

EMC Components

AVR-M Series

Varistors Countermeasure for Surge and Static Electricity SMD

FEATURES

- The AVR-M series chip varistors provide excellent application reliability as a result of their Ag base terminal electrodes with Ni+Sn electroplating.
- There is no asymmetrical degradation as with bismuth zinc oxide varistors.

APPLICATIONS

A countermeasure against static electricity and surges in portable electronic appliances, measurement devices, control devices, home electronic appliances, A/V equipment, and other electronic devices.

TEMPERATURE RANGES

Operating	-40 to +125°C
Storage	-40 to +125°C

PRODUCT IDENTIFICATION

AVR	-M	1005	C	270	M	T	AAB
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

(1) Common code

(2) Series name

(3) Element dimensions

(4) Chip type

(5) Varistor voltage

270	27×10 ⁰ (V)
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(6) Varistor voltage tolerance

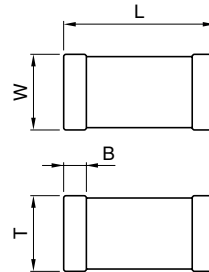
K	±10%
M	±20%
N	±30%

(7) Packaging style

T	Taping
B	Bulk

(8) TDK internal code

SHAPES AND DIMENSIONS

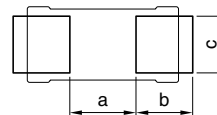


Dimensions in mm

Shape	L	W	T	B	Weight typ.
0.6×0.3	0.6±0.03	0.3±0.03	0.3±0.03	0.1 min.	0.2mg
1.0×0.5	1±0.05	0.5±0.05	0.5±0.05	0.1 min.	1.2mg
1.6×0.8	1.6±0.1	0.8±0.1	0.8±0.1	0.2 min.	5mg
2.0×1.2	2±0.2	1.25±0.2	1±0.2	0.2 min.	15mg

RECOMMENDED PC BOARD PATTERN

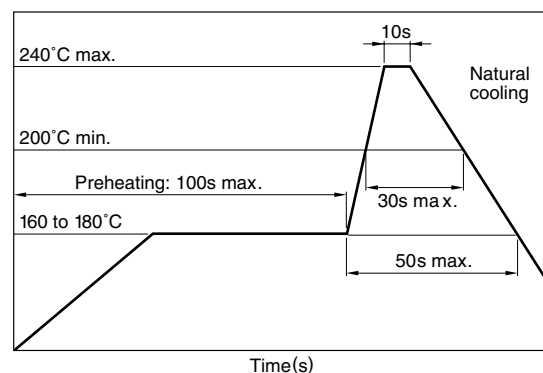
REFLOW SOLDERING



Dimensions in mm

Type	a	b	c
0603	0.25 to 0.35	0.2 to 0.3	0.25 to 0.35
1005	0.3 to 0.5	0.35 to 0.45	0.4 to 0.6
1608	0.3 to 0.5	0.35 to 0.45	0.4 to 0.6
2012	0.9 to 1.2	0.7 to 0.9	0.9 to 1.2

RECOMMENDED REFLOW SOLDERING CONDITIONS



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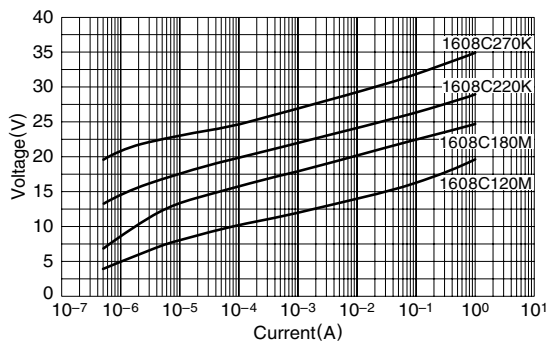
ELECTRICAL CHARACTERISTICS

