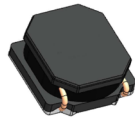


SDCLA1V40

Automotive grade semi-shielded power inductors



Product features

- AEC-Q200 qualified
- High current carrying capacity
- High power density, low core losses
- Magnetically semi-shielded
- Inductance range from 1 μH to 22 μH
- Current range from 0.72 A to 3.2 A
- 4.2 mm x 4.2 mm surface mount package in a maximum 1.8 mm height
- NiZn ferrite magnetic material
- Moisture sensitivity level (MSL): 1

Applications

- LED lighting
- Advanced driver assistance systems (ADAS)
- Adaptive cruise control (ACC)
- Collision avoidance
- Infotainment and cluster electronics
- Electronic control unit (ECU)

Environmental compliance and general specifications

- Storage temperature range (component): -55 °C to +125 °C
- Operating temperature range: -55 °C to +125 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant



Product specifications

| Part number ⁵ | OCL ¹ (μ H) | Tolerance | FLL ² (μ H) minimum | I_{DC} ³ (A) | I_{SAT} ⁴ (A) | DCR (m Ω) \pm 20% @ +25 °C | SRF (MHz) typical |
|--------------------------|--------------------------------|-----------|--|------------------------------|-------------------------------|---|----------------------|
| SDCLA1V4018-1R0-R | 1.0 | \pm 30% | 0.49 | 3.2 | 4.0 | 27 | 90 |
| SDCLA1V4018-1R5-R | 1.5 | \pm 30% | 0.74 | 2.4 | 3.3 | 37 | 75 |
| SDCLA1V4018-2R2-R | 2.2 | \pm 20% | 1.23 | 2.2 | 3.0 | 42 | 60 |
| SDCLA1V4018-3R3-R | 3.3 | \pm 20% | 1.85 | 2.0 | 2.3 | 55 | 46 |
| SDCLA1V4018-4R7-R | 4.7 | \pm 20% | 2.63 | 1.7 | 2.0 | 70 | 35 |
| SDCLA1V4018-6R8-R | 6.8 | \pm 20% | 3.81 | 1.45 | 1.6 | 98 | 30 |
| SDCLA1V4018-100-R | 10 | \pm 20% | 5.6 | 1.2 | 1.3 | 150 | 25 |
| SDCLA1V4018-150-R | 15 | \pm 20% | 8.4 | 0.85 | 1.1 | 210 | 18 |
| SDCLA1V4018-220-R | 22 | \pm 20% | 12.32 | 0.72 | 0.9 | 290 | 15 |

1. Open circuit inductance (OCL) test parameters: 100 kHz, 1.0 Vrms, 0.0 Adc, +25 °C

2. Full load inductance (FLL) test parameters: 100 kHz, 1.0 Vrms, I_{SAT} , +25 °C

3. I_{DC} : DC current for an approximate temperature rise of 40 °C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed +125 °C under worst case operating conditions verified in the end application.

4. I_{SAT} : Peak current for approximately 30% maximum rolloff @ +25 °C

5. Part number definition: SDCLA1V4018-xxx-R

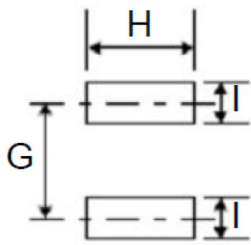
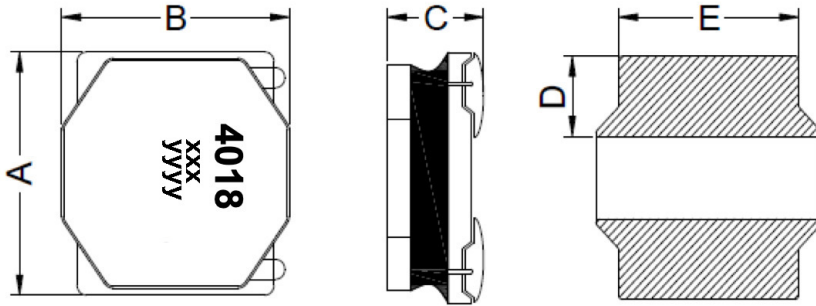
SDCLA1V4018 = Product code and size

xxx= Inductance value in μ H, R=decimal point, If no R is present last digit indicates number of zeros

