Anti-Surge Metal Film Chip Resistor -EGM Series

General

- This specification is available for Anti-Sulfur Metal Film Resistors manufactured by ELLON Electro-Mechanics Co., Ltd.
- The resistor is manufactured by highly quality-controlled process and guaranteed high reliability,
- it meets RoHS & Halogen-Free requirement.
- Temperature 20±2℃, Humidity 65±5%.Being no doubt about the judgment, measurements can
- be made within the following Temperature 5～35℃, Humidity 45～85%.

Application

- Consumer electronics
- Computer & relative products
- Communication devices
- Measuring instrument
- Industrial/Power supply
- Battery management system

Features

- Standard Package Sizes (1206 1210 2010 2512)
- High Power capability
- Low Resistance/TCR/inductance
- High precision current sensing
- Halogen free and lead free
- RoHs Compliant

Part Number System

EGM	16	F	T	1R00	D	E	S
Product Type	Size (Inch)	Resistor Tolerance	Rated Power	Resistor Value	TCR (PPM/℃)	Quantity (Pcs)	Remarks
EGM	16=1206 12-1210 20=2010 25=2512	D=±0.5% F = ±1% G=± 2% J=± 5% K= ±10% M=± 20% N=± 30%	T=1W A=1.5W S=2W R=3W U=3.5W	R050=50mΩ R100=100mΩ 1R00=1Ω 10R0=10Ω	D=±50PPM E=±100PPM	D=4000 E=5000	S=Standard

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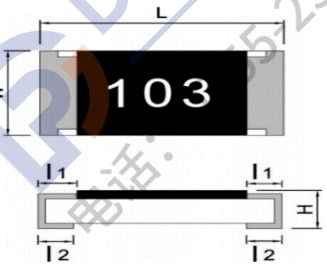
■ Standard Electrical Specifications

Type	EIA Size	Power Rating at 70° C	Max. Rated Current	Max. Overload Current	Resistance Tolerance (Code)	Temperature Coefficient (ppm/° C)	Resistance Range (Ω)	Operating Temperature
EGM16	1206	1W	4.47A	10.00A	±0.5% (D), ±1% (F)±2% (G), ±5% (J)	±100	50mΩ≤R< 100mΩ	-55℃~+170℃
						±50	100mΩ≤R≤33Ω	
EGM12	1210	1W	4.47A	10.00A		±100	50mΩ≤R< 100mΩ	
						±50	100mΩ≤R≤33Ω	
EGM20	2010	1.5W	5.48A	12.25A		±50	100mΩ≤R≤50Ω	
EGM25	2512	2W	6.32A	14.14A				
		3.5W	8.37A	18.71A				

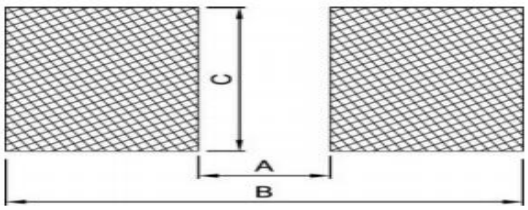
- If there are other TCR or Power requirements, please contact our sales department.

■ Type Dimension



TYPE	EIA Size	L	W	H	I1	I2
EGM16	1206	3.10±0.10	1.60±0.10	0.55±0.15	0.40±0.20	0.50±0.20
EGM12	1210	3.10±0.10	2.50±0.15	0.55±0.15	0.50±0.20	0.50±0.20
EGM20	2010	5.00±0.20	2.50±0.15	0.55±0.10	0.60±0.25	0.60±0.25
EGM25	2512	6.30±0.20	3.20±0.15	0.55±0.10	0.65±0.25	0.65±0.25

■ Recommend Land Pattern Design



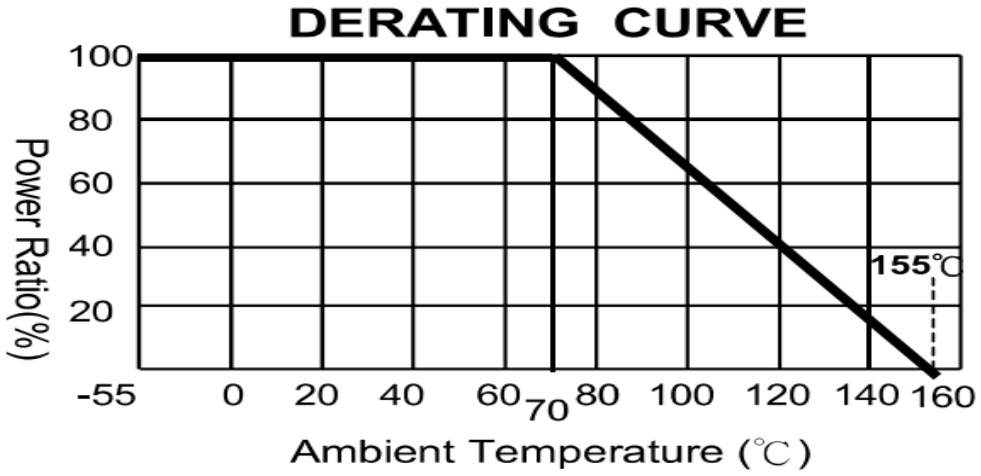
■ Dimension (unit:mm)

