

# 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  $\mu\text{H}$  to 22  $\mu\text{H}$
- 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 <sup>5</sup>	OCL <sup>1</sup> ( $\mu$ H)	Tolerance	FLL <sup>2</sup> ( $\mu$ H) minimum	$I_{DC}$ <sup>3</sup> (A)	$I_{sat}$ <sup>4</sup> (A)	DCR (m $\Omega$ ) $\pm$ 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

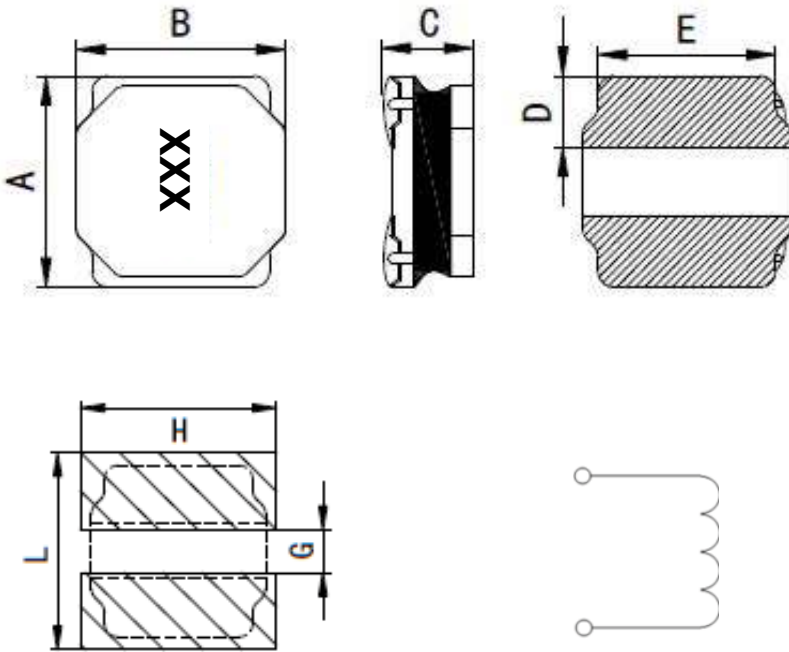
SDCLA1V4018 = Product code and size

xxx= Inductance value in  $\mu$ 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

<b>Dimension</b>	<b>SDCLA1V4018-xxx-R</b>
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	1.5
H	4.5
L	4.5

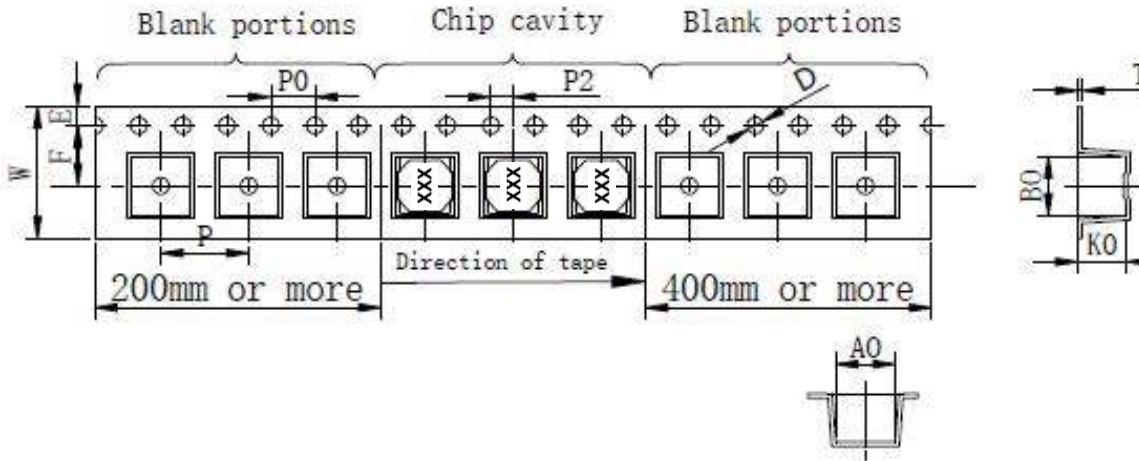
Part marking: xxx= inductance value in uH, R= decimal point. If no R is present then last character equals number of zeros  
 All soldering surfaces to be coplanar within 0.1 millimeters  
 PCB layout is referred to standard IPC-7351B  
 PCB layout reference only  
 Recommend solder paste thickness at 0.12 mm and above  
 Traces or vias underneath the inductor is not recommended

