

Introduction to Filter Connectors Transient Voltage Suppression Diode Selection Guide

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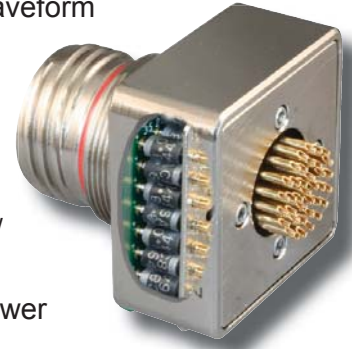
Diode Power Selection for Lightning Strike Waveform Threats

DO 160 Waveform	Level	Open Circuit Voltage/ Short Circuit Current V/A	Diode Peak Voltage (V _{wm})	Diode Clamp Voltage (V _c)	Recommended Diode Power (Watts)
1 MHz Damped Ringing Sine 3	1	100/4	5 to 60	9.2 to 96.8	600
	2	250/10	5 to 150	9.2 to 243	600
	3	600/24	5 to 170	9.2 to 275	600
	4	1500/60	5 to 54	9.2 to 87.1	600
			58 to 150	93.6 to 243	1500
			160 to 170	259 to 275	3000
	5	3200/128	5 to 22	9.2 to 35.5	600
			24 to 60	38.9 to 96.8	1500
			64 to 130	103 to 209	3000
			150 to 170	243 to 275	5000
Double Exponential 6.4 x 70 μsec 4	1	50/10	5 to 30	9.2 to 48.4	600
	2	125/25	5 to 75	9.2 to 121	600
	3	300/60	5 to 17	9.2 to 27.6	600
			18 to 26	29.2 to 42.1	3000
			28 to 110	45.4 to 177	5000
	4	750/150	120 to 170	193 to 275	15000
			5 to 8.5	9.2 to 14.4	3000
			9 to 60	15.4 to 96.8	5000
			64 to 170	103 to 275	15000
	5	1600/320	5 to 24	9.2 to 38.9	5000
26 to 78			42.1 to 126	15000	
90			147	30000	
Double Exponential 40 x 120 μsec 5A	1	50/50	5 to 30	9.2 to 48.4	1500
	2	125/125	5 to 75	9.2 to 121	3000
	3	300/300	5 to 15	9.2 to 24.4	3000
			17 to 170	26.7 to 275	15000
			180	291	30000
	4	750/750	17 to 22	26.7 to 35.5	15000
			30 to 48	55.2 to 77.4	30000
5	1600/1600	None			

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Tables for the selection of diodes and recommended DWV for a specified waveform voltage threat.



1. Determine the specification threat waveform and level.
2. Determine the maximum clamping voltage that the system can tolerate (this may be a different value for each pin of the connector).
3. Move down the table to the waveform and Voc/Isc (Open Circuit Voltage/ Short Circuit Current) that is covered in the specification.
4. Move across the table left to right and select the recommended diode power level.
5. If the application is a high frequency data line, a low capacitance diode will be needed. There is no difference in the power rating.
6. High speed data lines, Ethernet or USB, cannot tolerate much capacitance at all. These will need a special diode and no filter can be used.
7. If a filter is to be used in the application, consult EMI Filter Rating table (below) to determine the minimum DWV voltage needed to protect the selected filter capacitance.
8. The filter DWV rating applies with or without a diode.

EMI Filter Rating in Dielectric Withstanding Voltage (DWV) For Compatibility with Transient Suppressing Diodes										
DO 160 Waveform	Level	Waveform (Voc)		Capacitance pF Minimum						
				19000	16000	9000	4000	1650	400	200
1 MHz Damped Ringing Sine 3	1	100	▶ Recommended Dielectric Withstanding Voltage	500	500	500	500	500	500	500
	2	250		500	500	500	500	500	500	500
	3	600		500	500	500	670	720	720	720
	4	1500		740	840	1210	1660	1800	1800	1800
	5	3200		1580	1790	2580	3530	3840	3840	3840
Double Exponential 6.4 x70 µsec 4	1	50		500	500	500	500	500	500	500
	2	125		500	500	500	500	500	500	500
	3	300		500	500	500	500	500	500	500
	4	750		820	850	900	900	900	900	900
	5	1600		1920	1920	1920	1920	1920	1920	1920
Double Exponential 40 x 120 µsec 5A	1	50		500	500	500	500	500	500	500
	2	125		500	500	500	500	500	500	500
	3	300		500	500	500	500	500	500	500
	4	750		900	900	900	900	900	900	900
	5	1600		1920	1920	1920	1920	1920	1920	1920