

# EXLA1V05

## Automotive high current molded inductor



### Product features

- High current carrying capacity
- AEC-Q200 qualified
- Low DCR, high efficiency
- Magnetically shielded, low EMI
- Soft saturation
- Inductance range from 0.27  $\mu$ H to 22  $\mu$ H
- Current range from 3.4 A to 28 A
- EXLA1V0503: 6.2 mm x 5.9 mm footprint surface mount package in a 3.1 mm height
- EXLA1V0505: 6.2 mm x 5.9 mm footprint surface mount package in a 5.0 mm height
- Alloy powder core material
- Moisture Sensitivity Level (MSL) 1

### Applications

- LED lighting
- Advanced driver assistance systems (ADAS)
- Adaptive cruise control (ACC)
- Collision avoidance
- Infotainment and cluster electronics
- Battery management systems (BMS)
- Electric pumps, motor control and auxiliaries
- Powertrain control module (PCU)/Engine control module (ECM)
- Electronic Control Units (ECU)

### Environmental compliance and general specifications

- Operating temperature range: -55 °C to +155 °C (ambient plus self-temperature rise)
- Storage temperature range (component): -55 °C to +155 °C
- Solder reflow temperature: J-STD-020 (latest revision) compliant



**Product specifications**

Part number <sup>4</sup>	OCL <sup>1</sup> ( $\mu\text{H}$ ) $\pm 20\%$	$I_{\text{rms}}^2$ (A) typical	$I_{\text{sat}}^3$ (A) typical	DCR (m $\Omega$ ) typical @ +25 °C	DCR (m $\Omega$ ) maximum @ +25 °C	D (mm) $\pm 0.3$
<b>EXLA1V0503</b>						
EXLA1V0503-R27-R	0.27	25.5	28	2.15	2.55	4.5
EXLA1V0503-R56-R	0.56	21	9.0	3.2	3.8	4.5
EXLA1V0503-R60-R	0.6	18	8.8	3.9	4.3	4.5
EXLA1V0503-2R2-R	2.2	11.5	4.3	10.5	12	4.3
EXLA1V0503-5R6-R	5.6	5.9	6.0	31	34.1	4.3
<b>EXLA1V0505</b>						
EXLA1V0505-4R7-R	4.7	8.1	7.4	19	21	
EXLA1V0505-5R6-R	5.6	7.2	7.2	22	24.2	
EXLA1V0505-6R8-R	6.8	6.4	6.6	26	28.6	
EXLA1V0505-8R2-R	8.2	6.1	6.1	29.5	32.5	
EXLA1V0505-100-R	10	5.0	5.4	39	43	
EXLA1V0505-150-R	15	4.0	4.6	60	66	
EXLA1V0505-220-R	22	3.4	4.1	90.6	99.65	

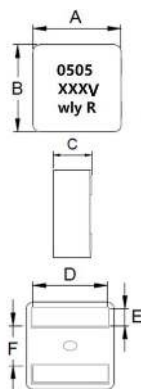
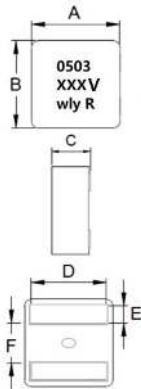
1. Open circuit inductance (OCL) test parameters: 100 kHz, 0.1 V<sub>rms</sub>, 0.0 Adc, +25 °C  
 2.  $I_{\text{rms}}$ : Heat rated current ( $I_{\text{rms}}$ ) will cause the part temperature rise approximately  $\Delta T$  of 40 °C. Circuit design, component, PCB trace size and thickness, airflow and other cooling provisions all affect the part temperature. Part temperature should be verified in the end application. The part temperature (ambient + temp rise) should not exceed +155 °C under worst case operating conditions.

3.  $I_{\text{sat}}$ : Peak current for approximately 30% rolloff @ +25 °C  
 4. Part number definition: EXLA1V0503-xxx-R  
 EXLA1V0503 = Product code and size  
 xxx= inductance value in  $\mu\text{H}$ , R= decimal point,  
 If no R is present then third digit equals the number of zeros  
 -R suffix = RoHS compliant  
 Note: Rated operating voltage (across inductor) 15 V ref.

