EXLA1V04
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 0.47 µH to 4.7 µH
- Current range from 3.5 A to 13.2 A
- 4.6 mm x 4.6 mm footprint surface mount package in a 2.1 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

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Product specifications

| Part number[4]	Part marking designator	OCL[1] (µH) ± 20%	I_{rms}[2] (A)	I_{sat}[3] (A)	DCR (mΩ) typical @ +25 °C	DCR (mΩ) maximum @ +25 °C
EXLA1V0402-R47-R	A	0.47	13.2	12.5	6.0	6.8
EXLA1V0402-R56-R	B	0.56	12.6	11.3	6.9	7.8
EXLA1V0402-R60-R	C	0.6	12.4	11.1	6.9	7.8
EXLA1V0402-R68-R	D	0.68	12	10.0	7.3	8.2
EXLA1V0402-R82-R	E	0.82	11.5	9.0	8.6	9.5
EXLA1V0402-1R0-R	F	1.0	11	8.0	10.6	11.7
EXLA1V0402-1R2-R	G	1.2	9.5	7.5	12.2	13.4
EXLA1V0402-1R5-R	H	1.5	9.1	6.7	14.4	15.8
EXLA1V0402-2R0-R	I	2.0	8.2	5.0	21.15	23.3
EXLA1V0402-2R2-R	J	2.2	8.0	4.8	21.35	23.5
EXLA1V0402-3R3-R	K	3.3	5.5	4.4	34.2	38.3
EXLA1V0402-4R7-R	L	4.7	5.1	3.5	52	57.2

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: EXLA1V0402-xxx-R
   EXLA1V0402 = 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)
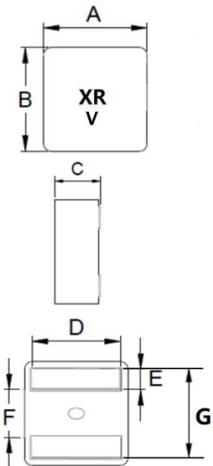
Recommended pad layout

Schematic

DCR Test
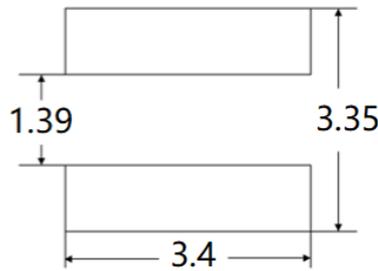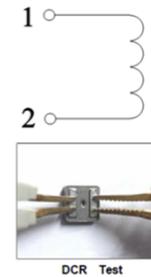
Part number	A	B	C	D	E	F	G
EXLA1V0402-xxx-R	4.4 ± 0.20	4.4 ± 0.20	1.9 ± 0.20	3.4 ± 0.30	0.88 ± 0.20	1.6 ± 0.25	3.36 typ

Part marking:

1st digit = Inductance value per the "Part marking designator" letter code in specification table

2nd digit = Revision level

V= vehicle

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)

Drawing not to scale

Supplied in tape and reel packaging, 3000 parts per 7″ diameter reel (EIA-481 compliant)

SECTION A-A

SECTION B-B
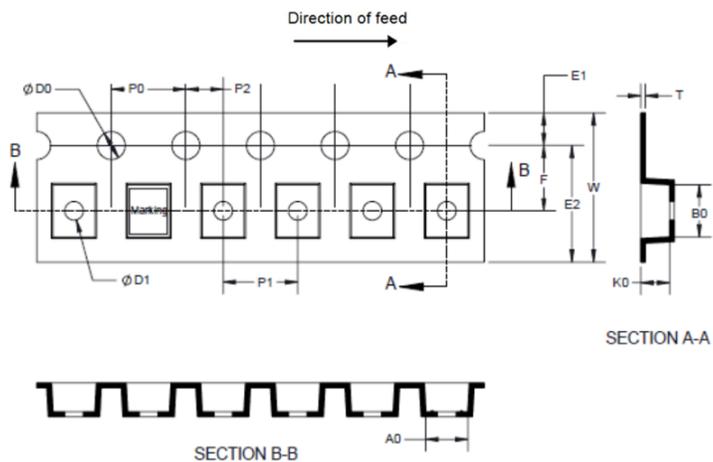
W ± 0.30	12.00
F ± 0.10	5.50
E1 ± 0.10	1.75
E2 min	10.25
P0 ± 0.10	4.00
P1 ± 0.10	8.00
P2 ± 0.05	2.00
D0 + 0.10/-0	1.50
D1 + 0.10/-0	1.50
A0 ± 0.10	4.70
B0 ± 0.10	4.70
K0 ± 0.10	2.30
T ± 0.05	0.35

