SINLOON®

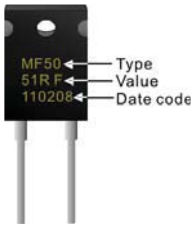
TO-220 封裝功率電阻

Power Range: 18W, 20W, 30W, 50W.

TYPE : MF Series

TO-220 Power Resistor

Mayloon Products Power Resistor MF series resistors satisfy demanding applications for accurate and stable power resistors housed in the convenient TO-220 case. The resistance element is Isolated from the mounting tab by an alumina ceramic layer, providing very low thermal resistance and ensuring high insulation resistance between terminals and tab.
The non-inductive design makes these products especially useful in high frequency and high speed pulse applications.



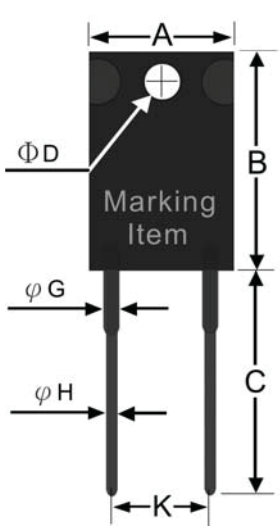
☐ **ORDERING PROCEDURE:**

Example: MF18JE10R0P

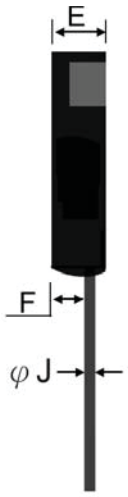
Type	Power	Part No.	Tol.	T.C.R/℃	Resistance	Package
TO220	18W	MF18	K = ±10%	E = ±50ppm	R100=0.1Ω	TB = T/Box.
TO220	20W	MF20	J = ±5%	F = ±100ppm	1R00=1Ω	B = Plastic Bulk
TO220	30W	MF30	F = ±1%	G = ±150ppm	10R0=10Ω	P=Plastic Fistulous
TO220	50W	MF50		H = ±200ppm	100R0=100Ω	

☐ **DIMENSION:**

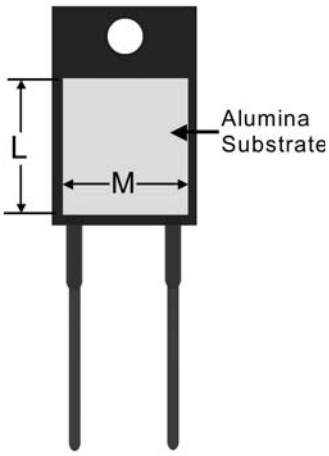
Dim	inch	mm
A	0.409	10.4±0.5
B	0.64	16.26±0.5
C	0.525	13.35±0.5
ΦD	0.125	3.18±0.26
E	0.128	3.25±0.26
φF	0.072	1.85±0.33
φG	0.048	1.24±0.20
φH	0.0275	0.68±0.02
φJ	0.0195	0.50±0.10
K	0.1935	4.91±0.20
L	0.374	9.50±0.20
M	0.321	8.15±0.20



Front side

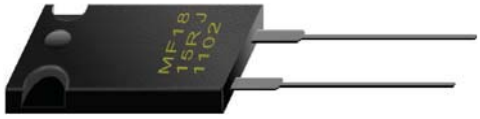


Side view



The back side

☐ Product Figure:



Plant Front Side

Plant Back Side

☐ 特點:

TO-220 MF 系列 封裝, 不使用金屬法藍底板,而是直接進行模壓包封,使得陶瓷基板的有效面積(及相應電阻膜層的有效面積)增大,從而使得電阻具有較強的脈衝電負荷性能。MF 系列採取了陶瓷基片直接裸露的結構,並配合使用專用L型錳鋼散熱片,改善其散熱性能,當在電阻本體溫度升高時能保持它有較佳的額定功率及有極佳的脈衝電負荷性能。

TO-220 MF 系列 封裝, 使用M3螺絲安裝,配合專用彈簧片,克服模壓電阻本體機械強度不够的弱點,使固定螺絲壓力直接作用於電阻本體的中心,增強了電阻的熱傳導性。產品規格無電感制成。

RoHS Compliant
品質承諾標誌
QUALITY COMMITMENT

SINLOON®

TO-220 封裝功率電阻

Power Range: 18W, 20W, 30W, 50W.

