www.vishay.com

Vishay BCcomponents

VDR Metal Oxide Varistors High Surge





QUICK REFERENCE DAT	Α	
PARAMETER	VALUE	UNIT
Maximum continuous voltage in operating temperature range:		
RMS	11 to 680	V
DC	14 to 895	V
Maximum non-repetitive transient current I _{NRP} (8 x 20 µs)	250 to 10 000	А
Maximum energy (10/1000 µs)	0.7 to 620	J
Detailed specification	Based on	
	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	
Storage temperature	-40 to +150	°C
Operating temperature	-40 to +125	°C

ORDERING INFORMATION

The varistors are available in a number of packaging options:

- Bulk
- On tape on reel
- On tape in ammopack (fanfold)

The basic ordering code for each option is given in tables titled Varistors on Tape on Reel, Varistors on Tape in Ammopack, and Varistors in Bulk. To complete the catalog number and to determine the required operating parameters, see Electrical Data and Ordering Information table.

Note

Special lead-configuration as inside or outside crimped leads on request

AGENCY APPROVALS

- cUL certificate
- ULus certificate
- VDE/IEC certificate

Note

Agency approval documents, please see: www.vishay.com/varistors/list/product-29082/tab/documents/

Revision: 21-Aug-2019

FEATURES

- Low β high purity zinc oxide disc
- Halogen free insulating epoxy coating
- Straight or kinked leads
- · Higher current surge/size ratio capability up to 10 kA for H20 types

Certified for operation up to 85 °C according to



- RoHS COMPLIANT HALOGEN
- UL 1449 edition 4, VDE/IEC 61051-1/2 FREE Material categorization: for definitions of compliance

APPLICATION

Overvoltage and transient voltage protection

please see www.vishay.com/doc?99912

DESCRIPTION

The varistors consist of a disc of low-ß ceramic material with two solid copper leads (H20 types only) or copper clad steel wire. The wires have a matte tin plating. They are coated with UL 94 V-0 approved ocher colored halogen-free epoxy. which provides electrical, mechanical and climatic protection. The encapsulation is resistant to all cleaning solvents in accordance with IEC 60068-2-45.

MOUNTING

The varistors are suitable for hand-mounting (bulk) or automatic pick and place mounting (tape on reel or fanfold). The parts can be soldered by hand or wave soldering. Pin-in-paste reflow soldering is not recommended. Bending of the leads for different angle placement is not recommended.

Typical Soldering

235 °C, duration: 5 s (Pb-bearing) 245 °C, duration: 5 s (lead (Pb)-free)

Resistance to Soldering Heat

260 °C, duration: 10 s max.

MARKING

The varistors are marked with the following information:

- Maximum continuous RMS voltage with E suffix
- Series numbers
 - 582 for VDRH05
 - 583 for VDRH07
 - 584 for VDRH10
 - 585 for VDRH14 - 586 for VDRH20
- Manufacture logo
- Date of manufacture (YYWW)
- Safety marks on VDRH10-14-20 types

INFLAMMABILITY

The varistors are passive non-flammable. The encapsulation is made of flame resistant epoxy in accordance with UL 94 V-0.

1 For technical questions, contact: nlr@vishay.com Document Number: 29082





ww.vishay.com

ELEC	TRIC		AND	ORI	DERING IN	FORMATIO	N				
MAXIM CONTIN VOLTA	NOOR	VOLTAGE ⁽³⁾ AT 1 mA	VOLI A STA	MUM FAGE T TED RENT	MAXIMUM ENERGY ⁽⁴⁾ (10 x 1000 μs)	MAXIMUM NON-REP. TRANSIENT CURRENT ⁽⁵⁾ I _{NRP} (8 x 20 μs)	NOMINAL DISCHARGE CURRENT ⁽⁷⁾ I _N	TYPICAL CAPACITANCE AT 1 kHz	T (max.)	E	SAP MATERIAL AND ORDERING NUMBER ⁽¹⁾
RMS ⁽²⁾ (V)	DC (V)	(V)	V (V)	I (A)	(J)	(A)	(kA)	(pF)	(mm)	(mm)	ху ⁽⁶⁾
	. ,		40	1.0	0.7	250	0.10	1600	3.4	0.5 ± 0.3	VDRH05B011xyE
		10	36	2.5	1.5	500	0.15	3600	3.4	0.5 ± 0.3	VDRH07D011xyE
11	14	18	36	5.0	2.6	1000	0.50	8000	3.8	0.7 ± 0.3	VDRH10G011xyE
			36	10.0	5.2	2000	1.00	20 000	3.8	0.7 ± 0.3	VDRH14M011xyE
			48	1.0	0.8	250	0.10	1300	3.4	0.7 ± 0.3	VDRH05B014xyE
			43	2.5	1.7	500	0.15	2800	3.4	0.7 ± 0.3	VDRH07D014xyE
14	18	22	43	5.0	3.2	1000	0.50	6000	3.8	0.9 ± 0.3	VDRH10G014xyE
			43	10.0	6.3	2000	1.00	15 000	3.8	0.9 ± 0.3	VDRH14M014xyE
			43	20.0	16.0	3000	2.00	30 000	4.2	1.1 ± 0.3	VDRH20R014ByE
			60	1.0	1.1	250	0.10	1050	3.7	0.8 ± 0.3	VDRH05B017xyE
			53	2.5	2.1	500	0.15	2000	3.7	0.8 ± 0.3	VDRH07D017xyE
17	22	27	53	5.0	3.9	1000	0.50	4000	4.1	1.0 ± 0.3	VDRH10G017xyE
			53	10.0	7.8	2000	1.00	10 000	4.1	1.0 ± 0.3	VDRH14M017xyE
			53	20.0	19.0	3000	2.00	20 000	4.5	1.2 ± 0.3	VDRH20R017ByE
			73	1.0	1.3	250	0.10	900	3.9	1.0 ± 0.3	VDRH05B020xyE
			65	2.5	2.8	500	0.15	1500	3.9	1.0 ± 0.3	VDRH07D020xyE
20	26	33	65	5.0	4.8	1000	0.50	3000	4.3	1.2 ± 0.3	VDRH10G020xyE
			65	10.0	9.5	2000	1.00	7500	4.3	1.2 ± 0.3	VDRH14M020xyE
			65	20.0	24.0	3000	2.00	15 000	4.7	1.4 ± 0.3	VDRH20R020ByE
			86	1.0	1.5	250	0.10	500	4.2	1.2 ± 0.3	VDRH05B025xyE
	5 31		77	2.5	3.0	500	0.15	1350	4.2	1.2 ± 0.3	VDRH07D025xyE
25		39	77	5.0	5.6	1000	0.50	2600	4.6	1.4 ± 0.3	VDRH10G025xyE
			77	10.0	11.0	2000	1.00	6500	4.6	1.4 ± 0.3	VDRH14M025xyE
			77	20.0	28.0	3000	2.00	13 000	5.0	1.6 ± 0.3	VDRH20R025ByE
			104	1.0	1.8	250	0.10	700	4.4	1.4 ± 0.5	VDRH05B030xyE
			93	2.5	3.8	500	0.15	1600	4.4	1.4 ± 0.5	,
30	38	47	93	5.0	6.8	1000	0.50	2700	4.8	1.6 ± 0.5	VDRH10G030xyE
			93	10.0	14.0	2000	1.00	6000	4.8	1.6 ± 0.5	VDRH14M030xyE
			93	20.0	34.0	3000	2.00	12 000	5.2	1.8 ± 0.5	· · · · ,
			123	1.0	2.2	250	0.10	560		1.7 ± 0.5	
			110	2.5	4.4	500	0.15	1300		1.7 ± 0.5	-
35	45	56	110	5.0	8.1	1000	0.50	2200		1.9 ± 0.5	
			110	10.0	16.0	2000	1.00	4800	5.2	1.9 ± 0.5	-
			110	20.0	41.0	3000	2.00	9600		2.1 ± 0.5	
			150	1.0	2.6	250	0.10	460		2.1 ± 0.5	
			135	2.5	5.4	500	0.15	1000		2.1 ± 0.5	
40	56	68	135	5.0	9.8	1000	0.50	1800		2.3 ± 0.5	
			135	10.0	20.0	2000	1.00	3800		2.3 ± 0.5	
			135	20.0	49.0	3000	2.00	7600		2.5 ± 0.5	,
			145	5.0	3.5	800	0.10	370		0.6 ± 0.3	
50	65	82	135	10.0	7.0	1750	1.00	900		0.6 ± 0.3	
			135	25.0	14.0	3500	1.50	1500		0.8 ± 0.3	
			135	50.0	28.0	6000	3.00	3100	3.9	0.8 ± 0.3	VDRH14V050xyE

