ISO-9001 Registered

METAL GLAZE™ CYLINDRICAL SM RESISTORS

CHP SERIES*
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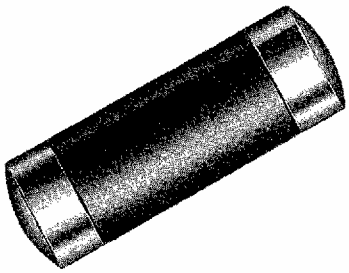
MRC SERIES*
- HIGH POWER DENSITY (pgs.8-9)
MCHP SERIES*
- HIGH RELIABILITY (pg.10)
CHPT SERIES*
- TEMPERATURE SENSITIVE (pgs.11-12)
ZCHP SERIES*
- ZEROHM JUMPERS (pg.13)



High power - up to 2 watts
Low resistance - down to 0.1 ohm at 1% tolerance
High resistance - up to 2.21 megohm
Precision - ±1% standard
Low TCR - ±100ppm/°C standard
High voltage - up to 1000 volts
Low inductance
Superior surge handling capability
-55°C to +150°C operating temperature

Military versions
Negative temperature coefficient version
Zerohm jumpers
Low-profile/minimum board real estate requirement
Superb solderability - wave and reflow
Established SPC & continuous improvement programs
Excellent service and quality record/proven reliability
High volume production capability

* Manufactured in the United States.

PRODUCT HISTORY:

The CHP Surface Mount Resistor Series is a member of the RG product family of precision Metal Glazed™ Resistors. The Metal Glaze technology, developed by IRC in 1960 to meet the stringent demands of the Military market, provides an unsurpassed combination of ruggedness, performance, and low cost. Since its development, IRC has supplied billions of units to meet the specific requirements not only of the Military, but also to all major users of resistive components requiring reliability, service, and quality at a reasonable price. Proven reliability of the Metal Glaze resistor family is supported by well over a billion unit hours of life testing with no failures.

The CHP Resistor was developed in 1980 by IRC to support the automotive move toward surface mount technology. The CHP uses the same highly reliable Metal Glaze technology and materials as its leaded counterpart. The termination and encapsulation have been modified to provide compatibility with surface mount technology. Since its development, the CHP has proven its reliability and service record by becoming a "World Class Product" supporting the surface mount needs of the Automotive, Computer, Instrumentation, Telecommunication, and other industrial electronics markets.

PRODUCT DESCRIPTION:

The CHP is a precision surface mount power resistor. Its cylindrical shape is composed of a Metal Glaze resistive element fired onto a ceramic core with capless solder terminations. The simplicity of design and construction provide a cost effective solution to common applications where reliability is a major concern, and also offer some unique features to surface mount technology:

The CHP uses a cylindrical high alumina ceramic for the core of the resistor. This substrate provides excellent thermal conductivity for maximum power dissipation in a minimum of board real estate. It also provides superb mechanical strength to easily withstand stresses presented during board assembly, mounting, and operation.

The Metal Glaze is composed of glass and metal particles which are fired onto the ceramic substrate at approximately 1000°C. This technology provides a resistive element that is impervious to environmental conditions without the need for an air-tight encapsulation. The inherent ruggedness of this glaze can absorb higher voltage surges and overloads than "thin-film" counterparts.

To terminate the CHP, an electroless nickel barrier is applied to the termination area. Solder is then applied by hot-solder dipping. This technique provides reliable electrical continuity through the termination without the use of end-caps or weld joints. Unlike the typical "MELF", there is no "dog-bone" shape resulting from end-caps to interfere with "pick and place" accuracy. The all solder termination is free of silver to provide superb solderability performance on both reflow and wave soldering processes.

