

Metal Oxide Varistors

Surface Mount



MVS Series

MERITEK

Size: 0402, 0603, 0805, 1206, 1210, 1812, 2230, 3220 --- Please see Page 1 to Page 5

Size: 3225, 4032 (Encapsulated Type) --- Please see Page 6 to Page 9

Size: 0402, 0603, 0805, 1206, 1210, 1812, 2220, 3220



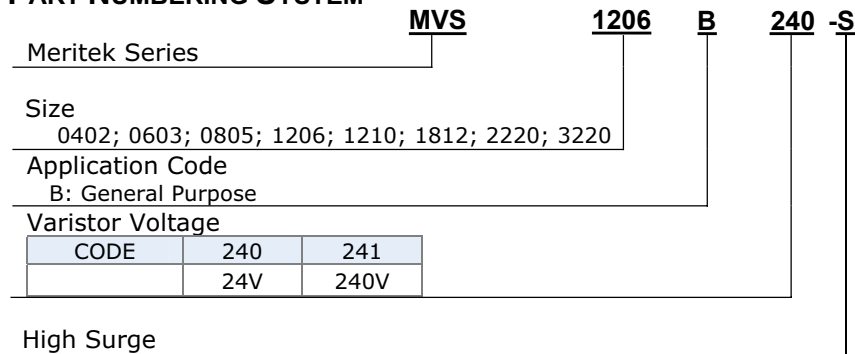
FEATURES

- Working voltage: 5.5 ~ 385 VDC
- -40 ~ +125°C operating temperature range
- Bidirectional and symmetrical V/I characteristics
- Multilayer ceramic construction technology
- Cost effective

RECOMMENDED APPLICATIONS

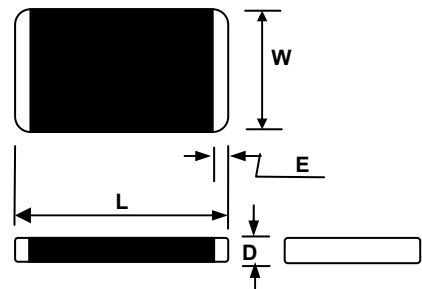
- RF/Handheld Devices
- Telecom / Datacom
- Networking
- Power Supplies
- Instrumentation
- Industrial Controls/Automation

PART NUMBERING SYSTEM



DIMENSIONS

Type	L	W	D	E
	mm	mm	mm	mm
0402	1.0 ± 0.10	0.5 ± 0.10	0.5 ± 0.10	0.25 +0.1/-0.1
0603	1.6 ± 0.15	0.8 ± 0.15	0.9 max.	0.3 +0.1/-0.1
\$, \$)	2.0 ± 0.20	1.25 ± 0.15	1.0 max.	0.3 +0.1/-0.1
1206	3.2 ± 0.20	1.6 ± 0.15	1.2 max.	0.5 +0.2/-0.2
1210	3.2 ± 0.20	2.5 ± 0.20	1.5 max.	0.5 +0.2/-0.2
1812	4.5 ± 0.20	3.2 ± 0.20	2.0 max.	0.5 +0.3/-0.1
2220	5.7 ± 0.20	5.0 ± 0.20	2.5 max.	0.5 +0.3/-0.1
3220	8.1 ± 0.30	5.0 ± 0.30	2.5 max.	0.8 +0.3/-0.1



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SPECIFICATIONS (0402, 0603, 0805)

