

WP Surface Mount Varistor Series



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Table of Contents

Approvals 2

WP05A Series

Structure 3

Electrical Characteristics 4

Specifications 5

Tape Dimensions 6

Environmental Characteristics 7

Mechanical Characteristics 8

Technical Term 8

WP07A Series

Structure 9

Electrical Characteristics 10

Specifications 11

Tape Dimensions 12

Environmental Characteristics 13

Mechanical Characteristics 14

Environmental Specifications 14

WP10A Series

Structure 15

Electrical Characteristics 16

Specifications 17



Tape Dimensions 18



Environmental Characteristics 19



Mechanical Characteristics 20

Environmental Specifications 20

Approvals

APPROVALS	5A011~5A115	5A125	5A130~5A230	5A250	5A275~5A350
UL and CUL 1449 Fourth Edition File #E321567 	PENDING	APPROVED	PENDING	APPROVED	PENDING
CE 	APPROVED	APPROVED	APPROVED	APPROVED	APPROVED

APPROVALS	7A011~7A115	7A125	7A130~7A230	7A250	7A275~7A510
UL and CUL 1449 Fourth Edition File #E321567 	PENDING	APPROVED	PENDING	APPROVED	PENDING
CE 	APPROVED	APPROVED	APPROVED	APPROVED	APPROVED

APPROVALS	10A011~10A115	10A125	10A130~10A230	10A250	10A275~10A680
UL and CUL 1449 Fourth Edition File #E321567 	PENDING	APPROVED	PENDING	APPROVED	PENDING
CE 	APPROVED	APPROVED	APPROVED	APPROVED	APPROVED

SURFACE MOUNT VARISTOR SERIES

Structure

WP05A Series

Item	Description		
Main Material	Metal Oxide Varistors (MOVs) are two-leaded, surface mounted components. Manufactured mainly from sintered zinc oxides and schematically equivalent to two back-to-back PN junctions, MOVs shunt surge currents by decreasing their resistance as transient voltage is applied.		
Package Type	Plastic enclosed and epoxy resin potted.		
Appearance	Without dirt and crack, marking should be clear.		
Dimensions		A	6.5 ± 0.5
		B	8.0 ± 0.5
		H	3.9 ± 0.5
		W	10.4 ± 1.0
		a	2.0 ± 0.2
		b	1.2 ± 0.2
Soldering Pad Layout		c	2.5
		d	2.5
		e	7.0

Electrical Characteristics

WP05A Series

Item	Performance	Test Methods
Standard Conditions		Unless otherwise specified, all tests are made under environmental conditions given below: Temperature: 20~35°C Relative Humidity: 45~85% RH
Maximum Continuous Operating Voltage (MCOV)		Maximum continuous AC sine wave (RMS) or DC voltage which may be applied.
Varistor Voltage		Varistors are connected to a variable voltage source adjusted to maintain a current of 0.1 mA DC applied between 10 ms and 500 ms and the voltage across the varistor is measured.
Varistor Voltage Temperature Coefficient	0.05~ +0.05%/°C	$\frac{V_{0.1mA \text{ at } 105} - V_{0.1mA \text{ at } 25^{\circ}C}}{V_{0.1mA \text{ at } 25^{\circ}C}} \times \frac{1}{60} \times 100 (\%/^{\circ}C)$
Max. Clamping Voltage		Peak voltage across the varistor with a specified peak impulse current of 8x20µs waveform.
Rated Power		Maximum 50~60Hz power which may be loaded for 1000 hrs at 105°±2°C with the varistor voltage change of less than ±10%.
Nominal Discharge Current (In)		Peak value of the current through the varistor having a current waveshape of 8x20µs where the varistor voltage change less than ±10% after applied 15 surges with intervals of 1 minute.
Withstanding Surge Current		Peak value of the current through the varistor having a current waveshape of 8x20µs where the varistor voltage change is less than ±10% after applied one or two times with intervals of 5 minutes.
Energy		The max. energy absorbed with the varistor voltage change less than ±10% when one impulse current waveform 10x1000µs is applied
Typical Capacitance (Reference)		Capacitance shall be measured at 1kHz ±10%, 1 Vrms max. (1MHz below 100pF) 0V bias and 20±2°C.