CHP FAMILY STANDARD SIZES, SOLDER PADS AND PACKAGING:

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DIMENSIONS (Inches and (mm)):

Size Code	Industry Footprint	Actual Size	L	W	C
B	1206		0.128±0.007 (3.25±0.18)	0.057±0.006 (1.45±0.15)	0.020±0.010 (0.51±0.25)
C	1206		0.128±0.007 (3.25±0.18)	0.063±0.010 (1.60±0.25)	0.020±0.010 (0.51±0.25)
D	2010		0.200±0.010 (5.08±0.25)	0.079±0.006 (2.01±0.15)	0.030±0.010 (0.76±0.25)
F	2512		0.251±0.010 (6.38±0.25)	0.079±0.006 (2.01±0.15)	0.040±0.010 (1.02±0.25)
H	3610		0.367±0.010 (9.32±0.25)	0.105±0.006 (2.67±0.15)	0.050±0.010 (1.27±0.25)

RECOMMENDED SOLDER PAD DIMENSIONS (REFLOW):

To ensure excellent solderability performance, IRC recommends the following pad design. This design will provide a large repeatable solder fillet to the CHP resistor on reflow processes and will provide maximum heat transfer to the PC board in high power applications. By placing the CHP on the solder paste while the paste is in the "tacky" state, the CHP will be held in position until solder reflow begins. The pad design then uses the surface tension of the molten solder to pull the component to the center of the solder pad. The placement of a via rising above the board level directly beneath the CHP is not recommended.

Size Code	Industry Footprint	Dimensions (Inches and (mm))					
		A	B	C	D	E	F
B&C	1206	0.076 (1.93)	0.093 (2.36)	0.058 (1.47)	0.098 (2.49)	0.032 (0.81)	0.211 (5.36)
D	2010	0.111 (2.82)	0.126 (3.20)	0.096 (2.44)	0.152 (3.86)	0.040 (1.02)	0.318 (8.08)
F	2512	0.121 (3.07)	0.126 (3.20)	0.127 (3.23)	0.183 (4.65)	0.040 (1.02)	0.369 (9.37)
H	3610	0.170 (4.32)	0.160 (4.06)	0.213 (5.41)	0.273 (6.93)	0.044 (1.12)	0.553 (14.05)

STANDARD REEL PACKAGING PER EIA-481:

Size Code	Industry Footprint	Reel Diameter*	Quantity Per Reel	Carrier Tape Width	Component Pitch
B&C	1206	7"	2,500 max.	8mm	4mm
		13"	10,000 max.		
D	2010	7"	1,500 max.	12mm	4mm
		13"	5,000 max.		
F	2512	7"	1,500 max.	12mm	4mm
		13"	5,000 max.		
H	3610	13"	1,500 max.	24mm	12mm

* The 13" reel is considered standard and will be supplied unless otherwise specified.

METAL GLAZE™ HIGH POWER DENSITY SURFACE MOUNT POWER RESISTOR

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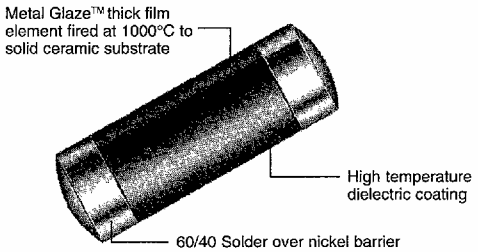

MRC SERIES

- 1/2 watt on 1206 footprint
- 0.1 ohm to 10,000 ohm range
- 150°C maximum operating temperature

MRC SPECIFICATIONS:

Size Code[1]	Industry Footprint	IRC Type	Maximum Power Rating	Working Voltage[2]	Maximum Voltage	Resistance Range (ohms)[3]	Tolerance (±%)[3]	TCR (ppm/°C)[3]	Product Category
C	1206	MRC 1/2	1/2W @ 70°C	200	400	0.1 to 0.99	1, 2, 5	100	Low Range
						1.0 to 10K	1, 2, 5	50, 100	Standard
						20 to 10K	0.25, 0.5	50, 100	Tight Tolerance

[1]. See page 5 for product dimensions, recommended solder pads, and standard packaging. [2] Not to exceed $\sqrt{PxR}$ [3]Consult factory for tighter TCR, tolerance, or resistance values.

MRC APPLICATIONS:

The MRC 1/2 will dissipate 1/2 watt at 70°C on a 1206 footprint. The MRC is recommended for applications where board real estate is a major concern. Due to the high power density and superior surge handling capability, it is also recommended as a direct replacement on existing board designs where a standard 1206 resistor is marginal or failing.

