

SMD Transient Voltage Suppressors

Feature

- Monolithic Surface Mount Construction with 1005, 1608, 2012, 3216, 3225, 4532, 5750 and 8050 Model Sizes
- Wide Operating Voltage Range $V_{DC} = 5V$ to 385V
- Excellent Nonlinear Voltage-Current Characteristics with Low Clamping Voltage and Large Surge Current / Energy Handling Capabilities at Small Size

Applications

1. Communication

Cellular/Cordless phone, programming port, LCD display, charger, speaker & microphone, laser diode protection, ASIC protection, FETs protection, data line connection, phone line, line card, fax machine

2. Computer & Peripheral

Personal computer, note book computer, hard disk drive, Vcc protection, modem, audio card, keyboard, I/O ports, PCMCIA cards

3. Consumer Product

Portable equipment, cassette player, CD player, MD player, PDAs
Digital camera, security system, sensor protection, microprocessor reset & I/O protection, CATV, LNA FETs protection, logic box protection.

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Part Number

1. Surge series

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1	2	3	4	5	6	7
EL: SMD	Application Series	Designator	Product Series	Max. working	End termination	Package option
Varistor	<u>V: Surge series</u>	<u>1005</u>	<u>A: Standard</u>	voltage	option	<u>T: Tape and reel</u>
		<u>1608</u>	<u>H: High surge</u>	Where	P: Ni/Sn Alloy	<u>B: Bulk</u>
		<u>2012</u>	<u>L: Low capacitance</u>	180=18Vm(dc)	(plated)	
		<u>3216</u>			N: Ag/Pt, Ag/Pd	
		<u>3225</u>			(non-plated)	
		<u>4532</u>				
		<u>5750</u>				

2. ESD series

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1	2	3	4	5	6	7
EL: SMD	Application Series	Designator	Max. working	Capacitance	End termination	Package option
Varistor	<u>E: ESD series</u>	<u>1005</u>	voltage	Where	option	<u>T: Tape and reel</u>
		<u>1608</u>	Where	<u>220=22 pF</u>	P: Ni/Sn Alloy	<u>B: Bulk</u>
			<u>120=12Vm(dc)</u>		(plated)	
					N: Ag/Pt, Ag/Pd	
					(non-plated)	

3. CH series

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1	2	3	4	5	6	7
EL: SMD	Application Series	Designator	Product Series	Breakdown	End termination	Package option
Varistor	<u>C: CH series</u>	<u>8050</u>	<u>A: Standard</u>	voltage	option	<u>T: Tape and reel</u>
				Where	P: Ni/Sn Alloy	<u>B: Bulk</u>
				180=18V	(plated)	
					N: Ag/Pt, Ag/Pd	
					(non-plated)	

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4. Automotive series

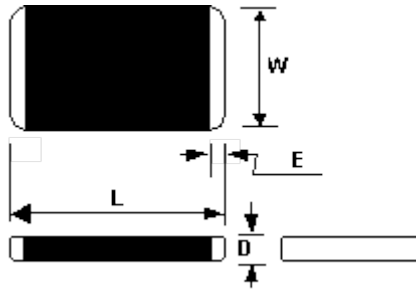
<u>□□</u>	<u>□</u>	<u>□□□□</u>	<u>□</u>	<u>□□□</u>	<u>□</u>	<u>□</u>
1	2	3	4	5	6	7
EL: SMD	Application Series	Designator	Product Series	Max working	End termination	Package option
Varistor	<u>M: Automotive series</u>	<u>2012</u>	<u>A: Standard</u>	Voltage	option	<u>T: Tape and reel</u>
		<u>3216</u>		Where	P: Ni/Sn Alloy	<u>B: Bulk</u>
		<u>3225</u>		180=18Vm(dc)	(plated)	
		<u>4532</u>			N: Ag/Pt, Ag/Pd	
		<u>5750</u>			(non-plated)	

5. Array series

<u>□□</u>	<u>□</u>	<u>□□□□</u>	<u>□</u>	<u>□□□</u>	<u>□</u>	<u>□</u>
1	2	3	4	5	6	7
EL: SMD	Application Series	Designator	Product Series	Max working	End termination	Package option
Varistor	<u>A: Array series</u>	<u>2012</u>	<u>A: Standard</u>	Voltage	option	<u>T: Tape and reel</u>
		<u>3216</u>		Where	P: Ni/Sn Alloy	<u>B: Bulk</u>
				180=18Vm(dc)	(plated)	
					N: Ag/Pt, Ag/Pd	
					(non-plated)	

