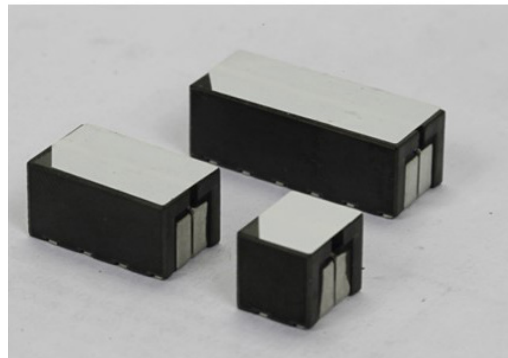


# CL1110-R

## Multi-phase power inductor



### Product features

- High current multi-phase inductor
- 100 nH per phase coupled inductor
- Ferrite core material
- Patents pending
- 11.8 mm wide x 10.5 mm high footprint surface mount package with 10 mm, 19.5 mm, and 29 mm lengths
- Moisture Sensitivity Level (MSL): 1
- Termination finish matte tin over nickel

### Applications

- For exclusive use with Maxim® VPR-Devices

### Environmental data

- Storage temperature range (Component): -40 °C to +125 °C
- Operating temperature range: -40 °C to +125 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant



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**Product specifications**

| Part number <sup>5</sup> | Inductor phases | OCL <sup>1</sup> (nH) ±20%     | OCL <sup>1</sup> (nH) ±20% | FLL <sup>2</sup> (nH) minimum | I <sub>sat</sub> <sup>3</sup> (A) | SCL <sup>4</sup> (nH) ±20% | DCR (mΩ) ±10% @ +20 °C |
|--------------------------|-----------------|--------------------------------|----------------------------|-------------------------------|-----------------------------------|----------------------------|------------------------|
| CL1110-2-100TR-R         | 2               | (3-4) = 450                    | (1-2) = 450                | 340                           | 15                                | 100                        | 0.63                   |
| CL1110-4-100TR-R         | 4               | (3-4),(5-6) = 470              | (1-2),(7-8) = 450          | 340                           | 15                                | 100                        | 0.63                   |
| CL1110-6-100TR-R         | 6               | (3-4),(5-6),(7-8),(9-10) = 470 | (1-2),(11-12) = 450        | 340                           | 15                                | 100                        | 0.63                   |

1. Open Circuit Inductance (OCL) test parameters: 1 MHz, 0.1 Vrms, 0.0 Adc, +25 °C

2. Full Load Inductance (FLL) test parameters: 1 MHz, 0.1 Vrms, I<sub>sat</sub>1, +25 °C

3. I<sub>sat</sub>1: Peak current at which OCL drops approximately 20% at +25 °C

4. Short Circuit Inductance (SCL) test parameters: 1 MHz, 0.1 Vrms, 0.0 Adc, +25 °C ±20%

CL1110-2-100TR-R short (1 & 4), measure (2 & 3), and divide by 2

CL1110-4-100TR-R short (1 & 4), (3 & 6), (5 & 8) measure (2 & 7), and divide by 4

CL1110-6-100TR-R short (1 & 4), (3 & 6), (5 & 8), (7 & 10), (9 & 12) measure (2 & 11), and divide by 6