TYPE : MF Series

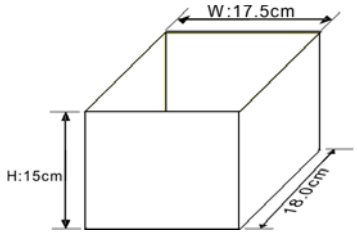
TO-220 Power Resistor

☐ Package

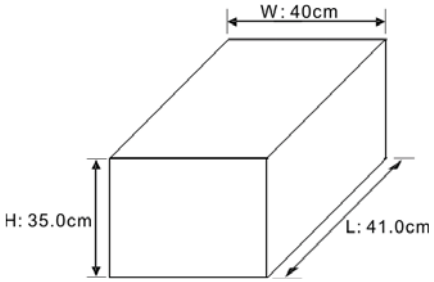
Type:		Power	In Box	Weight	Carton	Weight
TO-220	MF18	18W	700 pcs	0.95 Kgs	5.6K pcs	5.5Kgs
TO-220	MF20	20W	700 pcs	0.95 Kgs	5.6K pcs	5.5Kgs
TO-220	MF30	30W	700 pcs	0.95 Kgs	5.6K pcs	5.5Kgs
TO-220	MF50	50W	1000 pcs	1.4 Kgs	8.0K pcs	11.5Kgs

☐ Dimension

Inner Box Size:



Carton Size:



※ Other requirements not specified in the specifications sent by e-mail inquiries welcome。
※美隆電子產品規格特性參數的改變或更新,將不會另行通知。
※Mayloon characteristic parameters of electronic product specification changes or updates without prior notice。

RoHS Compliant
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QUALITY COMMITMENT

SINLOON®

TO-220 封裝功率電阻 TYPE : MF18 (18W)

Resistance Range: 0.05R ~ 1MΩ TO-220 Power Resistor

☐ Features:

- ◆ Low inductance
- ◆ Available in 18W ≦25℃
- ◆ TO-220 Style Power Package
- ◆ Single Screw Mounting to Heat Sink.
- ◆ High stability film resistance elements
- ◆ Molded Case for Protection and Easy to Mount.
- ◆ Without a heat sink , when in free air at 25℃.

The MF18 is rated for 3W.

Figure:

☐ Applications:

- ◆ UPS
- ◆ Snubber Circuits.
- ◆ Voltage Regulation.
- ◆ Low Energy Pulse Loading.
- ◆ Gate Resistors in Power Supplies.
- ◆ Terminal Resistance in RF Power Amplifiers.
- ◆ Load and Dumping Resistors in CRT Monitors.

