

APPROVAL SHEET

PRODUCT	<u>Multilayer Chip Varistor</u>		
SERIES	JMV-S Series JMV-S Automotive Series JMV-C Series JMV-E Series JMV-N Series JMV-B Series		
PART NO.			
ISSUE DATE	2023/6/5	REVISION DATE	
REFERENCE NO.			
		RoHS COMPLIANCE ITEM	
		Halogen Free	

CUSTOMER APPROVAL	
CUSTOMER	CUSTOMER PN

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INTRODUCTION

▪ Joyin's metal oxide based chip varistor (JMV) are used for transient voltage suppression. JMV has non-linear voltage current behavior which is similar to Zener Diode.

▪ 久尹的金屬氧化物電阻 (JMV) 用於抵制瞬間電壓，
JMV具有與二極體相似的非線性電壓電流特性。

▪ Since each grain in JMV exhibits small p-n-p junction, it has much better electrical reliability than Zener Diode. Furthermore, JMV also exhibits better electrical properties, such as excellent clamping voltage and low leakage current.

▪ 由於JMV中的每一晶粒都具有細小的p-n-p結，因此比二極體具有更好且可靠的電性。

此外，JMV還具有更好的電氣特性，例如優良的抑制電壓和低漏電流。

▪ ESD Protection Introduction ESD (Electrostatic Discharge)

The static to damage electronic devices is a problem not easy to resolve. Once the electronic devices are damaged by ESD, it will usually appear abnormal situation. If it's not a serious problem, it needs to reset for equipment. If it's a serious damage, the products will be broken. Static electricity is ubiquitous, mostly caused by human. For example, in the manufacturing process of electronic components, product assembly, transportation, storage environment, etc.. In the dry environment, the air flow causes molecules to rub against each other, which also leads to more significant electrostatic effect.

▪ 防靜電保護介紹

靜電放電

ESD對電子產品的傷害一直是不易解決的問題。一般電子產品受到ESD作用時會出現不穩定的狀況，輕微的只需要重開機即可，嚴重可能導致電子產品內的電子元件毀損。靜電無所不在，多是人為造成，例如：電子元件製造過程中、產品組裝、搬運過程、儲存環境等。在乾燥的環境下加上空氣的流動造成分子互相摩擦，也會導致靜電作用更加顯著。



INTRODUCTION

▪ Electrostatic discharge current test level

LEVEL	Contact discharge	Air discharge	1 st peak current of discharge (±10%)	30ns discharge current (±30%)	60ns discharge current (±30%)
1	±2KV	±2KV	5A	4A	2A
2	±4KV	±4KV	15A	8A	4A
3	±6KV	±8KV	22.5A	12A	6A
4	±8KV	±15KV	30A	16A	8A

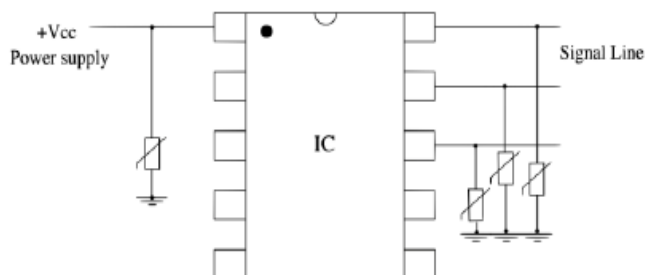
▪ ESD test result judgment

As per the IEC61000-4-2, the test product is accept when it meet the requirement of Level A or Level B.

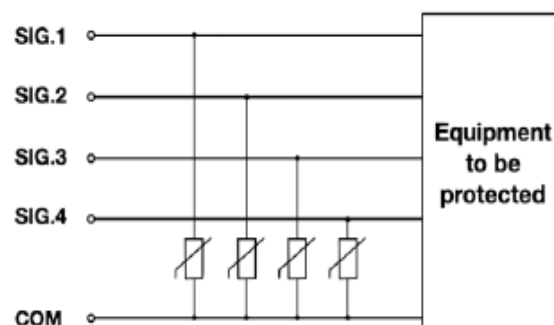
LEVEL	Test result	Judgment
A	No effect, the function is normal during test process.	Qualified
B	The function is affected temporary but will recover.	Qualified
C	The function appears abnormal situation and needs to reset or re-start by hand.	Unqualified
D	The function won't recover any more even re-start and damaged.	Unqualified