SURFACE MOUNT VARISTOR SERIES

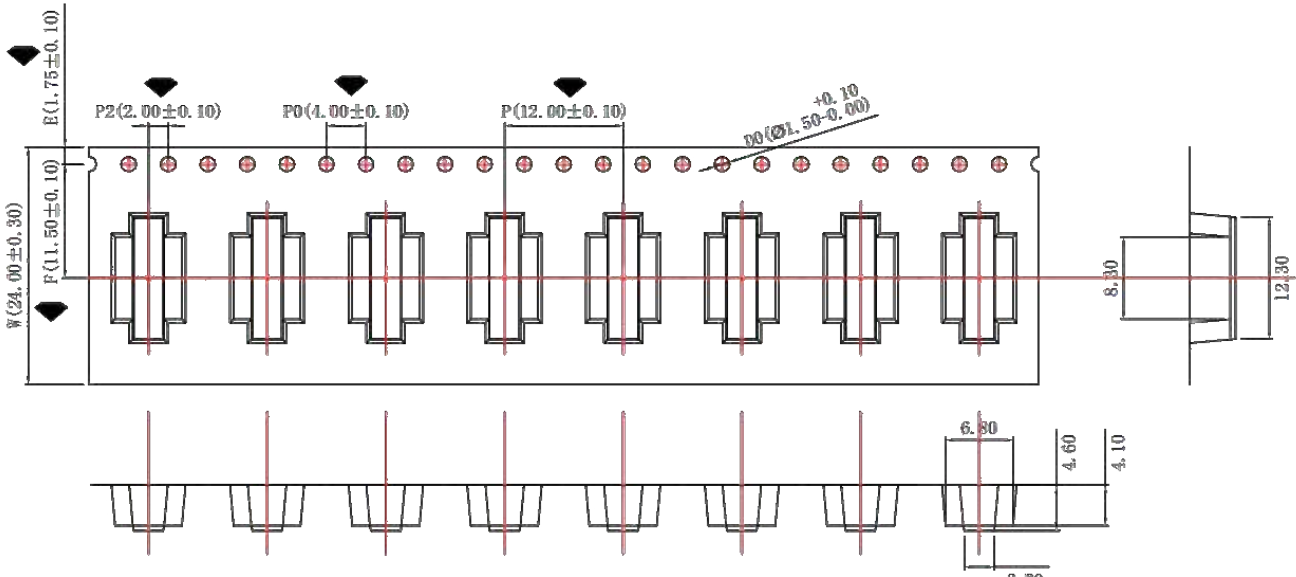
Specifications

WP05A Series

Part Number	Maximum Allowable Voltage		Varistor Voltage (V)	Maximum Clamping Voltage		Maximum Rated Wattage (W)	Surge Current 8/20 μ s		Maximum Energy (10/1000 μ s) W_{tm} (joule)	Typical Capacitance at 1MHz @1kHz (pf)
	AC _{rms} (V)	DC (V)		(V)	I _p (A)		1 _{tm} (A)			
			In 15 times			1 time				
WP05A011	11	14	16~21.5	40	1	0.01	150	250	0.6	1400
WP05A014	14	18	20~26	48					0.7	1150
WP05A017	17	22	24~31	60					0.9	930
WP05A020	20	26	30~36	73					1.1	760
WP05A025	25	31	35~43	86					1.2	640
WP05A030	30	38	42~52	104					1.5	530
WP05A035	35	45	50~62	123					1.8	450
WP05A040	40	56	61~75	150					2.2	370
WP05A050	50	65	74~90	145					3.5	300
WP05A060	60	85	90~110	175	5	0.1	500	800	4.0	250
WP05A075	75	100	108~132	210					5.0	210
WP05A095	95	125	135~165	260					6.5	165
WP05A115	115	150	162~198	320					8.0	140
WP05A125	175	225	243~297	475					11.0	95
WP05A130	130	170	185~225	355					8.5	125
WP05A140	140	180	198~242	380					9.0	110
WP05A150	150	200	216~264	415					10.5	100
WP05A175	175	225	243~297	475					11.0	95
WP05A190	190	250	270~330	525					12.0	85
WP05A210	210	275	297~363	570					13.0	75
WP05A230	230	300	324~396	620					16.0	70
WP05A250	250	320	351~429	675					17.0	65
WP05A275	275	350	387~473	745					20.0	60
WP05A300	300	385	423~517	810					21.0	55
WP05A320	320	415	459~561	845					22.5	50
WP05A350	350	460	504~616	920	24.0	45				

Tape Dimensions

WP05A Series



Packing Length per 13" Reel: 12.576 meters.

Component Load per 13" Reel: 1000 pcs.