Revision: 21-Aug-2019

Document Number: 29082



www.vishay.com

ELEC1	FRIC		AND	OR	DERING IN	FORMATIO	N				
MAXIMU CONTINI VOLTAG	UOUS E	VOLTAGE ⁽³⁾ AT 1 mA	VOL ⁻ A STA CUR	IMUM TAGE T TED RENT	MAXIMUM ENERGY ⁽⁴⁾ (10 x 1000 μs)	MAXIMUM NON-REP. TRANSIENT CURRENT ⁽⁵⁾ I _{NRP} (8 x 20 μs)	NOMINAL DISCHARGE CURRENT ⁽⁷⁾ I _N	TYPICAL CAPACITANCE AT 1 kHz	T (max.)	E	SAP MATERIAL AND ORDERING NUMBER ⁽¹⁾ xy ⁽⁶⁾
RMS ⁽²⁾ (V)	DC (V)	(V)	V (V)	 (A)	(J)	(A)	(kA)	(pF)	(mm)	(mm)	
			175	5.0	4.5	800	0.10	290	3.7	0.7 ± 0.3	VDRH05E060xyE
			165	10.0	9.0	1750	1.00	700	3.7	0.7 ± 0.3	VDRH07K060xyE
60	85	100	165	25.0	18.0	3500	1.50	1200	4.1	0.9 ± 0.3	VDRH10S060xyE
			165	50.0	36.0	6000	3.00	2300	4.1	0.9 ± 0.3	VDRH14V060xyE
			165	100.0	72.0	10 000	5.00	4600	4.5	1.1 ± 0.3	VDRH20X060ByE
			210	5.0	5.5	800	0.10	240	4.0	0.9 ± 0.3	VDRH05E075xyE
			200	10.0	11.0	1750	1.00	530	4.0	0.9 ± 0.3	VDRH07K075xyE
75	100	120	200	25.0	22.0	3500	1.50	1000	4.4	1.1 ± 0.3	VDRH10S075xyE
			200	50.0	44.0	6000	3.00	1900	4.4	1.1 ± 0.3	VDRH14V075xyE
			200	100.0	88.0	10 000	5.00	3800	4.8	1.3 ± 0.3	VDRH20X075ByE
			260	5.0	6.5	800	0.10	180	4.2	1.1 ± 0.3	VDRH05E095xyE
			250	10.0	13.0	1750	1.00	450	4.2	1.1 ± 0.3	VDRH07K095xyE
95	125	150	250	25.0	25.0	3500	1.50	800	4.6	1.3 ± 0.3	VDRH10S095xyE
			250	50.0	53.0	6000	3.00	1500	4.6	1.3 ± 0.3	VDRH14V095xyE
			250	100.0	106.0	10 000	5.00	3000	5.0	1.5 ± 0.3	VDRH20X095ByE
			320	5.0	8.0	800	0.10	150	3.6	0.9 ± 0.3	VDRH05E115xyE
			300	10.0	16.0	1750	1.00	390	3.6	0.9 ± 0.3	VDRH07K115xyE
115	150	180	300	25.0	32.0	3500	1.50	680	4.0	1.1 ± 0.3	VDRH10S115xyE
			300	50.0	65.0	6000	3.00	1320	4.0	1.1 ± 0.3	VDRH14V115xyE
			300	100.0	130.0	10 000	5.00	2640	4.4	1.3 ± 0.3	VDRH20X115ByE
			355	5.0	8.5	800	0.10	130	3.8	1.0 ± 0.3	VDRH05E130xyE
			340	10.0	17.5	1750	1.00	320	3.8	1.0 ± 0.3	VDRH07K130xyE
130	170	205	340	25.0	35.0	3500	1.50	580	4.3	1.2 ± 0.3	VDRH10S130xyE
			340	50.0	70.0	6000	3.00	1050	4.3	1.2 ± 0.3	VDRH14V130xyE
			340	100.0	140.0	10 000	5.00	2100	4.8	1.4 ± 0.3	VDRH20X130ByE
			380	5.0	9.0	800	0.10	120	3.9	1.0 ± 0.3	VDRH05E140xyE
			360	10.0	19.0	1750	1.00	290	3.9	1.0 ± 0.3	VDRH07K140xyE
140	180	220	360	25.0	39.0	3500	1.50	540	4.3	1.2 ± 0.3	VDRH10S140xyE
			360	50.0	78.0	6000	3.00	950	4.3	1.2 ± 0.3	VDRH14V140xyE
			360	100.0	155.0	10 000	5.00	1900	4.8	1.5 ± 0.3	VDRH20X140ByE
			415	5.0	10.5	800	0.10	110	4.1	1.1 ± 0.3	
			395	10.0	21.0	1750	1.00	270	4.1	1.1 ± 0.3	VDRH07K150xyE
150	200	240	395	25.0	42.0	3500	1.50	490	4.3	1.3 ± 0.3	VDRH10S150xyE
			395	50.0	84.0	6000	3.00	850	4.3	1.3 ± 0.3	VDRH14V150xyE
			395	100.0	168.0	10 000	5.00	1700	4.8	1.5 ± 0.3	
			475	5.0	11.0	800	0.10	90	4.1	1.3 ± 0.3	
			455	10.0	24.0	1750	1.00	230	4.1	1.3 ± 0.3	-
175	225	275	455	25.0	49.0	3500	1.50	430	4.5	1.5 ± 0.3	-
	_		455	50.0	99.0	6000	3.00	750	4.5	1.5 ± 0.3	
			455	100.0	190.0	10 000	5.00	1500	4.9	1.7 ± 0.3	
			525	5.0	12.0	800	0.10	80	4.3	1.4 ± 0.8	-
			505	10.0	26.0	1750	1.00	210	4.3	1.4 ± 0.8	-
195	250	300	505	25.0	52.0	3500	1.50	380	4.8	1.6 ± 0.8	
			505	50.0	105.0	6000	3.00	690	4.8	1.6 ± 0.8	
			505	100.0	210.0	10 000	5.00	1350	5.1	1.9 ± 0.8	,
			505	100.0	210.0	10 000	5.00	1000	5.1	1.0 ± 0.0	