▪ MLV Protection Application and Circuit

IC Protection against Electro-static Discharge



Noise Suppression

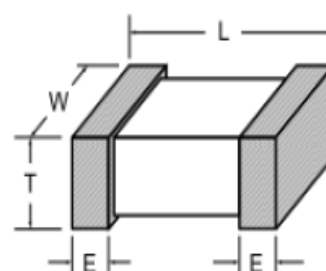
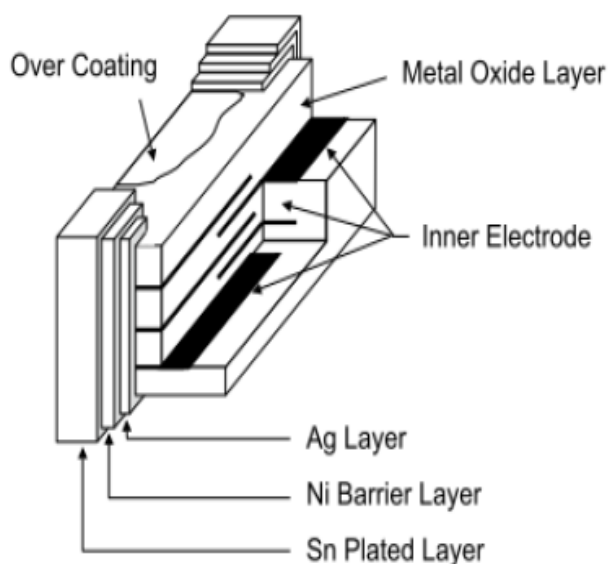


MULTILAYER VARISTOR

▪ ADVANTAGE

- ① Lead free plating termination provided
- ② Insulator over coat keeps excellent low and stable leakage current

▪ CONSTRUCTION



▪ PRODUCT SERIES

PN Series	SIZE								Vdc (V)								Varistor Voltage (V)											
	0201	0402	0603	0805	1206	1210	1812	2220	5.5	12	18	26	42	65	85	7.6	8	9	11	12	15	18	21	22	25	75	90	120
JMV-S series																												
JMV-C series																												
JMV-E series																												

PN Series	SIZE					Vdc (V)							Varistor Voltage (V)														
	0402	0603	0805	1206	2220	3.3	5.5	12	26	42	65	85	4	7.6	8	9	11	12	15	18	21	22	25	75	92	120	
JMV-S Automotive series																											

JMV-S Series

▪ FEATURES

- SMD type zinc oxide based ceramic chip
- Quick response time (<1ns)
- High transient current capability
- Meet IEC 61000-4-2 standard
- Meet IEC 61000-4-5 standard
- Compact size for EIA 0201/0402/0603/0805/1206/1210/1812/2220

▪ APPLICATIONS

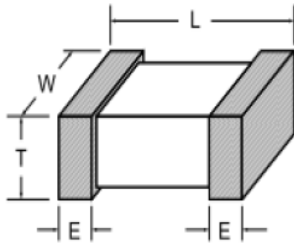
Mother Board and Notebook, Cellular Phone, PDA, handheld device, DSC, DV, Scanner, and Set-Top Box etc.

▪ EXPLANATION OF PART NUMBER

JMV	0201	S	5R5	T	330	XXG
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 Internal ID
④ Max DC working voltage	

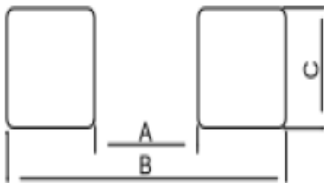
JMV-S Series



Unit : mm

• DIMENSION

EIA	L	W	T	E
0201	0.60±0.05	0.30±0.05	0.30±0.05	0.20±0.10
0402	1.00±0.10	0.50±0.10	0.34±0.10	0.20±0.15
0603	1.60±0.10	0.85±0.15	0.51±0.05	0.30±0.20
0805	2.00±0.20	1.25±0.15	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
1812	4.50±0.40	3.20±0.30	2.5 max	0.60±0.30
2220	5.70±0.40	5.20±0.40	4.0 max	1.4 max



Unit : mm

• SOLDER LAND INFORMATION

Size(EIA)	A	B	C
0201	0.30	0.80	0.30
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
1812	3.00	6.00	3.60
2220	4.20	7.20	5.50

• STANDARD PACKING

Size(EIA)	0201	0402	0603	0805	1206	1210	1812	2220
Quantity (pcs/reel)	15,000	10,000	4,000	4,000	4,000	2,000	1,000	1,500

JMV-S Series

• SPECIFICATIONS

	Working Voltage		Varistor Voltage		Clamping Voltage	Capacitance
Symbol	V _{RMS}	V _{DC}	V _V	V _V	V _C	C _P
Units	Volts	Volts (Max.)	Volts		Volts (Max.)	pF (Typical)
Test Condition		< 10 μ A	1mA DC		1A @ 8/20 μ s	1MHz
JMV0201S5R5T100XXG	4	5.5	11	± 3	31	10
JMV0201S5R5T330XXG	4	5.5	11	± 3	28	33
JMV0201S5R5T470XXG	4	5.5	11	± 3	26	47
JMV0201S5R5T640XXG	4	5.5	11	± 3	26	64
JMV0201S070T2R5XXG	5	7	40	± 10	90	2.5
JMV0201S120T2R5XXG	8	12	40	± 10	90	2.5

	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	Volts (Max.)	Volts	Volts (Max.)	pF (Typical)	Amps (Max.)	Joules (Max.)
Test Condition		< 10 μ A	1mA DC	1A @ 8/20 μ s	1MHz	8/20 μ s	10/1000 μ s
JMV0402S5R5T271XXG	4	5.5	8~18	24	270	20	0.05
JMV0402S090T131XXG	7	9	11.5~21.5	41	130	20	0.05
JMV0402S180T850XXG	14	18	23~33	54	85	20	0.05
JMV0402S200T350XXG	17	20	32~43	70	35	20	0.05
JMV0603S5R5T271XXG	4	5.5	8~18	24	270	30	0.1
JMV0603S090T211XXG	6	9	11.5~21.5	41	210	30	0.1
JMV0603S180T151XXG	14	18	23~33	54	150	30	0.1
JMV0603S260T101XXG	20	26	32~42	70	100	30	0.1