Environmental Characteristics

WP05A Series

Item	Performance	Test Methods
Climate Sequence	$V_{1mA} / V_{1mA} \leq \pm 10\%$ $(V_{0.1mA} / V_{0.1mA} \leq \pm 10\%$ for 05D or 5A series) No visible damage. Insulation resistance 1MΩ.	IEC 60068-2-2, Test B _a Dry Heat: 105±2°C / 16 hrs IEC60068-2-30, Test D _b Damp Heat, cyclic (first cycle): 55±2°C / 24 hrs., 93±3% RH IEC60068-2-1, Test A _a Cold: -40±2°C / 2 hrs IEC60068-2-30, Test D _b Damp Heat, cyclic (remaining 5 cycles): 55±2°C / 25±2°C, 93±3% RH 24 hrs. / cycle
Damp Heat, Steady State	$V_{1mA} / V_{1mA} \leq \pm 10\%$ $(V_{0.1mA} / V_{0.1mA} \leq \pm 10\%$ for 05D or 5A series) No visible damage. Insulation resistance 1MΩ.	IEC 60068-2-78, Test B _a Temperature: 40±2°C Humidity: 93±3% RH Duration: 56 days
Rapid Change in Temperature	$V_{1mA} / V_{1mA} \leq \pm 10\%$ $(V_{0.1mA} / V_{0.1mA} \leq \pm 10\%$ for 05D or 5A series) No visible damage.	IEC 60068-2-14, Test N _a T _A = 40°C; T _B = +105°C Duration: 30 minutes/step Total: 5 cycles
Dry Heat, Loading	$V_{1mA} / V_{1mA} \leq \pm 10\%$ $(V_{0.1mA} / V_{0.1mA} \leq \pm 10\%$ for 05D or 5A series) No visible damage. Insulation resistance 1MΩ.	IEC 60068-2-2, Test B Temperature: 105°C Duration: 1000 hrs Apply Voltage: Max. allowable voltage
Damp heat, Loading	$V_{1mA} / V_{1mA} \leq \pm 10\%$ $(V_{0.1mA} / V_{0.1mA} \leq \pm 10\%$ for 05D or 5A series) No visible damage. Insulation resistance 1MΩ.	IEC 60068-2-78, Test C _a Temperature: 40±2°C Humidity: 93±3% RH Duration: 56 days Apply Voltage: 10% of Max. allowable DC voltage

Mechanical Characteristics

WP05A Series

Item	Requirements	Test Specifications
Vibration	$V_{1mA} / V_{1mA} \leq \pm 5\%$ ($V_{0.1mA} / V_{0.1mA} \leq \pm 5\%$ for 05D or 5A series) No visible damage.	IEC 60068-2-6, Test F _c Method B4 Frequency range: 10~55Hz Amplitude: 0.75mm or 98 m/s ² Duration: 6 hrs (3 x 2 hrs) Pulse: sine wave
Solderability	95% of the immersed portion cover with solder.	IEC 60068-2-20, Test T _a Method 1 Solder Temp.: 245±5°C Immersed Time: 3±0.5 sec
Resistance to Soldering Heat	$V_{1mA} / V_{1mA} \leq \pm 5\%$ ($V_{0.1mA} / V_{0.1mA} \leq \pm 5\%$ for 05D or 5A series) No visible damage.	IEC 60068-2-20, Test T _b Method 1A Solder Temp.: 260±5°C Immersed Time: 10±1 sec
Robustness of Terminations, Tensile	$V_{1mA} / V_{1mA} \leq \pm 5\%$ ($V_{0.1mA} / V_{0.1mA} \leq \pm 5\%$ for 05D or 5A series) No break of solder joint, no wire break.	IEC 60068-2-21, Test U _{a1} Force: 1 kg _f for 0.6 and 0.8mm wire 2 kg _f for 1.0mm wire Duration: 10 sec
Shock	$V_{1mA} / V_{1mA} \leq \pm 5\%$ ($V_{0.1mA} / V_{0.1mA} \leq \pm 5\%$ for 05D or 5A series) No visible damage.	IEC 60068-2-27, Test E _a Pulse Shape: half sine Acceleration: 49 m/s ² Pulse Duration: 11 ms 3 x 6 shocks

Technical Term

WP05A Series

Item	Specifications	Description
Operating Temperature Range	-40°C to 105°C	Operating temperature without derating.
Storage Temperature Range	-40°C to 125°C	Storage temperature range without voltage applied.
Transient Reponse Time	-50 ns	Time lag between application of surge and varistor's "turn-on" conduction action.
Insulation Resistance	10,000 M minimum	Minimum resistance between shorted terminals and varistor surface.
Hipot Test	2500VAc	Minimum voltage applied for one minute between shorted terminals and varistor surface.

Structure

WP07A Series

Item	Description			
Main Material	Metal Oxide Varistors (MOVs) are two-leaded, surface mounted components. Manufactured mainly from sintered zinc oxides and schematically equivalent to two back-to-back PN junctions, MOVs shunt surge currents by decreasing their resistance as transient voltage is applied.			
Package Type	Plastic enclosed and epoxy resin potted.			
Appearance	Without dirt and crack, marking should be clear.			
Dimensions		A	8.3±0.5	
		B	10.6±0.5	
		a	3.0±0.2	
		b	1.5±0.2	
		W	13.8±1.0	
		H (max)	7A011~7A300	4.4
			7A320~7A250	8.0
Soldering Pad Layout		c	2.5	
		d	3.5	
		e	9.2	

