

ACDL1V

Automotive class D audio inductor alloy powder



Product features

- AEC-Q200
- Shielded construction
- Dual inductors in a single package
- 12.2 mm x 9.8 mm footprint surface mount package in a 11.6 mm height
- Low loss, low DCR
- High I_{sat}
- Alloy powder core material
- Moisture sensitivity level (MSL) 1

Applications

Automotive class D audio amplifiers

- Automotive 12 V/24 V/48 V bidirectional DC/DC converters
- EV battery chargers
- On-board-chargers
- xEV Electrical systems (multiple phases)

Environmental compliance and general specifications

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



Product specifications

Part number ⁵	OCL ³ (μH) $\pm 20\%$	I_{rms}^3 (A)	I_{sat}^4 (A)	DCR (m Ω) typical @ +25 °C	DCR (m Ω) maximum @ +25 °C	SRF (MHz) reference
ACDL1V1004-5R6-R	5.6	6.0	9.0	20	24	15
ACDL1V1004-7R5-R	7.5	5.3	8.0	25	30	14
ACDL1V1004-100-R	10	4.4	6.4	30.5	36.6	12
ACDL1V1004-150-R	15	4.1	5.0	43.5	52.2	10
ACDL1V1004-220-R	22	3.5	4.5	62	74.4	8.0
ACDL1V1004-330-R	33	2.8	4.0	100	120	7.0

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

2. All test data referenced to +25°C ambient.

3. I_{rms} (per winding): 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 +155 °C under worst case operating conditions verified in the end application.

4. I_{sat} (per winding): Peak current for approximately 30% rolloff @ +25 °C.

5. Part number definition: ACDL1V1004-xxx-R

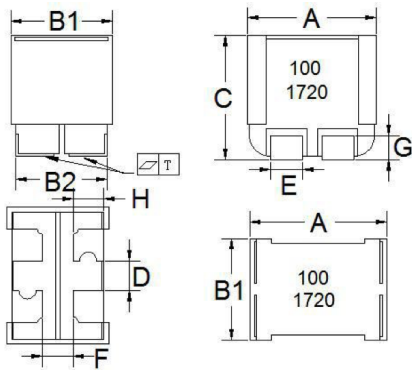
(ACDL1V1004)= Product code and size

xxx= inductance value in μH , R= decimal point, if no R is present then last character equals number of zeros

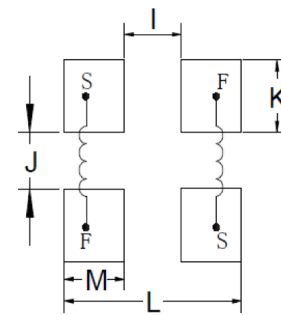
-R suffix = RoHS compliant

Note: Rated DC current: The lower value of I_{rms} or I_{sat} .

Mechanical parameters, schematic, pad layout (mm)

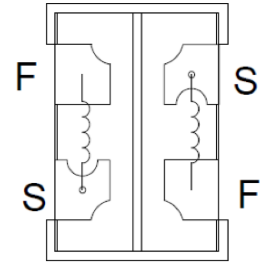


Recommended pad layout



I	2.9
J	1.5
K	3.3
L	9.7
M	3.4

Schematic



Part number	A	B1	B2	C	D	E	F	G	H	T
ACDL1V1004	12 ± 0.20	9.6 ± 0.20	8.7 ± 0.25	11.3 ± 0.30	1.95 ± 0.15	2.8 ± 0.10	3.4 minimum	2.3 ± 0.30	2.5 ± 0.30	≤ 0.1

Part marking: example 100

1720

100= inductance value in μH , last digit indicates number of zeros (100=10 μH)

1720= (randomly generated lot code)

