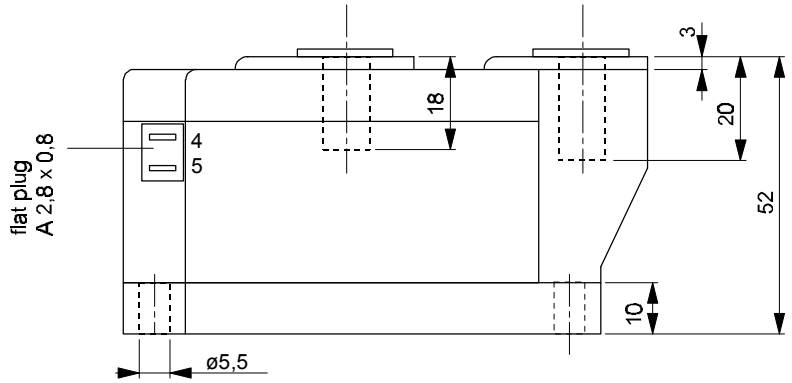
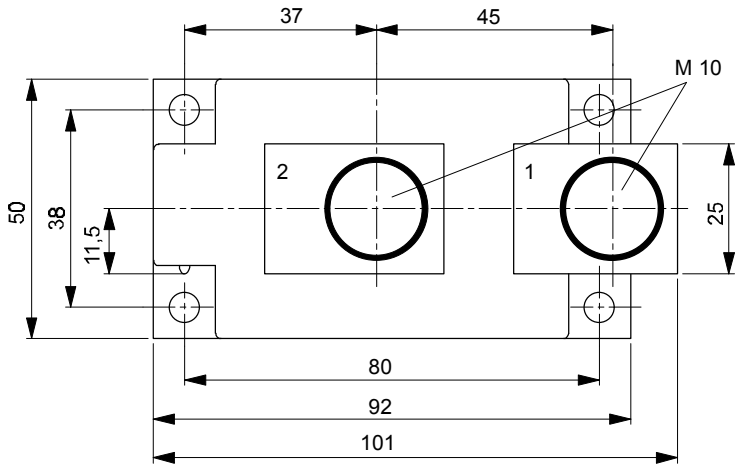
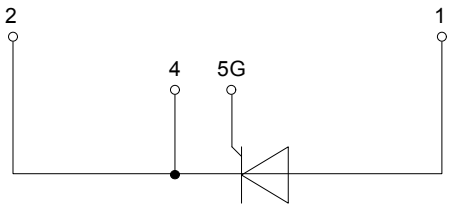
European Power-
Semiconductor and
Electronics Company