Electrical Characteristics

WP07A Series

Item	Performance	Test Methods
Standard Conditions		Unless otherwise specified, all tests are made under environmental conditions given below: Temperature: 20~35°C Relative Humidity: 45~85% RH
Maximum Continuous Operating Voltage (MCOV)		Maximum continuous AC sine wave (RMS) or DC voltage which may be applied.
Varistor Voltage		Varistors are connected to a variable voltage source adjusted to maintain a current of 0.1 mA DC applied between 10 ms and 500 ms and the voltage across the varistor is measured.
Varistor Voltage Temperature Coefficient	0.05~ +0.05%/°C	$\frac{V_{1mA} \text{ at } 105^{\circ}\text{C} - V_{1mA} \text{ at } 25^{\circ}\text{C}}{V_{1mA} \text{ at } 25^{\circ}\text{C}} \times \frac{1}{60} \times 100 (\%/\text{°C})$
Max. Clamping Voltage		Peak voltage across the varistor with a specified peak impulse current of 8x20µs waveform.
Rated Power		Maximum 50~60Hz power which may be loaded for 1000 hrs at 105°±2°C with the varistor voltage change of less than ±10%.
Nominal Discharge Current (In)		Peak value of the current through the varistor having a current waveshape of 8x20µs where the varistor voltage change less than ±10% after applied 15 surges with intervals of 1 minute.
Withstanding Surge Current		Peak value of the current through the varistor having a current waveshape of 8x20µs where the varistor voltage change is less than ±10% after applied one time.
Energy		The max. energy absorbed with the varistor voltage change less than ±10% when one impulse current waveform 10x1000µs is applied
Typical Capacitance (Reference)		Capacitance shall be measured at 1kHz ±10%, 1 Vrms max. (1MHz below 100pF) 0V bias and 20±2°C.