**Packaging information- mm**

**SDCLA1V4018**

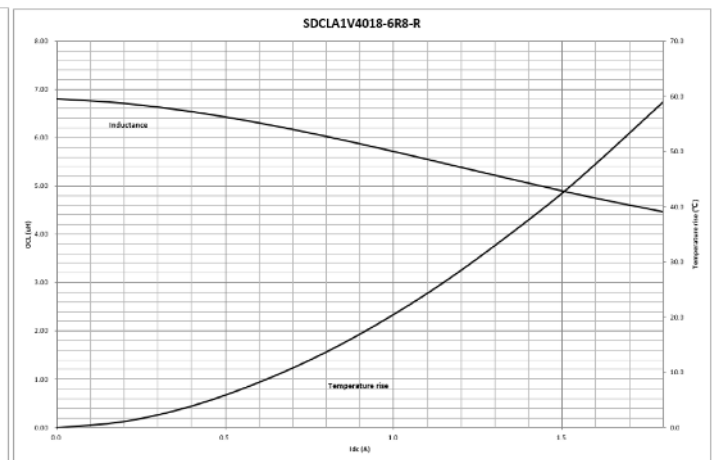
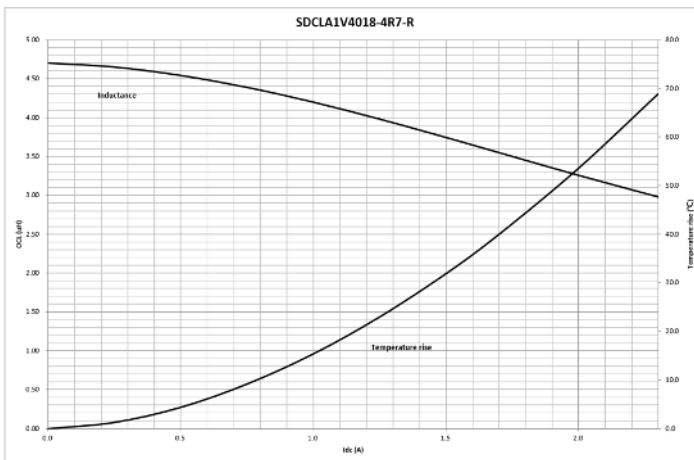
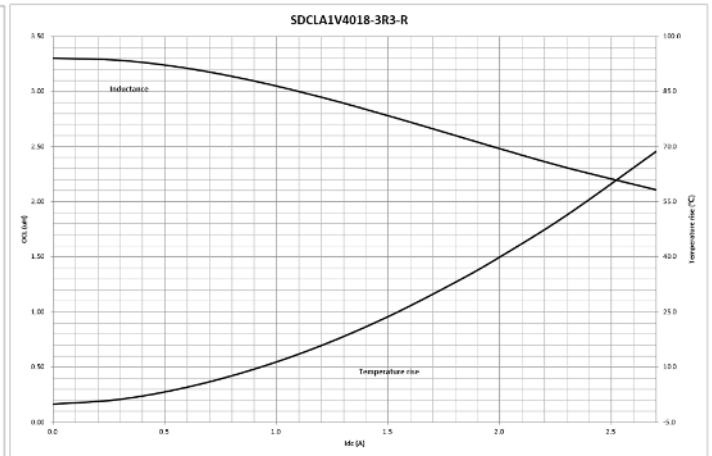
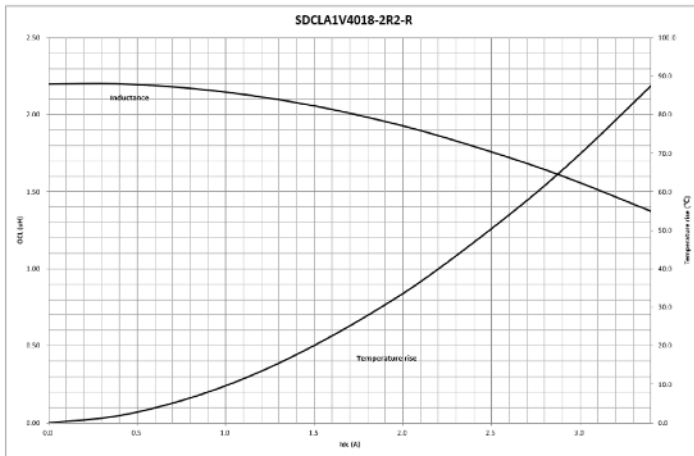
