



Product / Process Change Notification (PCN)

- ☒ Major change
☐ Minor change

PCN #: PCN_WPME-FISM_20230818

Affected Series: WPME-FISM, 1769205141; 1769205241;
 1769205341; 1769405141; 1769405241;
 1769405341

PCN Date: May 18, 2023

Effective Date: August 18, 2023

Change Category:

- ☐ Equipment / Location
☒ General Data
☐ Material
☒ Process
☐ Product Design
☐ Shipping / Packaging
☐ Supplier
☐ Software

Contact: Product Management

Phone: +49 (0) 7942 - 945 5001

Fax: +49 (0) 7942 - 945 5179

E-Mail: pcn.eisos@we-online.com

Data Sheet Change:

- ☒ Yes ☐ No

Attachment:

- ☒ Yes ☐ No

Description and purpose of change:

To improve the processability, Würth Elektronik has expanded the reflow solder profile to align with the JEDEC J-STD020E industry standard for reflow soldering.

As a datasheet information amendment, Würth Elektronik has changed the specified switching frequency to create a better understanding between the internal and external switching frequency of the topology and to justify the shown EMC diagrams.

There will be no change in form, fit, function or reliability of the product.

All date codes will be affected by this change.

Detail of Change:

The reflow solder profile peak temperature has been increased to 245°C to meet the JEDEC J-STD020E standard's recommendation for the given package volume and thickness. (Page 30)

Before

HANDLING RECOMMENDATIONS

The power module is classified as MSL1 (JEDEC Moisture Sensitivity Level 1) and requires special handling due to moisture sensitivity (JEDEC J-STD033).

SOLDER PROFILE

1. Measure the peak reflow temperature of the Mag²C power module in the middle of the top view.
2. Ensure that the peak reflow temperature does not exceed 235°C $\pm$ 5°C.
3. The reflow time period during peak temperature of 235°C $\pm$ 5°C must not exceed 30 seconds.
4. Reflow time above liquidus (217°C) must not exceed 150 seconds.
5. Maximum ramp up is rate 3K per second
6. Maximum ramp down rate is 3K per second
7. Reflow time from room (25°C) to peak must not exceed 8 minutes as per JEDEC J-STD020.
8. Maximum numbers of reflow cycles is two.
9. For minimum risk, solder the module in the last reflow cycle of the PCB production.
10. For soldering process please consider lead material copper (Cu) and lead finish tin (Sn).
11. For solder paste use a standard SAC Alloy such as SAC 305, type 3 or higher.
12. Below profile is valid for convection reflow only
13. Other soldering methods (e.g.vapor phase) are not verified and have to be validated by the customer on his own risk

Temperature [°C]

Time [sec]

Peak

Max 240

217

180

150

Preheat

Max 90 sec

Min 60 sec

Ramp Up Rate

Max 3°C/sec

Liquidus

Max 90 sec

Min 60 sec

Max 20 sec

235°C

Ramp Down Rate

Max 3°C/sec

Max 3 solder cycles !

After

21 HANDLING RECOMMENDATIONS

1. The power module is classified as MSL1 (JEDEC Moisture Sensitivity Level 1) and doesn't requires special handling due to moisture sensitivity (JEDEC J-STD033).
2. Parts have unlimited floor life according to JEDEC J-STD033.
3. Maximum numbers of reflow cycles is three.
4. For minimum risk, solder the module in the last reflow cycle of the PCB production.
5. The component lead material is copper (Cu) and the lead finish is ENEPIG (NiPdAu).
6. For solder paste use a standard SAC Alloy such as SAC 305, type 3 or higher.
7. The profile below is valid for convection reflow only
8. Other soldering methods (e.g. vapor phase) are not verified and have to be validated by the customer at their own risk

21.1 Soldering Profile

Table 16: Reflow solder profile.

Profile Feature	Symbol	Value
Preheat temperature minimum	T_{so_min}	150°C
Preheat temperature maximum	T_{so_max}	180°C
Preheat time from T_{so_min} to T_{so_max}	t_{so}	60-90 seconds
Liquidous temperature	T_L	217°C
Time maintained above T_L	t_L	60-90 seconds
Classification temperature	T_C	245°C
Peak package body temperature	T_P	$T_P \leq T_C$
Time within $T_C - 5^\circ\text{C}$ and T_C	t_P	$t_P \leq 20$ seconds
Ramp-up rate (T_L to T_P)		3°C/second maximum
Ramp-down rate (T_P to T_L)		3°C/second maximum
Time 25°C to peak temperature		8 minutes maximum

Please refer to JEDEC J-STD020 for further information pertaining to reflow soldering of electronic components.

Temperature in °C

Time in seconds

Time 25°C to Peak

Preheat Area

Max. Ramp Up Rate

Max. Ramp Down Rate

T_{so_max}

T_{so_min}

t_{so}

T_L

t_L

$T_C - 5^\circ\text{C}$

T_P

t_P

Over T_C

Figure 23: Solder profile.

The switching frequency is now distinguished between internal clock frequency (300kHz), input current frequency (600kHz) and output voltage ripple frequency (600kHz) to give an overview of the occurring / measurable frequencies. (page 7)

Before (1769205x41)							After (1769205x41)						
Switching Frequency							Switching Frequency						
f _{sw}	Switching frequency	V _{IN} nominal, I _{OUT} = 200mA	-	600	-	kHz	f _{sw}	Switching frequency, internal clock	V _{IN} nominal, I _{OUT} = 0.2A	—	300	—	kHz
								Switching frequency, input current	V _{IN} nominal, I _{OUT} = 0.2A	—	600 ⁽¹⁰⁾	—	kHz
								Switching frequency, output voltage ripple	V _{IN} nominal, I _{OUT} = 0.2A	—	600 ⁽¹⁰⁾	—	kHz
Before (1769405x41)							After (1769405x41)						
Switching Frequency							Switching Frequency						
f _{sw}	Switching frequency	V _{IN} nominal, I _{OUT} = 400mA	-	600	-	kHz	f _{sw}	Switching frequency, internal clock	V _{IN} nominal, I _{OUT} = 0.4A	—	300	—	kHz
								Switching frequency, input current	V _{IN} nominal, I _{OUT} = 0.4A	—	600 ⁽¹⁰⁾	—	kHz
								Switching frequency, output voltage ripple	V _{IN} nominal, I _{OUT} = 0.4A	—	600 ⁽¹⁰⁾	—	kHz



Reliability / Qualification Summary:

Components were subjected to five reflow soldering cycles with the new, higher temperature reflow profile. Intermittent and post-stress electrical tests were performed. All components passed all the electrical tests.