

Features

- Thick film technology
- Power rating up to 2 watts at 70 °C
- High power surge protection
- RoHS compliant*
- Halogen free**
- AEC-Q200 compliant

Applications

- Power supplies
- Stepper motor drives

CRM-Q Automotive Grade High Power Chip Resistor

Electrical Characteristics

Characteristic	CRM1206Q	CRM2010Q	CRM2512Q
Power Rating @ 70 °C	0.5 W	1 W	2 W
Operating Temp. Range	-55 °C to +155 °C		
Derated to Zero Load at	+155 °C		
Maximum Working Voltage 1 Ω to 1 mΩ	200 V	200 V	300 V
Maximum Overload Voltage 1 Ω to 1 mΩ	400 V	400 V	600 V
Resistance Tolerance	±1 %, ±5 %		
Temperature Coefficient			
1 Ω to 10 Ω (±1 %, E24 & E96 series)	±200 PPM/°C	±200 PPM/°C	±200 PPM/°C
10.2 Ω to 1 MΩ (±1 %, E24 & E96 series)	±100 PPM/°C	±100 PPM/°C	±100 PPM/°C
1 Ω to 1 MΩ (±5 %, E24 series)	±200 PPM/°C	±200 PPM/°C	±200 PPM/°C

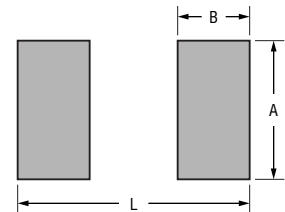
Additional Information

Click these links for more information:



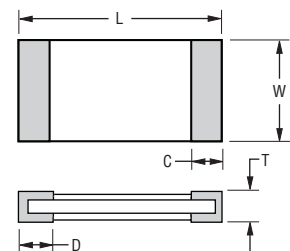
Recommended Solder Pad Layout

Model	A	B	L
CRM1206Q	$\frac{1.80}{(.071)}$	$\frac{1.30}{(.051)}$	$\frac{4.70}{(.185)}$
CRM2010Q	$\frac{3.00}{(.118)}$	$\frac{1.50}{(.059)}$	$\frac{6.80}{(.268)}$
CRM2512Q	$\frac{3.70}{(.146)}$	$\frac{1.60}{(.063)}$	$\frac{7.60}{(.299)}$



Product Dimensions

Model	L	W	C	D	T
CRM1206Q	$\frac{3.10 \pm 0.10}{(.122 \pm .004)}$	$\frac{1.60 \pm 0.10}{(.063 \pm .004)}$	$\frac{0.50 \pm 0.25}{(.020 \pm .010)}$	$\frac{0.50 \pm 0.25}{(.020 \pm .010)}$	$\frac{0.55 \pm 0.10}{(.022 \pm .004)}$
CRM2010Q	$\frac{5.00 \pm 0.20}{(.197 \pm .008)}$	$\frac{2.50 \pm 0.20}{(.098 \pm .008)}$	$\frac{0.65 \pm 0.25}{(.026 \pm .010)}$	$\frac{0.60 \pm 0.25}{(.024 \pm .010)}$	$\frac{0.60 \pm 0.10}{(.024 \pm .004)}$
CRM2512Q	$\frac{6.40 \pm 0.20}{(.252 \pm .008)}$	$\frac{3.10 \pm 0.20}{(.122 \pm .008)}$	$\frac{0.60 \pm 0.25}{(.024 \pm .010)}$	$\frac{0.90 \pm 0.25}{(.035 \pm .010)}$	$\frac{0.60 \pm 0.15}{(.024 \pm .006)}$



DIMENSIONS: $\frac{\text{MM}}{\text{(INCHES)}}$



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WARNING Cancer and Reproductive Harm - www.P65Warnings.ca.gov

* RoHS Directive 2015/863, Mar 31, 2015 and Annex.