Marketing Information
TZ 335 F







VWK Febr. 1997

TZ 335 F

Elektrische Eigenschaften	Electrical properties					
Höchstzulässige Werte	Maximum rated values					
Periodische Vorwärts- und Rückwärts-Spitzensperrspannung	repetitive peak forward off-state and reverse voltages	t_{vj} = -40°C...$t_{vj\,max}$	V_{DRM}, V_{RRM}	800, 1000, 1100, 1200, 1300		V [1]
Vorwärts-Stoßspitzensperrspannung	non-repetitive peak forward off-state voltage	t_{vj} = -40°C...$t_{vj\,max}$	V_{DSM}	800, 1000, 1100, 1200, 1300		V
Rückwärts-Stoßspitzensperrspannung	non-repetitive peak reverse voltage	t_{vj} = +25°C...$t_{vj\,max}$	V_{RSM}	900, 1100, 1200, 1300, 1400		V
Durchlaßstrom-Grenzeffektivwert	RMS on-state current		I_{TRMSM}		700	A
Dauergrenzstrom	average on-state current	t_c = 85°C	I_{TAVM}		335	A
		t_c = 68°C			445	A
Stoßstrom-Grenzwert	surge current	t_{vj} = 25°C, t_p = 10 ms	I_{TSM}		11,3	kA
		t_{vj} = $t_{vj\,max}$, t_p = 10 ms			10	kA
Grenzlastintegral	I^2t-value	t_{vj} = 25°C, t_p = 10 ms	I^2t		638 . 10^3	A^2s
		t_{vj} = $t_{vj\,max}$, t_p = 10 ms			500 . 10^3	A^2s
Kritische Stromsteilheit	critical rate of rise of on-state curren	DIN IEC 747-6, f = 50 Hz	$(di_T/dt)_{cr}$		200	A/µs
		I_{GM} = 1 A, di_G/dt = 1 A/µs				
Kritische Spannungssteilheit	critical rate of rise of off-state voltage	t_{vj} = $t_{vj\,max}$, v_D = 0,67 V_{DRM}	$(dv_D/dt)_{cr}$	[2]	[3]	
		6.Kennbuchstabe/6th letter B		50	50	V/µs
		6.Kennbuchstabe/6th letter C		500	500	V/µs
		6.Kennbuchstabe/6th letter L		500	50	V/µs
		6.Kennbuchstabe/6th letter M		1000	500	V/µs
Charakteristische Werte	Characteristic values					
Durchlaßspannung	on-state voltage	t_{vj} = $t_{vj\,max}$, i_T = 1300 A	v_T	max.	1,85	V
Schleusenspannung	threshold voltage	t_{vj} = $t_{vj\,max}$	$V_{T(TO)}$		1,15	V
Ersatzwiderstand	slope resistance	t_{vj} = $t_{vj\,max}$	r_T		0,42	mΩ
Zündstrom	gate trigger current	t_{vj} = 25 °C, v_D = 12 V	I_{GT}	max.	250	mA
Zündspannung	gate trigger voltage	t_{vj} = 25 °C, v_D = 12 V	V_{GT}	max.	2,2	V
Nicht zündender Steuerstrom	gate non-trigger current	t_{vj} = $t_{vj\,max}$, v_D = 12 V	I_{GD}	max.	10	mA
		t_{vj} = $t_{vj\,max}$, v_D = 0,5 V_{DRM}		max.	5	mA
Nicht zündende Steuerspannung	gate non-trigger voltage	t_{vj} = $t_{vj\,max}$, v_D = 0,5 V_{DRM}	V_{GD}	max.	0,25	V
Haltestrom	holding current	t_{vj} = 25 °C, v_D = 12 V, R_A = 10 Ω	I_H	max.	250	mA
Einraststrom	latching current	t_{vj} = 25 °C, v_D = 12 V, R_{GK} > = 10 Ω	I_L	max.	1000	mA
		i_{GM} = 1 A, di_G/dt = 1 A/µs, t_g = 20 µs				
Vorwärts- und Rückwärts-Sperrstrom	forward off-state and reverse current	t_{vj} = $t_{vj\,max}$	i_D, i_R	max.	100	mA
		v_D = V_{DRM}, v_R = V_{RRM}				
Zündverzug	gate controlled delay time	DIN IEC 747-6, t_{vj} = 25°C	t_{gd}	max.	1,5	µs
		i_{GM} = 1 A, di_G/dt = 1 A/µs				
Freiwerdezeit	circuit commutated turn-off time	t_{vj} = $t_{vj\,max}$, i_{TM} = I_{TAVM}	t_q			
		v_{RM} = 100 V, v_{DM} = 0,67 V_{DRM}				
		$-di_T/dt$ = 20 A/µs				
		dv_D/dt = 6.Kennbuchstabe/6th letter				
		5.Kennbuchstabe/5th letter E		max.	20	µs
		5.Kennbuchstabe/5th letter F		max.	25	µs
		5.Kennbuchstabe/5th letter G		max.	30	µs
Isolations-Prüfspannung	insulation test voltage	RMS, f = 50 Hz, 1 min.	V_{ISOL}		3	kV
Thermische Eigenschaften	Thermal properties				100	
Innerer Wärmewiderstand	thermal resistance, junction	pro Modul/per module, Θ =180° sin	R_{thJC}	max.	0,0800	°C/W
	to case	pro Modul/per module, Θ =180° sin		max.	0,0765	°C/W
Übergangs-Wärmewiderstand	thermal resistance, case to heatsink	pro Modul/per module	R_{thCK}	max.	0,02	°C/W
Höchstzul.Sperrschichttemperatur	max. junction temperature		$t_{vj\,max}$		125	°C
Betriebstemperatur	operating temperature		$t_{c\,op}$		-40...+125	°C
Lagertemperatur	storage temperature		t_{stg}		-40...+130	°C
Mechanische Eigenschaften	Mechanical properties					
Gehäuse, siehe Seite	case, see page					
Si-Elemente mit Druckkontakt	Si-pellet with pressure contact					
Innere Isolation	internal insulation				AlN	
Anzugsdrehmoment für mechanische Befestigung	mounting torque	Toleranz/tolerance +/- 15%	M1		5	Nm
Anzugsdrehmoment für elektrische Anschlüsse	terminal connection torque	Toleranz/tolerance +5%/-10%	M2		12	Nm
Gewicht	weight		G	typ.	900	g
Kriechstrecke	creepage distance				15	mm
Schwingfestigkeit	vibration resistance	f = 50 Hz			50	m/s^2