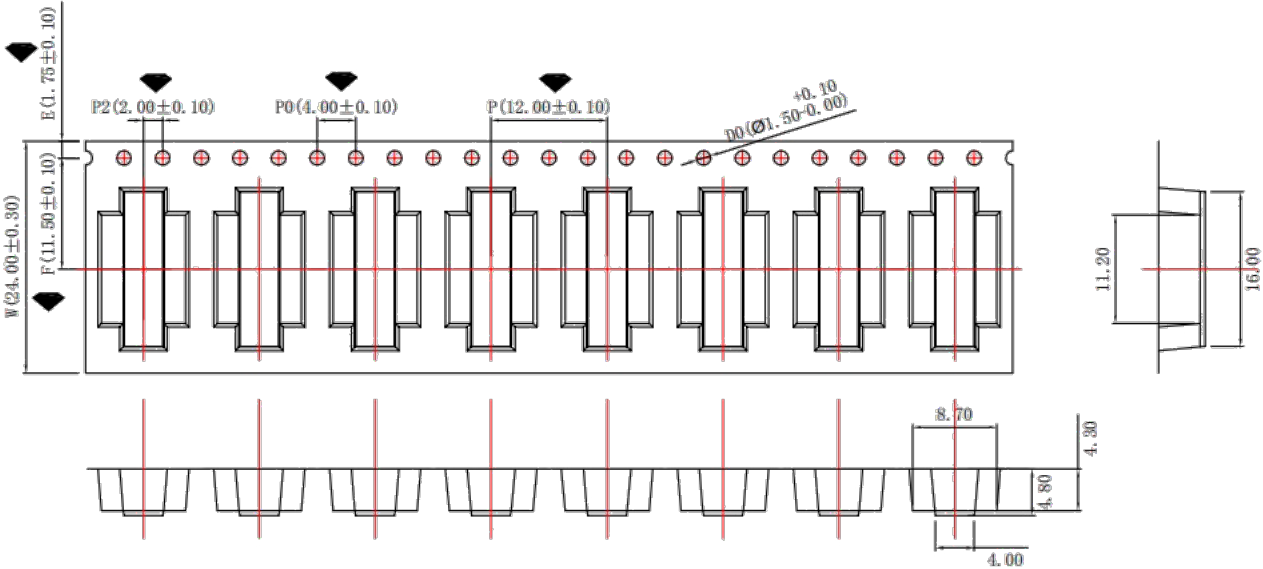
Specifications

WP07A Series

Part Number	Maximum Allowable Voltage		Varistor Voltage V _n (V)	Maximum Clamping Voltage		Maximum Rated Wattage (W)	Surge Current 8/20 μs		Maximum Energy (10/1000μs) (Joule)	Typical Capacitance Reference (pF)
	AC (V)	DC (V)		(V)	I _p (A)		(A)	I _{max} (A)		
			15 times			1 time				
WP07A011	11	14	16~21.5	36	2.5	0.02	250	500	2.0	2800
WP07A014	14	18	20~26	43					2.4	2300
WP07A017	17	22	24~31	53					3.0	1800
WP07A020	20	26	30~36	65					3.5	1500
WP07A025	25	31	35~43	77					4.0	1300
WP07A030	30	38	42~52	93					5.0	1100
WP07A035	35	45	50~62	110					6.0	890
WP07A040	40	56	61~75	135					7.0	740
WP07A050	50	65	74~90	135	10	0.25	1000	1750	10.0	600
WP07A060	60	85	90~110	165					12.0	500
WP07A075	75	100	108~132	200					13.0	420
WP07A095	95	125	135~165	250					15.0	330
WP07A115	115	150	162~198	300					16.0	280
WP07A125	175	225	243~297	455					24.0	185
WP07A130	130	170	185~225	340					17.0	250
WP07A140	140	180	198~242	360					19.0	230
WP07A150	150	200	216~264	395					21.0	210
WP07A175	175	225	243~297	455					24.0	185
WP07A190	190	250	270~330	505					26.0	165
WP07A210	210	275	297~363	550					28.0	150
WP07A230	230	300	324~396	595					32.0	140
WP07A250	250	320	351~429	650					35.0	130
WP07A275	275	350	387~473	710					40.0	115
WP07A300	300	385	423~517	775					42.0	105
WP07A320	320	415	459~561	845					45.0	100
WP07A350	350	460	504~616	925					49.0	90
WP07A385	385	505	558~682	1025					55.0	80
WP07A420	420	560	612~748	1120					60.0	75
WP07A460	460	615	645~825	1240	64.0	70				
WP07A485	485	640	702~858	1290	69.0	65				
WP07A510	510	670	738~902	1355	73.0	60				

Tape Dimensions

WP07A Series



Packing Length per 13" Reel: 12.576 meters.

Component Load per 13" Reel: 1000 pcs.

Environmental Characteristics

WP07A Series

Item	Performance	Test Methods
Climate Sequence	$\Delta V_{1mA} / V_{1mA} \leq \pm 10\%$ $(\Delta V_{0.1mA} / V_{0.1mA} \leq \pm 10\%$ for 07D or 7A series) No visible damage. Insulation resistance $\geq 1M\Omega$.	IEC 60068-2-2, Test B _a Dry Heat: 105±2°C / 16 hrs IEC60068-2-30, Test D _b Damp Heat, cyclic (first cycle): 55±2°C / 24 hrs., 93±3% RH IEC60068-2-1, Test A _a Cold: -40±2°C / 2 hrs IEC60068-2-30, Test D _b Damp Heat, cyclic (remaining 5 cycles): 55±2°C / 25±2°C, 93±3% RH 24 hrs. / cycle
Damp Heat, Steady State	$V_{1mA} / V_{1mA} \leq \pm 10\%$ $(V_{0.1mA} / V_{0.1mA} \leq \pm 10\%$ for 07D or 7A series) No visible damage. Insulation resistance $\geq 1M\Omega$.	IEC 60068-2-78, Test B _a Temperature: 40±2°C Humidity: 93±3% RH Duration: 56 days
Rapid Change in Temperature	$\Delta V_{1mA} / V_{1mA} \leq \pm 5\%$ $(\Delta V_{0.1mA} / V_{0.1mA} \leq \pm 5\%$ for 07D or 7A series) No visible damage.	IEC 60068-2-14, Test N _a T _A = 40°C; T _B = +105°C Duration: 30 minutes/step Total: 5 cycles
Dry Heat, Loading	$V_{1mA} / V_{1mA} \leq \pm 10\%$ $(V_{0.1mA} / V_{0.1mA} \leq \pm 10\%$ for 07D or 7A series) No visible damage. Insulation resistance $\geq 10M\Omega$.	IEC 60068-2-2, Test B Temperature: 105°C Duration: 1000 hrs Apply Voltage: Max. allowable voltage
Damp heat, Loading	$\Delta V_{1mA} / V_{1mA} \leq \pm 10\%$ $(\Delta V_{0.1mA} / V_{0.1mA} \leq \pm 10\%$ for 07D or 7A series) No visible damage. Insulation resistance $\geq 1M\Omega$.	IEC 60068-2-78, Test C _a Temperature: 40±2°C Humidity: 93±3% RH Duration: 56 days Apply Voltage: 10% of Max. allowable DC voltage

Mechanical Characteristics

WP07A Series

Item	Requirements	Test Specifications
Vibration	$\Delta V_{1mA} / V_{1mA} \leq \pm 5\%$ ($\Delta V_{0.1mA} / V_{0.1mA} \leq \pm 5\%$ for 07D or 7A series) No visible damage.	IEC 60068-2-6, Test Fc Method B4 Frequency range: 10~55Hz Amplitude: 0.75mm or 98 m/s ² Duration: 6 hrs (3 x 2 hrs) Pulse: sine wave
Solderability	95% of the immersed portion cover with solder.	IEC 60068-2-20, Test Ta Method 1 Solder Temp.: 245±5°C Immersed Time: 3±0.5 sec
Resistance to Soldering Heat	$\Delta V_{1mA} / V_{1mA} \leq \pm 5\%$ ($\Delta V_{0.1mA} / V_{0.1mA} \leq \pm 5\%$ for 07D or 7A series) No visible damage.	IEC 60068-2-20, Test Tb Method 1A Solder Temp.: 260±5°C Immersed Time: 10±1 sec
Robustness of Terminations, Tensile	$\Delta V_{1mA} / V_{1mA} \leq \pm 5\%$ ($\Delta V_{0.1mA} / V_{0.1mA} \leq \pm 5\%$ for 07D or 7A series) No break of solder joint, no wire break.	IEC 60068-2-21, Test Ua1 Force: 1 kgf for 0.6 and 0.8 φmm wire 2 kgf for 1.0 φmm wire Duration: 10 sec
Shock	$\Delta V_{1mA} / V_{1mA} \leq \pm 5\%$ ($\Delta V_{0.1mA} / V_{0.1mA} \leq \pm 5\%$ for 07D or 7A series) No visible damage.	IEC 60068-2-27, Test Ea Pulse Shape: half sine Acceleration: 49 m/s ² Pulse Duration: 11 ms 3 x 6 shocks

