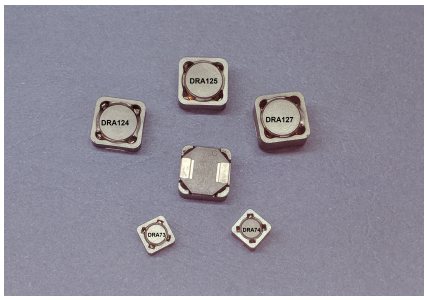
DRA
Automotive grade
High power density, high efficiency, shielded drum core power inductors



Product features

- AEC-Q200 qualified
- Five different mechanical sizes available
- Magnetically shielded-reduces EMI
- Ferrite core material
- Inductance range from 0.28 µH to 1000 µH
- Current range up to 56 A
- Rugged construction for high shock and vibration environments
- Moisture Sensitivity Level (MSL): 1

Applications

- Body electronics
  - Headlamps, tail lamps and interior lighting
  - Heating Ventilation and Air Conditioning controllers (HVAC)
  - Doors, window lift and seat control
- Advanced driver assistance systems
  - 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
- Chassis and safety electronics
  - Electronic Stability Control system (ESC)
  - Electric parking brake
  - Electronic Power Steering (EPS)
- Engine and powertrain systems
  - Diesel/gasoline engine management
  - Powertrain Control Module (PCM)/ 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

Powering Business Worldwide

Product specifications

Part Number[6]	OCL[1] ±20% (µH)	I_{rms}[2] (A)	$I_{sat}1$[3] (A)	$I_{sat}2$[4] (A)	DCR (Ω) @ +25 °C Typical	DCR (Ω) @ +25 °C Maximum	K-Factor[5]
DRA73-R33-R	0.29	8.42	14.8	11.8	0.0040	0.0048	636.5
DRA73-1R0-R	0.91	6.50	8.22	6.58	0.0067	0.0080	353.6
DRA73-1R5-R	1.36	5.39	6.73	5.38	0.0097	0.0117	289.3
DRA73-2R2-R	2.52	4.18	4.93	3.95	0.016	0.019	212.2
DRA73-3R3-R	3.18	3.59	4.35	3.48	0.022	0.026	187.2
DRA73-4R7-R	4.86	2.92	3.52	2.82	0.033	0.040	151.6
DRA73-6R8-R	6.63	2.62	2.96	2.37	0.041	0.049	127.3
DRA73-8R2-R	8.06	2.30	2.74	2.19	0.053	0.064	117.9
DRA73-100-R	10.27	2.11	2.39	1.91	0.064	0.077	102.7
DRA73-150-R	14.98	1.74	2.00	1.60	0.094	0.112	86.0
DRA73-220-R	22.39	1.42	1.64	1.32	0.141	0.170	70.7
DRA73-330-R	31.84	1.25	1.35	1.08	0.183	0.219	57.9
DRA73-470-R	47.83	1.02	1.10	0.884	0.275	0.330	47.5
DRA73-680-R	66.89	0.845	0.937	0.749	0.397	0.476	40.3
DRA73-820-R	83.77	0.731	0.851	0.680	0.530	0.636	36.6
DRA73-101-R	101.7	0.682	0.763	0.610	0.609	0.731	32.8
DRA73-151-R	151.1	0.551	0.632	0.506	0.932	1.12	27.2
DRA73-221-R	218.8	0.479	0.510	0.408	1.23	1.48	21.9
DRA73-331-R	326.4	0.391	0.423	0.338	1.85	2.22	18.2
DRA73-471-R	472.6	0.326	0.354	0.283	2.67	3.20	15.2
DRA73-681-R	682.9	0.270	0.297	0.238	3.89	4.66	12.8
DRA73-821-R	825.3	0.252	0.267	0.214	4.46	5.35	11.5
DRA73-102-R	991.9	0.235	0.239	0.192	5.15	6.18	10.3

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 V_{rms}, 0.0A dc @ +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 at +25 °C.
4. $I_{sat}2$: Peak current for approximately 40% rolloff at +125 °C.
5. K-factor: Used to determine Bp-p for core loss (see graph). $B_{p-p} = K * L * \Delta I$. B_{p-p}:(Gauss), K: (K-factor from table), L: (Inductance in µH), ΔI (peak-to-peak ripple current in amps).
6. Part Number Definition: DRAxxx-yyy-R
   - DRAxxx = Product code and size
   - yyy= Inductance value in uH, R = decimal point, if no R is present then third character = number of zeros.
   - -R suffix = RoHS compliant

Product specifications

Part Number[6]	OCL[1] ±20% (µH)	I_{rms}[2] (A)	$I_{sat}1$[3] (A)	$I_{sat}2$[4] (A)	DCR (Ω) @ +25 °C Typical	DCR (Ω) @ +25 °C Maximum	K-Factor[5]
DRA74-R33-R	0.29	7.26	18.4	14.7	0.0054	0.0064	547.9
DRA74-1R0-R	0.90	6.01	10.2	8.18	0.0078	0.0094	304.4
DRA74-1R5-R	1.31	5.55	8.36	6.69	0.0092	0.0110	249.0
DRA74-2R2-R	2.33	4.82	6.13	4.91	0.012	0.015	182.6
DRA74-3R3-R	3.05	4.16	5.41	4.33	0.016	0.020	161.1
DRA74-4R7-R	4.68	3.41	4.38	3.50	0.024	0.029	130.4
DRA74-6R8-R	6.51	2.91	3.68	2.94	0.034	0.040	109.6
DRA74-8R2-R	8.51	2.66	3.17	2.54	0.040	0.048	94.5
DRA74-100-R	9.62	2.56	2.97	2.37	0.043	0.052	88.4
DRA74-150-R	15.14	2.06	2.36	1.89	0.067	0.080	70.2
DRA74-220-R	22.25	1.68	1.96	1.57	0.100	0.120	58.3
DRA74-330-R	33.21	1.37	1.61	1.29	0.151	0.181	48.1
DRA74-470-R	46.56	1.14	1.37	1.10	0.219	0.263	40.9
DRA74-680-R	68.37	0.996	1.11	0.887	0.286	0.343	33.0
DRA74-820-R	81.45	0.879	1.03	0.827	0.367	0.440	30.8
DRA74-101-R	98.50	0.822	0.929	0.743	0.419	0.503	27.7
DRA74-151-R	150.9	0.661	0.748	0.598	0.648	0.780	22.3
DRA74-221-R	218.9	0.544	0.626	0.501	0.960	1.15	18.6
DRA74-331-R	328.9	0.435	0.514	0.411	1.50	1.79	15.3
DRA74-471-R	471.5	0.383	0.420	0.336	1.93	2.31	12.5
DRA74-681-R	682.8	0.315	0.352	0.282	2.86	3.43	10.5
DRA74-821-R	815.0	0.279	0.327	0.262	3.63	4.35	9.7
DRA74-102-R	1001.7	0.260	0.292	0.234	4.19	5.02	8.7

