DRAQ75

Automotive grade dual winding, high power density, shielded drum core power inductors

Product features

- AEC-Q200 qualified
- Dual winding inductors that can be used as a single inductor, SEPIC, Flyback, or other coupled inductor/transformer applications (1:1 turns ratio)
- Windings can be connected in series or parallel, offering a wide range of inductance and current ratings
- 500 Vdc isolation between windings
- 7.6 mm x 7.6 mm x 4.5 mm surface mount package
- Ferrite core material
- Moisture Sensitivity Level: 1

Applications

- Body electronics
  - LED lighting
  - Central body control module
  - Vehicle access control module
  - Headlamps, tail lamps and interior lighting
  - Heating ventilation and air conditioning controllers (HVAC)
  - Doors, window lift and seat control
- Advanced driver assistance systems
  - 77 GHz radar system
  - Adaptive cruise control (ACC)
  - Automatic parking control
  - Collision avoidance system/ Car black box system
- Infotainment and cluster electronics
  - Active noise cancellation (ANC)
  - Audio subsystem: head unit and trunk amp
  - Digital instrument cluster
  - In-vehicle infotainment (IVI) and navigation
- Engine and powertrain systems
  - Electric pumps, motor control and auxiliaries
  - Powertrain control module (PCU)/ Engine control unit (ECU)
  - Transmission control unit (TCU)

Environmental Data

- Storage temperature range (Component): -40 °C to +165 °C
- Operating temperature range: -40 °C to +165 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant

Pb HALOGEN HF FREE RoHS

EATON
Powering Business Worldwide

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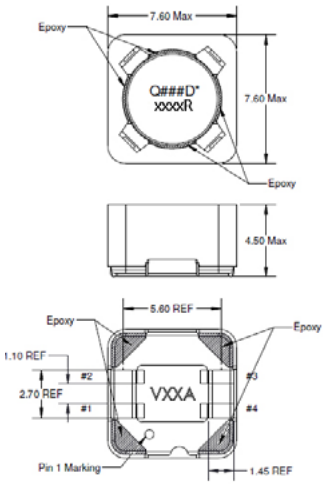
Product specifications

	Parallel ratings						Series ratings					
Part Number[8]	**OCL[1] (µH) ±25%**	**I_{rms}[2] (A)**	**$I_{sat}1$[3] (A)**	**$I_{sat}2$[4] (A)**	**DCR (Ω) maximum[5] @ +25 °C**	**K Factor[6]**	**OCL[1] (µH) ±25%**	**I_{rms}[2] (A)**	**$I_{sat}1$[3] (A)**	**$I_{sat}2$[4] (A)**	**DCR (Ω) maximum[7] @ +25 °C**	**K Factor[6]**
DRAQ75-4R5-R	4.48	4.53	4.38	3.50	0.031	125.3	17.93	2.26	2.19	1.75	0.122	62.7
DRAQ75-6R4-R	6.41	4.14	3.68	2.94	0.037	105.3	24.95	2.07	1.84	1.47	0.146	52.6
DRAQ75-8R5-R	8.47	3.57	3.17	2.54	0.049	90.7	33.86	1.79	1.59	1.27	0.196	45.4
DRAQ75-100-R	9.59	3.47	2.97	2.38	0.052	84.9	38.34	1.73	1.48	1.18	0.208	42.4
DRAQ75-150-R	15.14	2.80	2.36	1.89	0.080	67.5	60.56	1.40	1.18	0.95	0.320	33.8
DRAQ75-170-R	18.7	2.48	2.14	1.71	0.102	61.2	68.55	1.24	1.12	0.86	0.408	30.6
DRAQ75-220-R	22.1	2.33	1.96	1.57	0.116	56.0	88.52	1.16	0.98	0.78	0.462	28.0
DRAQ75-270-R	28.3	2.02	1.74	1.39	0.153	49.7	106.60	1.01	0.87	0.70	0.610	24.8
DRAQ75-330-R	32.8	1.88	1.61	1.29	0.177	46.2	131.39	0.94	0.81	0.65	0.708	23.1
DRAQ75-570-R	56.6	1.49	1.23	0.98	0.283	35.1	226.31	0.74	0.61	0.49	1.13	17.5
DRAQ75-680-R	68.3	1.39	1.11	0.89	0.324	31.7	273.21	0.69	0.55	0.44	1.30	15.9
DRAQ75-810-R	80.9	1.20	1.01	0.81	0.431	28.9	323.78	0.60	0.51	0.41	1.72	14.5
DRAQ75-101-R	98.3	1.14	0.91	0.72	0.478	25.5	393.23	0.57	0.46	0.37	1.91	12.8
DRAQ75-221-R	217	0.76	0.63	0.50	1.09	17.4	866.26	0.38	0.31	0.25	4.36	8.7

