SDCHA1V50

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 22 µH
- Current range from 1.1 A to 5.0 A
- SDCHA1V5020: 5.2 mm x 5.2 mm surface mount package in a maximum 2.0 mm height
- SDCHA1V5040: 5.15 mm x 5.15 mm surface mount package in a maximum 4.1 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

Powering Business Worldwide

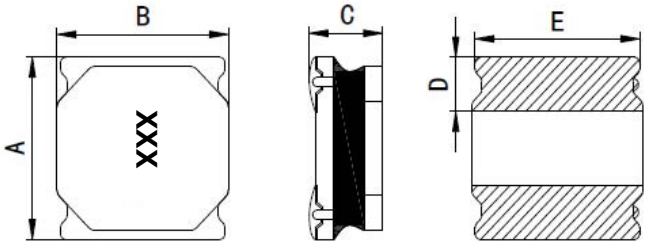
Product specifications

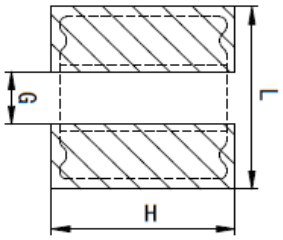
Part number[5]	OCL[1] (µH)	Tolerance	FLL[2] (µH) minimum	I_{rms}[3] (A)	I_{sat}[4] (A)	DCR (mΩ) ±20% @ +25 °C	SRF (MHz) typical
SDCHA1V5020							
SDCHA1V5020-1R0-R	1.0	±30%	0.49	4.1	5.0	20	137
SDCHA1V5020-1R5-R	1.5	±30%	0.74	3.5	4.5	25	100
SDCHA1V5020-2R2-R	2.2	±20%	1.23	3.3	4.1	32	86
SDCHA1V5020-3R3-R	3.3	±20%	1.85	2.8	3.5	43	66
SDCHA1V5020-4R7-R	4.7	±20%	2.63	2.4	2.7	60	55
SDCHA1V5020-5R6-R	5.6	±20%	3.14	2.1	2.4	69	50
SDCHA1V5020-6R8-R	6.8	±20%	3.81	1.9	2.1	90	45
SDCHA1V5020-8R2-R	8.2	±20%	4.59	1.75	1.9	98	41
SDCHA1V5020-100-R	10	±20%	5.6	1.6	1.7	110	38
SDCHA1V5020-150-R	15	±20%	8.4	1.25	1.3	165	31
SDCHA1V5020-220-R	22	±20%	12.32	1.1	1.1	225	24
SDCHA1V5040							
SDCHA1V5040-1R0-R	1.0	±20%	0.56	5.0	7.5	12	140
SDCHA1V5040-1R5-R	1.5	±20%	0.84	4.5	6.5	15	70
SDCHA1V5040-2R2-R	2.2	±20%	1.23	3.8	5.7	21	55
SDCHA1V5040-3R3-R	3.3	±20%	1.85	3.5	4.4	24	43
SDCHA1V5040-4R7-R	4.7	±20%	2.63	3.2	3.9	32	36
SDCHA1V5040-6R8-R	6.8	±20%	3.81	2.5	3.3	43	29
SDCHA1V5040-100-R	10	±20%	5.6	2.2	2.52	56	26
SDCHA1V5040-150-R	15	±20%	8.4	1.8	2.0	80	21
SDCHA1V5040-220-R	22	±20%	12.32	1.5	1.62	123	16

1. Open circuit inductance (OCL) test parameters: 100 kHz, 1.0 Vrms, 0.0 Adc, +25 °C
2. Full load inductance (FLL) test parameters: 100 kHz, 1.0 Vrms, I_{sat}, +25 °C
3. I_{rms}: 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 °C
5. Part number definition: SDCHA1V5020-xxx-R
   SDCHA1V5020 = Product code and size
   xxx= Inductance value in µH, R=decimal point, If no R is present last digit indicates number of zeros
   -R suffix = RoHS compliant
6. Rated operating voltage (across inductor) 20 V ref.

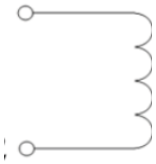
Dimensions-mm

SDCHA1V5020



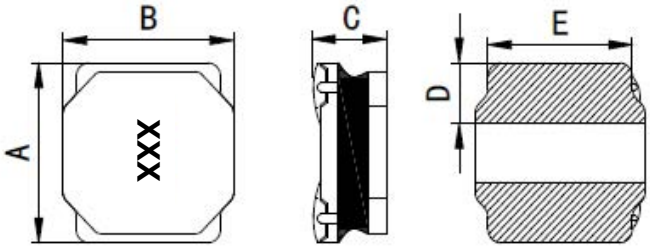


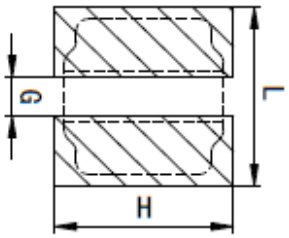
Recommended PCB Layout



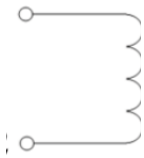
Schematic

SDCHA1V5040





Recommended PCB Layout



Schematic

Dimension	SDCHA1V5020-xxx-R
A	5.0 ± 0.2
B	5.0 ± 0.2
C	1.8 ± 0.2
D	1.3 ± 0.2
E	4.7 ± 0.2
G	1.8
H	5.5
L	5.5

Dimension	SDCHA1V5040-xxx-R
A	4.95 ± 0.2
B	4.95 ± 0.2
C	3.9 ± 0.2 (≤10 µH) 3.8 ± 0.2 (> 10 µH)
D	1.3 ± 0.3
E	4.2 ± 0.2
G	1.8
H	5.5
I	5.5

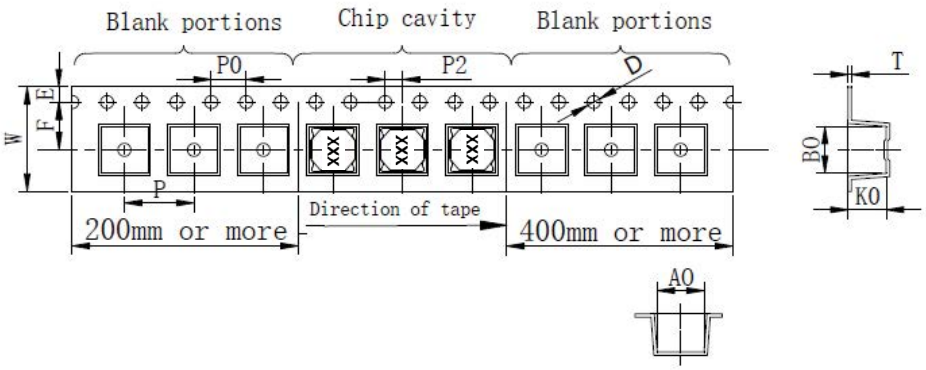
Part marking: xxx= inductance value in uH, R= decimal point. If no R is present then last character equals number of zeros
All soldering surfaces to be coplanar within 0.1 millimeters
PCB layout is referred to standard IPC-7351B
The above PCB layout reference only
Recommend solder paste thickness at 0.12 mm and above
Traces or vias underneath the inductor is not recommended

