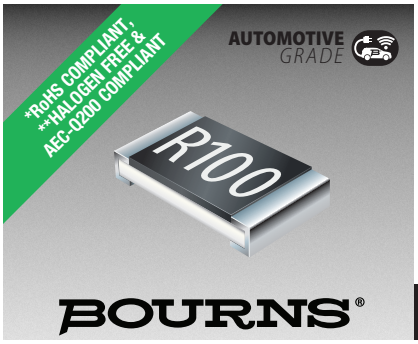


Features

- 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

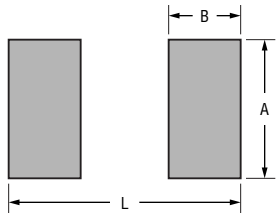
Additional Information

Click these links for more information:

PRODUCT SELECTOR | TECHNICAL LIBRARY | INVENTORY | SAMPLES | CONTACT

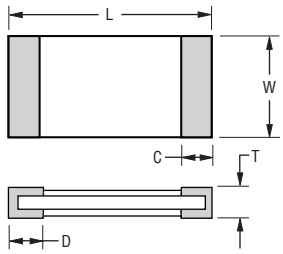
Recommended Solder Pad Layout

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



Product Dimensions

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



DIMENSIONS: MM (INCHES)

Asia-Pacific: Tel: +886-2 2562-4117 • Email: asiacus@bourns.com
EMEA: Tel: +36 88 885 877 • Email: eurocus@bourns.com
The Americas: Tel: +1-951 781-5500 • Email: americus@bourns.com
www.bourns.com

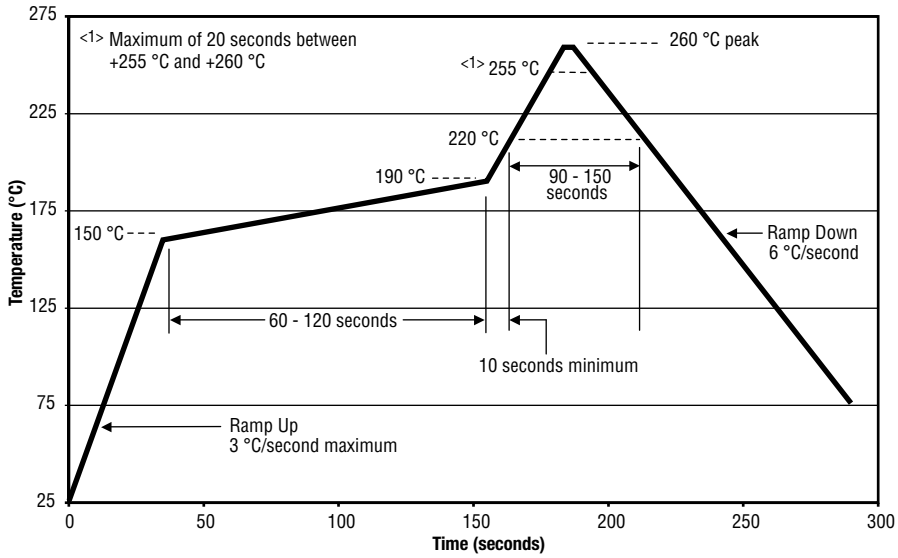
WARNING Cancer and Reproductive Harm - www.P65Warnings.ca.gov

* 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.

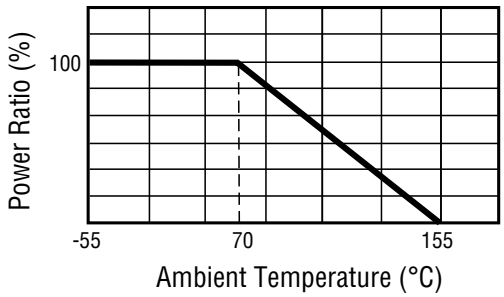
Performance Characteristics

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: ≤ ±1 % 5 % tolerance: ≤ ±3 %
Temperature Cycling	AEC-Q200 Table 7.4	1000 cycles (-55 °C to +125 °C);	1 % tolerance: ≤ ±0.5 % 5 % tolerance: ≤ ±1 %
Moisture Resistance	AEC-Q200 Table 7.6	65 °C / 80~100 % RH / 10 cycles;	1 % tolerance: ≤ ±0.5 % 5 % tolerance: ≤ ±1 %
Biased Humidity	AEC-Q200 Table 7.7	1000 hours 85 °C / 85 % RH, 10 % of operating power	1 % tolerance: ≤ ±1 % 5 % tolerance: ≤ ±3 %
Operational Life	AEC-Q200 Table 7.8	1000 hours @ 125 °C at specified rated power	1 % tolerance: ≤ ±1 % 5 % tolerance: ≤ ±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: ≤ ±0.5 % 5 % tolerance: ≤ ±1 %
Resistance to Solder Heat	AEC-Q200 Table 7.15	Solder dipping @ 270 °C ±5 °C for 10 sec. ±1 sec.	1 % tolerance: ≤ ±0.5 % 5 % tolerance: ≤ ±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: ≤ ±0.5 % 5 % tolerance: ≤ ±1 %
ESD	AEC-Q200-002	Test contact min. 1 KV	≤ ±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: ≤ ±0.5 % 5 % tolerance: ≤ ±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: ≤ ±1 % 5 % tolerance: ≤ ±2 %

