ZV/ZVY Series

Low Voltage SMD Varistors

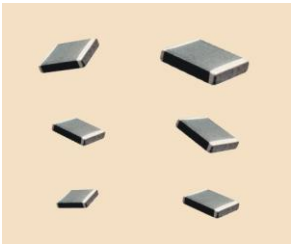
Stackpole Electronics, Inc.

Resistive Product Solutions

Description:

The ZV Series of low voltage varistors is designed to protect sensitive electronics devices against high voltage surges in the low voltage region. They offer excellent transient energy absorption due to improved energy volume distribution and power dissipation. Low voltage varistors cover wide DC operating voltage range from 14V to 170V. The ZVY Series is the same except for higher operating temperatures up to 150ºC.

ZV varistors are typically applied to protect components at the circuit board level.



Features:

- Nickel barrier terminations
- AC operating voltage (Vrms) from 11V to 130V
- DC operating voltage (Vdc) from 14V to 170V
- No plastic coating guarantees better flammability rating
- Bi-directional, low clamping voltages
- Broad range of current and energy handling capabilities
- +125ºC continuous operating temperature, +150ºC for ZVY
- Dimensional and weight savings on PC board
- AgPd end terminations also available
- ZVY high temperature product will have performance characteristics different from the ZV. Contact Factory for specific details.
- Compliant with the requirements of AEC-Q200 (Grade 1)
- RoHS compliant, lead-free and halogen-free

Applications:

- ESD protection for components sensitive to IEC 1000-4-2, MIL-STD 883C Method 3015.7 and other industry specifications
- Suppression of inductive switching or other low to medium transient events at the circuit board level
- Provides on-board transient voltage protection of ICs and transistors
- Replace larger surface mount TVS Zeners in many applications
- Used to help achieve electromagnetic compliance of end products
- 6 model sizes available 0603, 0805, 1206, 1210, 1812 and 2220

General Technical Data

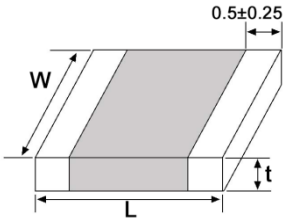
Operating Temperature - ZV	-55ºC to +125ºC	In accordance with CECC 42 000
Operating Temperature - ZVY	-55ºC to +150ºC	
Storage Temperature Range	-55ºC to +150ºC	
Threshold Voltage Temperature Coefficient	< +0.05% / ºC	
Response time	< 2 ns	
Ag/Pd Terminations	Recommended and suitable for Pb-containing soldering	
Nickel Barrier Terminations	Recommended and suitable for Pb-contaning and Pb-free soldering	

Standard Packaging Options / Quantities

Series	Voltage Range (Vrms)	Chip Size								
		0603			0805			1206		
		K	T	G	K	T	G	K	T	G
		180mm	180mm	330mm	180mm	180mm	330mm	180mm	180mm	330mm
		7"	7"	13"	7"	7"	13"	7"	7"	13"
ZV, ZVY	11 - 14	1,000	4,000	15,000	1,000	4,000	15,000	1,000	4,000	15,000
	17	1,000	3,500	14,000	1,000	3,500	14,000	1,000	2,500	14,000
	20 - 40	1,000	3,500	14,000	1,000	3,500	14,000	1,000	2,500	10,000
	50 - 95	N/A	N/A	N/A	N/A	N/A	N/A	1,000	2,000	8,000
	Voltage Range (Vrms)	1210			1812			2220		
		K	T	G	K	T	G	K	T	G
		180mm	180mm	330mm	180mm	180mm	330mm	180mm	180mm	330mm
		7"	7"	13"	7"	7"	13"	7"	7"	13"
	11 - 14	1,000	4,000	15,000	1,000	1,500	6,000	1,000	1,500	5,000
	17	1,000	2,500	14,000	1,000	1,500	6,000	1,000	1,500	5,000
	20 - 40	1,000	2,500	9,000	N/A	1,000	4,000	N/A	1,000	4,000
	50 - 95	1,000	2,000	8,000	N/A	1,000	4,000	N/A	1,000	4,000

This specification may be changed at any time without prior notice.
Please confirm technical specifications before you order and/or use.