Part No.	Working Voltage (MAX)		Breakdown Voltage	Peak Current (MAX)	Clamping Voltage (MAX)		Energy Absorption (MAX)	Typical Capacitance (ref.)
	Condition (Unit)	AC (V _{RMS})			DC (V)	1mA (V)		
MVS0402B050	2.5	3.3	5(4.0~6.0)	20	1	12	0.05	390
MVS0402B080	4	5.5	8(6.4~9.6)	20	1	18	0.05	295
MVS0402B120	6	9	12(10.2~13.8)	20	1	20	0.05	190
MVS0402B150	8	11	15(12.75~17.25)	20	1	25	0.05	160
MVS0402B180	11	14	18(15.3~20.7)	20	1	30	0.05	135
MVS0402B220	12	16.5	22(19.8~24.2)	20	1	36	0.05	105
MVS0402B240	14	18	24(21.6~26.4)	20	1	40	0.05	93
MVS0402B270	17	22	27(24.3~29.7)	20	1	45	0.05	75
MVS0402B330	20	26	33(29.7~36.3)	20	1	54	0.05	54
MVS0402B390	25	30	39(35.1~42.9)	20	1	65	0.05	45
MVS0603B050	2.5	3.3	5(4.0~6.0)	30	1	12	0.1	1250
MVS0603B080	4	5.5	8(6.4~9.6)	30	1	18	0.1	800
MVS0603B120	6	9	12(10.2~13.8)	30	1	20	0.1	680
MVS0603B150	8	11	15(12.75~17.25)	30	1	25	0.1	460
MVS0603B180	11	14	18(15.3~20.7)	30	1	30	0.1	350
MVS0603B240	14	18	24(21.6~26.4)	30	1	39	0.1	270
MVS0603B270	17	22	27(24.3~29.7)	30	1	44	0.1	235
MVS0603B330	20	26	33(29.7~36.3)	30	1	54	0.1	200
MVS0603B390	25	30	39(35.1~42.9)	30	1	65	0.1	120
MVS0603B470	30	38	47(42.3~51.7)	30	1	77	0.1	100
MVS0603B560	35	45	56(50.4~61.6)	30	1	90	0.1	80
MVS0805B080	4	5.5	8(6.4~9.6)	80	1	18	0.1	1600
MVS0805B120	6	9	12(10.2~13.8)	80	1	20	0.1	1180
MVS0805B150	8	11	15(12.75~17.25)	100	1	25	0.1	1050
MVS0805B180	11	14	18(15.3~20.7)	100	1	30	0.1	750
MVS0805B240	14	18	24(21.6~26.4)	100	1	39	0.2	550
MVS0805B270	17	22	27(24.3~29.7)	100	1	44	0.2	400
MVS0805B330	20	26	33(29.7~36.3)	100	1	54	0.3	350
MVS0805B390	25	30	39(35.1~42.9)	100	1	65	0.3	310
MVS0805B470	30	38	47(42.3~51.7)	100	1	77	0.3	280
MVS0805B560	35	45	56(50.4~61.6)	80	1	90	0.3	195

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SPECIFICATIONS (1206, 1210)

Part No.	Working Voltage (MAX)		Breakdown Voltage	Peak Current (MAX)	Clamping Voltage (MAX)		Energy Absorption (MAX)	Typical Capacitance (ref.)
	AC (V _{RMS})	DC (V)			1mA (V)	8/20 μ s (A)		
MVS1206B080	4	5.5	8(6.4~9.6)	100	1	18	0.2	3200
MVS1206B120	6	9	12(9.6~13.8)	100	1	20	0.2	2200
MVS1206B150	8	11	15(12.75~17.25)	100	1	25	0.2	1300
MVS1206B180	11	14	18(15.3~20.7)	100	1	30	0.3	1150
MVS1206B240	14	18	24(21.6~26.7)	100	1	38	0.3	900
MVS1206B270	17	22	27(24.3~29.7)	100	1	44	0.4	840
MVS1206B330	20	26	33(29.7~36.3)	100	1	54	0.5	490
MVS1206B390	25	30	39(35.1~42.9)	100	1	65	0.6	440
MVS1206B470	30	38	47(42.3~51.7)	100	1	77	0.7	400
MVS1206B560	35	45	56(50.4~61.6)	100	1	90	0.8	310
MVS1206B680	40	56	68(61.2~74.8)	100	1	110	1.0	280
MVS1206B820	50	65	82(73.8~90.2)	100	1	135	0.5	240
MVS1206B101	60	85	100(90~110)	100	1	165	0.6	160
MVS1210B120	6	9	12(10.2~13.8)	250	2.5	20	0.5	4400
MVS1210B150	8	11	15(12.75~17.25)	250	2.5	25	0.6	3520
MVS1210B180	11	14	18(15.3~20.7)	250	2.5	30	0.7	3260
MVS1210B240	14	18	24(21.6~26.4)	250	2.5	38	0.8	1950
MVS1210B270	17	22	27(24.3~29.7)	250	2.5	44	1.0	1720
MVS1210B330	20	26	33(29.7~36.3)	250	2.5	54	1.2	1090
MVS1210B390	25	30	39(35.1~42.9)	250	2.5	65	1.4	920
MVS1210B470	30	38	47(42.3~51.7)	250	2.5	77	1.6	780
MVS1210B560	35	45	56(50.4~61.6)	250	2.5	90	2.0	470
MVS1210B680	40	56	68(61.2~74.8)	250	2.5	110	2.3	390
MVS1210B820	50	65	82(73.8~90.2)	250	2.5	135	1.2	320
MVS1210B101	60	85	100(90~110)	200	2.5	165	1.4	220

