

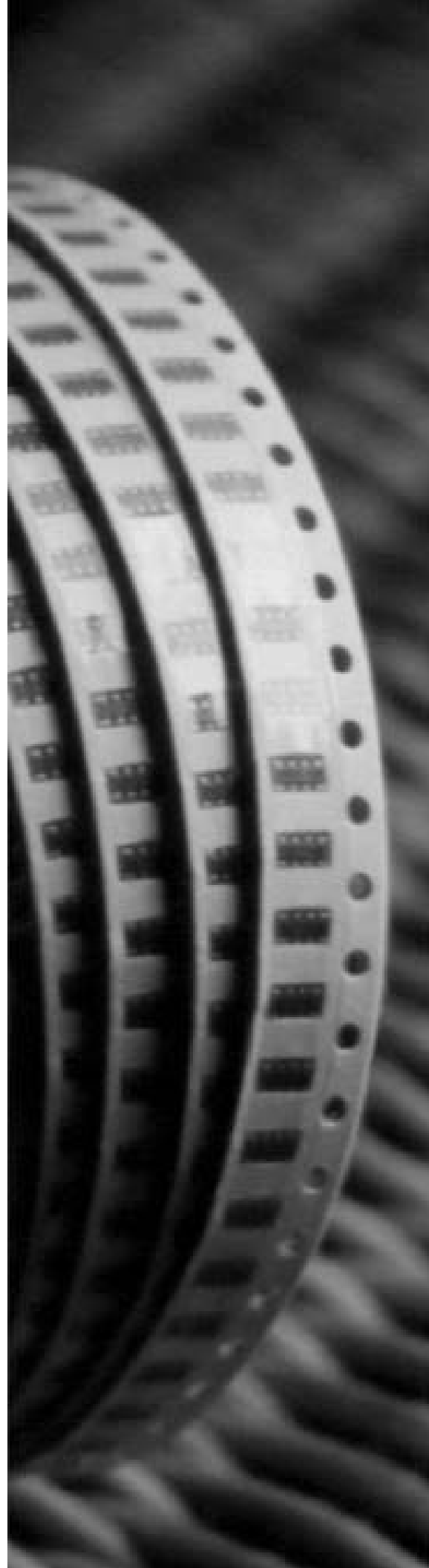
DATA SHEET

CURRENT SENSING METAL FOIL CHIP RESISTORS

PF2512 (Pb Free)

5%, 1%

1 W



SCOPE

This specification describes PF2512 9mΩ to 200mΩ current sensing metal foil chip resistor with lead-free terminations.

ORDERING INFORMATION

Part number is identified by the series, size, tolerance, packing style, temperature coefficient, special type and resistance value.

PF2512 **X** **X** **X** **XX** **XXXX** **L**
(1) (2) (3) (4) (5) (6)

(1) TOLERANCE

F = ±1%

J = ±5%

(2) PACKAGING TYPE

K = Embossed tapping reel

(3) TEMPERATURE CHARACTERISTIC OF RESISTANCE

F = ±100 ppm/°C

(4) SPECIAL TYPE

07 = 7 inch dia. Reel

(5) RESISTANCE VALUE

0R009 to 0R200

(6) RESISTOR TERMINATIONS

L = Lead free terminations (pure Tin)

MARKING

PF2512



Fig. 1 Value = 20 mΩ

The R is used as decimal point; the other 3 digits are significant.

CONSTRUCTION

The resistors are constructed by using an alloy-metal body. With outstanding TCR level which make Yageo PF2512 current sensing metal foil resistors excellent for current sensing application in battery charger circuit & DC-DC converter.