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.

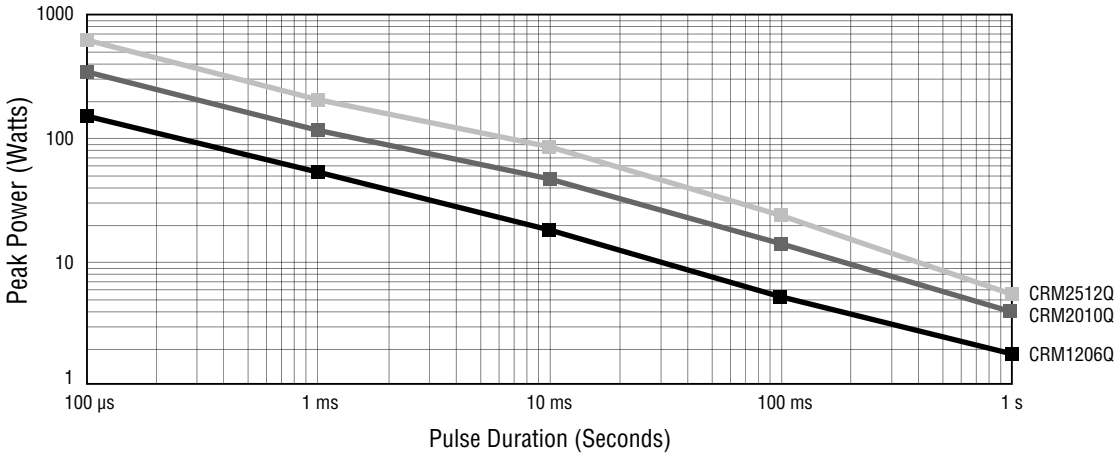
*Example: **301** = 30 x 10^1 = 300 ohms*

±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 x 10^2 = 15.4K ohms*

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 = ±1 %
J = ±5 %

TCR (PPM/°C - See Electrical Characteristics chart)
X = ±100
W = ±200

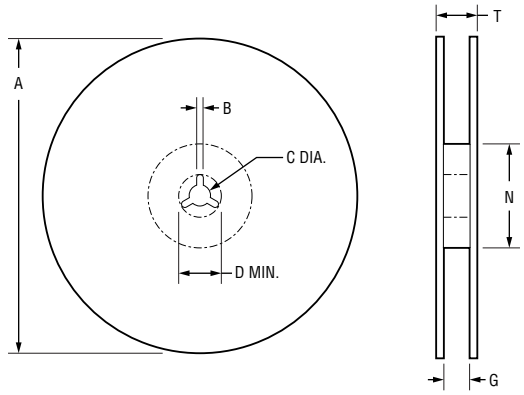
Resistance Value
1% Tolerance:
<100 ohms .....“R” represents decimal point (example: 24R3 = 24.3 ohms)
≥100 ohms.....First three digits are significant, fourth digit represents number of zeros to follow *(example: 8252 = 82.5K ohms)*

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

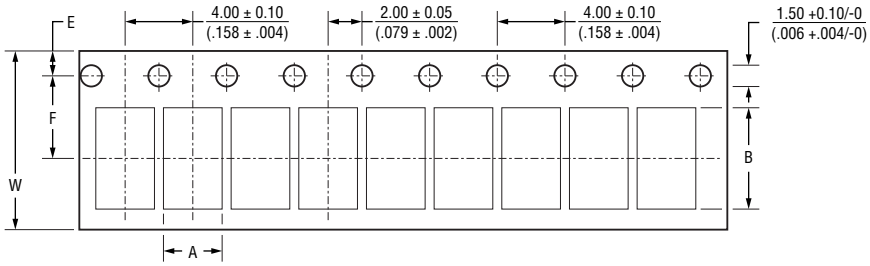
Termination
LF = Tin-plated (RoHS Compliant)

Packaging Dimensions (Conforms to EIA RS-481A)



DIMENSIONS: MM / (INCHES)

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



DIMENSIONS: MM / (INCHES)

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

Legal Disclaimer Notice

BOURNS®

This legal disclaimer applies to purchasers and users of Bourns® products manufactured by or on behalf of Bourns, Inc. and its affiliates (collectively, "Bourns").