5. Part number definition: CL1110-x-100TR-R

CL1110 = Product code and size

x = Number of phases

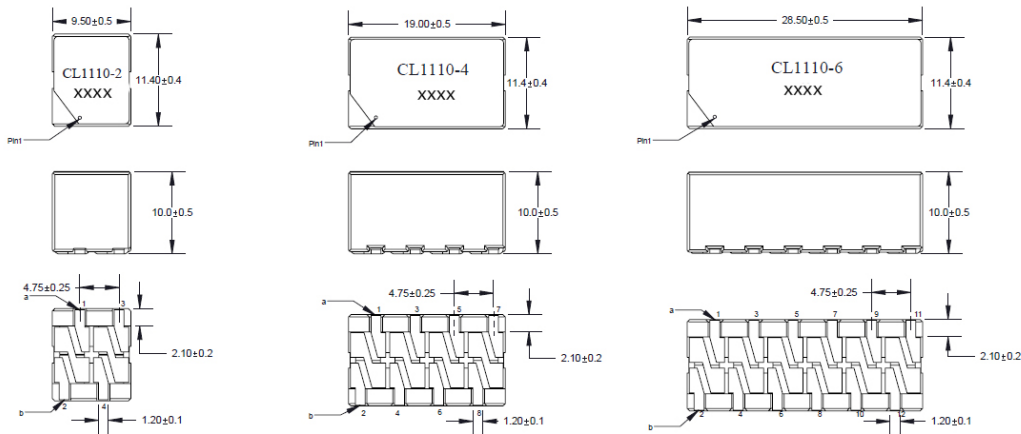
100 = Inductance value per phase in nH

TR = Tape and reel packaging

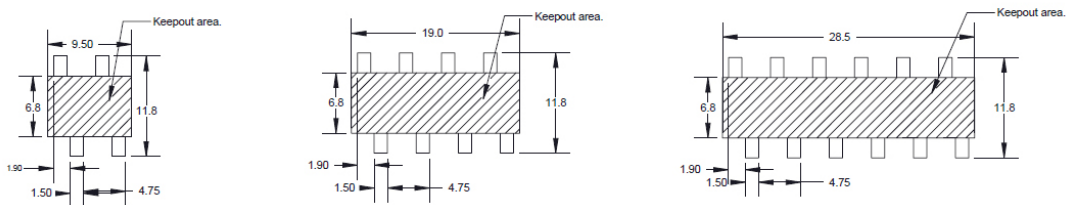
-R suffix = RoHS compliant

Note: This device is licensed for use only when incorporated within a voltage regulator employing power regulating devices manufactured by Maxim Integrated Devices, Inc. No license is granted expressly or by implication to use this device with power regulating devices manufactured by any company other than Maxim