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 V_{rms}, 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 at +25 °C.
4. $I_{sat}2$: Peak current for approximately 40% rolloff at +125 °C.
5. K-factor: Used to determine Bp-p for core loss (see graph). $B_{p-p} = K * L * \Delta I$. B_{p-p}:(Gauss), K: (K-factor from table), L: (Inductance in µH), ΔI (peak-to-peak ripple current in amps).
6. Part Number Definition: DRAxxx-yyy-R
   - DRAxxx = Product code and size
   - yyy= Inductance value in uH, R = decimal point, if no R is present then third character = number of zeros.
   - -R suffix = RoHS compliant

Product specifications

Part Number[6]	OCL[1] ±20% (µH)	I_{rms}[2] (A)	$I_{sat}1$[3] (A)	$I_{sat}2$[4] (A)	DCR (Ω) @ +25 °C Typical	DCR (Ω) @ +25 °C Maximum	K-Factor[5]
DRA124-R47-R	0.42	13.5	30.8	24.6	0.0024	0.0028	196.9
DRA124-1R0-R	0.82	11.7	22.0	17.6	0.0031	0.0038	140.7
DRA124-1R5-R	1.36	9.36	17.1	13.7	0.0049	0.0058	109.4
DRA124-2R2-R	2.04	7.64	14.0	11.2	0.0070	0.0090	89.5
DRA124-3R3-R	2.79	6.94	11.9	9.48	0.0090	0.011	75.7
DRA124-4R7-R	4.74	5.47	9.06	7.25	0.014	0.017	57.9
DRA124-6R8-R	7.28	4.46	7.33	5.87	0.021	0.026	46.9
DRA124-8R2-R	8.88	3.87	6.70	5.36	0.028	0.034	42.8
DRA124-100-R	10.37	3.67	6.16	4.93	0.031	0.038	39.4
DRA124-150-R	14.10	3.10	5.31	4.25	0.044	0.053	34.0
DRA124-220-R	23.00	2.44	4.16	3.33	0.071	0.086	26.6
DRA124-330-R	34.13	1.98	3.42	2.74	0.108	0.130	21.9
DRA124-470-R	46.27	1.78	2.91	2.33	0.134	0.160	18.6
DRA124-680-R	69.77	1.45	2.37	1.90	0.201	0.241	15.1
DRA124-820-R	80.57	1.29	2.23	1.79	0.257	0.309	14.3
DRA124-101-R	98.80	1.20	2.00	1.60	0.296	0.355	12.8
DRA124-151-R	151.7	0.967	1.62	1.30	0.454	0.550	10.4
DRA124-221-R	209.6	0.865	1.36	1.09	0.568	0.680	8.7
DRA124-331-R	326.9	0.690	1.09	0.874	0.892	1.070	7.0
DRA124-471-R	473.0	0.568	0.911	0.729	1.32	1.58	5.8
DRA124-681-R	682.1	0.466	0.759	0.607	1.96	2.35	4.9
DRA124-821-R	826.7	0.406	0.697	0.557	2.57	3.09	4.5
DRA124-102-R	1001.0	0.380	0.629	0.503	2.94	3.52	4.0

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 V_{rms}, 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 at +25 °C.
4. $I_{sat}2$: Peak current for approximately 40% rolloff at +125 °C.
5. K-factor: Used to determine Bp-p for core loss (see graph). $B_{p-p} = K * L * \Delta I$. B_{p-p}:(Gauss), K: (K-factor from table), L: (Inductance in µH), ΔI (peak-to-peak ripple current in amps).
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Product specifications

Part Number[6]	OCL[1] ±20% (µH)	I_{rms}[2] (A)	$I_{sat}1$[3] (A)	$I_{sat}2$[4] (A)	DCR (Ω) @ +25 °C Typical	DCR (Ω) @ +25 °C Maximum	K-Factor[5]
DRA125-R47-R	0.45	14.7	33.2	26.6	0.0025	0.0030	176.9
DRA125-1R0-R	0.85	12.7	23.7	19.0	0.0034	0.0042	126.4
DRA125-1R5-R	1.41	12.9	18.4	14.8	0.0033	0.0039	98.3
DRA125-2R2-R	2.12	10.6	15.1	12.1	0.0048	0.0058	80.4
DRA125-3R3-R	2.89	8.63	12.8	10.2	0.0073	0.0087	68.0
DRA125-4R7-R	4.90	7.67	9.76	7.81	0.0092	0.011	52.0
DRA125-6R8-R	6.23	6.81	8.74	6.99	0.012	0.014	46.6
DRA125-8R2-R	7.49	6.41	7.90	6.32	0.013	0.016	42.1
DRA125-100-R	9.22	5.57	7.22	5.77	0.017	0.021	38.5
DRA125-150-R	14.67	4.45	5.72	4.58	0.027	0.033	30.5
DRA125-220-R	20.65	3.95	4.74	3.79	0.035	0.042	25.3
DRA125-330-R	31.47	3.19	3.86	3.09	0.053	0.064	20.6
DRA125-470-R	47.83	2.59	3.13	2.51	0.081	0.097	16.7
DRA125-680-R	68.48	2.13	2.64	2.11	0.120	0.144	14.0
DRA125-820-R	80.86	2.01	2.41	1.93	0.135	0.162	12.8
DRA125-101-R	97.60	1.75	2.21	1.77	0.178	0.214	11.8
DRA125-151-R	150.0	1.41	1.79	1.43	0.273	0.330	9.5
DRA125-221-R	222.8	1.14	1.47	1.18	0.416	0.500	7.8
DRA125-331-R	325.1	1.00	1.19	0.96	0.543	0.650	6.4
DRA125-471-R	466.3	0.826	1.01	0.805	0.790	0.950	5.4
DRA125-681-R	683.3	0.673	0.834	0.667	1.200	1.440	4.4
DRA125-821-R	813.6	0.632	0.758	0.606	1.360	1.630	4.0
DRA125-102-R	992.8	0.552	0.695	0.556	1.780	2.130	3.7

