Effective December 2022 Supersedes September 2021

SDCHA1V80 Automotive grade semi-shielded power inductors



Product features

- · AEC-Q200 qualified
- · High current carrying capacity
- High power density, low core losses
- · Magnetically semi-shielded
- Inductance range from 1 μH to 100 μH
- Current range from 1.2 A to 8.5 A
- 8.3 mm x 8.3 mm surface mount package in a maximum 4.0 mm height
- NiZn ferrite magnetic material
- · Moisture sensitivity level (MSL): 1

Applications

- · LED lighting
- Advanced driver assistance systems (ADAS)
- Adaptive cruise control (ACC)
- · Collision avoidance
- Infotainment and cluster electronics
- · Electronic control unit (ECU)

Environmental compliance and general specifications

- Storage temperature range (component): -55 °C to +125 °C
- Operating temperature range: -55 °C to +125 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant





Product specifications

Part number⁵	ΟCL ¹ (μΗ)	Tolerance	FLL² (µH) minimum	I 3 (Å)	I_4 (Å)	DCR (mΩ) ±20% @ +25 °C	SRF (MHz) typical
SDCHA1V8040-1R0-R	1.0	±20%	0.56	8.5	13.8	8.2	85
SDCHA1V8040-1R5-R	1.5	±20%	0.84	8.0	11.5	10	66
SDCHA1V8040-2R2-R	2.2	±20%	1.23	7.4	9.8	11.5	57
SDCHA1V8040-3R3-R	3.3	±20%	1.85	6.6	8.0	15	48
SDCHA1V8040-4R7-R	4.7	±20%	2.63	5.8	6.7	19.5	38
SDCHA1V8040-5R6-R	5.6	±20%	3.14	5.4	6.2	22	33
SDCHA1V8040-6R8-R	6.8	±20%	3.81	5.1	5.6	25	29
SDCHA1V8040-100-R	10	±20%	5.60	4.6	5.0	33	25
SDCHA1V8040-150-R	15	±20%	8.40	3.6	4.0	50	20
SDCHA1V8040-220-R	22	±20%	12.32	2.9	3.1	73	18
SDCHA1V8040-330-R	33	±20%	18.48	2.3	2.6	100	15
SDCHA1V8040-470-R	47	±20%	26.32	2.0	2.2	135	12
SDCHA1V8040-560-R	56	±20%	31.36	1.75	1.9	160	10.5
SDCHA1V8040-680-R	68	±20%	38.08	1.65	1.75	205	9.5
SDCHA1V8040-820-R	82	±20%	45.92	1.4	1.6	230	8.5
SDCHA1V8040-101-R	100	±20%	56	1.2	1.45	300	8.0

1. Open circuit inductance (OCL) test parameters: 100 kHz, 1.0 Vrms, 0.0 Adc, +25 $^{\circ}\mathrm{C}$

2. Full load inductance (FLL) test parameters: 100 kHz, 1.0 Vrms, $\rm I_{sat},$ +25 °C

3. I_mm: 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 +125 °C under worst case operating conditions verified in the end application.

4. I_{sat} : Peak current for approximately 30% maximum rolloff @ +25 $^\circ\text{C}$

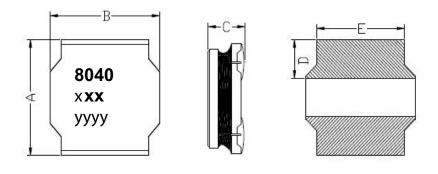
5. Part number definition: SDCHA1V8040-xxx-R

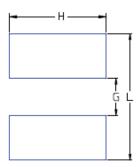
$$\label{eq:subcharge} \begin{split} & \text{SDCHA1V8040} = \text{Product code and size} \\ & \text{xxx} = \text{Inductance value in } \mu\text{H}, \text{R-decimal point, If no R is present last digit indicates number of zeros} \\ & -\text{R suffix} = \text{RoHS compliant} \end{split}$$

6. Rated operating voltage (across inductor) 20 V ref.

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Dimensions-mm







Recommended PCB Layout

Schematic

Dimension	SDCHA1V8040-xxx-R
А	8.0 ± 0.3
В	8.0 ± 0.3
С	3.7 ± 0.3
D	2.4 ± 0.3
E	6.3 ± 0.3
L	8.5
G	2.8
Н	6.6

