

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 μ H to 22 μ 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 ⁴	OCL ¹ (μH) $\pm 20\%$	I_{rms}^2 (A) typical	I_{sat}^3 (A) typical	DCR (m Ω) typical @ +25 °C	DCR (m Ω) maximum @ +25 °C	D (mm) ± 0.3
EXLA1V0503						
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
EXLA1V0505						
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	

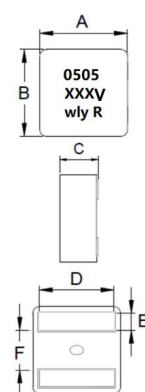
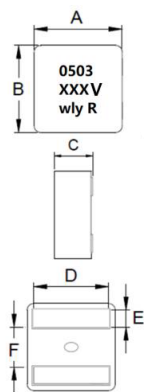
1. Open circuit inductance (OCL) test parameters: 100 kHz, 0.1 V_{rms}, 0.0 Adc, +25 °C
 2. I_{rms} : Heat rated current (I_{rms}) will cause the part temperature rise approximately ΔT of 40 °C. Circuit design, component, PCB trace size and thickness, airflow and other cooling provisions all affect the 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_{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 μH , 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.

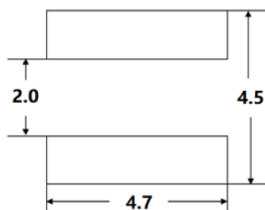
Mechanical parameters, schematic, pad layout (mm)

EXLA0503

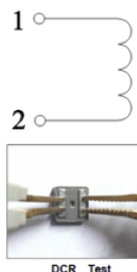
EXLA0505



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 μH (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 ± 0.3 millimeters unless stated otherwise

Dimensions of recommended PCB layout are reference only.

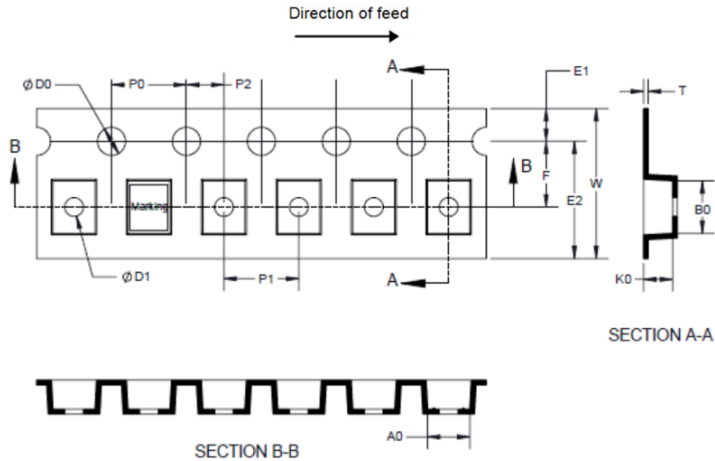
Pad layout tolerances are ± 0.1 millimeters unless stated otherwise

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)

