

HCSA1V1008

Automotive grade dual winding high current inductor



Product features

- AEC-Q200 qualified
- Magnetically shielded, low EMI
- Robust molded construction
- Dual winding, ideal for SEPIC converters
- Inductance range from 10 μ H to 22 μ H
- Current range from 3.3 A to 11.2 A
- 11.35 mm x 10.3 mm footprint surface mount package in a 8.2 mm height
- Moisture sensitivity level (MSL): 1
- Alloy powder core material

Applications

- Body electronics
 - Heating ventilation and air conditioning controllers (HVAC)
 - Headlamps, tail lamps and interior lighting and LED lighting
 - Doors, window lift and seat control
- Advanced driver assistance systems
 - Basic and smart surround, and rear and front-view camera
 - Adaptive cruise control (ACC)
 - Collision avoidance system
 - Car black box system
- Infotainment and cluster electronics
 - Audio subsystem: head unit and trunk amp
 - Digital instrument cluster
 - In-vehicle infotainment (IVI) and navigation
- Engine and powertrain systems
 - Diesel/gasoline engine management
 - Powertrain control module (PCM)/ engine control unit (ECU)
 - Transmission control unit (TCU)

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)



Product specifications

Part number ⁷	OCL ¹ (μH) ± 20%	FLL ² (μH) minimum	I_{rms}^3 (A) maximum	I_{sat}^4 (A) maximum	DCR ⁸ (mΩ) typical @ +20 °C	DCR ⁸ (mΩ) maximum @ +20 °C	Coupling coefficient (K)	SCL (μH) typical ⁵	SRF (MHz) typical	K-factor ⁶
HCSA1V1008-100-R	10	5.6	5.0	11.2	35.80	40.45	0.95	0.30	8.4	39
HCSA1V1008-150-R	15	8.4	3.8	9.1	58.37	65.96	0.95	0.35	7.0	29
HCSA1V1008-220-R	22	12.3	3.32	7.5	74.40	84.07	0.96	0.35	5.0	25

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 V_{rms}, 0.0 Adc, +25 °C, pins (1 - 3), (2 - 4)

2. Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.25 V_{rms}, I_{rms}, +25 °C, pins (1 - 3), (2 - 4)

3. I_{rms}: DC current for an approximate temperature rise of 30 °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}: Peak current for approximately 30% rolloff @ +25 °C, pins: (1 - 3), (2 - 4)

5. Short circuit inductance (SCL) test parameters: 100 kHz, 0.25 V_{rms}, 0.0 Adc, pins: (1 - 3) short pins (2 - 4)

6. K-factor: Used to determine B_{pp} for core loss (see graph). B_p = K * L * ΔI. B_{pp}: (Gauss), K: (K-factor from table),

L: (Inductance in μH), ΔI (Peak to peak ripple current in Amps).

7. Part Number Definition: HCSA1V1008-xxx-R

HCSA1V1008 = Product code and size

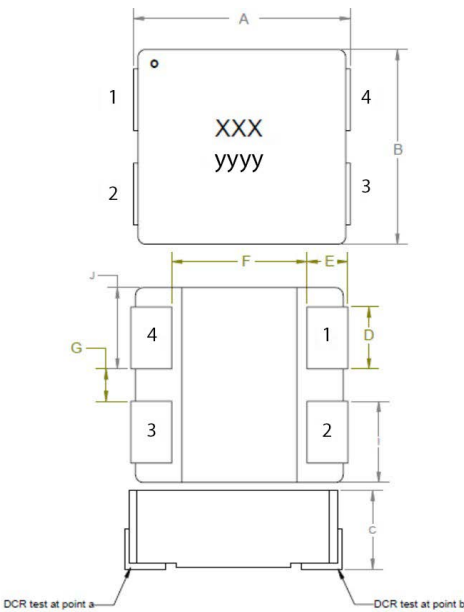
xxx= inductance value in μH, R= decimal point,