PCB layout is for reference

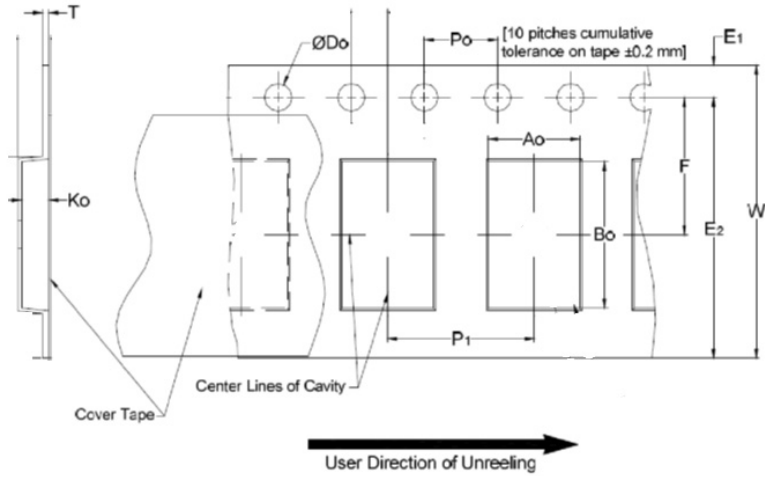
Recommended solder paste thickness at 0.15 mm and above.

Traces or vias underneath the inductor is not recommended.

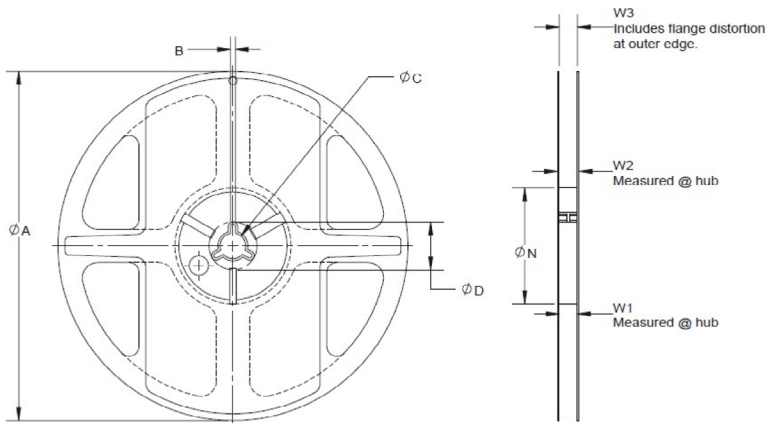
Packaging information (mm)

Drawing not to scale

Supplied in tape and reel packaging, 300 parts per 13" diameter reel (EIA-481 compliant)



W	24.0 ± 0.3
F	11.5 ± 0.1
E1	1.75 ± 0.10
E2	NA
P0	4 ± 0.10
P1	16.0 ± 0.1
ØD0	1.5 ± 0.1
A0	10.0 ± 0.1
B0	12.5 ± 0.1
K0	11.55 ± 0.10
T	0.50 ± 0.05

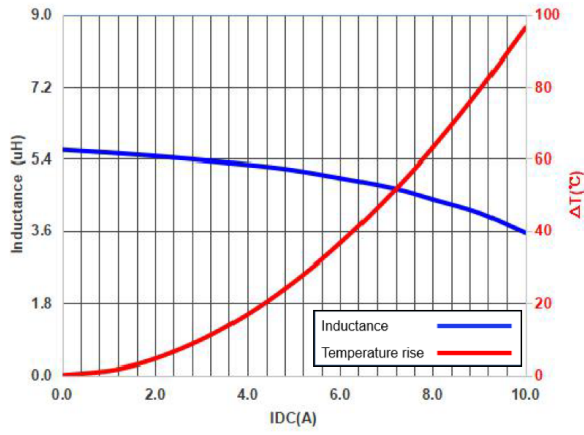


Shape & Appearance For Reference Only

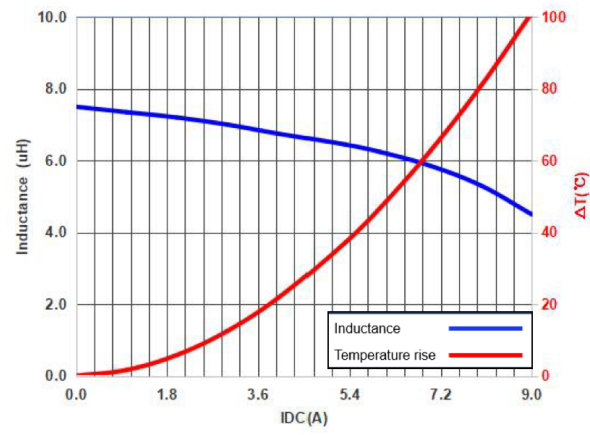
A	330 ± 2
B	2.3 ± 0.3
C	13 + 0.5/-0.2
D	20.2 minimum
N	97 ± 0.5
W1	24.4 + 2.0/-0
W2	30.4 maximum
W3	NA