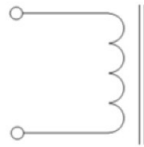
-R suffix = RoHS compliant

6. Absolute maximum voltage 20 V DC Buck

Dimensions-mm



Recommended PCB Layout



Schematic

| Dimension | SDCLA1V4018-xxx-R |
|-----------|-------------------|
| A | 4.0 ± 0.2 |
| B | 4.0 ± 0.2 |
| C | 1.6 ± 0.2 |
| D | 1.1 ± 0.2 |
| E | 3.5 ± 0.3 |
| G | 2.8 REF |
| H | 3.7 REF |
| I | 1.2 REF |

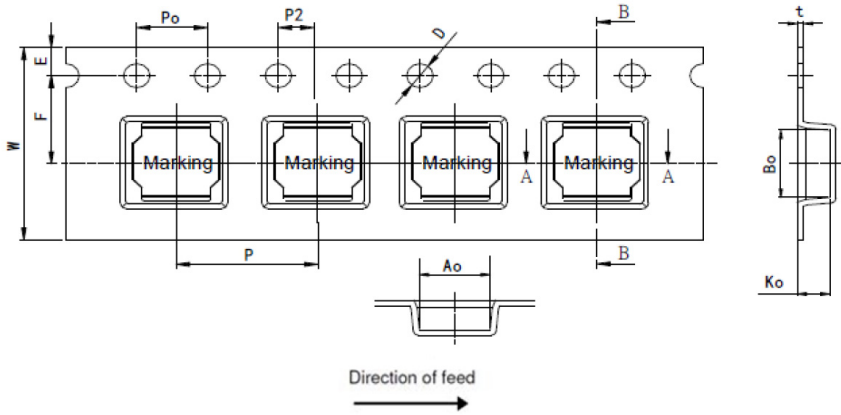
Part marking: 4018, xxx= inductance value in uH, R= decimal point. If no R is present then last character equals number of zeros, yyyy= lot code
Tolerances are ±0.3 millimeters unless stated otherwise
All soldering surfaces to be coplanar within 0.1 millimeters
Pad layout tolerances are ±0.1 millimeters unless stated otherwise
Traces or vias underneath the inductor is not recommended