If no R is present then last character equals number of zeros

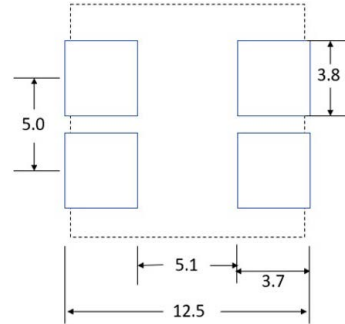
-R suffix = RoHS compliant

8. DCR: +20 °C (pins (1-3), (2-4))

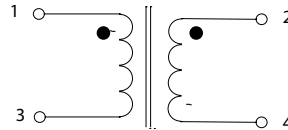
Dimensions- mm



Recommended pad layout



Schematic



Part number	A	B	C	D	E	F	G	H	I	J
HCSA1V1008-xxx-R	11 ±0.35	10 ±0.3	8.2 maximum	3.1 ±0.3	2.4 ±0.5	6.4 typical	1.6 ±0.2	0.05-0.25	4.2 reference	4.2 reference

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

yyyy= lot code

All soldering surfaces to be coplanar within 0.1 millimeters

Tolerances are ±0.3 millimeters unless stated otherwise

Pad layout tolerances are ±0.1 millimeters unless stated otherwise

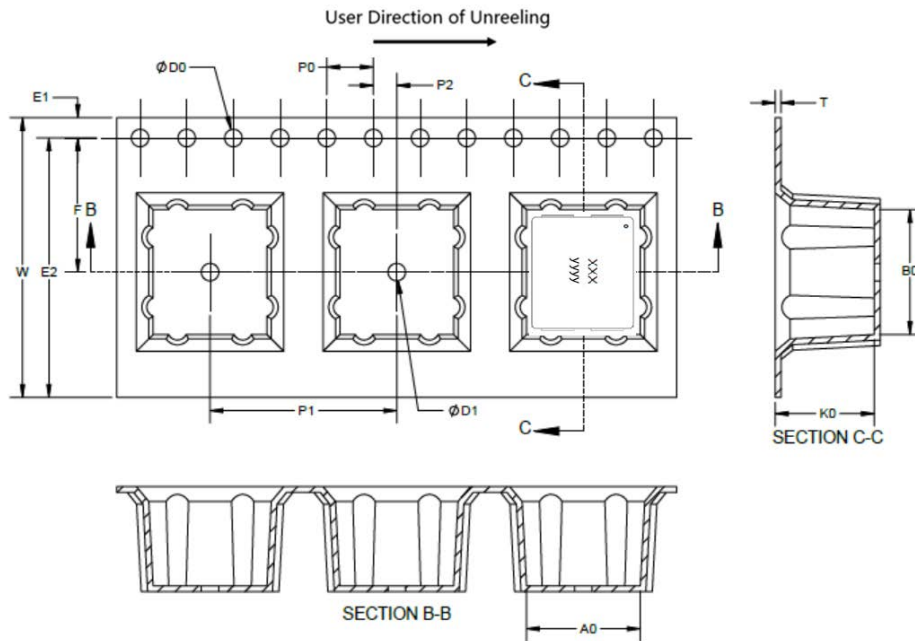
DCR is measured from point "a" to point "b"