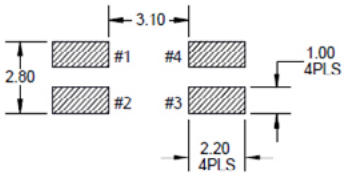
1. Open circuit inductance (OCL) test parameters: 100 kHz, 0.25 Vrms, 0.0 Adc, +25 °C
2. I_{rms}: DC current for an approximate temperature rise of 40 °C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed +165 °C under worst case operating conditions verified in the end application.
3. $I_{sat}1$: Peak current for approximately 30% rolloff @ +25 °C
4. $I_{sat}2$: Peak current for approximately 40% rolloff @ +125 °C
5. Paralllel DCR test pins (1,2 - 3,4)
6. K-factor: Used to determine Bp-p for core loss (see graph). Bp-p = K * L * ΔI. Bp-p:(Gauss), K: (K-factor from table), L: (Inductance in µH), ΔI (Peak-to-peak ripple current in Amps).
7. Series DCR test pins (1 - 4) short pins (2 - 3)
8. Part Number Definition: DRAQ75-xxx-R
   DRAQ75= Product code and size
   xxx= Inductance value in µH, R= decimal point,
   If no R is present last character equals number of zeros
   -R suffix = RoHS compliant

Single winding ratings: OCL= Parallel OCL rating, DCR= Series DCR divided by 2, Isat and Irms= Series Isat and Irms rating

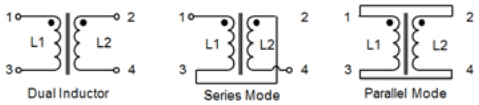
Dimensions (mm)



Recommended pad layout



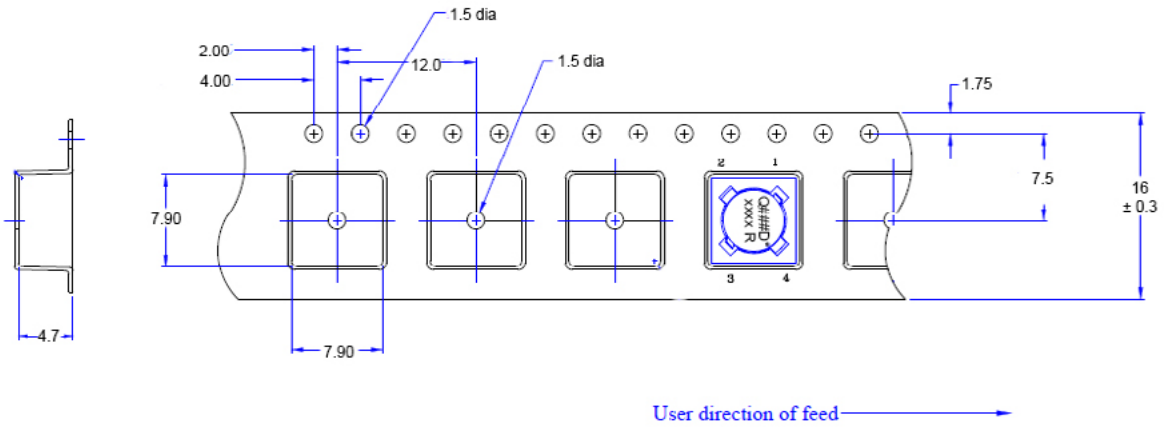
Schematic



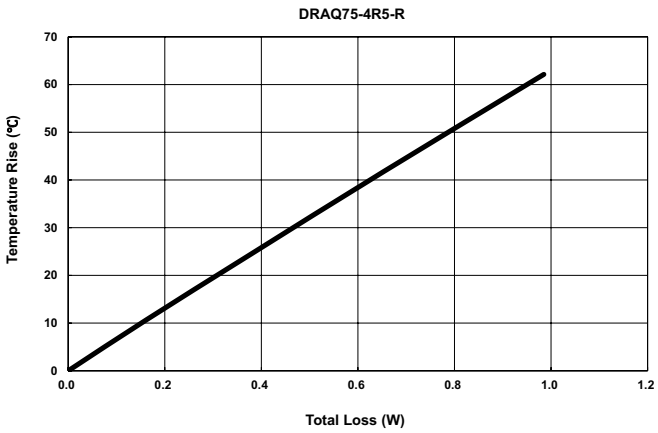
Part marking: Q###D*, ###= inductance value in uH, R= decimal point,
if no R is present last character equals number of zeros, D= shift number, *= production line number
xxxx=lot code, R= revision level
All soldering surface to be coplanar within 0.1 millimeters
Tolerances are ±0.2 millimeters unless stated otherwise
The characters on the bottom of the part are part of the header mold and shown for reference only
Pad layout tolerances are ±0.2 millimeters unless stated otherwise
Do not route traces or vias underneath the inductor

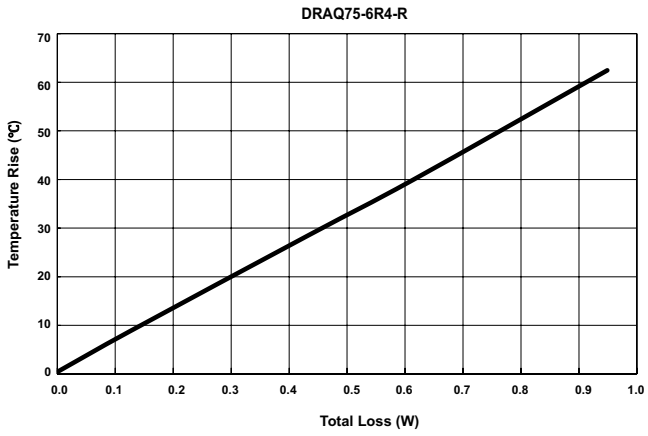
Packaging information (mm)