Packaging information- mm

SDCLA1V4018

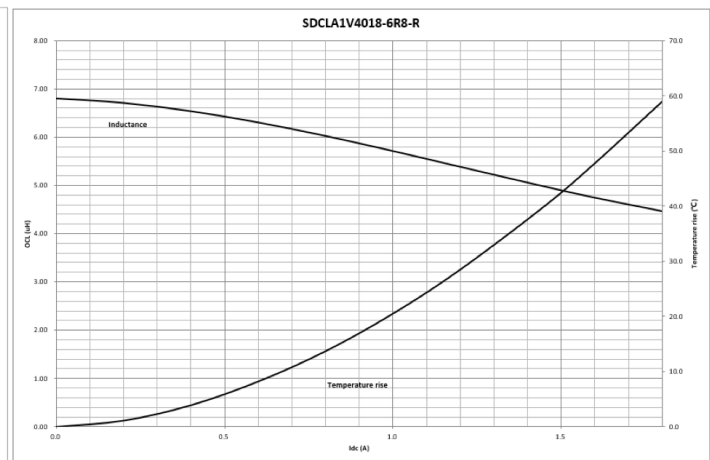
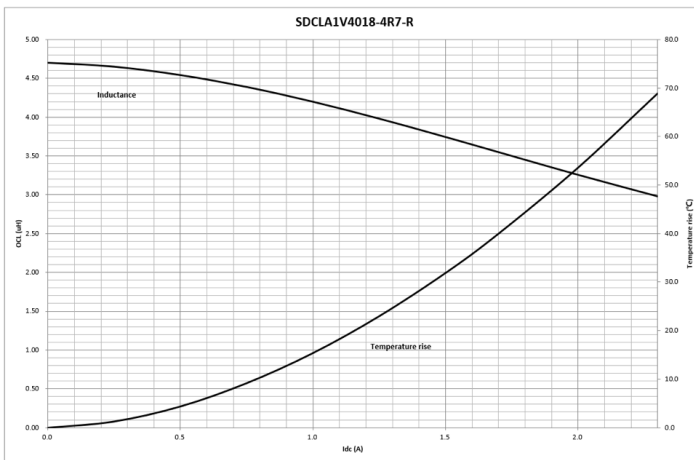
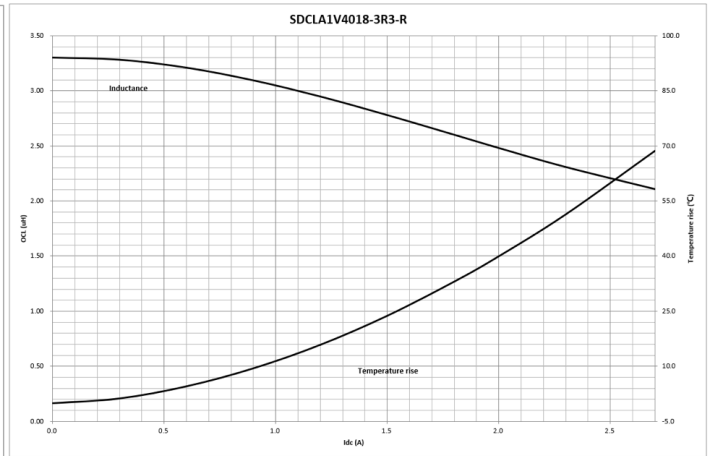
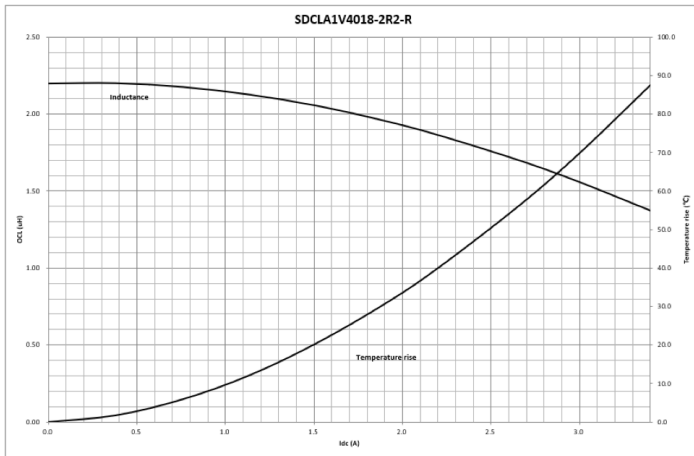
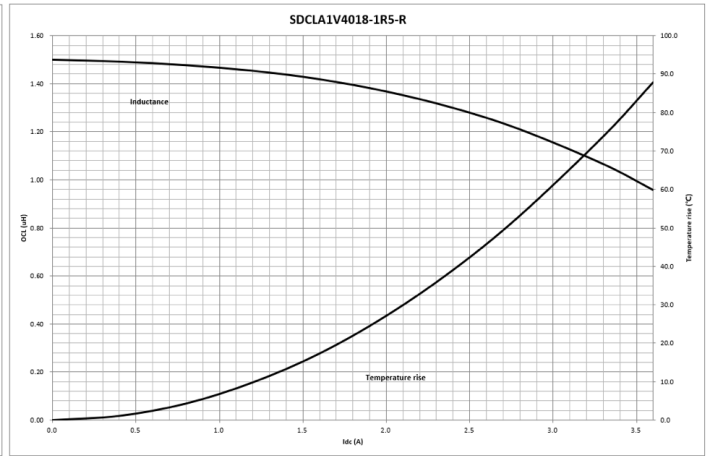
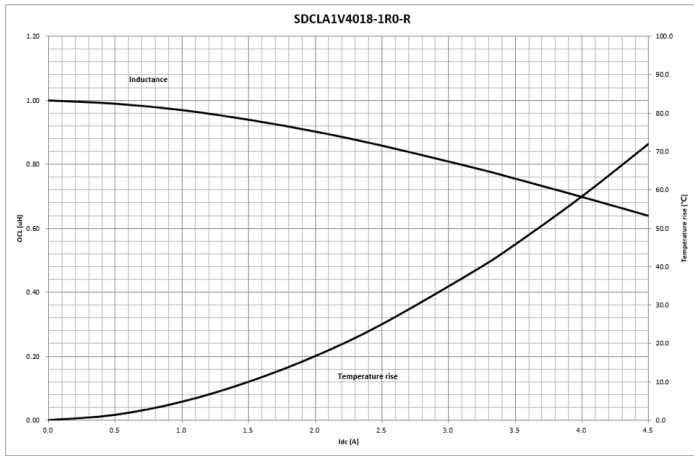
Supplied in tape and reel packaging, 3500 parts per 13" diameter reel (EIA-481 compliant)