Inductance and temperature rise vs. current

EXLA1V0402-R47-R

EXLA1V0402-R56-R

EXLA1V0402-R60-R

EXLA1V0402-R68-R

EXLA1V0402-R82R

EXLA1V0402-1R0-R
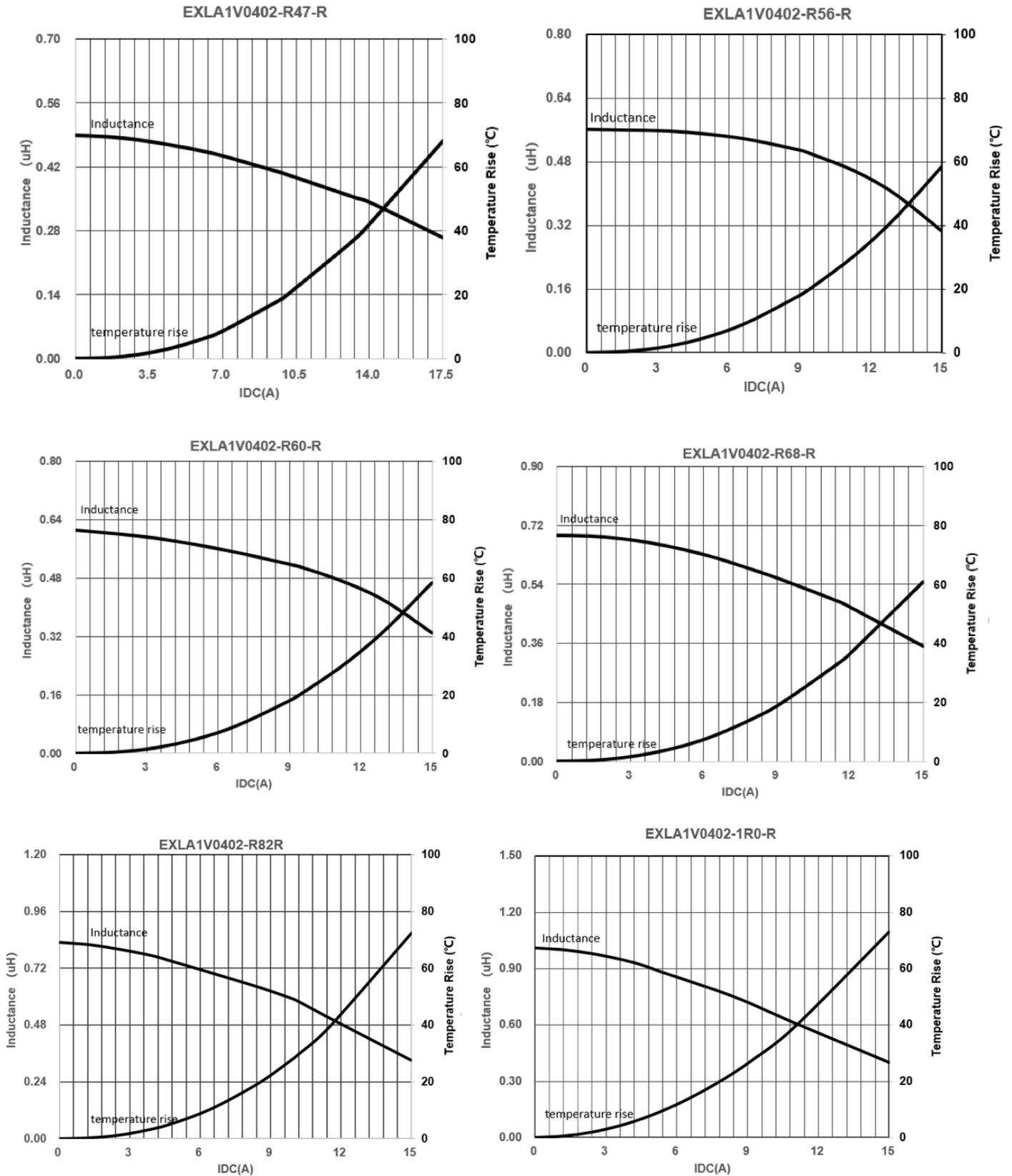
Inductance and temperature rise vs. current, continued