**Dimensions (mm)**



**Recommended pad layout**



Part marking: CL1110-x(x = number of phases), xxxx = lot code

Tolerances are ±0.15 millimeters unless stated otherwise

All soldering surfaces to be coplanar within 0.13 millimeters

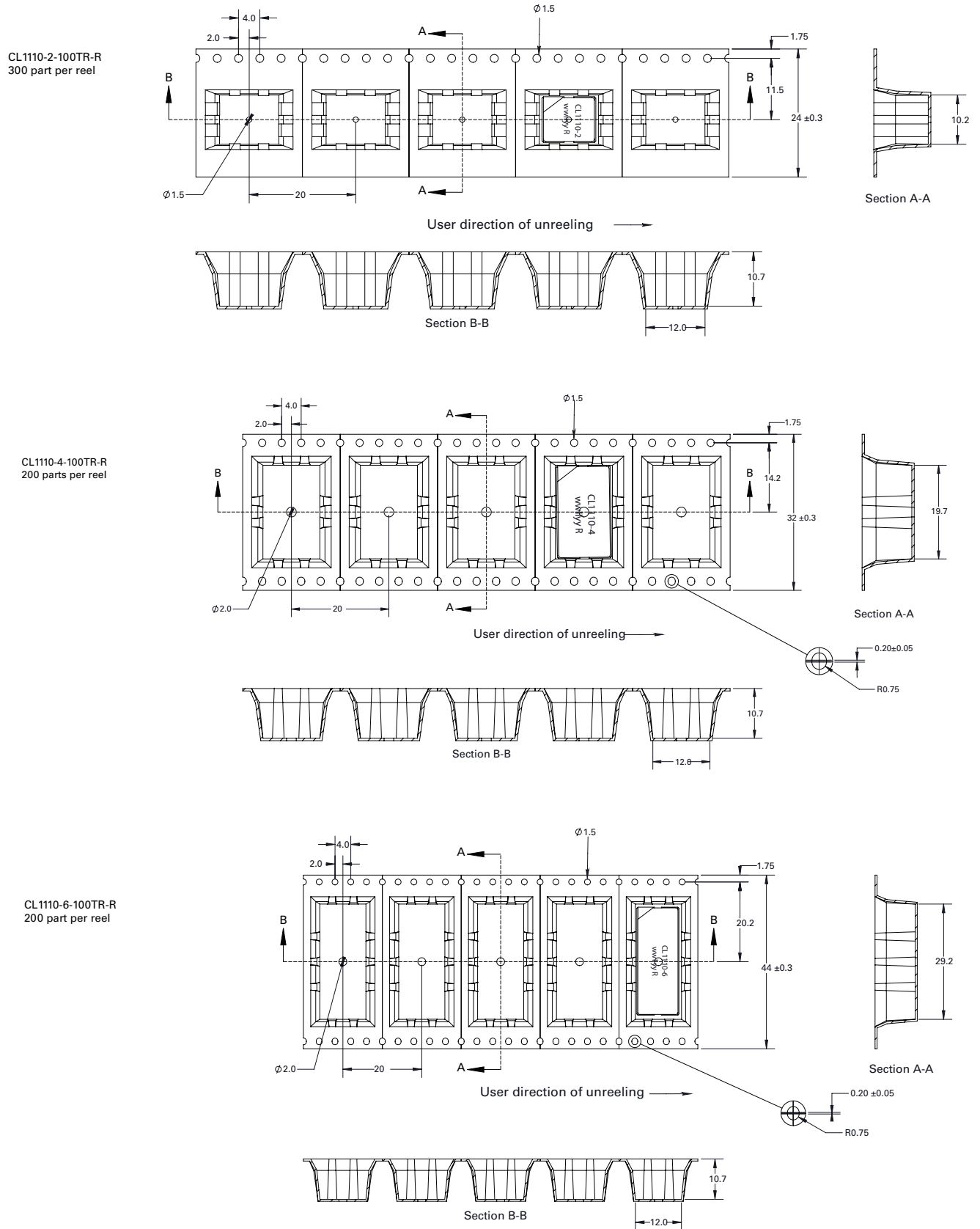
Pad layout tolerances are ±0.1 millimeters unless stated otherwise

DCR measured from point "a" to point "b"