Drawing not to scale

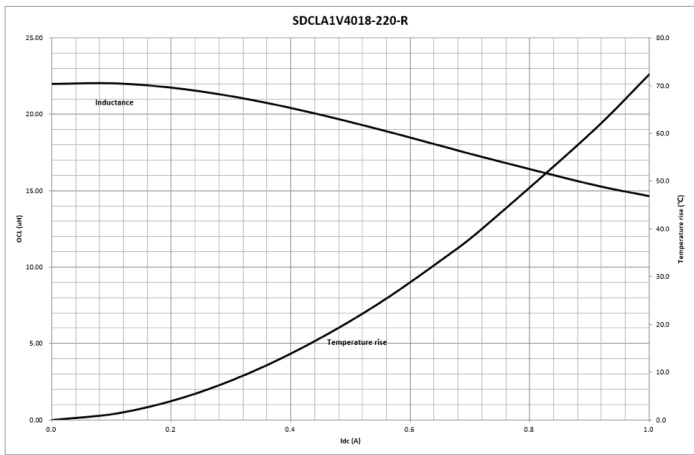
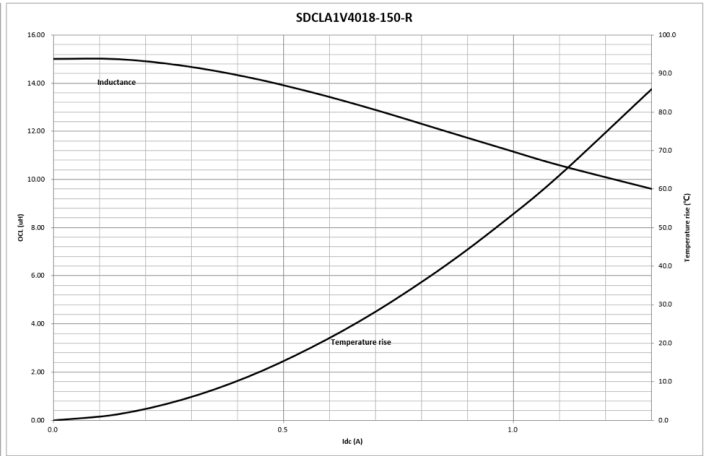
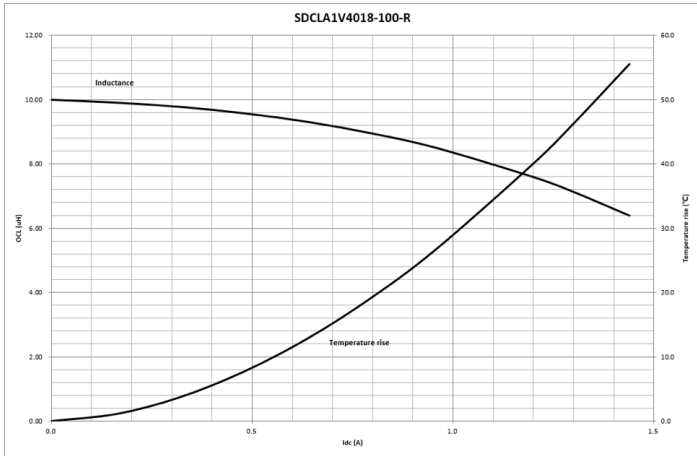


| Dimension | Value |
|-----------|------------|
| W | 12.0 ± 0.3 |
| F | 5.5 ± 0.1 |
| E | 1.75 ± 0.1 |
| P0 | 4.0 ± 0.1 |
| P | 8.0 ± 0.1 |
| P2 | 2.0 ± 0.1 |
| D | 1.5 ± 0.1 |
| A0 | 4.4 ± 0.1 |
| B0 | 4.4 ± 0.1 |
| K0 | 2.0 ± 0.1 |
| t | 0.35 ± 0.1 |