The resistive layer is covered with a protective coating and printed with the resistance value. Finally, the two external end terminations are added. For ease of soldering the outer layer of these end terminations is lead-free. See fig. 2

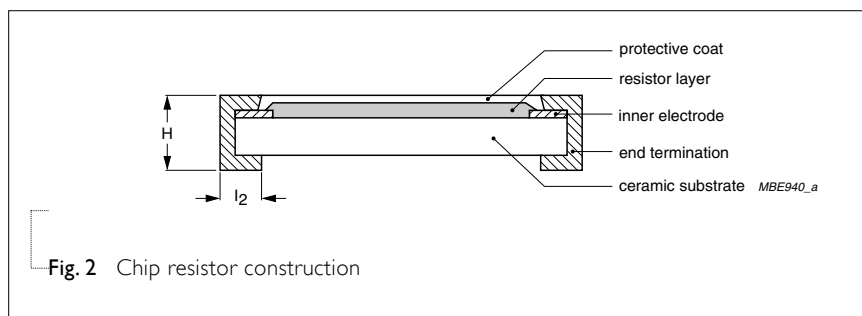
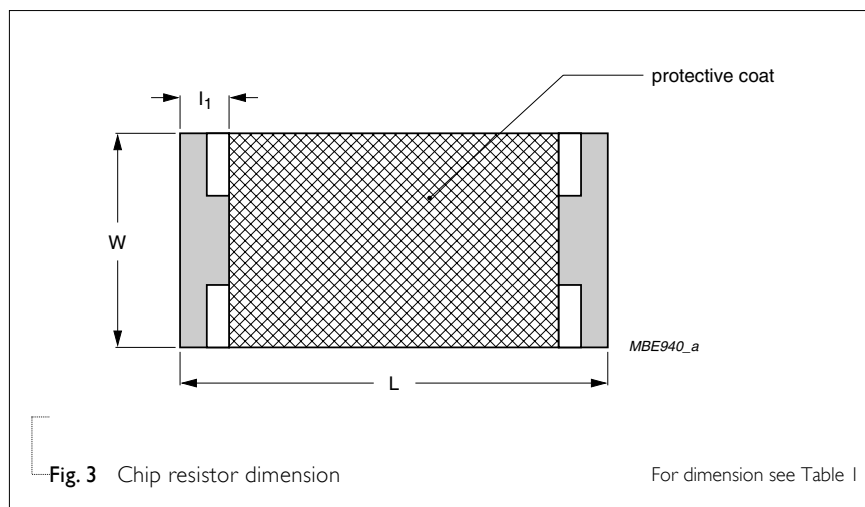


Fig. 2 Chip resistor construction

DIMENSION

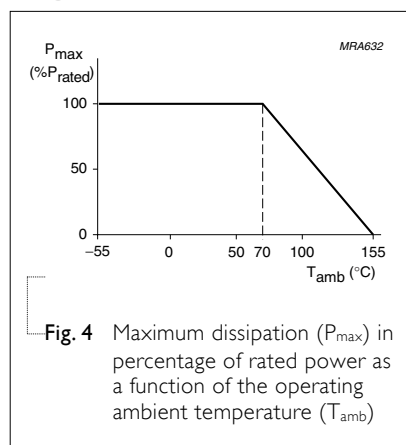
Table I

TYPE	PF2512
L (mm)	6.50±0.25
W (mm)	3.15±0.25
H (mm)	0.60±0.25
l ₁ (mm)	1.00±0.25
l ₂ (mm)	1.00±0.25



POWER RATING

**RATED POWER AT 70°C,
PF2512 1W**



ELECTRICAL CHARACTERISTICS

Table 2

CHARACTERISTICS	PF2512 1W
Operating Temperature Range	-55 °C to +155 °C
Resistance Range	9 mΩ to 200 mΩ (E24)
Temperature Coefficient	±100 ppm/°C

RATED VOLTAGE:

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

$$V = \sqrt{P \times R}$$

Where

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

P=Rated power (W)

R=Resistance value (Ω)

MOUNTING

Due to their rectangular shape and small dimensional tolerances, surface-mounted resistors are suitable for handling by automatic placement systems.

Chip placement can be on ceramic substrates and printed-circuit boards (PCBs). Electrical connection to the circuit is by means of wave, vapor phase, or infrared soldering. The end termination guarantee a reliable contact and the protective coating enables "face down" mounting.

The robust construction of the device allows it to be completely immersed in a solder bath of 260°C for one minute. Therefore, it is possible to mount Surface Mountable Resistor on one side of a printed-circuit board and other discrete components on the reverse (mixed prints).