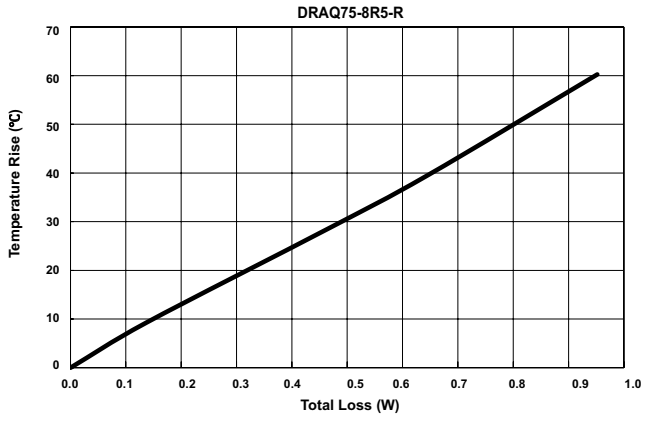
Supplied in tape and reel packaging , 1,100 parts per 13" diameter reel

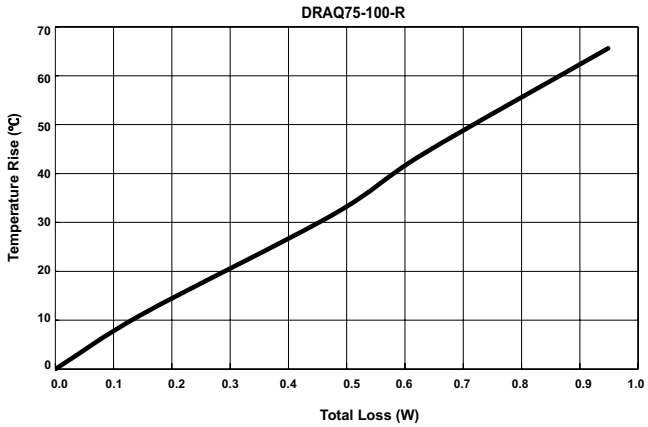


Temperature rise vs. total loss

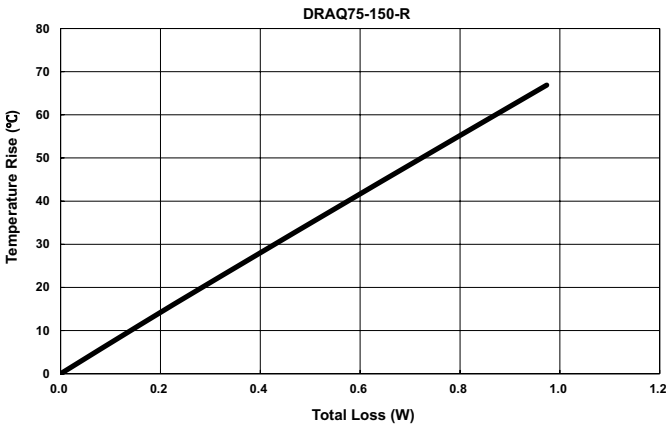


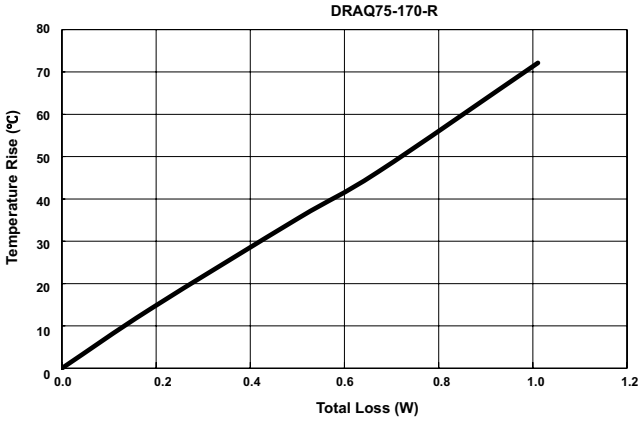


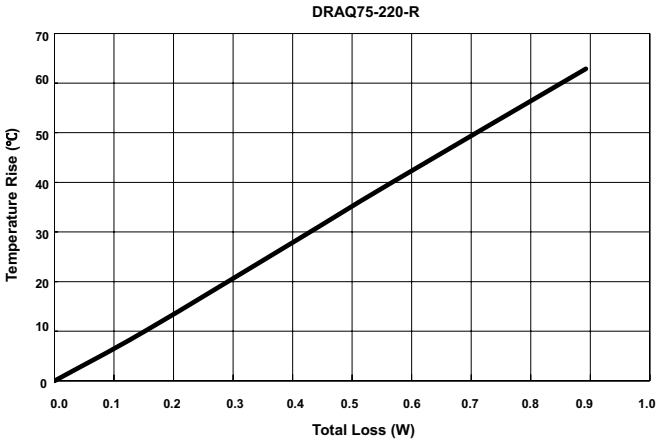