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 V_{rms}, 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 at +25 °C.
4. $I_{sat}2$: Peak current for approximately 40% rolloff at +125 °C.
5. K-factor: Used to determine Bp-p for core loss (see graph). $B_{p-p} = K * L * \Delta I$. B_{p-p}:(Gauss), K: (K-factor from table), L: (Inductance in µH), ΔI (peak-to-peak ripple current in amps).
6. Part Number Definition: DRAxxx-yyy-R
   - DRAxxx = Product code and size
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Product specifications

Part Number[6]	OCL[1] ±20% (µH)	I_{rms}[2] (A)	$I_{sat}1$[3] (A)	$I_{sat}2$[4] (A)	DCR (Ω) @ +25 °C Typical	DCR (Ω) @ +25 °C Maximum	K-Factor[5]
DRA127-R47-R	0.41	15.9	56.0	44.8	0.0024	0.0030	120.0
DRA127-1R0-R	0.77	13.6	40.0	32.0	0.0034	0.0040	85.7
DRA127-1R5-R	1.27	12.2	31.1	24.9	0.0043	0.0051	66.7
DRA127-2R2-R	1.92	12.5	25.5	20.4	0.0040	0.0048	54.6
DRA127-3R3-R	3.51	8.54	18.7	14.9	0.0086	0.0104	40.0
DRA127-4R7-R	4.58	8.14	16.5	13.2	0.0094	0.011	35.3
DRA127-6R8-R	6.72	6.52	13.3	10.7	0.015	0.018	28.6
DRA127-8R2-R	8.33	6.33	12.2	9.74	0.016	0.019	26.1
DRA127-100-R	9.63	6.02	11.2	8.96	0.017	0.021	24.0
DRA127-150-R	14.90	4.83	9.03	7.23	0.027	0.032	19.4
DRA127-220-R	21.47	3.98	7.57	6.05	0.040	0.047	16.2
DRA127-330-R	32.01	3.22	6.22	4.98	0.060	0.072	13.3
DRA127-470-R	47.91	2.62	5.09	4.07	0.091	0.110	10.9
DRA127-680-R	68.22	2.33	4.18	3.34	0.115	0.138	9.0
DRA127-820-R	83.91	2.01	3.84	3.07	0.155	0.186	8.2
DRA127-101-R	100.8	1.89	3.46	2.77	0.175	0.210	7.4
DRA127-151-R	151.2	1.52	2.83	2.26	0.269	0.320	6.1
DRA127-221-R	219.8	1.25	2.35	1.88	0.398	0.480	5.0
DRA127-331-R	328.3	1.01	1.93	1.54	0.612	0.730	4.1
DRA127-471-R	474.5	0.827	1.62	1.29	0.910	1.10	3.5
DRA127-681-R	676.6	0.736	1.33	1.06	1.15	1.39	2.8
DRA127-821-R	824.6	0.637	1.22	0.978	1.54	1.85	2.6
DRA127-102-R	998.7	0.598	1.10	0.878	1.75	2.10	2.4

