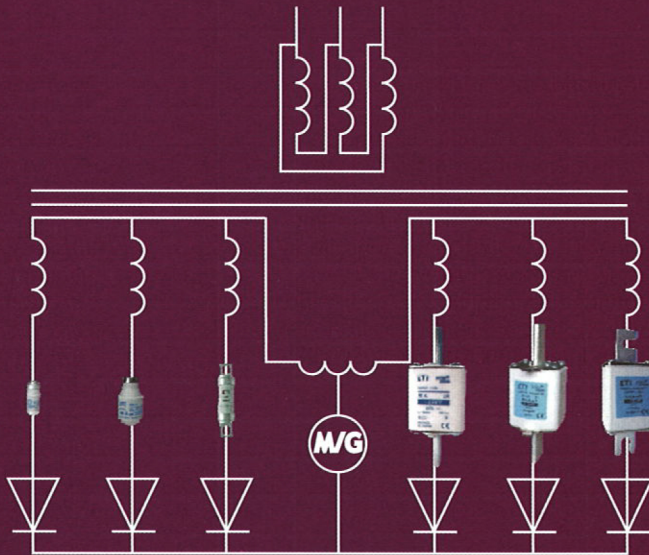


## ULTRA QUICK - SEMICONDUCTOR PROTECTION

ETI fuse-links for semiconductor protection ULTRA QUICK present an optimal solution for protection of power semiconductors, such as diodes, thyristors and other power semiconductors in DC and AC power applications such as AC/DC, DC/AC, DC/DC converters and frequency converters. ETI fuse-links elements for semiconductor protection comply with IEC 60269 and VDE 0636 standards.



SEMICONDUCTOR

# VV/HH

High voltage fuse-links 836

Technical data 845

**CESI** atestirano

## HIGH VOLTAGE FUSES



**ETI** POWER NEEDS CONTROL



## High voltage fuse-links

### Ordering Code Numbers

rated voltage $U_n$ [kV]	Dimension "e" according to DIN and IEC (mm)	rated current [A]	VVC Striker type 50N	VVT-D Striker type 80N THERMO	VVT-E Striker type 120N THERMO	Tube diameter "d" (mm)	weight [kg]	
6/12	192	2 A	004235103	004236103	004237103	53	1.1	
		4 A	004235104	004236104	004237104			
		6 A	004235105	004236105	004237105			
		10 A	004235106	004236106	004237106			
		16 A	004235107	004236107	004237107			
		20 A	004235108	004236108	004237108			
		25 A	004235109	004236109	004237109			
		32 A	004235110	004236110	004237110			
		40 A	004235111	004236111	004237111			
	50A	004235112	004236112	004237112	68	1.7		
	2 A	004235003	004236003	004237003				
	4 A	004235004	004236004	004237004				
	6 A	004235005	004236005	004237005				
	10 A	004235006	004236006	004237006				
	16 A	004235007	004236007	004237007				
	20 A	004235008	004236008	004237008				
	25 A	004235009	004236009	004237009				
	32 A	004235010	004236010	004237010				
	40 A	004235011	004236011	004237011				
	50 A	004235012	004236012	004237012	68	2.8		
	63 A	004235013	004236013	004237013				
	80 A	004235014	004236014	004237014				
	100 A	004235015	004236015	004237015				
	125 A	004235016	004236016	004237016				
	160 A	004235017	004236017	004237017			85	4.0
	2 A	004235503	004236503	004237503				
	4 A	004235504	004236504	004237504				
	6 A	004235505	004236505	004237505				
	10 A	004235506	004236506	004237506				
	16 A	004235507	004236507	004237507				
20 A	004235508	004236508	004237508					
25 A	004235509	004236509	004237509					
32 A	004235510	004236510	004237510					
40 A	004235511	004236511	004237511	53	2.3			
50 A	004235512	004236512	004237512					
63 A	004235513	004236513	004237513					
80 A	004235514	004236514	004237514					
100 A	004235515	004236515	004237515					
125 A	004235516	004236516	004237516					
160 A	004235517	004236517	004237517					
200 A	004235518	004236518	004237518			68	3.9	
160 A	004235617	004236617	004237617					
200 A	004235618	004236618	004237618					
250 A	004235619	004236619	004237619	85	7.0			
160 A	004235617	004236617	004237617					
200 A	004235618	004236618	004237618					

Note 1: Other ratings and dimensions can be supplied by customer request. For particular applications, please contact ETI technical team.  
 Note 2: Orange colored types according to IEC 60282-1 dimensions.