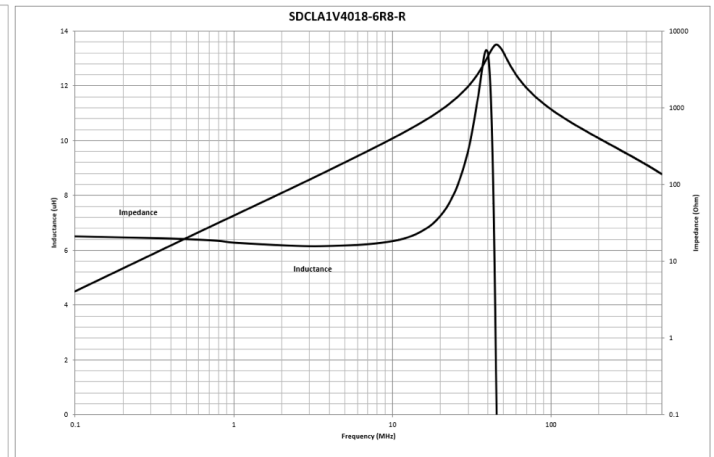
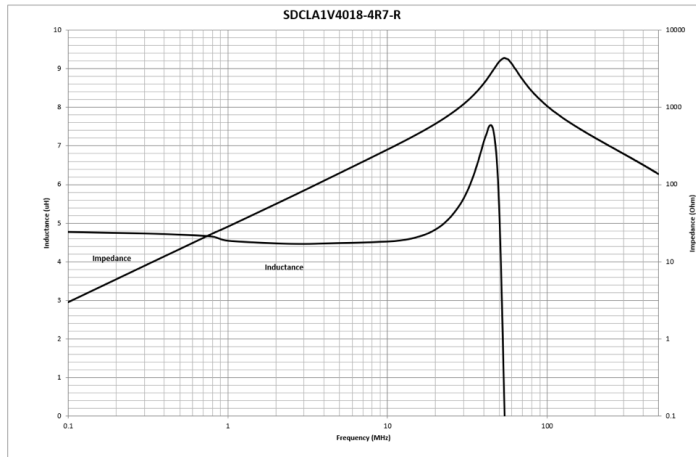
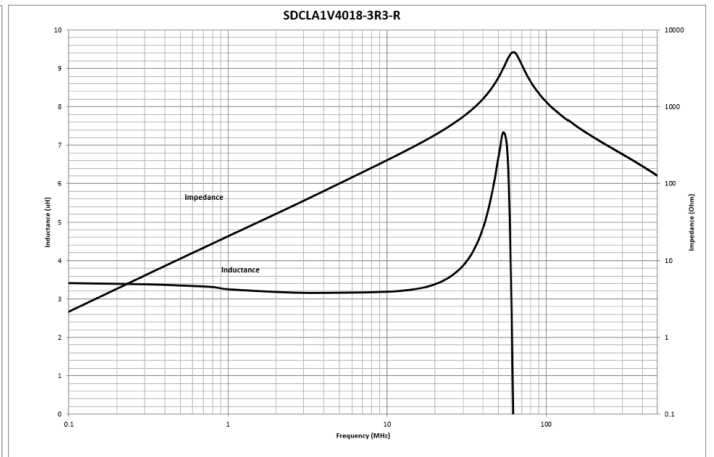
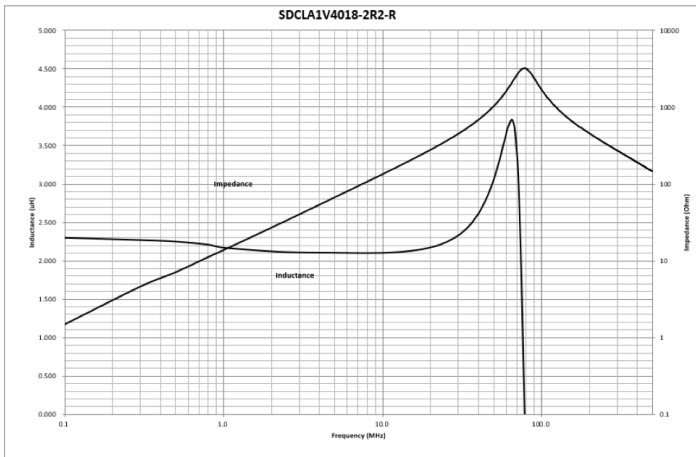
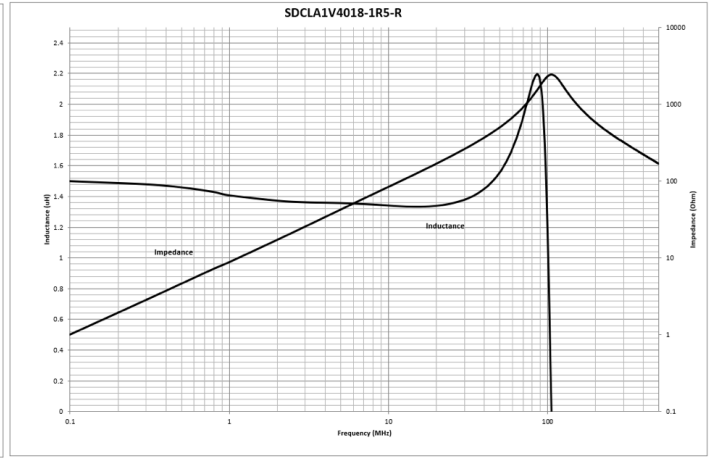
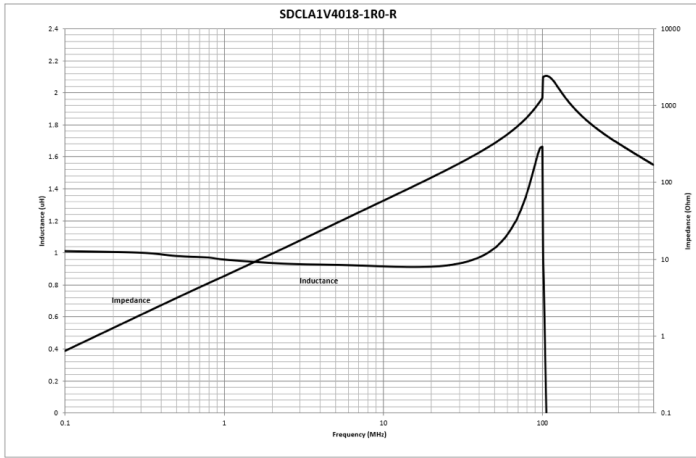
Inductance and temperature rise vs current
SDCLA1V4018