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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 at +25 °C.
4. $I_{sat}2$: Peak current for approximately 40% rolloff at +125 °C.
5. K-factor: Used to determine Bp-p for core loss (see graph). $B_{p-p} = K * L * \Delta I$. B_{p-p}:(Gauss), K: (K-factor from table), L: (Inductance in µH), ΔI (peak-to-peak ripple current in amps).
6. Part Number Definition: DRAxxx-yyy-R
   - DRAxxx = Product code and size
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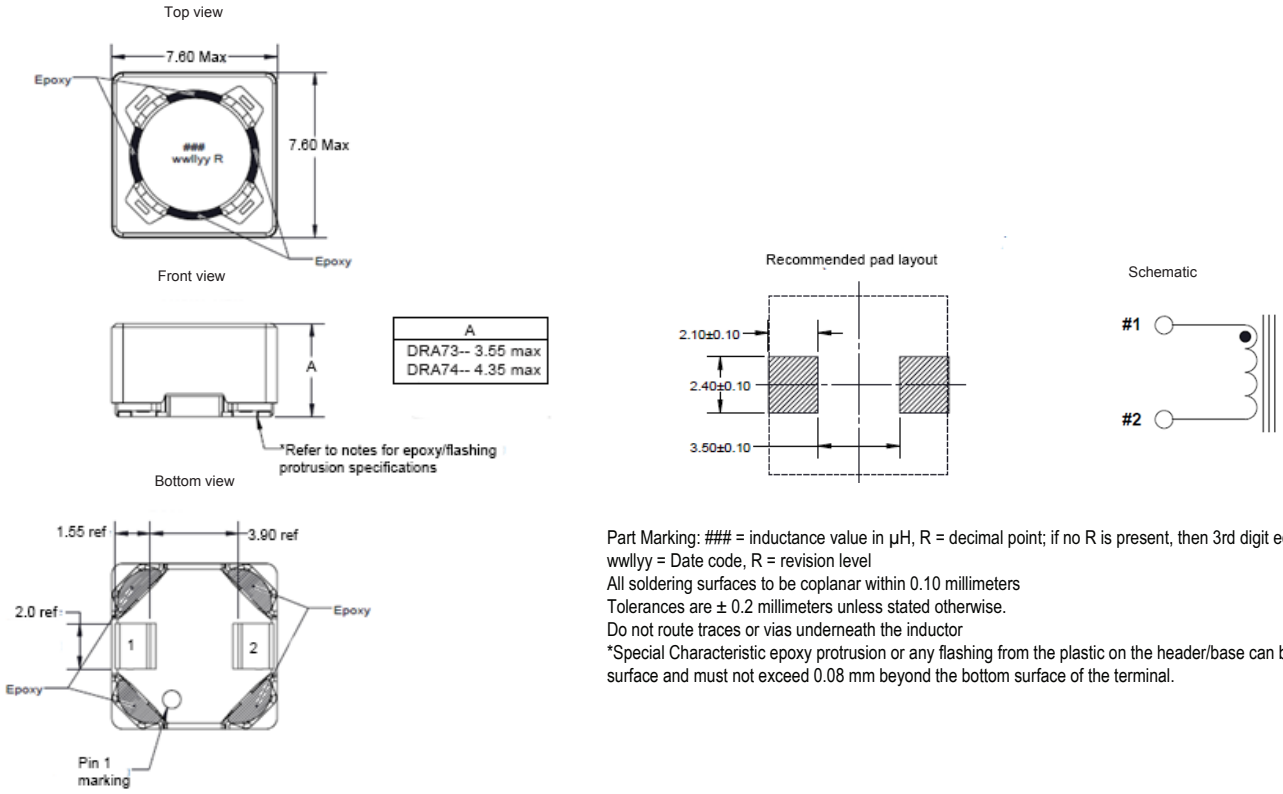
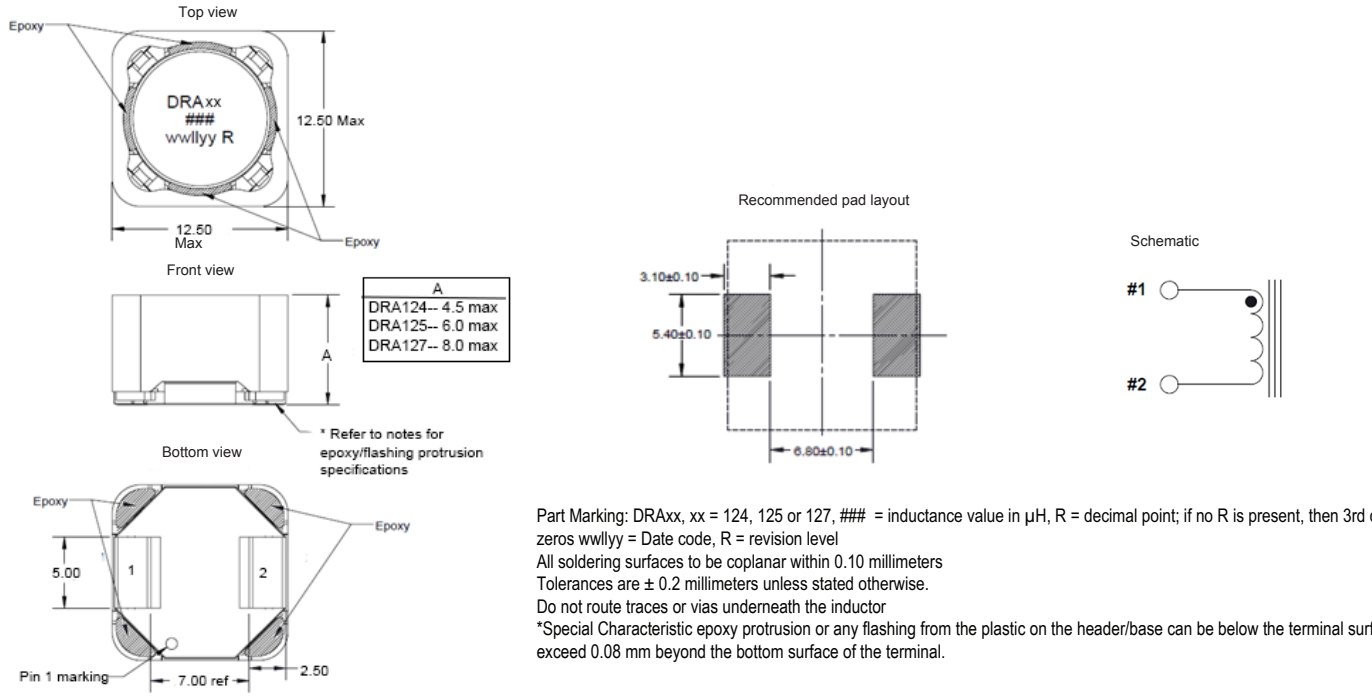
Dimensions - mm

DRA73 & DRA74



Part Marking: ### = inductance value in µH, R = decimal point; if no R is present, then 3rd digit equals number of zeros
wwllyy = Date code, R = revision level
All soldering surfaces to be coplanar within 0.10 millimeters
Tolerances are ± 0.2 millimeters unless stated otherwise.
Do not route traces or vias underneath the inductor
*Special Characteristic epoxy protrusion or any flashing from the plastic on the header/base can be below the terminal surface and must not exceed 0.08 mm beyond the bottom surface of the terminal.