Part No.	Varistor voltage (Breakdown voltage) E _{1mA} (V)		Maximum continuous voltage (Working voltage) Edc(V)	Clamping voltage (V) [8/20μs]	Energy (Joule) [10/1000μs]	Peak current(A) [8/20μs]	Resistance [5 to 35°C]		Capacitance (pF) [1kHz, Erms 1V]
	Resistance (MΩ)	Voltage (V)							
0603 type									
AVR-M0603C120N□*AAB	12	8.4 to 15.6	6.5 max.	23[1A]	0.01 max.	1 max.	1 min.	3	33 typ.
1005 type									
AVR-M1005C080M□AAB	8	6.4 to 9.6	5.5 max.	14[1A]	0.04 max.	25 max.	1 min.	3	650 typ.
AVR-M1005C080M□ABB	8	6.4 to 9.6	5.5 max.	15[1A]	0.02 max.	3 max.	1 min.	3	100 typ.
AVR-M1005C080M□ACB	8	6.4 to 9.6	5.5 max.	19[1A]	0.01 max.	1 max.	1 min.	3	33 typ.
AVR-M1005C120M□AAB	12	9.6 to 14.4	7.5 max.	20[1A]	0.05 max.	10 max.	1 min.	3	130 typ.
AVR-M1005C270M□AAB	27	21.6 to 32.4	15 max.	50[1A]	0.06 max.	4 max.	1 min.	5	40 typ.
AVR-M1005C270M□ABB	27	21.6 to 32.4	15 max.	50[1A]	0.05 max.	1 max.	1 min.	5	15 typ.
1608 type									
AVR-M1608C080M□AAB	8	6.4 to 9.6	5.5 max.	15[2A]	0.09 max.	30 max.	1 min.	3	650 typ.
AVR-M1608C120M□6AB	12	9.6 to 14.4	7.5 max.	20[2A]	0.09 max.	50 max.	1 min.	5	1050 typ.
AVR-M1608C120M□2AB	12	9.6 to 14.4	7.5 max.	20[2A]	0.06 max.	15 max.	1 min.	5	400 typ.
AVR-M1608C180M□6AB	18	14.4 to 21.6	11 max.	30[2A]	0.1 max.	30 max.	1 min.	5	600 typ.
AVR-M1608C220K□6AB	22	19.8 to 24.2	16 max.	34[2A]	0.1 max.	30 max.	5 min.	5	560 typ.
AVR-M1608C220K□2AB	22	19.8 to 24.2	16 max.	37[2A]	0.03 max.	10 max.	5 min.	5	210 typ.
AVR-M1608C270K□6AB	27	24 to 30	19 max.	42[2A]	0.1 max.	48 max.	5 min.	5	430 typ.
AVR-M1608C270K□2AB	27	24 to 30	19 max.	42[2A]	0.1 max.	20 max.	5 min.	5	160 typ.
AVR-M1608C270M□AAB	27	21.6 to 32.4	17 max.	52[2A]	0.05 max.	2 max.	1 min.	5	30 typ.
AVR-M1608C270M□ABB	27	21.6 to 32.4	17 max.	52[2A]	0.05 max.	2 max.	1 min.	5	15 typ.
2012 type									
AVR-M2012C120M□6AB	12	9.6 to 14.4	7.5 max.	20[5A]	0.2 max.	60 max.	1 min.	5	1000 typ.
AVR-M2012C220K□6AB	22	19.8 to 24.2	16 max.	38[5A]	0.3 max.	100 max.	5 min.	5	800 typ.
AVR-M2012C390K□6AB	39	35 to 43	28 max.	62[5A]	0.3 max.	100 max.	5 min.	5	430 typ.

* □ : Packaging style(T: Taping/B: Bulk)

• Operating and storage temperature: -40 to +125°C

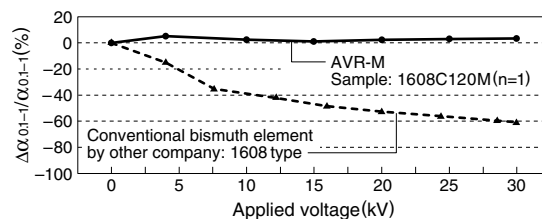
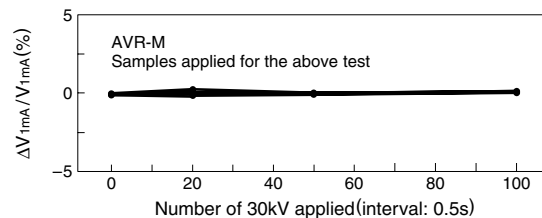
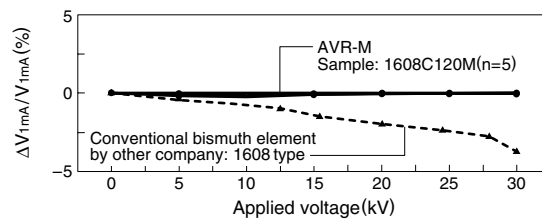
VOLTAGE vs. CURRENT CHARACTERISTICS



SURGE WITHSTAND CHARACTERISTICS

(ESD withstand test)

IEC1000-4 COMPLIANT/TEST APPARATUS:
NOISE LABORATORY CO., LTD.'s ESS-630A



• All specifications are subject to change without notice.