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SPECIFICATIONS (1812, 2220)

Part No.	Working Voltage (MAX)		Breakdown Voltage	Peak Current (MAX)	Clamping Voltage (MAX)		Energy Absorption (MAX)	Typical Capacitance (ref.)
	Condition (Unit)	AC (V _{RMS})			DC (V)	1mA (V)		
MVS1812B120	6	9	12(10.2~13.8)	500	5	20	0.9	9150
MVS1812B150	8	11	15(12.75~17.25)	500	5	25	1.2	7320
MVS1812B180	11	14	18(15.3~20.7)	500	5	30	1.4	6100
MVS1812B240	14	18	24(21.6~26.4)	500	5	38	1.7	3930
MVS1812B270	17	22	27(24.3~29.7)	500	5	44	2.0	3500
MVS1812B330	20	26	33(29.7~36.3)	500	5	54	2.5	2900
MVS1812B390	25	30	39(35.1~42.9)	500	5	65	2.9	2500
MVS1812B470	30	38	47(42.3~51.7)	500	5	77	3.5	2200
MVS1812B560	35	45	56(50.4~61.6)	500	5	90	4.2	1950
MVS1812B680	40	56	68(61.2~74.8)	500	5	110	4.8	1650
MVS1812B820	50	65	82(73.8~90.2)	400	5	135	4.5	1060
MVS2220B120	6	9	12(10.2~13.8)	1000	10	20	1.9	36500
MVS2220B150	8	11	15(12.75~17.25)	1000	10	25	2.3	18400
MVS2220B180	11	14	18(15.3~20.7)	1000	10	30	2.7	15300
MVS2220B240	14	18	24(21.6~26.4)	1000	10	38	3.1	11800
MVS2220B270	17	22	27(24.3~29.7)	1000	10	44	3.8	10400
MVS2220B330	20	26	33(29.7~36.3)	1000	10	54	4.3	8900
MVS2220B390	25	30	39(35.1~42.9)	1000	10	65	5.5	7500
MVS2220B470	30	38	47(42.3~51.7)	1000	10	77	6.3	4600
MVS2220B560	35	45	56(50.4~61.6)	1000	10	90	7.7	4000
MVS2220B680	40	56	68(61.2~74.8)	1000	10	110	8.8	3500
MVS2220B820	50	65	82(73.8~90.2)	800	10	135	5.6	2850

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SPECIFICATIONS (3220)