Packaging information- mm

SDCHA1V5020

Supplied in tape and reel packaging, 2500 parts per 13" diameter reel (EIA-481 compliant)

Drawing not to scale

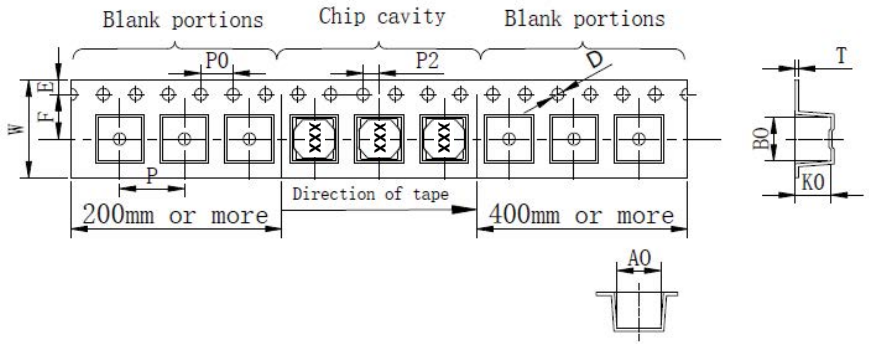


Dimension	Value
W	12.0 ± 0.3
F	7.5 ± 0.1
E	1.75 ± 0.1
P0	4.0 ± 0.1
P	8.0 ± 0.1
P2	2.0 ± 0.1
D	1.5 ± 0.1
A0	5.4 ± 0.1
B0	5.4 ± 0.1
K0	2.2 ± 0.1
T	0.4 ± 0.1

SDCHA1V5040

Supplied in tape and reel packaging, 1500 parts per 13" diameter reel (EIA-481 compliant)

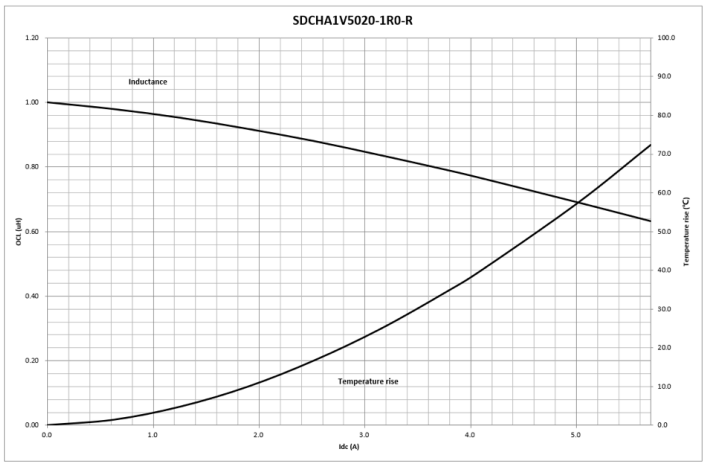
Drawing not to scale

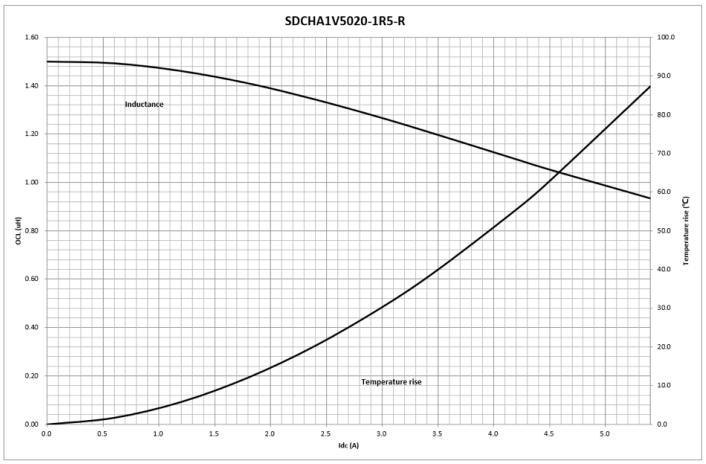


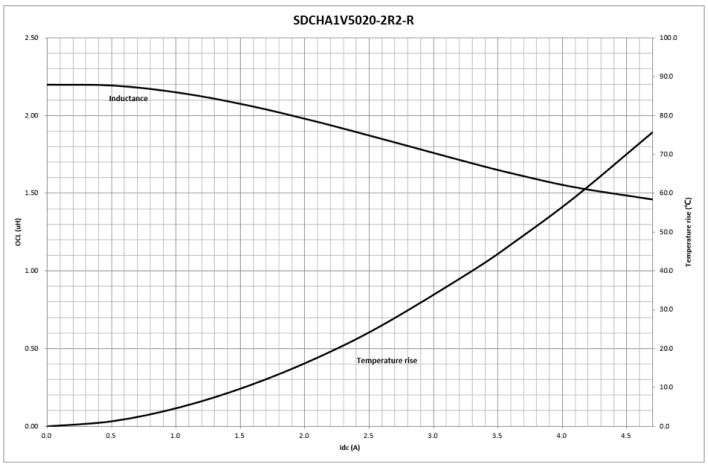
Dimension	Value
W	12.0 ± 0.3
F	7.5 ± 0.1
E	1.75 ± 0.1
P0	4.0 ± 0.1
P	8.0 ± 0.1
P2	2.0 ± 0.1
D	1.5 ± 0.1
A0	5.4 ± 0.1
B0	5.4 ± 0.1
K0	4.3 ± 0.1
T	0.4 ± 0.1

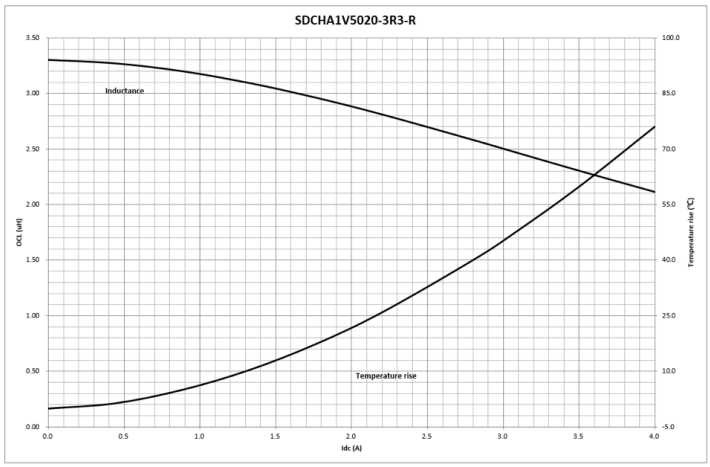
Inductance and temperature rise vs current

