DATA SHEET

PRODUCT	**MultiLayer chip Varistor**
SERIES	JMV-S Automotive Series
PART NO.	
ISSUE DATE	2023/6/12
REVISION DATE	2023/6/12
REFERENCE NO.	

AEC-Q200 Qualified

RoHS COMPLIANCE ITEM

Halogen Free

JMV-S Automotive Series

FEATURES

- Qualified based on AEC-Q200
- RoHS compliant
- Meet IEC 61000-4-2 standard
- Meet IEC 61000-4-5 standard
- SMD type zinc oxide based ceramic chip
- Quick response time (<0.5ns)
- High transient current capability
- High reliability
- Compact size for EIA 0402 / 0603 / 0805 / 1206 / 1210 / 2220

APPLICATIONS

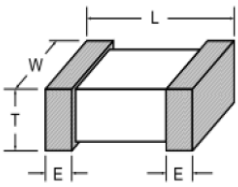
Protection against automotive related transient overvoltage.

EXPLANATION OF PART NUMBER

JMV	0402	S	5R5	T	241	XXC
①	②	③	④	⑤	⑥	⑦

① Joyin Multilayer Varistor	⑤ Tape on reel
② Chip size	⑥ Optional Suffix
③ Surge Protection and ESD Protection	⑦ Automotive series
④ Max DC working voltage	

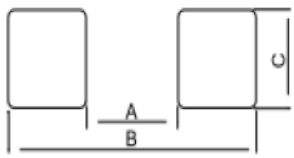
DIMENSION



unit:mm

Size(EIA)	L	W	T	E
0402	0.96±0.12	0.48±0.07	0.34±0.10	0.25±0.15
0603	1.60±0.15	0.85±0.10	0.51±0.10	0.30±0.20
0805	2.00±0.20	1.25±0.20	0.90±0.10	0.50±0.25
1206	3.20±0.30	1.60±0.20	1.7 max	0.50±0.25
1210	3.20±0.30	2.50±0.25	1.7 max	0.50±0.25
2220	5.70±0.40	5.20±0.40	4.0 max	1.4 max

SOLDER LAND INFORMATION



unit:mm

Size(EIA)	A	B	C
0402	0.50	1.70	0.50
0603	0.50	2.50	0.76
0805	1.10	3.50	1.20
1206	2.20	4.24	1.65
1210	2.20	4.50	2.80
2220	4.20	7.20	5.50

STANDARD PACKING

Size (EIA)	0402	0603	0805	1206	1210	2220
Quantity (pcs/reel)	10,000	4,000	4,000	4,000	2,000	2,000

SPECIFICATION

	Working Voltage		Varistor Voltage	Clamping Voltage	Capacitance	Peak Current	Transient Energy
Symbol	V_{RMS}	V_{DC}	V_V	V_C	C_P	i_{max}	W_{max}
Units	Volts (Max.)	Volts (Max.)	Volts	Volts (Max.)	pF (Typical)	Amps (Max.)	Joules (Max.)
Test Condition		< 10 µA	1mA DC	1A @ 8/20µs	1MHz	8/20µs	10/1000µs
JMV0402S3R3T601XXC	2.5	3.3	4 ~ 6.5	17	600	8	0.04
JMV0402S5R5T241XXC	4	5.5	6.5 ~ 9.4	22	240	20	0.04
JMV0402S090T121XXC	6	9	11 ~ 16.5	32	120	20	0.05
JMV0402S090T121X1C	7	9	11 ~ 16.5	33	120	20	0.05
JMV0402S110T850XXC	8	11	14 ~ 17.5	35	85	20	0.05
JMV0402S140T101XXC	11	14	18 ~ 22.5	44	100	10	0.02
JMV0402S180T750XXC	14	18	20 ~ 26.5	45	75	20	0.05