SHAPE and DIMENSIONS

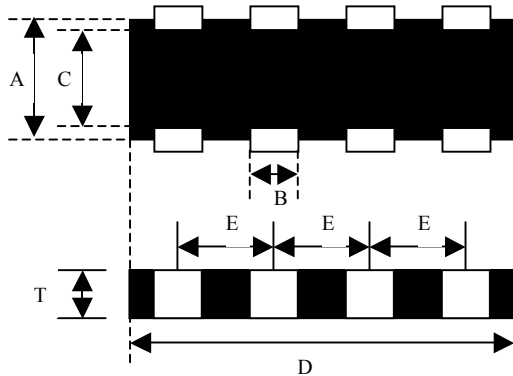
1. Common Type



unit : mm (inches)

Size	Length (L)	Width (W)	Thickness (D)	Termination Bandwidth (E)
1005 (0402)	1.00 ±0.10 (.040 ±.004)	0.50 ±0.10 (.020 ±.004)	0.60 max (.024)	0.25 ±0.15 (.010 ±.006)
1608 (0603)	1.65 ±0.15 (.063 ±.006)	0.80 ±0.15 (.032 ±.006)	0.90 max (.035)	0.40 ±0.20 (.015 ±.008)
2012 (0805)	2.00 ±0.20 (.079 ±.008)	1.25 ±0.20 (.049 ±.008)	1.30 max (.051)	0.40 ±0.20 (.015 ±.008)
3216 (1206)	3.20 ±0.25 (.126 ±.010)	1.60 ±0.20 (.040 ±.004)	1.70 max (.067)	0.50 ±0.25 (.020 ±.010)
3225 (1210)	3.20 ±0.25 (.126 ±.010)	2.50 ±0.25 (.098 ±.010)	1.70 max (.067)	0.50 ±0.25 (.020 ±.010)
4532 (1812)	4.50 ±0.25 (.177 ±.010)	3.20 ±0.25 (.126 ±.010)	2.00 max (.079)	0.50 ±0.25 (.020 ±.010)
5750 (2220)	5.70 ±0.25 (.224 ±.010)	5.00 ±0.25 (.197 ±.010)	2.50 max (.098)	0.50 ±0.25 (.020 ±.010)
8050 (3220)	8.10 ±0.30 (.315 ±.012)	5.00 ±0.30 (.197±.012)	3.00 max (.118)	0.80 ±0.40 (.031 ±.016)

2. Array Type



	2012	3216
A	1.25 ± 0.20	1.60 ± 0.20
B	0.25 ± 0.05	0.40 ± 0.15
C	1.00 (ref.)	1.40 (ref.)
D	2.00 ± 0.20	3.20 ± 0.20
E	0.50 (ref.)	0.80 (ref.)
T	0.72 ± 0.08	0.85 ± 0.10

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SPECIFICATIONS

Normal Type Multilayer Varistor

Part Number	Working Voltage (MAX)		Breakdown Voltage	Surge Current (MAX)	Clamping Voltage (MAX)		Surge Energy (MAX)	Typical Capacitance
	AC (V _{RMS})	DC (V)			(A)	(V)		
Unit Condition			1mA (V)	8/20μs (A)			10/1000 (J)	1KHz (pF)
ELV1005A050	4	5.5	8(6.4~9.6)	20	1	16	0.05	290
ELV1005A090	6	9	12(9.6~14.4)	20	1	20	0.05	160
ELV1005A110	8	11	15(12.75~17.25)	20	1	25	0.05	125
ELV1005A140	11	14	18(15.3~20.7)	20	1	30	0.05	115
ELV1005A160	12	16.5	22(19.8~24.2)	20	1	36	0.05	80
ELV1005A180	14	18	24(21.6~27)	20	1	40	0.05	70
ELV1005A220	17	22	27(24.3~29.8)	20	1	45	0.05	60
ELV1005A260	20	26	33(29.7~36.3)	20	1	54	0.05	50
ELV1005A300	25	30	39(35.1~42.9)	20	1	65	0.05	33
ELV1005A380	30	38	47(42.3~51.7)	20	1	77	0.05	20
ELV1608A050	4	5.5	8(6.4~9.6)	30	1	16	0.1	800
ELV1608A090	6	9	12(9.6~14.4)	30	1	20	0.1	680
ELV1608A110	8	11	15(12.75~17.25)	30	1	25	0.1	460
ELV1608A140	11	14	18(15.3~20.7)	30	1	30	0.1	350
ELV1608A160	12	16.5	22(19.8~24.2)	30	1	36	0.1	300
ELV1608A180	14	18	24(21.6~27)	30	1	39	0.1	270
ELV1608A220	17	22	27(24.3~29.8)	30	1	44	0.1	235
ELV1608A260	20	26	33(29.7~36.3)	30	1	54	0.1	200
ELV1608A300	25	30	39(35.1~42.9)	30	1	65	0.1	120
ELV1608A380	30	38	47(42.3~51.7)	30	1	77	0.1	100
ELV1608A450	35	45	56(50.4~61.6)	30	1	90	0.1	80