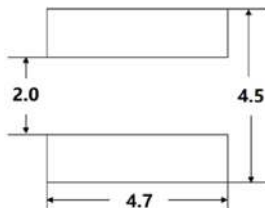
**Mechanical parameters, schematic, pad layout (mm)**

**EXLA0503**

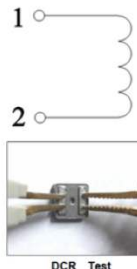
**EXLA0505**



**Recommended pad layout**



**Schematic**



Part number	A	B	C	D	E	F
EXLA1V0503-xxx-R	6.0 $\pm$ 0.20	5.7 $\pm$ 0.20	2.9 $\pm$ 0.20	See spec table 1	1.1 $\pm$ 0.20	2.3 $\pm$ 0.25
EXLA1V0505-xxx-R	6.0 $\pm$ 0.20	5.7 $\pm$ 0.20	4.8 $\pm$ 0.20	4.3 $\pm$ 0.30	1.1 $\pm$ 0.20	2.3 $\pm$ 0.25

Part marking: 0503 or 0505

xxx= Inductance value in  $\mu\text{H}$  (R= decimal point, if no R is present last digit equals number of zeros, V= vehicle, wly R= lot code)

All soldering surfaces to be coplanar within 0.1 millimeters

Tolerances are  $\pm 0.3$  millimeters unless stated otherwise

Dimensions of recommended PCB layout are reference only.

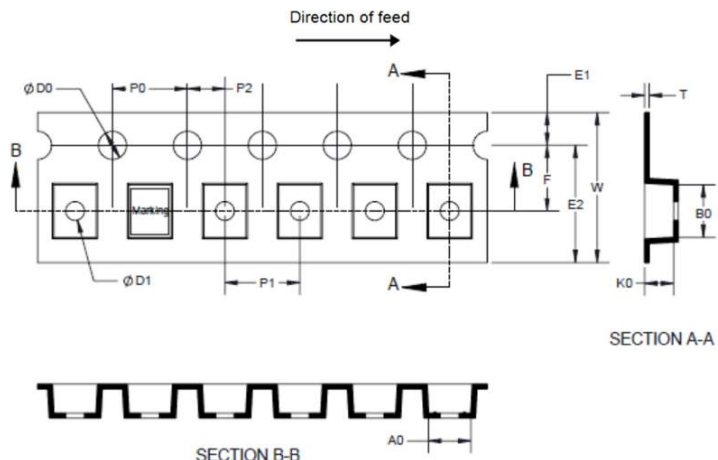
Pad layout tolerances are  $\pm 0.1$  millimeters unless stated otherwise

Traces or vias underneath the inductor is not recommended

**Packaging information (mm)**

Supplied in tape and reel packaging  
EXLA1V0503: 2000 parts per 13" diameter reel (EIA-481 compliant)  
EXLA1V0505: 1500 parts per 13" diameter reel (EIA-481 compliant)