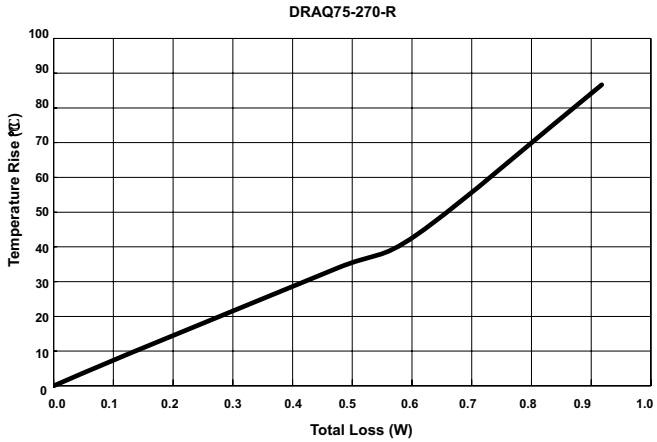


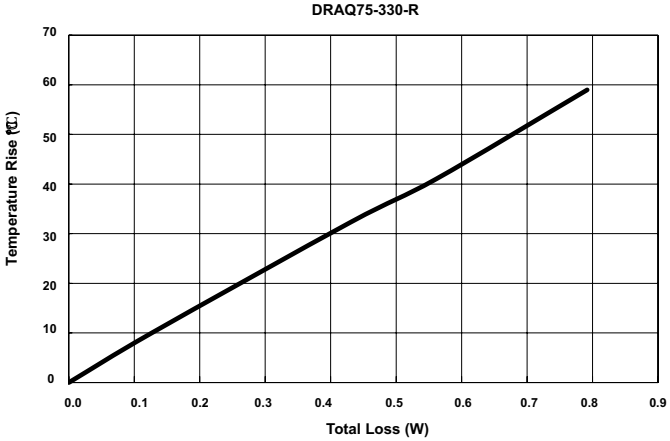
Temperature rise vs. total loss

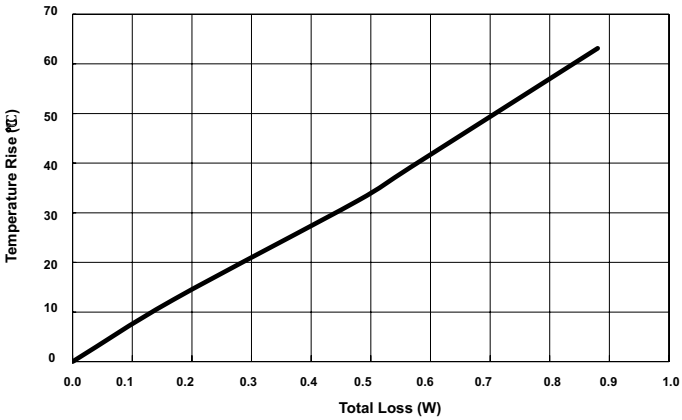




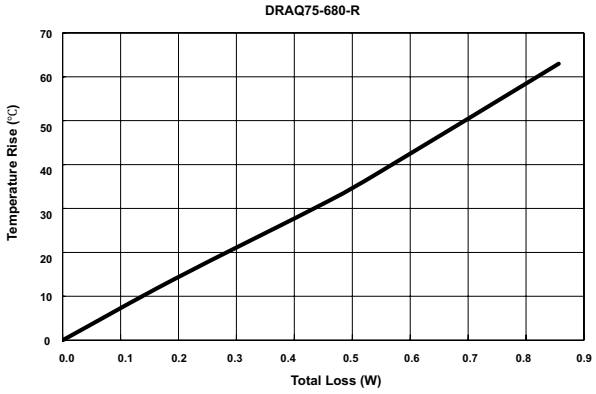


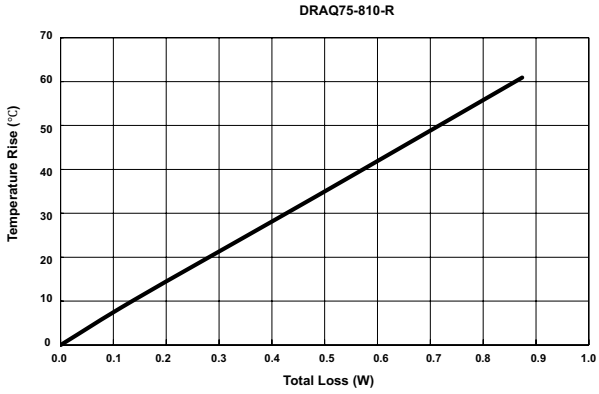


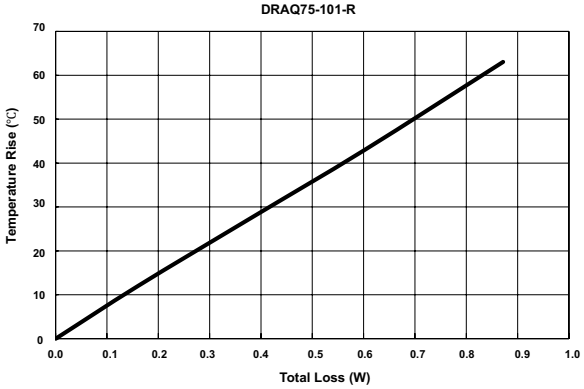


