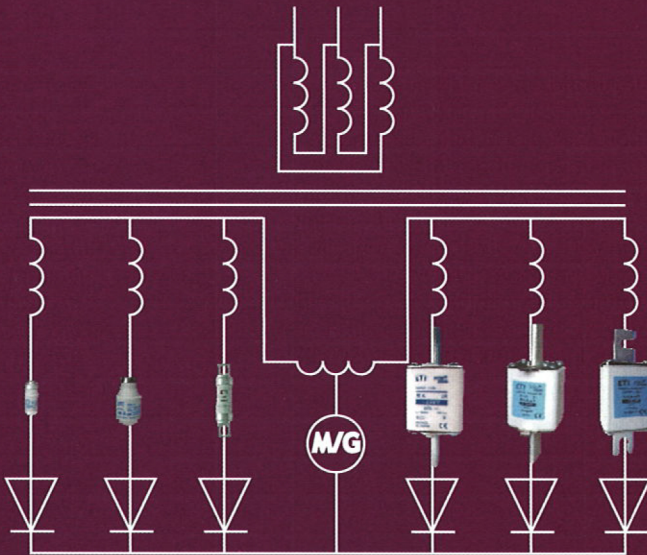


## ULTRA QUICK - SEMICONDUCTOR PROTECTION

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]	
10/24	292	2 A	004255103	004256103	004257103	53	1.6	
		4 A	004255104	004256104	004257104			
		6 A	004255105	004256105	004257105			
		10 A	004255106	004256106	004257106			
		16 A	004255107	004256107	004257107			
		20 A	004255108	004256108	004257108			
		25 A	004255109	004256109	004257109	68	2.8	
		32 A	004255110	004256110	004257110			
		40 A	004255111	004256111	004257111			
		50A	004255112	004256112	004257112			
		63 A	004255113	004256113	004257113			
		63 A	004255113	004256113	004257113			
	442	442	2 A	004255003	004256003	004257003	53	2.3
			4 A	004255004	004256004	004257004		
			6 A	004255005	004256005	004257005		
			10 A	004255006	004256006	004257006		
			16 A	004255007	004256007	004257007		
			20 A	004255008	004256008	004257008		
			25 A	004255009	004256009	004257009	68	3.9
			32 A	004255010	004256010	004257010		
			40 A	004255011	004256011	004257011		
			50 A	004255012	004256012	004257012		
			63 A	004255013	004256013	004257013		
			80A	004255014	004256014	004257014		
			100 A	004255015	004256015	004257015	85	5.8
			125A	004255016	004256016	004257016		
			125A	004255016	004256016	004257016		
	537	537	2 A	004255503	004256503	004257503	53	2.8
			4 A	004255504	004256504	004257504		
			6 A	004255505	004256505	004257505		
			10 A	004255506	004256506	004257506		
			16 A	004255507	004256507	004257507		
			20 A	004255508	004256508	004257508		
			25 A	004255509	004256509	004257509	68	4.7
			32 A	004255510	004256510	004257510		
			40 A	004255511	004256511	004257511		
			50 A	004255512	004256512	004257512		
			63 A	004255513	004256513	004257513		
			80A	004255514	004256514	004257514		
			100 A	004255515	004256515	004257515	85	7.0
			125 A	004255516	004256516	004257516		
			160 A	004255517	004256517	004257517		

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