For dimension see Table 3

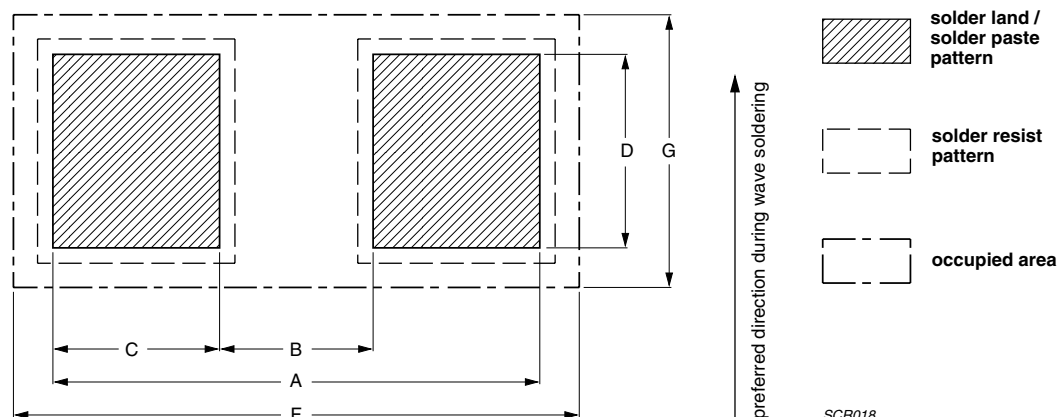


Fig. 5 Recommended footprint dimensions

FOOTPRINT DIMENSIONS

Table 3 Reflow soldering; for dimension see also Fig. 5

DIMENSION	PF2512
Footprint Dimensions	
A (mm)	8.0
B (mm)	4.4
C (mm)	1.8
D (mm)	3.0
F (mm)	7.25
G (mm)	3.85
Placement Accuracy (mm)	±0.25

TESTS AND REQUIREMENTS**Table 4** Test condition, procedure and requirements

TEST	PROCEDURE		REQUIREMENTS
Temperature Coefficient of Resistance (T.C.R.)	At +25/–55 °C and +25/+155 °C	Formula	Refer to table 2
		$T.C.R.= \frac{R_2-R_1}{R_1(t_2-t_1)} \times 10^6 \text{ (ppm/}^\circ\text{C)}$	
		Where	
		t ₁ =+25 °C or specified room temperature	
		t ₂ =–55 °C or +155 °C test temperature	
		R ₁ =resistance at reference temperature in ohms	
		R ₂ =resistance at test temperature in ohms	
Thermal Shock	At –65 (+0/–10) °C for 2 minutes and at +155 (+10/–0) °C for 2 minutes; 25 cycles		±(0.5%+0.05 Ω) for 1% tol. ±(1.0%+0.05 Ω) for 5% tol.
Low Temperature Operation	At –65 (+0/–5) °C for 1 hour; RCWV applied for 45 (+5/–0) minutes		±(0.5%+0.05 Ω) for 1% tol. . ±(1.0%+0.05 Ω) for 5% tol. No visible damage
Short Time Overload	2.5 × RCWV applied for 5 seconds at room temperature		±(1.0%+0.05 Ω) for 1% tol. ±(2.0%+0.05 Ω) for 5% tol. No visible damage
Insulation Resistance	RCOV for 1 minute	Type	PF2512
		Voltage (DC)	400 V
Dielectric Withstand Voltage	Maximum voltage (Vrms) applied for 1 minute	Type	PF2512
		Voltage (AC)	400 Vrms
Resistance to Soldering Heat	Unmounted chips; 260 ±5 °C for 10 ±1 seconds		±(0.5%+0.05 Ω) for 1% tol. ±(1.0%+0.05 Ω) for 5% tol. No visible damage
Life	At 70±2 °C for 1,000 hours; RCWV applied for 1.5 hours on and 0.5 hour off		±(1%+0.05 Ω) for 1% tol. ±(3%+0.05 Ω) for 5% tol.
Solderability	Solder bath at 245±3 °C Dipping time: 2±0.5 seconds		Well tinned (≥95% covered) No visible damage