TYPE	EIA Size	A	B	C
EGM16	1206	2.20	4.20	1.80
EGM12	1210	2.00	4.40	2.70
EGM20	2010	3.80	6.60	2.70
EGM25	2512	4.90	8.10	3.40

■ Performance Characteristics

- **Power Derating Curve**

The operating Temperature Range: -55℃~+170℃
Power rating or current rating is in the case based on continuous full-load at ambient temperature of 70℃ . For operation at ambient temperature in excess of 70℃ , the load should be derated in accordance with figure of derating Curve.



■ Rated Current

Resistance Range: ＜1Ω

Rated Current: The resistor shall have a DC continuous working current or a AC(RMS) continuous working current at commercial-line frequency and wave form corresponding to the power rating, as determined formula as following:

$I=\sqrt{P / R}$

I=Rated current(A)
P=Rated Power(W)
R=Resistance(Ω)

■ Rated Voltage

Resistance Range:≥1Ω

Rated Voltage: The resistor shall have a DC continuous working voltage or a RMS AC continuous working voltage at commercial-line frequency and wave form corresponding to the power rating, as determined formula as following:

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

V=Rated voltage(V)
P=Rated power(W)
R=Nominal resistance(Ω)

■ Reliability Tests and Requirements

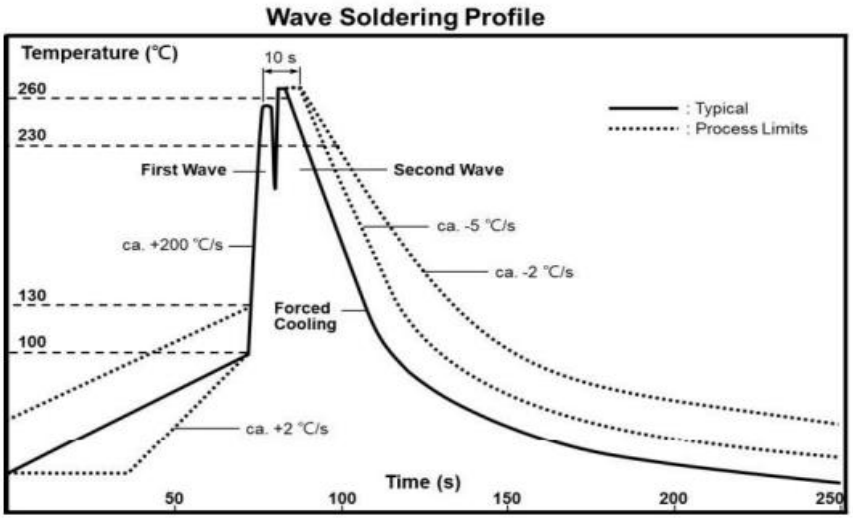
Test item	Test Method	procedure	requirements
Temperature coefficient of Resistance (T.C.R)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	At 25℃/=125℃ is the reference temperature	Refer to Standard Electrical Specifications
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	Standard power: 5 times rated power whichever is less for 5 seconds. High power (2x/4x):5 times rated power whichever is less for 5 seconds.	±(1.0%+0.001Ω)
Insulation Resistance	JIS-C-5201-1 4.8 IEC-60115-1 4.8	Apply 100VDC for 1 minute.	≥10GΩ
Dielectric withstanding voltage	JIS-C5201-1 4.7	applied 500VAC for 1 minute.	No short or burned on the appearance.
Core Body Strength	JIS-C5201-1 4.15	Central part pressurizing force:10N, 10 seconds.	No broken
Solderability	JIS-C-5201-1 4.17 IEC-60115-1 4.17	245±5℃ for 3 seconds.	>95% Coverage No Visual damage
Resistance to Soldering Heat	JIS-C-5201-1 4.8 IEC-60115-1 4.8	260±5℃ for 10 seconds.	±(1.0%+0.001Ω) No Visual damage
Leaching	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1	260±5℃ for 30 seconds.	>95% Coverage No Visual damage
Rapid Change of Temperature	JIS-C-5201-1 4.19 IEC-60115-1 4.19	-55℃to+155℃,300 cycles	±(1.0%+0.001Ω) No Visual damage