EXLA1V0402-1R2-R

EXLA1V0402-1R5-R

EXLA1V0402-2R0-R

EXLA1V0402-2R2-R

EXLA1V0402-3R3-R

EXLA1V0402-4R7-R
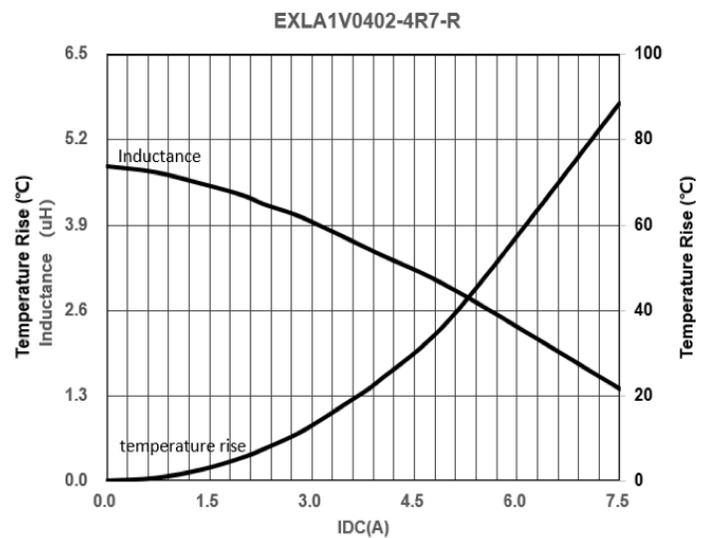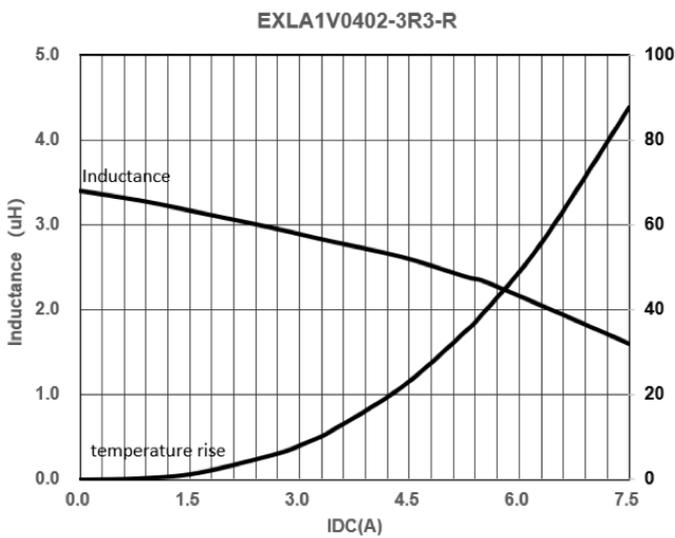