

# 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>	<b>MARKING</b>
	(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

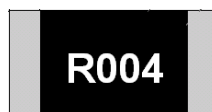


Fig.1 Value=4mΩ

( 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.

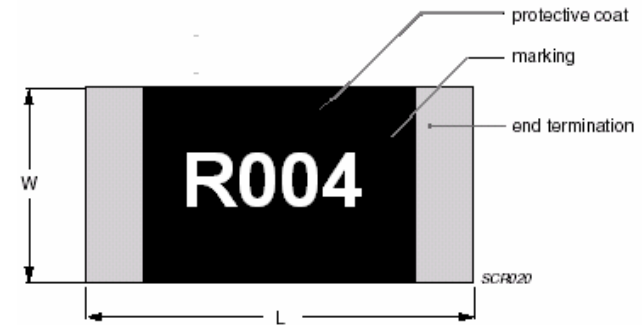
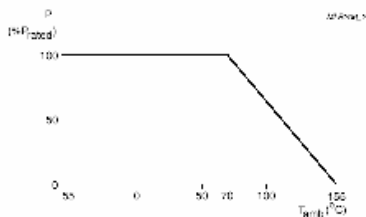


Fig.4 Chip resistor outlines

**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<sub>amb</sub>)

**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	1 mΩ~100mΩ
Temperature Coefficient	±50ppm/°C

**TAPING REEL**

Table 3

DIMENSION	2010
Tape Width(mm)	8
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

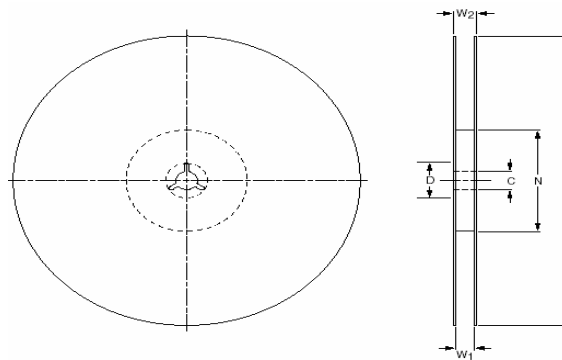


Fig.5 Reel

**EMBOSSED TAPE SPECIFICATION**

Table 4

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

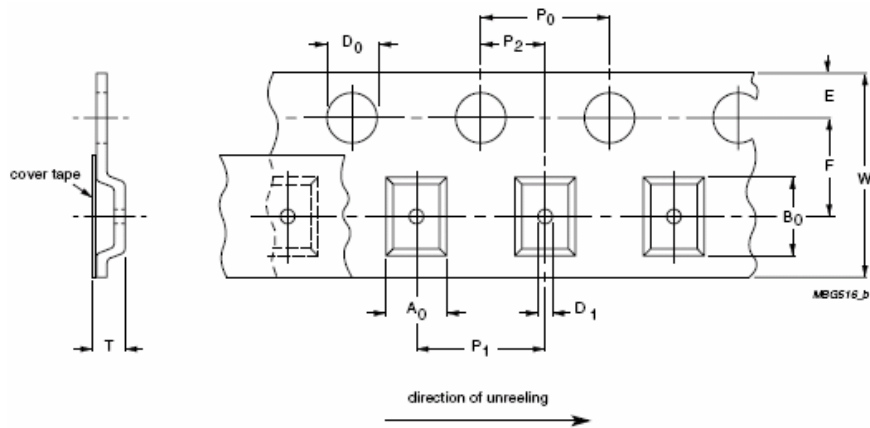


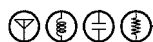
Fig.6 Embossed Dimensions

**PACKING STYLE AND PACKAGING QUATITY**

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