

Pan Overseas Zinc Oxide Varistors

PVR - ZINC OXIDE VARISTORS

Introduction

Zinc Oxide Varistor is a non-linear resistance device, whose voltage and current relationship vary according to the Law of Powers. When high Voltage transients or surges produced by induced lightning, switching or electrical noise, the varistor will switch from the rest stage to the protective stage. Its extremely high resistance value will change to very low and causes short circuit, allows large currents to go through. Thus the high voltage transients or surges can be suppressed to a safe level. This non-linear exponent characteristic with board application range is designed to protect various kinds of electronic devices and semiconductor elements.

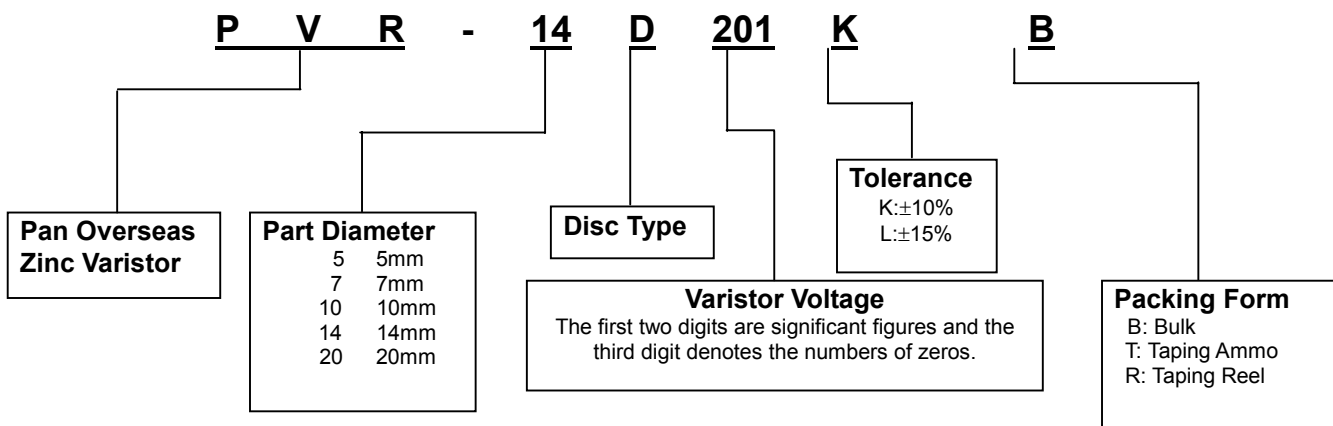
Features

- * Low leakage current.
- * Excellent voltage ratio.
- * Fast respond to the rapidly rising surge voltage.
- * High performance in clamping voltage characteristics.
- * High performance in surge current withstanding capability.

Applications

- * Transistor, diode, IC, Thyristor, and triac semiconductor protection.
- * Surge protection in consumer electronics.
- * Surge protection in industrial electronics.
- * Surge protection in communication, measuring, and controller electronics.
- * Surge protection in home electronic appliances and gas/petroleum appliances.

Part Number Code



Pan Overseas Zinc Oxide Varistors

PVR Series List

Varistor Voltage	Rated Watt (W)	5 Series	Rated Watt (W)	7 Series	Rated Watt (W)	10 Series	Rated Watt (W)	14 Series	Rated Watt (W)	20 Series	UL 144 9	UL 141 4 CSA	
18	0.01	PVR-5D180K	0.02	PVR-7D180K	0.05	PVR-10D180K	0.1	PVR-14D180K	1.0				
22		PVR-5D220K		PVR-7D220K		PVR-10D220K		PVR-14D220K					
27		PVR-5D270K		PVR-7D270K		PVR-10D270K		PVR-14D270K					
33		PVR-5D330K		PVR-7D330K		PVR-10D330K		PVR-14D330K					
39		PVR-5D390K		PVR-7D390K		PVR-10D390K		PVR-14D390K					
47		PVR-5D470K		PVR-7D470K		PVR-10D470K		PVR-14D470K					
56		PVR-5D560K		PVR-7D560K		PVR-10D560K		PVR-14D560K					
68		PVR-5D680K		PVR-7D680K		PVR-10D680K		PVR-14D680K					
82	0.1	PVR-5D820K	0.25	PVR-7D820K	0.4	PVR-10D820K	0.6	PVR-14D820K		PVR-20D820K			
100		PVR-5D101K		PVR-7D101K		PVR-10D101K		PVR-14D101K		PVR-20D101K			
120		PVR-5D121K		PVR-7D121K		PVR-10D121K		PVR-14D121K		PVR-20D121K			
150		PVR-5D151K		PVR-7D151K		PVR-10D151K		PVR-14D151K		PVR-20D151K			
180		PVR-5D181K		PVR-7D181K		PVR-10D181K		PVR-14D181K		PVR-20D181K			
200		PVR-5D201K		PVR-7D201K		PVR-10D201K		PVR-14D201K		PVR-20D201K			
220		PVR-5D221K		PVR-7D221K		PVR-10D221K		PVR-14D221K		PVR-20D221K			
240		PVR-5D241K		PVR-7D241K		PVR-10D241K		PVR-14D241K		PVR-20D241K			
270		PVR-5D271K		PVR-7D271K		PVR-10D271K		PVR-14D271K		PVR-20D271K			
300		PVR-5D301K		PVR-7D301K		PVR-10D301K		PVR-14D301K		PVR-20D301K			
331		PVR-5D331K		PVR-7D331K		PVR-10D331K		PVR-14D331K		PVR-20D331K			
360		PVR-5D361K		PVR-7D361K		PVR-10D361K		PVR-14D361K		PVR-20D361K			
390		PVR-5D391K		PVR-7D391K		PVR-10D391K		PVR-14D391K		PVR-20D391K			
430		PVR-5D431K		PVR-7D431K		PVR-10D431K		PVR-14D431K		PVR-20D431K			
470		PVR-5D471K		PVR-7D471K		PVR-10D471K		PVR-14D471K		PVR-20D471K			
510						PVR-10D511K		PVR-14D511K		PVR-20D511K			
560						PVR-10D561K		PVR-14D561K		PVR-20D561K			
620						PVR-10D621K		PVR-14D621K		PVR-20D621K			
680						PVR-10D681K		PVR-14D681K		PVR-20D681K			
750						PVR-10D751K		PVR-14D751K		PVR-20D751K			
780						PVR-10D781K		PVR-14D781K		PVR-20D781K			
820						PVR-10D821K		PVR-14D821K		PVR-20D821K			
910						PVR-10D911K		PVR-14D911K		PVR-20D911K			
1000						PVR-10D102K		PVR-14D102K		PVR-20D102K			
1100						PVR-10D112K		PVR-14D112K		PVR-20D112K			
1800								PVR-14D182K		PVR-20D182K			