Revision: 21-Aug-2019

Document Number: 29082

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000



www.vishay.com

ELEC	TRIC		AND	OR	DERING IN	FORMATIO	N				
MAXIMU CONTIN VOLTAG	iuous	VOLTAGE ⁽³⁾ AT 1 mA	VOLT A STA	IMUM TAGE T TED RENT	MAXIMUM ENERGY ⁽⁴⁾ (10 x 1000 μs)	MAXIMUM NON-REP. TRANSIENT CURRENT ⁽⁵⁾ I _{NRP} (8 x 20 μs)	NOMINAL DISCHARGE CURRENT ⁽⁷⁾ I _N	TYPICAL CAPACITANCE AT 1 kHz	T (max.)	E	SAP MATERIAL AND ORDERING NUMBER ⁽¹⁾ xy ⁽⁶⁾
RMS ⁽²⁾ (V)	DC (V)	(V)	V (V)	 (A)	(J)	(A)	(kA)	(pF)	(mm)	(mm)	ху (-)
			575	5.0	13.0	800	0.10	75	4.4	1.6 ± 0.8	VDRH05E210xyE
			550	10.0	28.0	1750	1.00	190	4.4	1.6 ± 0.8	VDRH07K210xyE
210	275	330	550	25.0	58.0	3500	1.50	350	4.8	1.8 ± 0.8	VDRH10S210xyE
			550	50.0	115.0	6000	3.00	610	4.8	1.8 ± 0.8	VDRH14V210xyE
			550	100.0	228.0	10 000	5.00	1250	5.3	2.0 ± 0.8	VDRH20X210ByE
			620	5.0	16.0	800	0.10	70	4.6	1.7 ± 0.8	VDRH05E230xyE
			595	10.0	32.0	1750	1.00	170	4.6	1.7 ± 0.8	VDRH07K230xyE
230	300	360	595	25.0	65.0	3500	1.50	320	5.1	1.9 ± 0.8	VDRH10S230xyE
			595	50.0	130.0	6000	3.00	540	5.1	1.9 ± 0.8	VDRH14V230xyE
			595	100.0	255.0	10 000	5.00	1100	5.4	2.2 ± 0.8	VDRH20X230ByE
			675	5.0	17.0	800	0.10	60	4.8	1.9 ± 0.8	VDRH05E250xyE
			650	10.0	35.0	1750	1.00	160	4.8	1.9 ± 0.8	VDRH07K250xyE
250	320	390	650	25.0	70.0	3500	1.50	300	5.1	2.1 ± 0.8	VDRH10S250xyE
		650	50.0	140.0	6000	3.00	480	5.1	2.1 ± 0.8	VDRH14V250xyE	
			650	100.0	275.0	10 000	5.00	960	5.5	2.3 ± 0.8	VDRH20X250ByE
			745	5.0	20.0	800	0.10	55	4.9	2.0 ± 0.8	VDRH05E275xyE
			710	10.0	40.0	1750	1.00	140	4.9	2.0 ± 0.8	VDRH07K275xyE
275	350	430	710	25.0	80.0	3500	1.50	270	5.3	2.2 ± 0.8	VDRH10S275xyE
2.0			710	50.0	155.0	6000	3.00	440	5.3	2.2 ± 0.8	VDRH14V275xyE ⁽⁸⁾
			710	100.0	303.0	10 000	5.00	900	5.8	2.5 ± 0.8	VDRH20X275ByE (8)
			810	5.0	21.0	800	0.10	50	5.1	2.2 ± 0.8	VDRH05E300xyE
			775	10.0	42.0	1750	1.00	130	5.1	2.2 ± 0.8	VDRH07K300xyE
300	385	470	775	25.0	85.0	3500	3.00	240	5.5	2.4 ± 0.8	VDRH10S300xyE
000	000		775	50.0	175.0	6000	3.00	400	5.5	2.4 ± 0.8	VDRH14V300xyE ⁽⁸⁾
			775	100.0	350.0	10 000	5.00	810	5.9	2.7 ± 0.8	VDRH20X300ByE (8)
			880	5.0	22.0	800	0.10	45	5.5	2.4 ± 0.8	VDRH05E320xyE
			842	10.0	45.0	1750	1.00	120	5.5	2.4 ± 0.8	VDRH07K320xyE
320	420	510	842	25.0	92.0	3500	3.00	220	6.0	2.6 ± 0.8	VDRH10S320xyE
520	420	510	842	50.0	190.0	6000	3.00	370	6.0	2.6 ± 0.8	VDRH14V320xyE ⁽⁸⁾
			842	100.0	382.0	10 000	5.00	750	6.3	2.9 ± 0.8	VDRH20X320ByE
			940	5.0	25.0	800	0.10	42	5.8	2.7 ± 0.8	VDRH05E350xyE
			920	10.0	51.0	1750	1.00	110	5.8	2.7 ± 0.8	VDRH07K350xyE
350	460	560	920	25.0	102.0	3500	3.00	200	6.1	2.9 ± 0.8	VDRH10S350xyE
			920	50.0	205.0	6000	3.00	320		2.9 ± 0.8	
			920	100.0	410.0	10 000	5.00	650	6.5	3.2 ± 0.8	VDRH20X350ByE
	1		1050	5.0	27.0	800	0.10	40		3.0 ± 0.8	
			1025	10.0	54.0	1750	1.00	95		3.0 ± 0.8	
385	505	620	1025	25.0	107.0	3500	3.00	180		3.2 ± 0.8	-
			1025		215.0	6000	3.00	280		3.2 ± 0.8	
			1025	100.0		10 000	5.00	570	6.8	3.5 ± 0.8	VDRH20X385ByE