☐ Electrical Data

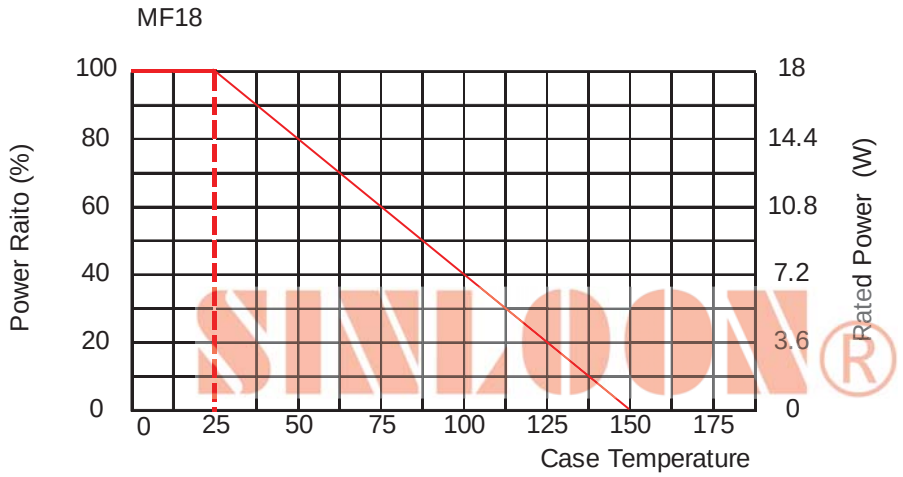
Type	Power Rating 25/℃		Voltage Rating Max.	Medium Withstanding Voltage	Resistance Range (Ω)	Tolerances	Nominal Resistance	Typ.Temperat Coefficient
	Heat sink	Free Air						
MF18	18W	3.0W	350V	1800V	0.05R-1R	±1%,±5%	E6,E24	±250ppm/℃
					1R-10R			±100ppm/℃
					10R - 1M			±50ppm/℃
Temperature Range:	25℃ ~ 150℃							
Insulation Resistance:	≦10G Ω							
Maximum Torque:	0.9 Nm							

◆ The case temperature is to be used for the definition of the applied power limit.

◆ The case temperature measurement must be with a thermocouple contacting the center of the component mounted on the designed heat sink.

◆ Thermal grease should be applied properly.

☐ Rating Curve



註: TO-220 ML18 (18W) 的額定功率,在25℃常溫下,如果不配合使用散熱片是3W,當環境溫度高於25℃時,以0.018W/°K降功率.

品質承諾標誌 QUALITY COMMITMENT

SINLOON®

TO-220 封裝功率電阻 TYPE : MF20 (20W)

Resistance Range: 0.05R ~ 1MΩ TO-220 Power Resistor

☐ Features:

- ◆ Low inductance
- ◆ Available in 20W ≦25℃
- ◆ TO-220 Style Power Package
- ◆ Single Screw Mounting to Heat Sink.
- ◆ High stability film resistance elements
- ◆ Molded Case for Protection and Easy to Mount.
- ◆ Without a heat sink , when in free air at 25℃.

The MF20 is rated for 3W.

Figure:

☐ Applications:

- ◆ UPS
- ◆ Snubbers Circuit.
- ◆ Voltage Regulation.
- ◆ Low Energy Pulse Loading.
- ◆ Gate Resistors in Power Supplies.
- ◆ Terminal Resistance in RF Power Amplifiers.
- ◆ Load and Dumping Resistors in CRT Monitors.

☐ Electrical Data

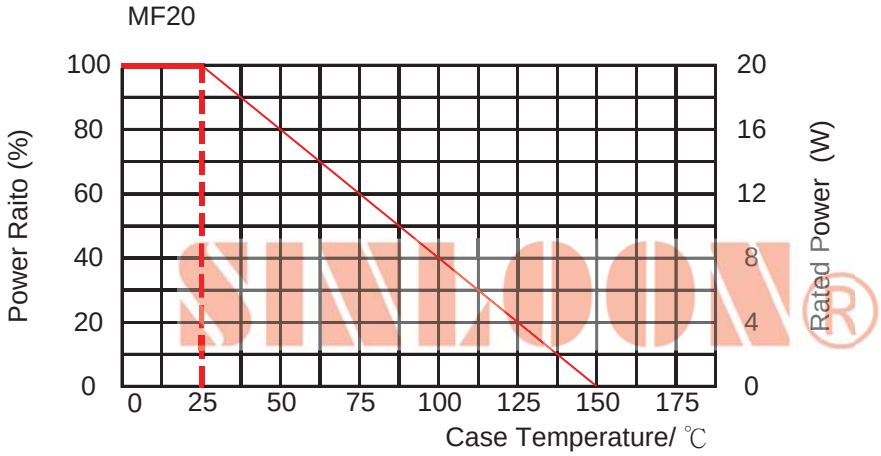
Type	Power Rating 25/℃		Voltage Rating Max.	Medium Withstanding Voltage	Resistance Range (Ω)	Tolerances	Nominal Resistance	Typ.Temperat Coefficient
	Heatsink	Free Air						
MF20	20W	3.0W	350V	1800V	0.05R-1R	±1%,±5%	E6,E24	±250ppm/℃
					1R-10R			±100ppm/℃
					10R - 1M			±50ppm/℃
Temperature Range:	25℃ ~ 150℃							
Insulation Resistance:	≦10G Ω							
Maximum Torque:	0.9 Nm							

◆ The case temperature is to be used for the definition of the applied power limit.