[1] 1300 V auf Anfrage / 1300 V on demand

[2] Werte nach DIN IEC 747-6 (ohne vorausgehende Kommutierung) / Values according to DIN IEC 747-6 (without prior commutation)

[3] Unmittelbar nach der Freiwerdezeit, vgl. Meßbedingungen für t_q. / Immediately after circuit commutated turn-off time, see parameters for t_q.

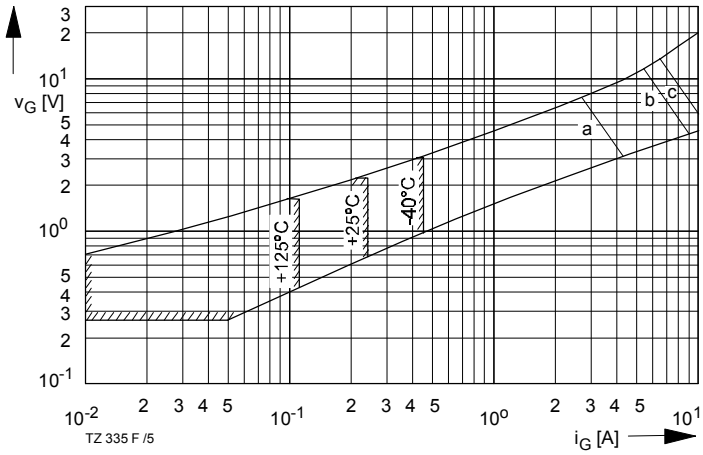


Bild / Fig. 1
Steuercharakteristik $v_G = f(i_G)$ mit Zündbereich für V_D = 12V
Gate characteristic $v_G = f(i_G)$ with triggering area for V_D = 12V
Höchstzulässige Spitzensteuerverlustleistung / Maximum rated peak gate power dissipation $P_{GM} = f(t_g)$:
a - 20W/10ms b - 40W/1ms c - 60W/0.5ms

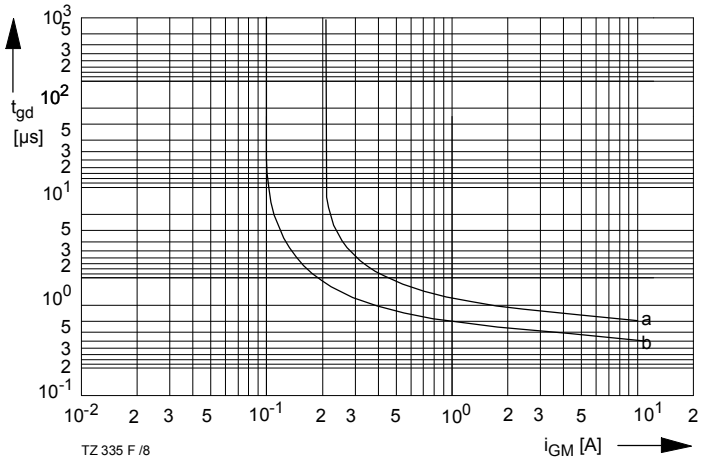


Bild / Fig. 2
Zündverzug / Gate controlled delay time $t_{gd} = f(i_{GM})$
t_{vj} = 25°C, $di_G/dt = i_{GM}/1µs$
a - maximaler Verlauf / limiting characteristic
b - typischer Verlauf / typical characteristic