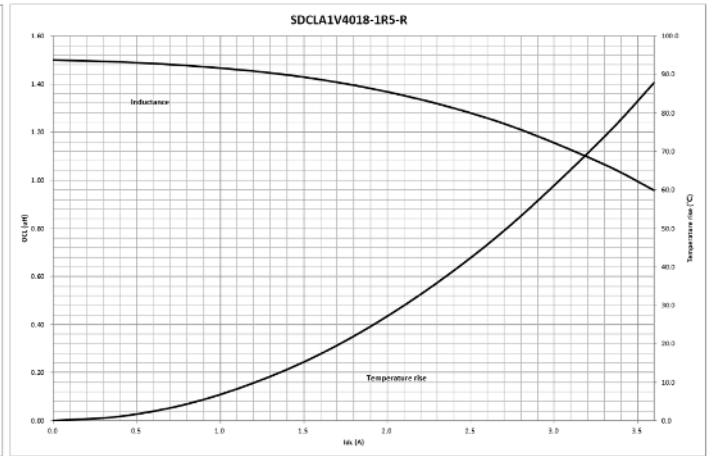
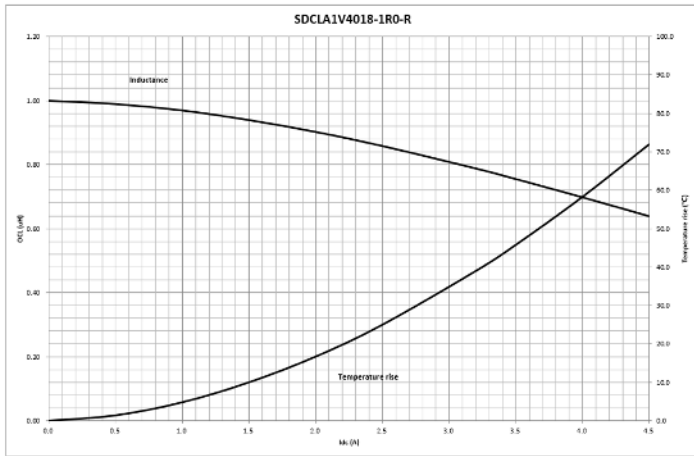
Supplied in tape and reel packaging, 3500 parts per 13" diameter reel (EIA-481 compliant)