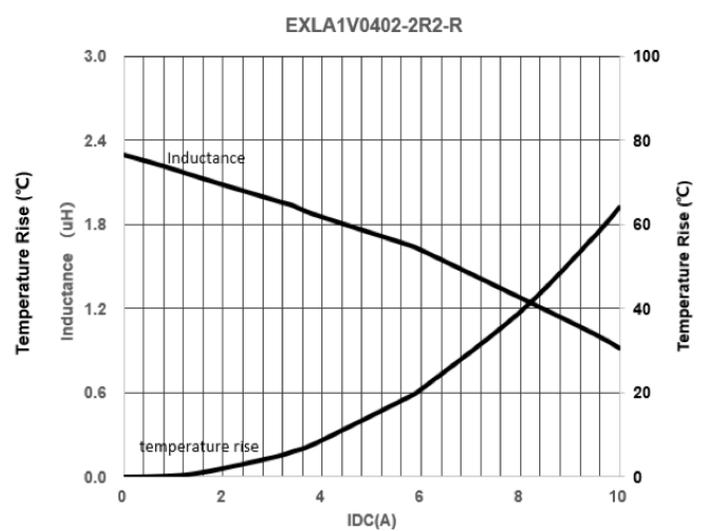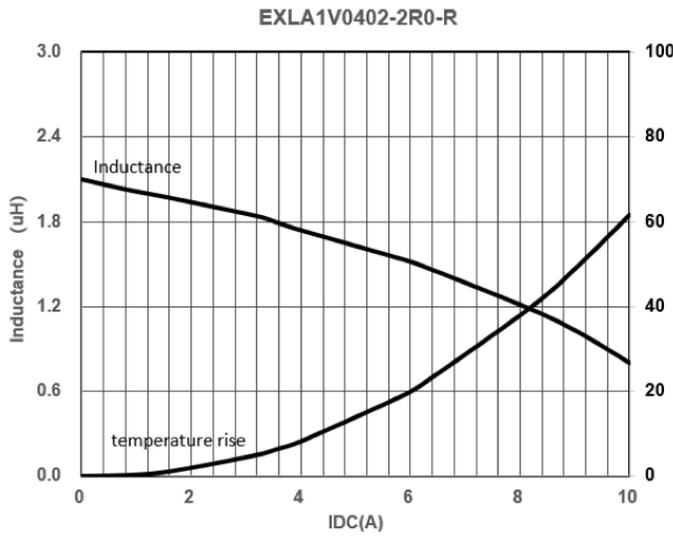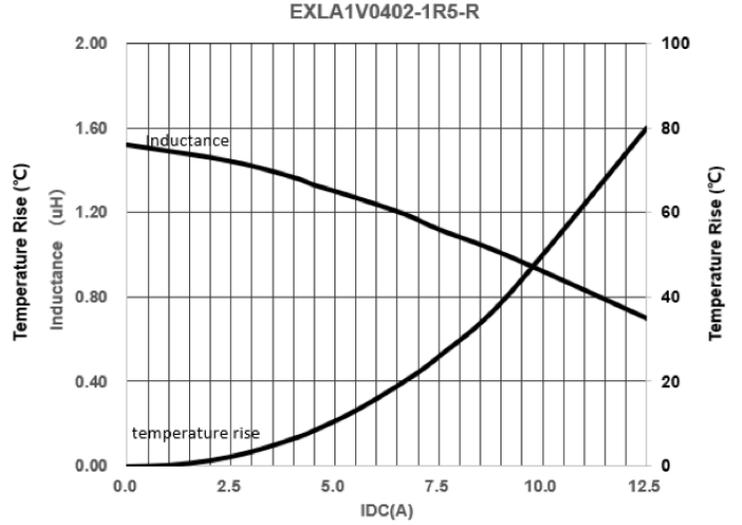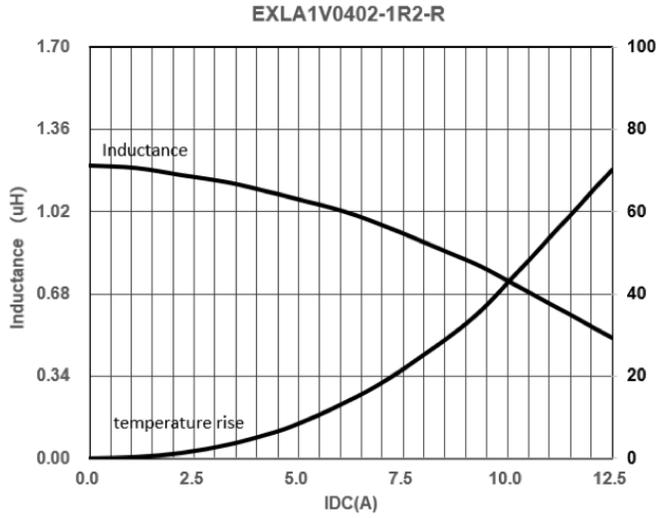
Inductance & impedance vs. frequency Curve