Part No.	Working Voltage (MAX)		Breakdown Voltage	Peak Current (MAX)	Clamping Voltage (MAX)		Energy Absorption (MAX)	Typical Capacitance (ref.)
	AC (V _{RMS})	DC (V)			1mA (V)	8/20 μ s (A)		
MVS3220B180	11	14	18(15.3~20.7)	250	5	40	0.8	3300
MVS3220B220	14	18	22(18.7~25.3)	250	5	46	0.8	1750
MVS3220B270	17	22	27(22.95~31.05)	250	5	56	1.0	1500
MVS3220B330	20	26	33(28.05~37.95)	250	5	67	1.2	1200
MVS3220B390	25	31	39(35.1~42.9)	250	5	76	1.4	820
MVS3220B470	30	38	47(42.3~51.7)	250	5	90	1.8	660
MVS3220B560	35	45	56(50.4~61.6)	250	5	106	2.3	530
MVS3220B680	40	56	68(61.2~74.8)	250	5	124	3.0	360
MVS3220B820	50	65	82(74~90)	500	10	135	4.0	250
MVS3220B101	65	85	100(90~110)	500	10	165	5.0	225
MVS3220B121	75	102	120(108~132)	500	10	198	6.0	200
MVS3220B151	95	127	150(135~165)	500	10	248	8.0	150
MVS3220B181	115	153	180(162~198)	500	10	292	12.0	110
MVS3220B201	130	175	200(180~220)	500	10	340	13.0	100
MVS3220B221	140	180	220(198~242)	500	10	356	14.0	94
MVS3220B241	150	200	240(216~264)	500	10	390	15.0	86
MVS3220B271	175	225	270(243~297)	500	10	450	16.0	76
MVS3220B301	190	250	300(270~330)	500	10	495	17.0	64
MVS3220B331	210	275	330(297~363)	500	10	545	18.0	52
MVS3220B361	230	300	360(324~396)	500	10	593	19.0	45
MVS3220B391	250	330	390(351~429)	500	10	647	20.0	42
MVS3220B431	275	369	430(387~473)	450	10	705	19.0	39
MVS3220B471	300	385	470(423~517)	400	10	775	18.0	35

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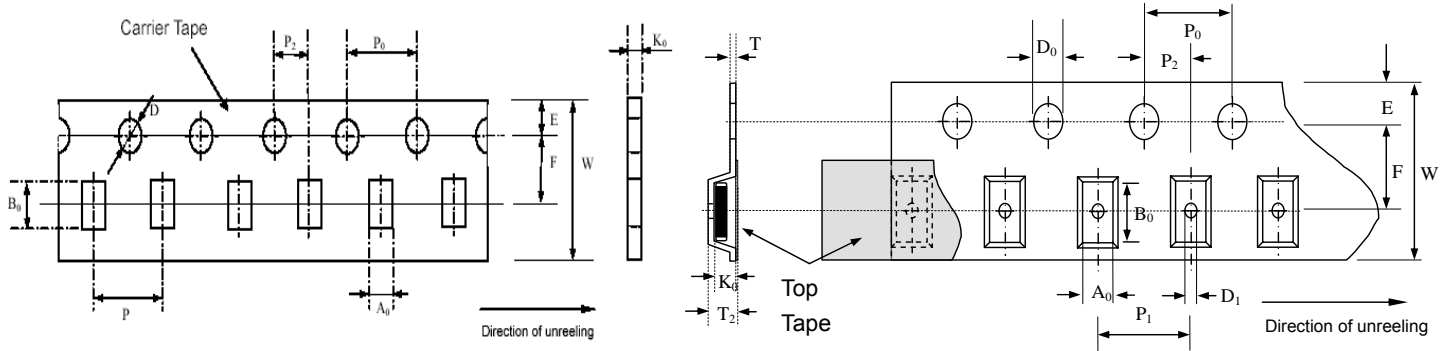
SPECIFICATIONS (High Surge)