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Part Number	Working Voltage (MAX)		Breakdown Voltage	Surge Current (MAX)	Clamping Voltage (MAX)		Surge Energy (MAX)	Typical Capacitance
	AC (V _{RMS})	DC (V)			1mA (V)	8/20μs (A)		
ELV2012A030	2.5	3.3	5(4.0~6.0)	40	1	10	0.1	2250
ELV2012A050	4	5.5	8(6.4~9.6)	80	1	16	0.1	1420
ELV2012A090	6	9	12(9.6~14.4)	80	1	20	0.1	1120
ELV2012A110	8	11	15(12.75~17.25)	100	1	25	0.1	820
ELV2012A140	11	14	18(15.3~20.7)	100	1	30	0.1	740
ELV2012A160	12	16.5	22(19.8~24.2)	100	1	36	0.2	680
ELV2012A180	14	18	24(21.6~27)	100	1	39	0.2	560
ELV2012A220	17	22	27(24.3~29.8)	100	1	44	0.2	480
ELV2012A260	20	26	33(29.7~36.3)	100	1	54	0.3	370
ELV2012A300	25	30	39(35.1~42.9)	100	1	65	0.3	320
ELV2012A380	30	38	47(42.3~51.7)	100	1	77	0.3	280
ELV2012A450	35	45	56(50.4~61.6)	80	1	90	0.3	185
ELV2012A560	40	56	68(61.2~74.8)	80	1	110	0.3	135
ELV2012A650	50	65	82(73.8~90.2)	60	1	135	0.3	80
ELV3216A030	2.5	3.3	5(4.0~6.0)	60	1	10	0.1	4400
ELV3216A050	4	5.5	8(6.4~9.6)	100	1	16	0.2	3100
ELV3216A090	6	9	12(9.6~14.4)	100	1	20	0.2	2100
ELV3216A110	8	11	15(12.75~17.25)	100	1	25	0.2	1600
ELV3216A140	11	14	18(15.3~20.7)	100	1	30	0.3	1300
ELV3216A160	12	16.5	22(19.8~24.2)	100	1	36	0.3	1080
ELV3216A180	14	18	24(21.6~27)	100	1	38	0.3	950
ELV3216A220	17	22	27(24.3~29.8)	100	1	44	0.4	850
ELV3216A260	20	26	33(29.7~36.3)	100	1	54	0.5	670
ELV3216A300	25	30	39(35.1~42.9)	100	1	65	0.6	510
ELV3216A380	30	38	47(42.3~51.7)	100	1	77	0.7	400
ELV3216A450	35	45	56(50.4~61.6)	100	1	90	0.8	310
ELV3216A560	40	56	68(61.2~74.8)	100	1	110	1.0	250
ELV3216A650	50	65	82(73.8~90.2)	100	1	135	0.5	210
ELV3216A850	60	85	100(90~110)	100	1	165	0.6	125
ELV3216A900	70	90	110(99~121)	100	1	180	0.6	110

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Part Number	Working Voltage (MAX)		Breakdown Voltage	Surge Current (MAX)	Clamping Voltage (MAX)		Surge Energy (MAX)	Typical Capacitance
	AC (V _{RMS})	DC (V)			1mA (V)	8/20μs (A)		
ELV3225A030	2.5	3.3	5(4.0~6.0)	250	2.5	10	0.3	7300
ELV3225A050	4	5.5	8(6.4~9.6)	250	2.5	16	0.4	5400
ELV3225A090	6	9	12(9.6~14.4)	250	2.5	20	0.5	4240
ELV3225A110	8	11	15(12.75~17.25)	250	2.5	25	0.6	3470
ELV3225A140	11	14	18(15.3~20.7)	250	2.5	30	0.7	2760
ELV3225A160	12	16.5	22(19.8~24.2)	250	2.5	36	0.8	2000
ELV3225A180	14	18	24(21.6~27)	250	2.5	38	0.8	1750
ELV3225A220	17	22	27(24.3~29.8)	250	2.5	44	1.0	1470
ELV3225A260	20	26	33(29.7~36.3)	250	2.5	54	1.2	1070
ELV3225A300	25	30	39(35.1~42.9)	250	2.5	65	1.4	920
ELV3225A380	30	38	47(42.3~51.7)	250	2.5	77	1.6	790
ELV3225A450	35	45	56(50.4~61.6)	250	2.5	90	2.0	570
ELV3225A560	40	56	68(61.2~74.8)	250	2.5	110	2.3	620
ELV3225A650	50	65	82(73.8~90.2)	250	2.5	135	1.2	460
ELV3225A850	60	85	100(90~110)	200	2.5	165	1.4	240
ELV3225A900	70	90	110(99~121)	200	2.5	180	1.4	200
ELV4532A050	4	5.5	8(6.4~9.6)	500	5	16	0.5	11000
ELV4532A090	6	9	12(9.6~14.4)	500	5	20	0.9	8700
ELV4532A110	8	11	15(12.75~17.25)	500	5	25	1.2	6770
ELV4532A140	11	14	18(15.3~20.7)	500	5	30	1.4	4950
ELV4532A160	12	16.5	22(19.8~24.2)	500	5	36	1.6	4270
ELV4532A180	14	18	24(21.6~27)	500	5	38	1.7	3900
ELV4532A220	17	22	27(24.3~29.8)	500	5	44	2.0	3550
ELV4532A260	20	26	33(29.7~36.3)	500	5	54	2.5	3000
ELV4532A300	25	30	39(35.1~42.9)	500	5	65	2.9	2700
ELV4532A380	30	38	47(42.3~51.7)	500	5	77	3.5	2430
ELV4532A450	35	45	56(50.4~61.6)	500	5	90	4.2	2000
ELV4532A560	40	56	68(61.2~74.8)	500	5	110	4.8	2110
ELV4532A650	50	65	82(73.8~90.2)	400	5	135	4.5	1220
ELV4532A850	60	85	100(90~110)	400	5	165	5.8	800
ELV4532A900	70	90	110(99~121)	400	5	180	5.8	540