Revision: 21-Aug-2019

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000



www.vishay.com

ELEC1	FRIC		AND	OR	DERING IN	FORMATIO	N					
MAXIMU CONTIN VOLTAG	UOUS	AT 1 MA STATED CURRENT		TAGE T TED	MAXIMUM ENERGY ⁽⁴⁾ (10 x 1000 μs)	MAXIMUM NON-REP. TRANSIENT CURRENT ⁽⁵⁾ I _{NRP} (8 x 20 μs)	NOMINAL DISCHARGE CURRENT ⁽⁷⁾ I _N	TYPICAL CAPACITANCE AT 1 kHz	T (max.)	E	SAP MATERIAL AND ORDERING NUMBER ⁽¹⁾ XV ⁽⁶⁾	
RMS ⁽²⁾ (V)	DC (V)	(V)	V (V)	 (A)	(J)	(A)	(kA)	(pF)	(mm)	(mm)	∧y ↔	
			1150	5.0	28.0	800	0.10	35	6.3	3.2 ± 0.8	VDRH05E420xyE	
			1120	10.0	56.0	1750	1.00	85	6.3	3.2 ± 0.8	VDRH07K420xyE	
420	560	680	1120	25.0	112.0	3500	3.00	165	6.7	3.4 ± 0.8	VDRH10S420xyE	
			1120	50.0	225.0	6000	3.00	250	6.7	3.4 ± 0.8	VDRH14V420xyE	
			1120	100.0	430.0	10 000	5.00	510	7.1	3.7 ± 0.8	VDRH20X420ByE	
			1290	5.0	29.0	800	0.10	30	6.6	3.6 ± 0.8	VDRH05E460xyE	
				1240	10.0	58.0	1750	1.00	75	6.6	3.6 ± 0.8	VDRH07K460xyE
460	615	750	1240	25.0	115.0	3500	3.00	150	7.0	3.8 ± 0.8	VDRH10S460xyE	
			1240	50.0	230.0	6000	3.00	225	7.0	3.8 ± 0.8	VDRH14V460xyE	
			1240	100.0	440.0	10 000	5.00	450	7.5	4.1 ± 0.8	VDRH20X460ByE	
			1290	10.0	59.0	1750	1.00	65	6.8	3.7 ± 0.8	VDRH07K485xyE	
485	640	780	1290	25.0	116.0	3500	3.00	145	7.3	3.9 ± 0.8	VDRH10S485xyE	
400	040	700	1290	50.0	233.0	6000	3.00	220	7.3	3.9 ± 0.8	VDRH14V485xyE	
			1290	100.0	450.0	10 000	5.00	400	7.6	4.2 ± 0.8	VDRH20X485ByE	
			1355	10.0	60.0	1750	1.00	62	7.0	3.9 ± 0.8	VDRH07K510xyE	
510	670	820	1355	25.0	118.0	3500	3.00	135	7.5	4.1 ± 0.8	VDRH10S510xyE	
510	070	020	1355	50.0	235.0	6000	3.00	220	7.5	4.1 ± 0.8	VDRH14V510xyE	
			1355	100.0	460.0	10 000	5.00	400	7.9	4.4 ± 0.8	VDRH20X510ByE	
			1500	25.0	127.0	3500	3.00	120	7.9	4.5 ± 0.8	VDRH10S550xyE	
550	745	910	1500	50.0	255.0	6000	3.00	180	7.9	4.5 ± 0.8	VDRH14V550xyE	
			1500	100.0	510.0	10 000	5.00	320	8.3	4.9 ± 0.8	VDRH20X550ByE	
			1650	25.0	140.0	3500	1.50	105	8.4	5.0 ± 0.8	VDRH10S625ByE	
625	825	1000	1650	50.0	283.0	6000	3.00	165	8.4	5.0 ± 0.8	VDRH14V625ByE	
			1650	100.0	566.0	10 000	5.00	280	8.8	5.3 ± 0.8	VDRH20X625ByE	
			1815	25.0	155.0	3500	1.50	80	9.8	5.4 ± 0.8	VDRH10S680ByE	
680	895	1100	1815	50.0	310.0	6000	3.00	150	9.8	5.4 ± 0.8	VDRH14V680ByE	
			1815	100.0	620.0	10 000	3.00	250	10.2	5.8 ± 0.8	VDRH20X680ByE	

Notes

(1) The products are certified according to cULus (E332800) for operation up to 85 °C or 105 °C, and VDE/IEC (40013495) for operation up to 85 °C. See Agency Approval section for certificate download

⁽²⁾ The sinusoidal voltage is assumed as the normal operating condition. If a non-sinusoidal voltage is present, type selection should be based on multiplying the peak voltage by a factor of 0.707

⁽³⁾ The voltage measured at 1 mA meets the requirements of IEC 61051.

The tolerance on the voltage at 1 mA is \pm 10 %

⁽⁴⁾ High energy surges are generally of longer duration. The maximum energy for one pulse of 10 x 1000 μ s is given as a reference for longer duration pulses. This pulse can be characterized by peak current (I_p) and pulse width t₂ (virtual time of half I_p value, following "IEC 60060-2, section 6"). If V_p is the clamping voltage corresponding to I_p, the energy absorbed in the varistor is determined by the formula: $E = K \times V_p \times I_p \times I_2$ where K is dependent on the value of t₂ (see Peak Current as a Function of Pulse Width drawing)

(5) A current wave of 8 x 20 µs is used as a standard for pulse current and clamping voltage ratings. The maximum non-repetitive transient current is given for one pulse applied during the life of the component

Κ

For composition of the SAP part number:

Replace "x" by B for bulk type

for tape and reel

A for tape and ammopack

т

for straight leads

for kinked leads (bulk only)

L for kinked leads with H0 = 16 mm (tape and reel/ammo)

M for kinked leads with H0 = 18.25 mm (tape and reel/ammo)

(8) These varistors are UL 1449 edition 4 recognized as SPD type 5 (component level) for operating temperatures up to 105 °C

Replace "y" by S

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT

ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

(6)

⁽⁷⁾ All varistors are UL 1449 edition 4 recognized as SPD type 5 (component level) for operating temperatures up to 85 °C. The varistors may be used in other SPD types as 2, 3, or 4 depending on the indicated I_N nominal discharge current ratings. The final acceptance of the component is dependent upon its installation and use in complete equipment submitted to underwriters laboratories Inc.

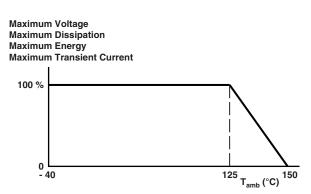


Vishay BCcomponents

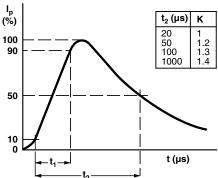
ELECTRICAL CHARACTERISTICS

PARAMETER	VALUE	UNIT
Maximum continuous voltage:		
RMS	11 to 680	V
DC	14 to 895	V
Maximum non-repetitive transient current (I _{NRP}) (8 x 20 µs)		
VDRH05	250 or 800	А
VDRH07	500 or 1750	А
VDRH10	1000 or 3500	А
VDRH14	2000 or 6000	А
VDRH20	3000 or 10 000	А
Thermal resistance:		
VDRH05	≈ 80	K/W
VDRH07	≈ 70	K/W
VDRH10	≈ 60	K/W
VDRH14	≈ 50	K/W
VDRH20	≈ 40	K/W
Maximum dissipation:		
VDRH05	100	mW
VDRH07	250	mW
VDRH10	400	mW
VDRH14	600	mW
VDRH20	1000	mW
Temperature coefficient of voltage at 1 mA maximum	± 0.05	%/K
Voltage proof between interconnected leads and case	2500	V
Storage temperature	-40 to +150	°C
Operating temperature	-40 to +125	°C

DERATING CURVE



PEAK CURRENT AS A FUNCTION OF PULSE WIDTH



COMP	COMPONENT DIMENSIONS (BULK TYPE) in millimeters AND CATALOG NUMBERS										
	IAX.		IAX.	A ₀ MAX.		L MIN.	T ⁽¹⁾	F (1)	d	F	CATALOG
$V \le 320 V$	V > 320 V	$V \le 300 V$	V > 300 V	$V \le 320 V$	V > 320 V MAX.		-	ũ	•	NUMBER	
7	.0	9	.0	11	.0	24.0	6.5	0.7 to 3.6	0.6 ± 0.05	5 ± 1.0	VDRH05
9	.0	11	.0	13	3.0	24.0	6.5	0.7 to 3.6	0.6 ± 0.05	5 ± 1.0	VDRH07
12.0	12.5	14.5	15.0	16.5	17.0	17.0	8.0	0.9 to 4.5	0.8 ± 0.05	7.5 ± 1.0	VDRH10
16.0	16.5	19.0		21.0	21.5	16.0	8.0	0.9 to 4.5	0.8 ± 0.05	7.5 ± 1.0	VDRH14
22.5	23.0	25	5.5	27.5	28.0	24.0	10.0	1.1 to 5.8	1.0 ± 0.05	10 ± 1.0	VDRH20