Part No.	Working Voltage (MAX)		Breakdown Voltage	Peak Current (MAX)	Clamping Voltage (MAX)		Energy Absorption (MAX)	Typical Capacitance (ref.)
	Condition (Unit)	AC (V _{RMS})			DC (V)	1mA (V _{RMS})		
MVS1206B180-S	11	14	18(15.3~20.7)	200	1	30	0.5	1500
MVS1206B240-S	14	18	24(21.6~27)	200	1	39	0.5	1160
MVS1206B270-S	17	22	27(24.3~29.8)	200	1	44	0.6	1080
MVS1206B330-S	20	26	33(29.7~36.3)	200	1	54	0.7	680
MVS1206B390-S	25	30	39(35.1~42.9)	200	1	65	1.0	620
MVS1206B470-S	30	38	47(42.3~51.7)	200	1	77	1.1	550
MVS1206B560-S	35	45	56(50.4~61.6)	200	1	90	0.8	400
MVS1210B150-S	8	11	15(12.75~17.25)	400	2.5	25	1.0	4050
MVS1210B180-S	11	14	18(15.3~20.7)	400	2.5	30	1.2	3860
MVS1210B240-S	14	18	24(21.6~27.0)	400	2.5	39	1.4	2380
MVS1210B270-S	17	22	27(24.3~29.8)	400	2.5	44	1.7	2100
MVS1210B330-S	20	26	33(29.7~36.3)	400	2.5	54	1.9	1400
MVS1210B390-S	25	30	39(35.1~42.9)	400	2.5	65	1.7	1180
MVS1210B470-S	30	38	47(42.3~51.7)	400	2.5	77	2.0	1000
MVS1210B560-S	35	45	56(50.4~61.6)	400	2.5	90	2.0	660
MVS1812B180-S	11	14	18(15.3~20.7)	800	5	30	1.9	7030
MVS1812B240-S	14	18	24(21.6~27.0)	800	5	38	2.3	4650
MVS1812B270-S	17	22	27(24.3~29.8)	800	5	44	2.7	4150
MVS1812B330-S	20	26	33(29.7~36.3)	800	5	54	3.0	3400
MVS1812B390-S	25	30	39(35.1~42.9)	800	5	65	3.7	2950
MVS1812B470-S	30	38	47(42.3~51.7)	800	5	77	4.2	2550
MVS1812B560-S	35	45	56(50.4~61.6)	800	5	90	4.2	2400
MVS2220B180-S	11	14	18(15.3~20.7)	1200	10	30	5.4	17000
MVS2220B240-S	14	18	24(21.6~27.0)	1200	10	39	5.8	13600
MVS2220B270-S	17	22	27(24.3~29.8)	1200	10	44	7.2	12000
MVS2220B330-S	20	26	33(29.7~36.3)	1200	10	54	7.8	10500
MVS2220B390-S	25	30	39(35.1~42.9)	1200	10	65	9.6	8900
MVS2220B470-S	30	38	47(42.3~51.7)	1200	10	77	12.0	5700



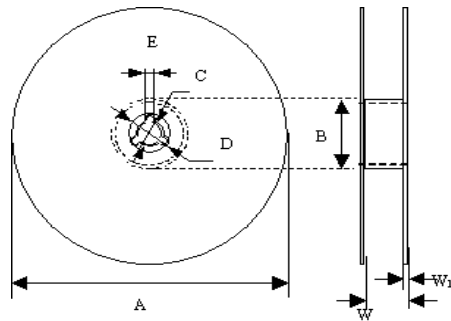
Surface Mount

PACKAGE/TAPE DIMENSIONS



Symbol	A ₀ ±0.10	B ₀ ±0.10	K ₀ ±0.10	T ±0.05	T ₂ ±0.05	D ₀ +0.10 -0.00	D ₁ ±0.05	P ₁ ±0.10	P ₂ ±0.05	P ₀ ±0.05	W ±0.20	E ±0.10	F ±0.05
0402	0.85	1.25	0.65	0.22	0.87	1.50	1.00	3.00	2.00	4.00	8.00	1.75	3.50
0603	1.08	1.88	0.95	0.22	1.17	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
0805	1.42	2.30	1.04	0.22	1.26	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1206	1.88	3.50	1.27	0.22	1.49	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1210	2.78	3.46	1.55	0.22	1.77	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1812	3.66	4.95	1.74	0.25	1.99	1.50	1.50	8.00	2.00	4.00	12.00	1.75	5.50
2220	5.10	5.97	2.80	0.25	3.05	1.50	1.50	8.00	2.00	4.00	12.00	1.75	5.50
3220	5.50	8.50	2.80	0.30	3.50	1.50	1.50	8.00	2.00	4.00	16.00	1.75	7.50