◆ The case temperature measurement must be with a thermocouple contacting the center of the component mounted on the designed heat sink.

◆ Thermal grease should be applied properly.

☐ Rating Curve



註: TO-220 ML20 (20W) 的額定功率,在25℃常溫下,如果不配合使用散熱片是3W,當環境溫度高於25℃時,以0.018W/°K降功率.

SINLOON®

TO-220 封裝功率電阻 TYPE : MF30 (30W)

Resistance Range: 0.5R ~ 1MΩ TO-220 Power Resistor

☐ Features:

- ◆ Low inductance
- ◆ Available in 30W / ≦25℃
- ◆ TO-220 Style Power Package
- ◆ Single Screw Mounting to Heat Sink.
- ◆ High stability film resistance elements
- ◆ Molded Case for Protection and Easy to Mount.
- ◆ Without a heat sink , when in free air at 25℃.

The MF30 is rated for 2.25W.

- ◆ Precision tolerance ±0.5%.

Figure:

☐ Applications:

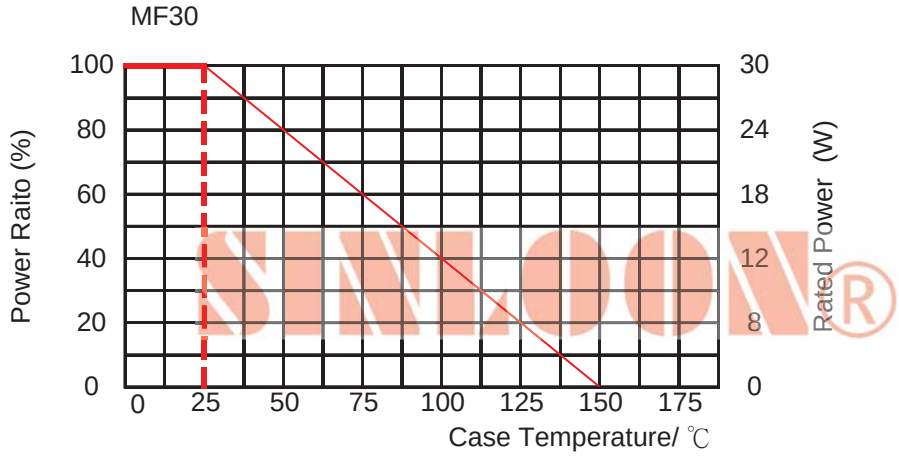
- ◆ UPS
- ◆ Snubbers Circuit.
- ◆ Voltage Regulation.
- ◆ Low Energy Pulse Loading.
- ◆ Gate Resistors in Power Supplies.
- ◆ Terminal Resistance in RF Power Amplifiers.
- ◆ Load and Dumping Resistors in CRT Monitors.

☐ Electrical Data

Type	Power Rating 25/℃		Voltage Rating Max.	Medium Withstanding Voltage	Resistance Range (Ω)	Tolerances	Nominal Resistance	Typ.Temperat Coefficient
	Heatsink	Free Air						
MF30	30W	2.25W	420V	1800V	0.5R ~1R	±0.5%, ±1%,±5%	E6,E24	±250ppm/℃
					1R-10R			±100ppm/℃
					10R - 1M			±50ppm/℃
Temperature Range:			25℃ ~ 150℃					
Insulation Resistance:			≦10G Ω					
Maximum Torque:			0.9 Nm					

- ◆ The case temperature is to be used for the definition of the applied power limit.
- ◆ The case temperature measurement must be with a thermocouple contacting the center of the component mounted on the designed heat sink.
- ◆ Thermal grease should be applied properly.