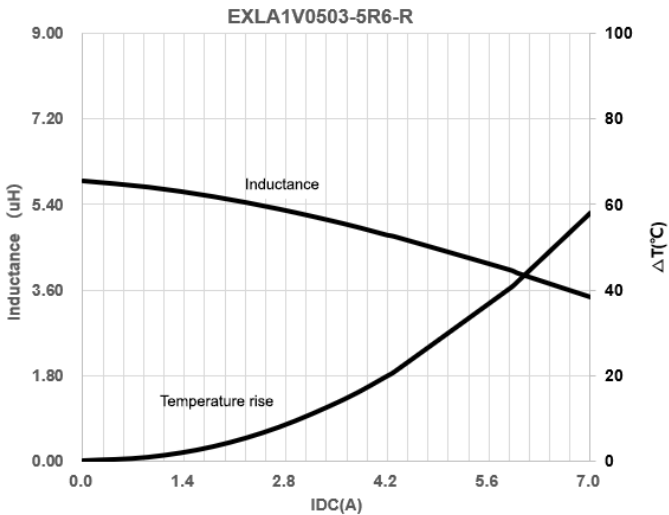
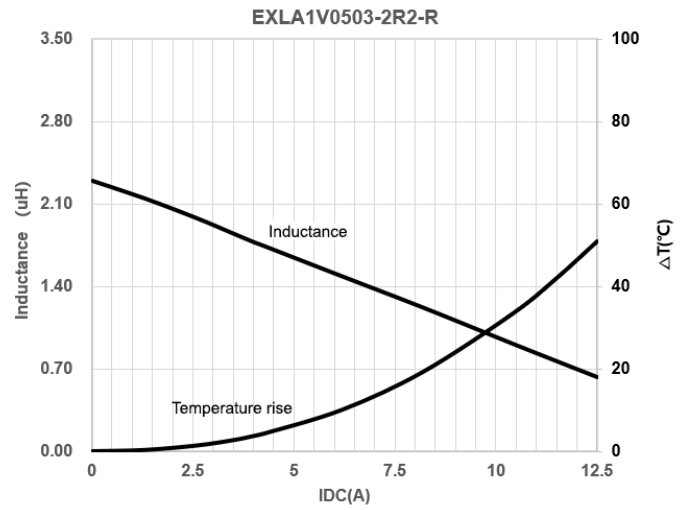
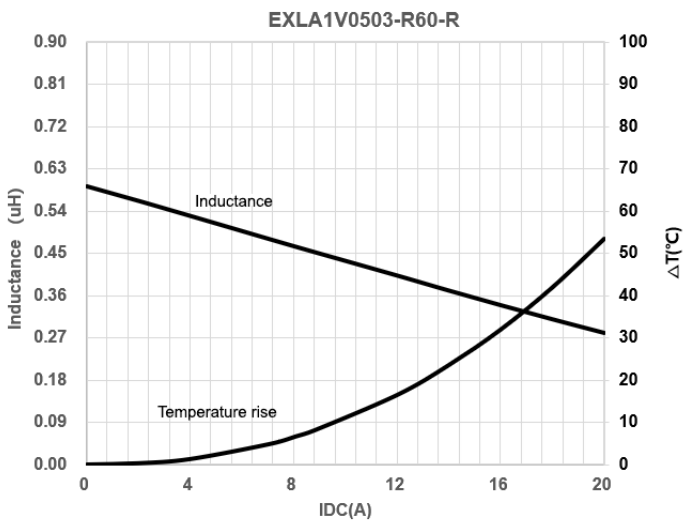