Unless otherwise expressly indicated in writing, Bourns® products and data sheets relating thereto are subject to change without notice. Users should check for and obtain the latest relevant information and verify that such information is current and complete before placing orders for Bourns® products.

The characteristics and parameters of a Bourns® product set forth in its data sheet are based on laboratory conditions, and statements regarding the suitability of products for certain types of applications are based on Bourns' knowledge of typical requirements in generic applications. The characteristics and parameters of a Bourns® product in a user application may vary from the data sheet characteristics and parameters due to (i) the combination of the Bourns® product with other components in the user's application, or (ii) the environment of the user application itself. The characteristics and parameters of a Bourns® product also can and do vary in different applications and actual performance may vary over time. Users should always verify the actual performance of the Bourns® product in their specific devices and applications, and make their own independent judgments regarding the amount of additional test margin to design into their device or application to compensate for differences between laboratory and real world conditions.

Unless Bourns has explicitly designated an individual Bourns® product as meeting the requirements of a particular industry standard (e.g., ISO/TS 16949) or a particular qualification (e.g., UL listed or recognized), Bourns is not responsible for any failure of an individual Bourns® product to meet the requirements of such industry standard or particular qualification. Users of Bourns® products are responsible for ensuring compliance with safety-related requirements and standards applicable to their devices or applications.

Bourns® products are not recommended, authorized or intended for use in nuclear, lifesaving, life-critical or life-sustaining applications, nor in any other applications where failure or malfunction may result in personal injury, death, or severe property or environmental damage. Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any Bourns® products in such unauthorized applications might not be safe and thus is at the user's sole risk. Life-critical applications include devices identified by the U.S. Food and Drug Administration as Class III devices and generally equivalent classifications outside of the United States.

Bourns expressly identifies those Bourns® standard products that are suitable for use in automotive applications on such products' data sheets in the section entitled "Applications." Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any other Bourns® standard products in an automotive application might not be safe and thus is not recommended, authorized or intended and is at the user's sole risk. If Bourns expressly identifies a sub-category of automotive application in the data sheet for its standard products (such as infotainment or lighting), such identification means that Bourns has reviewed its standard product and has determined that if such Bourns® standard product is considered for potential use in automotive applications, it should only be used in such sub-category of automotive applications. Any reference to Bourns® standard product in the data sheet as compliant with the AEC-Q standard or "automotive grade" does not by itself mean that Bourns has approved such product for use in an automotive application.

Bourns® standard products are not tested to comply with United States Federal Aviation Administration standards generally or any other generally equivalent governmental organization standard applicable to products designed or manufactured for use in aircraft or space applications. Bourns expressly identifies Bourns® standard products that are suitable for use in aircraft or space applications on such products' data sheets in the section entitled "Applications." Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any other Bourns® standard product in an aircraft or space application might not be safe and thus is not recommended, authorized or intended and is at the user's sole risk.

The use and level of testing applicable to Bourns® custom products shall be negotiated on a case-by-case basis by Bourns and the user for which such Bourns® custom products are specially designed. Absent a written agreement between Bourns and the user regarding the use and level of such testing, the above provisions applicable to Bourns® standard products shall also apply to such Bourns® custom products.

Users shall not sell, transfer, export or re-export any Bourns® products or technology for use in activities which involve the design, development, production, use or stockpiling of nuclear, chemical or biological weapons or missiles, nor shall they use Bourns® products or technology in any facility which engages in activities relating to such devices. The foregoing restrictions apply to all uses and applications that violate national or international prohibitions, including embargos or international regulations. Further, Bourns® products and Bourns technology and technical data may not under any circumstance be exported or re-exported to countries subject to international sanctions or embargoes. Bourns® products may not, without prior authorization from Bourns and/or the U.S. Government, be resold, transferred, or re-exported to any party not eligible to receive U.S. commodities, software, and technical data.

To the maximum extent permitted by applicable law, Bourns disclaims (i) any and all liability for special, punitive, consequential, incidental or indirect damages or lost revenues or lost profits, and (ii) any and all implied warranties, including implied warranties of fitness for particular purpose, non-infringement and merchantability.

For your convenience, copies of this Legal Disclaimer Notice with German, Spanish, Japanese, Traditional Chinese and Simplified Chinese bilingual versions are available at:

Web Page: http://www.bourns.com/legal/disclaimers-terms-and-policies

PDF: http://www.bourns.com/docs/Legal/disclaimer.pdf