☐ Rating Curve



註: TO-220 ML30 (30W) 的額定功率,在25℃常溫下,如果不配合使用散熱片是2.25W,當環境溫度高於25℃時,以0.018W/°K降功率.

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QUALITY COMMITMENT

SINLOON®

TO-220 封裝功率電阻 TYPE : MF50 (50W)

Resistance Range: 0.2R ~ 1MΩ TO-220 Power Resistor

☐ Features:

- ◆ Low inductance
- ◆ Available in 50W / ≦25℃
- ◆ TO-220 Style Power Package
- ◆ Single Screw Mounting to Heat Sink.
- ◆ High stability film resistance elements
- ◆ Molded Case for Protection and Easy to Mount.
- ◆ Without a heat sink , when in free air at 25℃.

The MF50 is rated for 2.25W.

Figure:

☐ Applications:

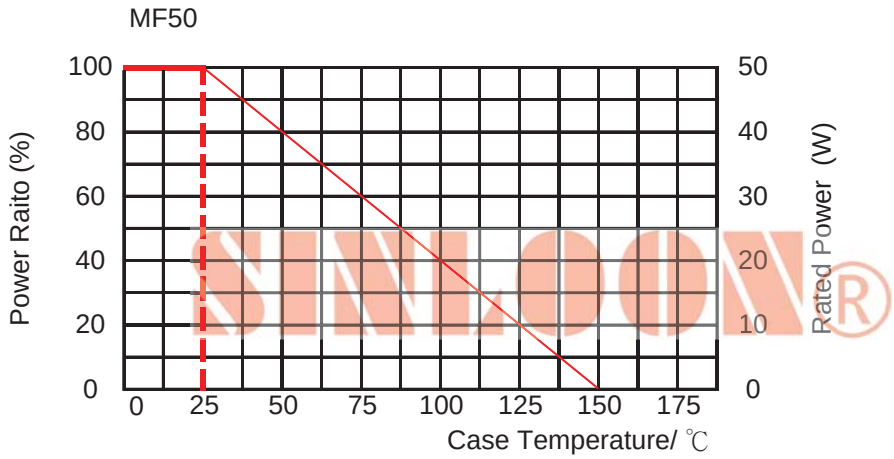
- ◆ UPS
- ◆ Snubbers Circuit.
- ◆ Voltage Regulation.
- ◆ Low Energy Pulse Loading.
- ◆ Gate Resistors in Power Supplies.
- ◆ Terminal Resistance in RF Power Amplifiers.
- ◆ Load and Dumping Resistors in CRT Monitors.

☐ Electrical Data

Type	Power Rating 25/℃		Voltage Rating Max.	Medium Withstanding Voltage	Resistance Range (Ω)	Tolerances	Nominal Resistance	Typ.Temperat Coefficient
	Heat sink	Free Air						
MF50	50W	2.25W	420V	1800V	0.2R ~1R	±1%,±5%	E6,E24	±250ppm/℃
					1R-10R			±100ppm/℃
					10R - 1M			±50ppm/℃
Temperature Range:			25℃ ~ 150℃					
Insulation Resistance:			≦10G Ω					
Maximum Torque:			0.9 Nm					

◆ The case temperature is to be used for the definition of the applied power limit.
◆ The case temperature measurement must be with a thermocouple contacting the center of the component mounted on the designed heat sink.
◆ Thermal grease should be applied properly.

☐ Dating Curve



註: TO-220 ML50 (50W) 的額定功率,在25℃常溫下,如果不配合使用散熱片是2.25W,當環境溫度高於25℃時,以0.018W/°K降功率.