Note: Varistor Voltage: 5 Series -- @ 0.1mA DC test current, 7, 10, 14, 20 Series -- @ 1mA DC test current

Temperature range : -40 ...+85

Storage temperature : -40 ...+125

Voltage temperature :

coefficient : -0.05% /

Pan Overseas Zinc Oxide Varistors

5Φ PVR VARISTOR

Spec. Part No.	Varistor Voltage V1mA		Maximum Allowable Voltage		Maximum Clamping Voltage	Withstanding Surge Current (8/20us)		Rated Wattage	Energy 10/1000us	Typical Capacitance	UL 1449	UL 1414 CSA
	(V)	Tolerance Min-max	ACrms (V)	DC (V)	V5A (V)max	1Time (A)	2Times (A)	(W)	(J)	1KHz (PF)		
PVR-5D180K	18	(16-20)	11	14	40	100	50	0.01	0.6	2,400		
PVR-5D220K	22	(20-24)	14	18	48	100	50	0.01	0.7	1,800		
PVR-5D270K	27	(24-30)	17	22	60	100	50	0.01	0.9	1,500		
PVR-5D330K	33	(30-36)	20	26	73	100	50	0.01	1.1	1,200		
PVR-5D390K	39	(35-43)	25	31	86	100	50	0.01	1.2	1,000		
PVR-5D470K	47	(42-52)	30	38	104	100	50	0.01	1.5	850		
PVR-5D560K	56	(50-62)	35	45	123	100	50	0.01	1.8	700		
PVR-5D680K	68	(61-75)	40	56	150	100	50	0.01	2.1	560		
PVR-5D820K	82	(74-90)	50	65	145	400	200	0.1	2.8	480		
PVR-5D101K	100	(90-110)	60	85	175	400	200	0.1	3.5	420		
PVR-5D121K	120	(108-132)	75	100	210	400	200	0.1	4.0	360		
PVR-5D151K	150	(135-165)	95	125	260	400	200	0.1	5.5	280		
PVR-5D181K	180	(162-198)	115	150	320	400	200	0.1	6.5	200		
PVR-5D201K	200	(185-225)	130	170	355	400	200	0.1	7.1	160		
PVR-5D221K	220	(198-242)	140	180	380	400	200	0.1	7.8	100		
PVR-5D241K	240	(216-264)	150	200	415	400	200	0.1	8.4	80		
PVR-5D271K	270	(247-303)	175	225	475	400	200	0.1	9.9	75		
PVR-5D301K	300	(270-330)	195	250	525	400	200	0.1	10.5	66		
PVR-5D331K	330	(297-363)	210	275	575	400	200	0.1	11.5	60		
PVR-5D361K	360	(324-396)	230	300	620	400	200	0.1	13.0	55		
PVR-5D391K	390	(351-429)	250	320	675	400	200	0.1	15.0	53		
PVR-5D431K	430	(387-473)	275	350	745	400	200	0.1	16.5	50		
PVR-5D471K	470	(423-517)	300	385	810	400	200	0.1	17.5	45		

- The clamping voltage from 180K to 680K is tested with current 1A.