Drawing not to scale

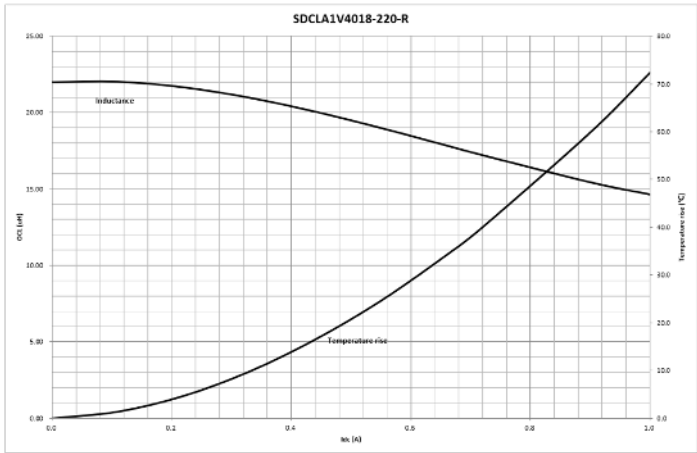
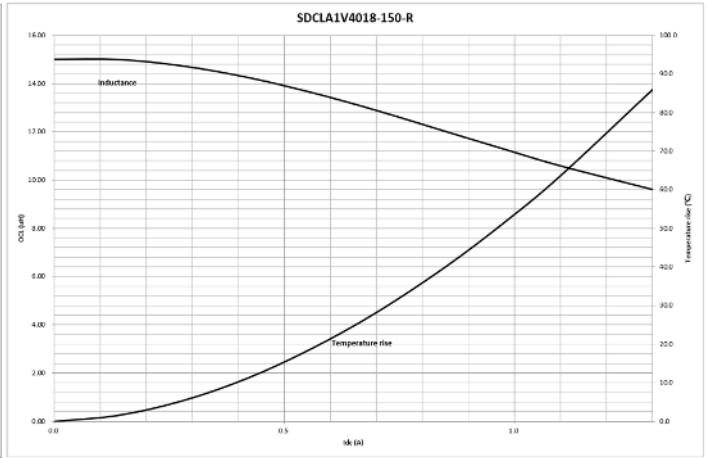
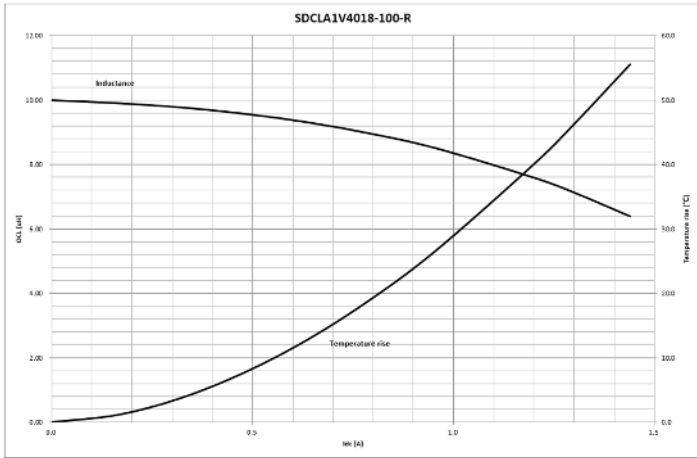


Dimension	Value
W	12.0 ± 0.3
F	5.5 ± 0.1
E	1.75 ± 0.1
P0	4.0 ± 0.1
P	8.0 ± 0.1
P2	2.0 ± 0.1
D	1.5 ± 0.1
A0	4.4 ± 0.1
B0	4.4 ± 0.1
K0	2.0 ± 0.1
T	0.35 ± 0.1