Inductance and temperature rise vs. Idc

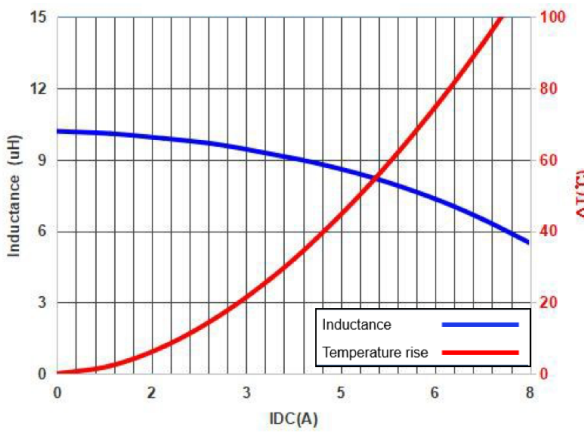
ACDL1V1004-5R6-R



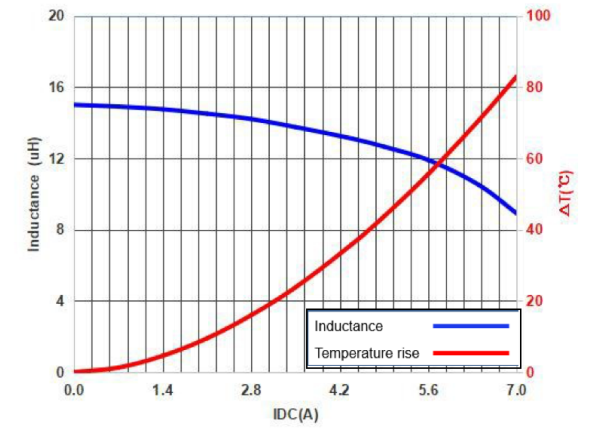
ACDL1V1004-7R5-R



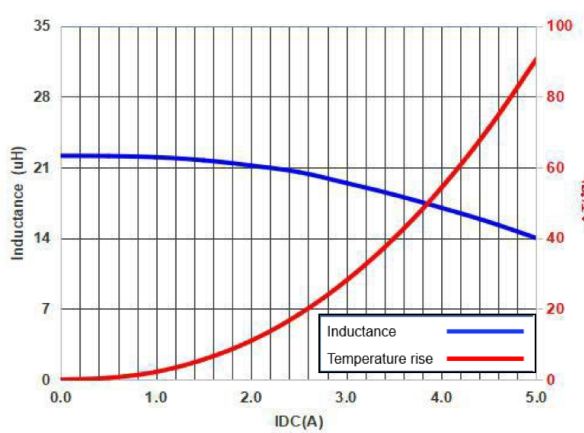
ACDL1V1004-100-R



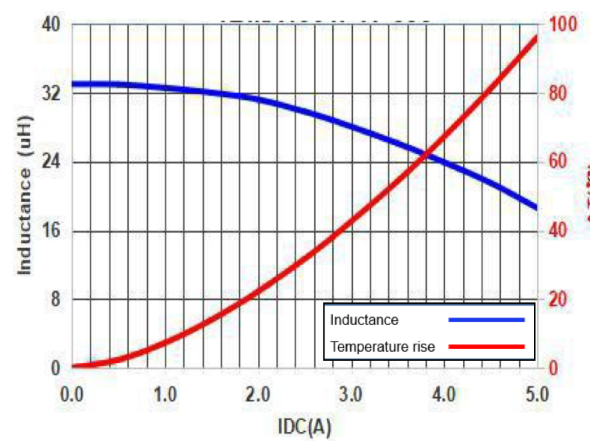
ACDL1V1004-150-R



ACDL1V1004-220-R



ACDL1V1004-330-R



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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Printed in USA
Publication No. ELX1245 BU-ELX22107
October 2022

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