TEST	PROCEDURE	REQUIREMENTS
Bending Strength	Resistors mounted on a 90 mm glass epoxy resin PCB (FR4) Bending: 2 mm	$\pm(1.0\%+0.05\ \Omega)$ for 1% tol. $\pm(1.0\%+0.05\ \Omega)$ for 5% tol. No visible damage
Resistance to Solvent	Isopropylalcohol (C_3H_7OH) or dichloromethane (CH_2Cl_2) followed by brushing	No smeared
Humidity (steady state)	1,000 hours; $40\pm 2\ ^\circ C$; $93(+2/-3)\%$ RH RCWV applied for 1.5 hours on and 0.5 hour off	$\pm(0.5\%+0.05\ \Omega)$ for 1% tol. $\pm(2.0\%+0.05\ \Omega)$ for 5% tol.
Leaching	Solder bath at $260\pm 5\ ^\circ C$ Dipping time: 30 ± 1 seconds	No visible damage
Intermittent Overload	At room temperature; $2.5 \times$ RCWV applied for 1 second on and 25 seconds off; total 10,000 cycles	$\pm(1.0\%+0.05\ \Omega)$ for 1% tol. $\pm(2.0\%+0.05\ \Omega)$ for 5% tol.
Moisture Resistance	42 cycles; total 1,000 hours Shown as Fig. 6	$\pm(0.5\%+0.05\ \Omega)$ for 1% tol. $\pm(2.0\%+0.05\ \Omega)$ for 5% tol. No visible damage

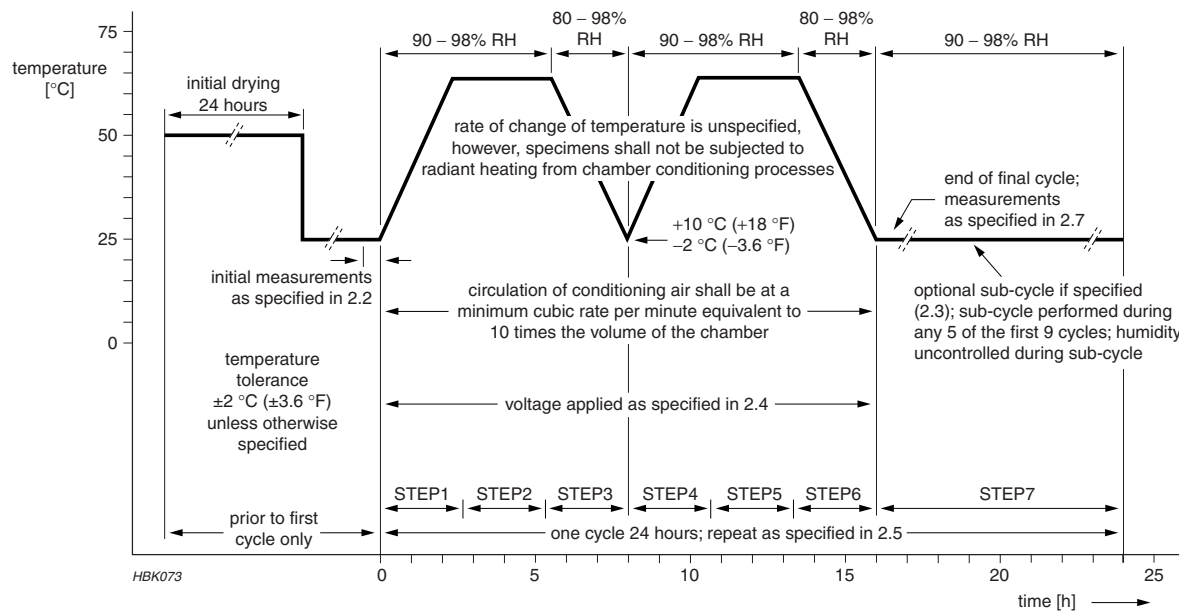


Fig. 6 Moisture resistance test requirements.

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 0	Jun 03, 2004	-	- First issue of this specification
Version 1	Jun 11, 2004	-	- Product series renamed "Current sensing"
Version 2	Jul 07, 2004	-	- Product series renamed "Current sensing metal foil"