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DIRECT

Electronics Tech.

(SMEF)

Power Metal Film Chip Resistors

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▶ Product Introduction

Direct advanced power metal film sputtering technology meets stability and high-precision requirements.

Features :

- Automatic surface mount special design. Lower assembly costs.
- Excellent electrical stability and mechanical strength.
- Flameproof UL94V0 Resin molded package.
- Heat resistant, moisture resistant, insulated.

Applications :

- Consumer electronics, computers.
- Telecommunications, control equipment and so on.

In the metal layer to achieve a homogenous crystalline structure, Direct Electronics' surface mount power type metal film package resistor (SMF) benefits from the key advantages of today's sputtering technology for the tight control of metal film thickness.

By photolithography, the same length and width of the resistive element can be controlled by the same precision and accuracy as the thickness of the sputtered metal film layer.

Surface Mounted Power Metal Film Resistors (SMF) have good accuracy tolerances, good stability and low TCR characteristics. In addition, due to the low voltage coefficient, the resistor has low noise characteristics and high linearity. Thus, in important circuits, (SMF) power chip resistors are commonly used in active filters or bridge circuits.

Direct (SMF) power-type metal film molded resistors provide three power, 2W, 3W, and 5W. Resistance range of $10\Omega \sim 2M\Omega$, and the maximum working voltage up to 500V. The tolerance accuracy has two options $\pm 1\%$ (F), and $\pm 5\%$ (J) with temperature coefficient of $\pm 100\text{ppm}/^\circ\text{C}$.

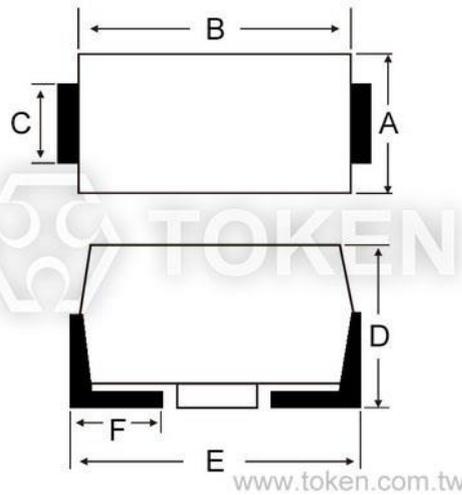
(SMF) series are available in tapes, RoHS compliant and 100% lead free. For conventional parameters, specifications outside the parameters, or technical requirements, please contact Direct. Detailed specifications, both mechanical and electrical, please contact us with your specific needs, or link to Direct official website "[Chip Resistors](#)" to get more information.



► **Construction & Dimensions**

Construction & Dimensions (Unit: mm) (SMF)

Rated Wattage	A ±0.3	B ±0.3	C ±0.3	D ±0.3	E Max.	F ±0.3	Resistance Range (Ω)	Max. Working Voltage (V)
2W	4.0	6.7	1.4	3.55	7.9	1.5	10 ~ 2M	300
3W	5.5	10.5	1.7	5.0	12	2.3	10 ~ 2M	500
5W	7.3	13.5	1.7	6.8	17	2.5	10 ~ 2M	500



Surface Mounted Power Metal Film Resistor Dimensions (SMF)

Note:

- Rated Continuous Working Voltage (RCWV) = $\sqrt{P \times R}$, or Max. Operating Voltage listed in above table whichever is lower.
- Resistance or specifications outside the parameters can be on request.



► **Electrical Spec.**

Electrical And Mechanical Performance (SMF)

Characteristics	Standards	Test Methods
Resistance Tolerance	±5% (J) or ±1% (F)	-
TCR	±100ppm/°C	-55°C ~ 200°C
Power Rating Load	Surface temp. 275°C Max.	Rated voltage for 30 minutes
Short Time Overload	±(1% + 0.05Ω)	5 times rated power with applied voltage not to exceed 2 times maximum continuous operating voltage for 5 seconds.
Dielectric Withstanding Voltage	No evidence of mechanical damage or insulation breakdown.	AC 500V for 1 minutes
Insulation Resistance	10,000MΩ	DC 500V megger
Solder-ability	Minimum 95% coverage	235 ± 5°C for 2 seconds
Resistance to Soldering Heat	No evidence of mechanical damage. ±(1% + 0.05Ω)	270 ± 5°C for 10±1 seconds

Environmental Characteristics (SMF)