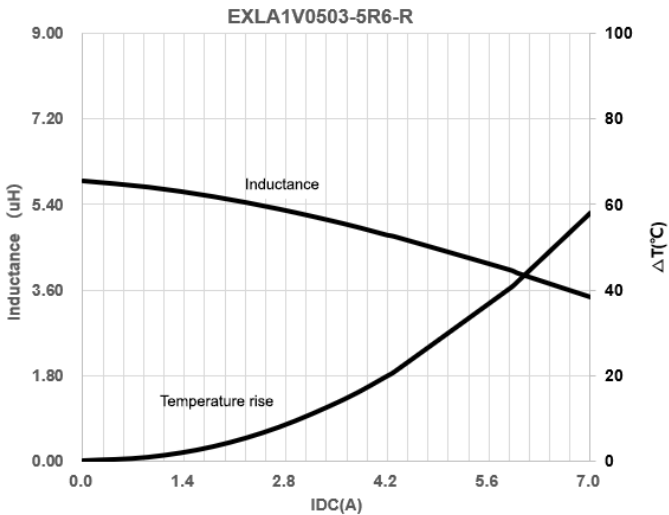
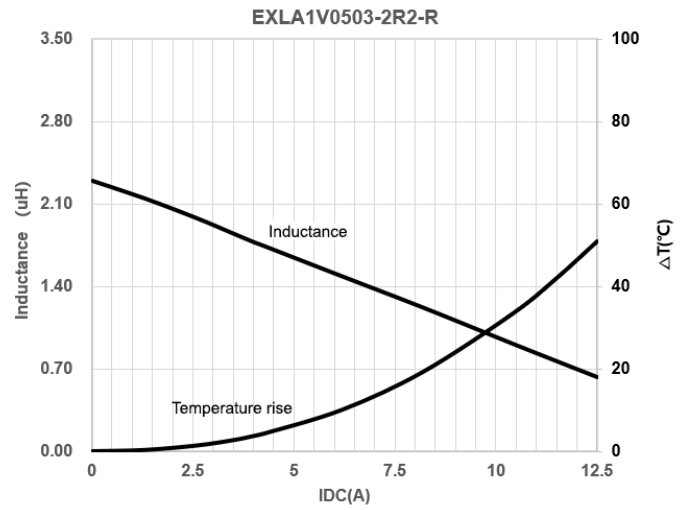
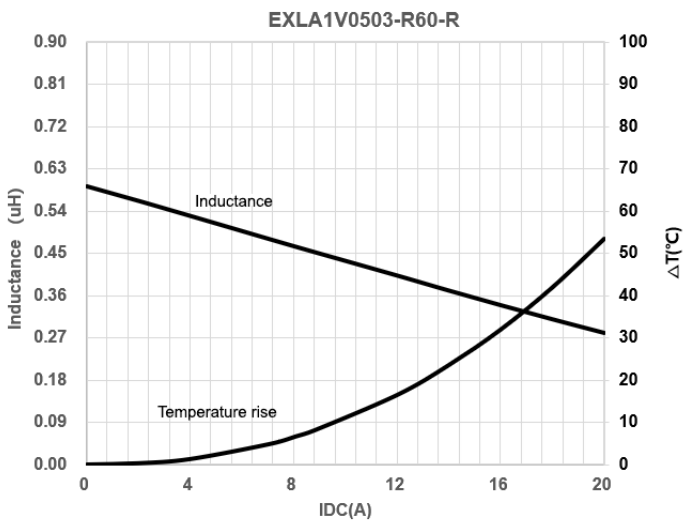
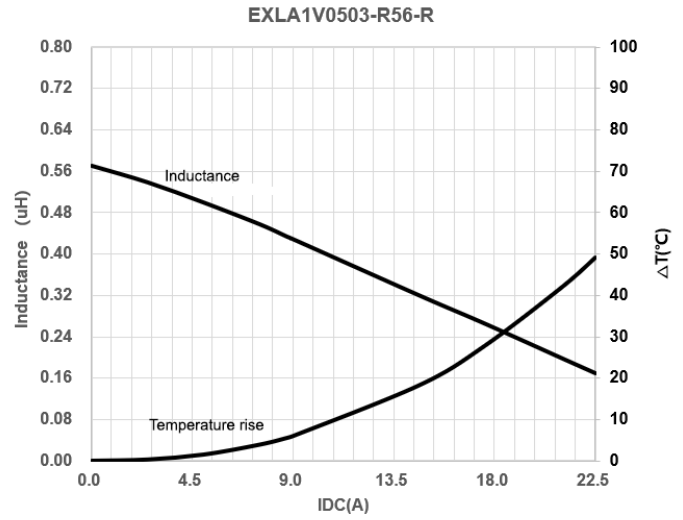
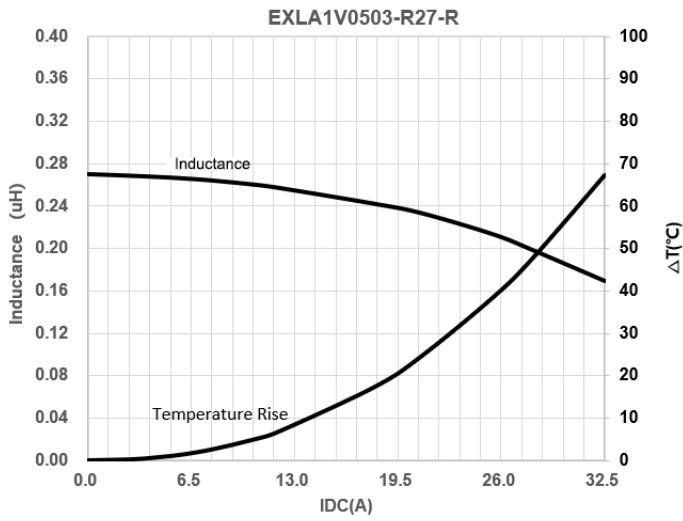
Drawing not to scale