	Working Voltage		Varistor Voltage	Clamping Voltage	Capacitance
Symbol	V _{RMS}	V _{DC}	V _V	V _C	C _P
Units	Volts	Volts (Max.)	Volts	Volts (Max.)	pF (Typical)
Test Condition		< 10 μ A	1mA DC	1A @ 8/20 μ s	1MHz
JMV0402S120T070XXG	9	12	25~40	110	7.0
JMV0402S120T3R5XXG	9	12	45~65	150	3.5
JMV0402S180T151XXG	13	18	45~65	150	3.5
JMV0402S260T040XXG	19	26	45~65	145	4.0
JMV0603S120T400XXG	9	12	25~40	110	40.0
JMV0603S120T3R5XXG	9	12	45~65	150	3.5
JMV0603S260T040XXG	19	26	45~65	145	4.0

JMV-S Series

• SPECIFICATIONS

	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	Volts (Max.)	Volts	Volts (Max.)	pF (Typical)	Amps (Max.)	Joules (Max.)
Test Condition		< 10 μA	1mA DC	1A @ 8/20 μs	1KHz	8/20 μs	10/1000 μs
JMV0805S5R5T501XXG	4	5.5	7.8~12.0	22	500	80	0.1
JMV0805S090T421XXG	6	9	10.8~18.0	30	420	80	0.2
JMV0805S110T361XXG	8	11	14.0~20.0	32	360	100	0.3
JMV0805S140T401XXG	11	14	17.2~21.0	38	400	100	0.1
JMV0805S160T401XXG	14	16	22.0~28.0	46	400	120	0.3
JMV0805S180T351XXG	14	18	19.8~25.2	44	350	120	0.3
JMV0805S220T101XXG	17	22	25.0~34.0	54	100	30	0.1
JMV0805S220T401XXG	17	22	24.3~30.7	50	400	120	0.3
JMV0805S260T221XXG	20	26	29.7~37.3	56	220	100	0.4
JMV0805S310T251XXG	25	31	35.1~43.9	71	250	100	0.3
JMV0805S380T201XXG	30	38	42.3~52.7	81	200	100	0.3
JMV0805S450T171XXG	35	45	55.0~61.0	93	170	80	0.1

	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	Volts (Max.)	Volts	Volts (Max.)	pF (Typical)	Amps (Max.)	Joules (Max.)
Test Condition		< 50 μA	1mA DC	1A @ 8/20 μs	1KHz	8/20 μs	10/1000 μs
JMV1206S5R6T152XXR	4	5.6	7.0~10.0	22	1500	150	1.0
JMV1206S120T801XXR	9	12	14.0~18.3	34	800	150	0.6
JMV1206S140T401XXR	10	14	16.2~19.8	37	400	100	0.3
JMV1206S140T801XXR	10	14	16.2~19.8	37	800	200	0.5
JMV1206S160T132XXR	12	16	19.8~24.2	40	1300	200	1.0
JMV1206S180T132XXR	13	18	21.6~26.0	48	1300	200	1.0
JMV1206S180T901XXR	13	18	21.6~26.0	48	900	100	0.3
JMV1206S260T901XXR	19	26	31.0~38.0	62	900	200	1.0
JMV1206S300T201XXR	22	30	37.0~46.0	73	200	100	0.3
JMV1206S300T401XXR	22	30	37.0~46.0	73	400	100	0.3
JMV1206S300T551XXR	22	30	37.0~46.0	73	550	200	1.0
JMV1206S330T551XXR	24	33	39.0~47.0	75	550	180	1.0
JMV1206S380T501XXR	27	38	42.3~51.7	88	500	200	1.1
JMV1206S450T551XXR	32	45	50.4~61.6	95	550	180	0.8
JMV1206S480T251XXR	34	48	55.8~68.2	100	250	100	0.8
JMV1206S560T101XXR	40	56	61.0~77.0	120	100	100	0.3
JMV1206S560T381XXR	40	56	61.0~77.0	120	380	180	1.0
JMV1206S650T241XXR	46	65	73.8~90.2	135	240	100	0.6

JMV-S Series

• SPECIFICATIONS

	Working Voltage		Varistor Voltage	Clamping Voltage	Capacitance	Peak Current
Symbol	V_{RMS}	V_{DC}	V_V	V_C	C_P	i_{max}
Units	Volts	Volts (Max.)	Volts	Volts (Max.)	pF (Typical)	Amps (Max.)
Test Condition		< 50 μ A	1mA DC	2.5A @ 8/20 μ s	1KHz	8/20 μ s
JMV1210S5R6T502XXR	4	5.6	7.0~10.0	22	5000	250
JMV1210S180T202XXR	13	18	21.6~26.0	48	2000	400
JMV1210S220T182XXR	16	22	24.3~29.7	52	1800	400
JMV1210S260T112XXR	19	26	31.0~38.0	62	1100	250
JMV1210S260T152XXR	19	26	31.0~38.0	62	1500	400
JMV1210S300T901XXR	22	30	37.0~46.0	77	900	250
JMV1210S300T122XXR	22	30	37.0~46.0	77	1200	400
JMV1210S450T951XXR	32	45	50.4~61.6	95	950	250