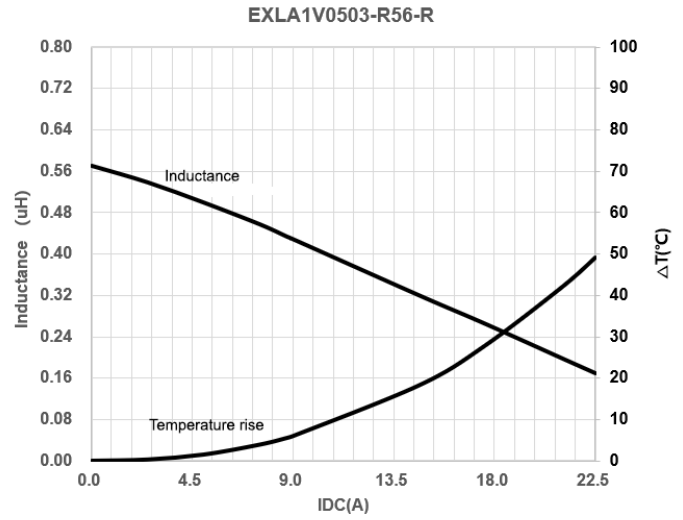
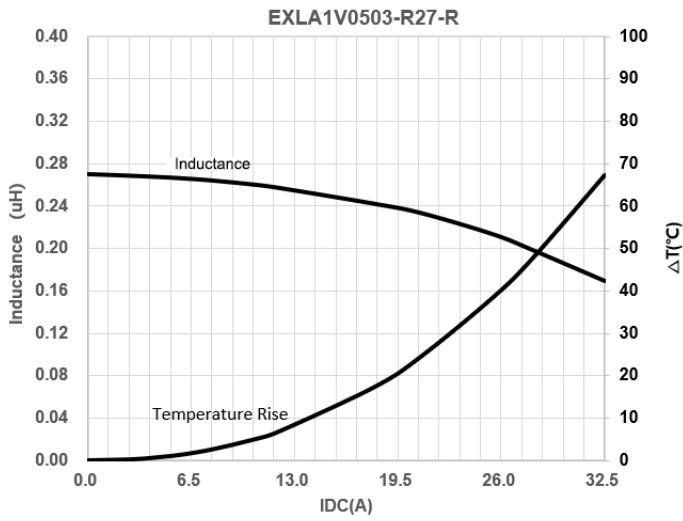
Drawing not to scale



