for IR reflow soldering.