Traces or vias underneath the inductor is not recommended

Packaging information- mm

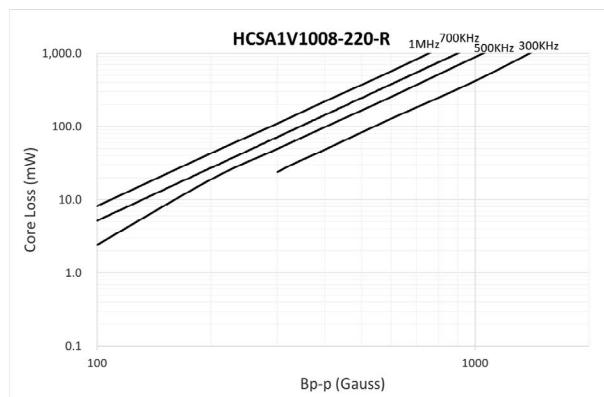
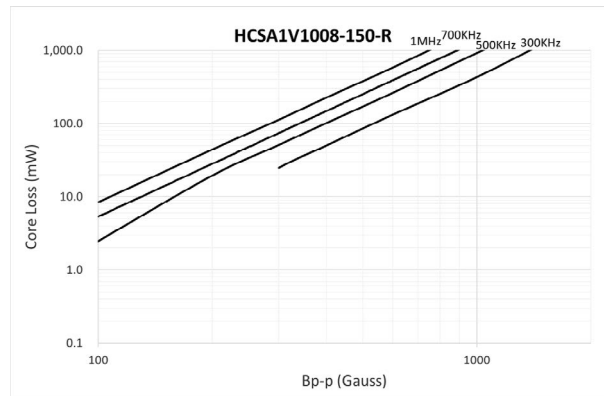
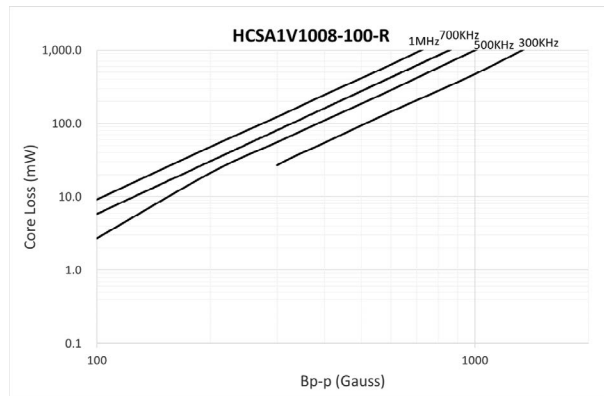
Drawing not to scale

Supplied in tape and reel packaging, 400 parts per 13" diameter reel (EIA-481 compliant)

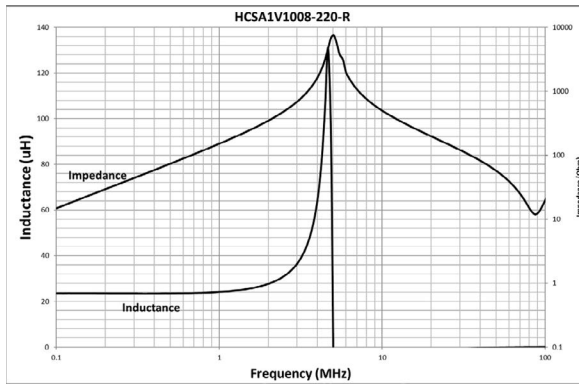
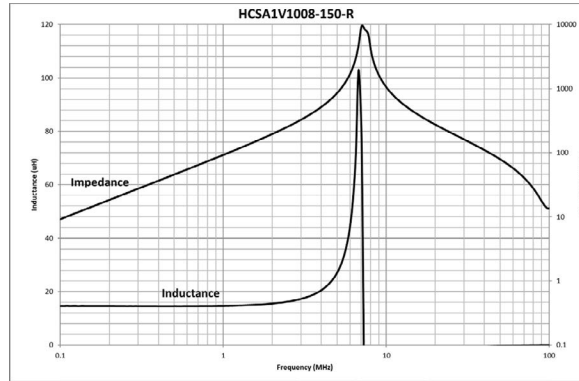
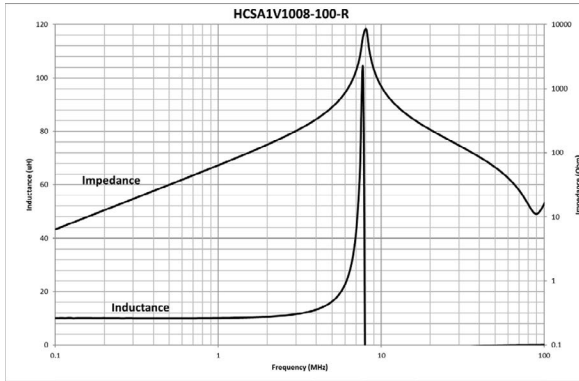


Dimension	Value
W	24 ± 0.3
F	11.50 ± 0.1
E1	1.75 ± 0.1
E2	22.25 min
P0	4.0 ± 0.1
P1	16.0 ± 0.1
P2	2.0 ± 0.05
D0	1.5 +0.1 -0
D1	1.5 +0.1 -0
A0	10.7 ± 0.1
B0	11.65 ± 0.1
K0	8.50 ± 0.1
T	0.5 ± 0.05