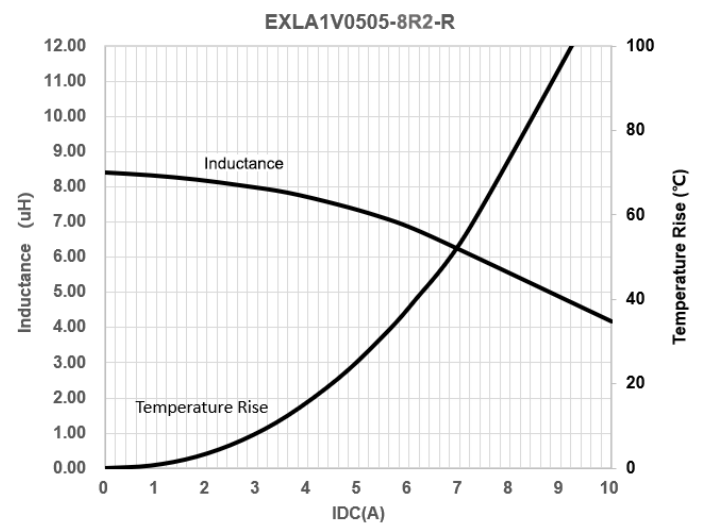
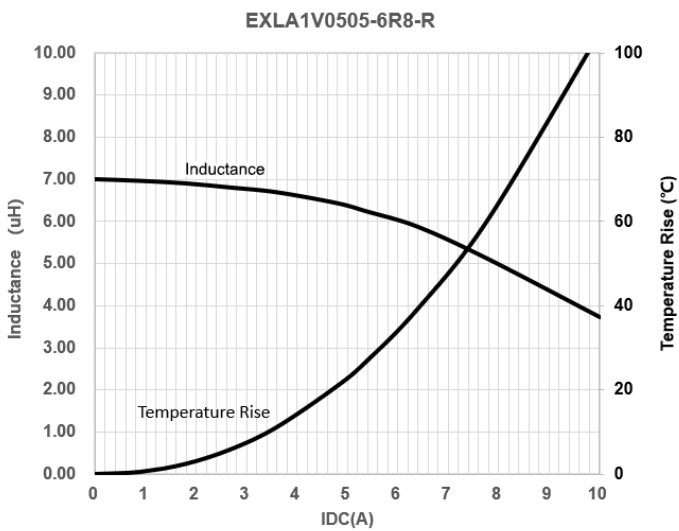
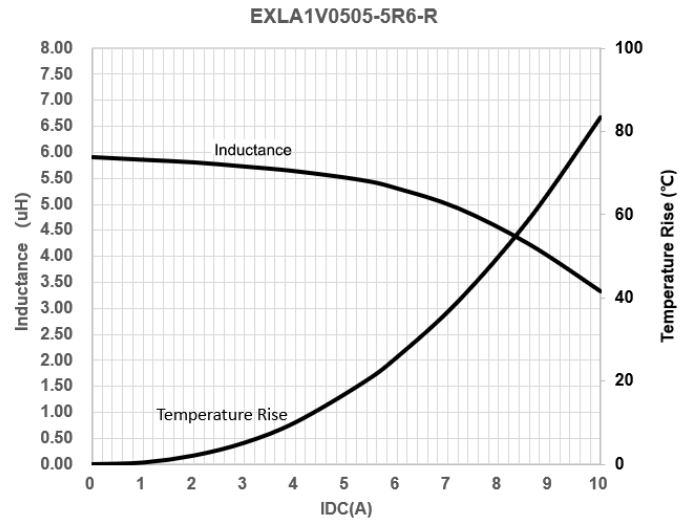
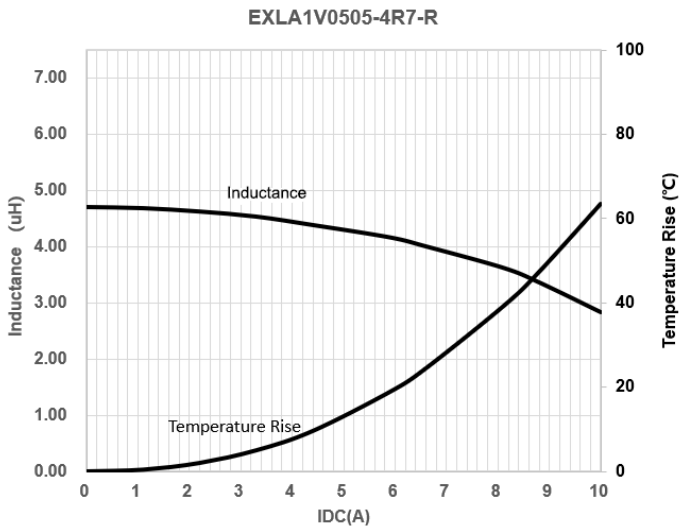
	EXLA1V0503	EXLA1V0505
W ± 0.30	16.00	16.00
F ± 0.10	7.50	7.50
E1 ± 0.10	1.75	1.75
E2 min	14.25	14.25
P0 ± 0.10	4.00	4.00
P1 ± 0.10	8.00	8.00
P2 ± 0.05	2.00	2.00
D0 + 0.10/-0	1.50	1.50
D1 + 0.10/-0	1.50	1.50
A0 ± 0.10	6.40	6.40
B0 ± 0.10	6.10	6.10
K0 ± 0.10	3.30	5.30
T ± 0.05	0.35	0.35