DRA124, DRA125 & DRA127



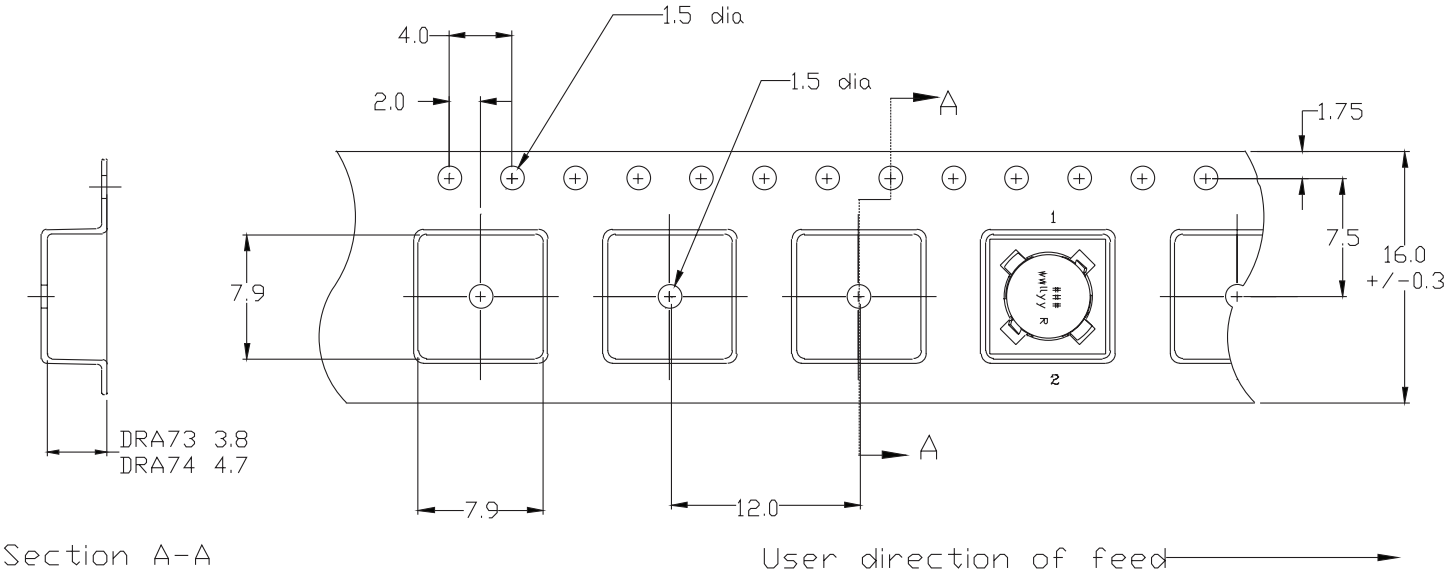
Part Marking: DRAxx, xx = 124, 125 or 127, ### = inductance value in µH, R = decimal point; if no R is present, then 3rd digit equals number of zeros wwllyy = Date code, R = revision level
All soldering surfaces to be coplanar within 0.10 millimeters
Tolerances are ± 0.2 millimeters unless stated otherwise.
Do not route traces or vias underneath the inductor
*Special Characteristic epoxy protrusion or any flashing from the plastic on the header/base can be below the terminal surface and must not exceed 0.08 mm beyond the bottom surface of the terminal.

Packaging information - mm

DRA73 & DRA74

Supplied in tape and reel packaging, on a 13" diameter reel:

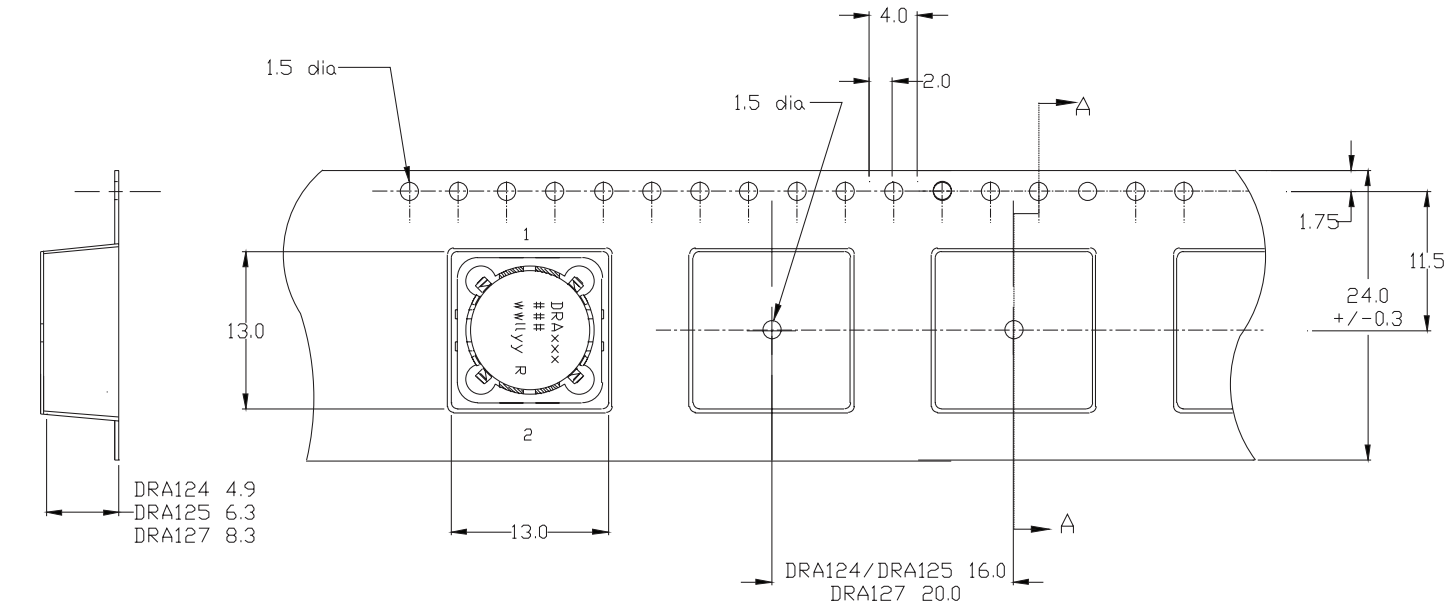
- DRA73 - 1350 pieces
- DRA74 - 1100 pieces



DRA124, DRA125 & DRA127

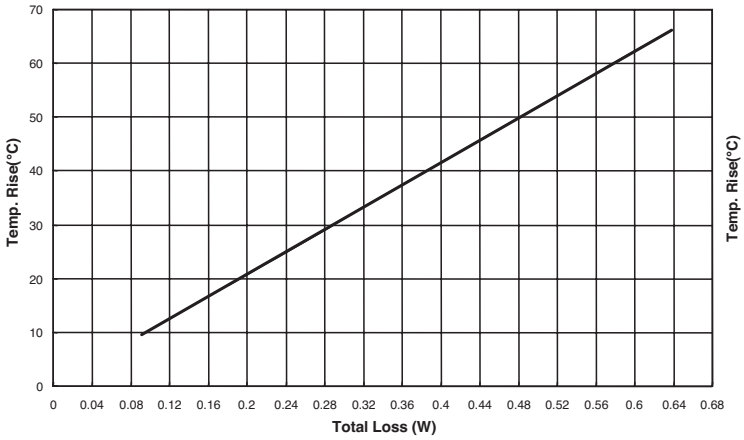
Supplied in tape and reel packaging, on a 13" diameter reel:

- DRA124 - 750 pieces
- DRA125 - 600 pieces
- DRA127 - 350 pieces

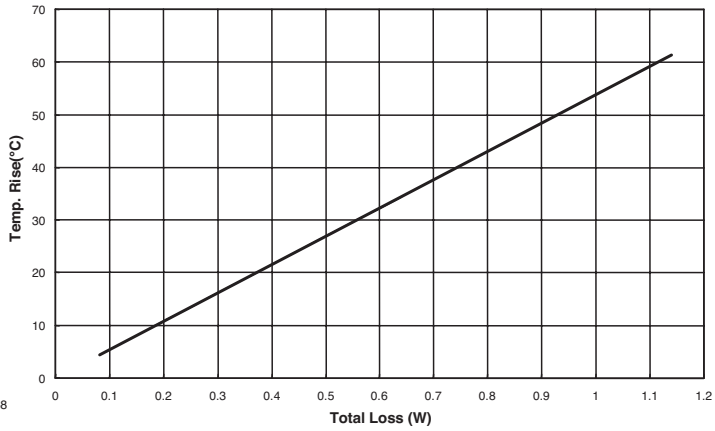


Temperature rise vs. total loss

DRA73



DRA74



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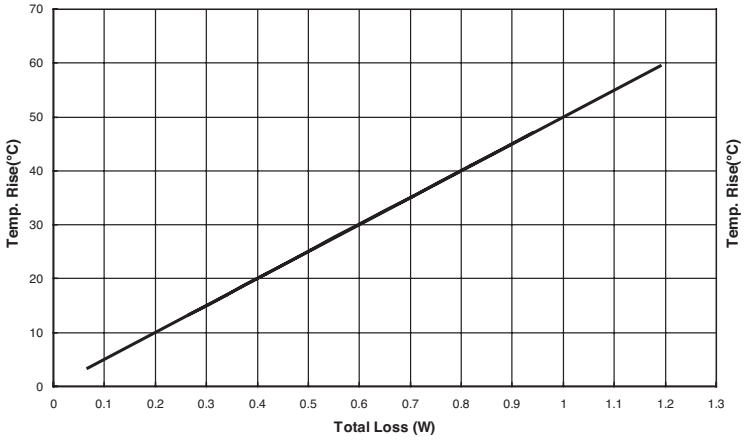

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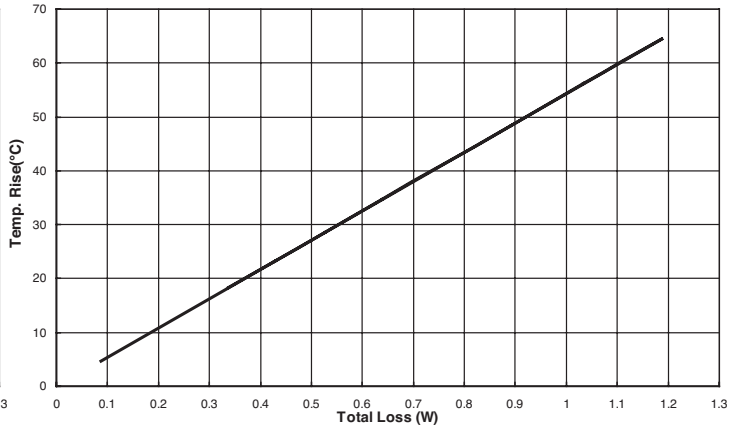

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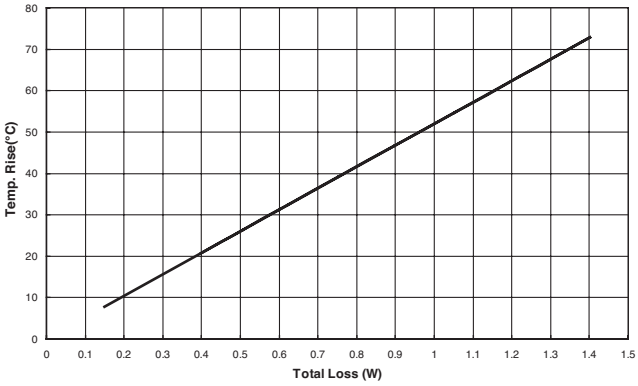
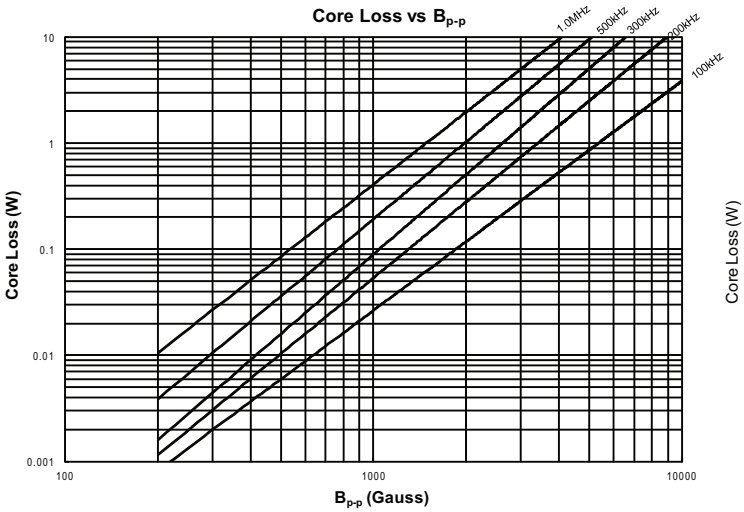