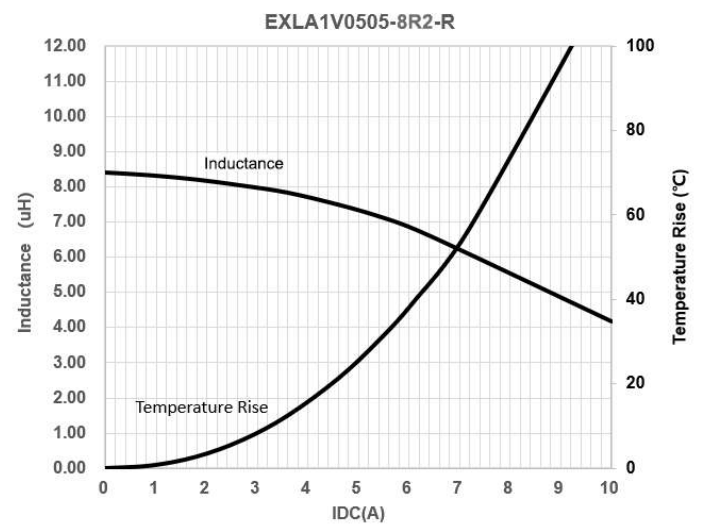
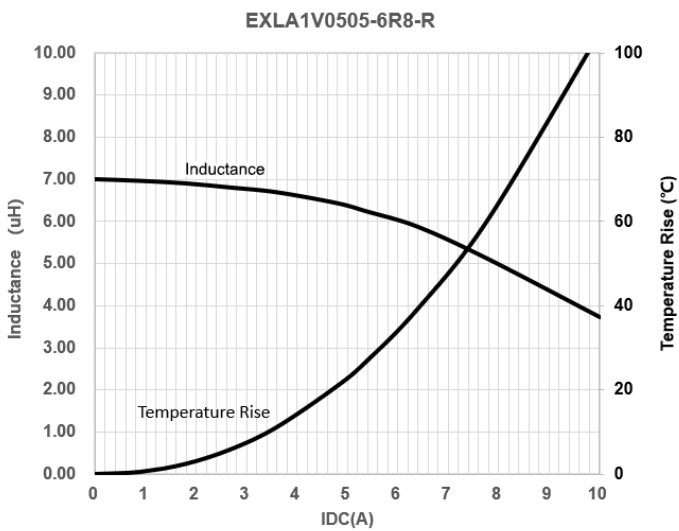
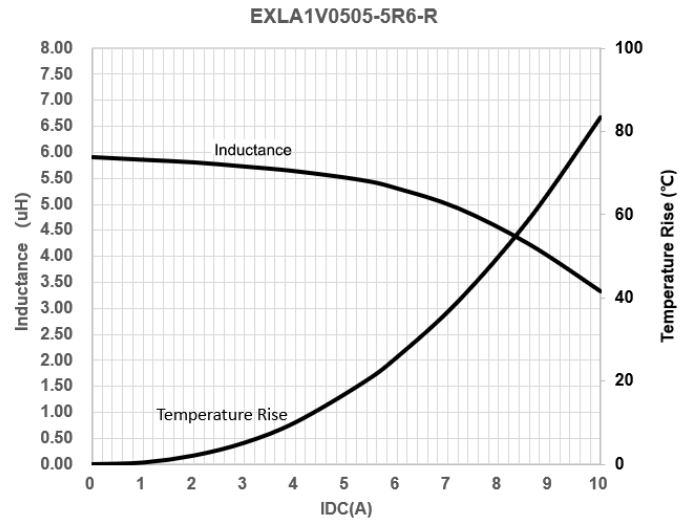
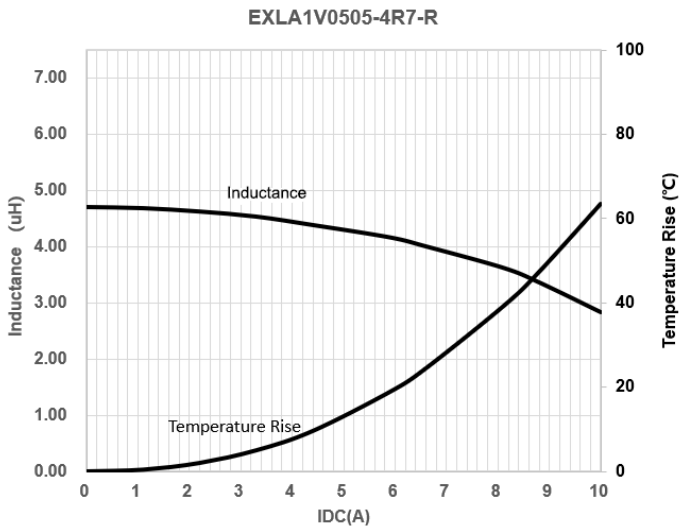
	<b>EXLA1V0503</b>	<b>EXLA1V0505</b>
$W \pm 0.30$	16.00	16.00
$F \pm 0.10$	7.50	7.50
$E1 \pm 0.10$	1.75	1.75
$E2 \text{ min}$	14.25	14.25
$P0 \pm 0.10$	4.00	4.00
$P1 \pm 0.10$	8.00	8.00
$P2 \pm 0.05$	2.00	2.00
$D0 + 0.10/-0$	1.50	1.50
$D1 + 0.10/-0$	1.50	1.50
$A0 \pm 0.10$	6.40	6.40
$B0 \pm 0.10$	6.10	6.10
$K0 \pm 0.10$	3.30	5.30
$T \pm 0.05$	0.35	0.35