Device Ratings and Dimensions



Part Number	V_{RMS}	V_{DC}	V_N	V_C	I_C	W_{MAX}	P_{MAX}	I_{MAX}	C_{TYP}	L_{TYP}	L	W	t_{MAX}
	(volts)	(volts)	(volts)	(volts)	(amps)	(joules)	(watts)	(amps)	(pF)	(nH)	(mm)	(mm)	(mm)
ZV11K0603...300	11	14	18	33	1	0.20	0.003	30	210	1.0	1.60 ± 0.20	0.80 ± 0.10	0.95
ZV11K0805...121	11	14	18	33	1	0.30	0.005	120	400	1.5	2.00 ± 0.25	1.25 ± 0.20	0.80
ZV11K1206...201	11	14	18	33	1	0.60	0.008	200	1,300	1.8	3.20 ± 0.30	1.60 ± 0.20	0.85
ZV11K1210...401	11	14	18	33	3	1.30	0.010	400	2,600	1.8	3.20 ± 0.30	2.50 ± 0.25	0.85
ZV11K1812...801	11	14	18	33	5	2.00	0.015	800	5,100	2.5	4.70 ± 0.40	3.20 ± 0.30	1.25
ZV11K2220...122	11	14	18	33	10	5.50	0.020	1200	12,000	3.0	5.70 ± 0.50	5.00 ± 0.40	1.25
ZV14K0603...300	14	18	22	38	1	0.30	0.003	30	195	1.0	1.60 ± 0.20	0.80 ± 0.10	0.95
ZV14K0805...121	14	18	22	38	1	0.40	0.005	120	355	1.5	2.00 ± 0.25	1.25 ± 0.20	0.80
ZV14K1206...201	14	18	22	38	1	0.60	0.008	200	950	1.8	3.20 ± 0.30	1.60 ± 0.20	0.85
ZV14K1210...401	14	18	22	38	3	1.60	0.010	400	2,000	1.8	3.20 ± 0.30	2.50 ± 0.25	0.85
ZV14K1812...801	14	18	22	38	5	2.40	0.015	800	4,200	2.5	4.70 ± 0.40	3.20 ± 0.30	1.25
ZV14K2220...122	14	18	22	38	10	6.00	0.020	1200	9,400	3.0	5.70 ± 0.50	5.00 ± 0.40	1.25
ZV17K0603...300	17	22	27	44	1	0.30	0.003	30	185	1.0	1.60 ± 0.20	0.80 ± 0.10	0.95
ZV17K0805...121	17	22	27	44	1	0.40	0.005	120	315	1.5	2.00 ± 0.25	1.25 ± 0.20	1.05
ZV17K1206...201	17	22	27	44	1	0.70	0.008	200	740	1.8	3.20 ± 0.30	1.60 ± 0.20	1.25
ZV17K1210...401	17	22	27	44	3	1.80	0.010	400	1,700	1.8	3.20 ± 0.30	2.50 ± 0.25	1.35
ZV17K1812...801	17	22	27	44	5	2.80	0.015	800	3,500	2.5	4.70 ± 0.40	3.20 ± 0.30	1.25
ZV17K2220...122	17	22	27	44	10	7.50	0.020	1200	7,700	3.0	5.70 ± 0.50	5.00 ± 0.40	1.25
ZV20K0603...300	20	26	33	54	1	0.30	0.003	30	175	1.0	1.60 ± 0.20	0.80 ± 0.10	0.95