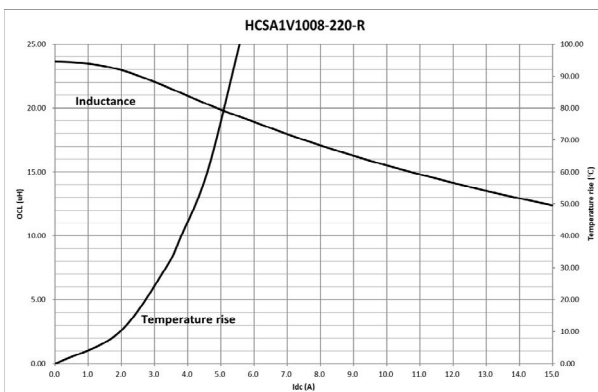
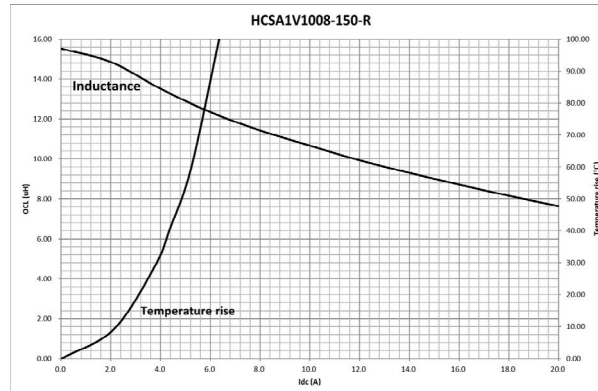
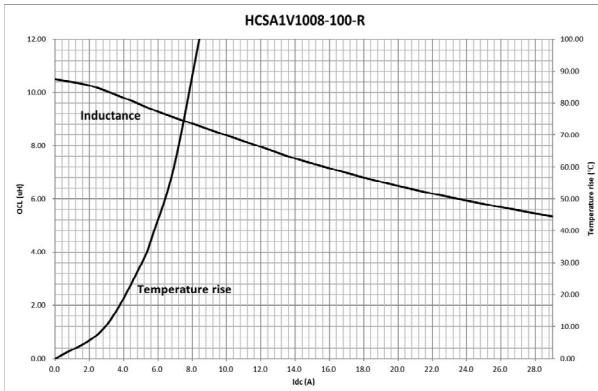
Core loss vs B_{p-p} (per winding)



Inductance and impedance vs. frequency (per winding)



Inductance and temperature rise vs. current (per winding)



Solder reflow profile

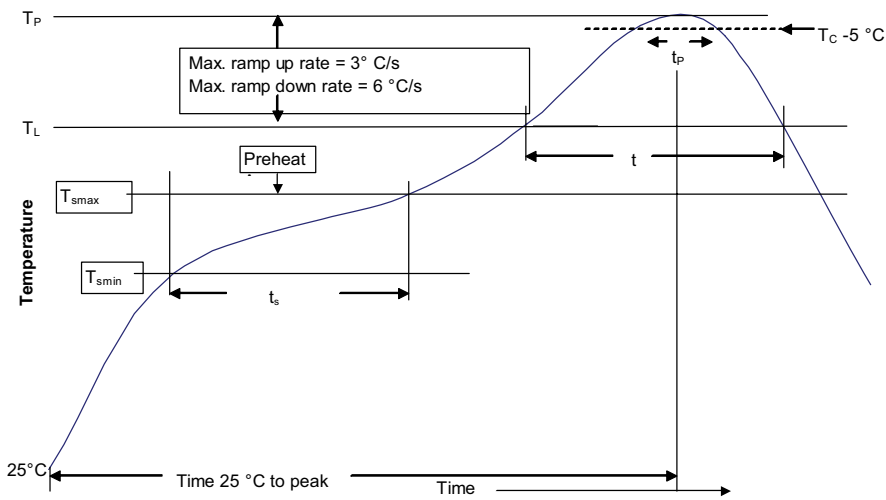


Table 1 - Standard SnPb solder (T_C)

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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