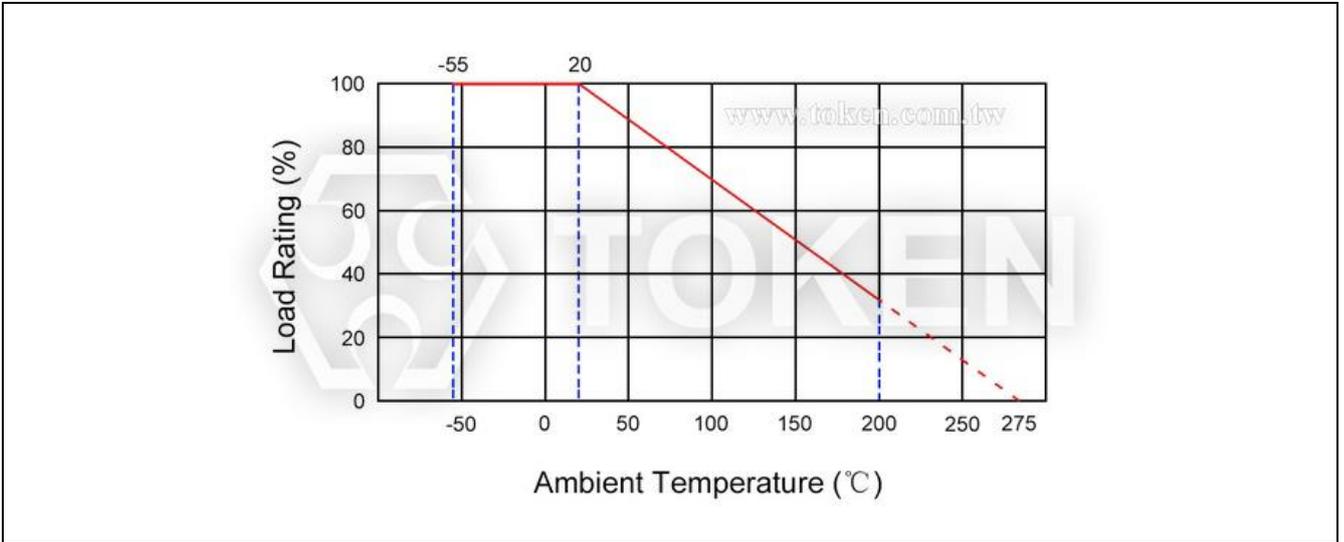
Characteristics	Standards	Test Methods
Temp. Cycle	±(1% + 0.05Ω)	-55°C (30min.) → Room Temp. (3min.) → +200°C (30min.) → Room Temp. (3min.)/(5cycles)
Load Life	±(1% + 0.05Ω)	Rated power load 90 minutes ON 30 minutes OFF 70°C 1000 hours
Moisture-proof Load Life	±(1% + 0.05Ω)	Rated power load 90 minutes ON 30 minutes OFF 40°C 95% RH 500 hours



Graph

Derating Curve (SMF)

For resistors operated in ambient temperatures above 20°C, power rating must be derated in accordance with the curve below.



Surface Temperature Rise (SMF)



► **Order Codes**

Order Codes (SMF)

SMF	2W	10Ω		J	
Part Number	Rated Wattage (W)	Resistance (Ω)		Tolerance (%)	
SMF	2W	10	10Ω	F	±1.00%
	3W	1K1	1.1KΩ	J	±5.00%
	5W	110K	110KΩ		
		1M1	1.1MΩ		

► **General Information**

Direct Thin Film Chips Add Powerful New Options

Direct electronics provides the industry’s most comprehensive range of precision thin film technologies for discrete, network, and integrated passive components used in instrumentation; automotive electronics; communications systems; and portable electronics applications. Ultra-reliable precision Nichrome resistive elements are available on ceramic or silicon substrates in a wide variety of surface mount resistors.

In response to market demands for increased precision and stability, Direct has expanded range of nichrome thin-film chip resistors. Offering solutions to precision test and measurement and voltage regulation across industrial, military and medical monitoring equipment markets designed to offer superior humidity performance.

Direct Thick Film Chips Cut the Cost of Precision Resistors

Direct electronics has developed an extensive range of thick film / thin film resistive technologies for electronic circuits in power supplies; test and measurement; industrial electronics; telecommunications; audio circuits; automotive control systems; lighting controls; medical electronics; industrial equipment; and control systems applications.

In addition to this, proven thick film technologies from Direct electronics provide a large range of standard resistive low Ohmic current sense products for critical battery management, and line termination. The enhanced performance of the chips is made possible by the precise use of the best resistance inks and a closely controlled production process.

Direct Chip Low Ohmic Resistors come in Smaller Sizes and Minimized Power Consumption

Today’s electronic devices are becoming smaller and smaller. As a result, designers are moving more towards surface mount components not only for new designs but also to design out large axial and other through-hole resistors.

In most cases this is a straight forward task as several resistor manufacturers offer chip resistors with performances to match axial parts. However in some cases, due to power rating or pulse withstanding requirements, this has been impossible. The requirement, in particular, for pulse withstand capability is growing due to the need to protect sensitive modern electronic systems. To meet this demand Direct electronics have designed a Pulse Withstanding Chip Resistor (PWR Series).