Damp Heat with Load	JIS-C-5201-1 4.24 IEC-60115-1 4.24	40±2℃,90-95% R.H. RCWV or Max. working current whichever is less for 1000 Hours with 1.5 Hours "ON" and 0.5 Hour "OFF"	±(1.0%+0.001Ω)
Biased Humidity	MIL-STD-202 Method 103	1000 Hours; 85℃/85% RH, 10% of operating power ,Measurement at 24±4 Hours after test conclusion.	±(1.0%+0.05Ω)
Load Life (Endurance)	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1	72±2℃,Rated power, or Max. working current whichever is less for 1000 hours with 1.5 hours "ON" and 0.5 Hour "OFF"	±(1.0%+0.001Ω)
High Temperature Exposure	JIS-C-5201-1 4.25 IEC-60068-2-2	At 170±5℃ for 1000 Hours.	±(1.0%+0.001Ω)
Resistance to Solvent	JIS-C-5201-1 4.29	The tested resistor be immersed into isopropyl alcohol of 20~25℃ for 60 secs. Then the resistor is left in the room for 48 hours	±(1.0%+0.001Ω) No Visual damage
Terminal Strength	JIS-C-5201-1 4.33 AEC-Q200-006	Pressurizing force for 60 seconds 1210 and above:17.7N	NO broken
Bending STRENGTH	JIS-C-5201-1 4.33 IEC-60115-1 4.33	Bending once for 5 seconds D: 1206 1210=3mm 2010 2512=2mm	±(1.0%+0.001Ω) No Visual damage

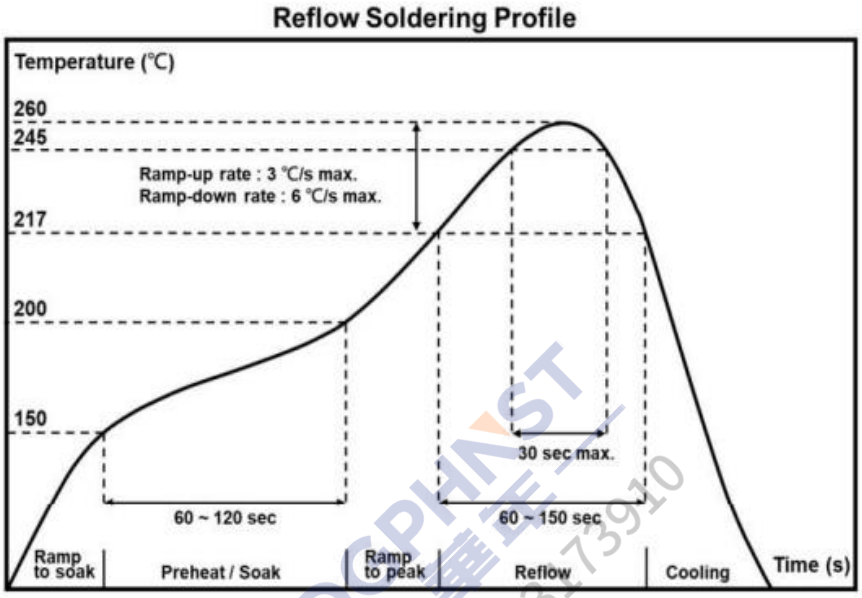
- Temperature Coefficient of Resistance test to -55℃ is available on request
- We can also provide AEC-Q200 test reports if required by customers.

■ Recommended Customer Soldering Parameters

● Wave solder Temperature condition



- **Solder reflow Temperature condition**



- **Rework temperature (hot air equipment):350℃,3-5seconds**

- **Recommended reflow methods**

IR, Vapor phase oven, hot air oven

If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

■ Part Marking

1. No marking on 0402 case size.
2. Marking for 0603 case size:

E-24 values and E-96 values: ± 1% (F), ± 0.5% (D), ± 0.25% (C). ± 0.1% (B) tolerances E-192 values: ± 0.1% (B) tolerance (No Marking)

CODING FORMULA

Example: $10.2k\Omega = \frac{102}{02} \times \frac{10^2}{C}\ \Omega = 02C$

$33.2\ \Omega = \frac{332}{51} \times \frac{10^{-1}}{X} = 51X$

■ Marking Examples

10Ω = 01X
7.5k Ω = 85B
150k Ω = 18D
1 MegΩ = 01E

3. Marking for 0805, 1206, 2010 and 2512 case sizes:
E-24 and E-96 values - ±1%(F), ±0.5% (D), ±0.25%(C), ±0.1% (B) tolerances E-192 values: ±0.1% (B) tolerance (No Marking)
4 DIGIT MARKING SYSTEM - First 3 digits are the significant figures, the 4th digit is the multiplier ."R"= decimal point