─── Inductance   ─── Impedance

EXLA1V0402-R47-R

EXLA1V0402-R56-R

EXLA1V0402-R60-R

EXLA1V0402-R68-R

EXLA1V0402-R82-R

EXLA1V0402-1R0-R
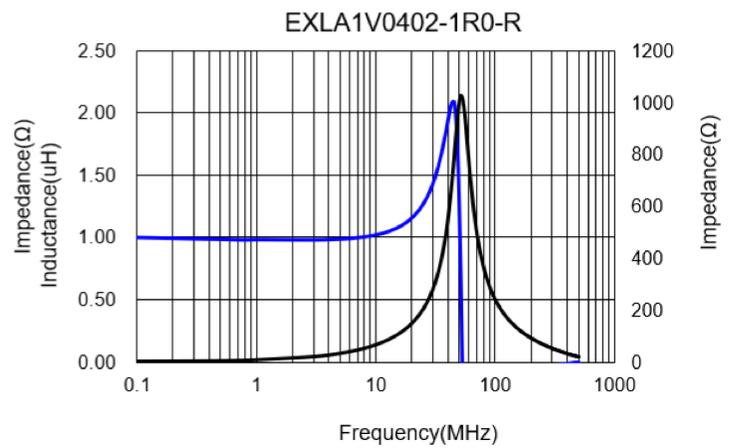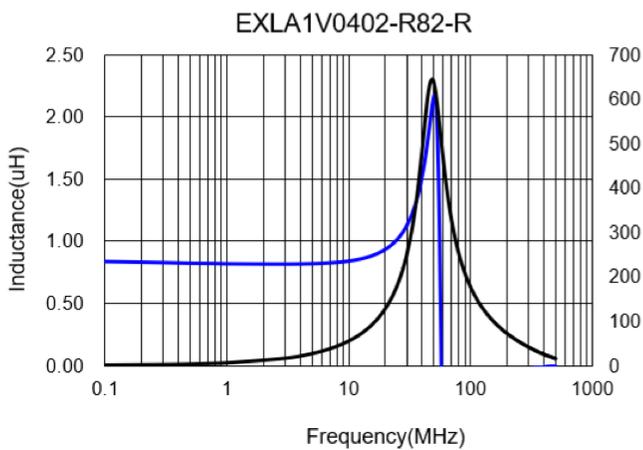