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Units	Volts (Max.)	Volts (Max.)	Volts	Volts (Max.)	pF (Typical)	Amps (Max.)	Joules (Max.)
Test Condition		< 10 µA	1mA DC	1A @ 8/20µs	1KHz	8/20µs	10/1000µs
JMV0603S310T900XXC	25	31	35 ~ 43.9	71	90	30	0.20
JMV0603S180T101XXC	14	18	19.8 ~ 25.2	44	100	30	0.20
JMV0603S220T101XXC	17	22	24.3 ~ 30.7	50	100	30	0.20
JMV0603S180T111XXC	14	18	19.8 ~ 24.2	40	110	30	0.20
JMV0603S160T121XXC	14	16	22 ~ 28	46	120	30	0.20
JMV0603S220T161XXC	17	22	24.3 ~ 30.7	50	160	30	0.20
JMV0603S5R5T301XXC	4	5.5	6.4 ~ 9.7	21	300	30	0.10
JMV0603S170T300XXC	14	17	21.6 ~ 34.4	70 [2A]	30	2	0.05
JMV0603S190T161XXC	14	19	24 ~ 32	64 [2A]	160	20	0.10
JMV0603S320T120XXC	25	32	51.9 ~ 71	124	12 [1MHz]	5	0.10
JMV0603S160T150XXC	14	16	23 ~ 34.2	70	15 [1MHz]	5	0.03
JMV0603S090T241XXC	6	9	11 ~ 15.5	30	240 [1MHz]	30	0.10
JMV0603S090T241X1C	7	9	11 ~ 15.5	30	240 [1MHz]	30	0.10
JMV0603S380T350XXC	30	38	42 ~ 51	80	35[1MHz]	30	0.10
JMV0603S3R3T481XXC	2.5	3.3	4 ~ 6.5	17	480 [1MHz]	20	0.04
JMV0603S140T500XXC	11	14	16.5 ~ 22	40	50 [1MHz]	30	0.10
JMV0603S220T500XXC	17	22	24.3 ~ 30.7	54	50[1MHz]	10	0.10
JMV0603S220T750XXC	17	22	25 ~ 41	54	75 [1MHz]	30	0.08
JMV0603S260T800XXC	20	26	30 ~ 43	67	80 [1MHz]	30	0.10

	Working Voltage		Varistor Voltage	Clamping Voltage	Capacitance	Peak Current	Transient Energy
Symbol	V_{RMS}	V_{DC}	V_V	V_C	C_P	i_{max}	W_{max}
Units	Volts (Max.)	Volts (Max.)	Volts	Volts (Max.)	pF (Typical)	Amps (Max.)	Joules (Max.)
Test Condition		< 10 µA	1mA DC	1A @ 8/20µs	1MHz	8/20µs	10/1000µs
JMV0805S5R5T501XXC	4	5.5	7.8 ~ 12	22	500	80	0.10
JMV0805S090T421XXC	6	9	10.8 ~ 18	30	420	80	0.20
JMV0805S110T361XXC	8	11	14 ~ 20	32	360	100	0.30
JMV0805S140T401XXC	11	14	17.2 ~ 21	38	400	100	0.10
JMV0805S160T401XXC	14	16	22 ~ 28	46	400	120	0.30
JMV0805S180T351XXC	14	18	19.8 ~ 25.2	44	350	120	0.30
JMV0805S220T101XXC	17	22	25 ~ 34	54	100	30	0.10
JMV0805S220T401XXC	17	22	24.3 ~ 30.7	50	400	120	0.30
JMV0805S260T221XXC	20	26	29.7 ~ 37.3	56	220	100	0.40
JMV0805S310T251XXC	25	31	35.1 ~ 43.9	71	250	100	0.30
JMV0805S380T201XXC	30	38	42.3 ~ 52.7	81	200	100	0.30
JMV0805S450T171XXC	35	45	55 ~ 61	93	170	80	0.10

JMV-S Automotive Series

	Working Voltage		Varistor Voltage	Clamping Voltage	Capacitance	Peak Current	Transient Energy
Symbol	V_{RMS}	V_{DC}	V_V	V_C	C_P	i_{max}	W_{max}
Units	Volts (Max.)	Volts (Max.)	Volts	Volts (Max.)	pF (Typical)	Amps (Max.)	Joules (Max.)
Test Condition		< 10 µA	1mA DC	1A @ 8/20µs	1KHz	8/20µs	10/1000µs
JMV1206S5R5T152XXC	4	5.5	8 ~ 13	23	1500	200	0.30
JMV1206S140T461XXC	11	14	18 ~ 21.6	38	460	100	0.30
JMV1206S140T641XXC	11	14	18 ~ 21.6	36	640	200	0.50
JMV1206S160T801XXC	14	16	22 ~ 28	44	800	200	0.60
JMV1206S160T701XXC	14	16	19.8 ~ 25.2	42	700	200	0.50
JMV1206S220T651XXC	17	22	24.3 ~ 30.7	48	650	200	0.30
JMV1206S220T841XXC	17	22	24.3 ~ 29.7	50	840	100	0.40
JMV1206S260T601XXC	20	26	29.7 ~ 37.3	58	600	200	0.70
JMV1206S310T551XXC	25	31	35.1 ~ 43.9	69	550	200	1.00
JMV1206S380T501XXC	30	38	42.3 ~ 52.7	81	500	200	1.10
JMV1206S450T201XXC	35	45	54 ~ 62	108	200	200	1.10
JMV1206S560T181XXC	40	56	63 ~ 77	110	180	200	1.00
JMV1206S650T251XXC	50	65	76 ~ 92	138	250	100	0.50
JMV1206S850T121XXC	60	85	100 ~ 120	168	120	100	0.70