	Working Voltage		Varistor Voltage	Clamping Voltage	Capacitance	Peak Current
Symbol	V_{RMS}	V_{DC}	V_V	V_C	C_P	i_{max}
Units	Volts	Volts (Max.)	Volts	Volts (Max.)	pF (Typical)	Amps (Max.)
Test Condition		< 50 μ A	1mA DC	2.5A @ 8/20 μ s	1KHz	8/20 μ s
JMV1812S180T452XXR	13	18	21.6~26.0	48	4500	800
JMV1812S220T352XXR	16	22	24.3~29.7	52	3500	500
JMV1812S220T402XXR	16	22	24.3~29.7	52	4000	800
JMV1812S260T282XXR	19	26	31.0~38.0	65	2800	500
JMV1812S260T302XXR	19	26	31.0~38.0	65	3000	800
JMV1812S300T252XXR	22	30	37.0~46.0	78	2500	800
JMV1812S380T202XXR	27	38	42.3~51.7	88	2000	800

	Working Voltage		Varistor Voltage	Clamping Voltage	Capacitance	Peak Current
Symbol	V_{RMS}	V_{DC}	V_V	V_C	C_P	i_{max}
Units	Volts	Volts (Max.)	Volts	Volts (Max.)	pF (Typical)	Amps (Max.)
Test Condition		< 50 μ A	1mA DC	10A @ 8/20 μ s	1KHz	8/20 μ s
JMV2220S5R6T203XXR	4	5.6	7.0~10.0	19	20000	1200
JMV2220S180T153XXR	13	18	22.0~27.0	56	15000	1200
JMV2220S300T502XXR	22	30	37.0~46.0	85	5000	1200
JMV2220S380T402XXR	27	38	42.3~51.7	88	4000	1200

JMV-S Automotive Serie

▪ 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

▪ APPLICATIONS

Protection against automotive related transient overvoltage.

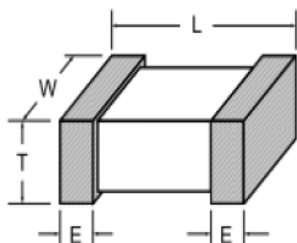
▪ EXPLANATION OF PART NUMBER

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	

JMV-S Automotive Serie

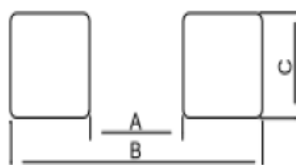
• DIMENSION



Unit : mm

EIA	L	W	T	E
0402	0.96±0.12	0.48±0.07	0.50±0.10	0.25±0.15
0603	1.60±0.15	0.80±0.10	0.80±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

• 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

• STANDARD PACKING

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

JMV-S Automotive Serie



• SPECIFICATIONS

	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 μ A	1mA DC	1A @ 8/20 μ s	1MHz	8/20 μ s	10/1000 μ s
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

	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 μ A	1mA DC	1A @ 8/20 μ s	1MHz	8/20 μ s	10/1000 μ s
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 [1MH]	30	0.10
JMV0603S090T241X1C	7	9	11 ~ 15.5	30	240 [1MH]	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

JMV-S Automotive Serie



• SPECIFICATIONS

	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 @ 8/20 μs	1MHz	8/20 μs	10/1000 μs
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

	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 @ 8/20 μs	1KHz	8/20 μs	10/1000 μs
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	0.5
JMV1206S850T121XXC	60	85	100 ~ 120	168	120	100	0.7

	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	1A @ 8/20 μs	1KHz	8/20 μs
JMV2220S160T832XXC	14	16	21.4 ~ 27.8	55	8300	1500
JMV2220S160T193XXC	14	16	21.4 ~ 27.9	55	19000	4000
JMV2220S650T652XXC	50	65	73.8 ~ 90.2	140	6500	4500

JMV-C Series

▪ FEATURES

- Lead free type
- SMD type zinc oxide based ceramic chip
- Quick response time (<1ns)
- Low clamping voltage
- Meet IEC 61000-4-2 standard
- Low capacitance can meet high speed signal transient voltage protection
- Compact size for EIA 0402 / 0603

▪ APPLICATIONS

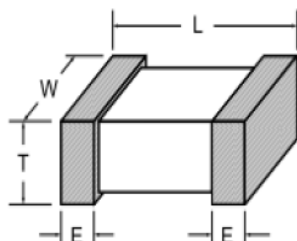
Low Capacitance Product Applications for High Speed I/O port such as HDMI, DVI, USB, and IEEE1394 etc. Normal capacitance product applications for I/O Port such as RS232, USB, PS2, VGA, Audio on Mother Board and Notebook, Set-Top Box, MP3 Players, DVD Players, and Docking System etc.