Pan Overseas Zinc Oxide Varistors

7Φ PVR VARISTOR

Spec. Part No.	Varistor Voltage V1mA		Maximum Allowable Voltage		Maximum Clamping Voltage	Withstanding Surge Current (8/20us)		Rated Wattage	Energy 10/1000us	Typical Capaci- tance	UL 1449	UL 1414 CSA
	(V)	Tolerance Min-max	ACrms (V)	DC (V)	V10A (V)max	1Time (A)	2Times (A)	(W)	(J)	1KHz (PF)		
PVR-7D180K	18	(16-20)	11	14	38	250	125	0.02	1.2	3,500		
PVR-7D220K	22	(20-24)	14	18	43	250	125	0.02	1.4	2,800		
PVR-7D270K	27	(24-30)	17	22	53	250	125	0.02	1.7	2,200		
PVR-7D330K	33	(30-36)	20	26	65	250	125	0.02	2.2	1,800		
PVR-7D390K	39	(35-43)	25	31	77	250	125	0.02	2.4	1,450		
PVR-7D470K	47	(42-52)	30	38	93	250	125	0.02	3.0	1,150		
PVR-7D560K	56	(50-62)	35	45	110	250	125	0.02	3.5	1,050		
PVR-7D680K	68	(61-75)	40	56	135	250	125	0.02	4.3	970		
PVR-7D820K	82	(74-90)	50	65	135	1200	600	0.25	5.5	930		
PVR-7D101K	100	(90-110)	60	85	165	1200	600	0.25	7.0	860		
PVR-7D121K	120	(108-132)	75	100	200	1200	600	0.25	8.0	670		
PVR-7D151K	150	(135-165)	95	125	250	1200	600	0.25	11.0	490		
PVR-7D181K	180	(162-198)	115	150	300	1200	600	0.25	13.0	330		
PVR-7D201K	200	(185-225)	130	170	340	1200	600	0.25	14.3	240		
PVR-7D221K	220	(198-242)	140	180	360	1200	600	0.25	15.5	190		
PVR-7D241K	240	(216-264)	150	200	395	1200	600	0.25	16.8	165		
PVR-7D271K	270	(247-303)	175	225	455	1200	600	0.25	19.8	150		
PVR-7D301K	300	(270-330)	195	250	505	1200	600	0.25	21.0	135		
PVR-7D331K	330	(297-363)	210	275	550	1200	600	0.25	23.0	130		
PVR-7D361K	360	(324-396)	230	300	595	1200	600	0.25	26.0	125		
PVR-7D391K	390	(351-429)	250	320	650	1200	600	0.25	30.0	105		
PVR-7D431K	430	(387-473)	275	350	710	1200	600	0.25	33.0	100		
PVR-7D471K	470	(423-517)	300	385	775	1200	600	0.25	35.0	90		

- The clamping voltage from 180K to 680K is tested with current 2.5A.

Pan Overseas Zinc Oxide Varistors

10Φ PVR VARISTOR

Spec. Part No.	Varistor Voltage V1mA		Maximum Allowable Voltage		Maximum Clamping Voltage	Withstanding Surge Current (8/20us)		Rated Wattage	Energy 10/1000us	Typical Capacitance	UL 1449	UL 1414 CSA
	(V)	Tolerance Min-max	ACrms (V)	DC (V)	V25A (V)max	1Time (A)	2Times (A)	(W)	(J)	1KHz (PF)		
PVR-10D180K	18	(16-20)	11	14	38	500	250	0.05	2.4	7,500		
PVR-10D220K	22	(20-24)	14	18	43	500	250	0.05	2.7	6,000		
PVR-10D270K	27	(24-30)	17	22	53	500	250	0.05	3.5	4,800		
PVR-10D330K	33	(30-36)	20	26	65	500	250	0.05	4.4	4,200		
PVR-10D390K	39	(35-43)	25	31	77	500	250	0.05	4.7	3,700		
PVR-10D470K	47	(42-52)	30	38	93	500	250	0.05	6.0	3,300		
PVR-10D560K	56	(50-62)	35	45	110	500	250	0.05	7.0	2,900		
PVR-10D680K	68	(61-75)	40	56	135	500	250	0.05	8.5	2,500		
PVR-10D820K	82	(74-90)	50	65	135	2500	1250	0.4	11.0	2,100		
PVR-10D101K	100	(90-110)	60	85	165	2500	1250	0.4	14.0	1,700		
PVR-10D121K	120	(108-132)	75	100	200	2500	1250	0.4	16.0	1,500		
PVR-10D151K	150	(135-165)	95	125	250	2500	1250	0.4	22.0	1,300		
PVR-10D181K	180	(162-198)	115	150	300	2500	1250	0.4	26.0	470		
PVR-10D201K	200	(185-225)	130	170	340	2500	1250	0.4	28.5	430		
PVR-10D221K	220	(198-242)	140	180	360	2500	1250	0.4	31.0	390		
PVR-10D241K	240	(216-264)	150	200	395	2500	1250	0.4	33.5	360		
PVR-10D271K	270	(247-303)	175	225	455	2500	1250	0.4	39.5	330		
PVR-10D301K	300	(270-330)	195	250	505	2500	1250	0.4	42.0	290		
PVR-10D331K	330	(297-363)	210	275	550	2500	1250	0.4	46.0	280		
PVR-10D361K	360	(324-396)	230	300	595	2500	1250	0.4	52.0	260		
PVR-10D391K	390	(351-429)	250	320	650	2500	1250	0.4	60.0	240		
PVR-10D431K	430	(387-473)	275	350	710	2500	1250	0.4	66.0	220		
PVR-10D471K	470	(423-517)	300	385	775	2500	1250	0.4	70.0	190		
PVR-10D511K	510	(459-561)	320	418	842	2500	1250	0.4	74.0	180		
PVR-10D561K	560	(504-616)	350	460	920	2500	1250	0.4	78.0	180		
PVR-10D621K	620	(558-682)	385	505	1,025	2500	1250	0.4	82.0	160		
PVR-10D681K	680	(612-748)	420	560	1,120	2500	1250	0.4	86.0	140		
PVR-10D751K	750	(675-825)	460	615	1,240	2500	1250	0.4	90.0	130		
PVR-10D781K	780	(702-858)	485	640	1,290	2500	1250	0.4	92.0	130		
PVR-10D821K	820	(738-902)	510	670	1,355	2500	1250	0.4	94.0	130		
PVR-10D911K	910	(819-1001)	550	745	1,500	2500	1250	0.4	102.0	120		
PVR-10D102K	1000	(900-1100)	625	825	1,650	2500	1250	0.4	112.0	100		
PVR-10D112K	1100	(990-1210)	680	895	1,815	2500	1250	0.4	124.0	90		