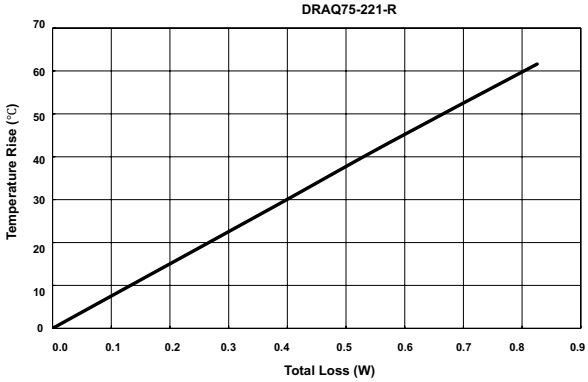


Temperature rise vs. total loss

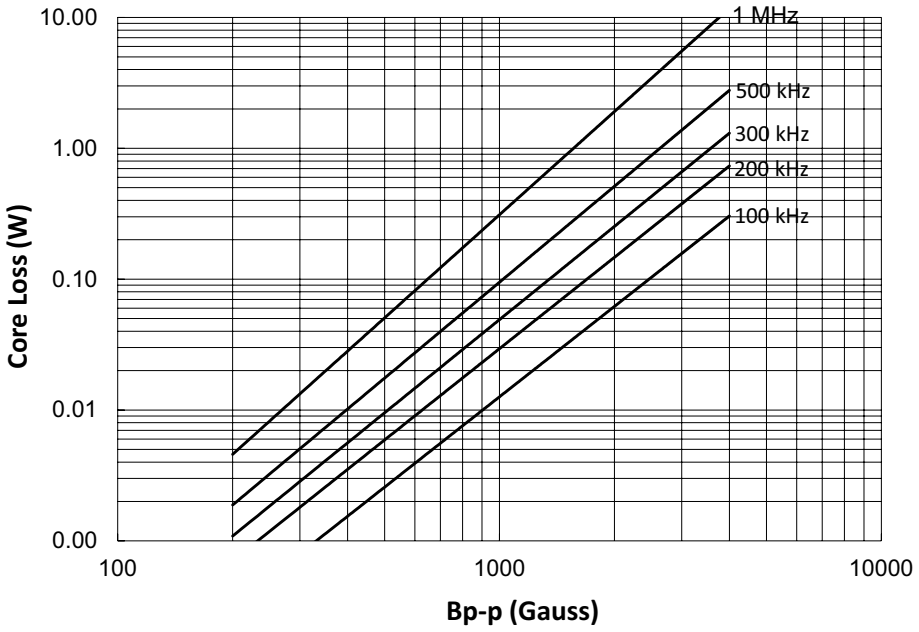






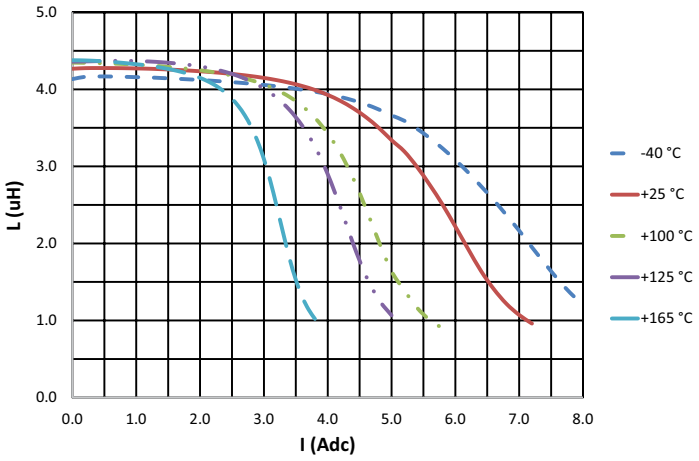


Core loss vs. Bp-p

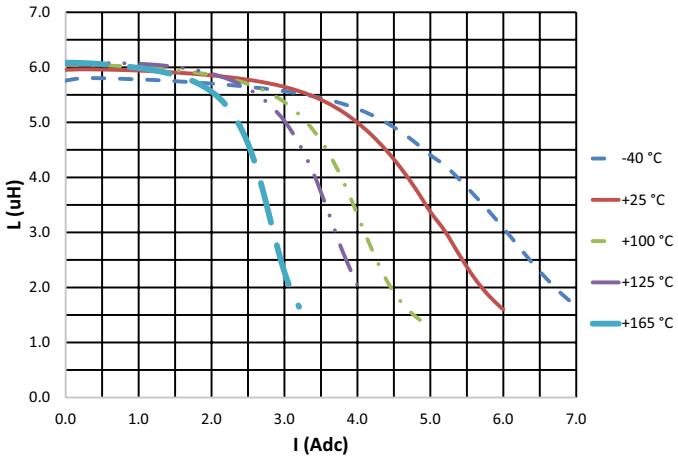


Inductance characteristics

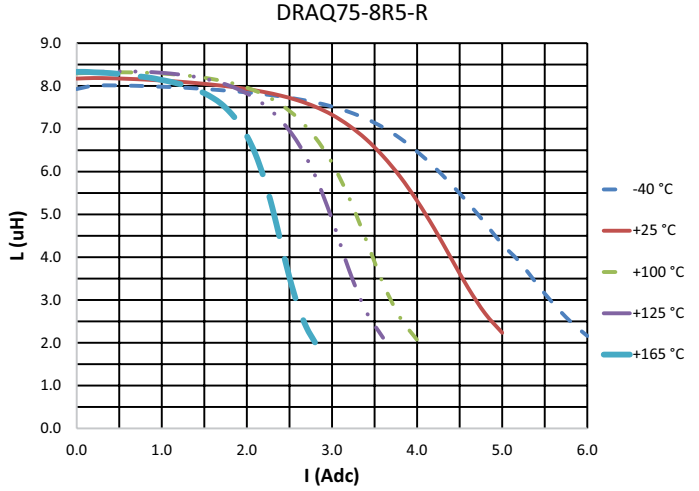