▪ EXPLANATION OF PART NUMBER

JMV	0402	C	5R5	T	050	XXG
①	②	③	④	⑤	⑥	⑦

① Joyin Multilayer Varistor	⑤ Tape on reel
② Chip size	⑥ Optional Suffix
③ ESD Protection Only	⑦ Internal ID
④ Max DC working voltage	

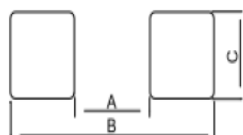
JMV-C Series



Unit : mm

• DIMENSION

EIA	L	W	T	E
0402	0.96±0.12	0.48±0.07	0.50±0.10	0.25±0.15
0603	1.60±0.15	0.80±0.10	0.80±0.10	0.30±0.20



Unit : mm

• SOLDER LAND INFORMATION

Size(EIA)	A	B	C
0402	0.50	1.70	0.50
0603	0.50	2.50	0.76

• STANDARD PACKING

Size(EIA)	0402	0603
Quantity (pcs/reel)	10,000	4,000

JMV-C Series

• SPECIFICATIONS

	Working Voltage	Varistor Voltage	Clamping Voltage	Capacitance
Symbol	V_{DC}	V_V	V_C	C_P
Units	Volts (Max.)	Volts	Volts (Max.)	pF
Test Condition	< 10 μ A	1mA DC	1A @ 8/20 μ s	1MHz
JMV0402C180T0R5XXG	18	90 ~ 120	250*	0.5
JMV0402C180T010XXG	18	46 ~ 60	110*	1
JMV0402C180T030XXG	18	22 ~ 34	58	3
JMV0402C180T100XXG	18	22 ~ 34	58	10
JMV0402C180T220XXG	18	22 ~ 34	58	22
JMV0402C180T900XXG	18	22 ~ 34	58	90
JMV0402C5R5T030XXG	5.5	46 ~ 60	105	3
JMV0402C5R5T050XXG	5.5	7.6 ~ 12	25	5
JMV0402C5R5T220XXG	5.5	7.6 ~ 12	25	22
JMV0402C5R5T101XXG	5.5	7.6 ~ 12	25	100
JMV0402C5R5T221XXG	5.5	7.6 ~ 12	25	220
JMV0402C090T050XXG	9	11 ~ 17	35	5
JMV0402C090T220XXG	9	11 ~ 17	35	22
JMV0402C260T050XXG	26	46 ~ 60	110	5
JMV0402C420T030XXG	42	46 ~ 75	135	3

	Working Voltage	Varistor Voltage	Clamping Voltage	Capacitance
Symbol	V_{DC}	V_V	V_C	C_P
Units	Volts (Max.)	Volts	Volts (Max.)	pF
Test Condition	< 10 μ A	1mA DC	1A @ 8/20 μ s	1MHz
JMV0603C180T0R5XXG	18	90 ~ 120	250*	0.5
JMV0603C180T010XXG	18	46 ~ 60	110*	1
JMV0603C180T030XXG	18	22 ~ 34	58	3
JMV0603C180T030X1G	18	46 ~ 60	110	3
JMV0603C180T101XXG	18	22 ~ 34	58	100
JMV0603C180T221XXG	18	22 ~ 34	58	220
JMV0603C5R5T050XXG	5.5	7.6 ~ 12	25	5
JMV0603C5R5T220XXG	5.5	7.6 ~ 12	25	22
JMV0603C090T050XXG	9	11 ~ 17	35	5
JMV0603C090T220XXG	9	11 ~ 17	35	22
JMV0603C420T030XXG	42	46 ~ 75	135	3

JMV-E Series

▪ FEATURES

- Dual function for EMI and ESD
- Compact size EIA 0402 / EIA 0603
- ESD protection for IEC61000-4-2 Level 4
- Fixed capacitance suitable for high-speed I/O port transient voltage protection
- Compact size EIA 0402 / 0603

▪ APPLICATIONS

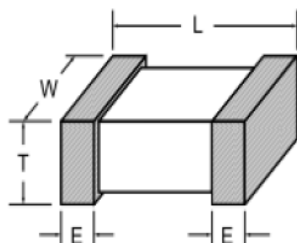
Motherboard, notebook (RS232, USB, PS2, VGA and Audio), Set-Top Box, MP3 Players, DVD Players, and docking system, etc.

▪ EXPLANATION OF PART NUMBER

JMV	0402	E	5R5	T	330	XXG
①	②	③	④	⑤	⑥	⑦

① Joyin Multilayer Varistor	⑤ Tape on reel
② Chip size	⑥ Optional Suffix
③ ESD Protection Only	⑦ Internal ID
④ Max DC working voltage	