Core loss vs. Bp-p

DRA73



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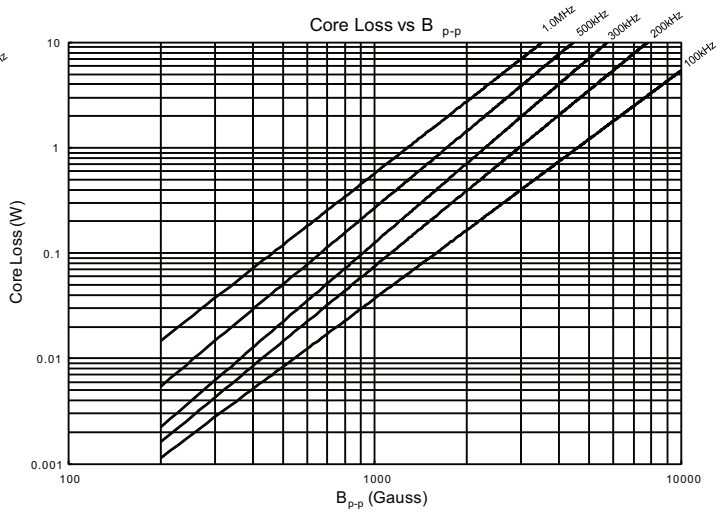

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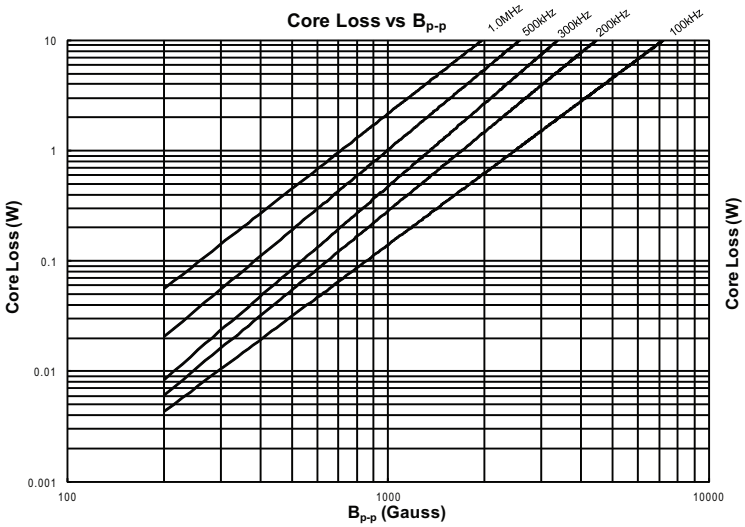

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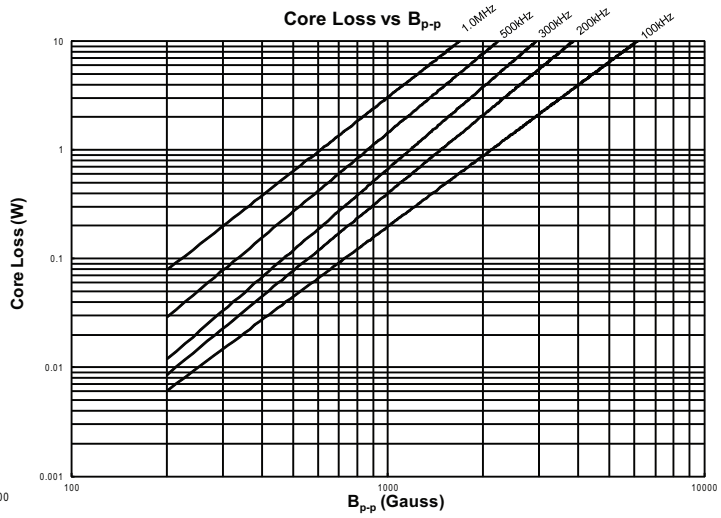

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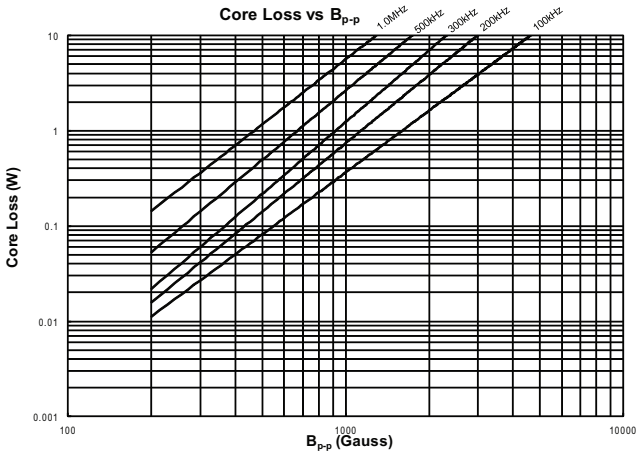
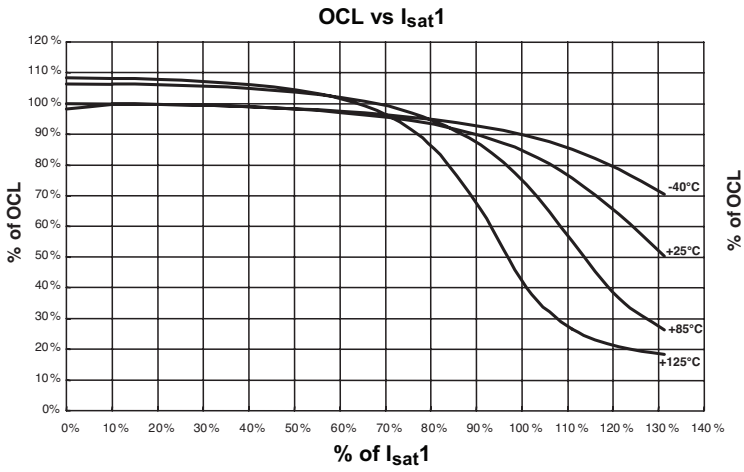