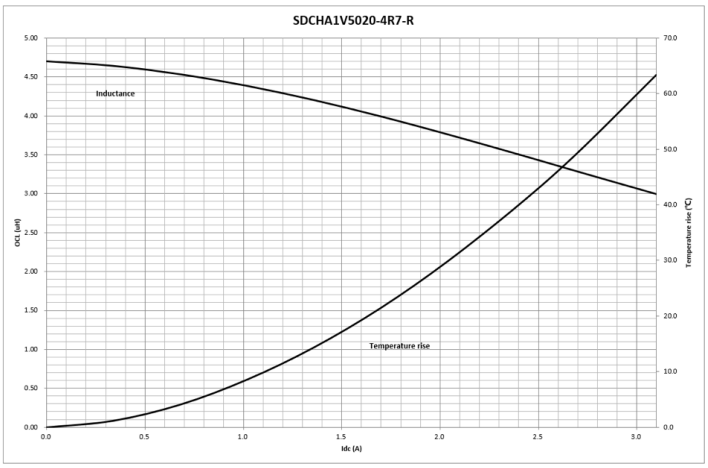
SDCHA1V5020

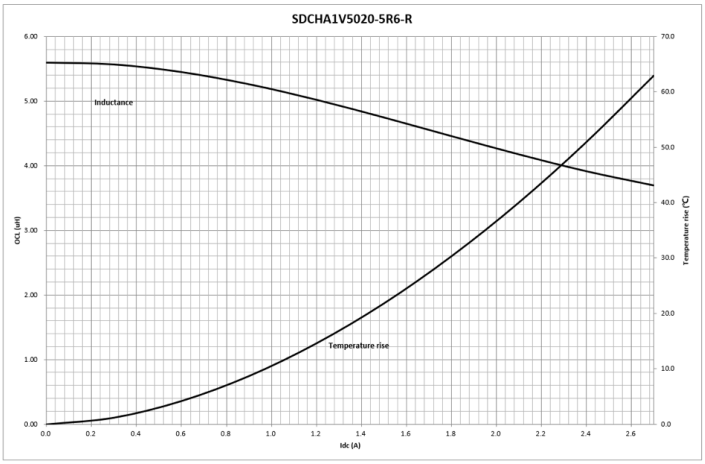






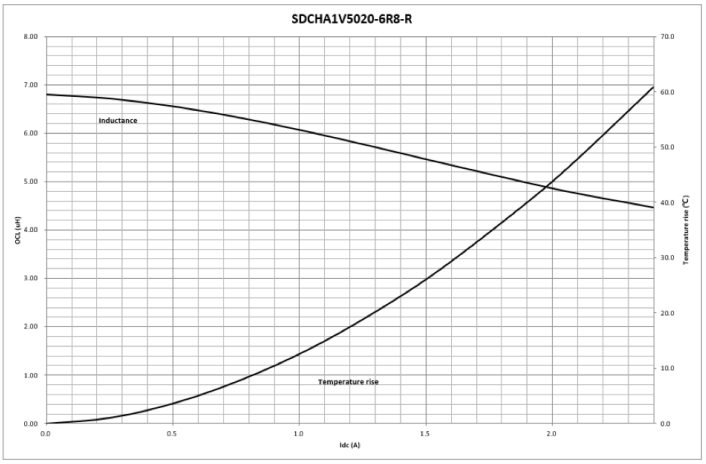


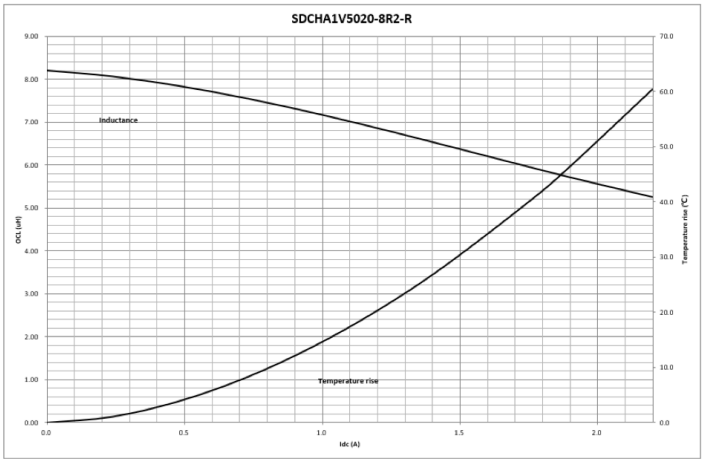


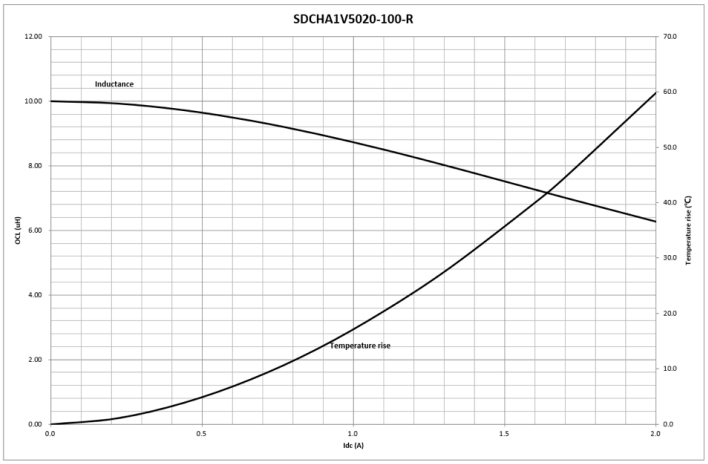


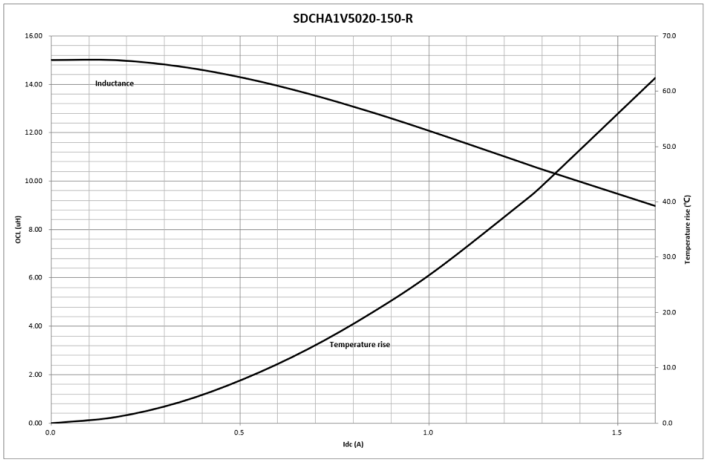
Inductance and temperature rise vs current