DRAQ75-4R5-R



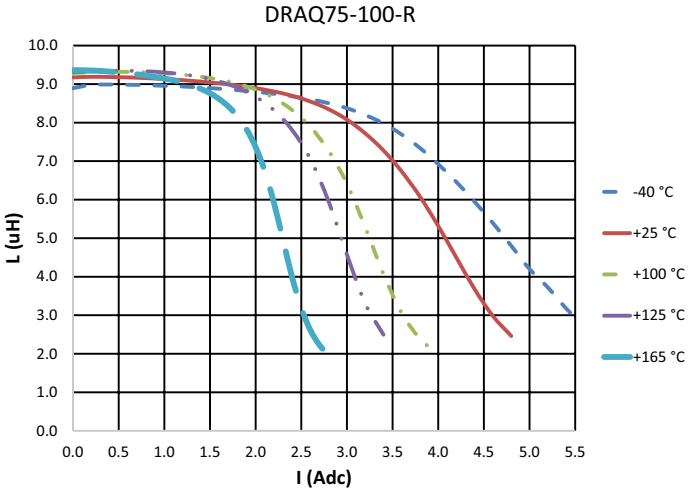
DRAQ75-6R4-R



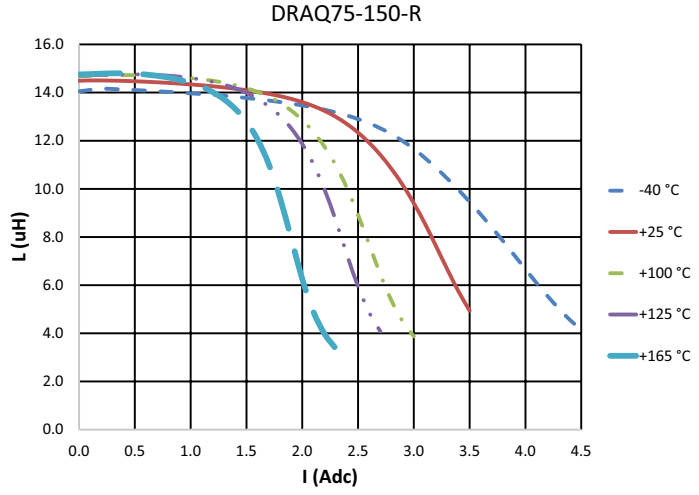
DRAQ75-8R5-R



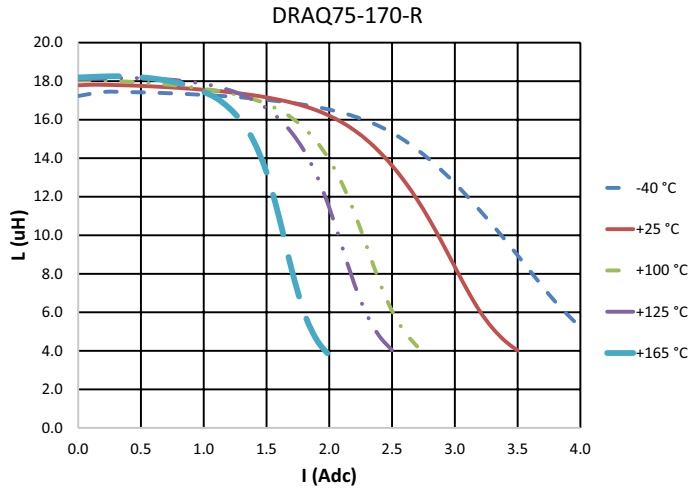
DRAQ75-100-R



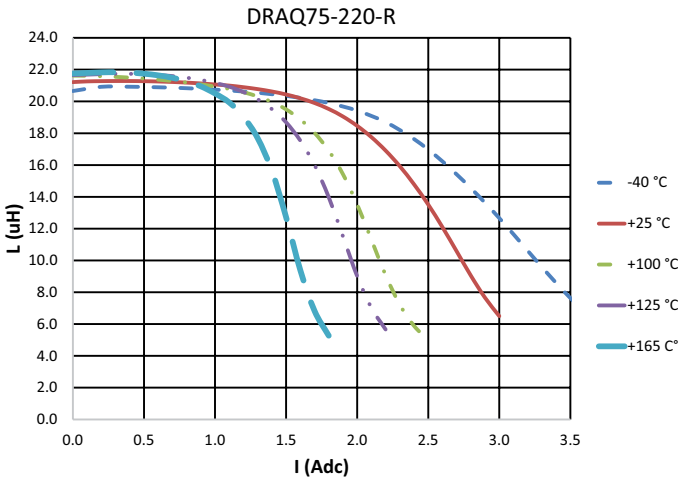
DRAQ75-150-R

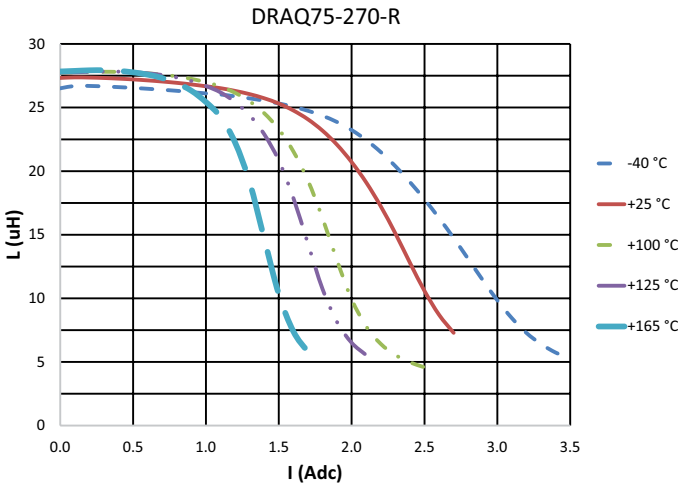