	Working Voltage		Varistor Voltage	Clamping Voltage	Capacitance	Peak Current
Symbol	V_{RMS}	V_{DC}	V_V	V_C	C_P	i_{max}
Units	Volts (Max.)	Volts (Max.)	Volts	Volts (Max.)	pF (Typical)	Amps (Max.)
Test Condition		< 10 µA	1mA DC	2.5A @ 8/20µs	1KHz	8/20µs
JMV1210S5R5T212XXC	4	5.5	9 ~ 14	28	2100	400
JMV1210S180T112XXC	14	18	22 ~ 29	45	1100	500
JMV1210S260T601XXC	18	26	31 ~ 38	60	600	400
JMV1210S480T351XXC	34	48	54 ~ 67	100	350	300
JMV1210S600T301XXC	46	60	69 ~ 83	125	300	450
JMV1210S650T211XXC	50	65	73 ~ 91	135	210	300
JMV1210S850T231XXC	60	85	90 ~ 110	165	230	400
JMV1210S101T111XXC	75	100	108 ~ 132	190	110	200
JMV1210S121T141XXC	107	120	135 ~ 165	220	140	200

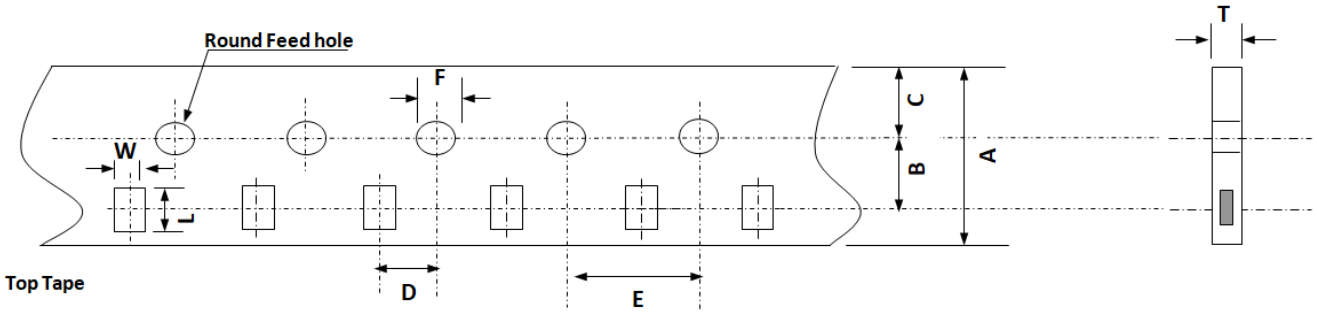
	Working Voltage		Varistor Voltage	Clamping Voltage	Capacitance	Peak Current
Symbol	V_{RMS}	V_{DC}	V_V	V_C	C_P	i_{max}
Units	Volts (Max.)	Volts (Max.)	Volts	Volts (Max.)	pF (Typical)	Amps (Max.)
Test Condition		< 50 µA	1mA DC	10A @ 8/20µs	1KHz	8/20µs
JMV2220S160T103XXC	14	16	21.4 ~ 27.8	55	10000	1500
JMV2220S160T193XXC	14	16	21.4 ~ 27.9	55	19000	4000
JMV2220S160T273XXC	14	16	21.4 ~ 27.9	55	27000	5000
JMV2220S380T382XXC	30	38	42.3 ~ 51.7	77	3800	1200
JMV2220S630T692XXC	50	63	69.3 ~ 84.7	115	6900	4500
JMV2220S650T192XXC	50	65	73.8 ~ 90.2	135	1900	800
JMV2220S650T652XXC	50	65	73.8 ~ 90.2	140	6500	4500
JMV2220S850T102XXC	60	85	90 ~ 110	165	1000	800