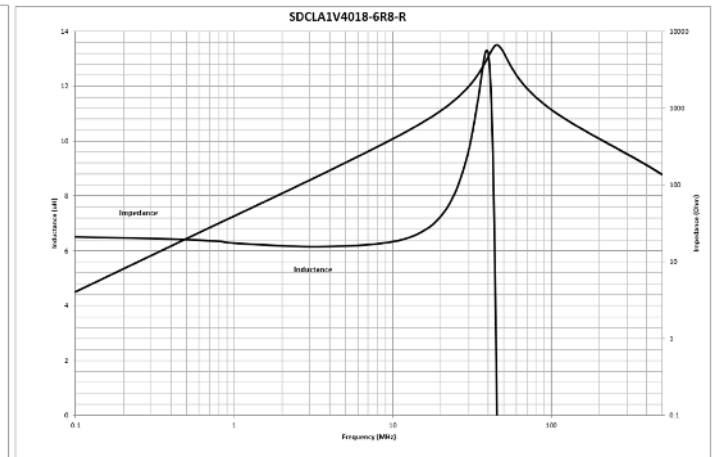
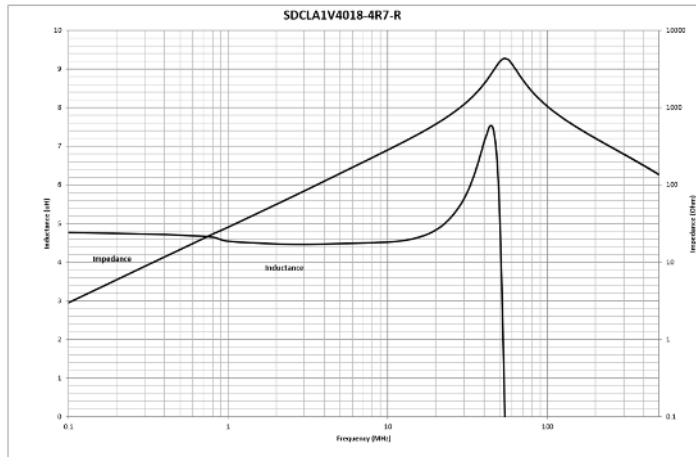
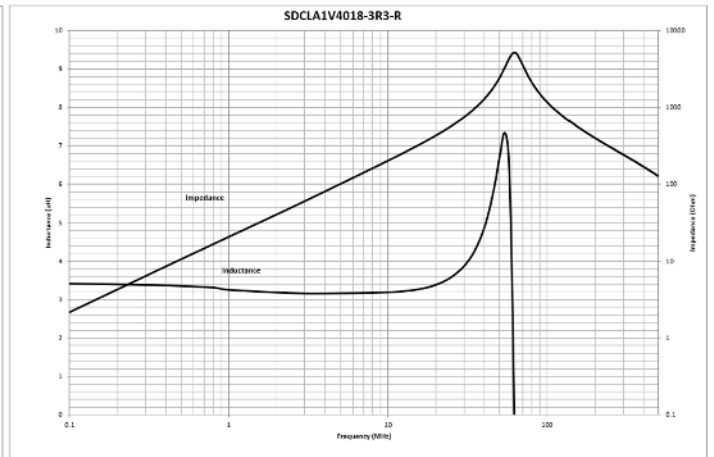
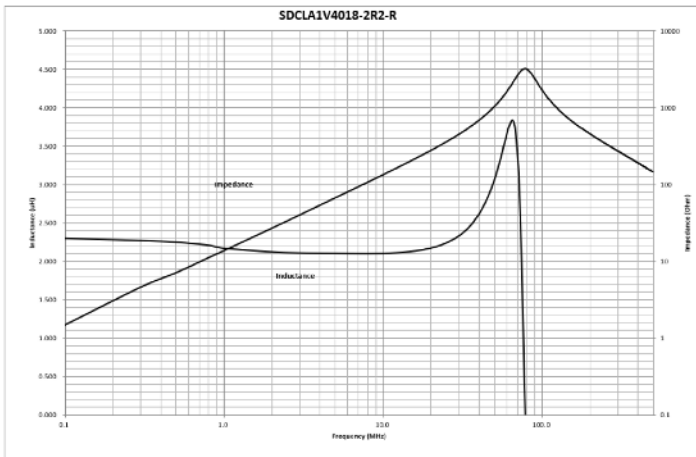
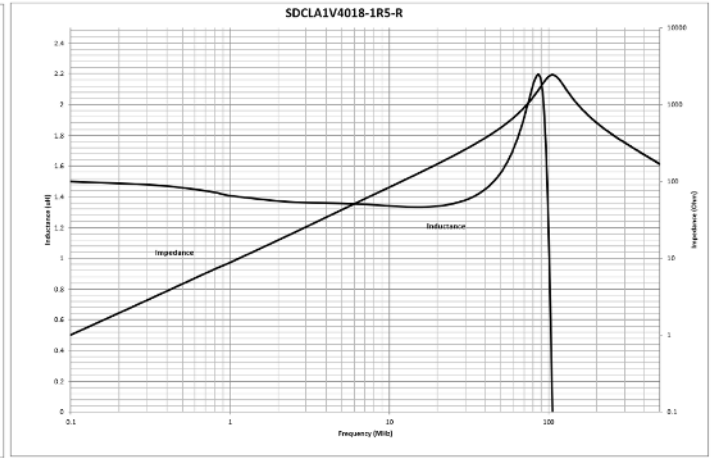
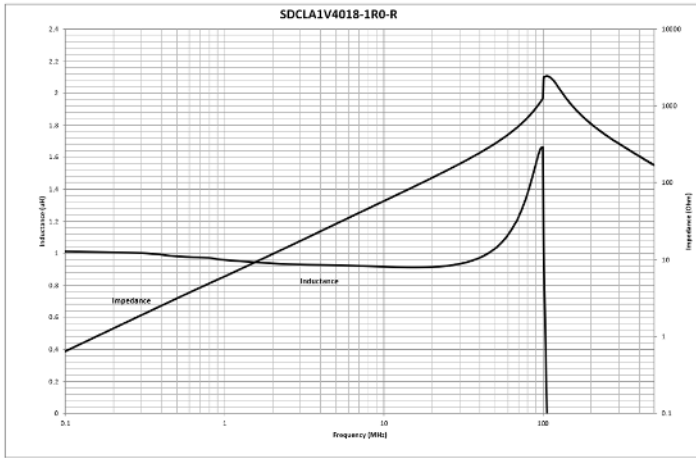
Inductance and temperature rise vs current  
SDCLA1V4018

