

DATA SHEET

CURRENT SENSOR-LOW TCR

PR2010

5%,1%

RoHS Compliant



SCOPE

This specification describes PR2010 series current sensor – low TCR chip resistors with lead-free terminations made by metal substrate.

FEATURES

- Products with lead free terminations meet RoHS requirements.
- High component and equipment reliability
- Low thermal EMF(<1uV/°C).
- Ultra-low resistance and narrow tolerance can suitable for current detection.
- Low inductance 0.5nH to 5nH.

Product Applications

- Battery Pack,
- Inverter/ Converter (DC-DC/AC-DC/DC-AC)
- Consumer Electrics
- Laptop

ORDERING INFORMATION

Part number is identified by the series name, size, tolerance, packaging type, temperature coefficient of resistance, taping reel, resistance value and special packing quantity.

PR2010	<u>X</u>	<u>X</u>	<u>X</u>	<u>XX</u>	<u>XXXXX</u>	<u>Z</u>	MARKING
	(1)	(2)	(3)	(4)	(5)	(6)	PR2010

(1) TOLERANCE

J = ±5%
F = ±1%

(2) PACKAGING TYPE

K = Embossed taping reel

(3) TEMPERATURE COEFFICIENT OF RESISTANCE

E=±50ppm/°C

(4) TAPING REEL

07 = 7" dia. Reel & 0.5W
7W = 7" dia. Reel & 1W

(5) RESISTANCE VALUE

PR: 0R001~ 0R1
(1mΩ~100mΩ)

(6) Special Packaging Quantity

Z = 2,000 units/reel



Fig.1 Value=4mΩ

(4 digits, resistance greater or equal than 4mΩ)



Fig.2 Value=1mΩ

(4 digits, resistance below or equal than 3mΩ)

ORDERING EXAMPLE

The ordering code for a PR2010 0.5W chip resistor, value 0.015Ω with ±1% tolerance, supplied in 7-inch tape reel with 2Kpcs quantify is:
PR2010FKE070R015Z.

DIMENSION

Table 1

PR2010	1 mΩ~3 mΩ	4 mΩ~100 mΩ
L (mm)	5.10±0.25	5.10±0.25
W (mm)	2.54±0.25	2.54±0.25
H (mm)	0.80±0.25	0.64±0.25
l1 (mm)	1.30±0.25	0.80±0.25

For dimension see Table 1



Fig.3

CONSTRUCTION

The resistors are constructed in high grade materials. Internal metal electrodes are added at each end and connected by a resistive paste that is applied to the top surface of metal alloy. See fig. 3.

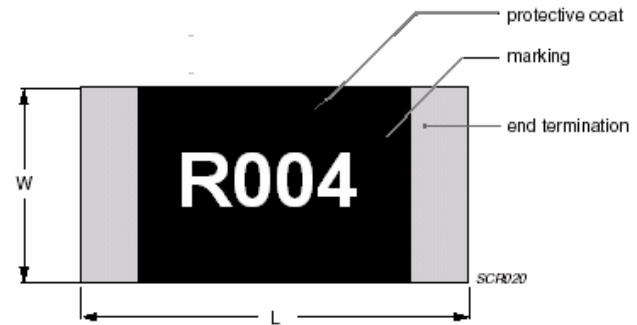
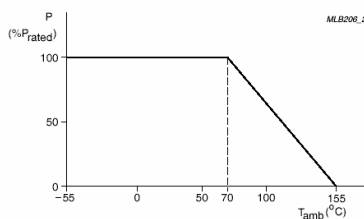


Fig.4 Chip resistor outlines

POWER RATING

PR2010 rated power at 70°C is 0.5W & 1W



Maximum dissipation (P) in percentage of rated power as a function of the operating ambient temperature (T_{amb})

RATED VOLTAGE:

The DC or AC (rms) continuous working voltage corresponding to the rated power is determined by the following formula:

$$U = \sqrt{(P * R)}$$

Where

U=Continuous rated DC
or AC (rms) working voltage

P=Rated power

R=Resistance value

ELECTRICAL CHARACTERISTICS

Table 2

CHARACTERISTICS	PR2010 0.5W & 1W
Operating Temperature Range	-55°C to +155°C
Maximum Working Voltage	$\sqrt{(P * R)}$
Resistance Range	1mΩ~100mΩ
Temperature Coefficient	±50ppm/°C

TAPING REEL

Table 3

DIMENSION	2010
Tape Width(mm)	12
ØA (mm)	178.0±1.0
ØN (mm)	60.0±0.5
ØC (mm)	13.50±0.5
ØD (mm)	17.70±0.5
W1 (mm)	13.0±0.5
W2 (mm)	16.2±0.5

