Metal Alloy Low-Resistance Resistor-EMA

◆ FEATURES

- Surface mount 1206/2512/2725/2728/2817/4527 case sizes
- Resistance values up to 500mΩ
- High precision current sensing and voltage division
- Resistance tolerance (±0.1%)
- Reflow compatible
- Low resistance / Low TCR

◆ APPLICATION

- Entertainment
- Power supply
- Measuring instrument
- Industrial
- Battery management system

◆ Part number system

EMA	25	F	3W0	R001	M	D	G
EMA	12=1206 25=2512 27=2725 28=2728 87=2817 45=4527	B =±0.1% C =±0.25% D =±0.5% F =±1% J=±5%	2W0=2.0Watt 3W0=3.0Watt 5W0=5.0Watt --- 15W0=15Watt	0M30=0.3mΩ R001=1mΩ --- R005=5mΩ	F:FeCrAl M:MnCu K:Karma	B=2000 D=4000 E=5000 M=500 N=1500 J=1000	RoHS

(1):EMA Series

(2): Size Code: 12=1206, 25=2512, 27=2725,28=2728, 87=2817,45=4527

(3): Tolerance Code: B = ± 0.1%, C = ± 0.25%, D = ± 0.5%, F = ±1%

(4): Power Rating:Ex. 2W0=2.0Watt ; 3W0=3.0Watt;5W0=5.0Watt 12W0=12.0Watt;

(5): Resistance Code: 0M30=0.3mΩ 0R005=5mΩ 0R010=10mΩ.

(6): Tape & Reel Packaging

(7): Optional piece reel quantity：

A=1000;B=2000;C=3000;D=4000,E=5000,F=10000;G=15000;H=50000;J=20000;K=700;M=500;N=1500;J=1000

(8): RoHS compliant

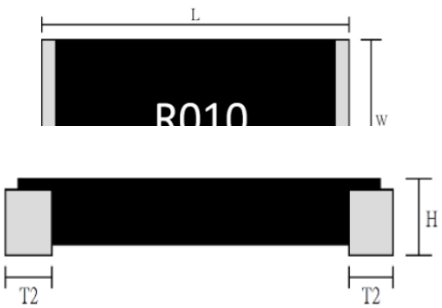
Metal Alloy Low-Resistance Resistor-EMA

ELLON

◆ **SPECIFICATIONS**

Type	EIA SIZE	Rating Power at 70℃	Material	Resistance Range (Ω)		T.C.R. (ppm/℃)	Operating Temperature Range (℃)
				0.1% (B) 0.5%(D)	1.0%(F) 2.0% (G) 5.0% (J)		
EMA12	1206	0.75W	FeCrAl	R051-R100	R051~R100	≦±50	-55 ~ + 170
		1W	R001:MnCuSn R002-R007:MnCu R008-R050 :FeCrAl	R007~R050	R001~R050		
EMA25	2512	1W	R0005-R00075:MnCuSn R001-R006:MnCu R007-R500:FeCrAl	R077-R500	R0005~R00075	≦±75	
					R001-R500	≦±50	
		2W	R0005-R00075:MnCuSn R001-R006:MnCu R007-R500:FeCrAl	R077-R450	R0005~R00075	≦±75	
					R001-R450	≦±50	
		3W	R0005-R00075:MnCuSn R001-R006:MnCu R007-R300:FeCrA	R077-R100	R0005~R00075	≦±75	
					R001-R300	≦±50	
EMA27	2725	4W	R00025-R0003:MnCuSn R0005-R0025:MnCu R003:FeCrA	--	R00025~R0003	≦±75	
					R0005-R003	≦±50	
EMA28	2728	4W	R004-R450:FeCrA	R007-R450	R004-R450	≦±50	
EMA87	2817	5W	R001-R003 MnCu R004-R050 Karma	--	R001-R003	≦±75	
				--	R004-R050	≦±50	
EMA45	4527	2W	R0005:MnCuSn	--	R0005	≦±75	
			R001-R006:MnCu R007-R100:FeCrA	R007-R100	R001-R100	≦±50	
		3W	R0005:MnCuSn	--	R0005	≦±75	
			R001-R005:MnCu R006-R60:FeCrA	R007-R060	R001-R060	≦±50	
		5W	R0005:MnCuSn	--	R0005	≦±75	
			R001-R005:MnCu R006-R500:FeCrA R006-R500:Karma	R007~R500	R001~R500	≦±50	