ZV20K0805...121	20	26	33	54	1	0.40	0.005	120	290	1.5	2.00 ± 0.25	1.25 ± 0.20	1.05
ZV20K1206...201	20	26	33	54	1	0.80	0.008	200	620	1.8	3.20 ± 0.30	1.60 ± 0.20	1.25
ZV20K1210...401	20	26	33	54	3	2.00	0.010	400	1,400	1.8	3.20 ± 0.30	2.50 ± 0.25	1.35
ZV20K1812...801	20	26	33	54	5	3.00	0.015	800	3,000	2.5	4.70 ± 0.40	3.20 ± 0.30	1.55
ZV20K2220...122	20	26	33	54	10	8.00	0.020	1200	6,500	3.0	5.70 ± 0.50	5.00 ± 0.40	1.45
ZV25K0603...300	25	31	39	65	1	0.10	0.003	30	165	1.0	1.60 ± 0.20	0.80 ± 0.10	0.95
ZV25K0805...121	25	31	39	65	1	0.20	0.005	120	260	1.5	2.00 ± 0.25	1.25 ± 0.20	1.05
ZV25K1206...201	25	31	39	65	1	1.00	0.008	200	510	1.8	3.20 ± 0.30	1.60 ± 0.20	1.25
ZV25K1210...401	25	31	39	65	3	1.80	0.010	400	1,060	1.8	3.20 ± 0.30	2.50 ± 0.25	1.45
ZV25K1812...801	25	31	39	65	5	3.90	0.015	800	2,300	2.5	4.70 ± 0.40	3.20 ± 0.30	1.55
ZV25K2220...122	25	31	39	65	10	9.50	0.020	1200	5,000	3.0	5.70 ± 0.50	5.00 ± 0.40	1.45
ZV30K0603...300	30	38	47	77	1	0.10	0.003	30	160	1.0	1.60 ± 0.20	0.80 ± 0.10	0.95
ZV30K0805...121	30	38	47	77	1	0.20	0.005	120	230	1.5	2.00 ± 0.25	1.25 ± 0.20	1.05
ZV30K1206...201	30	38	47	77	1	1.20	0.008	200	450	1.8	3.20 ± 0.30	1.60 ± 0.20	1.25
ZV30K1210...301	30	38	47	77	3	2.10	0.010	300	850	1.8	3.20 ± 0.30	2.50 ± 0.25	1.45
ZV30K1812...801	30	38	47	77	5	4.40	0.015	800	1,800	2.5	4.70 ± 0.40	3.20 ± 0.30	1.55
ZV30K2220...122	30	38	47	77	10	12.20	0.020	1200	4,000	3.0	5.70 ± 0.50	5.00 ± 0.40	1.45
ZV35K1206...121	35	45	56	90	1	0.60	0.008	120	400	1.8	3.20 ± 0.30	1.60 ± 0.20	1.25
ZV35K1210...251	35	45	56	90	3	2.20	0.010	250	670	1.8	3.20 ± 0.30	2.50 ± 0.25	1.45
ZV35K1812...601	35	45	56	90	5	4.20	0.015	600	1,340	2.5	4.70 ± 0.40	3.20 ± 0.30	1.55
ZV35K2220...102	35	45	56	90	10	7.60	0.020	1000	3,000	3.0	5.70 ± 0.50	5.00 ± 0.40	1.45