Part marking: 8040, xxx= inductance value in uH, 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

PCB layout reference only

Recommend solder paste thickness at 0.15 mm and above

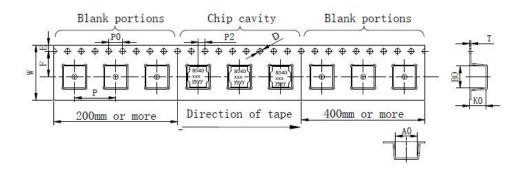
Traces or vias underneath the inductor is not recommended

Technical Data **ELX1097** Effective December 2022

Packaging information- mm

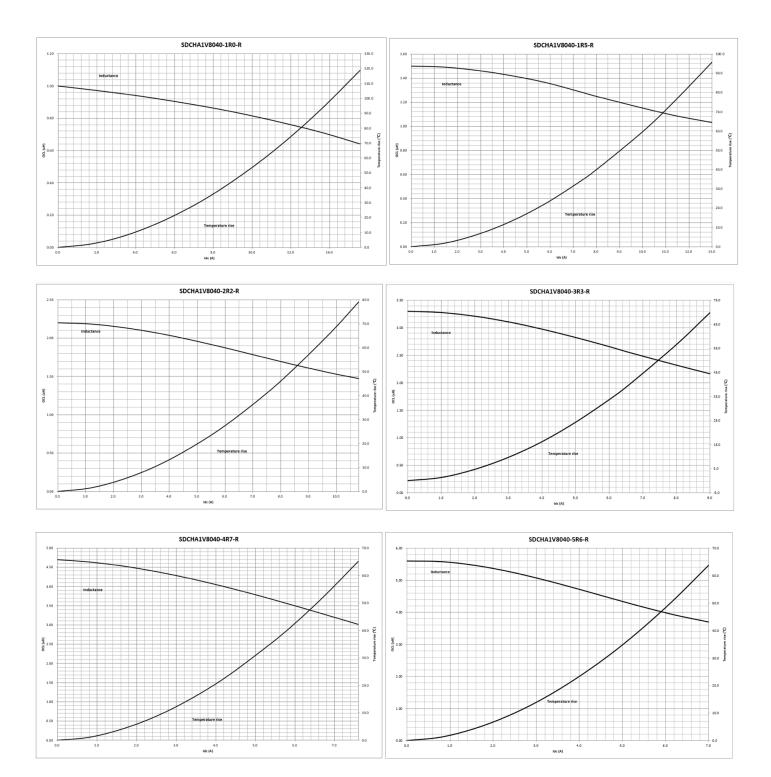
SDCHA1V8040

Supplied in tape and reel packaging, 1000 parts per 13" diameter reel (EIA-481 compliant) Drawing not to scale