Note

(1) T_{max.} and E values per size and voltage level can be found back in the Electrical Data and Ordering Information table

Revision: 21-Aug-2019

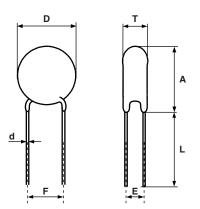
6



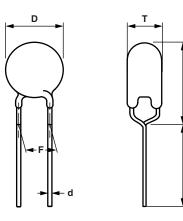
VARISTORS IN BULK					
ТҮРЕ	VDRH05 Ø 5 mm 11 V to 460 V	VDRH07 Ø 7 mm 11 V to 510 V	VDRH10 Ø 10 mm 11 V to 680 V	VDRH14 Ø 14 mm 11 V to 680 V	VDRH20 Ø 20 mm 11 V to 680 V
Straight leads; see outline of components with straight leads drawing	BSE	BSE	BSE	BSE	BSE
Kinked leads; see outline of components with kinked leads drawing	BKE	BKE	BKE	BKE	BKE
Packaging quantities					
11 V to 95 V	250	250	250	100	50
130 V to 385 V	250	250	250	100	50
420 V to 460 V	250	250	200	100	50
485 V to max. V	-	250	150	100	50

DIMENSIONS in millimeters: see Component Dimensions and Electrical Data table

OUTLINE of Component with Straight Leads



OUTLINE of Component with Kinked Leads



A₀

L



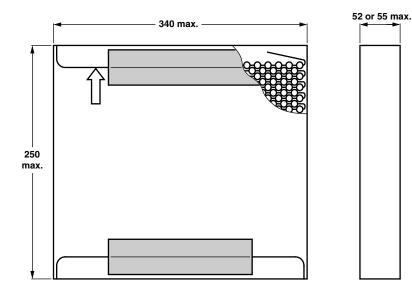
Vishay BCcomponents

VARISTORS ON TAPE IN AMMOPA	NCK .			
ТҮРЕ	VDRH05 Ø 5 mm 11 V to 460 V	VDRH07 Ø 7 mm 11 V to 510 V	VDRH10 Ø 10 mm 11 V to 680 V	VDRH14 Ø 14 mm 11 V to 680 V
Straight leads				
H = 18 mm	-	-	ASE	ASE
H = 20 mm	ASE	ASE	-	-
See drawing: taped version with straight leads				
Kinked leads				
H ₀ = 18.25 mm	AME	AME	AME	AME
H ₀ = 16 mm	ALE	ALE	ALE	ALE
See drawing: taped version with kinked leads				
Packaging quantities				
14 V to 210 V	1500 ⁽¹⁾	1500 ⁽¹⁾	500	500
230 V to 510 V	1000	1000	500	500
550 V to max. V	_	-	400	400

Note

⁽¹⁾ Except for 35 V and 40 V = 1000 pieces

DIMENSIONS OF AMMOPACK in millimeters



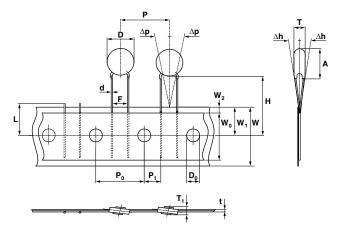
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000



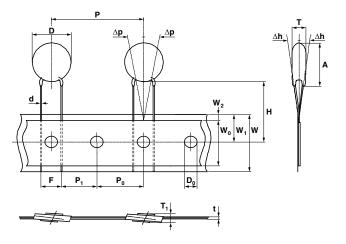
VARISTORS ON TAPE AND REEL				
ТҮРЕ	VDRH05 Ø 5 mm 11 V to 460 V	VDRH07 Ø 7 mm 11 V to 510 V	VDRH10 Ø 10 mm 11 V to 680 V	VDRH14 Ø 14 mm 11 V to 680 V
	Straight leads			
H = 18 mm	-	-	TSE	TSE
H = 20 mm	TSE	TSE	-	-
See drawing: taped version with straight leads				
Kinked leads				
H ₀ = 18.25 mm	TME	TME	TME	TME
H ₀ = 16 mm	TLE	TLE	TLE	TLE
See drawing: taped version with kinked leads				
Packaging quantities				
14 V to 250 V	1500	1500	1000	750
275 V to 300 V	1500	1500	750	750
320 V to 350 V	1000	1000	500	500
385 V to max. V	1000	1000	500	500

PACKAGING

TAPED VERSION WITH STRAIGHT LEADS (only for VDRH05 and VDRH07)



TAPED VERSION WITH STRAIGHT LEADS (only for VDRH10 and VDRH14)



Revision: 21-Aug-2019

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

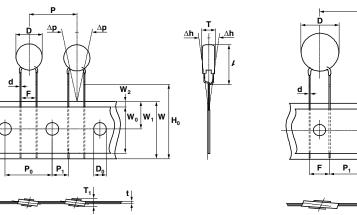


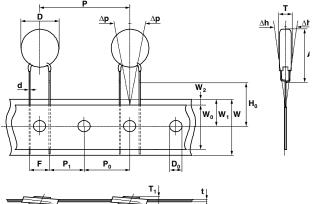
TAPED VERSION WITH KINKED LEADS

(only for VDRH05 and VDRH07)

TAPED VERSION WITH KINKED LEADS

(only for VDRH10 and VDRH14)





TAPING	DATA (based on	IEC 60286-2)							
SYMBOL	PARAM	ETED	DIMENSIONS/TOLERANCE						
STMBOL	PARAM	EIER	VDRH05	VDRH07	VDRH10	VDRH14			
A max.	Max. mounting	$V \leq 300 \ V$	9.0	11.0	14.5	19.0			
A max.	height	V > 300 V	0.0	11.0	15.0	19.0			
A	Max. mounting	$V \leq 320 \ V$	11.0	13.0	16.5	21.0			
A ₀ max.	height	V > 320 V	11.0	15.0	17.0	21.5			
D max.	Max hady diamatar	$V \le 320 V$	7.0	9.0	12.0	16.0			
D max.	Max. body diameter	V > 320 V	7.0		12.5	16.5			
d	Lead wire	diameter	0.6 ±	0.05	0.8 ±	0.05			
F	Lead to lead	distance ⁽¹⁾	5.0 + 0.	8/- 0.2	7.5 ±	± 0.8			
н	Distance componen	t to tape center ⁽²⁾	20.0 + 2	.0/- 0.0	18.0 + 2.0/- 0.0				
H ₀	Lead wire cli	nch height	16.0 or 18.25 ± 0.5						
Ρ	Pitch of compo	nents on tape	12.7 ± 1.0 25.4 ± 1.0			± 1.0			
Т	Total thi	ckness	See Electrical Data table						