** Bourns considers a product to be "halogen free" if (a) the Bromine (Br) content is 900 ppm or less; (b) the Chlorine (Cl) content is 900 ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500 ppm or less.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

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CRM-Q Automotive Grade High Power Chip Resistor

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Performance Characteristics

Test Item	Method	Procedure	Test Limits ΔR
High Temperature Exposure (Storage)	AEC-Q200 Table 7.3	1,000 hrs. @ 155 °C. No power loading.	1 % tolerance: $\leq \pm 1$ % 5 % tolerance: $\leq \pm 3$ %
Temperature Cycling	AEC-Q200 Table 7.4	1000 cycles (-55 °C to +125 °C);	1 % tolerance: $\leq \pm 0.5$ % 5 % tolerance: $\leq \pm 1$ %
Moisture Resistance	AEC-Q200 Table 7.6	65 °C / 80~100 % RH / 10 cycles;	1 % tolerance: $\leq \pm 0.5$ % 5 % tolerance: $\leq \pm 1$ %
Biased Humidity	AEC-Q200 Table 7.7	1000 hours 85 °C / 85 % RH, 10 % of operating power	1 % tolerance: $\leq \pm 1$ % 5 % tolerance: $\leq \pm 3$ %
Operational Life	AEC-Q200 Table 7.8	1000 hours @ 125 °C at specified rated power	1 % tolerance: $\leq \pm 1$ % 5 % tolerance: $\leq \pm 3$ %
Mechanical Shock	AEC-Q200 Table 7.13	100 g's, wave: hail-sine; Duration: 6 ms, Velocity: 12.3 ft/sec.	Within product specification tolerance and no visible damage
Vibration	AEC-Q200 Table 7.14	5 g's for 20 min., 12 cycles each of 3 orientations; Test from 10-200 Hz	1 % tolerance: $\leq \pm 0.5$ % 5 % tolerance: $\leq \pm 1$ %
Resistance to Solder Heat	AEC-Q200 Table 7.15	Solder dipping @ 270 °C ± 5 °C for 10 sec. ± 1 sec.	1 % tolerance: $\leq \pm 0.5$ % 5 % tolerance: $\leq \pm 1$ %
Thermal Shock	AEC-Q200 Table 7.16	-55 to 155 °C / dwell time 15 min / max transfer time 20 sec / 300 cycles	1 % tolerance: $\leq \pm 0.5$ % 5 % tolerance: $\leq \pm 1$ %
ESD	AEC-Q200-002	Test contact min. 1 KV	$\leq \pm 1$ %
Solderability	AEC-Q200 Table 7.18	a) Baking 155 °C 4 hrs.; dipping 235 °C, 5 sec b) Steam 8 hrs., dipping 215 °C 5 sec c) Steam 8 hrs., dipping 260 °C 7 sec	Over 95 % of termination must be covered with solder
Flammability	AEC-Q200 Table 7.20	UL-94 V-0 or V-1 are acceptable	Refer to UL-94
Board Flex	AEC-Q200 Table 7.21	Bending 2 mm (2512, 1210, 1206),	1 % tolerance: $\leq \pm 0.5$ % 5 % tolerance: $\leq \pm 1$ %
Terminal Strength	AEC-Q200 Table 7.22	Force 1.8 Kg for 60 sec	No mechanical damage
Short Term Overload	IEC 60115-1, 4.13	5X rated power for 5 sec	1 % tolerance: $\leq \pm 1$ % 5 % tolerance: $\leq \pm 2$ %

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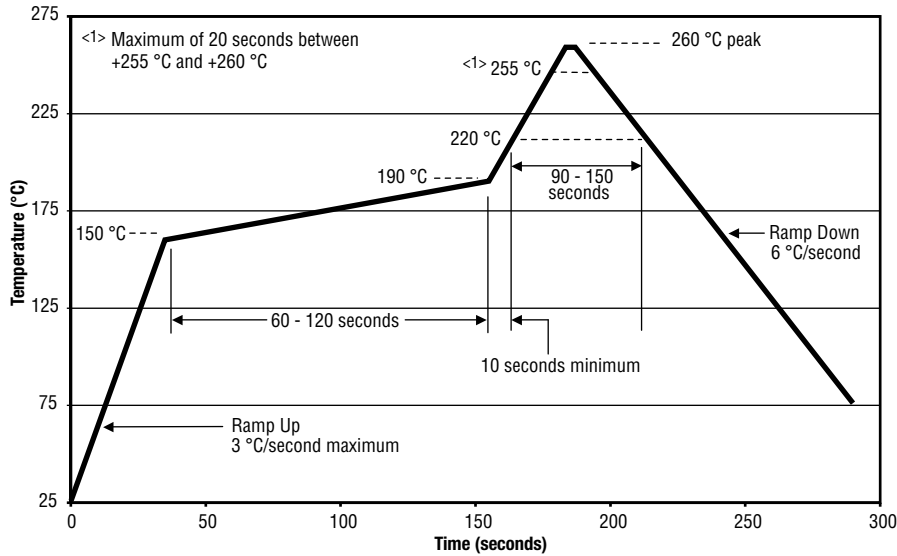
Users should verify actual device performance in their specific applications.