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14Φ PVR VARISTOR

Spec. Part No.	Varistor Voltage V1mA		Maximum Allowable Voltage		Maximum Clamping Voltage	Withstanding Surge Current (8/20us)		Rated Wattage	Energy 10/1000us	Typical Capacitance	UL 1449	UL 1414 CSA
	(V)	Tolerance Min-max	ACrms (V)	DC (V)	V50A (V)max	1Time (A)	2Times (A)	(W)	(J)	1KHz (PF)		
PVR-14D180K	18	(16-20)	11	14	38	1000	500	0.1	4.7	18,000		
PVR-14D220K	22	(20-24)	14	18	43	1000	500	0.1	5.4	15,000		
PVR-14D270K	27	(24-30)	17	22	53	1000	500	0.1	6.9	10,000		
PVR-14D330K	33	(30-36)	20	26	65	1000	500	0.1	8.8	8,500		
PVR-14D390K	39	(35-43)	25	31	77	1000	500	0.1	9.4	7,500		
PVR-14D470K	47	(42-52)	30	38	93	1000	500	0.1	12.0	6,500		
PVR-14D560K	56	(50-62)	35	45	110	1000	500	0.1	14.0	5,600		
PVR-14D680K	68	(61-75)	40	56	135	1000	500	0.1	17.0	4,700		
PVR-14D820K	82	(74-90)	50	65	135	4500	2500	0.6	22.0	3,900		
PVR-14D101K	100	(90-110)	60	85	165	4500	2500	0.6	28.0	3,400		
PVR-14D121K	120	(108-132)	75	100	200	4500	2500	0.6	32.0	3,100		
PVR-14D151K	150	(135-165)	95	125	250	4500	2500	0.6	44.0	3,000		
PVR-14D181K	180	(162-198)	115	150	300	4500	2500	0.6	52.0	1,030		
PVR-14D201K	200	(185-225)	130	170	340	4500	2500	0.6	57.0	970		
PVR-14D221K	220	(198-242)	140	180	360	4500	2500	0.6	62.0	840		
PVR-14D241K	240	(216-264)	150	200	395	4500	2500	0.6	67.0	710		
PVR-14D271K	270	(247-303)	175	225	455	4500	2500	0.6	79.0	650		
PVR-14D301K	300	(270-330)	195	250	505	4500	2500	0.6	84.0	600		
PVR-14D331K	330	(297-363)	210	275	550	4500	2500	0.6	92.0	550		
PVR-14D361K	360	(324-396)	230	300	595	4500	2500	0.6	104.0	500		
PVR-14D391K	390	(351-429)	250	320	650	4500	2500	0.6	120.0	480		
PVR-14D431K	430	(387-473)	275	350	710	4500	2500	0.6	132.0	440		
PVR-14D471K	470	(423-517)	300	385	775	4500	2500	0.6	140.0	420		
PVR-14D511K	510	(459-561)	320	418	842	4500	2500	0.6	148.0	390		
PVR-14D561K	560	(504-616)	350	460	920	4500	2500	0.6	156.0	360		
PVR-14D621K	620	(558-682)	385	505	1,025	4500	2500	0.6	164.0	320		
PVR-14D681K	680	(612-748)	420	560	1,120	4500	2500	0.6	172.0	290		
PVR-14D751K	750	(675-825)	460	615	1,240	4500	2500	0.6	180.0	260		
PVR-14D781K	780	(702-858)	485	640	1,290	4500	2500	0.6	184.0	230		
PVR-14D821K	820	(738-902)	510	670	1,355	4500	2500	0.6	188.0	230		
PVR-14D911K	910	(819-1001)	550	745	1,500	4500	2500	0.6	204.0	200		
PVR-14D102K	1000	(900-1100)	625	825	1,650	4500	2500	0.6	224.0	180		
PVR-14D112K	1100	(990-1210)	680	895	1,815	4500	2500	0.6	248.0	150		

- The clamping voltage from 180K to 680K is tested with current 10A.