Notes

⁽¹⁾ Guaranteed between component and tape

⁽²⁾ For VDRH14V510xSE and VDRH14V550xSE: $H = 20 \text{ mm} \pm 1 \text{ mm}$

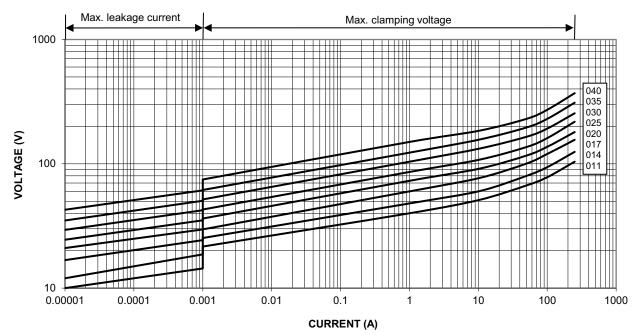
WISHAY. www.vishay.com

VDRH Series

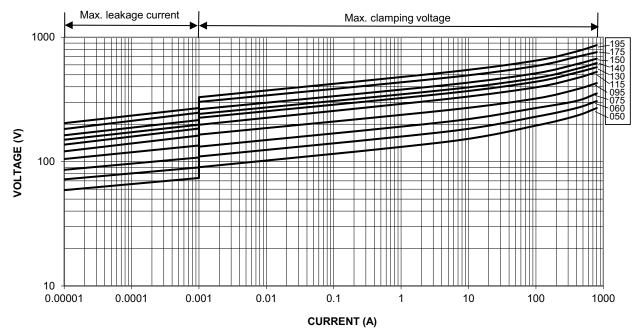
Vishay BCcomponents

V/I CHARACTERISTICS

11 V_{RMS} to 40 V_{RMS}; VDRH05



50 V_{RMS} to 195 V_{RMS}; VDRH05



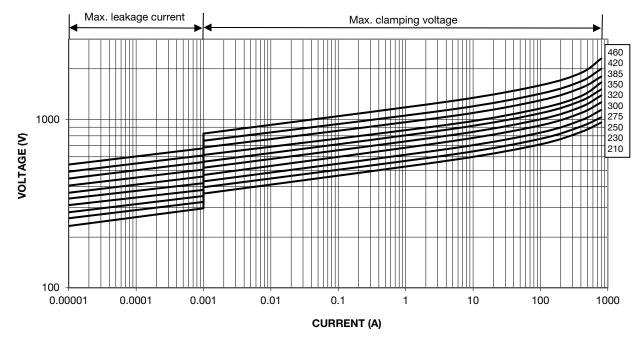
11



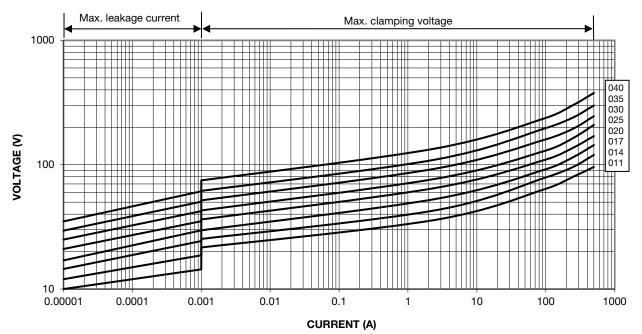
210 V_{RMS} to 460 $V_{\text{RMS}};$ VDRH05

www.vishay.com

VISHAY



11 V_{RMS} to 40 V_{RMS}; VDRH07



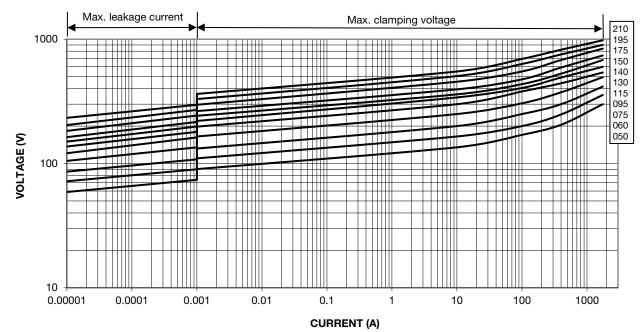
12

Vishay BCcomponents

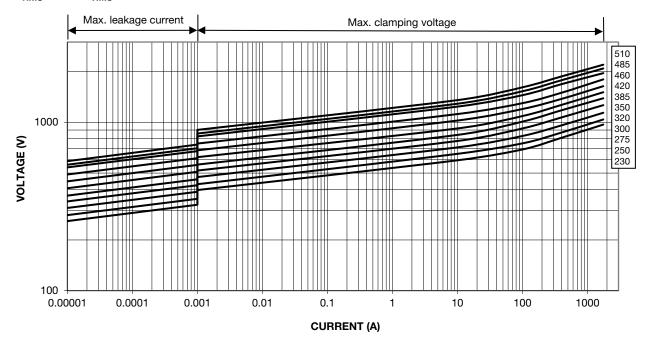
50 V_{RMS} to 210 V_{RMS}; VDRH07

www.vishay.com

VISHAY



230 V_{RMS} to 510 V_{RMS}; VDRH07



13 For technical questions, contact: <u>nlr@vishay.com</u>

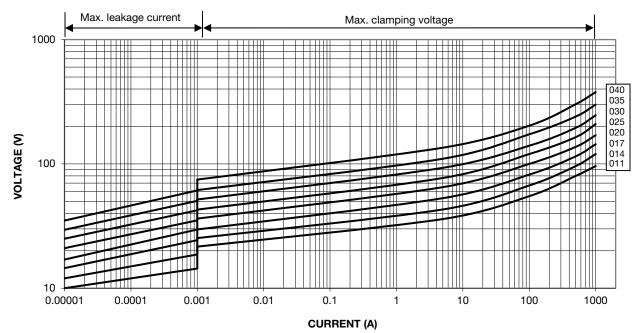
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

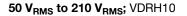


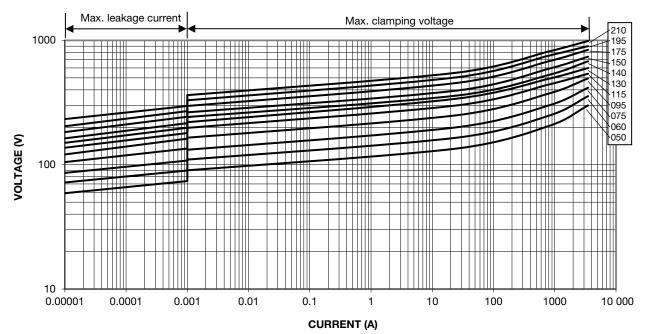
11 V_{RMS} to 40 V_{RMS}; VDRH10

www.vishay.com

VISHAY







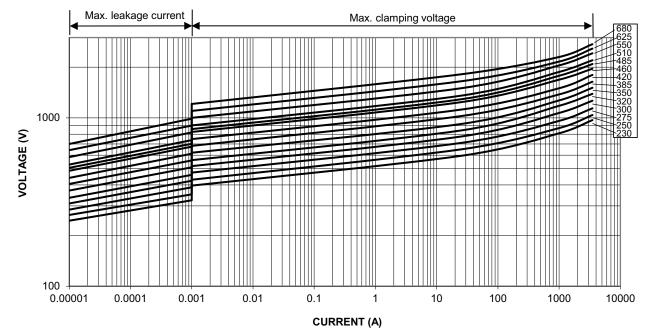
14 For technical questions, contact: <u>nlr@vishay.com</u>

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT <u>www.vishay.com/doc?91000</u>