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Part Number	Working Voltage (MAX)		Breakdown Voltage	Surge Current (MAX)	Clamping Voltage (MAX)		Surge Energy (MAX)	Typical Capacitance
	AC (V _{RMS})	DC (V)			1mA (V)	8/20μs (A)		
ELV5750A050	4	5.5	8(6.4~9.6)	1000	10	16	1.5	28000
ELV5750A090	6	9	12(9.6~14.4)	1000	10	20	1.9	18500
ELV5750A110	8	11	15(12.75~17.25)	1000	10	25	2.3	15200
ELV5750A140	11	14	18(15.3~20.7)	1000	10	30	2.7	13500
ELV5750A160	12	16.5	22(19.8~24.2)	1000	10	36	2.9	11000
ELV5750A180	14	18	24(21.6~27)	1000	10	38	3.1	10000
ELV5750A220	17	22	27(24.3~29.8)	1000	10	44	3.8	8200
ELV5750A260	20	26	33(29.7~36.3)	1000	10	54	4.3	7000
ELV5750A300	25	30	39(35.1~42.9)	1000	10	65	5.5	5000
ELV5750A380	30	38	47(42.3~51.7)	1000	10	77	6.3	3600
ELV5750A450	35	45	56(50.4~61.6)	1000	10	90	7.7	3000
ELV5750A560	40	56	68(61.2~74.8)	1000	10	110	8.8	2400
ELV5750A650	50	65	82(73.8~90.2)	800	10	135	5.6	2050
ELV5750A850	60	85	100(90~110)	800	10	165	6.8	1650
ELV5750A900	70	90	110(99~121)	800	10	180	6.8	1330

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High Surge Type Multilayer Varistor