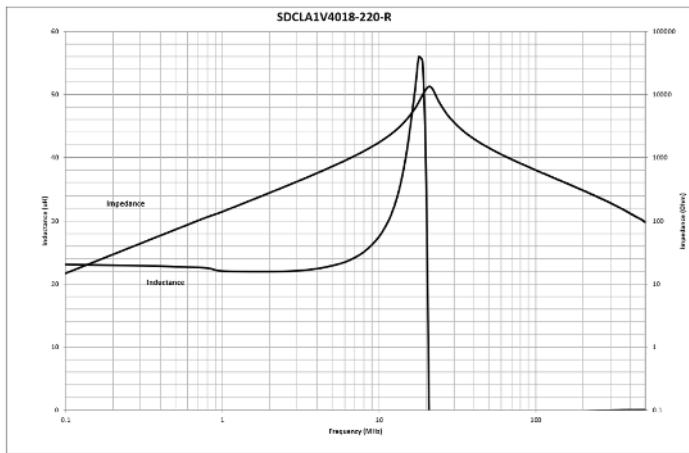
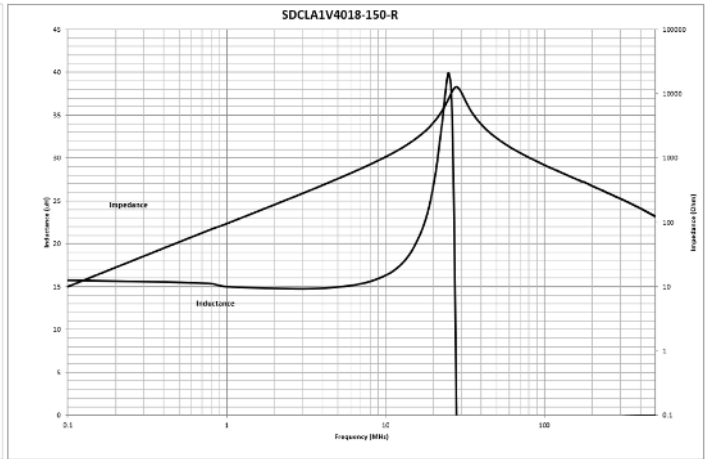
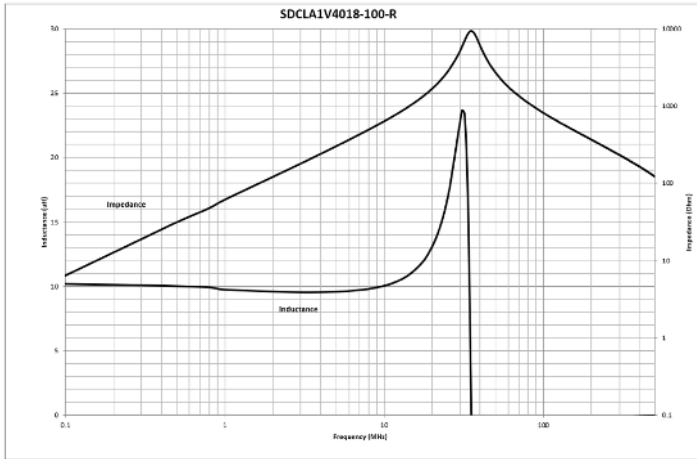