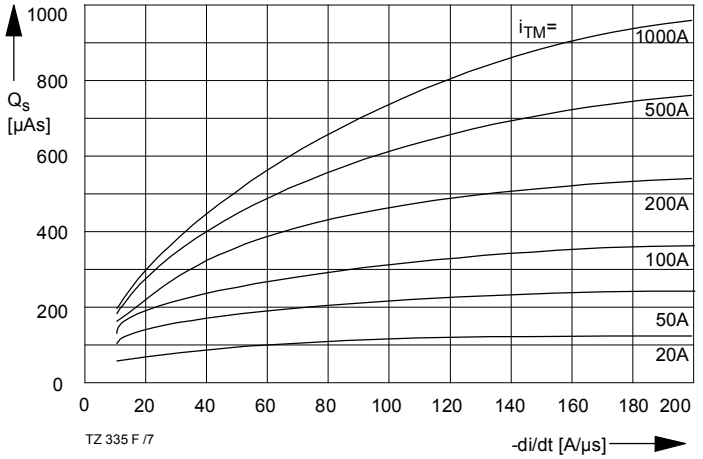


Bild / Fig. 3
Sperrverzögerungsladung Q_s in Abhängigkeit von der abkommutierenden Stromsteilheit -di/dt bei $t_{vj} = t_{vj\,max}$, V_R= 0,5 V_{RRM}, v_{RM}= 0,8 V_{RRM}
Recovered charge Q_s versus the rate of decay of the forward on-state current -di/dt at $t_{vj} = t_{vj\,max}$, v_R = 0,5 V_{RRM}, v_{RM} = 0,8 V_{RRM}
Parameter: Durchlaßstrom i_{TM} / On-state current i_{TM}

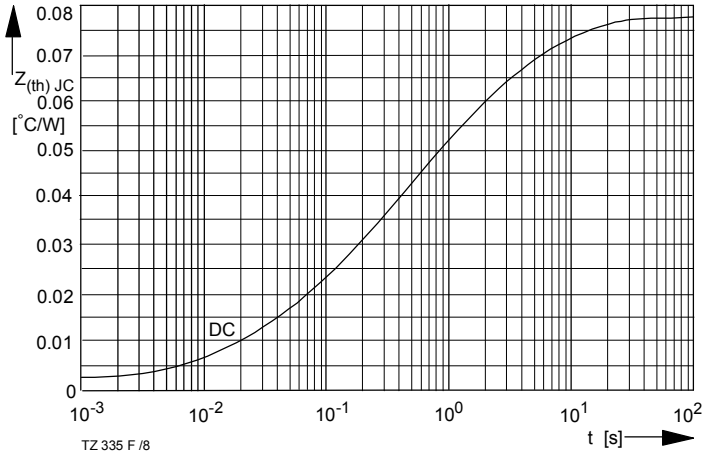


Bild / Fig. 4
Transienter innerer Wärmewiderstand / Transient thermal impedance
$Z_{(th)JC} = f(t)$

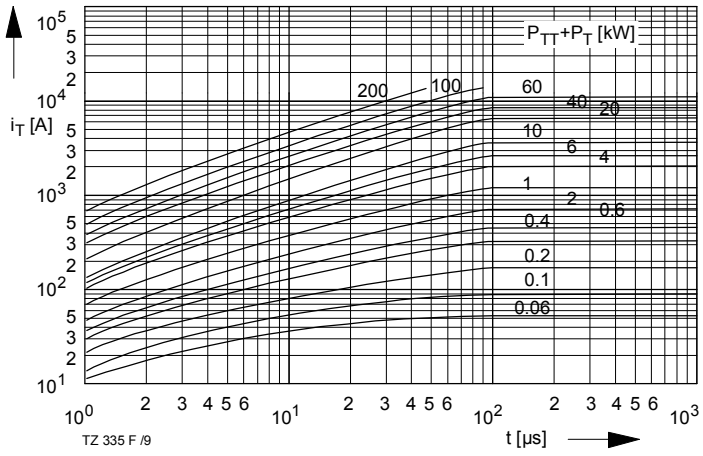


Bild / Fig. 5
EDL-Diagramm / EDL-diagram

Summe aus Einschalt- und Durchlaßverlustleistung $P_{TT}+P_T$ /
Sum of the turn-on and on-state power loss $P_{TT}+P_T$

Analytische Elemente des transienten Wärmewiderstandes Z_{thJC} pro Zweig für DC
Analytical elements of transient thermal impedance Z_{thJC} per arm for DC

Pos. n	1	2	3	4	5	6	7
R_{thn}[°C/W]	0,00194	0,00584	0,1465	0,0254	0,0287		
τ_n [s]	0,000732	0,00824	0,108	0,57	3		