Inductance and temperature rise vs. current

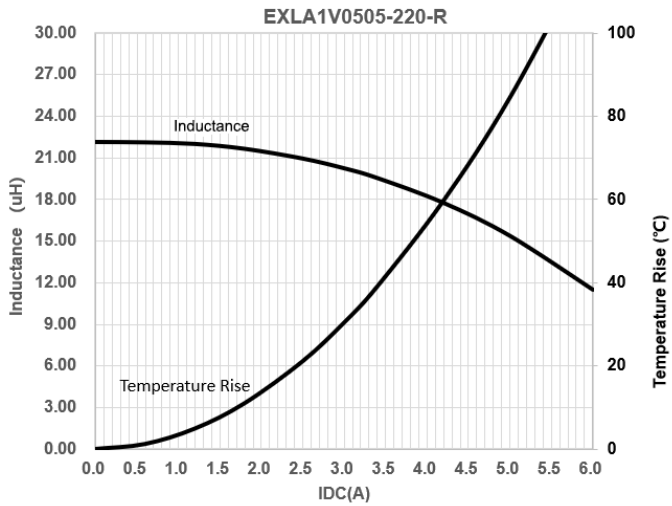
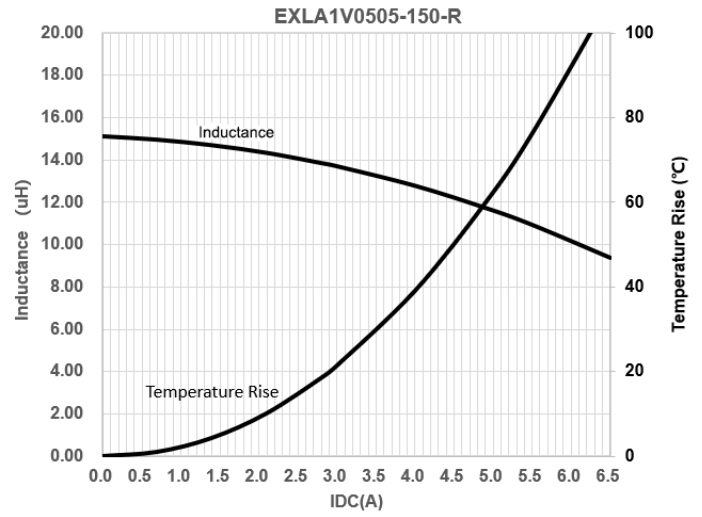
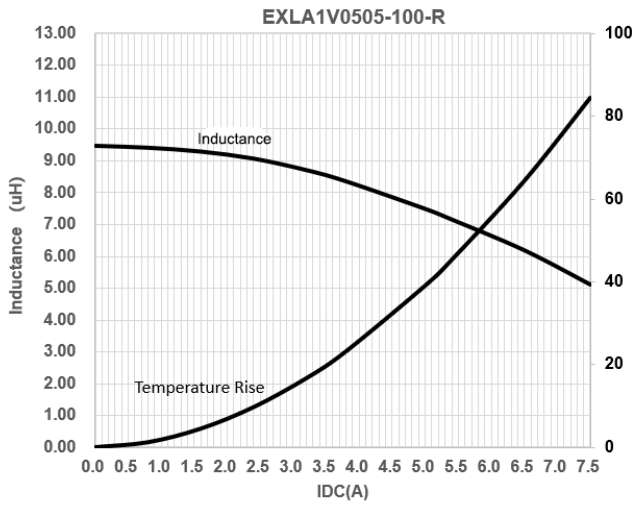
EXLA1V0503