Technical Term

WP07A Series

Item	Specifications	Description
Operating Temperature Range	-40°C to 105°C	Operating temperature without derating.
Storage Temperature Range	-40°C to 125°C	Storage temperature range without voltage applied.
Transient Reponse Time	<50 ns	Time lag between application of surge and varistor's "turn-on" conduction action.
Insulation Resistance	10,000 M minimum	Minimum resistance between shorted terminals and varistor surface.
Hipot Test	≥2500VAc	Minimum voltage applied for one minute between shorted terminals and varistor surface.

Structure

WP10A Series

Item	Description		
Main Material	Metal Oxide Varistors (MOVs) are two-leaded, surface mounted components. Manufactured mainly from sintered zinc oxides and schematically equivalent to two back-to-back PN junctions, MOVs shunt surge currents by decreasing their resistance as transient voltage is applied.		
Package Type	Plastic enclosed and epoxy resin potted.		
Appearance	Without dirt and crack, marking should be clear.		
Dimensions		A	14.0±0.5
		B	16.6±0.5
		a	3.0±0.2
		b	1.5±0.2
		W	19.6±1.0
		H (max)	10A011~10A300 5.5
			10A320~10A250 11.5
Soldering Pad Layout		c	2.5
		d	4.0
		e	16.6

Electrical Characteristics

WP10A Series

Item	Performance	Test Methods
Standard Conditions		Unless otherwise specified, all tests are made under environmental conditions given below: Temperature: 20~35°C Relative Humidity: 45~85% RH
Maximum Continuous Operating Voltage (MCOV)		Maximum continuous AC sine wave (RMS) or DC voltage which may be applied.
Varistor Voltage		Varistors are connected to a variable voltage source adjusted to maintain a current of 0.1 mA DC applied between 10 ms and 500 ms and the voltage across the varistor is measured.
Varistor Voltage Temperature Coefficient	0.05~ +0.05%/°C	$\frac{V_{1mA} \text{ at } 105^{\circ}\text{C} - V_{1mA} \text{ at } 25^{\circ}\text{C}}{V_{1mA} \text{ at } 25^{\circ}\text{C}} \times \frac{1}{60} \times 100 (\%/^{\circ}\text{C})$
Max. Clamping Voltage		Peak voltage across the varistor with a specified peak impulse current of 8x20µs waveform.
Rated Power		Maximum 50~60Hz power which may be loaded for 1000 hrs at 105°±2°C with the varistor voltage change of less than ±10%.
Nominal Discharge Current (In)		Peak value of the current through the varistor having a current waveshape of 8x20µs where the varistor voltage change less than ±10% after applied 15 surges with intervals of 1 minute.
Withstanding Surge Current		Peak value of the current through the varistor having a current waveshape of 8x20µs where the varistor voltage change is less than ±10% after applied one time.
Energy		The max. energy absorbed with the varistor voltage change less than ±10% when one impulse current waveform 10x1000µs is applied
Typical Capacitance (Reference)		Capacitance shall be measured at 1kHz ±10%, 1 Vrms max. (1MHz below 100pF) 0V bias and 20±2°C.