Pan Overseas Zinc Oxide Varistors

20Φ PVR VARISTOR

Spec. Part No.	Varistor Voltage V1mA		Maximum Allowable Voltage		Maximum Clamping Voltage	Withstanding Surge Current (8/20us)		Rated Wattage	Energy 10/1000us	Typical Capaci- tance	UL 1449	UL 1414 CSA
	(V)	Tolerance Min-max	ACrms (V)	DC (V)	V100A (V)max	1Time (A)	2Times (A)	(W)	(J)	1KHz (PF)		
PVR-20D820K	82	(74-90)	50	65	135	6500	4000	1.0	44	5,800		
PVR-20D101K	100	(90-110)	60	85	165	6500	4000	1.0	56	4,800		
PVR-20D121K	120	(108-132)	75	100	200	6500	4000	1.0	64	3,800		
PVR-20D151K	150	(135-165)	95	125	250	6500	4000	1.0	88	3,000		
PVR-20D181K	180	(162-198)	115	150	300	6500	4000	1.0	104	2,600		
PVR-20D201K	200	(185-225)	130	170	340	6500	4000	1.0	114	2,400		
PVR-20D221K	220	(198-242)	140	180	360	6500	4000	1.0	124	1,800		
PVR-20D241K	240	(216-264)	150	200	395	6500	4000	1.0	134	1,500		
PVR-20D271K	270	(247-303)	175	225	455	6000	4000	1.0	185	1,400		
PVR-20D301K	300	(270-330)	195	250	505	6500	4000	1.0	168	1,350		
PVR-20D331K	330	(297-363)	210	275	550	6500	4000	1.0	184	1,300		
PVR-20D361K	360	(324-396)	230	300	595	6500	4000	1.0	208	1,250		
PVR-20D391K	390	(351-429)	250	320	650	6500	4000	1.0	240	1,180		
PVR-20D431K	430	(387-473)	275	350	710	6500	4000	1.0	364	1,100		
PVR-20D471K	470	(423-517)	300	385	775	6500	4000	1.0	280	1,050		
PVR-20D511K	510	(459-561)	320	418	842	6500	4000	1.0	296	1,000		
PVR-20D561K	560	(504-616)	350	460	920	6500	4000	1.0	312	970		
PVR-20D621K	620	(558-682)	385	505	1,025	6500	4000	1.0	328	950		
PVR-20D681K	680	(612-748)	420	560	1,120	6500	4000	1.0	344	900		
PVR-20D751K	750	(675-825)	460	615	1,240	6500	4000	1.0	360	850		
PVR-20D781K	780	(702-858)	485	640	1,290	6500	4000	1.0	368	750		
PVR-20D821K	820	(738-902)	510	670	1,355	6500	4000	1.0	376	700		
PVR-20D911K	910	(819-1001)	550	745	1,500	6500	4000	1.0	408	600		
PVR-20D102K	1000	(900-1100)	625	825	1,650	6500	4000	1.0	448	500		
PVR-20D112K	1100	(990-1210)	680	895	1,815	6500	4000	1.0	496	450		
PVR-20D182K	1800	(1620-1980)	1000	1465	2,970	6500	4000	1.0	682	220		

Pan Overseas Zinc Oxide Varistors

Electrical Performance Characteristics

Characteristics	Test Method	Specifications
Standard test condition	Environmental conditions under which every measuring is done without doubt on the measuring results. Unless specified, the temperature, and relative humidity should be 5 to 35 and 45 to 85% respectively.	
Varistor voltage	The varistor voltage is measured with an impressed current of 1mA (exception, 5Φ:0.1mA) and serves to characterize each varistor type.	To meet the specified value
Maximum operating voltage	The maximum sinusoidal RMS voltage or maximum DC voltage that can be applied continuously in the specified environmental temperature range.	
Maximum clamping voltage	Maximum clamping voltage is the maximum voltage V_P between two terminals with the specified standard impulse current I_P (8/20μS).	
Withstanding surge current	The maximum current within the varistor voltage change of ±10% with the standard impulse current (8/20μS) applied one or two times.	
Energy	The maximum energy within the varistor voltage change of ±10% when one impulse of 10/1000μs m-sec is applied.	
Rated power	The maximum power that can be applied within the specified ambient temperature.	
Capacitance	The capacitance of varistor is the typical value measured at 1 KHz, 1Vrms max, OV bias and 25±2 .	
Temperature Coefficient of varistor Voltage	$(V_C \text{ at } 85 - V_C \text{ at } 25) / (V_C \text{ at } 25) * 1 / 60 * 100 (\% /)$	-0.05%/ max.

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Mechanical Performance Characteristics

Characteristics	Test Methods	Specifications								
Robustness of Terminations (Tensile)	<p>After gradually applying the force specified below and keeping the unit fixed for ten seconds, the terminal shall be visually examined for any damage.</p> <table><thead><tr><th>Terminal diameter</th><th>Force</th></tr></thead><tbody><tr><td>Φ0.6mm</td><td>9.8N (1.0kgf)</td></tr><tr><td>Φ0.8mm</td><td>9.8N (1.0kgf)</td></tr><tr><td>Φ1.0mm</td><td>19.6N (2.0kgf)</td></tr></tbody></table>	Terminal diameter	Force	Φ0.6mm	9.8N (1.0kgf)	Φ0.8mm	9.8N (1.0kgf)	Φ1.0mm	19.6N (2.0kgf)	No outstanding damage
Terminal diameter	Force									
Φ0.6mm	9.8N (1.0kgf)									
Φ0.8mm	9.8N (1.0kgf)									
Φ1.0mm	19.6N (2.0kgf)									
Robustness of Terminations (Bending)	<p>The unit shall be secured with its terminal kept vertical and the force specified below be applied in the axial direction. The terminal shall gradually be bent by 90° in one direction, then 90° in the opposite direction, and again back to the original position. The damage of the terminal shall be visually examined.</p> <table><thead><tr><th>Terminal diameter</th><th>Force</th></tr></thead><tbody><tr><td>Φ0.6mm</td><td>4.9N (0.5kgf)</td></tr><tr><td>Φ0.8mm</td><td>4.9N (0.5kgf)</td></tr><tr><td>Φ1.0mm</td><td>9.8N (1.0kgf)</td></tr></tbody></table>	Terminal diameter	Force	Φ0.6mm	4.9N (0.5kgf)	Φ0.8mm	4.9N (0.5kgf)	Φ1.0mm	9.8N (1.0kgf)	
Terminal diameter	Force									
Φ0.6mm	4.9N (0.5kgf)									
Φ0.8mm	4.9N (0.5kgf)									
Φ1.0mm	9.8N (1.0kgf)									
Vibration	<p>After repeatedly applying a single harmonic vibration (amplitude: 0.75 mm): double amplitude: 1.5 mm with 1 minute vibration frequency cycles (10 Hz to 55 Hz to 10 Hz) to each of three perpendicular directions for 2 hours. Thereafter, the unit shall be visually examined.</p>									
Solderability	<p>After dipping the terminals to a depth of approximately 3 mm from the body in a soldering bath of 235±5 for 2±0.5 seconds, the terminal shall be visually examined.</p>	Approximately 95% of the terminals shall be covered with solder uniformly.								
Resistance to Soldering Heat	<p>After each lead shall be dipped into a solder bath having a temperature 260±5 to a point 2.0 to 2.5 mm from the body of the unit, using shielding board (t=1.5mm), be held there for specified time (5 series: 5±1 s and others: 10±1 s), and then be stored at room temperature and humidity for 1 to 2 hours. The change of Vc and mechanical damages are examined.</p>	$V_{cmA}/V_{cmA} \pm 5\%$ No outstanding damage								