**Inductance and temperature rise vs. current**  
**EXLA1V0505**

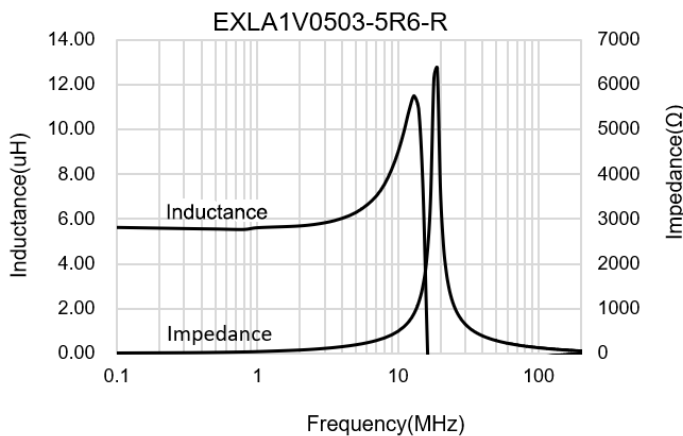
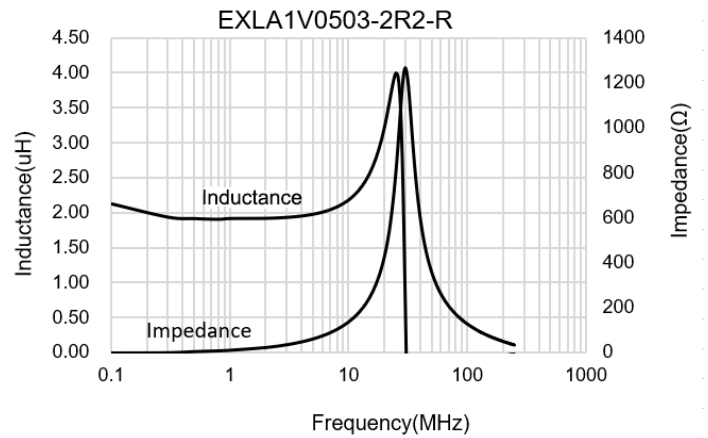
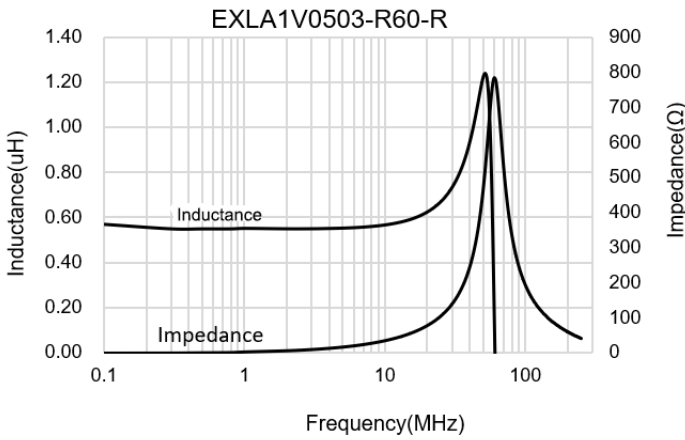
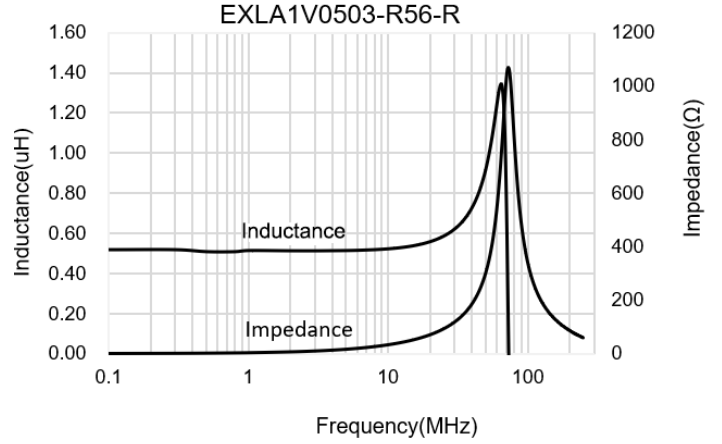
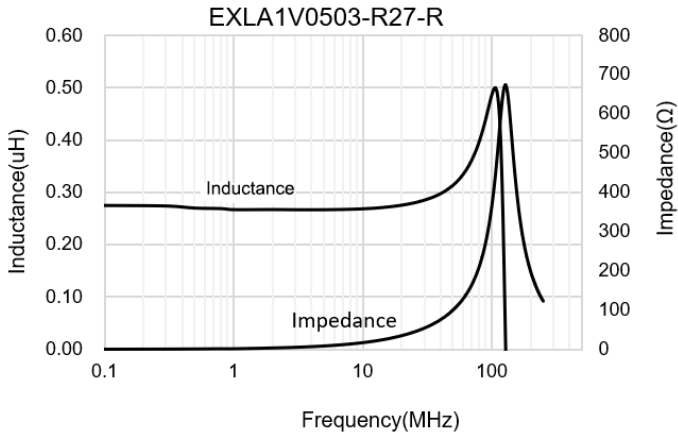