SURFACE MOUNT VARISTOR SERIES

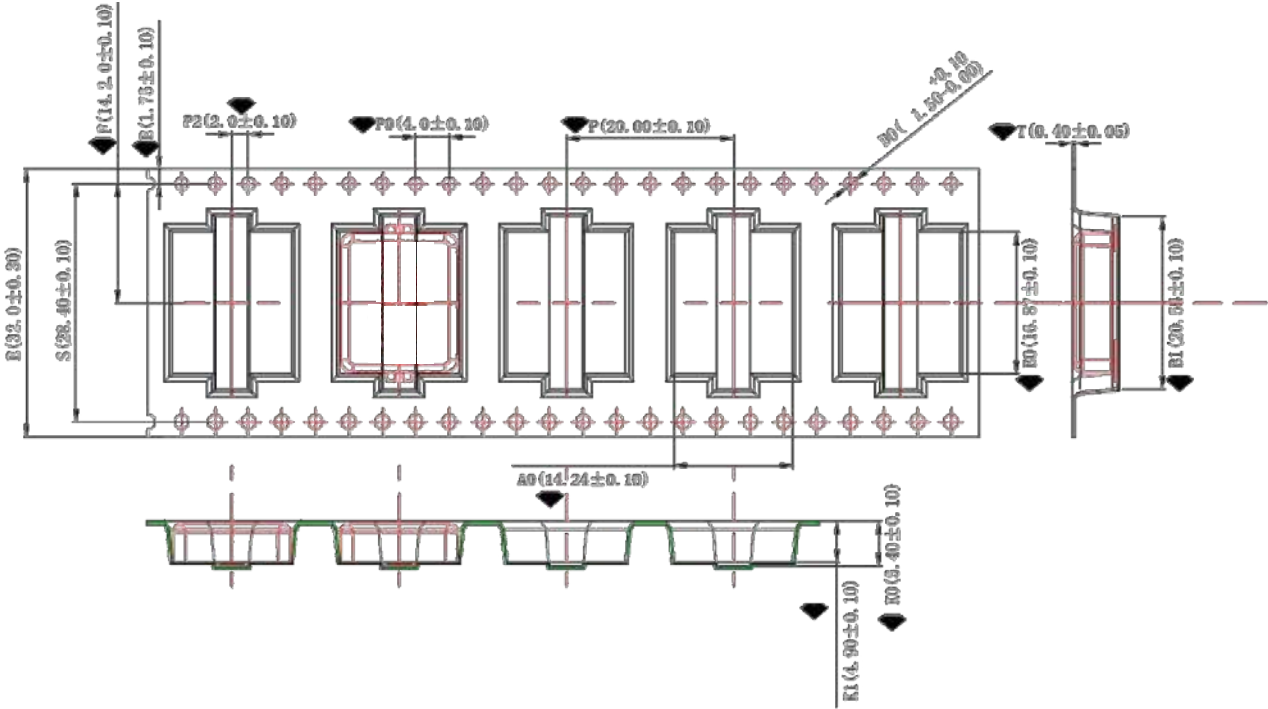
Specifications

WP10A Series

Part Number	Maximum Allowable Voltage		Varistor Voltage V _n (V)	Maximum Clamping Voltage		Maximum Rated Wattage (W)	Surge Current 8/20 μs		Maximum Energy (10/1000μs) (Joule)	Typical Capacitance Reference (pF)
	AC (V)	DC (V)		(V)	I _p (A)		I _n (A) 15 times	I _{max} (A) 1 time		
	WP10A011	11	14	16~21.5	36	5	0.05	500	1000	2.1
WP10A014	14	18	20~26	43	2.5					5400
WP10A017	17	22	24~31	53	3.0					4400
WP10A020	20	26	30~36	65	4.0					3600
WP10A025	25	31	35~43	77	4.6					2900
WP10A030	30	38	42~52	93	5.5					2500
WP10A035	35	45	50~62	110	7.0					2200
WP10A040	40	56	61~75	135	8.2					1800
WP10A050	50	65	74~90	135	25					0.4
WP10A060	60	85	90~110	165		15.0	1300			
WP10A075	75	100	108~132	200		18.0	1080			
WP10A095	95	125	135~165	250		22.0	870			
WP10A115	115	150	162~198	300		27.0	730			
WP10A125	175	225	243~297	455		37.0	480			
WP10A130	130	170	185~225	340		30.0	650			
WP10A140	140	180	198~242	360		32.0	590			
WP10A150	150	200	216~264	395		35.0	550			
WP10A175	175	225	243~297	455		37.0	480			
WP10A190	190	250	270~330	500		40.0	430			
WP10A210	210	275	297~363	550		43.0	390			
WP10A230	230	300	324~396	595		47.0	360			
WP10A250	250	320	351~429	650		60.0	340			
WP10A275	275	350	387~473	710		65.0	300			
WP10A300	300	385	423~517	775		67.0	270			
WP10A320	320	410	459~561	845		69.0	260			
WP10A350	350	460	504~616	925		70.0	230			
WP10A385	385	505	558~682	1025		72.0	210			
WP10A420	420	560	612~748	1120		75.0	200			
WP10A440	440	585	639~781	1180		76.0	180			
WP10A460	460	615	675~825	1240		77.0	170			
WP10A485	485	640	702~858	1290		80.0	160			
WP10A510	510	670	738~902	1355		85.0	160			
WP10A550	550	745	819~1001	1500		93.0	140			
WP10A625	625	825	900~1100	1650		102.0	130			
WP10A680	680	895	990~1210	1815		115.0	120			

Tape Dimensions

WP10A Series



Packing Length per 13" Reel: 10.6 meters.

Component Load per 13" Reel: 500 pcs.