品質承諾標誌 QUALITY COMMITMENT

SINLOON® **TO-220 封裝功率電阻** **MF Series**

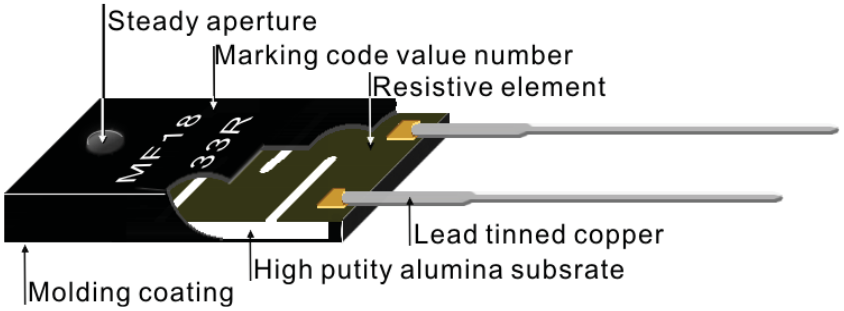
Power Range: 18W, 20W, 30W TO-220 Power Resistor

☐ Environmental Data

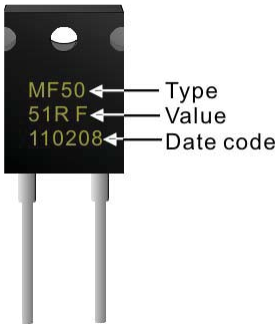
Test	Method	Specification - Performance
Thermal Shock (熱衝擊)	MIL-STD-202 Method 107 Condition F	△R ≦ ± (0.30% +1mΩ)
Short time overload (瞬間過負荷)	2 time rated power with applied voltage not to exceed 1.5 time maximum continuous operating voltage for 5	R ≦ ± (0.30% +1mΩ)
Wet resistance (耐濕)	MIL-STD-202 Method 106 Condition F	△R ≦ ± (0.5% +1mΩ)
Terminal Strength (引腳強度)	MIL-STD-211 Method condition A.	Pull test 2.4N
High frequency vibration (高頻振	MIL-STD-202 Method 204 condition D.	△R ≦ ± (0.2% +1mΩ)
Temperature range (溫度範圍)		25℃ to ~105℃

◆ During soldering, the soldering temperature profile must not cause the metal tab of this device to exceed 220℃.
※ Other requirements not specified in the specifications sent by e-mail inquiries welcome。

☐ CONSTRUCTION



☐ Body Marking Code



☐ RESISTANCE STANDARD VALUE

E3	10				22						47						
E6	10		15		22		33		47		68						
E12	10	12	15	18	22	27	33	39	47	56	68	82					
E24	10	11	12	13	15	16	18	20	22	24	27	30	33	36	39	43	47
	51	56	62	68	75	82	91										
E96	100	102	105	107	110	113	115	118	121	124	127	130	133	137	140	143	147
	150	154	158	162	165	169	174	178	182	187	191	196	200	205	210	215	221
	226	232	237	243	249	255	261	267	274	280	287	294	301	309	316	324	332
	340	348	357	365	374	383	392	402	412	422	432	442	453	464	475	487	499
	511	523	536	549	562	576	590	604	619	634	649	665	681	698	715	732	750
	768	787	806	825	845	866	887	909	931	953	976						

☐ Application Notes:

1. insulating material is unnecessary between the heat sink and the tab, as the resistor film is isolated by the internal alumina substrate
2. When mounting with a fastener, thermal grease is recommended
3. Thermal design should satisfy the following equation: Case Temperature(Tc)+[Thermal Resistance(RθJC)x Power applied(Watts)]≦155℃ over the full operating temperature of the application
4. Resistor film temperature is not to exceed 155℃ during operation
5. This product is RoHS compliant by exemption according to RoHS directive 2002/95/EC exemptions 5&7 , as they apply to lead in glass and internal solder connections.

RoHS Compliant
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QUALITY COMMITMENT

SINLOON®

TO-220 封裝功率電阻

Power Range: 18W, 20W, 30W, 50W.