Pan Overseas Zinc Oxide Varistors

Environmental Performance Characteristics

Characteristics	Test Methods	Specifications															
High Temperature Storage / Dry Heat	The specimen shall be subjected to 125 ± 2 for 1000 hours in a thermostatic bath without load and then stored at room temperature and humidity for 1 to 2 hours. Thereafter, the change of Vc shall be measured.	$V_{cmA}/V_{cmA} \pm 5\%$															
Damp Heat / Humidity (Steady State)	The specimen shall be subjected to 40 ± 2 , 90 to 95% RH for 1000 hours without load and then stored at room temperature and humidity for one to two hours. Thereafter, the change of Vc shall be measured.																
Temperature Cycle	<p>The temperature cycle shown below shall be repeated five times and then stored at room temperature and humidity for one to two hours. The change of Vc and mechanical damage shall be examined.</p> <table> <tr> <th>Step</th><th>Temperature()</th><th>Period(minutes)</th></tr> <tr> <td>1</td><td>-40 ± 3</td><td>30 ± 3</td></tr> <tr> <td>2</td><td>Room temperature</td><td>15 ± 3</td></tr> <tr> <td>3</td><td>125 ± 2</td><td>30 ± 3</td></tr> <tr> <td>4</td><td>Room temperature</td><td>15 ± 3</td></tr> </table>	Step	Temperature()	Period(minutes)	1	-40 ± 3	30 ± 3	2	Room temperature	15 ± 3	3	125 ± 2	30 ± 3	4	Room temperature	15 ± 3	
Step	Temperature()	Period(minutes)															
1	-40 ± 3	30 ± 3															
2	Room temperature	15 ± 3															
3	125 ± 2	30 ± 3															
4	Room temperature	15 ± 3															
High Temperature Load / Dry Heat Load	After being continuously applied the Maximum Allowable Voltage at 85 ± 2 for 1000 hours, the specimen shall be stored at room temperature and humidity for one to two hours. Thereafter, the change of Vc shall be measured.	$V_{cmA}/V_{cmA} \pm 10\%$															
Damp Heat Load / Humidity Load	The specimen shall be subjected to 40 ± 2 , 90 to 95% RH and the Maximum Allowable Voltage for 1000 hours and then stored at room temperature and humidity for one to two hours. Thereafter, the change of Vc shall be measured.	$V_{cmA}/V_{cmA} \pm 10\%$															
Low Temperature Storage / Cold	The specimen shall be subjected to -40 ± 2 without load for 1000 hours and then stored at room temperature for one to two hours. Thereafter, the change of Vc shall be measured.	$V_{cmA}/V_{cmA} \pm 5\%$															

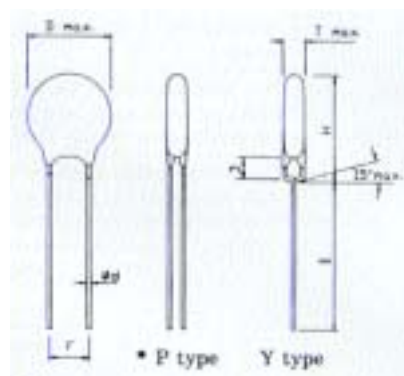
Pan Overseas Zinc Oxide Varistors

DIMENSION OF COMPONENT

Dimension Table

measure:m/m

Dia	5Φ	7Φ	10Φ	14Φ	20Φ
Code					
D max.	7.5	9.0	13.5	17.0	23.0
d(±0.02)	0.6	0.6	0.8	0.8	1.0
F(±1.0)	5.0	5.0	7.5	7.5	10.0
H max.	11.0	12.0	15.0	20.5	28.0
L min.	25.0	25.0	25.0	25.0	25.0



OPTION:

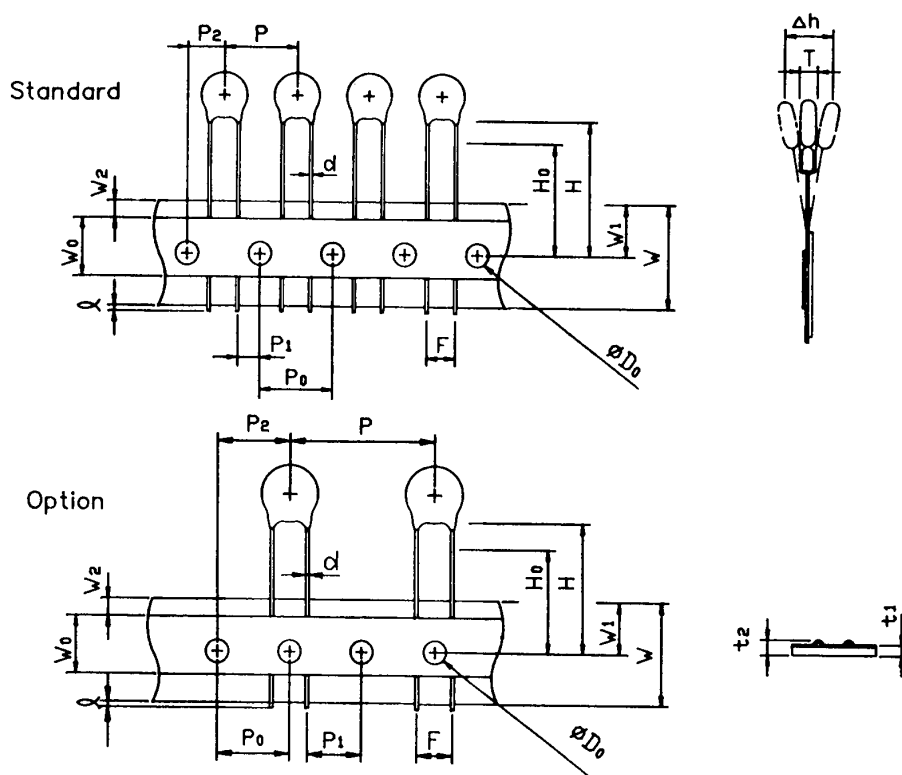
* 'P' type lead wire is not the standard products. Please indicate 'P' type on the P.O. if it is ordered.

T max. Table

Voltage \ Dia	5Φ	7Φ	10Φ	14Φ	20Φ
180K	4.0	4.0	4.0	4.0	
220K	5.0	5.0	5.0	5.0	
270K	5.0	5.0	5.0	5.0	
330K	5.0	5.0	5.0	5.0	
390K	5.0	5.0	5.0	5.0	
470K	5.0	5.0	5.0	5.0	
560K	5.0	5.0	5.0	5.0	
680K	5.0	5.0	5.0	5.0	
820K	5.0	5.0	5.0	5.0	5.0
101K	5.0	5.0	5.0	5.0	5.0
121K	5.0	5.0	5.0	5.0	5.0
151K	5.0	5.0	5.0	5.0	5.0
181K	5.0	5.0	5.0	5.0	5.0
201K	5.0	5.0	5.0	5.0	5.0
221K	5.0	5.0	5.0	5.0	5.0
241K	5.0	5.0	5.0	5.0	5.0
271K	5.0	5.0	5.0	5.0	5.0
301K	6.0	6.0	6.0	6.0	6.0
331K	6.0	6.0	6.0	6.0	6.0
361K	6.0	6.0	6.0	6.0	6.0
391K	6.0	6.0	6.0	6.0	6.0
431K	6.0	6.0	6.0	6.0	6.0
471K	6.0	6.0	6.0	6.0	6.0
511K			7.0	7.0	7.0
561K			7.0	7.0	7.0
621K			7.0	7.0	7.0
681K			7.0	7.0	7.0
751K			8.0	8.0	8.0
781K			8.0	8.0	8.0
821K			8.0	8.0	8.0
911K			8.0	8.0	8.0
102K			9.0	9.0	9.0
112K			9.0	9.0	9.0
182K			14.5	14.5	14.5