**Inductance and temperature rise vs. current, continued**  
**EXLA1V0505**



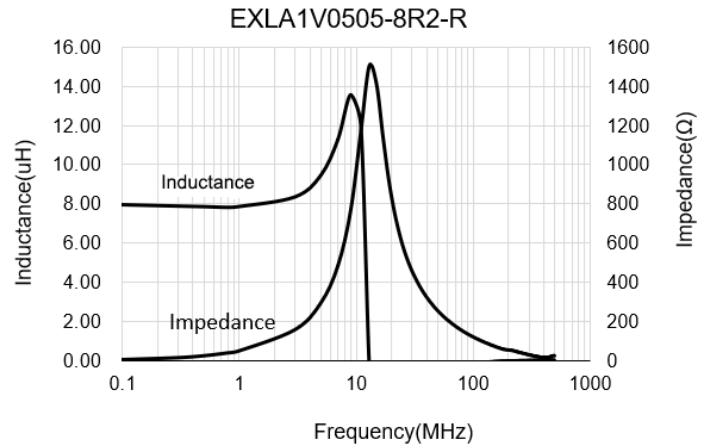
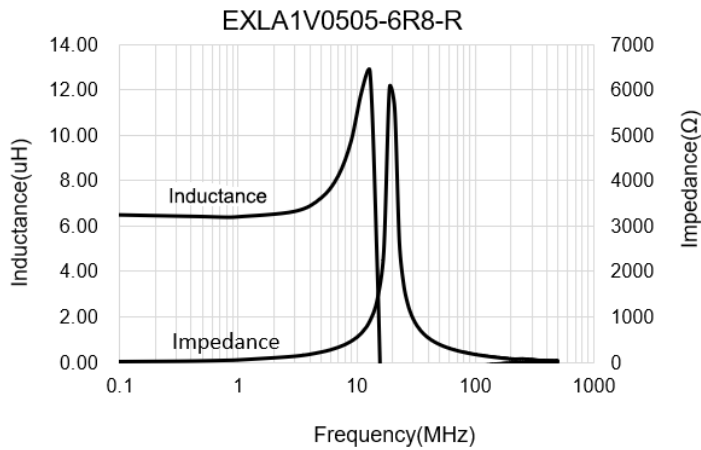
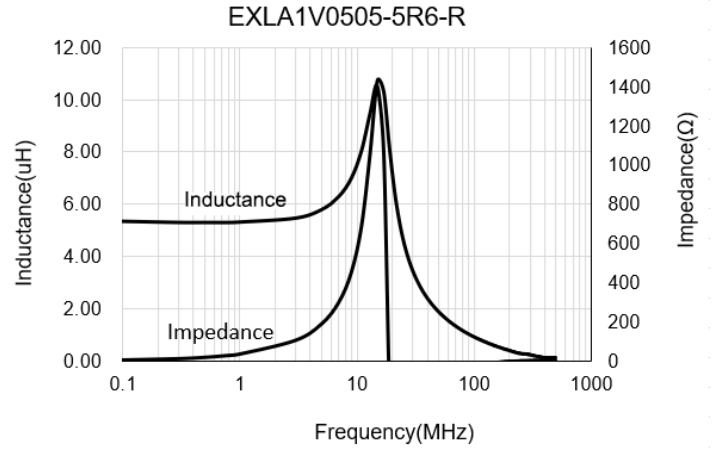
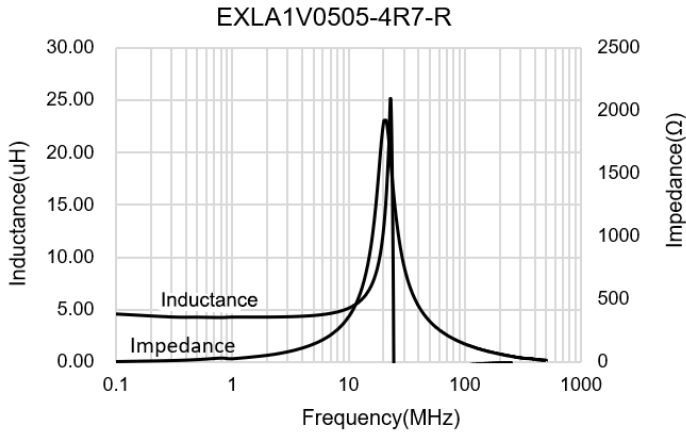
Inductance and impedance vs frequency curve