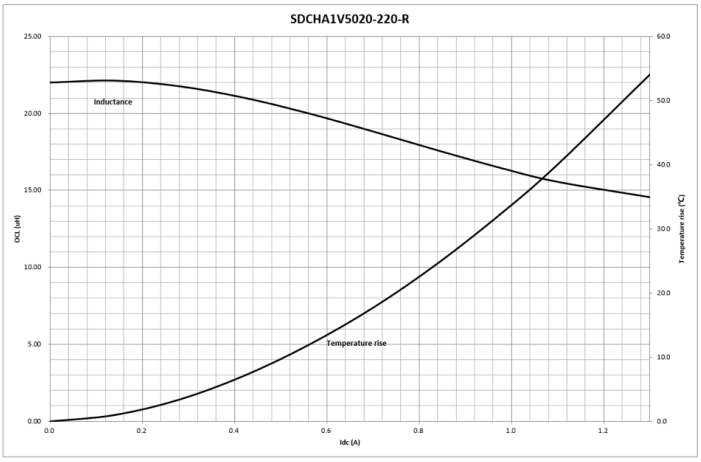
SDCHA1V5020





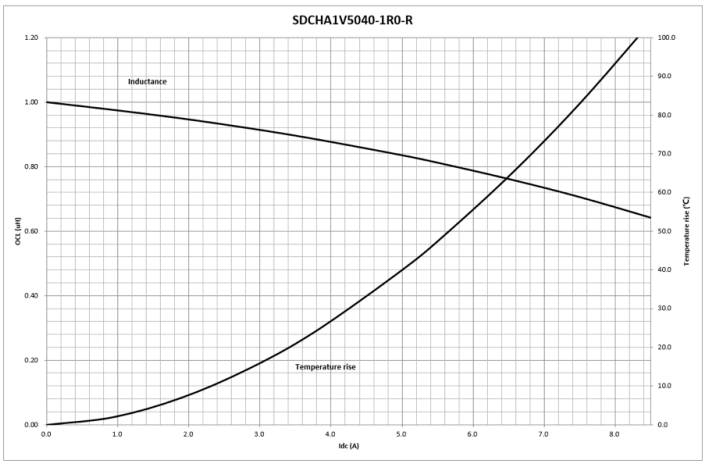


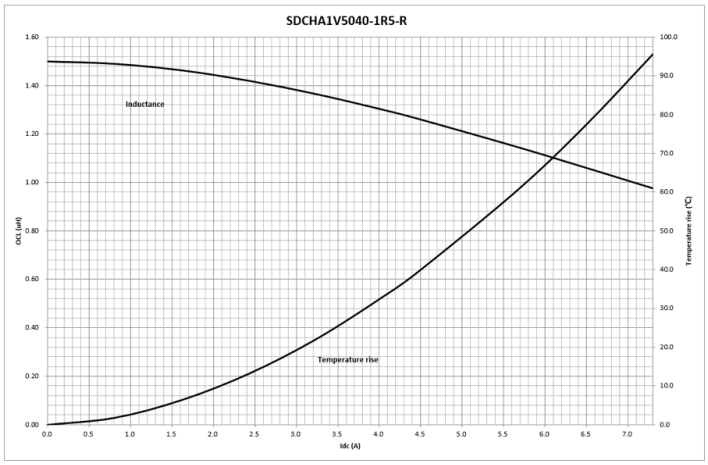


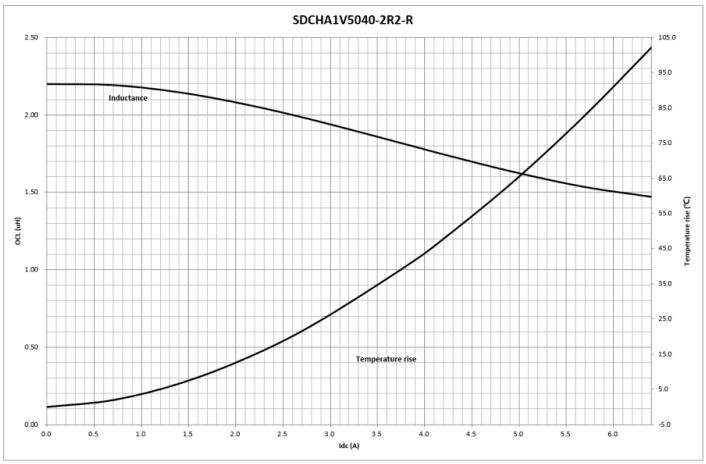


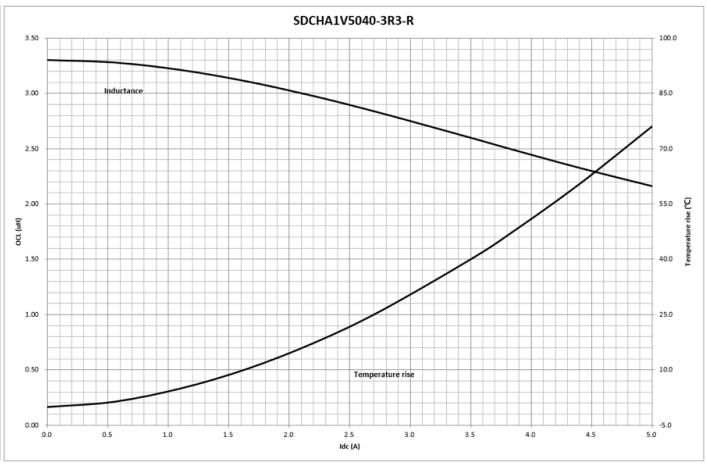
Inductance and temperature rise vs current