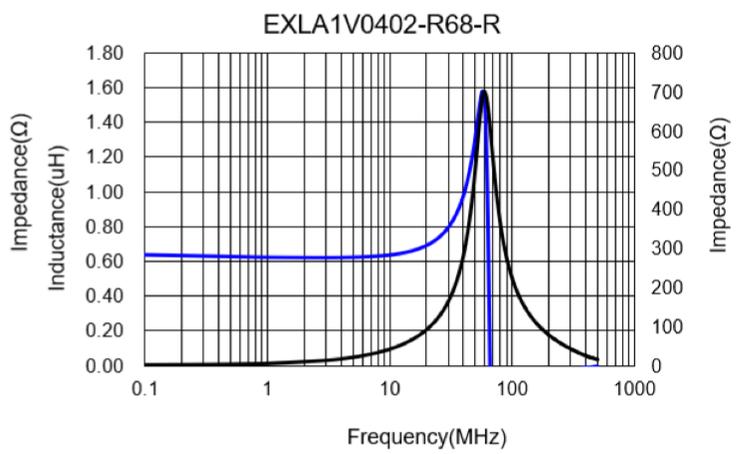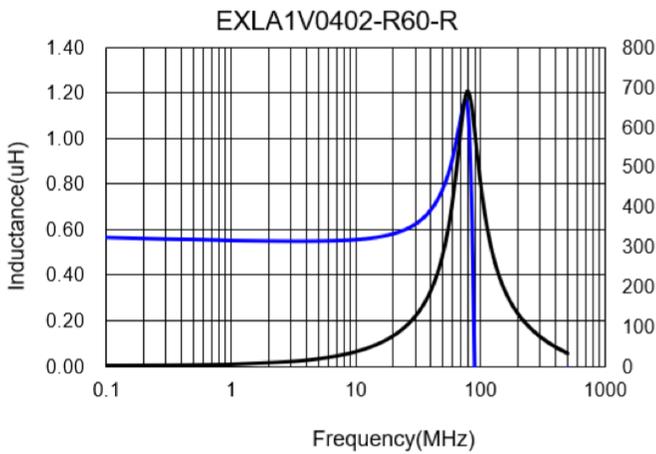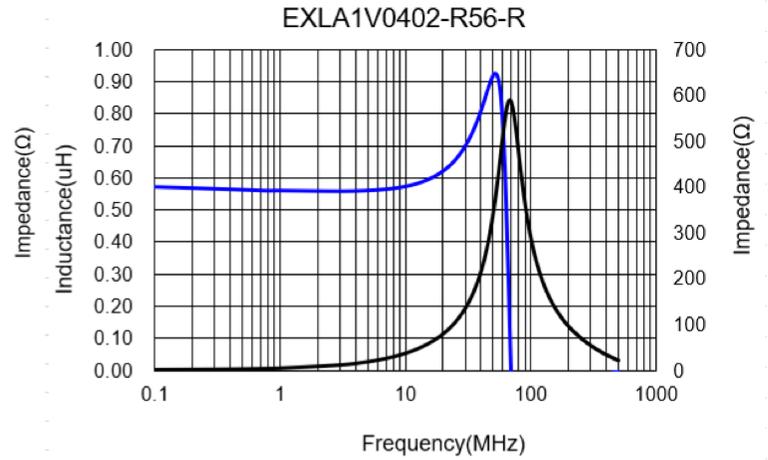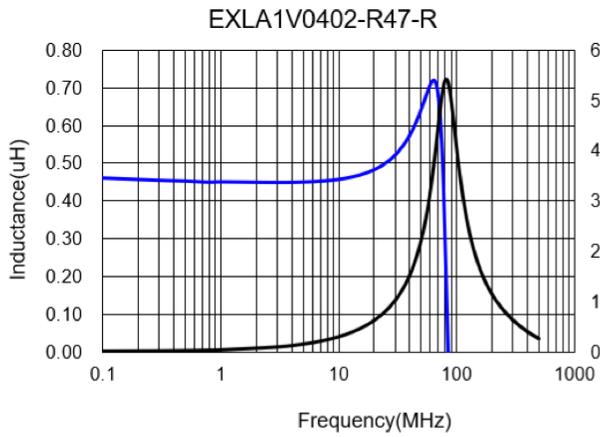
Inductance & impedance vs. frequency Curve, continued