Reliability and Test Condition

Test item	Test condition	Reference
Resistance to Solder Heat	1. Solder temperature : 260 ± 5°C. 2. Flux : Rosin. 3. DIP time : 10 ± 1 sec.	MIL-STD-202 Method 210F
Temperature Cycle	1. Temperature:-40°C/85°C For 30 minutes each temperature. 2. Cycle: 100 cycles. 3. Measurement: At room temperature 24 hours after test completion.	JESD22 Method JA-104
High Temperature Life	1. Temperature: 125 ± 2°C. 2. Testing time: 1000 hrs. 3. Applied rated source. 4. Measurement: At room temperature 24 hours after test completion.	MIL-STD-202 Method 108
Bias Humidity Test	1. Temperature: 85 ± 2°C. 2. Humidity: 85% RH. 3. Applied rated source. 4. Testing time: 1000 hrs. 5. Measurement: At room temperature 24 hours after test completion.	MIL-STD-202 Method 103
Solderability	1. 8 hours ± 15 min. steam conditioning 2. Solder temperature : 260 ± 5°C. 3. Flux : Rosin. 4. DIP time : 10 ± 1 sec.	J-STD-002
Resistance to Solvent	1. Immerse the chips in the IPA solution with ultrasonic. 2. Testing time: 5 min. 3. Measurement: At room temperature 1 hours after test completion.	MIL-STD-202 Method 215
Moisture Sensitivity	1. Temperature: 85 ± 2°C. 2. Humidity: 85% RH. 3. Testing time: 168 hrs.	J-STD-020

PACKAGING SPECIFICATIONS

Carrier Tape Specifications

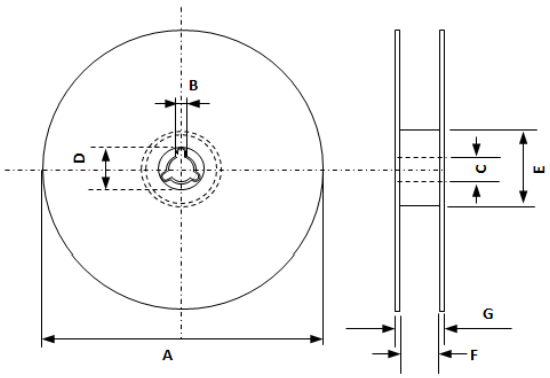


Dimensions of Paper Tape

Unit in mm

SIZE	A	B ± 0.05	C	D ± 0.05	E ± 0.1	F	L	W	T	Quantity Reel (pcs)
0402	8.0 ± 0.1	3.5	1.75 ± 0.05	2.0	4.0	1.55 ± 0.05	1.12 ± 0.03	0.59 ± 0.03	0.60 ± 0.03	10,000
0603	8.0 ± 0.3	3.5	1.75 ± 0.10	2.0	4.0	1.50 ± 0.10	1.90 ± 0.15	1.05 ± 0.15	0.60 ± 0.03	4,000
0805	8.0 ± 0.3	3.5	1.75 ± 0.10	2.0	4.0	1.50 ± 0.10	2.30 ± 0.15	1.55 ± 0.15	0.95 ± 0.05	4,000
1206	8.0 ± 0.3	3.5	1.75 ± 0.10	2.0	4.0	1.50 ± 0.10	3.50 ± 0.15	1.90 ± 0.15	0.95 ± 0.05	4,000
1210	8.0 ± 0.3	3.5	1.75 ± 0.10	2.0	4.0	1.50 ± 0.10	3.63 ± 0.10	2.84 ± 0.10	1.50 ± 0.10	2,000