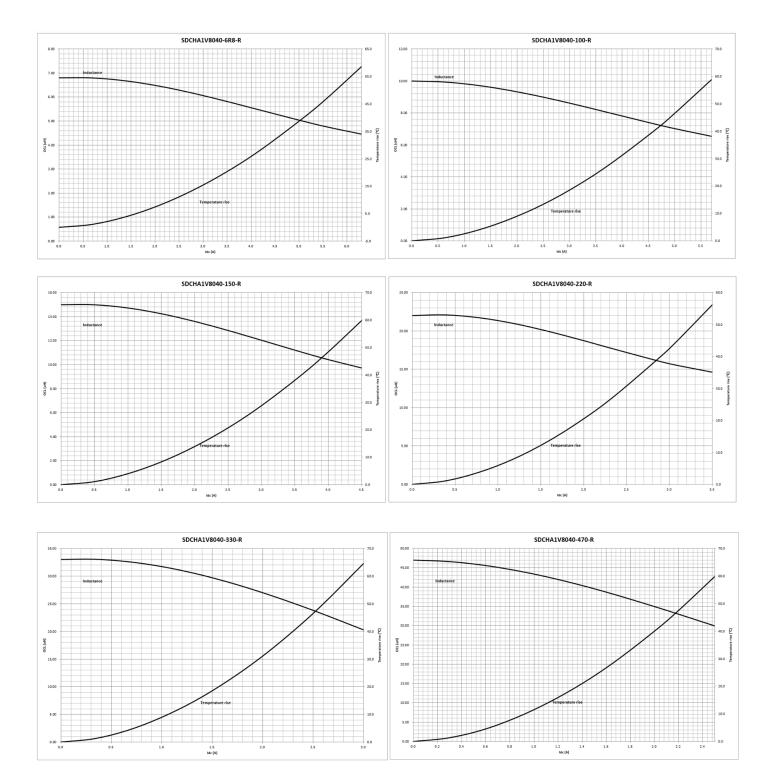


Dimension	Value
W	16.0 ± 0.3
F	7.5 ± 0.1
E	1.75 ± 0.1
PO	4.0 ± 0.1
Р	12.0 ± 0.1
P2	2.0 ± 0.1
D	1.5 ± 0.1
A0	8.4 ± 0.1
B0	8.4 ± 0.1
KO	4.3 ± 0.1
Т	0.4 ± 0.1

Inductance and temperature rise vs current SDCHA1V8040

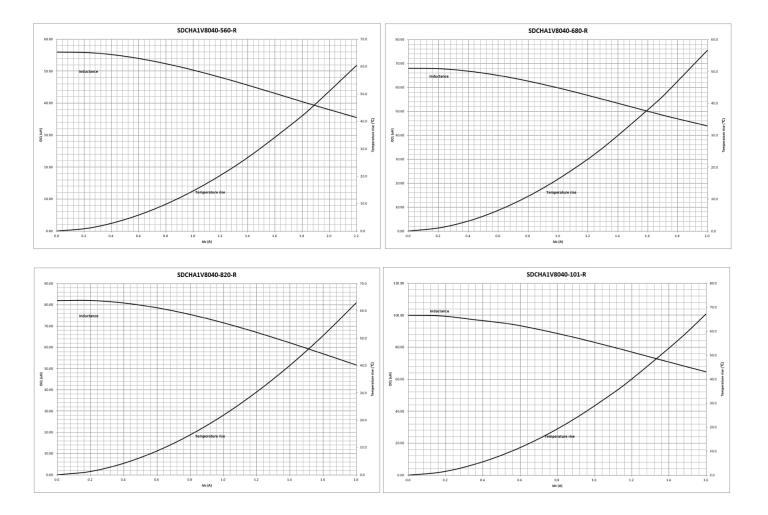


Inductance and temperature rise vs current

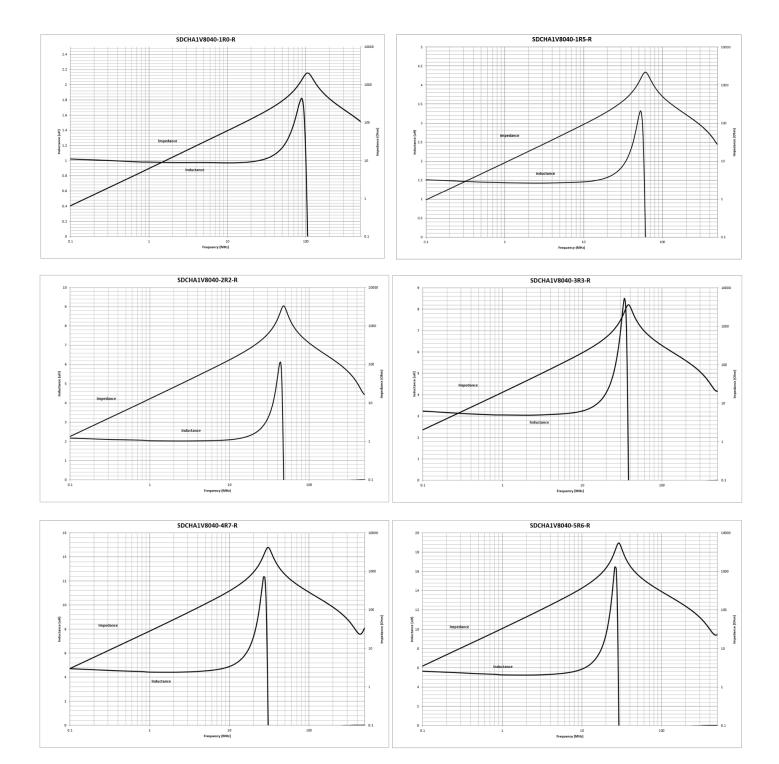


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Inductance and temperature rise vs current