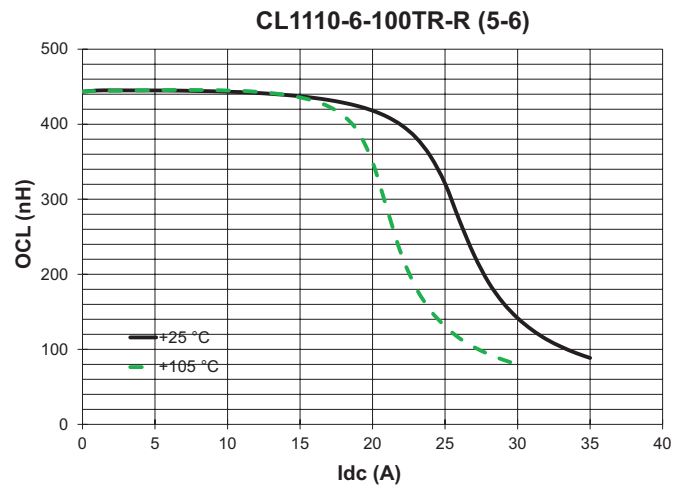
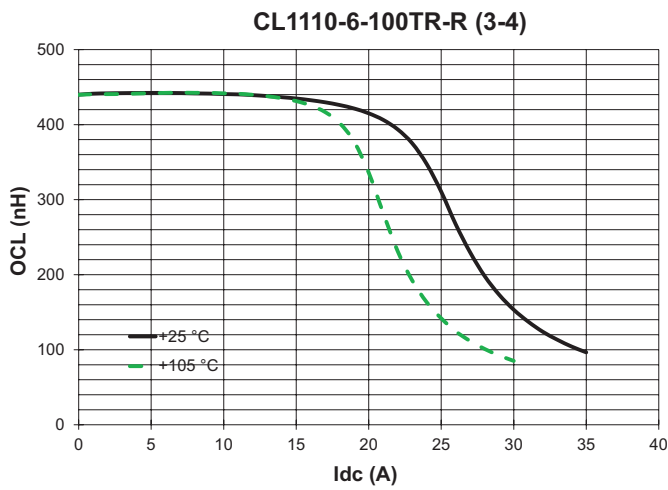
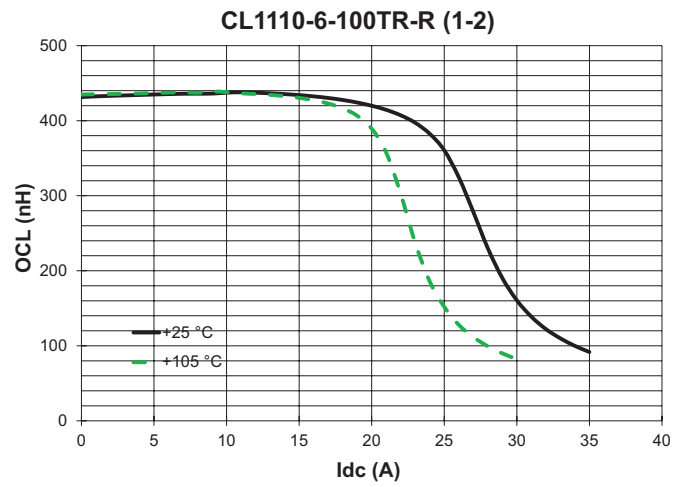
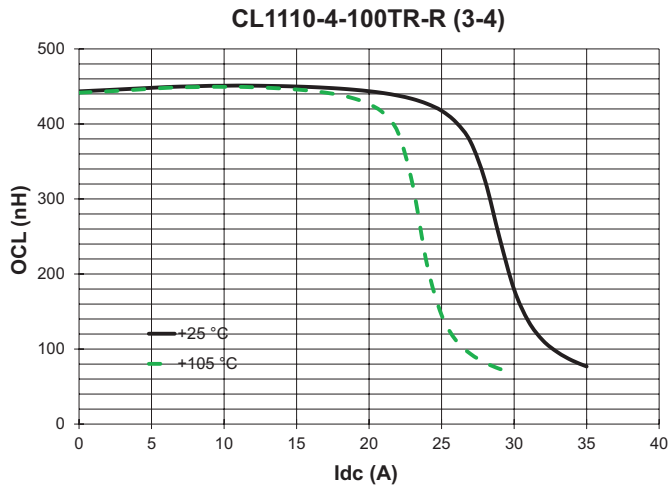
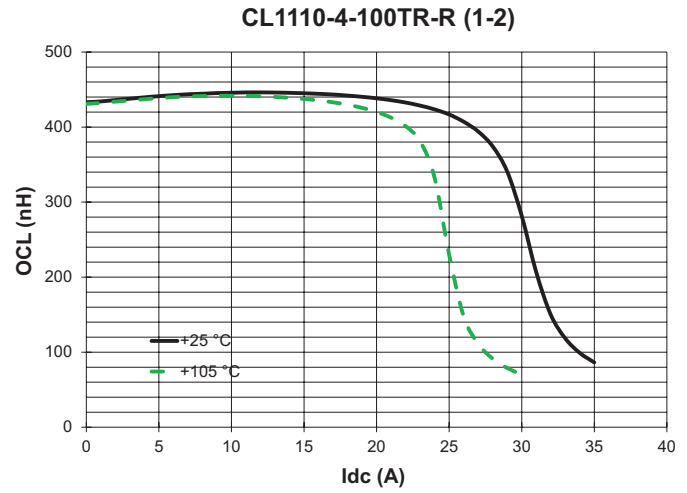
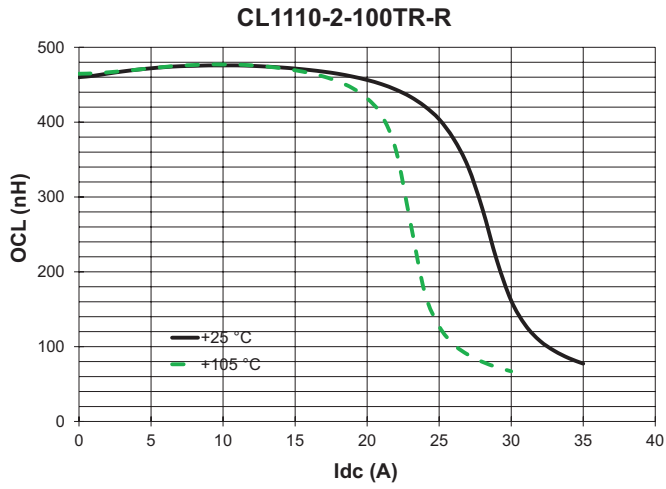
Do not route traces or vias underneath the inductor