Part Number	Working Voltage (MAX)		Breakdown Voltage	Surge Current (MAX)	Clamping Voltage (MAX)		Surge Energy (MAX)	Typical Capacitance
	AC (V _{RMS})	DC (V)			1mA (V)	8/20μs (A)		
ELV3216H110	8.0	11.0	15(12.75~17.25)	200	1	25	0.4	1950
ELV3216H140	11.0	14.0	18(15.3~20.7)	200	1	30	0.5	1580
ELV3216H160	12.0	16.5	22(19.8~24.2)	200	1	36	0.5	1320
ELV3216H180	14.0	18.0	24(21.6~27)	200	1	39	0.5	1160
ELV3216H220	17.0	22.0	27(24.3~29.8)	200	1	44	0.6	1040
ELV3216H260	20.0	26.0	33(29.7~36.3)	200	1	54	0.7	860
ELV3216H300	25.0	30.0	39(35.1~42.9)	200	1	65	1.0	650
ELV3216H380	30.0	38.0	47(42.3~51.7)	200	1	77	1.1	515
ELV3216H450	35.0	45.0	56(50.4~61.6)	200	1	90	0.8	435
ELV3225H110	8.0	11.0	15(12.75~17.25)	400	2.5	25	1.0	4100
ELV3225H140	11.0	14.0	18(15.3~20.7)	400	2.5	30	1.2	3260
ELV3225H160	12.0	16.5	22(19.8~24.2)	400	2.5	36	1.4	2440
ELV3225H180	14.0	18.0	24(21.6~27)	400	2.5	39	1.4	2140
ELV3225H220	17.0	22.0	27(24.3~29.8)	400	2.5	44	1.7	1800
ELV3225H260	20.0	26.0	33(29.7~36.3)	400	2.5	54	1.9	1380
ELV3225H300	25.0	30.0	39(35.1~42.9)	400	2.5	65	1.7	1180
ELV3225H380	30.0	38.0	47(42.3~51.7)	400	2.5	77	2.0	1020
ELV3225H450	35.0	45.0	56(50.4~61.6)	400	2.5	90	2.0	800
ELV4532H110	8.0	11.0	15(12.75~17.25)	800	5	25	1.8	8000
ELV4532H140	11.0	14.0	18(15.3~20.7)	800	5	30	1.9	5850
ELV4532H160	12.0	16.5	22(19.8~24.2)	800	5	36	2.3	5050
ELV4532H180	14.0	18.0	24(21.6~27)	800	5	38	2.3	4630
ELV4532H220	17.0	22.0	27(24.3~29.8)	800	5	44	2.7	4200
ELV4532H260	20.0	26.0	33(29.7~36.3)	800	5	54	3.0	3550
ELV4532H300	25.0	30.0	39(35.1~42.9)	800	5	65	3.7	3210
ELV4532H380	30.0	38.0	47(42.3~51.7)	800	5	77	4.2	2880
ELV4532H450	35.0	45.0	56(50.4~61.6)	800	5	90	4.2	2450

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Part Number	Working Voltage (MAX)		Breakdown Voltage	Surge Current (MAX)	Clamping Voltage (MAX)		Surge Energy (MAX)	Typical Capacitance
	AC (V _{RMS})	DC (V)			1mA (V)	8/20μs (A)		
ELV5750H110	8.0	11.0	15(12.75~17.25)	1200	10	25	4.2	17200
ELV5750H140	11.0	14.0	18(15.3~20.7)	1200	10	30	5.4	15300
ELV5750H160	12.0	16.5	22(19.8~24.2)	1200	10	36	5.8	12500
ELV5750H180	14.0	18.0	24(21.6~27)	1200	10	39	5.8	11500
ELV5750H220	17.0	22.0	27(24.3~29.8)	1200	10	44	7.2	9450
ELV5750H260	20.0	26.0	33(29.7~36.3)	1200	10	54	7.8	8100
ELV5750H300	25.0	30.0	39(35.1~42.9)	1200	10	65	9.6	5900
ELV5750H380	30.0	38.0	47(42.3~51.7)	1200	10	77	12.0	4400
ELV5750H450	35.0	45.0	56(50.4~61.6)	1200	10	90	7.7	3600

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ESD Series Multilayer Varistor

Part Number	Working Voltage (MAX)	Clamping Voltage (MAX)	Typical Capacitance
Unit Condition	DC (V)	(V)	1KHz (pF)
ELE1005-050-050	5	30	5
ELE1005-050-100	5	50	10
ELE1005-050-220	5	50	22
ELE1005-050-330	5	50	33
ELE1005-050-560	5	50	56
ELE1005-050-101	5	50	100
ELE1005-120-050	12	80	5
ELE1005-120-100	12	60	10
ELE1005-120-220	12	40	22
ELE1005-120-330	12	40	33
ELE1005-120-560	12	40	56
ELE1608-120-101	12	50	100
ELE1608-050-050	5	30	5
ELE1608-050-100	5	50	10
ELE1608-050-220	5	50	22
ELE1608-050-330	5	50	33
ELE1608-050-560	5	50	56
ELE1608-050-101	5	50	100
ELE1608-120-050	12	80	5
ELE1608-120-100	12	60	10
ELE1608-120-220	12	40	22
ELE1608-120-330	12	40	33
ELE1608-120-560	12	40	56
ELE1608-120-101	12	50	100

Notes:

- Maximum ESD clamp voltage tested with IEC 1000-4-2 Human Body Model discharge test circuit and direct discharge to device terminals (IEC preferred test method) .
- Capacitance may be customized, please contact Factory for availability.

SMD Transient Voltage Suppressors

CH Type Surface Mount Varistor

Part Number	Working Voltage (MAX)		Breakdown Voltage	Surge Current (MAX)	Clamping Voltage (MAX)		Surge Energy (MAX)	Typical Capacitance
	AC (V _{RMS})	DC (V)			1mA (V)	8/20μs (A)		
ELC8050A560	35	45	56(50~62)	250	5	106	2.3	530
ELC8050A680	40	56	68(62~74)	250	5	124	3.0	360
ELC8050A121	75	102	120(108~132)	500	10	198	6.0	200
ELC8050A201	130	175	200(184~228)	500	10	340	13.0	100
ELC8050A361	230	300	360(324~396)	500	10	593	19.0	45
ELC8050A431	275	369	430(387~473)	450	10	705	19.0	39
ELC8050A471	300	385	470(423~517)	400	10	775	18.0	35

Notes :

- Power dissipation of transient < 0.25w
- The CH series of surface mount chip varistors are for a wide range of applications. And more compatible with most surface-mounting assembly equipment.
- No Branding on the chip Itself.