MF Series

TO-220 Power Resistor

☐ Codes for the representation resistance (電阻值代碼表示法)

◆ If the resistance tolerance of ± 5%, standard resistance values to 3 digits;
if the resistance tolerance of ± 1%, standard resistance values of 4 digits.

◆ 2 or 3 digits before that effective digits The last digit indicates the number of zero, R letters decimal point.

Multiplier	$x10^0$	$x10^1$	$x10^2$	$x10^3$	$x10^4$	$x10^5$	$x10^6$	$x10^7$	$x10^8$	$x10^9$		
1st digit	0	1	2	3	4	5	6	7	8	9		
2nd digit	0	1	2	3	4	5	6	7	8	9		
3rd digit	0	1	2	3	4	5	6	7	8	9		
Tolerance		±1% (F)	±2% (G)			±0.5% (D)	±0.25% (C)	±0.1% (B)			±5% (J)	±10% (K)

Resistance tolerance and standard resistance values					
Example (E24) of ± 5%		3 Digits	Example (E6) ±1%		4 Digits
(1)	$9\Omega1 = 9.1 \times 10^{-1}$	919	(1)	$9\Omega1 = 910 \times 10^{-1}$	9108
(2)	$10\Omega = 10 \times 10^0$	100	(2)	$10\Omega1 = 101 \times 10^0$	1009
(3)	$220\Omega = 22 \times 10^1$	221	(3)	$221\Omega = 221 \times 10^1$	2210
(4)	$3.3K\Omega = 33 \times 10^2$	331	(4)	$3.32K\Omega = 332 \times 10^2$	3321
(5)	$47K\Omega = 47 \times 10^3$	473	(5)	$47K5\Omega = 475 \times 10^3$	4752
(6)	$510K\Omega = 51 \times 10^4$	514	(6)	$517K\Omega = 517 \times 10^4$	5173
(7)	$6M2\Omega = 62 \times 10^5$	625	(7)	$6M26\Omega = 626 \times 10^5$	6264

☐ Low ohm Resistance value notation:

Resistance (Ω)	
R0005	m5 R
R001	1m R
R02	20m R
R5	500mR
1R0	1000mR

☐ Resistance Tolerance Notation

Code	Tolerance	Code	Tolerance:
A	±0.01%	J	±5%
B	±0.1%	K	±10%
C	±0.25%	L	±15%
D	±0.5%	M	±20%
F	±1%	N	±50%
G	±2%	P	±80%
H	±3%	Z	±80-20%

☐ Resistor Power Notation

Power	Code	Power	Code
1/32W	Z	4W	L
1/16W	Y	5W	K
1/10W	X	7W	I
1/8W	W	10W	H
1/4W	V	15W	G
1/2W	U	20W	F
3/4W	T	25W	D
1W	S	30W	E
1.5W	R	35W	C
2W	Q	50W	B
2.5W	P	75W	A
3W	N	100W	AA
3.5W	M		

☐ Temperature Notation

Code	T.C.R.	Code	T.C.R.
A	±5ppc/℃	L	±400ppc/℃
B	±10ppc/℃	M	±450ppc/℃
C	±15ppc/℃	N	±500ppc/℃
D	±25ppc/℃	O	±550ppc/℃
E	±50ppc/℃	P	600ppc/℃
F	±100ppc/℃	Q	650ppc/℃
G	±150ppc/℃	R	700ppc/℃
H	±200ppc/℃	S	750ppc/℃
I	±250ppc/℃	T	800ppc/℃
J	±300ppc/℃	U	1000ppc/℃
K	±350ppc/℃	Z	1500ppc/℃

※ Other requirements not specified in the specifications sent by e-mail inquiries welcome。

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TO-220 封裝功率電阻 **TYPE : MF Series**