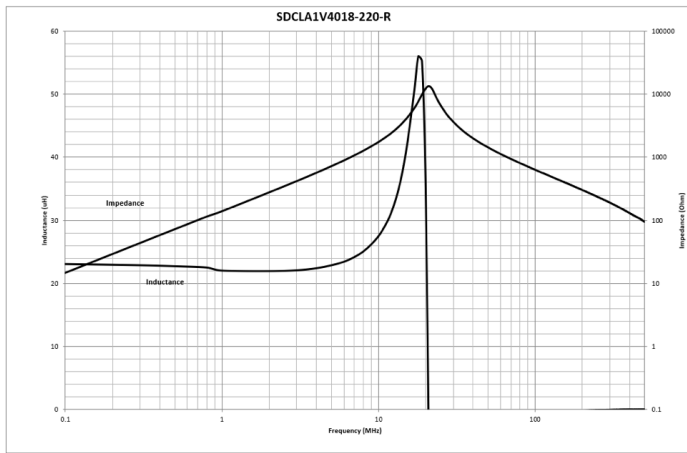
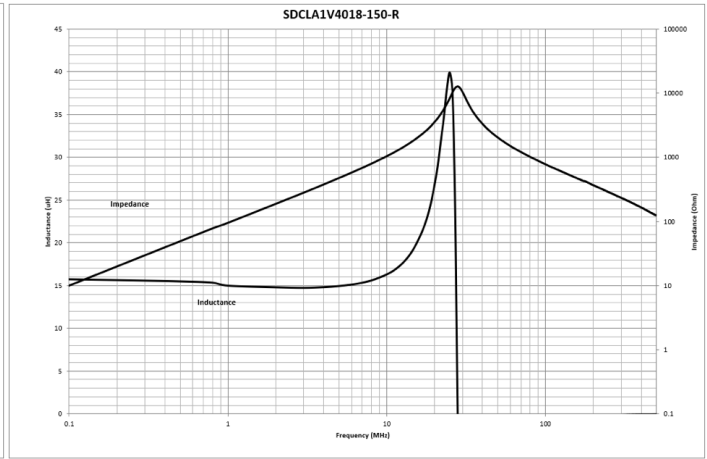
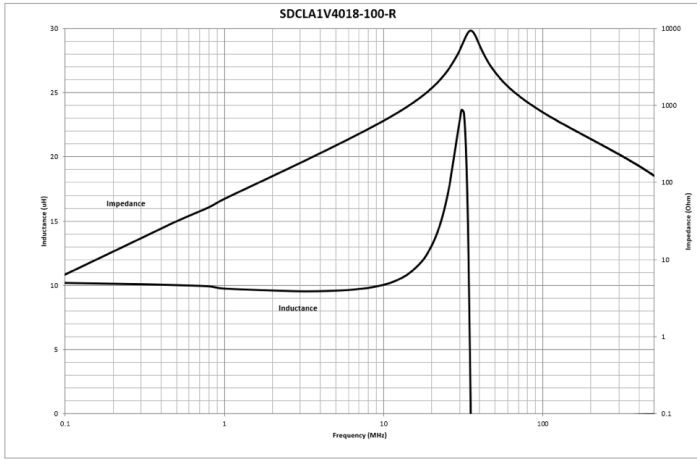