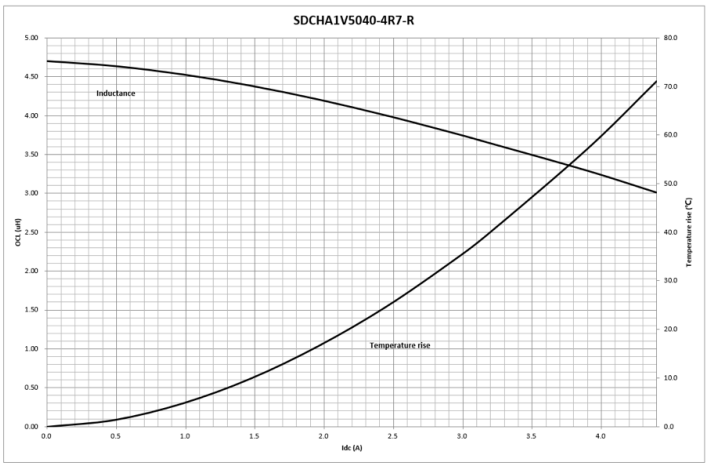
SDCHA1V5040

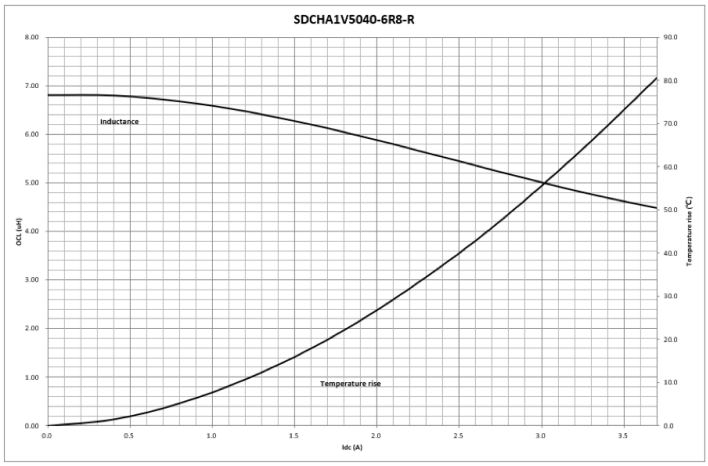






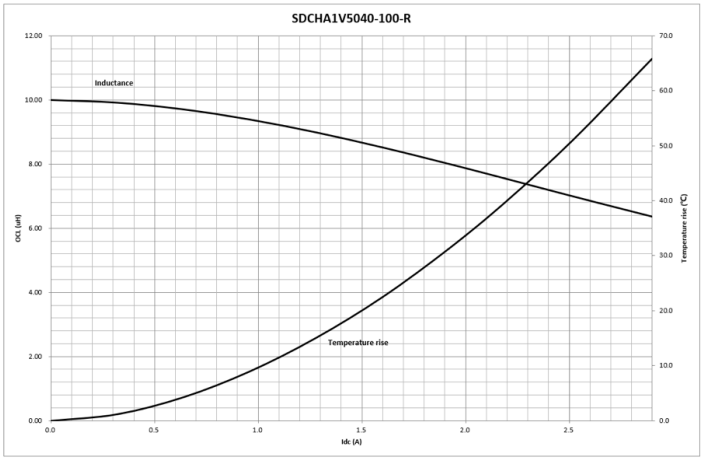


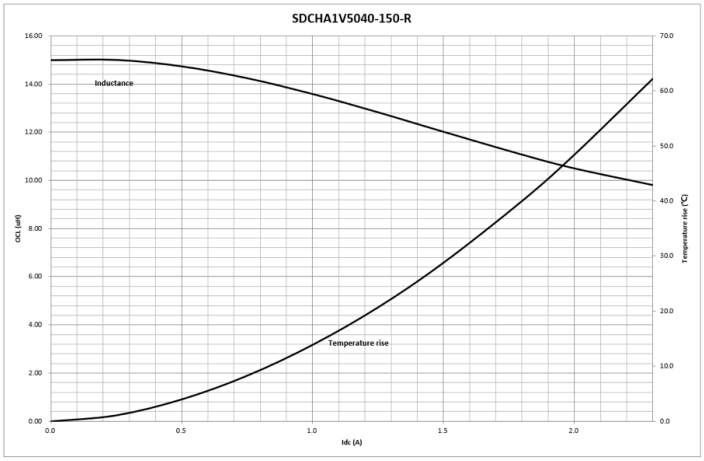


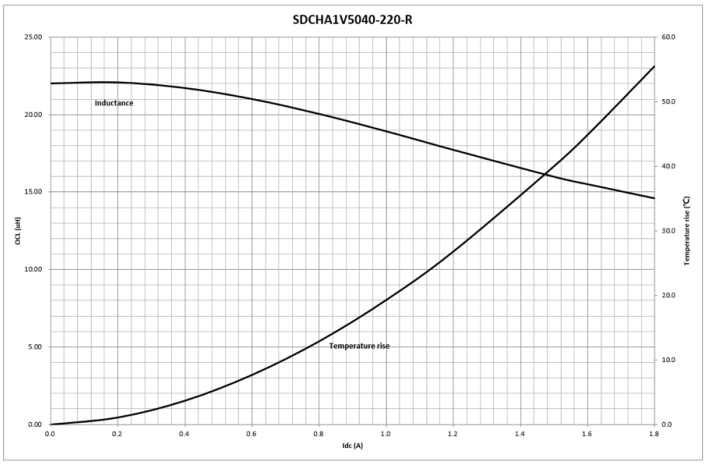


Inductance and temperature rise vs current

SDCHA1V5040

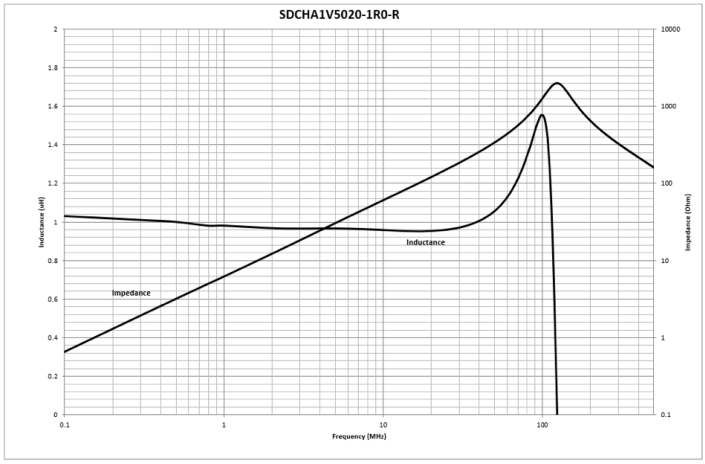


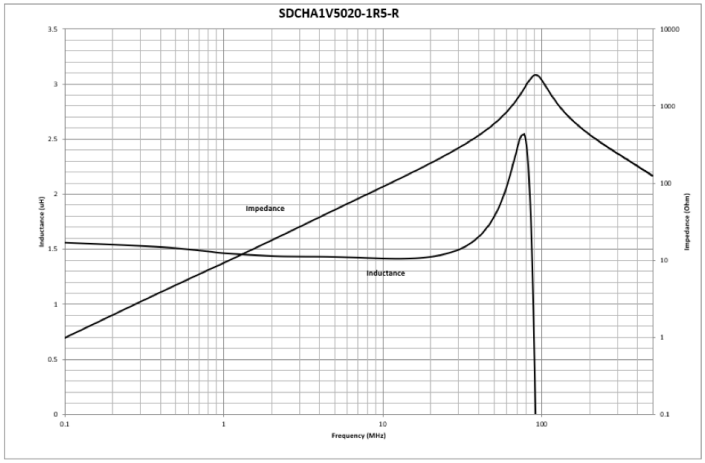


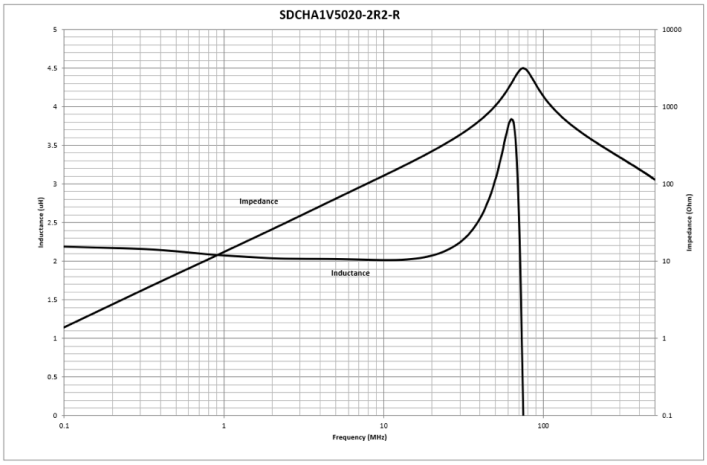


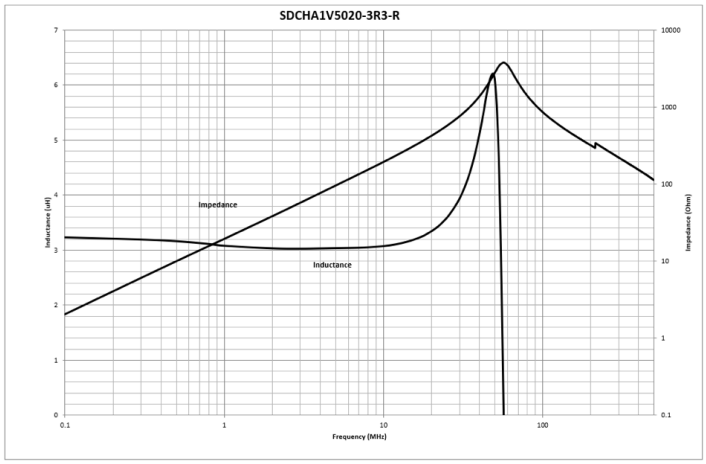
Inductance and impedance vs. frequency curve