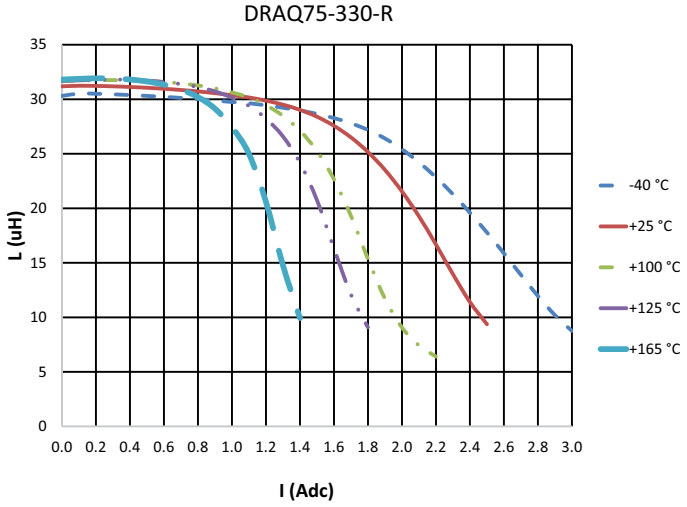
DRAQ75-170-R

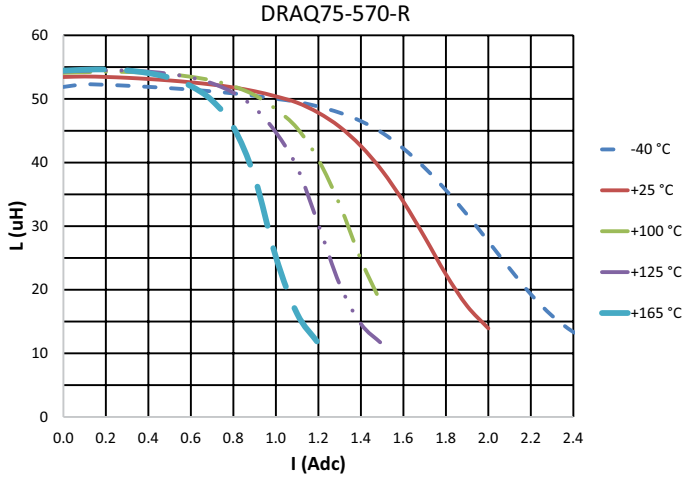


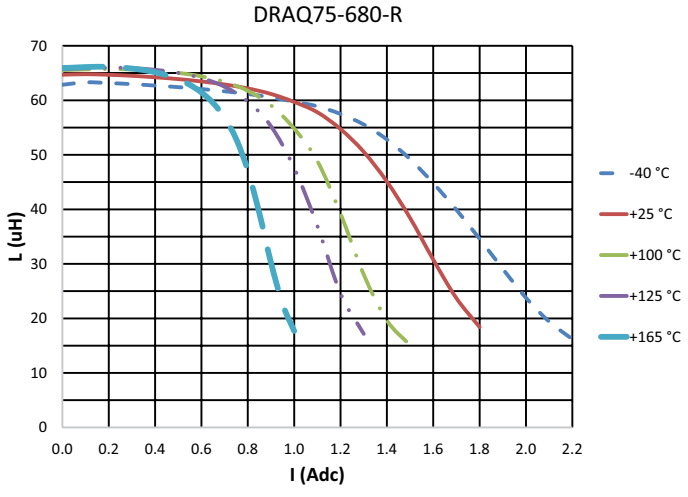
Inductance characteristics

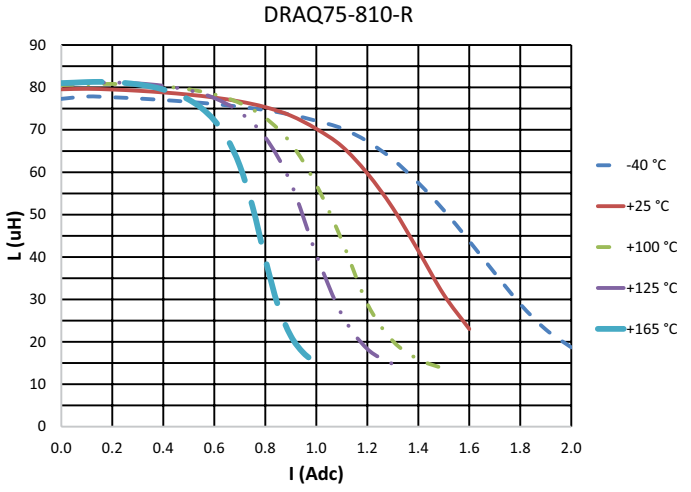




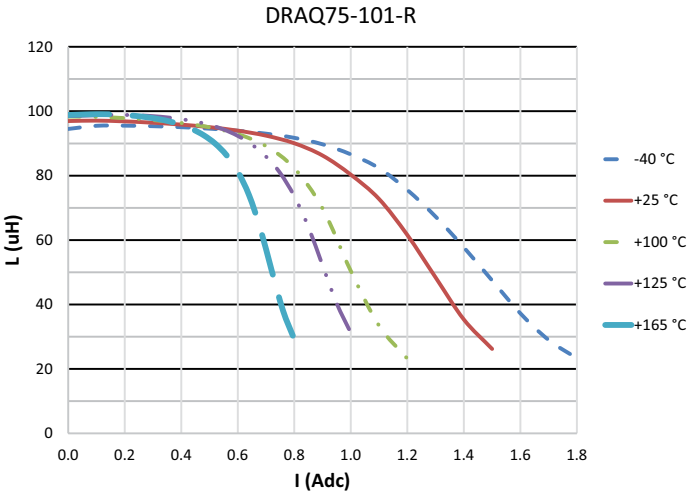


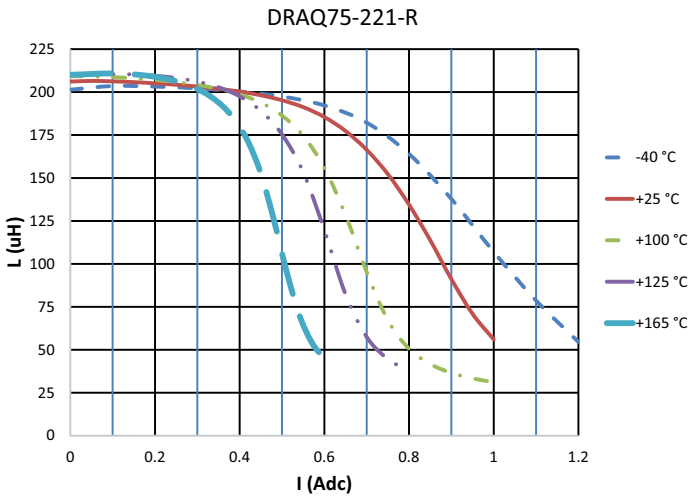