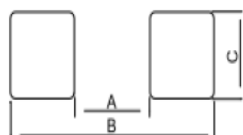
JMV-E Series



Unit : mm

• DIMENSION

EIA	L	W	T	E
0402	0.96±0.12	0.48±0.07	0.50±0.10	0.25±0.15
0603	1.60±0.15	0.80±0.10	0.80±0.10	0.30±0.20



Unit : mm

• SOLDER LAND INFORMATION

Size(EIA)	A	B	C
0402	0.50	1.70	0.50
0603	0.50	2.50	0.76

• STANDARD PACKING

Size(EIA)	0402	0603
Quantity (pcs/reel)	10,000	4,000

JMV-E Series

• SPECIFICATIONS

	Working Voltage	Varistor Voltage	Clamping Voltage	Capacitance
Symbol	V_{DC}	V_V	V_C	C_P
Units	Volts (Max.)	Volts	Volts (Max.)	pF
Test Condition	< 10 μ A	1mA DC	1A @ 8/20 μ s	1MHz
JMV0402E5R5T100XXG	5.5	11 ~ 21	40	10 $\pm$ 30%
JMV0402E5R5T330XXG	5.5	11 ~ 21	38	33 $\pm$ 30%
JMV0402E5R5T470XXG	5.5	9 ~ 19	36	47 $\pm$ 30%
JMV0402E5R5T101XXG	5.5	9 ~ 19	35	100 $\pm$ 30%
JMV0402E5R5T181XXG	5.5	8 ~ 18	34	180 $\pm$ 30%
JMV0402E5R5T331XXG	5.5	8 ~ 18	32	330 $\pm$ 30%

	Working Voltage	Varistor Voltage	Clamping Voltage	Capacitance
Symbol	V_{DC}	V_V	V_C	C_P
Units	Volts (Max.)	Volts	Volts (Max.)	pF
Test Condition	< 10 μ A	1mA DC	1A @ 8/20 μ s	1MHz
JMV0603E5R5T100XXG	5.5	11 ~ 21	40	10 $\pm$ 30%
JMV0603E5R5T330XXG	5.5	11 ~ 21	38	33 $\pm$ 30%
JMV0603E5R5T470XXG	5.5	9 ~ 19	37	47 $\pm$ 30%
JMV0603E5R5T101XXG	5.5	9 ~ 19	36	100 $\pm$ 30%
JMV0603E5R5T331XXG	5.5	8 ~ 18	32	330 $\pm$ 30%
JMV0603E5R5T102XXG	5.5	8 ~ 18	30	1000 $\pm$ 30%
JMV0603E120T220XXG	12	15 ~ 25	46	22 $\pm$ 30%
JMV0603E120T151XXG	12	15 ~ 25	44	150 $\pm$ 30%
JMV0603E120T331XXG	12	15 ~ 25	42	330 $\pm$ 30%

JMV-N Series

▪ FEATURES

- RoHS compliant
- Meet IEC61000-4-5 standard (Pass 10/700µs 40Ω surge 4~8KV test)
- SMD type zinc oxide based ceramic chip
- Insulator over coat keeps excellent low and stable leakage current
- Quick response time (<0.5ns)
- High transient current capability
- High reliability
- Compact size for EIA1210

▪ APPLICATIONS

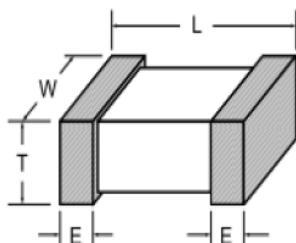
Protection against high working voltage and Network applications related transient overvoltage

▪ EXPLANATION OF PART NUMBER

JMV	1210	N	600	T	602	AXG
①	②	③	④	⑤	⑥	⑦

① Joyin Multilayer Varistor	⑤ Tape on reel
② Chip size	⑥ Surge voltage
③ Networking series	⑦ Internal ID
④ Working Voltage	

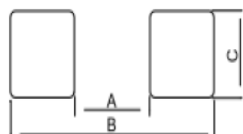
JMV-N Series



• DIMENSION

Unit : mm

EIA	L	W	T	E
1210	3.20±0.25	2.50±0.25	2.75 max	0.50±0.25



• SOLDER LAND INFORMATION

Unit : mm

Size(EIA)	A	B	C
1210	2.10	4.50	2.80

• STANDARD PACKING

Size(EIA)	1210
Quantity (pcs/reel)	2,000

JMV-N Series

• SPECIFICATIONS

	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			1mA DC	2.5A @ 8/20 μ s	1KHz	8/20 μ s
JMV1210N240T602AXG	17	24	27~34	50	5000	2000
JMV1210N380T402AXG	25	38	41~51	70	2400	1500
JMV1210N380T602AXG	25	38	41~51	70	2500	1500
JMV1210N600T402AXG	48	60	69~83	115	1300	1200
JMV1210N600T602AXG	48	60	69~83	115	1350	1200
JMV1210N600T802AXG	48	60	69~83	115	1400	1200
JMV1210N650T602AXG	50	65	73~91	120	900	900

V_{RMS} – Maximum AC operating voltage the varistor can maintain and not exceed 15 μ A leakage current.

V_{DC} – Maximum DC operating voltage the varistor can maintain and not exceed 15 μ A leakage current.

V_V –Voltage across the device measured at 1mA DC current. Equivalent to V_b , “Breakdown Voltage”.

V_C – Maximum peak voltage across the varistor measured at 8/20 μ s waveform and 2.5A pulse current.