Inductance and temperature rise vs current



Inductance and impedance vs. frequency curve





Solder reflow profile

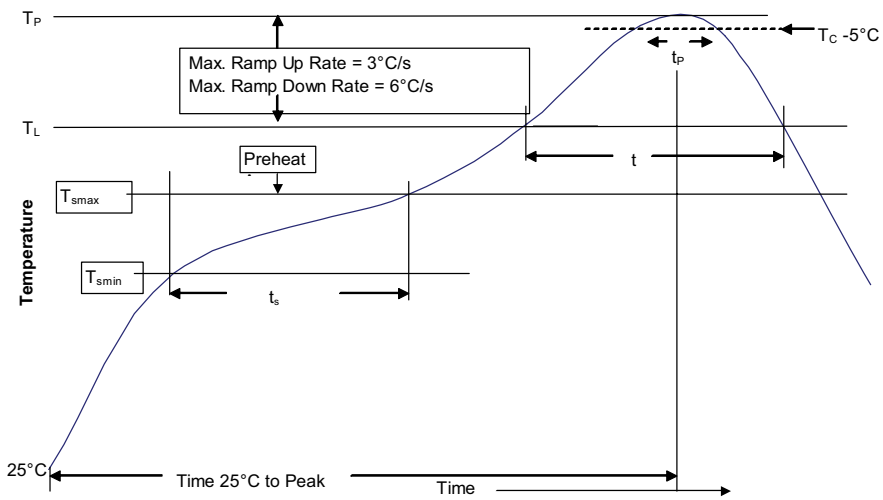


Table 1 - Standard SnPb solder (T_C)

| Package thickness | Volume mm ³ <350 | Volume mm ³ ≥350 |
|-------------------|-----------------------------|-----------------------------|
| <2.5 mm | 235 °C | 220 °C |
| ≥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 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 |
| 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 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* |
| 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. |

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

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