Power Range: 18W, 20W, 30W, 50W. **TO-220 Power Resistor**

☐ Package Mounting Guide

It is important that the packages are correctly mounted if full functionality is to be achieved. Mounting of the package to a heat sink must be done such that there is sufficient pressure from the mounting screws to insure good contact with the heat sink for efficient heat flow. Incorrect mounting may lead to both thermal and mechanical problems. Over tightening the mounting screws will cause the package to warp reducing the contact area with the heat sink and increasing the thermal resistance from the package case to the heat sink, resulting in higher operating die temperatures. Extreme over tightening of the mounting screws beyond the recommended torque force will cause severe physical stress resulting in cracked die and catastrophic IC failure. Though the reliability of the package is excellent, the use of inappropriate techniques or unsuitable tools during the mounting process can affect the long term reliability of the device and even damage it.

Figure (1)

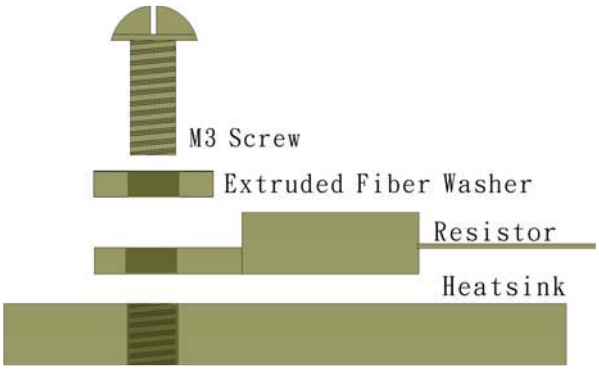
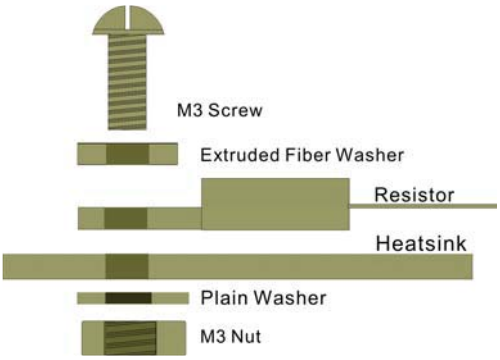


Figure (2)



☐ TO220 功率電阻使用指南及其重要性的說明:

要得到更好的特性功能和效率,正确完整的安裝散熱器是必須做的。要有配合外加散熱器來共同使用,上緊螺絲以保證本體部件和散熱片有良好的接觸面達致有高效的熱流量。不正确的使用可能會導致部件產生的熱量影響整體部件的功效。收緊螺絲不當將導致本體部件和散熱片接觸面積減少,熱電阻的增加導致更高的工作環境溫度。過度的收緊螺絲而超出了承受的壓力會導致零部件的失效。雖然該部件的可靠性非常好,使用不當或選擇不適合的外加散熱器,在使用過程中可能會影響長期使用壽命,甚至破壞。

SINLOON®

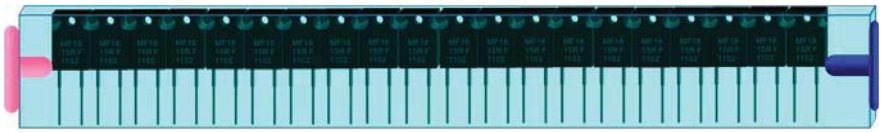
TO-220 封裝功率電阻
Power Range: 18W, 20W, 30W, 50W.

TYPE : MF Series
TO-220 Power Resistor

☐ Package

Type:		Power	Fistulous	In Box	Carton
TO-220	MF18	18W	20 PCS	50 Fistulous	1K/Box
TO-220	MF20	20W	20 PCS	50 Fistulous	1K/Box
TO-220	MF30	30W	20 PCS	50 Fistulous	1K/Box
TO-220	MF50	50W	20 PCS	50 Fistulous	1K/Box

Plastic Fistulous : 20 pcs
Size: 210x30x7.0 mm



Inside Box : 50 Plastic Fistulous
Box Size: 220x150x35mm
Quantity : 1000 pcs

RoHS Compliant
品質承諾標誌
QUALITY COMMITMENT