Inductance and temperature rise vs. current

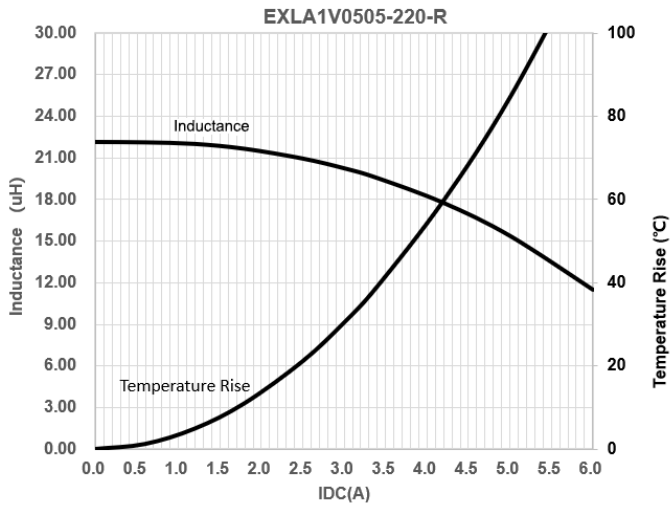
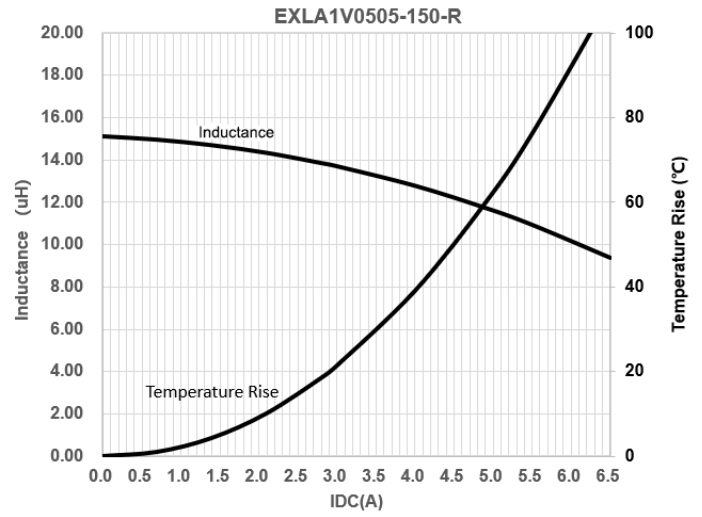
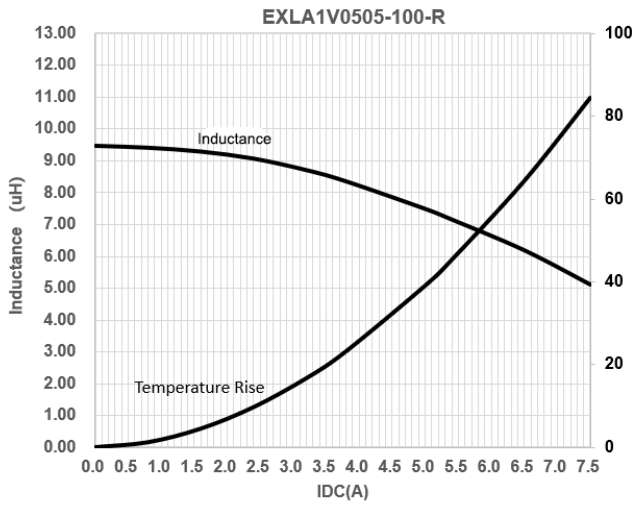
EXLA1V0503