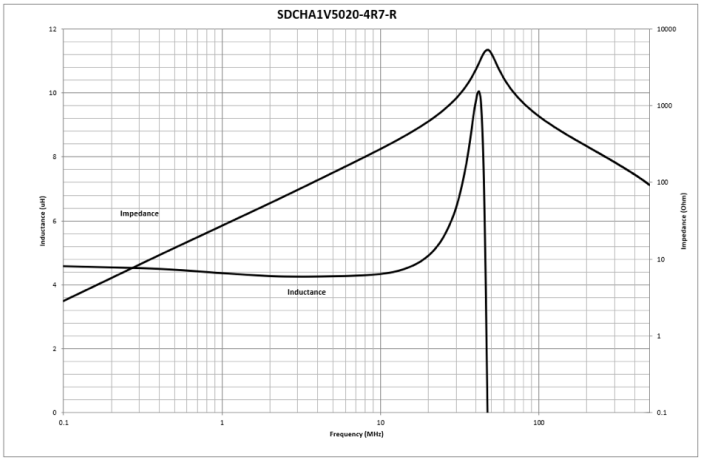
SDCHA1V5020

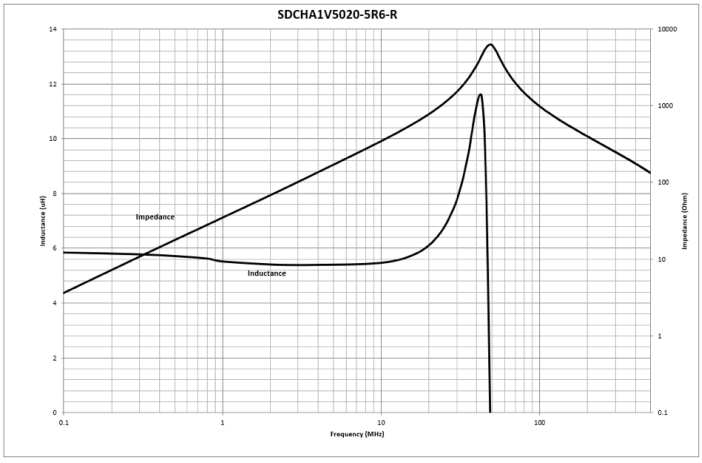






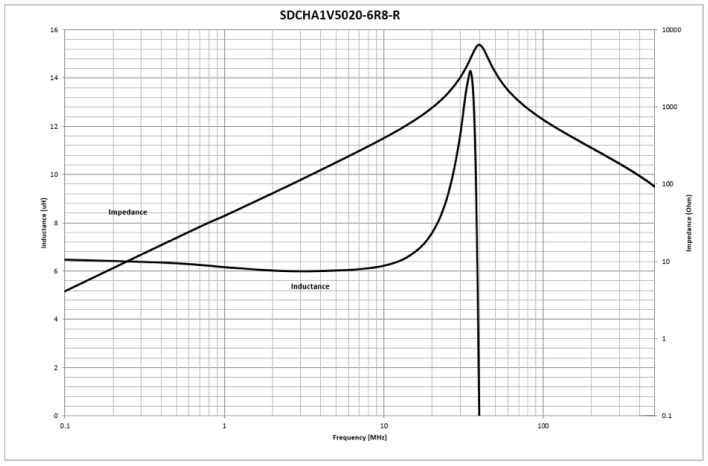


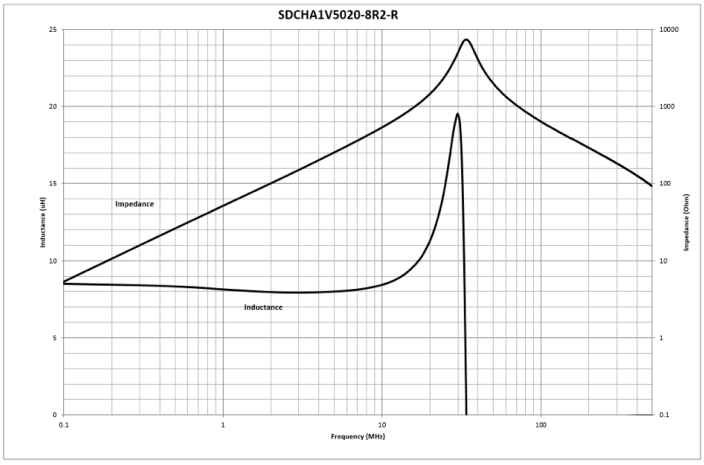


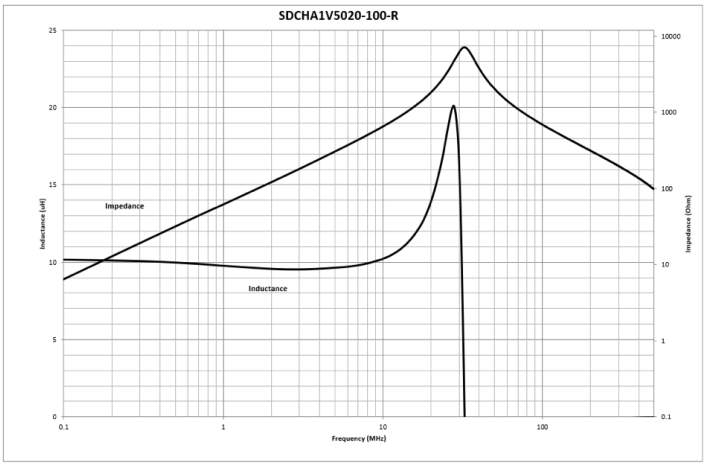


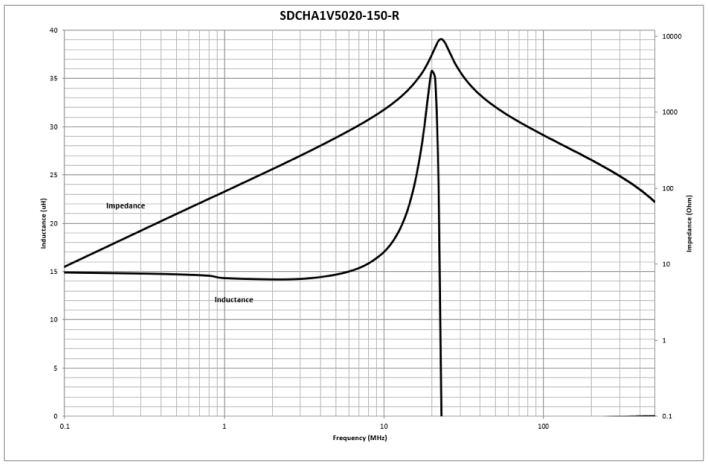
Inductance and impedance vs. frequency curve