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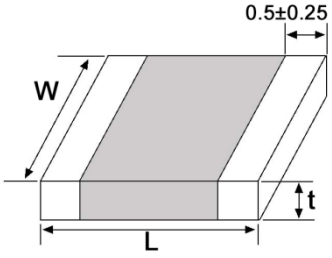
Device Ratings and Dimensions



Part Number	V_{RMS}	V_{DC}	V_N	V_C	I_C	W_{MAX}	P_{MAX}	I_{MAX}	C_{TYP}	L_{TYP}	L	W	t_{MAX}
	(volts)	(volts)	(volts)	(volts)	(amps)	(joules)	(watts)	(amps)	(pF)	(nH)	(mm)	(mm)	(mm)
ZV40K1206...121	40	56	68	110	1	0.80	0.008	120	370	1.8	3.20 ± 0.30	1.60 ± 0.20	1.25
ZV40K1210...251	40	56	68	110	3	2.40	0.010	250	570	1.8	3.20 ± 0.30	2.50 ± 0.25	1.45
ZV40K1812...601	40	56	68	110	5	4.80	0.015	600	1,000	2.5	4.70 ± 0.40	3.20 ± 0.30	1.55
ZV40K2220...102	40	56	68	110	10	9.20	0.020	1000	2,200	3.0	5.70 ± 0.50	5.00 ± 0.40	1.45
ZV50K1206...121	50	65	82	135	1	0.80	0.008	120	340	1.8	3.20 ± 0.30	1.60 ± 0.20	1.65
ZV50K1210...251	50	65	82	135	3	1.70	0.010	250	470	1.8	3.20 ± 0.30	2.50 ± 0.25	1.75
ZV50K1812...401	50	65	82	135	5	4.80	0.015	400	710	2.5	4.70 ± 0.40	3.20 ± 0.30	1.85
ZV50K2220...801	50	65	82	135	10	5.80	0.020	800	1,500	3.0	5.70 ± 0.50	5.00 ± 0.40	1.85
ZV60K1206...121	60	85	100	165	1	0.90	0.008	120	330	1.8	3.20 ± 0.30	1.60 ± 0.20	1.65
ZV60K1210...251	60	85	100	165	3	2.20	0.010	250	390	1.8	3.20 ± 0.30	2.50 ± 0.25	1.75
ZV60K1812...401	60	85	100	165	5	5.80	0.015	400	580	2.5	4.70 ± 0.40	3.20 ± 0.30	1.85
ZV60K2220...801	60	85	100	165	10	6.20	0.020	800	1,000	3.0	5.70 ± 0.50	5.00 ± 0.40	1.85
ZV75K1206...121	75	100	120	200	1	0.90	0.008	120	240	1.8	3.20 ± 0.30	1.60 ± 0.20	1.70
ZV75K1210...251	75	100	120	200	3	2.20	0.010	250	330	1.8	3.20 ± 0.30	2.50 ± 0.25	1.80
ZV75K1812...401	75	100	120	200	5	5.80	0.015	400	440	2.5	4.70 ± 0.40	3.20 ± 0.30	1.90
ZV75K2220...801	75	100	120	200	10	6.20	0.020	800	700	3.0	5.70 ± 0.50	5.00 ± 0.40	1.90
ZV95K1210...201	95	125	150	250	3	2.60	0.010	200	240	1.8	3.20 ± 0.30	2.50 ± 0.25	1.80
ZV95K1812...301	95	125	150	250	5	5.20	0.015	300	340	2.5	4.70 ± 0.40	3.20 ± 0.30	1.90
ZV95K2220...501	95	125	150	250	10	7.40	0.020	500	600	3.0	5.70 ± 0.50	5.00 ± 0.40	1.90
ZV115K1210...201	115	150	180	300	3	2.60	0.010	200	200	1.8	3.20 ± 0.30	2.50 ± 0.25	1.80
ZV115K1812...301	115	150	180	300	5	5.20	0.015	300	310	2.5	4.70 ± 0.40	3.20 ± 0.30	1.90
ZV115K2220...501	115	150	180	300	10	7.40	0.020	500	560	3.0	5.70 ± 0.50	5.00 ± 0.40	1.90
ZV130K1210...201	130	170	205	340	3	2.60	0.010	200	150	1.8	3.20 ± 0.30	2.50 ± 0.25	1.80
ZV130K1812...301	130	170	205	340	5	5.20	0.015	300	240	2.5	4.70 ± 0.40	3.20 ± 0.30	1.90
ZV130K2220...501	130	170	205	340	10	7.40	0.020	500	500	3.0	5.70 ± 0.50	5.00 ± 0.40	1.90