C_P – Device capacitance measured with zero volt bias 1Vrms.

i_{max} – Maximum peak current which may be applied with 8/20 μ s waveform without device failure.

JMV-B Series

▪ FEATURES

- SMD type zinc oxide based ceramic chip
- Lead free plating termination provided good solderability characteristic
- Insulator over coat keeps excellent low and stable leakage current
- Quick response time (<1ns)
- Low clamping voltage
- High transient current capability (Peak surge current : 1.5KA~4.5KA)
- High reliability
- Meet IEC 61000-4-5 standard
- Compact size for EIA2220

▪ APPLICATIONS

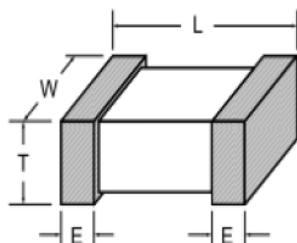
Suitable for base station, Power Line and Low Frequency single line over voltage protect.

▪ EXPLANATION OF PART NUMBER

JMV	2220	B	101	K	452	XXG
①	②	③	④	⑤	⑥	⑦

① Joyin Multilayer Varistor	⑤ Breakdown Voltage Tolerance
② Chip size	⑥ Surge Current
③ Base station series	⑦ Internal ID
④ Breakdown Voltage	

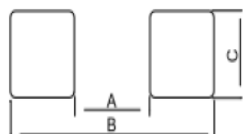
JMV-B Series



• DIMENSION

Unit : mm

EIA	L	W	T	E
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
2220	4.20	7.20	5.50

• STANDARD PACKING

Size(EIA)	2220
Quantity (pcs/reel)	1,500

JMV-B Series

• SPECIFICATIONS

	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			1mA DC	8/20 μ s	1KHz	8/20 μ s
JMV2220B250K152XXG	14	16	21.4~27.8	55	8300	1500
JMV2220B250K402XXG	14	16	21.4~27.9	55	19000	4000
JMV2220B820K452XXG	50	65	73.8~90.2	140	6500	4500

V_{RMS} – Maximum AC operating voltage the varistor can maintain and not exceed 50 μ A leakage current

V_{DC} – Maximum DC operating voltage the varistor can maintain and not exceed 50 μ A leakage current

V_V –Voltage across the device measured at 1mA DC current. Equivalent to V_b , “Breakdown Voltage”.

V_C – Maximum peak voltage across the varistor measured at 8/20 μ s waveform

C_P – Device capacitance measured with zero volt bias 1Vrms.

i_{max} – Maximum peak current which may be applied with 8/20 μ s waveform without device failure

8/20 μ s : Calibration method by short circuit

Reliability and Test Condition

For General Products

Test item	Test condition	Reference
Resistance to Solder Heat	1. Solder temperature : $260 \pm 5^{\circ}\text{C}$ 2. Flux : Rosin 3. DIP time : 10 ± 1 sec	MIL-STD-202 Method 210F
Temperature Cycle	1. Temperature : $-40^{\circ}\text{C}/85^{\circ}\text{C}$ For 30 minutes each temperature 2. Cycle : 100 cycles 3. Measurement : At room temperature 24 hours after test completion	JESD22 MIL STD 202-107
High Temperature Life	1. Temperature : $85 \pm 2^{\circ}\text{C}$ 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 : $40 \pm 2^{\circ}\text{C}$ 2. Humidity : 90% 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 $\pm$ 15 min steam conditioning 2. Solder temperature : $245 \pm 5^{\circ}\text{C}$ 3. Flux : Rosin 4. DIP time : 5 ± 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 24 hours after test completion	MIL-STD-202 Method 215
Moisture Sensitivity	1. Temperature : $85 \pm 2^{\circ}\text{C}$ 2. Humidity : 85% RH 3. Testing time : 168 hrs.	J-STD-020

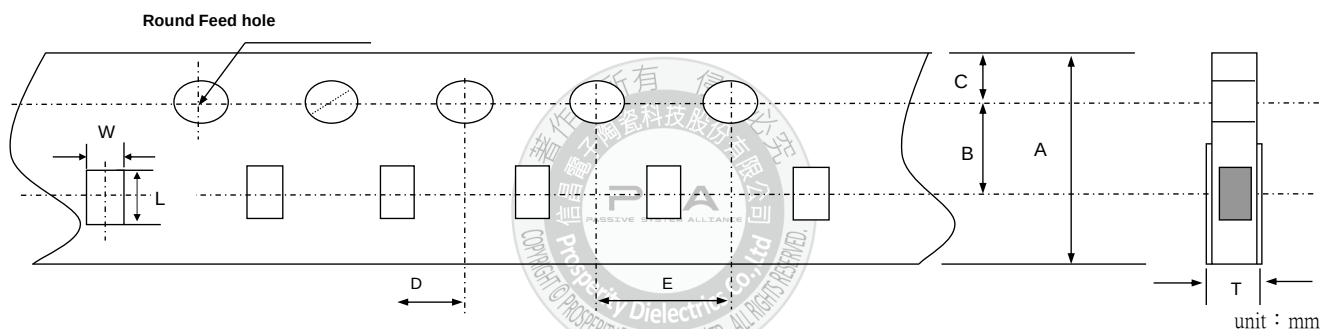
Reliability and Test Condition (AEC-Q200)