—— Inductance   —— Impedance

EXLA1V0402-1R2-R

EXLA1V0402-1R5-R

EXLA1V0402-2R0-R

EXLA1V0402-2R2-R

EXLA1V0402-3R3-R

EXLA1V0402-4R7-R
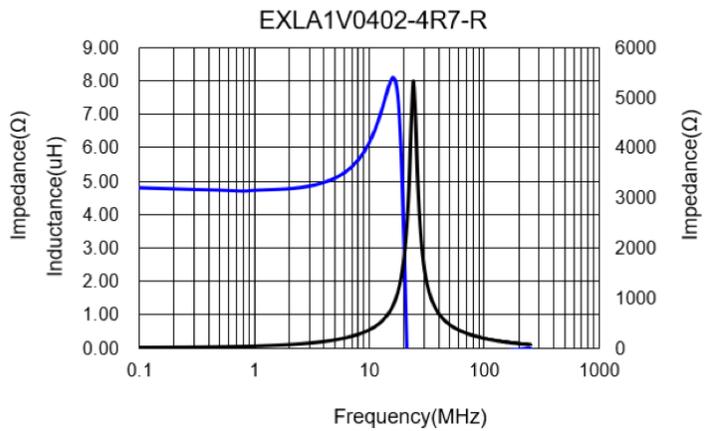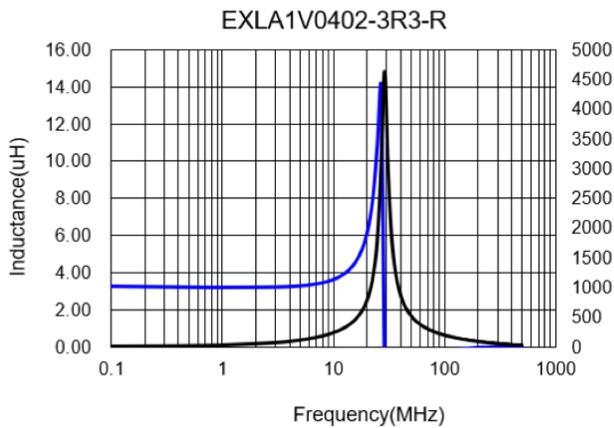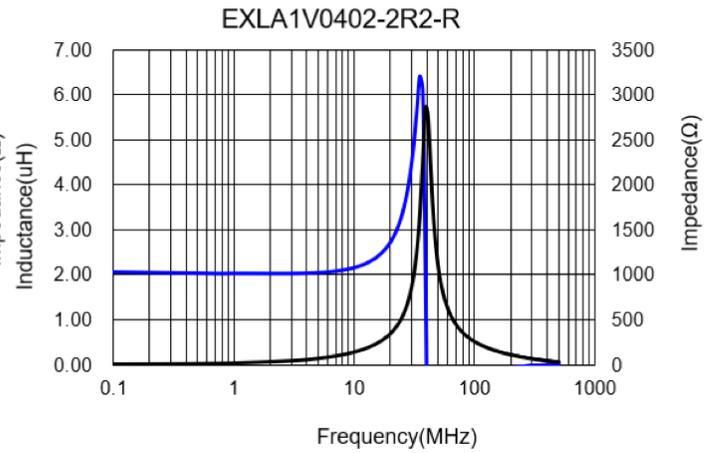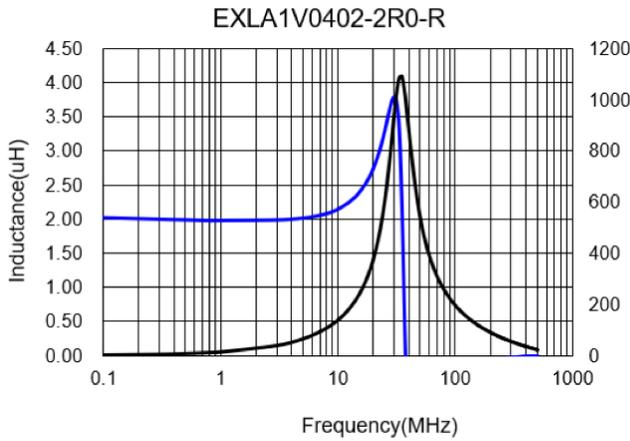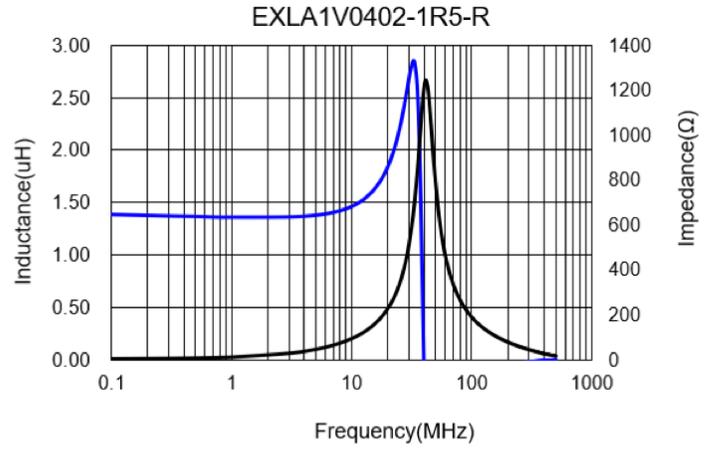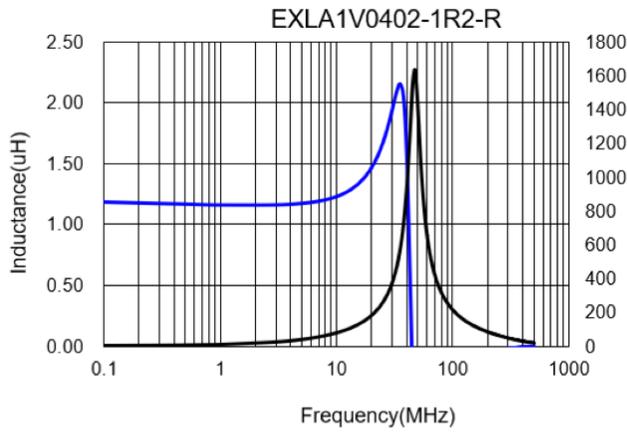
Solder reflow profile
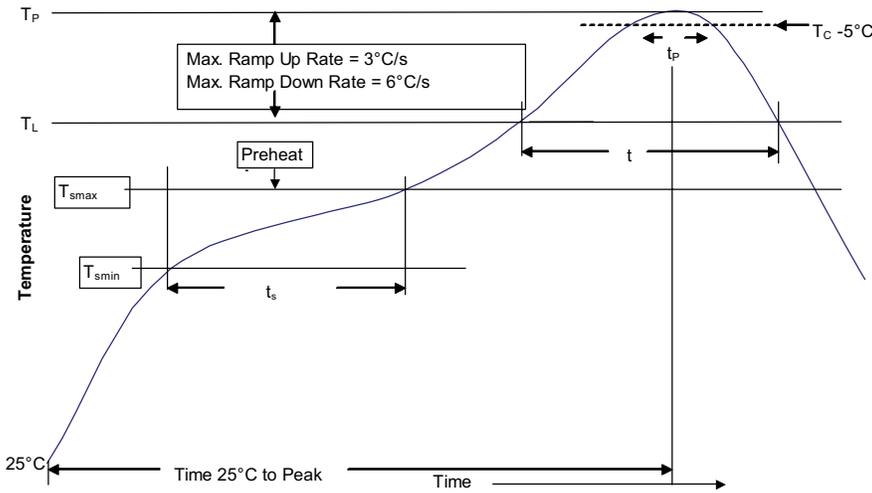
Table 1 - Standard SnPb solder (T_C)

Package thickness	Volume mm3 <350	Volume mm3 ≥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 mm³ <350	Volume mm³ 350 - 2000	Volume mm³ >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) Time (t_L) maintained above T_L		183 °C 60-150 seconds	217 °C 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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