**Packaging information (mm)**

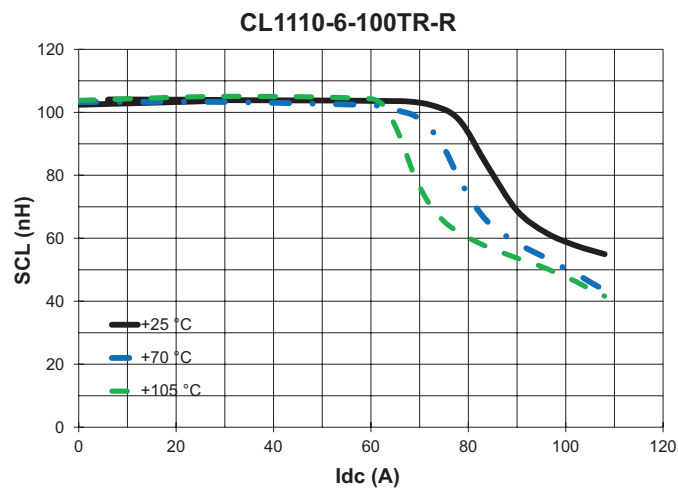
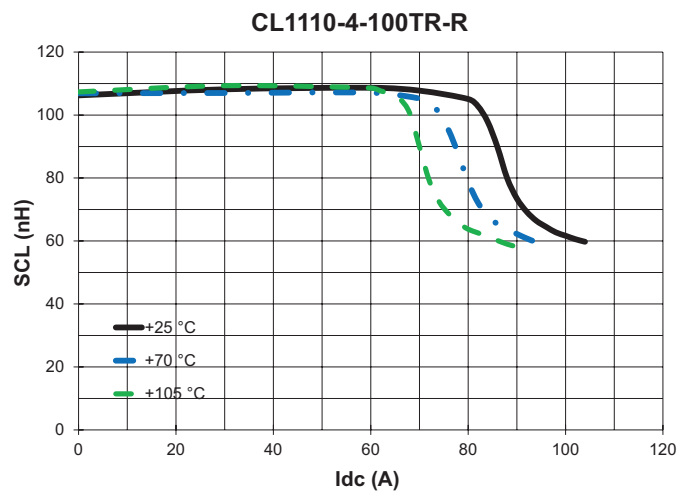
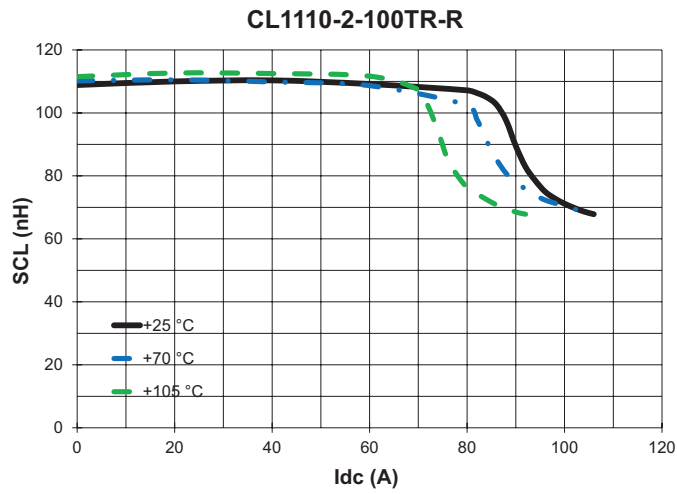
Supplied in tape and reel packaging on a 13" diameter reel  
Drawing not to scale