Analytische Funktion / Analytical function:

$$Z_{thJC} = \sum_{n=1}^{n_{max}} R_{thn}\,(1-e^{-\frac{t}{\tau_n}})$$

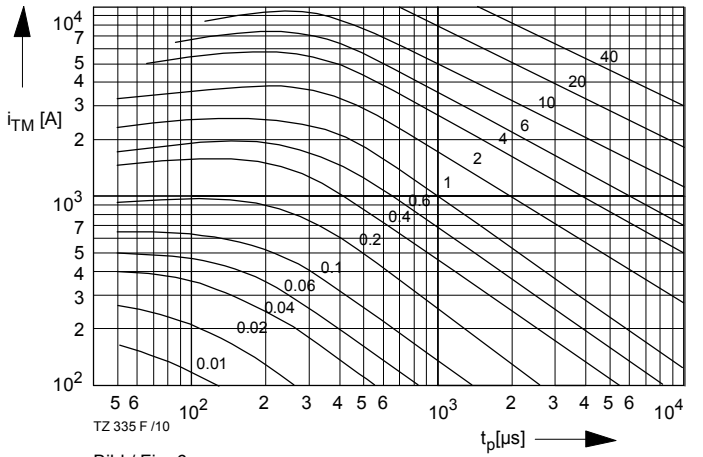
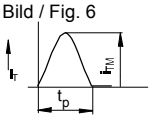
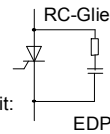


Bild / Fig. 6





Steuergenerator / Pulse generator:
i_G =1A
di_G/dt =1A/µs

Lastkreis /Load circuit:
v_{DM} ≤ 67% V_{DRM}
v_{RM} ≤ 50V
dv_R/dt ≤ 100V/µs

EDP-Diagramm /EDP-diagram
Gesamtenergie W_{tot} je Durchlaßstromplus /
Total energy W_{tot} per on-state current pulse

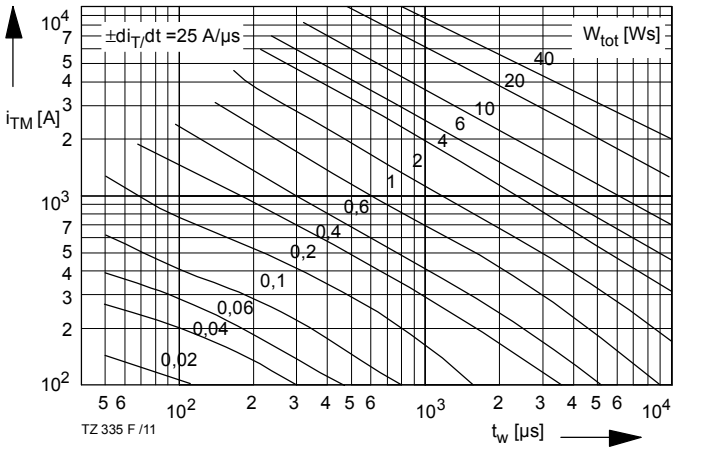
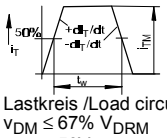
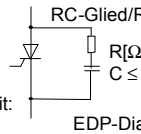


Bild / Fig. 7





Steuergenerator / Pulse generator:
i_G =1A
di_G/dt =1A/µs

Lastkreis /Load circuit:
v_{DM} ≤ 67% V_{DRM}
v_{RM} ≤ 50V
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EDP-Diagramm /EDP-diagram
Gesamtenergie W_{tot} je Durchlaßstromplus /
Total energy W_{tot} per on-state current pulse

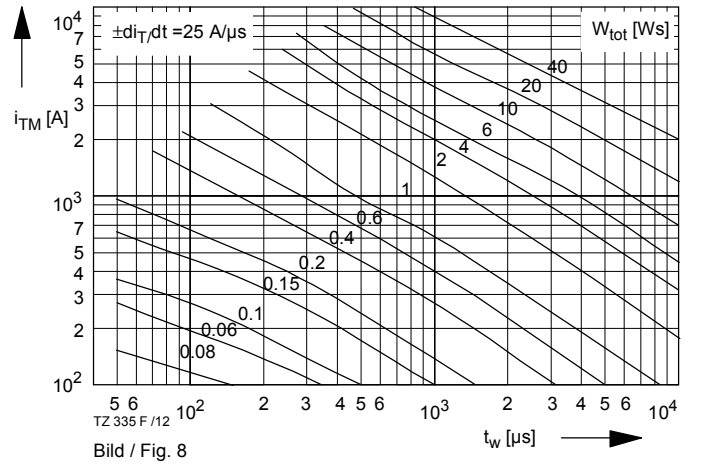
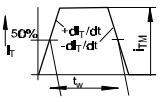
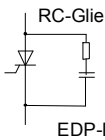