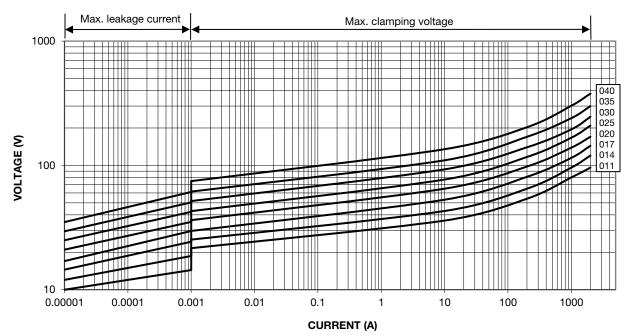
VDRH Series Vishay BCcomponents

www.vishay.com

230 V_{RMS} to 680 V_{RMS}; VDRH10



11 V_{RMS} to 40 $V_{\text{RMS}};$ VDRH14



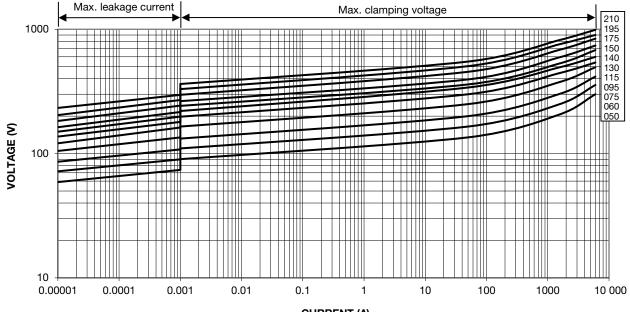
15

Vishay BCcomponents

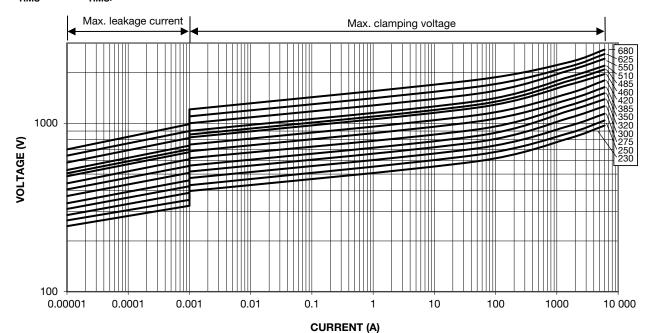
50 V_{RMS} to 210 $V_{RMS};$ VDRH14

www.vishay.com

VISHAY



CURRENT (A)



230 V_{RMS} to 680 V_{RMS}; VDRH14

Revision: 21-Aug-2019

16

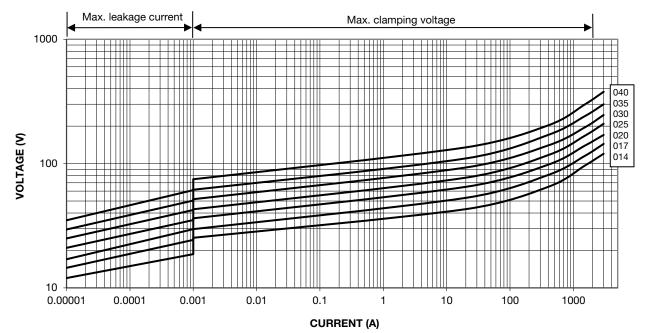
Document Number: 29082

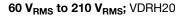
Vishay BCcomponents

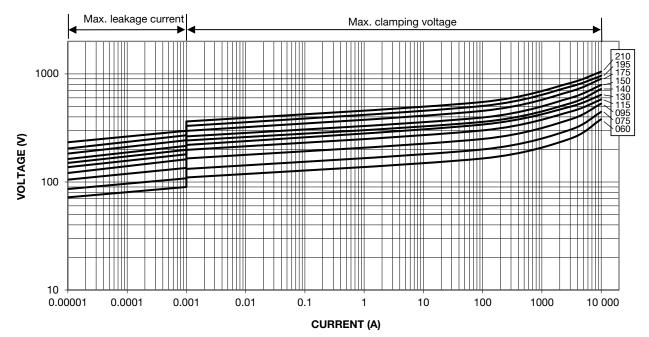
14 V_{RMS} to 40 V_{RMS}; VDRH20

www.vishay.com

VISHAY







17 For technical questions, contact: <u>nlr@vishay.com</u>

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

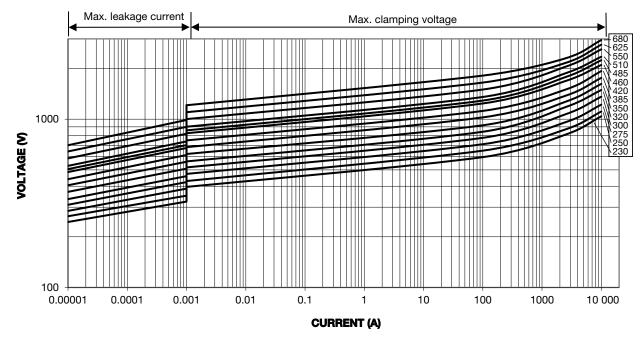
Downloaded from Arrow.com.

Vishay BCcomponents

230 V_{RMS} to 680 $V_{\text{RMS}};$ VDRH20

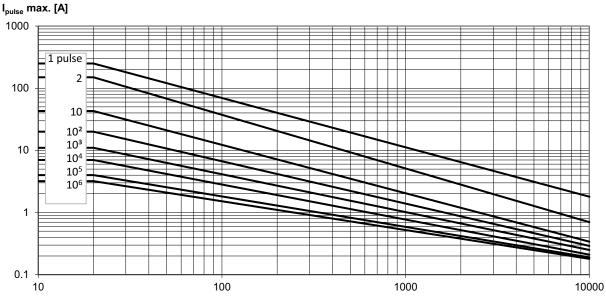
www.vishay.com

VISHA



MAXIMUM APPLICABLE TRANSIENT CURRENT AS A FUNCTION OF PULSE DURATION

11 V_{RMS} to 40 V_{RMS}; VDRH05

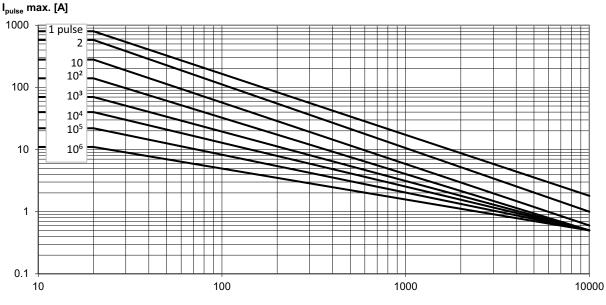




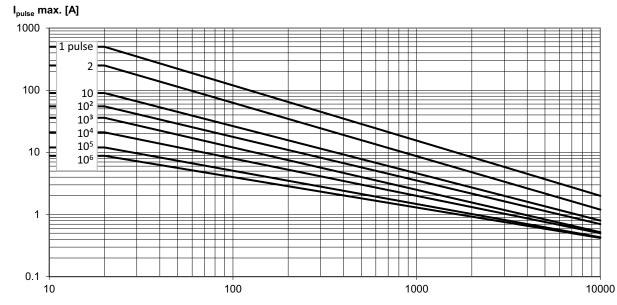


50 V_{RMS} to 460 V_{RMS}; VDRH05

11 V_{RMS} to 40 V_{RMS}; VDRH07



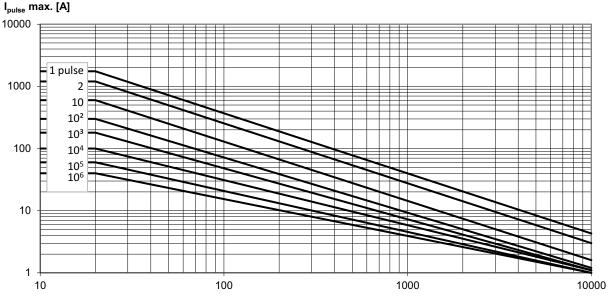
t_{pulse} _∏_[µs]