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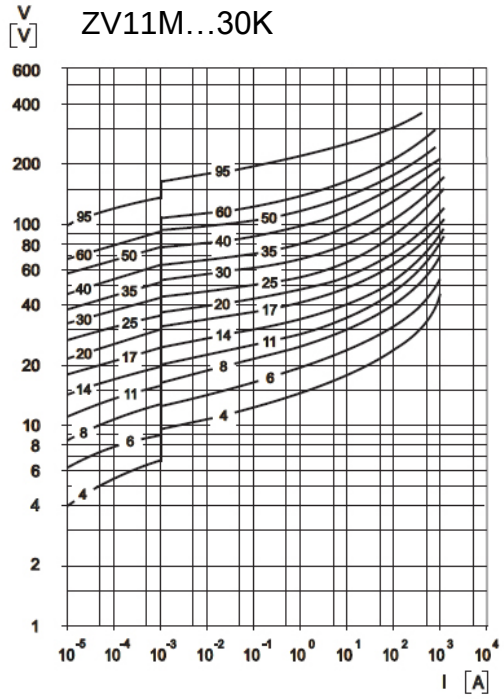
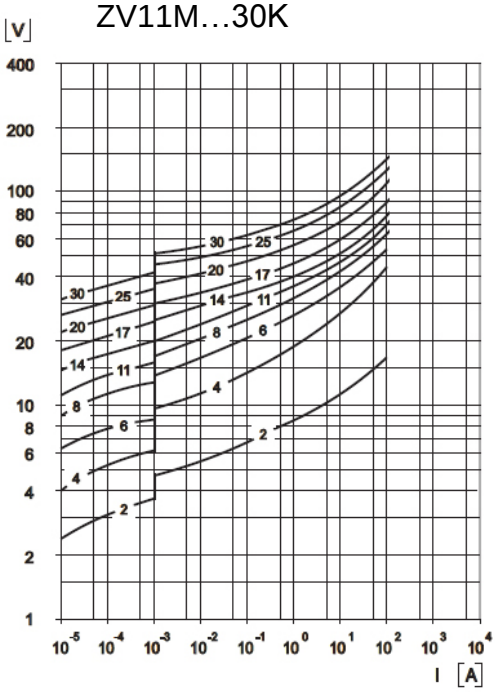
Protection Level

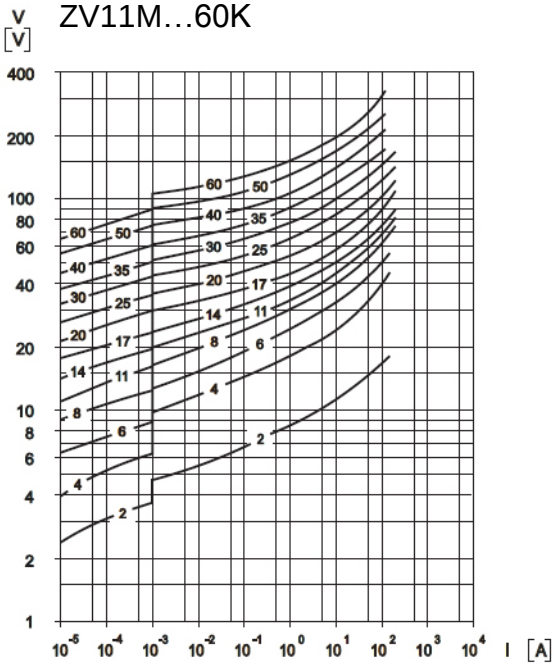
Model Size 0603
ZV11M…30K



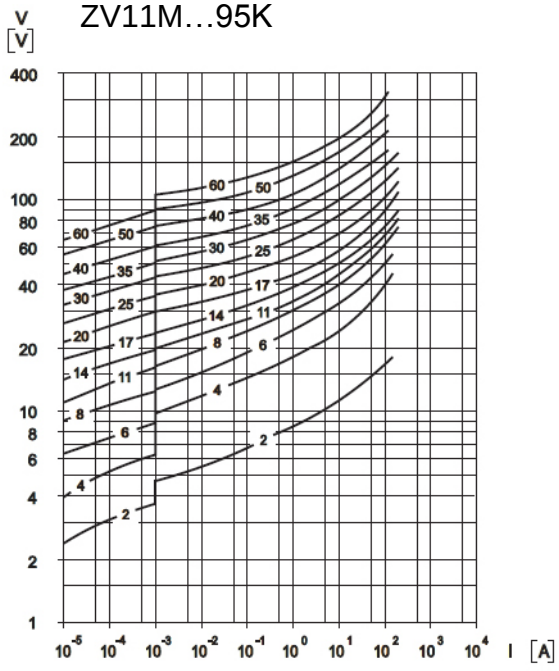
Model Size 0805
ZV11M…30K



Model Size 1206
ZV11M…60K



Model Size 1210
ZV11M…95K



(With the worst-case condition in the tolerance region)