Inductance characteristics





Solder reflow profile

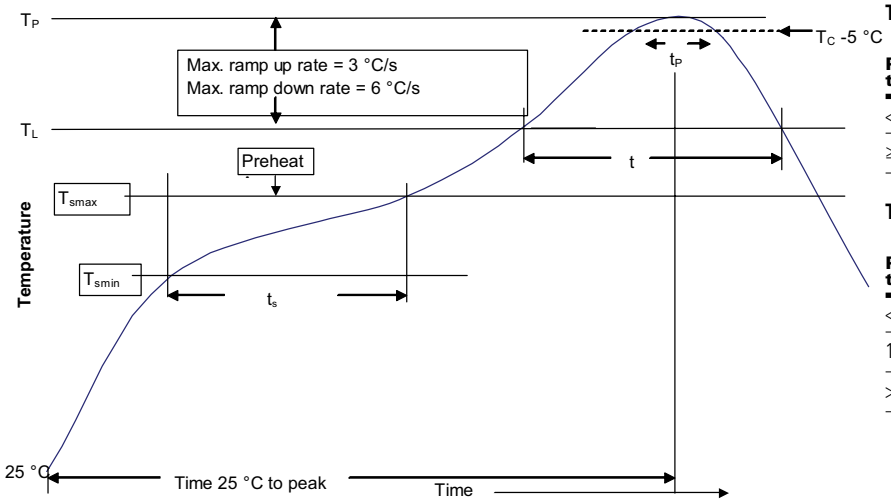


Table 1 - Standard SnPb solder (T_C)

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 (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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