SMD Transient Voltage Suppressors

Automotive Type Multilayer Varistor

Part Number	Working Voltage (MAX)	Breakdown Voltage	Jump Start Voltage MAX. 5 minutes	Clamping Voltage (MAX)		Load Dump Energy (10 pulses)	Typical Capacitance
				(A)	(V)		
Unit Condition	DC (V)	1mA (V)	V _{JUMP} (V)	(A)	(V)	W _{LD} (J)	1KHz (pF)
ELM2012A180	18	22.5~27.5	24.5	1	40	1.0	500
ELM3216A180	18	22.5~27.5	24.5	1.5	40	1.5	630
ELM3225A180	18	21.5~26.5	24.5	2.5	40	3.0	2400
ELM4532A180	18	22.5~27.5	24.5	5	40	6.0	4300
ELM5750A180	18	22.5~27.5	24.5	10	40	25.0	7300
ELM5750A380	38	48.5~56.0	50.0	10	77	30.0	3000

NOTES:

- Average power dissipation not to exceed 0.1w · 0.1w · 0.15w · 0.3w and 1w for chip size 2012, 3216, 3225, 4532 and 5750 respectively.
- If the maximum loads specified for load dump or jump start are fully utilized, subsequent polarity reversal of Auto TVS is inadmissible.
- If the load remains under the maximum ratings, polarity reversal may be admissible.
- Thermal shock capability per MIL- STD- 750, Method 1051:-55□ to 125□, 5 minutes at 25□, 25 cycle: 15 minutes at each extreme.
- For application specific requirement, please contact factory for availability.

SMD Transient Voltage Suppressors

Array Type Multilayer Varistor

Part Number	Working Voltage (MAX)	Breakdown Voltage	Leakage Current (MAX)	Clamping Voltage (MAX)	Insulation Resistance (MIN)	Typical Capacitance
Unit Condition	DC (V)	1mA (*1) (V)	I _L (*3) (μA)	(V) (*2)	R _s (*4) (Mohm)	1MHz (*5) (pF)
ELA2012A050	5	24	0.1	50	10	20
ELA2012A050	5	24	0.1	60	10	10
ELA3216A180	18	27	0.1	60	10	120

* 1 The Breakage Voltage was measured at 1mA DC, tolerance ±30%.

* 2 The Clamping Voltage was measured at 8/20μs waveform, 1A current.

* 3 The Leakage Current was measured at working voltage.

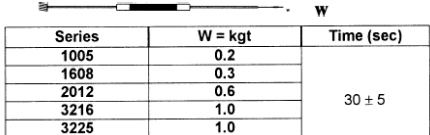
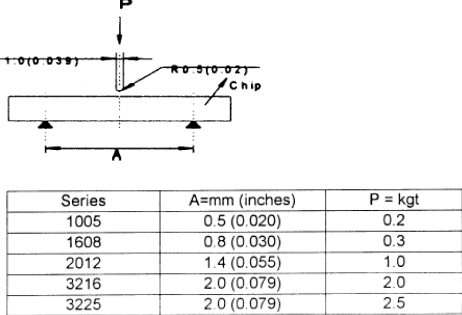
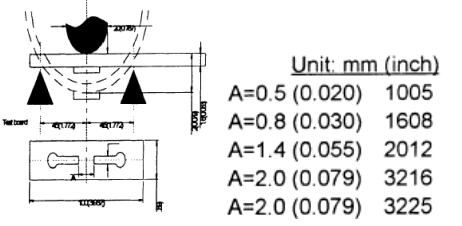
* 4 The Insulation Resistance was measured at working voltage.

* 5 The Capacitance was measured at 1M Hz, tolerance ±30%.

* 6 Special specification requirement are available upon request, please contact sales for further request.