REEL DIMENSIONS



Symbol	A	B	C	D	E	W	W ₁
0402	178.0±1.0	60.0±0.5	13.0±0.2	21.0±0.2	2.0±0.5	9.0±0.50	1.5±0.15
0603	178.0±1.0	60.0±0.5	13.0±0.2	21.0±0.2	2.0±0.5	9.0±0.50	1.5±0.15
0805	178.0±1.0	60.0±0.5	13.0±0.2	21.0±0.2	2.0±0.5	9.0±0.50	1.5±0.15
1206	178.0±1.0	60.0±0.5	13.0±0.2	21.0±0.2	2.0±0.5	9.0±0.50	1.5±0.15
1210	178.0±1.0	60.0±0.5	13.0±0.2	21.0±0.2	2.0±0.5	9.0±0.50	1.5±0.15
1812	178.0±1.0	60.0±0.5	13.5±0.1	21.0±0.2	2.0±0.5	13.6±0.2	1.5±0.15
2220/3220	178.0±1.0	60.0±0.5	13.5±0.1	21.0±0.2	2.0±0.5	13.6±0.2	1.5±0.15

Type	0402	0603	0805	1206	1210	1812	2220/3220
pcs/reel	10000	4000	3000	3000	2000	1000	1000

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MVS Series

MERITEK

9bWdgi UHYX GA 8

UL E326004

Size: 3225, 4032

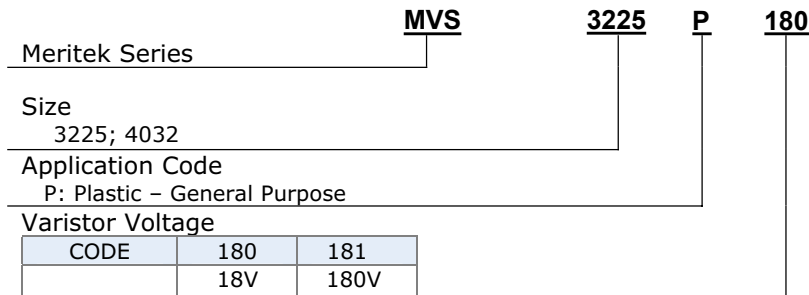
FEATURES

1. Working voltage: 14 ~ 615 VDC
2. Available for SMT flow/reflow soldering
3. RoHS compliant, low profile, and space saving
4. Large capability to withstand high surge current
5. Low inductance construction with excellent response
6. Encapsulation material according to UL94V-0
7. Operating temperature range : -40 ~ +85°C
8. Agency recognition: UL E326004

RECOMMENDED APPLICATIONS

1. Power supply
2. Home appliance
3. Industrial equipment / Automation / Controls
4. Telecom / Datacom
5. Instrumentation

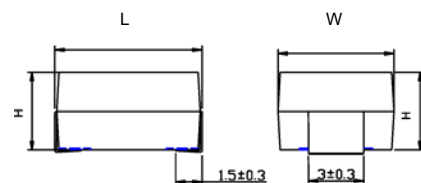
PART NUMBERING SYSTEM



DIMENSIONS

(Unit: mm)

Type	Varistor Voltage Range	L	W	H
3225	$V_{1mA}=180 \sim 271$	8.0+/- 0.3	6.3+/- 0.3	3.2+/- 0.3
	$V_{1mA}=361 \sim 561$			4.5+/- 0.3
4032	$V_{1mA}=180 \sim 271$	10.2+/- 0.3	8.0+/- 0.3	3.2+/- 0.3
	$V_{1mA}=361 \sim 751$			4.5+/- 0.3