**Inductance and temperature rise vs current**



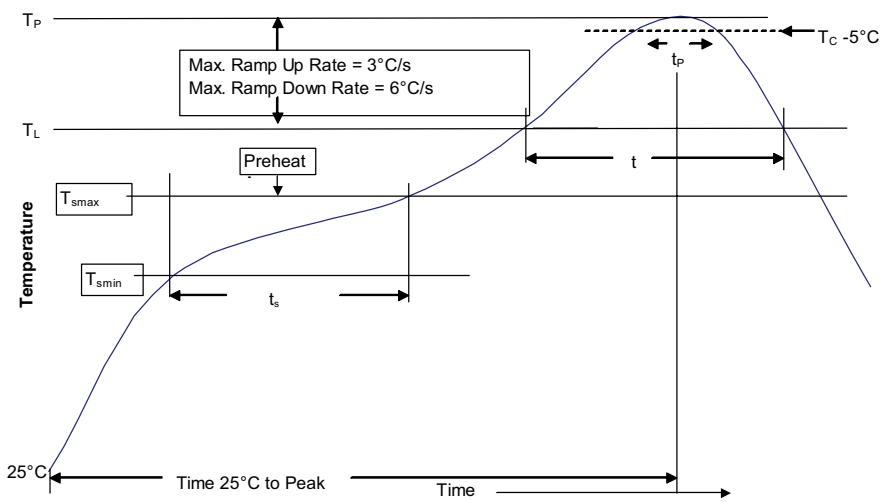
Inductance and impedance vs. frequency curve







**Solder reflow profile**



**Table 1 - Standard SnPb solder (T<sub>C</sub>)**

Package thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

**Table 2 - Lead (Pb) free solder (T<sub>C</sub>)**

Package thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> 350 - 2000	Volume mm <sup>3</sup> >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 <sub>smin</sub> )	100 °C	150 °C
• Temperature max. (T <sub>smax</sub> )	150 °C	200 °C
• Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )	60-120 seconds	60-120 seconds
Ramp up rate T <sub>L</sub> to T <sub>p</sub>	3 °C/ second max.	3 °C/ second max.
Liquidous temperature (T <sub>L</sub> )	183 °C	217 °C
Time (t <sub>L</sub> ) maintained above T <sub>L</sub>	60-150 seconds	60-150 seconds
Peak package body temperature (T <sub>p</sub> )*	Table 1	Table 2
Time (t <sub>p</sub> )* within 5 °C of the specified classification temperature (T <sub>C</sub> )	20 seconds*	30 seconds*
Ramp-down rate (T <sub>p</sub> to T <sub>L</sub> )	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<sub>p</sub>) is defined as a supplier minimum and a user maximum.

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