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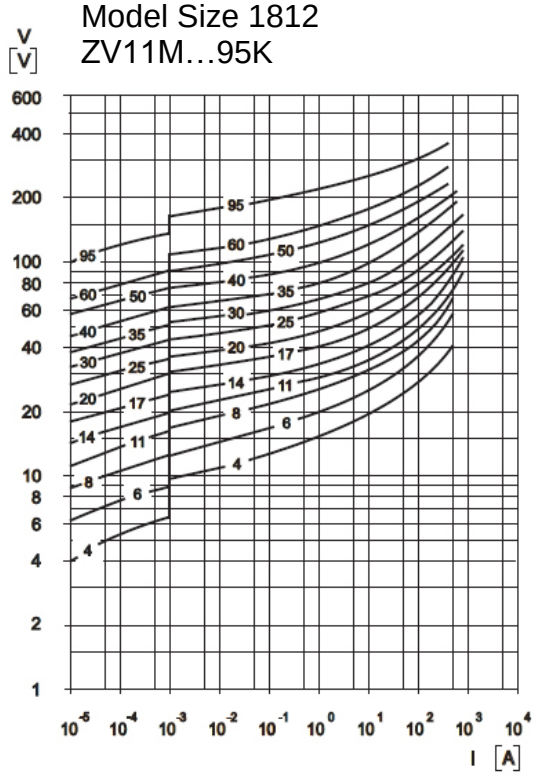
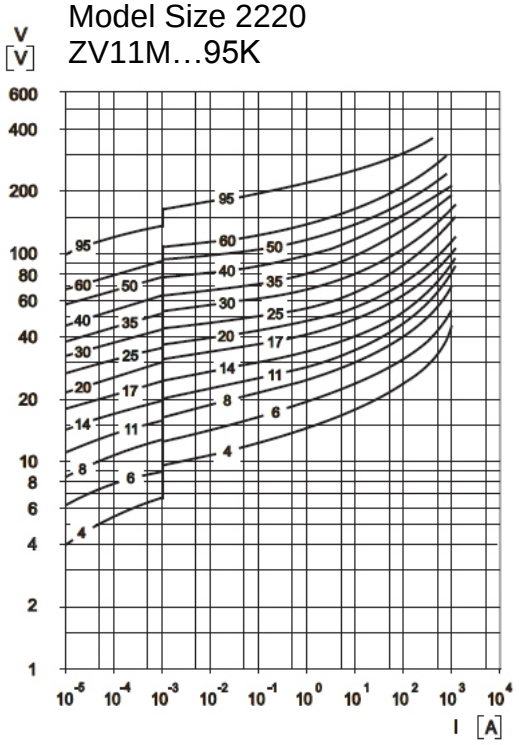
Protection Level

Model Size 1812
ZV11M…95K



Model Size 2220
ZV11M…95K



(With the worst-case condition in the tolerance region)

RoHS Compliance

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

RoHS Compliance Status

Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/WW)
ZV/ZVY	Standard Low Voltage SMD Varistor	SMD	YES	Proprietary Barrier Termination (special designation "N") for lead-free assembly; AgPd for Pb-containing assembly	Always	Always

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"Conflict Metals" Commitment

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the "conflict region" of the eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

Compliance to "REACH"

We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, "The Registration, Evaluation, Authorization and Restriction of Chemicals", otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

Environmental Policy

It is the policy of Stackpole Electronics, Inc. (SEI) to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.

How to Order

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Z	V	2	0	K	1	2	1	0	T	4	0	1	N

Product Series	
ZV	Standard
ZVY	High Temp

Voltage Range	
Code	Vrms
11 to 130	11 to 130

Tolerance	
Code	Tol
K	10%
L	15%
M	20%

Size
Code
0603
0805
1206
1210
1812
2220

Packaging			
Code	Description	Size	Quantity
K	7" Plastic Reel	180mm	See Standard Packaging Options
T			
G	13" Plastic Reel	330mm	

Surge Current	
Code	Amps
300	30
121	120
201	200
401	400
801	800
122	1200

Termination Type	
Code	Description
N	Nickel Barrier
(blank)	Palladium Silver

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