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9bWdgi UHYX GA 8

SPECIFICATIONS (3225)

Part No.	Varistor Voltage (@ 1mA DC)	Max. Operating Voltage		Max. Clamping Voltage (8/20 μ s)		Max. Surge Current (8/20 μ s)	Max. Energy (10/1000 μ S)	Rated Power	Reference Capacitance @1KHz
	V _{1mA} (V)	V _{AC(rms)} (V)	V _{DC} (V)	V _P (V)	I _P (A)	I _{max} (A)	W _{max} (J)	P (W)	C (pF)
MVS3225P180	18	11	14	36	1.0	150	0.6	0.01	1750
MVS3225P220	22	14	18	43	1.0	150	0.7	0.01	1450
MVS3225P270	27	17	22	53	1.0	150	0.9	0.01	1200
MVS3225P330	33	20	26	65	1.0	150	1.1	0.01	980
MVS3225P390	39	25	31	77	1.0	150	1.2	0.01	850
MVS3225P470	47	30	38	93	1.0	150	1.5	0.01	720
MVS3225P560	56	35	45	110	1.0	150	1.8	0.01	620
MVS3225P680	68	40	56	135	1.0	150	2.2	0.01	520
MVS3225P820	82	50	65	135	5.0	400	2.5	0.1	300
MVS3225P101	100	60	85	165	5.0	400	3.0	0.1	250
MVS3225P121	120	75	100	200	5.0	400	4.0	0.1	210
MVS3225P151	150	95	125	250	5.0	400	6.0	0.1	135
MVS3225P181	180	115	150	300	5.0	400	6.5	0.1	110
MVS3225P201	205	130	170	340	5.0	400	7.0	0.1	100
MVS3225P221	220	140	180	360	5.0	400	7.5	0.1	95
MVS3225P241	240	150	200	395	5.0	400	9.0	0.1	90
MVS3225P271	270	175	225	455	5.0	400	9.5	0.1	75
MVS3225P361	360	230	300	595	5.0	400	10.0	0.1	60
MVS3225P391	390	250	320	650	5.0	400	11.0	0.1	55
MVS3225P431	430	275	350	710	5.0	400	13.0	0.1	50
MVS3225P471	470	300	385	775	5.0	400	15.0	0.1	45
MVS3225P511	510	320	410	845	5	400	16.5	0.1	40
MVS3225P561	560	350	450	930	5	400	18.0	0.1	35

Metal Oxide Varistors

... 9bW/dgi UHYX GA 8



MVS Series

MERITEK

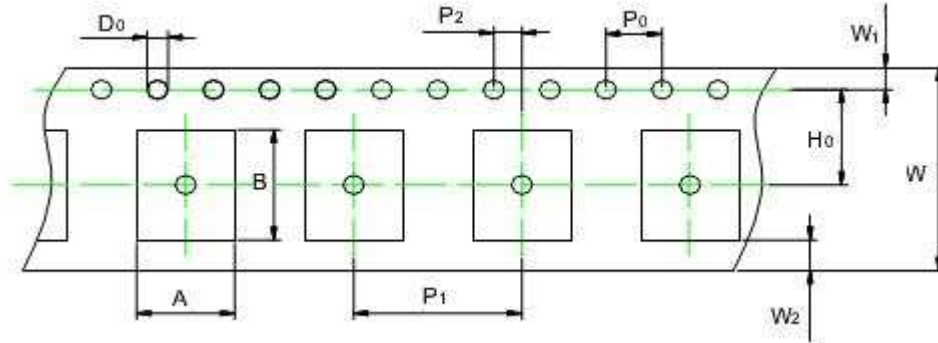
SPECIFICATIONS (4032)