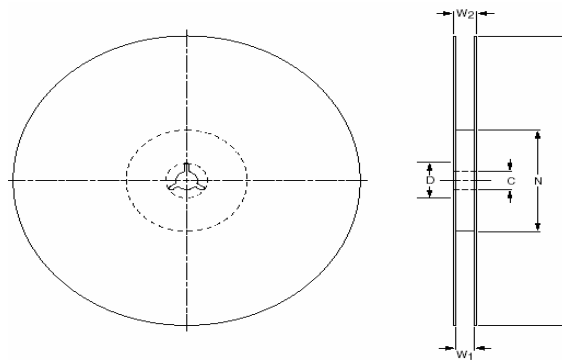


Fig.5 Reel

EMBOSSED TAPE SPECIFICATION

Table 4

DIMENSION	2010
A ₀ (mm)	2.90±0.10
B ₀ (mm)	5.45±0.10
W (mm)	12.00±0.15
E (mm)	1.75±0.10
F (mm)	5.50±0.10
P ₀ (mm)	4.00±0.10
P ₁ (mm)	4.00±0.10
P ₂ (mm)	2.00±0.10
D ₀ (mm)	1.50±0.05
D ₁ (mm)	1.50±0.10
T (mm)	1.10±0.10

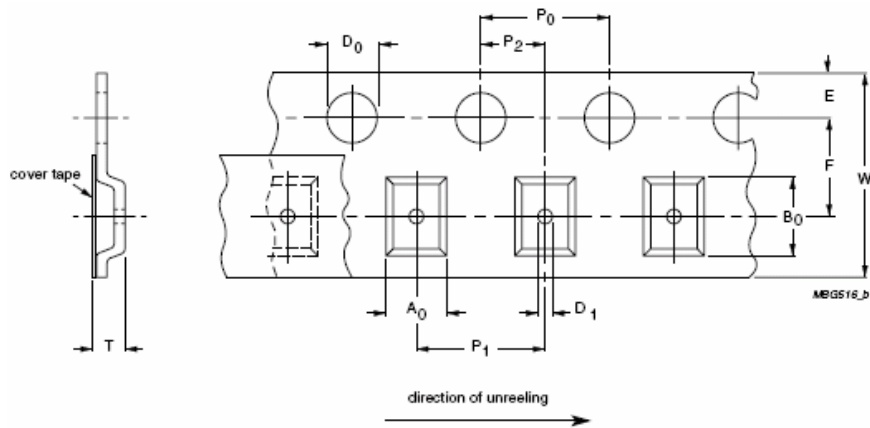


Fig.6 Embossed Dimensions

PACKING STYLE AND PACKAGING QUANTITY

PACKING STYLE	REEL DIMENSION	2010
Embossed Taping Reel	7" (178 mm)	2,000 Units

TESTS AND REQUIREMENTS

TEST	TEST METHOD	PROCEDURE	REQUIREMENT
T.C.R	IEC 60115-1 4.8	At +25/+125 °C Formula: $T.C.R = \frac{R2-R1}{R1(t2-t1)} \times 10^6 \text{ (ppm/°C)}$ Where t1=+25 °C or specified room temperature t2=+125 °C test temperature R1=resistance at room temperature in ohms R2=resistance at test temperature in ohms	Refer to table 2
Life/Endurance	IEC 60115-1 4.25.1	1,000 hours at 70±5 °C applied RCWV 1.5 hours on, 0.5 hour off, still air required	±(1%+0.0005 Ω)
High Temperature Exposure/ Endurance at upper category temperature	IEC 60068-2-2	1,000 hours at maximum operating temperature depending on specification, un-powered No direct impingement of forced air to the parts Tolerances: 155±3 °C	±(1%+0.0005 Ω)
Moisture Resistance	MIL-STD-202 Method 106G	Mil-STD-202, Method 106,0% power,7a and 7b not required, t=24h/cycle,10 cycles, Unpowered.	±(0.5%+0.0005 Ω)
Short time overload	IEC 60115-1 4.13	4 times RCWV, rating power 5 secs	±(0.5%+0.0005 Ω)
Board Flex/ Bending	IEC 60068-2-21	Device mounted on PCB test board as described, only 1 board bending required 2 mm bending Bending time: 60±1 seconds Ohmic value checked during bending	±(1%+0.0005 Ω)
Solder-ability - Wetting	IPC/JEDEC J-STD-002B test B	Electrical Test not required Magnification 50X SMD conditions: 1st step: Method B, aging 4 hours at 155 °C dry heat 2nd step: leadfree solder bath at 245±3 °C Dipping time: 3±0.5 seconds	Well tinned (≥95% covered) No visible damage
- Resistance to Soldering Heat	IEC 60068-2-58	Condition B, no pre-heat of samples Leadfree solder, 260±5 °C, 10±1seconds immersion time Procedure 2 for SMD: devices fluxed and cleaned with isopropanol	±(0.5%+0.0005 Ω) No visible damage
Bias Humidity	JIS C5202-7.9	±85 °C,85% RH,10% Bias, Extended Life Test: 1,000 hours, 1.5 hours On, 0.5 hours Off	±(0.5%+0.0005 Ω)

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 0	2009-03-11		- First issue of this specification
Version 1	2010-02-22		- Marking Rule Defined