SMD Transient Voltage Suppressors

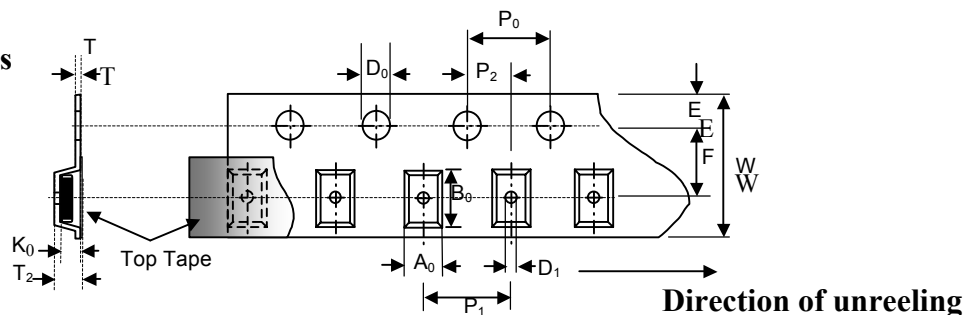
Environmental and Mechanical Reliability

Item	Test Conditions	Specification																		
1 Humidity	<ol style="list-style-type: none"> Temp. : 40 ±2 °C Humidity : 90~95% RH Testing time : 1000 h Measure the variation of V_{1mA} at ambient temperature, 24 hours after completion. 	<ol style="list-style-type: none"> No mechanical damage $\Delta V_{1mA} / V_{1mA} \leq \pm 10\%$ 																		
2 Operational Life	<ol style="list-style-type: none"> Temp. : 125 ±5 °C Test time : 1000 h Applying the working voltage (V_{DC}) Measure the variation of V_{1mA} at ambient temperature, 24 hours after completion. 	<ol style="list-style-type: none"> No mechanical damage $\Delta V_{1mA} / V_{1mA} \leq \pm 10\%$ 																		
3 Thermal Shock	<ol style="list-style-type: none"> Temp. : -40 °C ~ 85 °C, dwell time is 30 min Cycle : 100 cycles Measurement at ambient temperature, 24 h after test completion 	<ol style="list-style-type: none"> No mechanical damage $\Delta V_{1mA} / V_{1mA} \leq \pm 10\%$ 																		
4 Storage Temperature	<ol style="list-style-type: none"> Temp. : -40 °C to + 85 °C Humidity : 70% RH max. 	At packing condition																		
5 Leaching	<ol style="list-style-type: none"> Solder Temp. : 260 ±5 °C Dip Time : 10 ±3 sec 	All termination shall exhibit a continuous solder coating free from body exposed																		
6 Solderability (1)	IR profile refer to “Recommended Soldering Condition”	<ol style="list-style-type: none"> Solder height more than 20% of chip thickness Chip shift distance less than 50% of width No short, open, ...etc. defect 																		
7 Solderability (2)	<ol style="list-style-type: none"> Temperature : 235 ±5 °C Dip time : 5 ±1 sec 	All termination shall exhibit a continuous solder coating free from defects for a minimum of 75% of the critical area of any individual termination																		
8 Terminal Strength	 <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Series</th> <th>W = kgt</th> <th>Time (sec)</th> </tr> </thead> <tbody> <tr> <td>1005</td> <td>0.2</td> <td rowspan="5" style="text-align: center; vertical-align: middle;">30 ± 5</td> </tr> <tr> <td>1608</td> <td>0.3</td> </tr> <tr> <td>2012</td> <td>0.6</td> </tr> <tr> <td>3216</td> <td>1.0</td> </tr> <tr> <td>3225</td> <td>1.0</td> </tr> </tbody> </table>	Series	W = kgt	Time (sec)	1005	0.2	30 ± 5	1608	0.3	2012	0.6	3216	1.0	3225	1.0	The terminal electrode should not break off nor mechanical damaged				
Series	W = kgt	Time (sec)																		
1005	0.2	30 ± 5																		
1608	0.3																			
2012	0.6																			
3216	1.0																			
3225	1.0																			
9 Bending Strength	 <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Series</th> <th>A=mm (inches)</th> <th>P = kgt</th> </tr> </thead> <tbody> <tr> <td>1005</td> <td>0.5 (0.020)</td> <td>0.2</td> </tr> <tr> <td>1608</td> <td>0.8 (0.030)</td> <td>0.3</td> </tr> <tr> <td>2012</td> <td>1.4 (0.055)</td> <td>1.0</td> </tr> <tr> <td>3216</td> <td>2.0 (0.079)</td> <td>2.0</td> </tr> <tr> <td>3225</td> <td>2.0 (0.079)</td> <td>2.5</td> </tr> </tbody> </table>	Series	A=mm (inches)	P = kgt	1005	0.5 (0.020)	0.2	1608	0.8 (0.030)	0.3	2012	1.4 (0.055)	1.0	3216	2.0 (0.079)	2.0	3225	2.0 (0.079)	2.5	The body should not be damaged by force applied on the top
Series	A=mm (inches)	P = kgt																		
1005	0.5 (0.020)	0.2																		
1608	0.8 (0.030)	0.3																		
2012	1.4 (0.055)	1.0																		
3216	2.0 (0.079)	2.0																		
3225	2.0 (0.079)	2.5																		
11 Board Flexure Strength	 <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Series</th> <th>A=mm (inch)</th> <th>P = kgt</th> </tr> </thead> <tbody> <tr> <td>1005</td> <td>0.5 (0.020)</td> <td>1005</td> </tr> <tr> <td>1608</td> <td>0.8 (0.030)</td> <td>1608</td> </tr> <tr> <td>2012</td> <td>1.4 (0.055)</td> <td>2012</td> </tr> <tr> <td>3216</td> <td>2.0 (0.079)</td> <td>3216</td> </tr> <tr> <td>3225</td> <td>2.0 (0.079)</td> <td>3225</td> </tr> </tbody> </table> <ol style="list-style-type: none"> At ambient Temp. & humidity Flex 2 mm (min.) 	Series	A=mm (inch)	P = kgt	1005	0.5 (0.020)	1005	1608	0.8 (0.030)	1608	2012	1.4 (0.055)	2012	3216	2.0 (0.079)	3216	3225	2.0 (0.079)	3225	No mechanical damage shall be noticed even when the board is bent 2 mm (0.079 inch)
Series	A=mm (inch)	P = kgt																		
1005	0.5 (0.020)	1005																		
1608	0.8 (0.030)	1608																		
2012	1.4 (0.055)	2012																		
3216	2.0 (0.079)	3216																		
3225	2.0 (0.079)	3225																		