EXLA1V0503



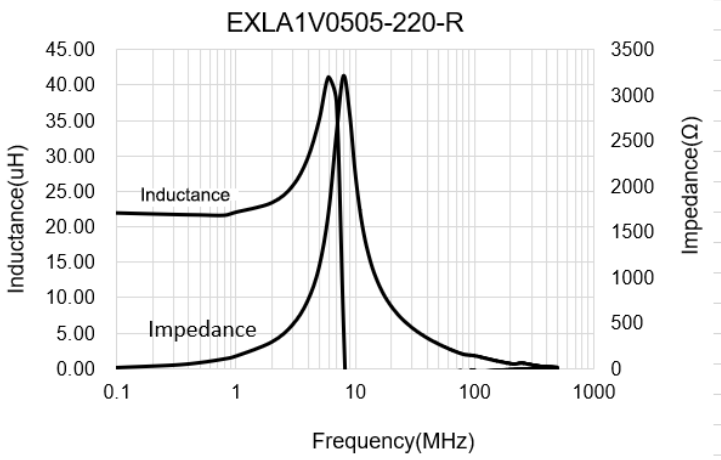
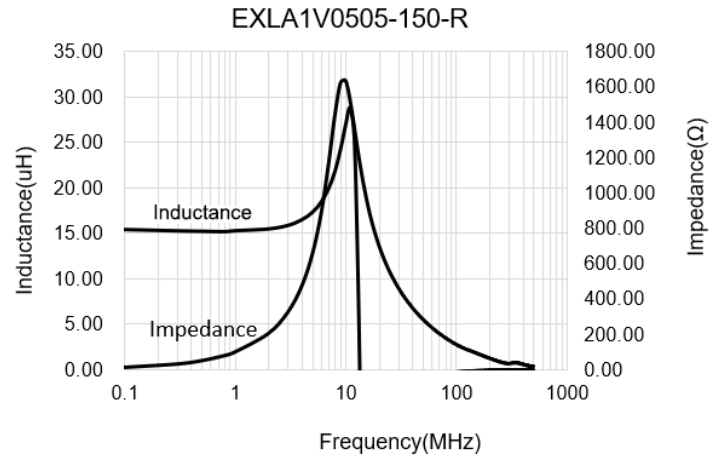
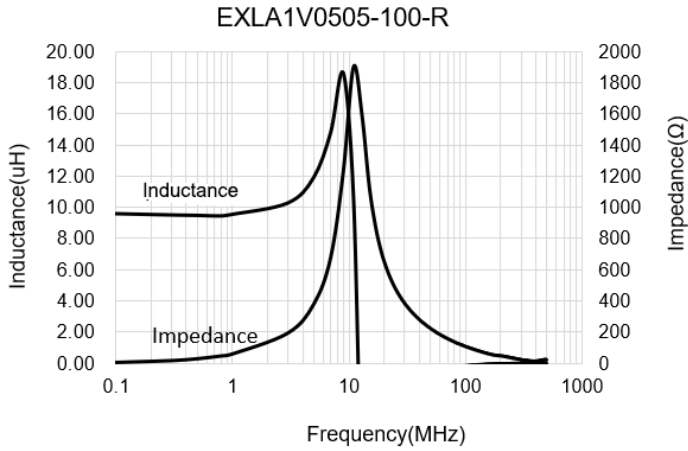
**Inductance and impedance vs frequency curve**

**EXLA1V0505**

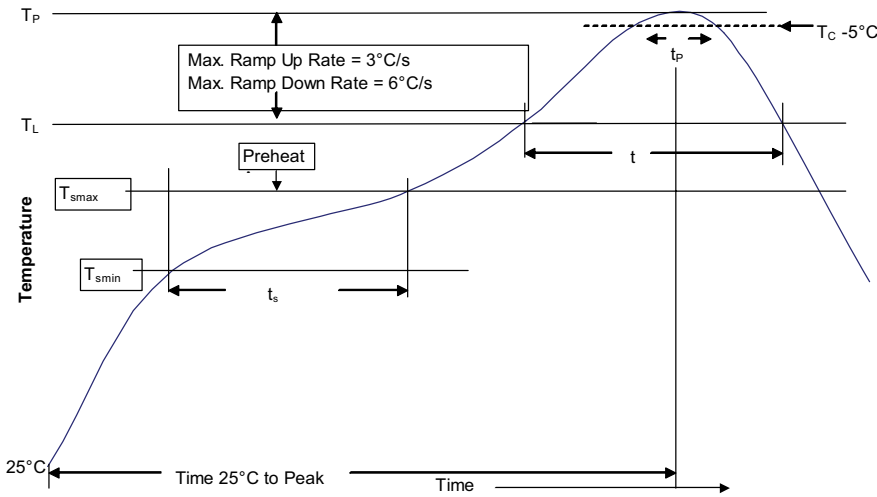




Inductance and impedance vs frequency curve, continued  
EXLA1V0505



**Solder reflow profile**



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

Package thickness	Volume $\text{mm}^3$ <350	Volume $\text{mm}^3$ $\geq$ 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 $\text{mm}^3$ <350	Volume $\text{mm}^3$ 350 - 2000	Volume $\text{mm}^3$ >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	<ul style="list-style-type: none"> <li>Temperature min. (<math>T_{smin}</math>)</li> <li>Temperature max. (<math>T_{smax}</math>)</li> <li>Time (<math>T_{smin}</math> to <math>T_{smax}</math>) (<math>t_s</math>)</li> </ul>	<ul style="list-style-type: none"> <li>100 °C</li> <li>150 °C</li> <li>60-120 seconds</li> </ul>
Ramp up rate $T_L$ to $T_p$	3 °C/ second max.	3 °C/ second max.
Liquidous temperature ( $T_L$ ) Time ( $t_L$ ) maintained above $T_L$	<ul style="list-style-type: none"> <li>183 °C</li> <li>60-150 seconds</li> </ul>	<ul style="list-style-type: none"> <li>217 °C</li> <li>60-150 seconds</li> </ul>
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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