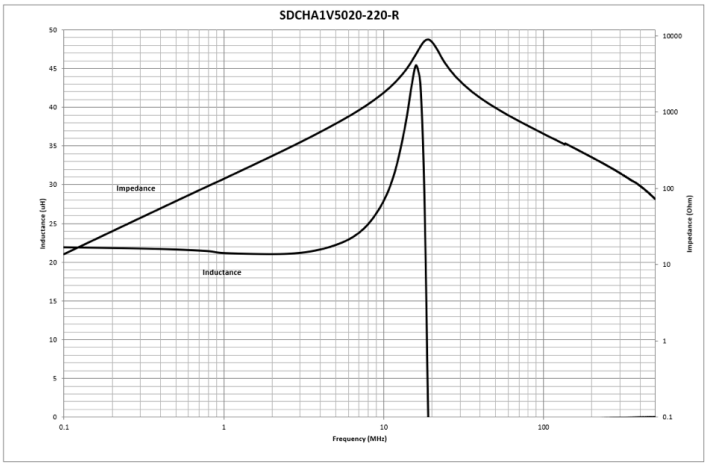
SDCHA1V5020





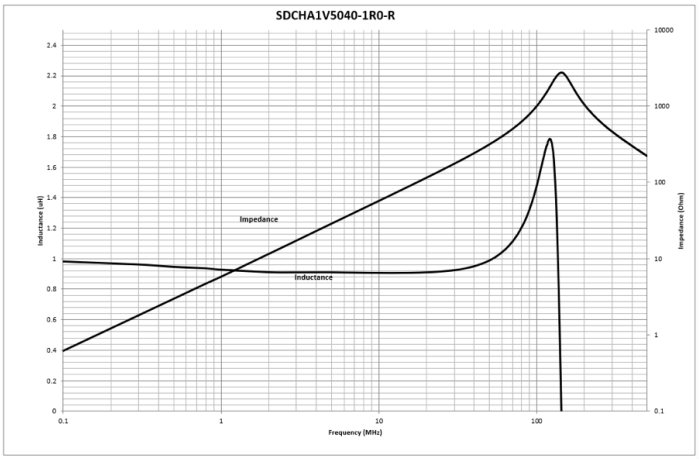


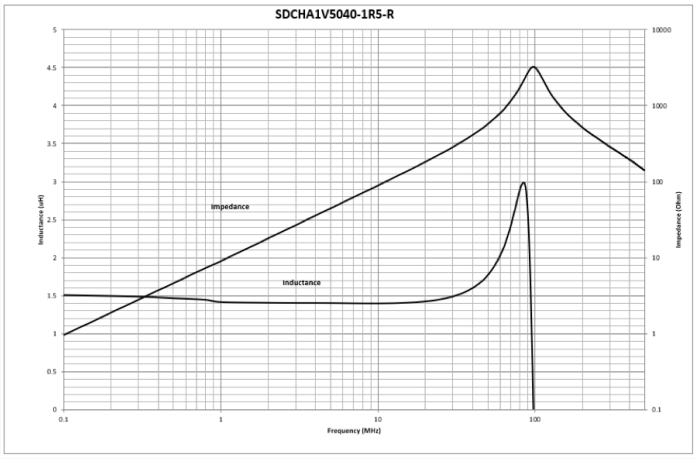


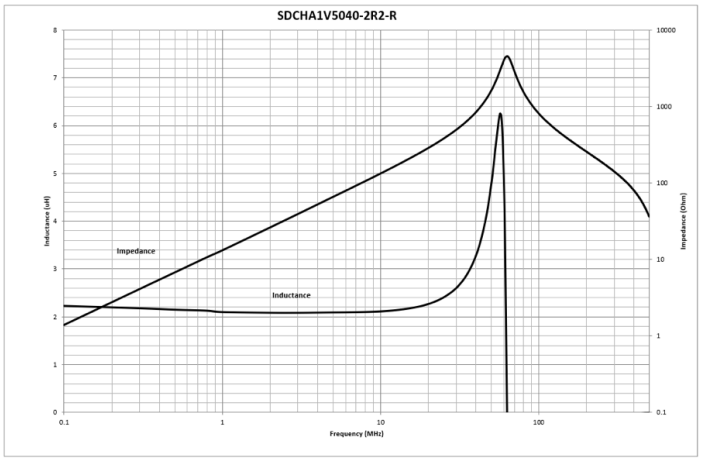


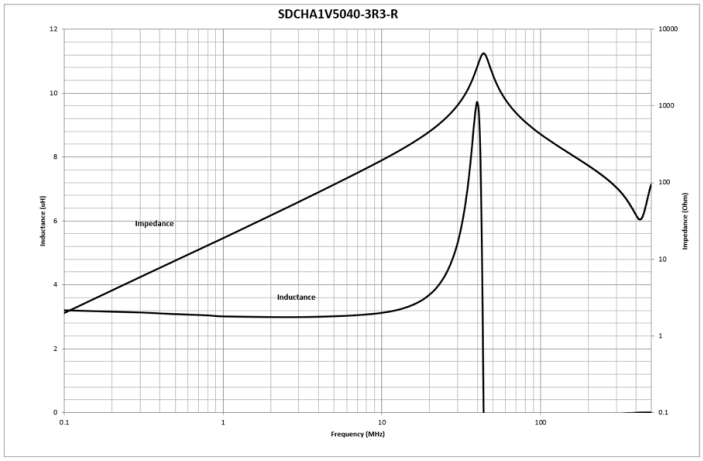
Inductance and impedance vs. frequency curve