◆ **Component Dimensions**



Metal Alloy Low-Resistance Resistor-EMA

Case Size	Rating Power	Resistance Range (Ω)	L	W	H	T1	T2
EMA12	0.75W	R051~R075	3.200±0.254	1.650±0.254	0.420±0.254	0.40±0.25	0.508±0.25
		R076-R100	3.200±0.254	1.650±0.254	0.370±0.254	0.40±0.25	0.508±0.25
	1W	R001	3.200±0.254	1.650±0.254	0.790±0.254	0.40±0.25	0.508±0.25
		R002	3.200±0.254	1.650±0.254	0.670±0.254	0.40±0.25	0.508±0.25
		R003-R020	3.200±0.254	1.650±0.254	0.570±0.254	0.40±0.25	0.508±0.25
		R021-R050	3.200±0.254	1.650±0.254	0.490±0.254	0.40±0.25	0.508±0.25
EMA25	1W 2W	R0005	6.350±0.254	3.050±0.254	0.790±0.254	1.05±0.25	2.200±0.25
		R001	6.350±0.254	3.050±0.254	0.670±0.254	1.05±0.25	2.200±0.25
		R0015	6.350±0.254	3.050±0.254	0.570±0.254	1.05±0.25	2.000±0.25
		R002	6.350±0.254	3.050±0.254	0.570±0.254	1.05±0.25	1.4±0.25
		R0025-R006	6.350±0.254	3.050±0.254	0.570±0.254	1.05±0.25	1.1±0.25
		R007-RR075	6.350±0.254	3.050±0.254	0.620±0.254	1.05±0.25	1.1±0.25
		R076-R100	6.350±0.254	3.050±0.254	0.570±0.254	0.75±0.25	1.1±0.25
		R101-R135	6.350±0.254	3.050±0.254	0.490±0.254	0.75±0.25	1.1±0.25
		R136-R200	6.350±0.254	3.050±0.254	0.420±0.254	0.75±0.25	1.1±0.25
		R201-R450	6.350±0.254	3.050±0.254	0.420±0.254	0.75±0.25	0.80±255
	1W	R450-R500	6.350±0.254	3.050±0.254	0.370±0.254	0.75±0.25	0.80±255
	3W	R0005	6.350±0.254	3.050±0.254	0.790±0.254	1.05±0.25	2.200±0.25
		R001	6.350±0.254	3.050±0.254	0.670±0.254	1.05±0.25	2.200±0.25
		R0015	6.350±0.254	3.050±0.254	0.570±0.254	0.75±0.25	2.000±0.25
		R002	6.350±0.254	3.050±0.254	0.570±0.254	0.75±0.25	1.4±0.25
		R0025-R006	6.350±0.254	3.050±0.254	0.570±0.254	0.75±0.25	1.1±0.25
		R007-RR075	6.350±0.254	3.050±0.254	0.620±0.254	0.75±0.25	1.1±0.25
		R076-R300	6.350±0.254	3.050±0.254	0.570±0.254	0.75±0.25	1.1±0.25
EMA27	4W	R00025	6.800±0.254	6.350±0.254	0.790±0.254	1.15±0.25	2.300±0.25
		R0003	6.800±0.254	6.350±0.254	0.790±0.254	1.15±0.25	1.800±0.25
		R0005	6.800±0.254	6.350±0.254	0.670±0.254	1.15±0.25	2.300±0.25
		R001	6.800±0.254	6.350±0.254	0.670±0.254	1.15±0.25	1.800±0.25
		R0015	6.800±0.254	6.350±0.254	0.670±0.254	1.15±0.25	1.500±0.25
		R002-R003	6.800±0.254	6.350±0.254	0.570±0.254	1.15±0.25	1.500±0.25
EMA28	4W	R004-R450	6.600±0.254	6.700±0.254	0.600±0.254	0.40±0.25	1.050±0.25
EMA87	5W	R001-R003	7.100±0.254	4.300±0.254	1.000±0.155	1.20±0.25	1.20±0.25
		R004-R050	7.100±0.254	4.300±0.254	1.000±0.155	1.20±0.25	1.20±0.25
EMA45	2W	R0005	11.30±0.500	6.600±0.500	0.790±0.254	0.90±0.25	3.000±0.25
		R001	11.30±0.500	6.600±0.500	0.670±0.254	0.90±0.25	3.000±0.25
		R0015-R005	11.30±0.500	6.600±0.500	0.670±0.254	0.90±0.25	2.000±0.25
		R006-R100	11.30±0.500	6.600±0.500	0.570±0.254	0.90±0.25	2.000±0.25
	3W	R0005	11.30±0.500	6.600±0.500	0.790±0.254	0.90±0.25	3.000±0.25
		R001	11.30±0.500	6.600±0.500	0.670±0.254	0.90±0.25	3.000±0.25
		R0015-R005	11.30±0.500	6.600±0.500	0.670±0.254	0.90±0.25	2.000±0.25
		R006-R060	11.30±0.500	6.600±0.500	0.570±0.254	0.90±0.25	2.000±0.25