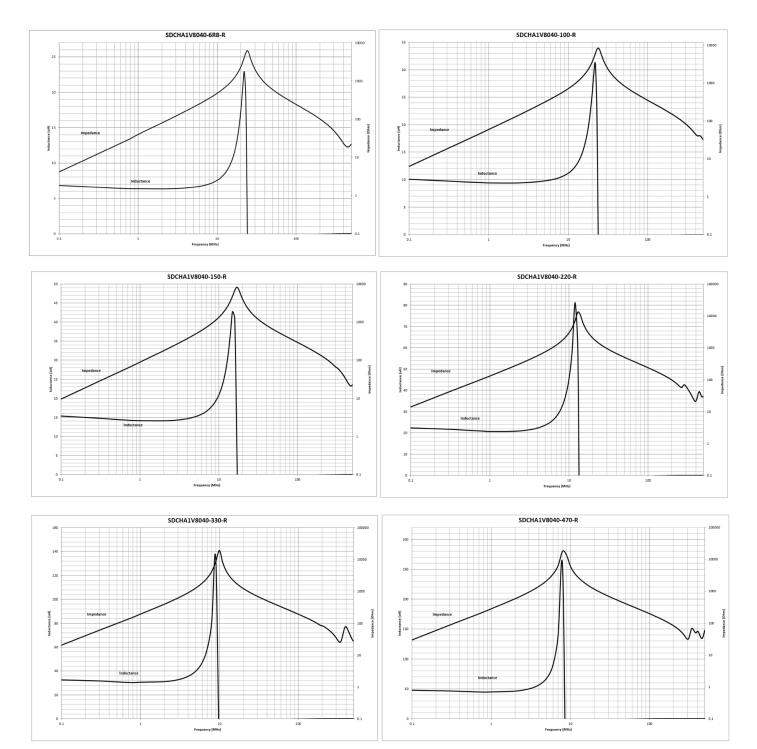


Inductance and impedance vs. frequency curve

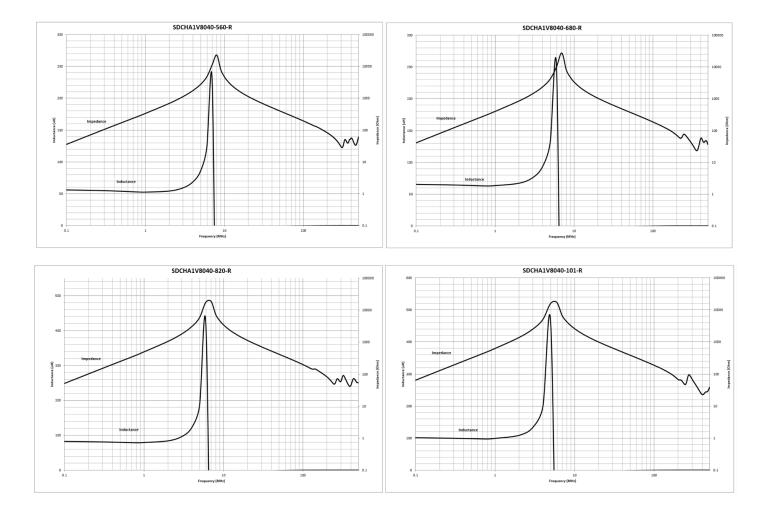


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Inductance and impedance vs. frequency curve



Inductance and impedance vs. frequency curve



Solder reflow profile

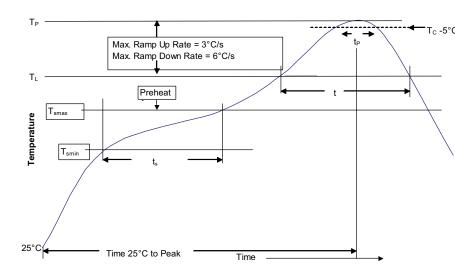


Table 1 - Standard SnPb solder (T_{C})

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 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

Powering Business Worldwide

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 (TL) Time (t_) maintained above ${\rm T_L}$	183 °C 60-150 seconds	217 °C 60-150 seconds	
Peak package body temperature (Tp)*	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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Electronics Division 1000 Eaton Boulevard Cleveland, OH 44122 United States Eaton.com/electronics

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