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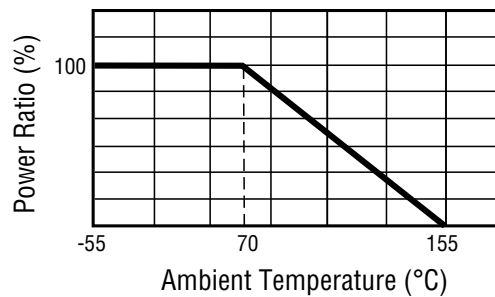
CRM-Q Automotive Grade High Power Chip Resistor



Soldering Profile



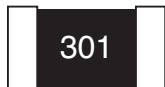
Derating Curve



Typical Part Marking

±5 % (E24):

CRM1206Q, CRM2010Q, CRM2512Q

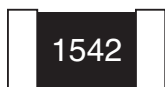


Resistance value is expressed by 3 digits. The first two digits represent the significant figures of the nominal resistance value in ohms; the third digit represents the exponent for a base of 10.

Example: **301** = $30 \times 10^1 = 300 \text{ ohms}$

±1 % (E24/E96):

CRM1206Q, CRM2010Q, CRM2512Q



Resistance value is expressed by 4 digits. The first three digits represent the significant figures of the nominal resistance value in ohms; the third digit represents the exponent for a base of 10.

Example: **1542** = $154 \times 10^2 = 15.4K \text{ ohms}$

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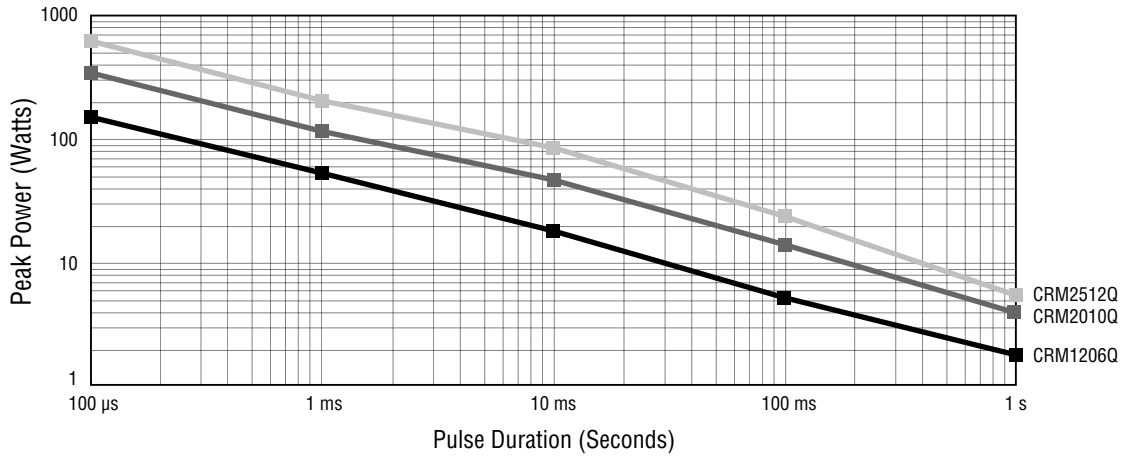
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CRM-Q Automotive Grade High Power Chip Resistor



Surge Performance



How to Order

CRM 1206 Q F X - 1002 E LF

Model _____
 CRM = High Power Surge Resistor

Size _____
 1206 = 1206 Size
 2010 = 2010 Size
 2512 = 2512 Size

Feature _____
 Q = AEC-Q200 Compliant

Resistance Tolerance _____
 F = $\pm 1\%$
 J = $\pm 5\%$

TCR (PPM/ $^{\circ}$ C - See Electrical Characteristics chart) _____
 X = ± 100
 W = ± 200

Resistance Value _____
1% Tolerance:
 <100 ohms "R" represents decimal point (example: 24R3 = 24.3 ohms)
 ≥ 100 ohms..... First three digits are significant, fourth digit represents number of zeros to follow (example: 8252 = 82.5K ohms)
5% Tolerance:
 <10 ohms "R" represents decimal point (example: 4R7 = 4.7 ohms)
 ≥ 10 ohms..... First two digits are significant, third digit represents number of zeros to follow (example: 474 = 470K ohms)