Inductance characteristics

DRA73



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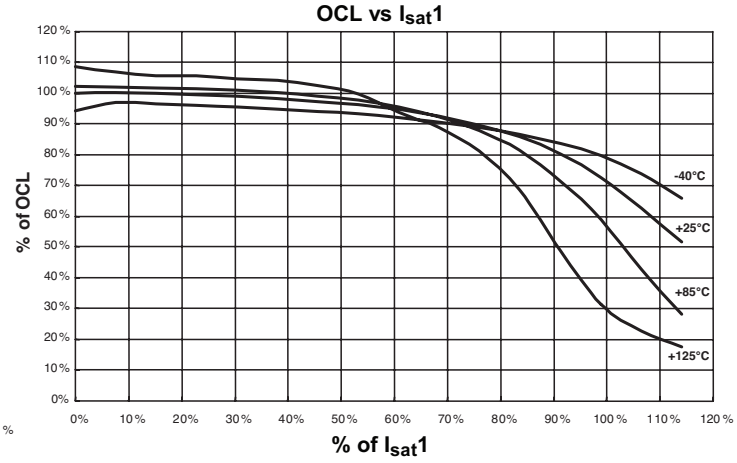

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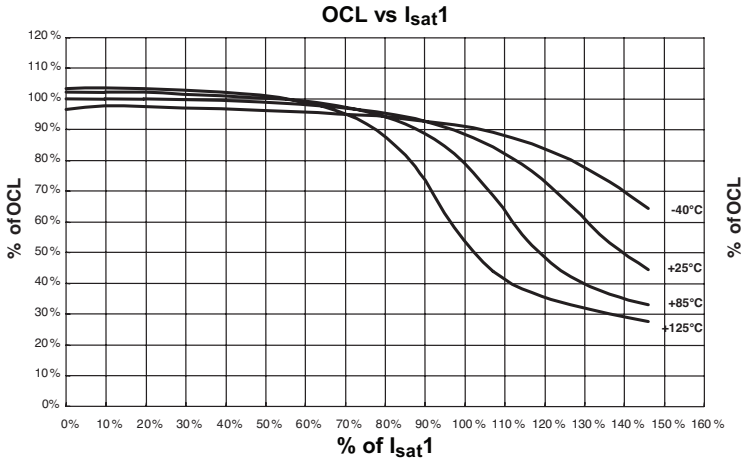

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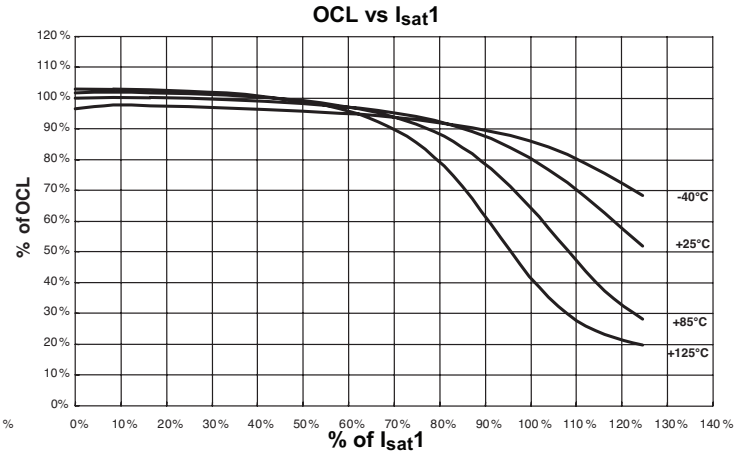

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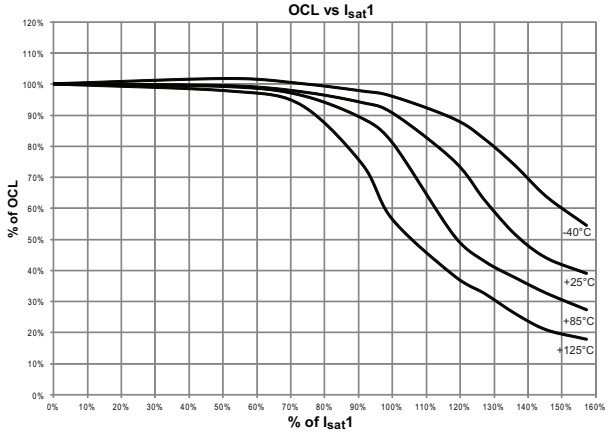

Solder Reflow Profile

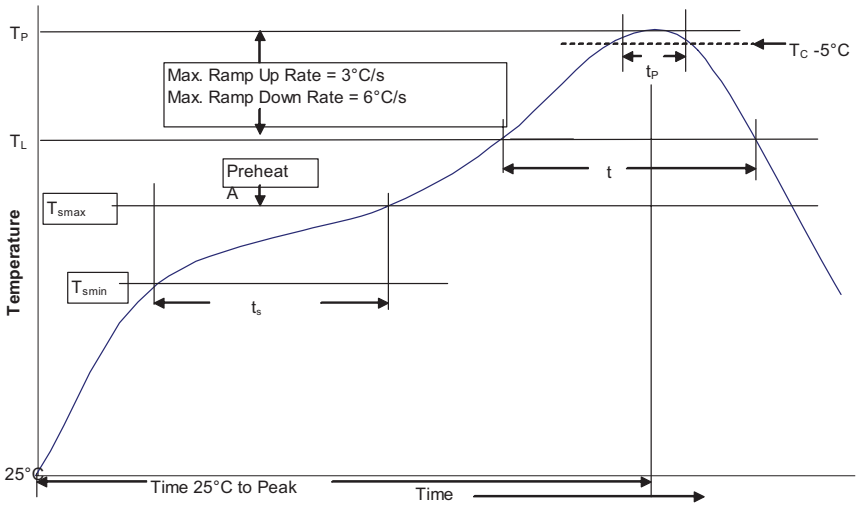

Table 1 - Standard SnPb Solder (T_C)

Package Thickness	Volume mm³ <350	Volume mm³ ≥350
<2.5mm	235°C	220°C
≥2.5mm	220°C	220°C

Table 2 - Lead (Pb) Free Solder (T_C)

Package Thickness	Volume mm³ <350	Volume mm³ 350 - 2000	Volume mm³ >2000
<1.6mm	260°C	260°C	260°C
1.6 – 2.5mm	260°C	250°C	245°C
>2.5mm	250°C	245°C	245°C

Reference JDEC 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
Average ramp up rate T_{smax} to T_p		3°C/ Second Max.	3°C/ Second Max.
Liquidous temperature (T_L) Time at liquidous (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**
Average ramp-down rate (T_p to T_{smax})		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.

** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.

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