	5W	R0005	11.30±0.500	6.600±0.500	0.820±0.254	0.65±0.25	3.000±0.25
		R001	11.30±0.500	6.600±0.500	0.700±0.254	0.65±0.25	3.000±0.25
		R0015-R005	11.30±0.500	6.600±0.500	0.700±0.254	0.65±0.25	2.000±0.25
		R006-R500	11.30±0.500	6.600±0.500	0.600±0.254	0.65±0.25	2.000±0.25

◆ Environmental characteristics

Item	Specification	Test Method	Reference Standard
Temperature Coefficient of Resistance	Within specified value	+25°C ~ +125°C	IEC60115-1 4.8 JIS-C5201 4.8
Load Life	<±1% (<±2% 0508 & 0612)	1,000 hours at rated power, +70°C, 1.5 hours ON, 0.5 hours OFF	IEC60115-1 4.25.1 JIS-C5201 4.25.1
Short Time Overload	<±1%	5 x rated power for 5 seconds	IEC60115-1 4.13 JIS-C5201 4.13
Moisture Resistance (no load)	<±1% (<±2% 0508 & 0612)	+85°C, 85% RH, 1000 hours	IEC60115-1 4.24.2 1a JIS-C5201 4.24.2
Temperature Cycling	<±1%	-55°C & +125°C, 300 cycles, 15 minutes at each temperature	IEC60115-1 4.19 JIS-C5201 4.19
Resistance to Soldering Heat	<±0.5% (<±1% 0508 & 0612)	+260°C ± 5°C for 10 sec. ±1 sec .,Two cycles	IEC60115-1 4.18 JIS-C5201 4.18
Solderability	At least 95% coverage of electrode surface	+245°C ± 5°C, 2 sec. ± 0.5sec.	IEC60115-1 4.17 JIS-C5201 4.17
High Temperature Exposure	<±1% (<±2% 0508 & 0612)	+155°C for 1,000 hours	IEC60115-1 4.23.2 JIS-C5201 4.23.2
Low Temperature Storage	<±1% (<±2% 0508 & 0612)	-55°C for 1,000 hours	IEC60115-1 4.23.4 JIS-C5201 4.23.4
Substrate Bending	<±0.5% (<±1% 0508 & 0612)	Bending within 2mm	IEC60115-1 4.33 JIS-C5201 4.33
Insulation Resistance	>100MW	100VDC for 1 minute	IEC60115-1 4.6 JIS-C5201 4.6

Voltage and Current Ratings: Voltage and current ratings can be calculated for each part number by using the formulas below:

Current Rating Formula: I=$\sqrt{P/R}$
Example: EMA12F0R006TR5F
P=1W
R=0.006Ω(6milli-ohm)

I=$\sqrt{P/R}$= $\sqrt{1.0/0.006}$=12.909A

Voltage Rating Formula: V =$\sqrt{P*R}$
Example: EMA12F0R006TR5F
P=1W
R=0.006Ω(6milli-ohm)