Inductance and temperature rise vs. current
EXLA1V0505

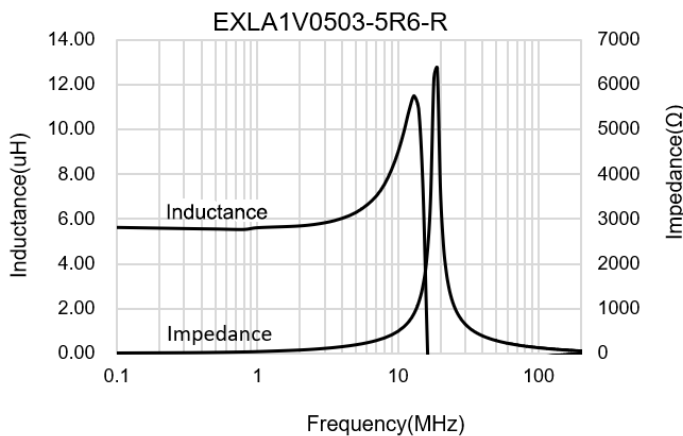
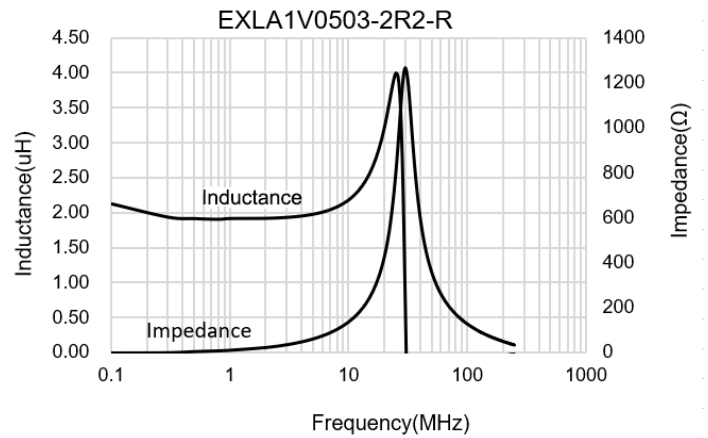
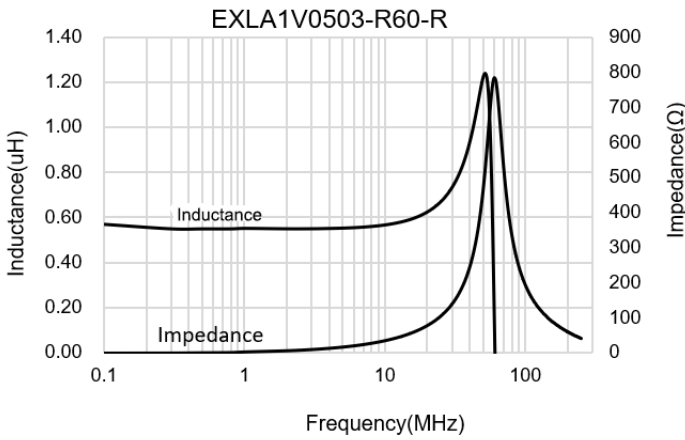
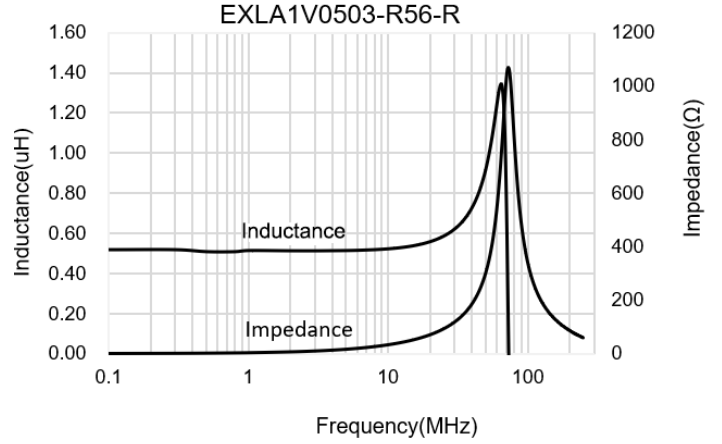
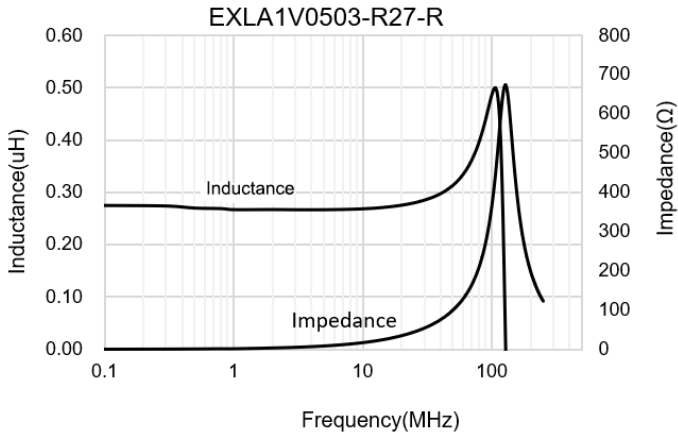