SMD Transient Voltage Suppressors

Packaging

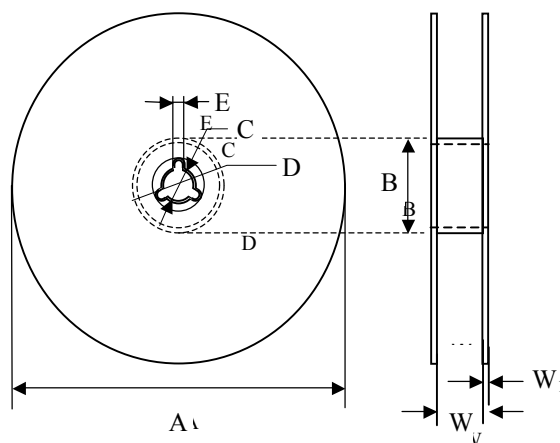
Tape Dimensions



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
1005	0.85	1.25	0.65	0.22	0.87	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1608	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
2012	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
3216	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
3225	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
4532	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
5750	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
8050	5.50	8.50	2.80	1.00	3.05	1.50	1.50	8.00	2.00	4.00	16.00	1.75	7.50

Unit: mm

Reel Dimensions



Symbol	A	B	C	D	E	W	W_1
1005	178.0 \pm 1.0	60.0 \pm 0.5	13.0 \pm 0.2	21.0 \pm 0.2	2.0 \pm 0.5	9.0 \pm 0.50	1.5 \pm 0.15
1608	178.0 \pm 1.0	60.0 \pm 0.5	13.0 \pm 0.2	21.0 \pm 0.2	2.0 \pm 0.5	9.0 \pm 0.50	1.5 \pm 0.15
2012	178.0 \pm 1.0	60.0 \pm 0.5	13.0 \pm 0.2	21.0 \pm 0.2	2.0 \pm 0.5	9.0 \pm 0.50	1.5 \pm 0.15
3216	178.0 \pm 1.0	60.0 \pm 0.5	13.0 \pm 0.2	21.0 \pm 0.2	2.0 \pm 0.5	9.0 \pm 0.50	1.5 \pm 0.15
3225	178.0 \pm 1.0	60.0 \pm 0.5	13.0 \pm 0.2	21.0 \pm 0.2	2.0 \pm 0.5	9.0 \pm 0.50	1.5 \pm 0.15
4532	178.0 \pm 1.0	60.0 \pm 0.5	13.5 \pm 0.1	21.0 \pm 0.2	2.0 \pm 0.5	13.6 \pm 0.2	1.5 \pm 0.15
5750	178.0 \pm 1.0	60.0 \pm 0.5	13.5 \pm 0.1	21.0 \pm 0.2	2.0 \pm 0.5	13.6 \pm 0.2	1.5 \pm 0.15
8050	178.0 \pm 1.0	60.0 \pm 0.5	13.5 \pm 0.1	21.0 \pm 0.2	2.0 \pm 0.5	13.6 \pm 0.2	1.5 \pm 0.15

Unit: mm

Pieces packaged per reel

Type	1005	1608	2012	3216	3225	4532	5750/8050
pcs/reel	4000	4000	3000	3000	2000	1000	1000