Environmental Characteristics

WP10A Series

Item	Performance	Test Methods
Climate Sequence	$\Delta V_{1mA} / V_{1mA} \leq \pm 10\%$ $(\Delta V_{0.1mA} / V_{0.1mA} \leq \pm 10\%$ for 10D or 10A series) No visible damage. Insulation resistance $\geq 1M\Omega$.	IEC 60068-2-2, Test B _a Dry Heat: 105±2°C / 16 hrs IEC60068-2-30, Test D _b Damp Heat, cyclic (first cycle): 55±2°C / 24 hrs., 93±3% RH IEC60068-2-1, Test A _a Cold: -40±2°C / 2 hrs IEC60068-2-30, Test D _b Damp Heat, cyclic (remaining 5 cycles): 55±2°C / 25±2°C, 93±3% RH 24 hrs. / cycle
Damp Heat, Steady State	$V_{1mA} / V_{1mA} \leq \pm 10\%$ $(V_{0.1mA} / V_{0.1mA} \leq \pm 10\%$ for 10D or 10A series) No visible damage. Insulation resistance $\geq 1M\Omega$.	IEC 60068-2-78, Test B _a Temperature: 40±2°C Humidity: 93±3% RH Duration: 56 days
Rapid Change in Temperature	$\Delta V_{1mA} / V_{1mA} \leq \pm 5\%$ $(\Delta V_{0.1mA} / V_{0.1mA} \leq \pm 5\%$ for 10D or 10A series) No visible damage.	IEC 60068-2-14, Test N _a T _A = 40°C; T _B = +105°C Duration: 30 minutes/step Total: 5 cycles
Dry Heat, Loading	$V_{1mA} / V_{1mA} \leq \pm 10\%$ $(V_{0.1mA} / V_{0.1mA} \leq \pm 10\%$ for 10D or 10A series) No visible damage. Insulation resistance $\geq 10M\Omega$.	IEC 60068-2-2, Test B Temperature: 105°C Duration: 1000 hrs Apply Voltage: Max. allowable voltage
Damp heat, Loading	$\Delta V_{1mA} / V_{1mA} \leq \pm 10\%$ $(\Delta V_{0.1mA} / V_{0.1mA} \leq \pm 10\%$ for 10D or 10A series) No visible damage. Insulation resistance $\geq 1M\Omega$.	IEC 60068-2-78, Test C _a Temperature: 40±2°C Humidity: 93±3% RH Duration: 56 days Apply Voltage: 10% of Max. allowable DC voltage

Mechanical Characteristics

WP10A Series

Item	Requirements	Test Specifications
Vibration	$\Delta V_{1mA} / V_{1mA} \leq \pm 5\%$ ($\Delta V_{0.1mA} / V_{0.1mA} \leq \pm 5\%$ for 10D or 10A series) No visible damage.	IEC 60068-2-6, Test Fc Method B4 Frequency range: 10~55Hz Amplitude: 0.75mm or 98 m/s ² Duration: 6 hrs (3 x 2 hrs) Pulse: sine wave
Solderability	95% of the immersed portion cover with solder.	IEC 60068-2-20, Test Ta Method 1 Solder Temp.: 245±5°C Immersed Time: 3±0.5 sec
Resistance to Soldering Heat	$\Delta V_{1mA} / V_{1mA} \leq \pm 5\%$ ($\Delta V_{0.1mA} / V_{0.1mA} \leq \pm 5\%$ for 10D or 10A series) No visible damage.	IEC 60068-2-20, Test Tb Method 1A Solder Temp.: 260±5°C Immersed Time: 10±1 sec
Robustness of Terminations, Tensile	$\Delta V_{1mA} / V_{1mA} \leq \pm 5\%$ ($\Delta V_{0.1mA} / V_{0.1mA} \leq \pm 5\%$ for 10D or 10A series) No break of solder joint, no wire break.	IEC 60068-2-21, Test Ua1 Force: 1 kgf for 0.6 and 0.8 φmm wire 2 kgf for 1.0 φmm wire Duration: 10 sec
Shock	$\Delta V_{1mA} / V_{1mA} \leq \pm 5\%$ ($\Delta V_{0.1mA} / V_{0.1mA} \leq \pm 5\%$ for 10D or 10A series) No visible damage.	IEC 60068-2-27, Test Ea Pulse Shape: half sine Acceleration: 49 m/s ² Pulse Duration: 11 ms 3 x 6 shocks

Technical Term

WP10A Series

Item	Specifications	Description
Operating Temperature Range	-40°C to 105°C	Operating temperature without derating.
Storage Temperature Range	-40°C to 125°C	Storage temperature range without voltage applied.
Transient Reponse Time	<50 ns	Time lag between application of surge and varistor's "turn-on" conduction action.
Insulation Resistance	10,000 M minimum	Minimum resistance between shorted terminals and varistor surface.
Hipot Test	≥2500VAc	Minimum voltage applied for one minute between shorted terminals and varistor surface.

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