t_{pulse} _<mark>∏_[µs]</mark>

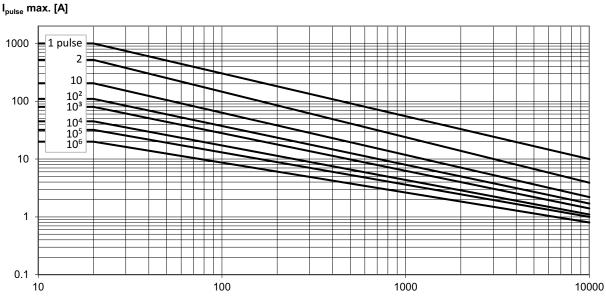


50 V_{RMS} to 510 V_{RMS}; VDRH07









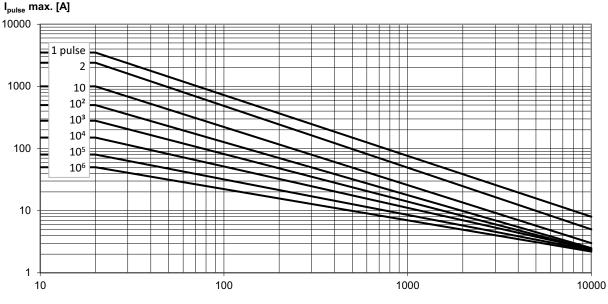
t_{pulse} _∏_[µs]



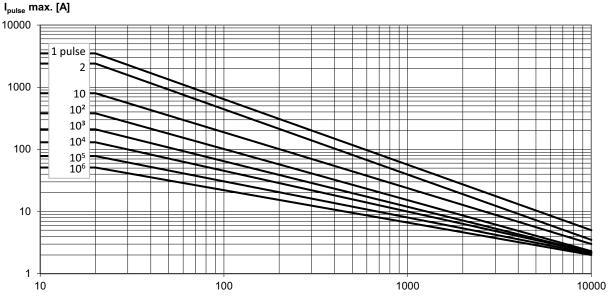
Vishay BCcomponents

50 V_{RMS} to 300 V_{RMS}; VDRH10

320 V_{RMS} to 680 V_{RMS}; VDRH10



t_{pulse} _∏_[µs]



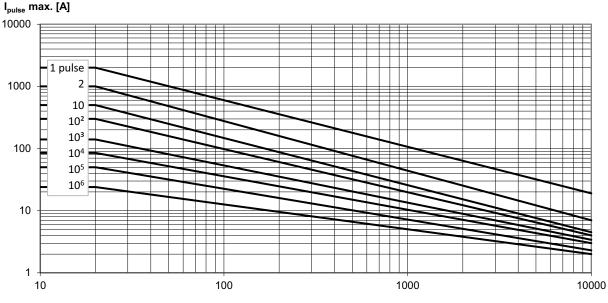
t_{pulse} _∏_[µs]

Downloaded from Arrow.com.

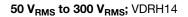


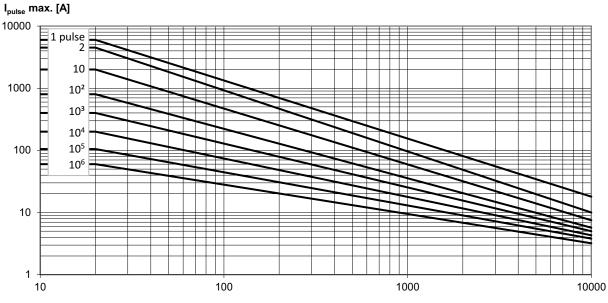
Vishay BCcomponents

11 V_{RMS} to 40 V_{RMS}; VDRH14



t_{pulse} _∏_[µs]





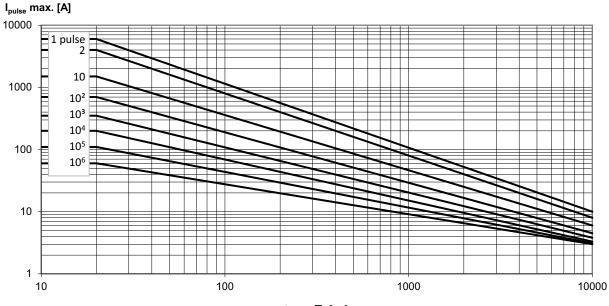
t_{pulse} _∏_[µs]



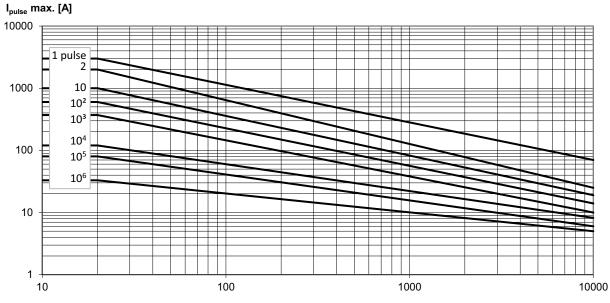
Vishay BCcomponents

320 V_{RMS} to 680 V_{RMS}; VDRH14

14 V_{RMS} to 40 V_{RMS}; VDRH20



t_{pulse} _∏_[µs]

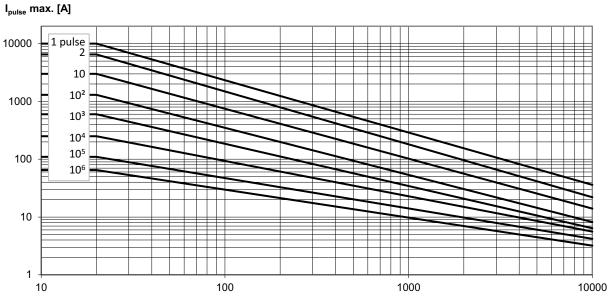


t_{pulse} _∏_[µs]

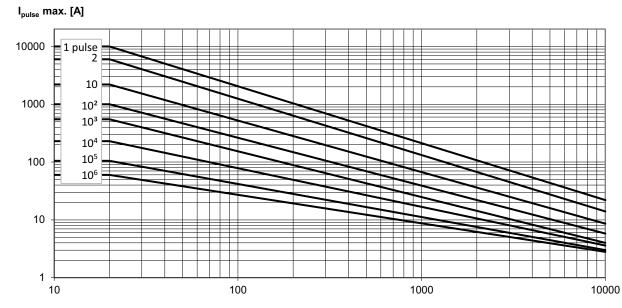


60 V_{RMS} to 300 V_{RMS}; VDRH20

320 V_{RMS} to 680 V_{RMS}; VDRH20



t_{pulse} _<mark>∏_[µs]</mark>







Vishay

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.