Inductance and temperature rise vs. current, continued
EXLA1V0505



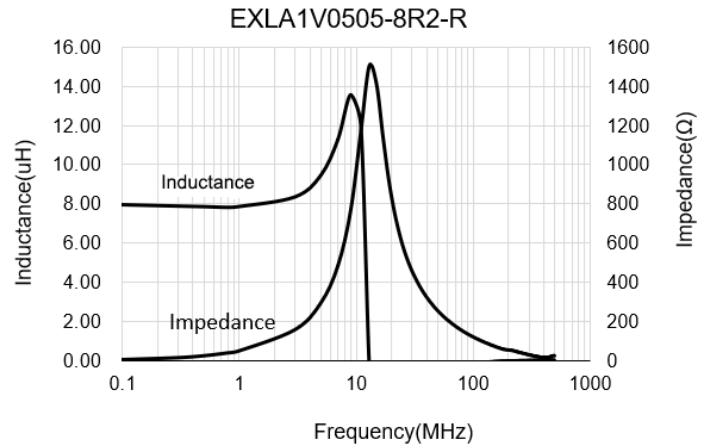
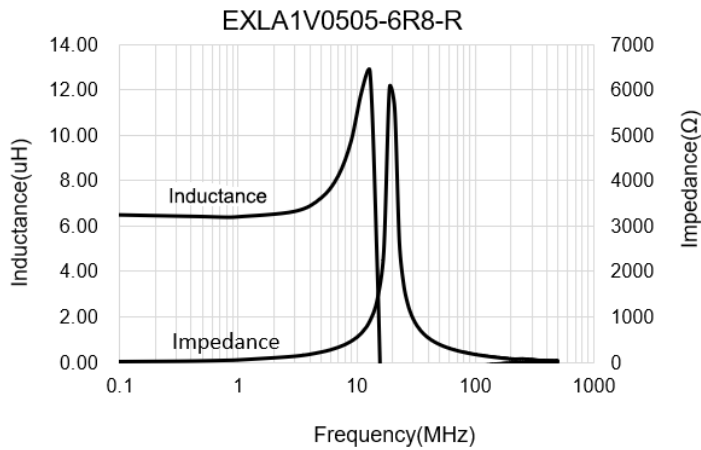
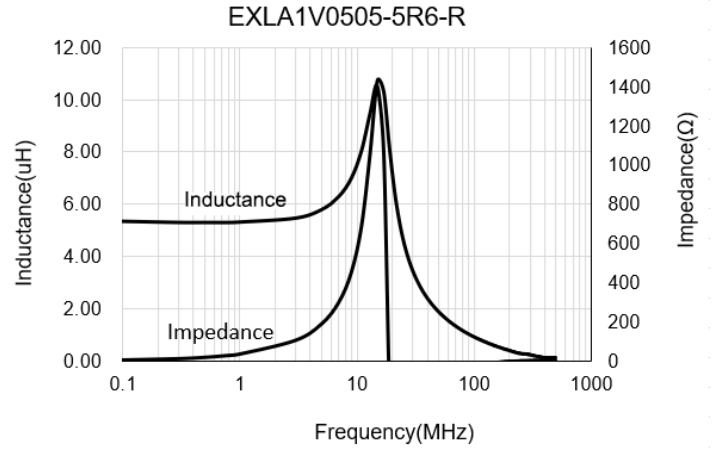
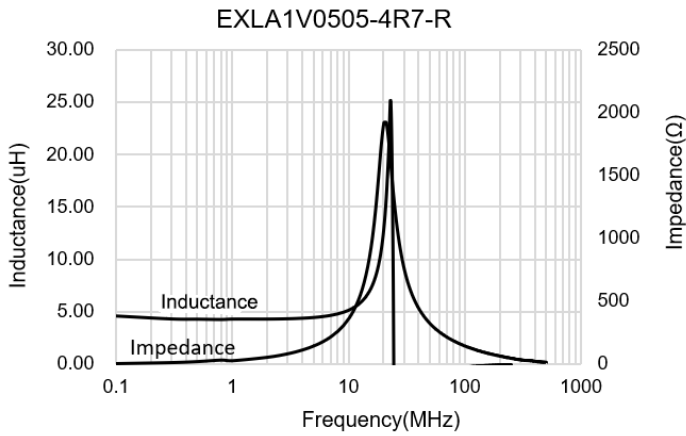
Inductance and impedance vs frequency curve