Part No.	Varistor Voltage (@ 1mA DC)	Max. Operating Voltage		Max. Clamping Voltage (8/20μs)		Max. Surge Current (8/20μs)	Max. Energy (10/1000μS)	Rated Power	Reference Capacitance @1KHz
	V _{1mA} (V)	V _{AC(rms)} (V)	V _{DC} (V)	V _P (V)	I _P (A)	I _{max} (A)	W _{max} (J)	P (W)	C (pF)
MVS4032P180	18	11	14	36	2.5	300	1.1	0.02	2750
MVS4032P220	22	14	18	43	2.5	300	1.3	0.02	2300
MVS4032P270	27	17	22	53	2.5	300	1.6	0.02	1900
MVS4032P330	33	20	26	65	2.5	300	2.0	0.02	1600
MVS4032P390	39	25	31	77	2.5	300	2.4	0.02	1400
MVS4032P470	47	30	38	93	2.5	300	2.8	0.02	1200
MVS4032P560	56	35	45	110	2.5	300	3.4	0.02	1050
MVS4032P680	68	40	56	135	2.5	300	4.1	0.02	900
MVS4032P820	82	50	65	135	10	1200	6.5	0.25	530
MVS4032P101	100	60	85	165	10	1200	7.0	0.25	480
MVS4032P121	120	75	100	200	10	1200	9.0	0.25	430
MVS4032P151	150	95	125	250	10	1200	11.0	0.25	260
MVS4032P181	180	115	150	300	10	1200	13.0	0.25	220
MVS4032P201	205	130	170	340	10	1200	15.0	0.25	200
MVS4032P221	220	140	180	360	10	1200	18.0	0.25	180
MVS4032P241	240	150	200	395	10	1200	18.5	0.25	170
MVS4032P271	270	175	225	455	10	1200	21.0	0.25	150
MVS4032P361	360	230	300	595	10	1200	23.0	0.25	115
MVS4032P391	390	250	320	650	10	1200	25.0	0.25	105
MVS4032P431	430	275	350	710	10	1200	29.0	0.25	95
MVS4032P471	470	300	385	775	10	1200	30.0	0.25	90
MVS4032P511	510	320	410	845	10	1200	33.0	0.25	85
MVS4032P561	560	350	450	930	10	1200	33.0	0.25	80
MVS4032P751	750	460	615	1235	10	1200	50.5	0.25	55



9bWdgi UHYX GA 8

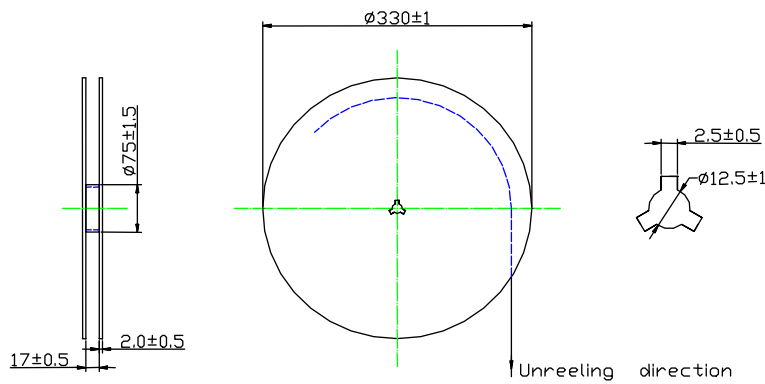
PACKAGE/TAPE DIMENSIONS



(Unit: mm)

Item	A*B	P ₀	P ₁	P ₂	H ₀	W	W ₁	W ₂	D ₀
Size	3225	4.0	12.0	2.0	7.5	16	1.75	0.75	1.5
	4032								
Tolerance	+/- 0.2	+/- 0.1	+/- 0.1	+/- 0.05	+/- 0.05	+/- 0.3	+/- 0.1	Min.	+0.1 -0

REEL DIMENSIONS



(Unit: mm)

Type	3225	4032
pcs/reel	1000	1000