Packaging _____
 E = 5,000 pieces on 180 mm (7 inch) reel with paper tape - CRM1206Q
 4,000 pieces on 180 mm (7 inch) reel with plastic tape - CRM2010Q, CRM2512Q

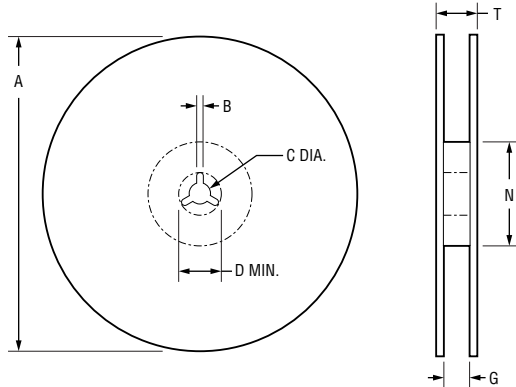
Termination _____
 LF = Tin-plated (RoHS Compliant)

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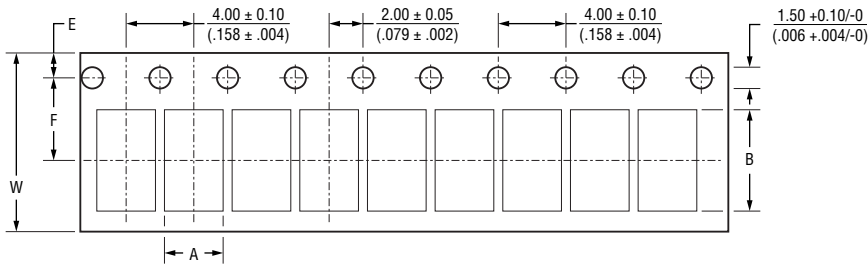
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Packaging Dimensions (Conforms to EIA RS-481A)



DIMENSIONS: $\frac{\text{MM}}{\text{(INCHES)}}$

Model	Packaging Qty.	A	N	C	D (min.)	B	G	T (max.)
CRM1206Q	5000 pcs./reel	$\frac{178 \pm 2.0}{(7.008 \pm .008)}$	$\frac{60 \pm 0.5}{(2.362 \pm .020)}$	$\frac{13.0 \pm 0.5}{(.512 \pm .020)}$	$\frac{20}{(.787)}$	$\frac{2.0 \pm 0.5}{(.079 \pm .020)}$	$\frac{10.0 \pm 1.5}{(.394 \pm .059)}$	$\frac{14.9}{(.587)}$
CRM2010Q	4000 pcs./reel	$\frac{178 \pm 2.0}{(7.008 \pm .008)}$	$\frac{60 \pm 0.5}{(2.362 \pm .020)}$	$\frac{13.0 \pm 0.5}{(.512 \pm .020)}$	$\frac{20}{(.787)}$	$\frac{2.0 \pm 0.5}{(.079 \pm .020)}$	$\frac{13.8 \pm 1.5}{(.543 \pm .059)}$	$\frac{16.7}{(.657)}$
CRM2512Q								



DIMENSIONS: $\frac{\text{MM}}{\text{(INCHES)}}$

Model	Tape Type	A	B	W	F	E
CRM1206Q	Paper	$\frac{2.00 \pm 0.20}{(.079 \pm .008)}$	$\frac{3.60 \pm 0.20}{(.142 \pm .008)}$	$\frac{8.00 \pm 0.30}{(.315 \pm .012)}$	$\frac{3.50 \pm 0.05}{(.138 \pm .002)}$	$\frac{1.75 \pm 0.10}{(.069 \pm .004)}$
CRM2010Q	Plastic	$\frac{2.80 \pm 0.20}{(.110 \pm .008)}$	$\frac{5.50 \pm 0.20}{(.217 \pm .008)}$	$\frac{12.0 \pm 0.30}{(.472 \pm .012)}$	$\frac{3.50 \pm 0.05}{(.138 \pm .002)}$	$\frac{1.75 \pm 0.10}{(.069 \pm .004)}$
CRM2512Q	Plastic	$\frac{3.50 \pm 0.20}{(.138 \pm .008)}$	$\frac{6.70 \pm 0.20}{(.264 \pm .008)}$	$\frac{12.0 \pm 0.30}{(.472 \pm .012)}$	$\frac{3.50 \pm 0.05}{(.138 \pm .002)}$	$\frac{1.75 \pm 0.10}{(.069 \pm .004)}$

REV. 09/23

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