STANDARD E-24, E-96 AND E-192 VALUES AND 0603 RESISTANCE CODES

E-24	*E-96*								*E-192**					
Value	Value	Code	Value	Code	Value	Code	Value	Code	Value	Value	Value	Value	Value	Value
100	100	01	102	02	105	03	107	04	100	147	215	316	464	681
110	110	05	113	06	115	07	118	08	101	149	218	320	470	690
120	121	09	124	10	127	11	130	12	102	150	221	324	475	698
130	133	13	137	14	140	15	143	16	104	152	223	328	481	706
150	147	17	150	18	154	19	158	20	105	154	226	332	487	715
160	162	21	165	22	169	23	174	24	106	156	229	336	493	723
180	178	25	182	26	187	27	191	28	107	158	232	340	499	732
200	196	29	200	30	205	31	210	32	109	160	234	344	505	741
220	215	33	221	34	226	35	232	36	110	162	237	348	511	750
240	237	37	243	38	249	39	255	40	111	164	240	352	517	759
270	261	41	267	42	274	43	280	44	113	165	243	357	523	768
300	287	45	294	46	301	47	309	48	114	167	246	361	530	777
330	316	49	324	50	332	51	340	52	115	169	249	365	536	787
360	348	53	357	54	365	55	374	56	117	172	252	370	542	796
390	383	57	392	58	402	59	412	60	118	174	255	374	549	806
430	422	61	432	62	442	63	453	64	120	176	258	379	556	816
470	464	65	475	66	487	67	499	68	121	178	261	383	562	825
510	511	69	523	70	536	71	549	72	123	180	264	388	569	835
560	562	73	576	74	590	75	604	76	124	182	267	392	576	845
620	619	77	634	78	649	79	665	80	126	184	271	397	583	856
680	681	81	698	82	715	83	732	84	127	187	274	402	590	866
750	750	85	768	86	787	87	806	88	129	189	270	407	597	876
820	825	89	845	90	866	91	887	92	130	191	280	412	604	887
910									132	193	284	417	612	898
									133	196	287	422	619	909
									135	198	291	427	626	920
									137	200	294	432	634	931
									138	203	298	437	642	942
									140	205	301	442	649	953
									142	208	305	448	657	965
									143	210	309	453	665	976
									145	213	312	459	673	988

*** Special E192 resistance values are supported on all case sizes of NTR series. Please review your E192 value requirements with NIC, as special terms apply, and E192 values are supplied without component resistance value marking.**

■ Multiplier code

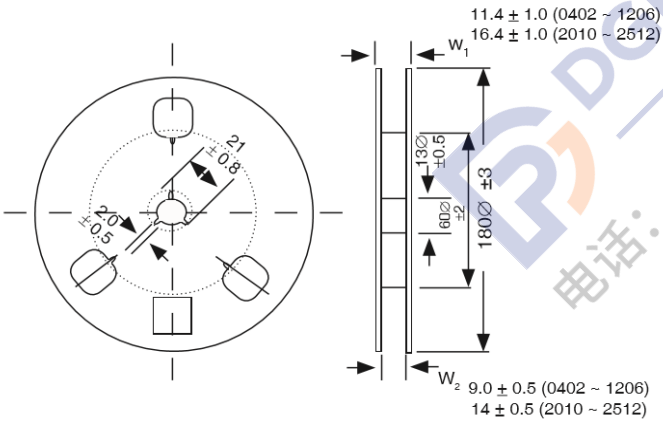
Code	A	B, b	C	D, d	E	F	G	H	X	Y	Z
Multiplier	10^0	10^1	10^2	10^3	10^4	10^5	10^6	10^7	10^{-1}	10^{-2}	10^{-3}

■ Taping specifications

Availability

Type	EIA Size	Carrier Tape			Qty per Reel (pcs)
		Fig.	Material	Width (mm)	Standard
EGM16	1206	A	Paper	8	5000
EGM12	1210	A			
EGM20	2010	B	Plastic	12	4000
EGM25	2512	B			

■ Reel Dimensions (mm)



■ Land pattern dimensions (mm)

Type	EIA Size	A	B	C
EGM16	1206	2.00	1.15	1.70 ± 0.2
EGM12	1210	2.00	1.15	2.50 ± 0.2
EGM20	2010	3.60	1.40	2.50 ± 0.2
EGM25	2512	4.90	1.60	3.10 ± 0.2