EXLA1V0503

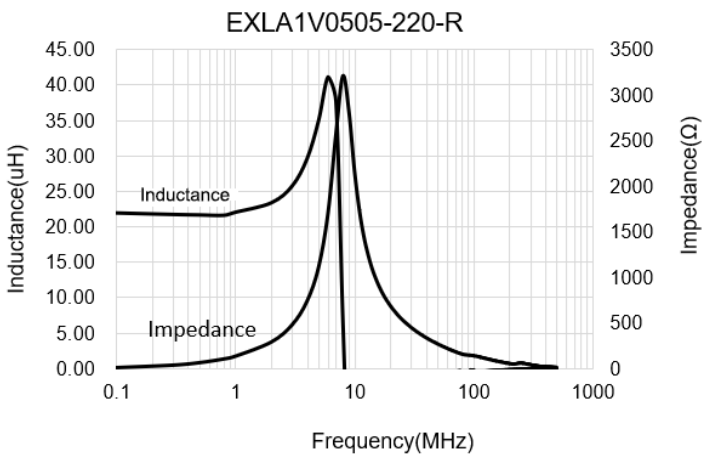
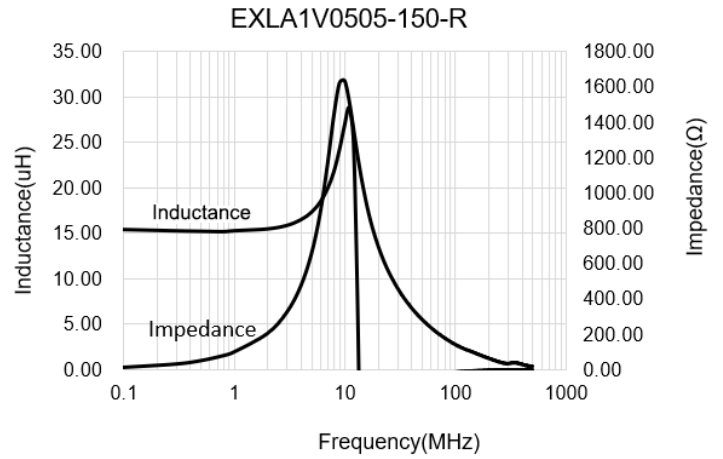
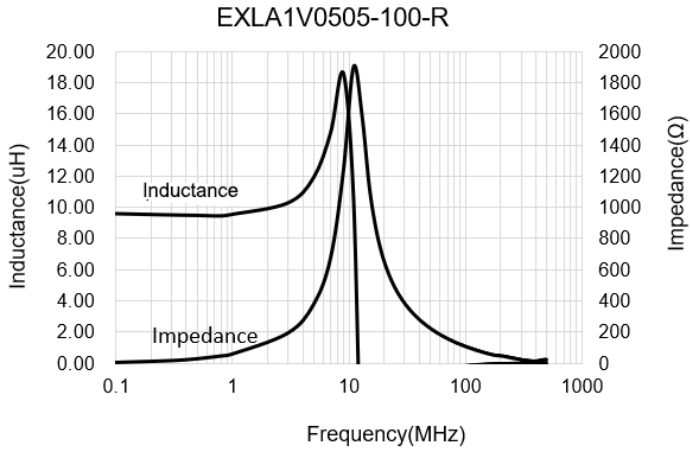


Inductance and impedance vs frequency curve

EXLA1V0505



Inductance and impedance vs frequency curve, continued
EXLA1V0505



Solder reflow profile

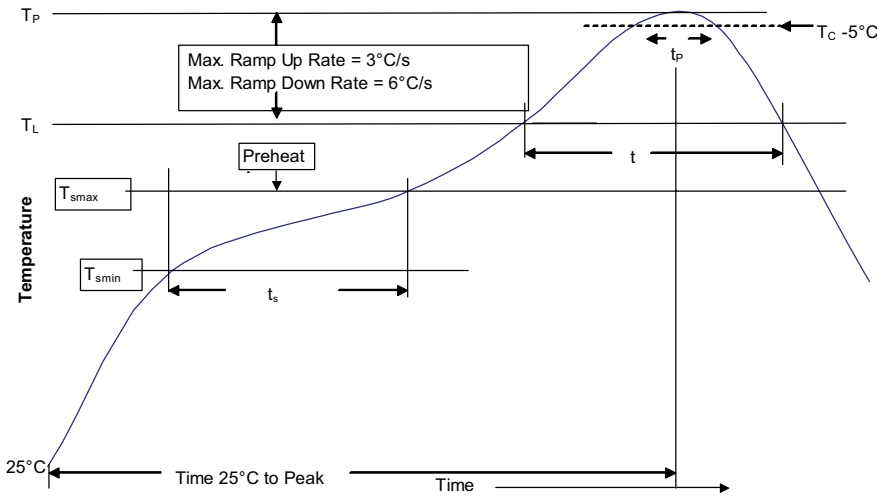


Table 1 - Standard SnPb solder (T_C)

Package thickness	Volume 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 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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