Pan Overseas Zinc Oxide Varistors

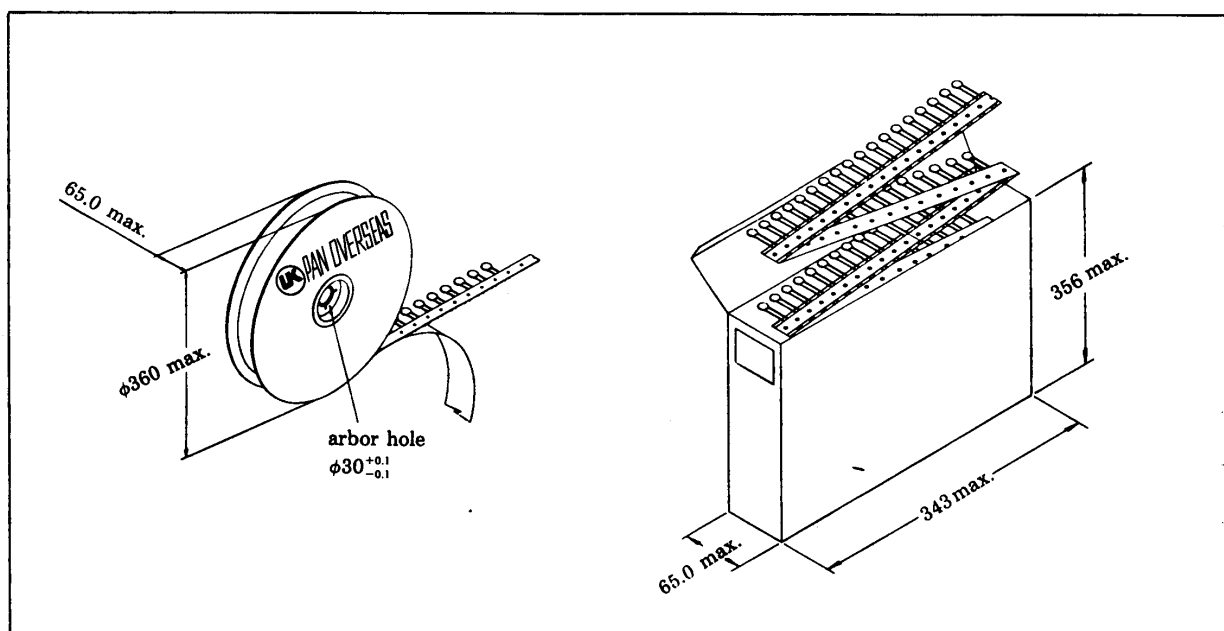
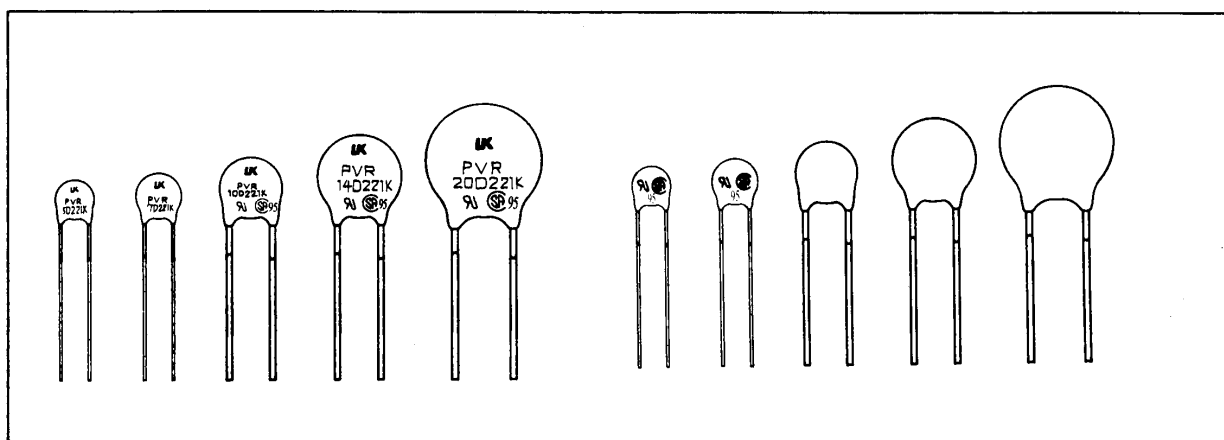
TAPING SPECIFICATION



Code	Description	Dimension 5, 7	Dimension 10, 14	Dimension 20
		(Standard)	(Option)	(Option)
I	Cut out length	1.1 mm max.	1.1 mm max.	1.1 mm max.
H	Height of component from hole center	20.0 +1,-0.5 mm	20.0 +1,-0.5 mm	20.0 +1,-0.5 mm
H ₀	Height to seating plane	16.0±0.5 mm	16.0±0.5 mm	16.0±0.5 mm
h	Front to back deviation	0±2.0 mm	0±2.0 mm	0±2.0 mm
W	Tape carrier cardboard width	18.0+1, -0.5 mm	18.0+1, -0.5 mm	18.0+1, -0.5 mm
W ₁	Sprocket hole position	9.0+0.75, -0.5 mm	9.0+0.75, -0.5 mm	9.0+0.75, -0.5 mm
W ₀	Hold down tape width	6.0 mm min.	6.0 mm min.	8.0 mm min.
F	Component lead spacing	5.0+0.8, -0.2 mm	7.5+0.8, -0.2 mm	10.0+0.8, -0.2 mm
P	Pitch of component	12.7±0.3 mm	25.4±0.3 mm	25.4±0.3 mm
P ₀	Sprocket hole pitch	12.7±0.3 mm	12.7±0.3 mm	12.7±0.3 mm
P ₁	Lead Length from hole center to lead	3.87±0.7 mm	8.95±0.7 mm	7.7±0.7 mm
P ₂	Length from hole center to disk center	6.35±1.3 mm	12.7±1.3 mm	12.7±1.3 mm
D ₀	Sprocket hole diameter	4.0±0.2 mm	4.0±0.2 mm	4.0±0.2 mm
d	Lead wire diameter	0.6±0.05 mm	0.8±0.05 mm	1.0±0.05 mm
T	Disk thickness	See T max. table	See T max. table	See T max. table
t ₁	Total thickness of tape	0.7±0.2 mm	0.7±0.2 mm	0.7±0.2 mm
t ₂	Total thickness of tape with wire	1.6 mm max.	1.8 mm max.	2.0 mm max.

Pan Overseas Zinc Oxide Varistors

MARKING & PACKAGING



Quantity per Package Unit

Series	Bulk (Box)	Reel/Ammo
5Φ	200	1,000
7Φ	200	1,000
10Φ	200	1,000
14Φ	200	1,000
20Φ	200	---