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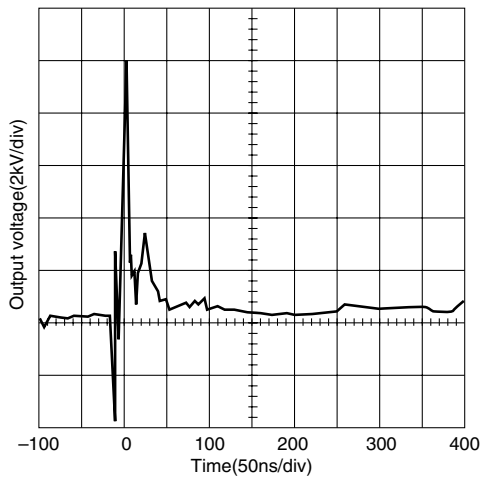
SMD

ELECTROSTATIC ABSORPTION WAVEFORM

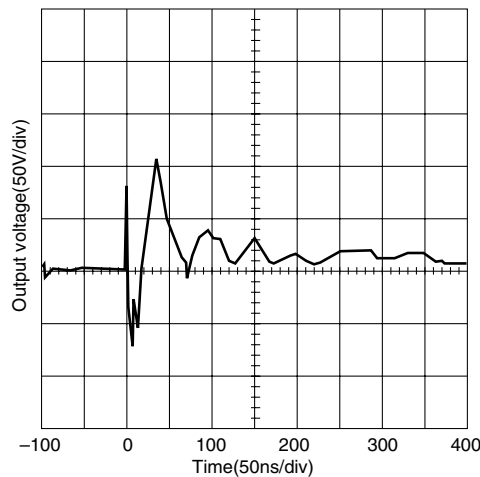
TEST INSTRUMENT: ESS-630A/HP54540C,
NOISE KENKYUSHO K.K.

ELECTROSTATIC CONTACT DISCHARGE WAVEFORM
(PRIOR TO COUNTERMEASURES)

COMPLIANT WITH IEC801-2/10kV



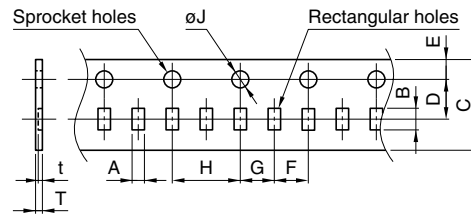
AFTER USE OF CHIP VARISTOR AS COUNTERMEASURE
AVR-M1608C120MB6A/110V



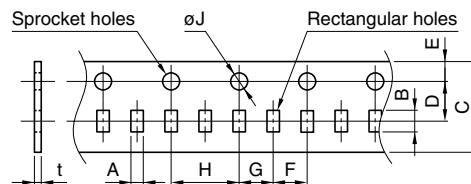
PACKAGING STYLES

TAPING SPECIFICATIONS

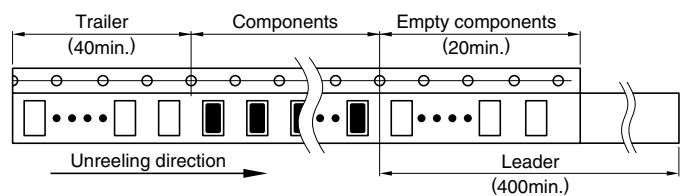
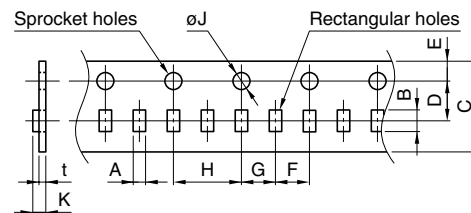
0603 TYPE



1005 AND 1608 TYPES



2012 TYPE



Dimensions in mm

Type (EIA)	0603 (CC0201)	1005 (CC0402)	1608 (CC0603)	2012 (CC0805)
A	0.38±0.05	0.65+0.05,-0.1	1.1±0.2	1.6±0.2
B	0.68±0.05	1.15+0.05,-0.1	1.9±0.2	2.3±0.2
C	8.0±0.3	8.0±0.3	8.0±0.3	8.0±0.3
D	3.5±0.05	3.5±0.05	3.5±0.05	3.5±0.05
E	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1
F	2.0±0.05	2.0±0.05	4.0±0.1	4.0±0.1
G	2.0±0.05	2.0±0.05	2.0±0.05	2.0±0.05
H	4.0±0.05	4.0±0.05	4.0±0.1	4.0±0.1
J	∅1.5+0.1,-0	∅1.5+0.1,-0	∅1.5+0.1,-0	∅1.5+0.1,-0
t	0.35±0.02	0.6±0.05	1.1 max.	2.0 max.
T	0.4 min.	—	—	—
K	—	—	—	0.3 max.
Packaging quantities (pieces/reel)	15,000	10,000	4,000	2,000