V=$\sqrt{P*R}$= $\sqrt{1.0*0.006}$=0.07745V

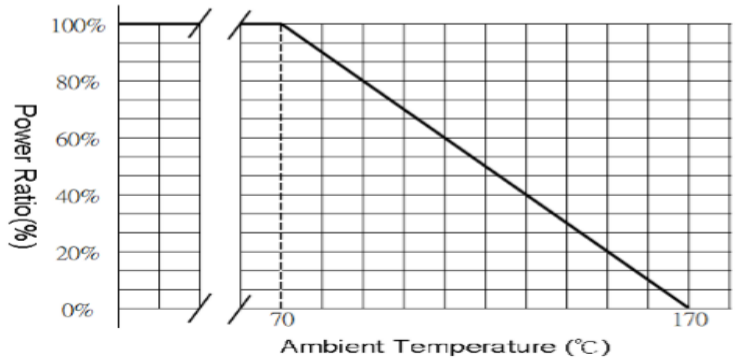
Thermal EMF Characteristics:
Thermal EMF=-1μV/℃

◆ **Performance characteristics**

Power Derating Curve

The Operating Temperature Range: -55°C ~+170°C.

For resistors operated in ambient temperatures above 70°C, power rating must be derating in accordance with the curve below



◆ **Rating current**

The following equation may be used to determine the DC (Direct Current) or AC (Alternating Current) (RMS, root mean square value) of normal rated power. However, if the result value exceeds the highest current of regulated standards (paragraph 5), the highest normal rated power is to be used

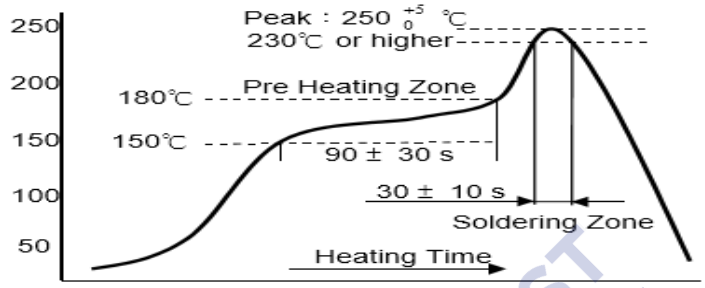
I = Rating current (A)

P= Rating Power (W)

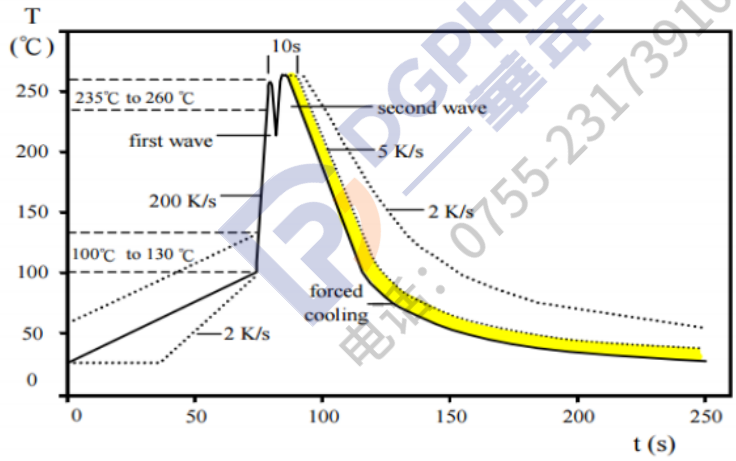
R= Resistance(Ω)

I=$\sqrt{P/R}$

◆ **Soldering Profile**

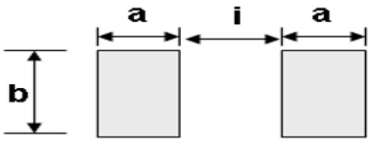


Reflow Soldering



WAVE soldering.

◆ **Recommend land pattern design**



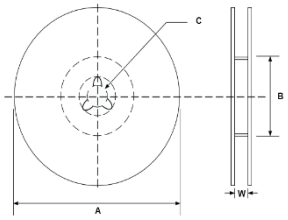
◆ **STORAGE TEMPERATURE**

Temperature：25±5℃, Humidity：60±20%

◆ Packaging information

REEL DIMENIONS (mm) AND QUANTITY

Type	A	B	C	W	Quantity
EMA12	178 ±2.0	60 ±1.0	13 ±1.0	9.0 ±1.0	5000/4000/3000
EMA25					
EMA27				13.0 ±1.0	2000/1000/500
EMA28					
EMA45					
EMA87				12.3 ±1.0	1000/500



◆ Storage Temperature

Temperature 20~30℃, Humidity 40~80%