Reel Specifications



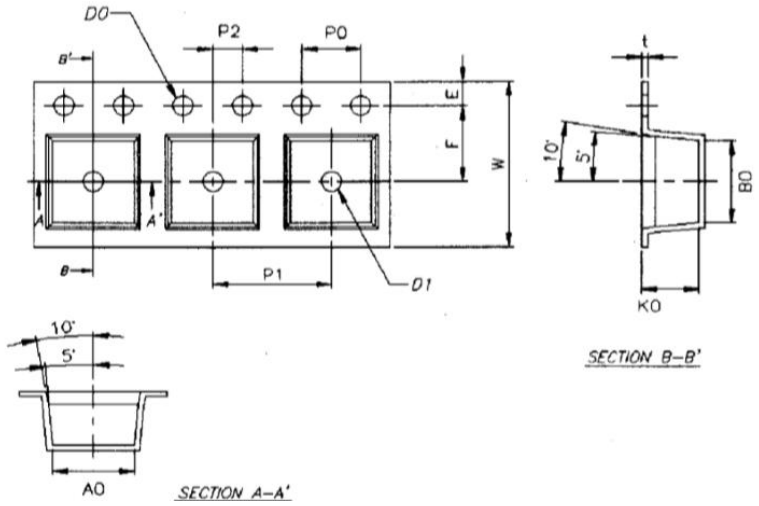
Dimensions

Unit in mm

SIZE	A	B	C	D	E	F	G
0402	178 ± 2.0	2.0 ± 0.5	13.0 ± 0.5	21.0 ± 0.8	62.0 ± 1.5	9.0 ± 0.5	13.0 ± 1.0
0603	178 ± 2.0	2.0 ± 0.5	13.0 ± 0.5	21.0 ± 0.8	62.0 ± 1.5	9.0 ± 0.5	13.0 ± 1.0
0805	178 ± 2.0	2.0 ± 0.5	13.0 ± 0.5	21.0 ± 0.8	62.0 ± 1.5	9.0 ± 0.5	13.0 ± 1.0
1206	178 ± 2.0	2.0 ± 0.5	13.0 ± 0.5	21.0 ± 0.8	62.0 ± 1.5	9.0 ± 0.5	13.0 ± 1.0
1210	178 ± 2.0	2.0 ± 0.5	13.0 ± 0.5	21.0 ± 0.8	62.0 ± 1.5	9.0 ± 0.5	13.0 ± 1.0

PACKAGING SPECIFICATIONS

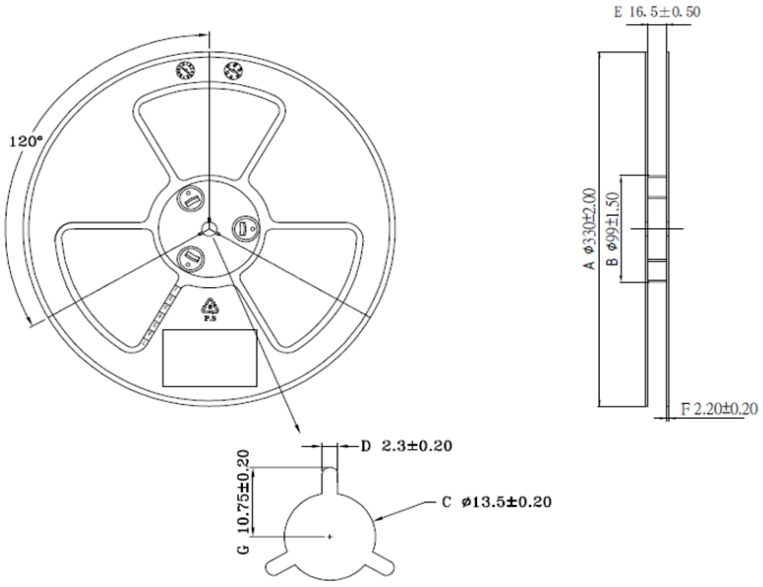
Carrier Tape Specifications



Unit in mm

SIZE	W	E	F	D0		D1	P0	P1	P2	P0 x10
2220	12.00 ±0.30	1.75 ±0.10	5.5 ±0.05	1.5 +0.10/-0.00		1.5 +0.10/-0.00	4.00 ±0.10	8.00 ±0.10	2.00 ±0.05	40.00 ±0.20
	t	A0	B0	K0						
	0.40 ±0.05	5.45 ±0.05	5.95 ±0.05	3.20 ±0.10	4.10 ±0.10					

Reel Specifications



Unit in mm

SIZE	A	B	C	D	E	F	G
2220	330 ± 2.0	99 ± 1.50	13.5 ± 0.20	2.3 ± 0.20	16.5 ± 0.50	2.2 ± 0.20	10.75 ± 0.20