## Selection of fuses for transformer protection

For HV fuse-link rated current selection, following transformer technical features has to be known:

- Rated power  $P_n$  (kVA)
- Short-circuit voltage  $U_{cc}$  (%)
- Rated current  $I_{nt}$
- Inrush current usually between  $8-12 \times I_{nt}$
- Short-circuit current  $I_{cc}$
- Overload current usually  $1.4 I_{nt}$
- Maximum short-circuit duration. Standard 2 sec for transformers up to 630 kVA and 3 sec for higher rated powers

Following HV fuse-link technical features has to be known:

- Rated voltage  $U_n$  (kV)
- Rated current  $I_n$  (A)
- I/t Characteristics According to the curves
- Melting current (0.1 sec)  $I_f(0.1sec)$
- Melting current at 2s ec or 3sec melting time
- Minimum breaking current  $I_3$  (A)
- Breaking capacity  $I_f$  (kA)

General about transformer protection:

- Fuse-link rated voltage  $U_n$  must be higher then network voltage.
- Maximum fuse-link breaking current  $I_f$  must be higher then short circuit-current  $I_{cc}$ .
- Inrush current should not melt the fuse-link. Melting current at 100 msec must be higher than 12 times transformer rated current
- Fuse-link has to operate before the expected short-circuit current damage the transformer  $I_{cc} > I_f(2 \text{ sec})$  or  $I_{cc} > I_f(3 \text{ sec})$
- Fuse-link must be able to withstand possible short duration overloads.  $I_n \text{ FUSE} > 1.4 I_n \text{ TRAF0}$

Selection table for VV - THERMO back-up fuse links

Pt (kVA)	6/7,2 kV					10/12 kV					15/17.5kV				
	Transformer rated primary current Ip(A) at 6 kV	Inrush current (A)	HV Fuse-link rated current		LV Fuse- Link NH gG  I <sub>LV</sub> (A)	Transformer rated primary current Ip(A) at 10 kV	Inrush current (A)	HV Fuse-link rated current		LV Fuse- Link NH gG  I <sub>LV</sub> (A)	Transformer rated primary current Ip(A) at 15 kV	Inrush current (A)	HV Fuse-link rated current		LV Fuse- Link NH gG  I <sub>LV</sub> (A)
			I <sub>HV</sub> min (A)	I <sub>HV</sub> max (A)				I <sub>HV</sub> min (A)	I <sub>HV</sub> max (A)				I <sub>HV</sub> min (A)	I <sub>HV</sub> max (A)	
50	5	58	10	16	63	3	35	6	10	63	2	23	6	10	63
75	7	86	16	20	100	4	52	10	16	100	3	35	6	10	100
100	10	115	25	32	125	6	70	10	16	125	4	46	10	16	125
125	12	145	32	40	160	7	86	16	20	160	5	58	10	16	160
160	15	185	40	50	200	9	110	20	25	200	6	74	16	20	200
200	19	230	40	50	250	12	138	25	32	250	8	92	20	25	250
250	24	289	50	63	315	14	173	32	40	315	10	115	25	32	315
315	30	364	50	63	400	18	218	40	50	400	12	145	32	40	400
400	39	462	63	80	500	23	276	50	63	500	15	185	40	50	500
500	48	577	80	100	630	29	346	50	63	630	19	230	40	50	630
630	61	727	100	125	800	36	437	63	80	800	24	293	50	63	800
800	77	923	100	125	1000	46	554	80	100	1000	31	370	63	80	1000
1000	96	1154	125	160	1250	58	692	100	125	1250	38	462	80	100	1250
1250	120	1440	160	200*	1250	72	866	100	125	1250	48	577	100	125	1250
1600	154	1848	200*	250*	1500	92	1109	125	160	1500	62	739	125	160	1500
2000	192	2310	250*	315*	1600	115	1380	160	200*	1600					

\* Note: nonstandard tube dimension



**Selection table for VV - THERMO back-up fuse links**

Pt (kVA)	20/24 kV					30/36 kV				
	Transformer rated pri- mary current Ip(A) at 20 kV	Inrush current (A)	HV Fuse-link rated current		LV Fuse- Link NH gG  I <sub>LV</sub> (A)	Transformer rated pri- mary current Ip(A) at 30 kV	Inrush current (A)	HV Fuse-link rated current		LV Fuse- Link NH gG  I <sub>LV</sub> (A)
			I <sub>HV</sub> min (A)	I <sub>HV</sub> max (A)				I <sub>HV</sub> min (A)	I <sub>HV</sub> max (A)	
50	1	18	4	6	63	1	12	2	4	63
75	2	26	4	6	100	1	17	4	6	100
100	3	35	6	10	125	2	23	6	10	125
125	4	43	6	10	160	2	29	6	10	160
160	5	55	10	16	200	3	37	6	10	200
200	6	70	10	16	250	4	46	10	16	250
250	7	86	16	20	315	5	58	10	16	315
315	9	109	20	25	400	6	73	16	20	400
400	12	138	25	32	500	8	92	20	25	500
500	14	173	32	40	630	10	115	20	25	630
630	18	217	40	50	800	12	145	25	32	800
800	23	277	50	63	1000	15	185	40	50	1000
1000	29	346	50	63	1250	19	230	50	63	1250