For Automotive Products (Passive Component)

Test item	Test condition	Reference
Resistance to Solder Heat	1. Solder temperature : $260 \pm 5^{\circ}\text{C}$. 2. Flux : Rosin. 3. DIP time : 10 ± 1 sec.	MIL-STD-202 Method 210F
Temperature Cycle	1. Temperature: $-40^{\circ}\text{C}/85^{\circ}\text{C}$ 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: $125 \pm 2^{\circ}\text{C}$. 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: $85 \pm 2^{\circ}\text{C}$. 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 $\pm$ 15 min. steam conditioning 2. Solder temperature : $260 \pm 5^{\circ}\text{C}$. 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: $85 \pm 2^{\circ}\text{C}$. 2. Humidity: 85% RH. 3. Testing time: 168 hrs.	J-STD-020

Packaging Specification

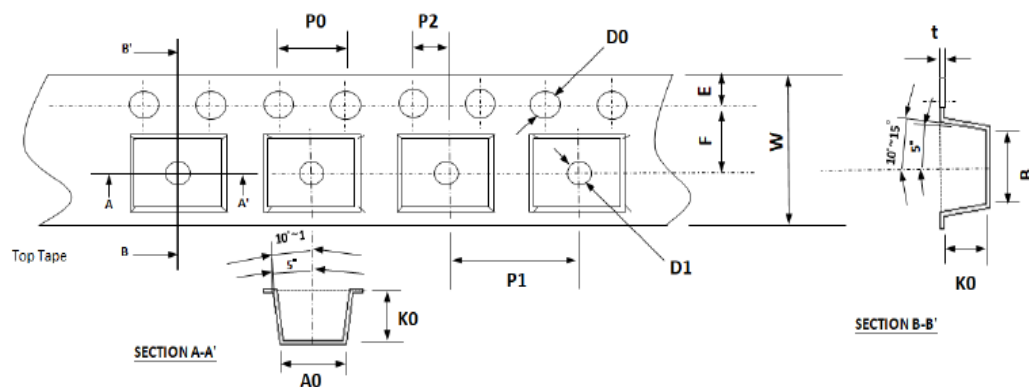
Carrier Tape Specifications



Dimensions of Paper Tape

SIZE	A	B ± 0.05	C	D ± 0.05	E ± 0.1	F	L	W	T	Quantity Reel (pcs)
0201	8.0 ± 0.1	3.5	1.75 ± 0.05	2.0	4.0	1.55 ± 0.05	0.7 ± 0.02	0.36 ± 0.02	0.42 ± 0.02	15,000
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

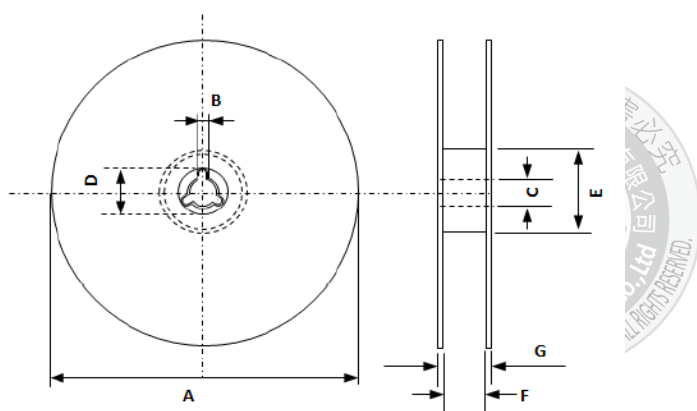
Carrier Tape Specifications



Dimensions of Paper Tape

SIZE	W	E	F	D0	D1	P0	P1	P2	P0 * 10
1812 2220	12.0 ± 0.15	1.75 ± 0.10	5.50 ± 0.10	1.55 ± 0.10	1.55 ± 0.10	4.0 ± 0.10	8.0 ± 0.10	2.0 ± 0.10	40.0 ± 0.20
	12.0 ± 0.30	1.75 ± 0.10	5.50 ± 0.05	1.50 ± 0.10	1.50 ± 0.10	4.0 ± 0.10	8.0 ± 0.10	2.0 ± 0.05	40.0 ± 0.20
	t	A0	B0	K0	Quantity Reel (pcs)				
	0.25 ± 0.50	3.50 ± 0.10	4.90 ± 0.10	2.20 ± 0.10	1,000				
	0.40 ± 0.05	5.45 ± 0.05	5.95 ± 0.05	4.10 ± 0.10	2,000				

Reel Specifications



unit : mm

Dimensions

SIZE	A	B	C	D	E	F	G
0201	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
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
1812	178 ± 1.0	2.0 ± 0.5	13.0 ± 0.5	25.0 ± 1.0	60.2 ± 0.5	13.0 ± 0.5	16.0 ± 0.5
2220	330 ± 2.0	2.3 ± 0.2	13.5 ± 0.2	21.5 ± 0.4	99.0 ± 1.5	16.5 ± 0.5	20.9 ± 0.4