MRC PERFORMANCE CHARACTERISTICS:

Characteristics	Maximum Change	Test Method
Temperature Coefficient	As specified	MIL-R-55342E Par 4.7.9 (-55°C +125°C)
Thermal Shock	±0.5% +0.01 ohm	MIL-R-55342E Par 4.7.3 (-65°C +150°C, 5 cycles)
Low Temperature Operation	±0.25% +0.01 ohm	MIL-R-55342E Par 4.7.4 (-65°C @ working voltage)
Short Time Overload	±1.0% +0.01 ohm	MIL-R-55342E Par 4.7.5 2.5 x $\sqrt{PxR}$ for 5 seconds
High Temperature Exposure	±0.5% +0.01 ohm	MIL-R-55342E Par 4.7.6 (+150°C for 100 hours)
Resistance to Bonding Exposure	±0.25% 0.01 ohm	MIL-R-55342E Par 4.7.7 (Reflow soldered to board at 260°C for 10 seconds)
Solderability	95% minimum coverage	MIL-STD-202, Method 208 (245°C for 5 seconds)
Moisture Resistance	±0.5% +0.01 ohm	MIL-R-55342E Par 4.7.8 (10 cycles, total 240 hours)
Life Test	±1.0% +0.01 ohm	MIL-R-55342E Par 4.7.10 (2000 hour at 70°C intermittent)
Terminal Adhesion Strength	±1% +0.01 ohm no mechanical damage	1200 gram push from underside of mounted chip for 60 seconds
Resistance to Board Bending	±1% + 0.01 ohm no mechanical damage	Chip mounted in center of 90mm long board, deflected 5mm so as to exert pull on chip contacts for 10 seconds

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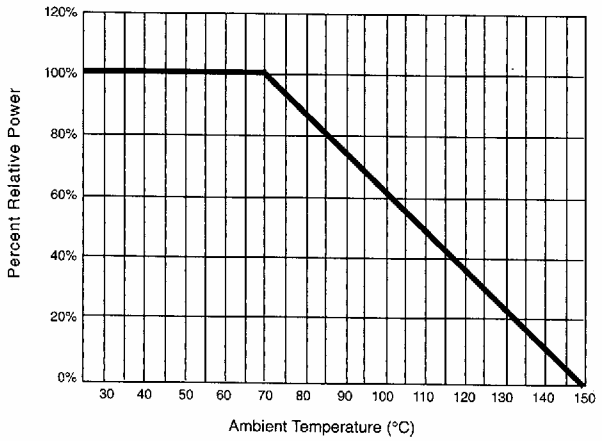
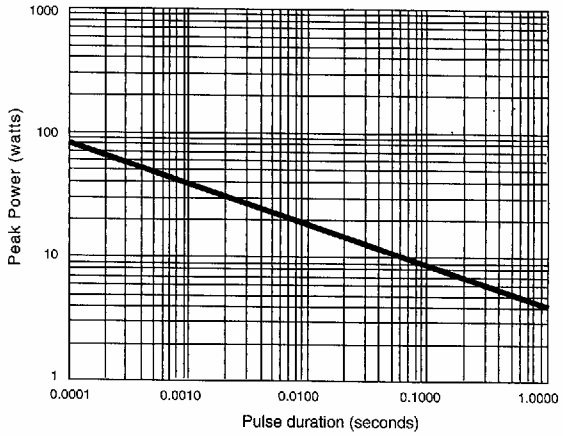
MRC POWER DERATING CURVE:



MRC PULSE CURVE:



HOW TO ORDER:

Sample Part No.

MRC1/2 - 100 - 1000 - F - 13

IRC Type
(MRC 1/2)

Temperature Coefficient
(50 or 100)

Resistance Value
(100 ohms and greater - First 3 significant figures plus 4th digit multiplier)
Example: 100 ohms = 1000, 1000 ohms = 1001, 150,000 ohms = 1503
(Less than 100 ohms - "R" is used to designate decimal)
Example: 51 ohms = 51R0, 1 ohm = 1R00, 0.25 ohm = R250

Tolerance
(C = 0.25%, D = 0.5%, F = 1.0%, G = 2.0%, J = 5.0%)

Packaging Code*
(BLK = Bulk, 7=7" Reel, 13=13" Reel)
*See page 5 for packaging details