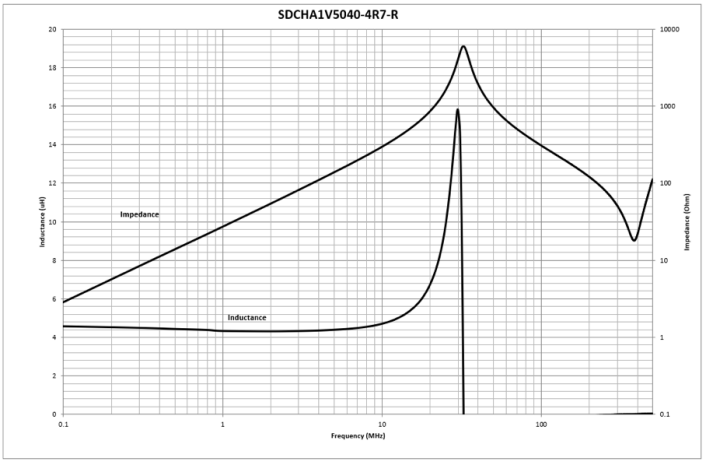
SDCHA1V5040

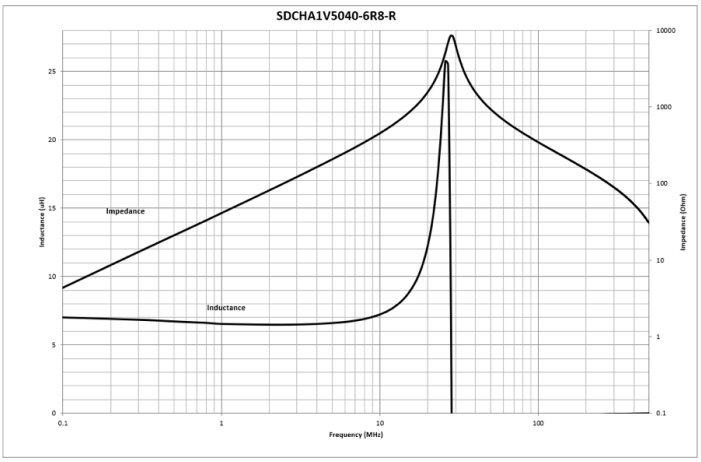






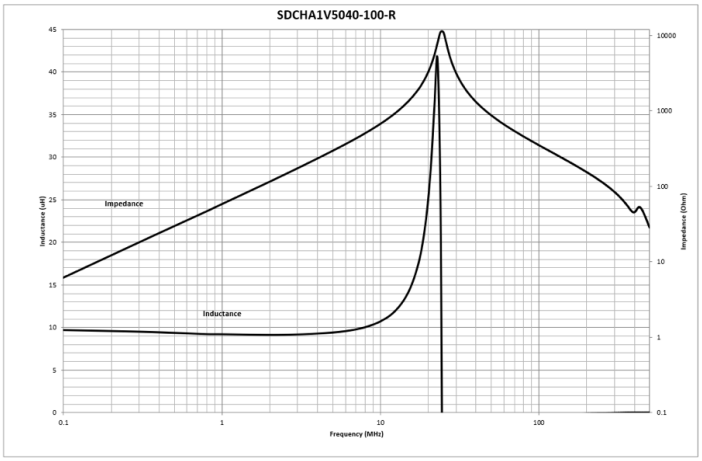


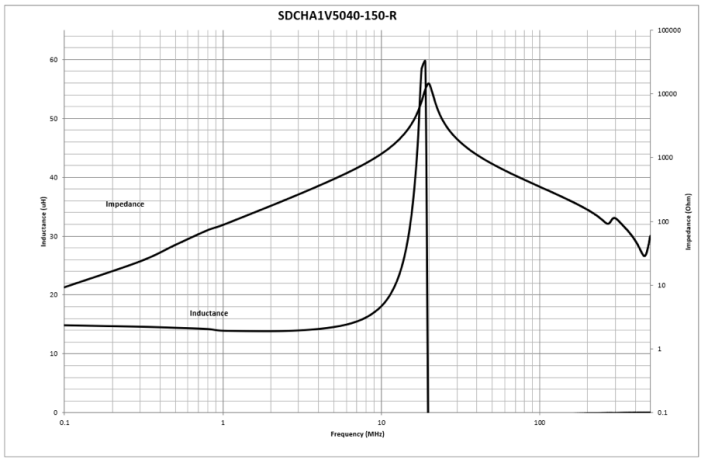


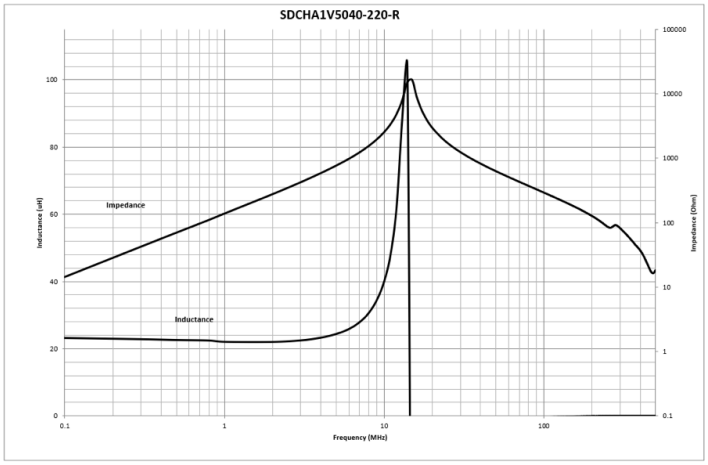


Inductance and impedance vs. frequency curve

SDCHA1V5040







Solder reflow profile

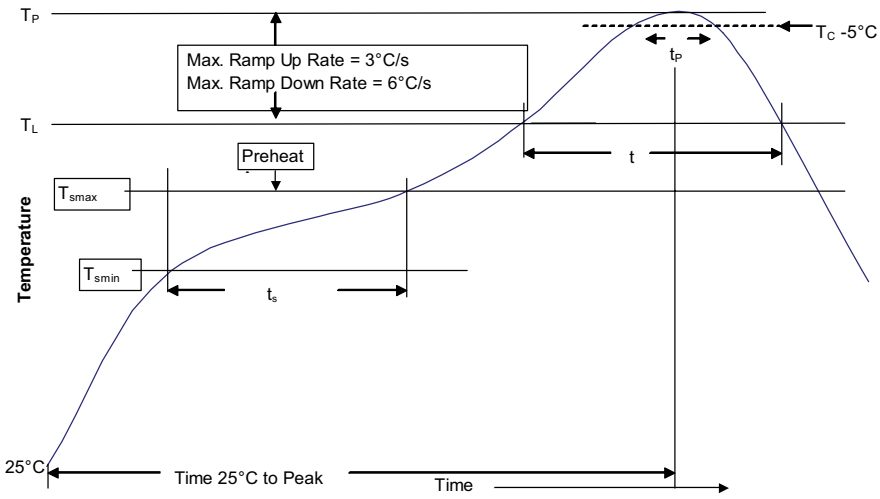


Table 1 - Standard SnPb solder (T_C)

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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