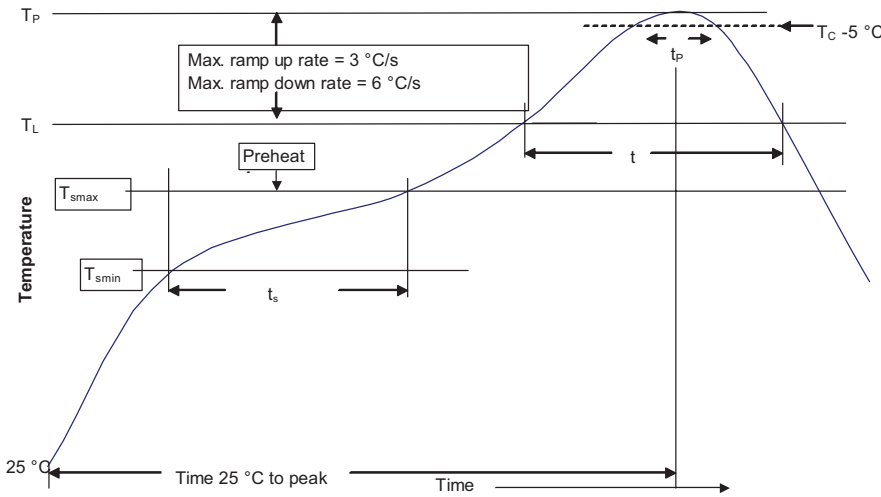
Inductance characteristics- OCL vs. current



Inductance characteristics- SCL vs. current



**Solder reflow profile**



**Table 1 - Standard SnPb solder ( $T_c$ )**

| Package thickness | Volume $mm^3$ <350 | Volume $mm^3$ $\geq$ 350 |
|-------------------|--------------------|--------------------------|
| <2.5 mm)          | 235 °C             | 220 °C                   |
| $\geq$ 2.5 mm     | 220 °C             | 220 °C                   |

**Table 2 - Lead (Pb) free solder ( $T_c$ )**

| Package thickness | Volume $mm^3$ <350 | Volume $mm^3$ 350 - 2000 | Volume $mm^3$ >2000 |
|-------------------|--------------------|--------------------------|---------------------|
| <1.6 mm           | 260 °C             | 260 °C                   | 260 °C              |
| 1.6 – 2.5 mm      | 260 °C             | 250 °C                   | 245 °C              |
| >2.5 mm           | 250 °C             | 245 °C                   | 245 °C              |

**Reference JDEC J-STD-020**

| Profile feature  | Standard SnPb solder | Lead (Pb) free solder |
|--|----------------------|-----------------------|
| Preheat and soak   |                      |                       |
| • Temperature min. ( $T_{smin}$ )  | 100 °C               | 150 °C                |
| • Temperature max. ( $T_{smax}$ )  | 150 °C               | 200 °C                |
| • Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )                                      | 60-120 seconds       | 60-120 seconds        |
| Average ramp up rate $T_{smax}$ to $T_p$   | 3 °C/ second max.    | 3 °C/ second max.     |
| Liquidous temperature ( $T_L$ )  | 183 °C               | 217 °C                |
| Time at liquidous ( $t_L$ )  | 60-150 seconds       | 60-150 seconds        |
| Peak package body temperature ( $T_p$ )*   | Table 1              | Table 2               |
| Time ( $t_p$ )** within 5 °C of the specified classification temperature ( $T_c$ ) | 20 seconds**         | 30 seconds**          |
| Average ramp-down rate ( $T_p$ to $T_{smax}$ )                                     | 6 °C/ second max.    | 6 °C/ second max.     |
| Time 25 °C to peak temperature   | 6 minutes max.       | 8 minutes max.        |

\* Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum.

\*\* Tolerance for time at peak profile temperature ( $t_p$ ) is defined as a supplier minimum and a user maximum.

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