Bild / Fig. 8





Steuergenerator / Pulse generator:
i_G =1A
di_G/dt =1A/µs

Lastkreis /Load circuit:
v_{DM} ≤ 67% V_{DRM}
v_{RM} ≤ 67% V_{RRM}
dv_R/dt ≤ 600V/µs

EDP-Diagramm / EDP-diagram
Gesamtenergie W_{tot} je Durchlaßstromplus /
Total energy W_{tot} per on-state current pulse

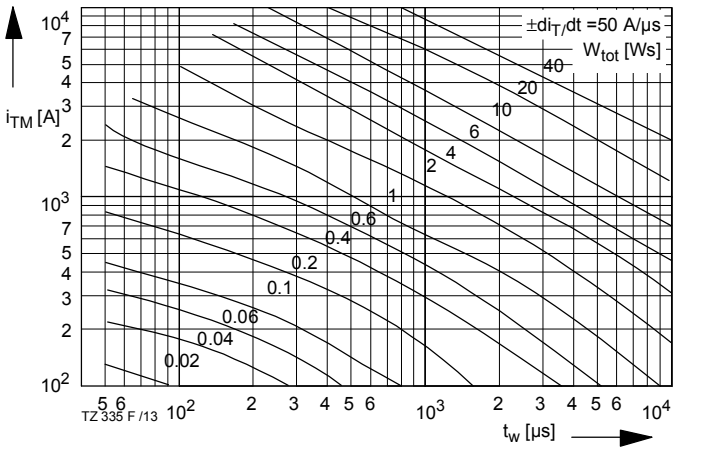
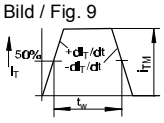
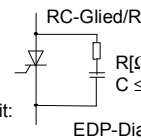


Bild / Fig. 9





Steuergenerator / Pulse generator:
i_G =1A
di_G/dt =1A/µs

Lastkreis /Load circuit:
v_{DM} ≤ 67% V_{DRM}
v_{RM} ≤ 50V
dv_R/dt ≤ 100V/µs

EDP-Diagramm /EDP-diagram
Gesamtenergie W_{tot} je Durchlaßstromplus /
Total energy W_{tot} per on-state current pulse

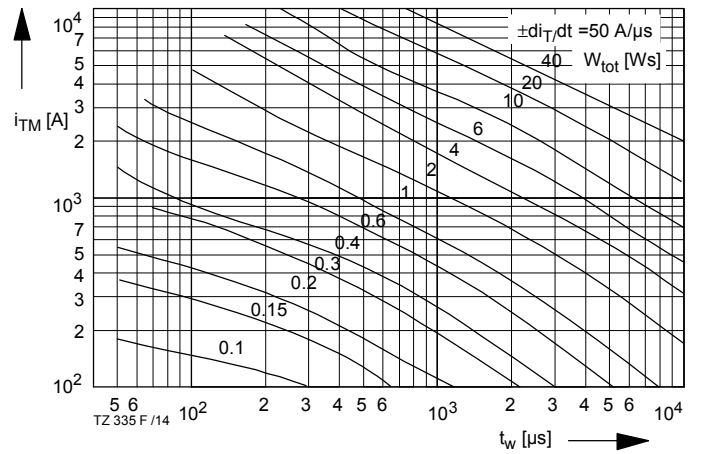
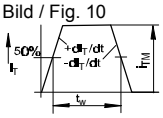
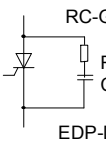


Bild / Fig. 10





Steuergenerator / Pulse generator:
i_G =1A
di_G/dt =1A/µs

Lastkreis /Load circuit:
v_{DM} ≤ 67% V_{DRM}
v_{RM} ≤ 67% V_{RRM}
dv_R/dt ≤ 600V/µs

EDP-Diagramm /EDP-diagram
Gesamtenergie W_{tot} je Durchlaßstromplus /
Total energy W_{tot} per on-state current pulse

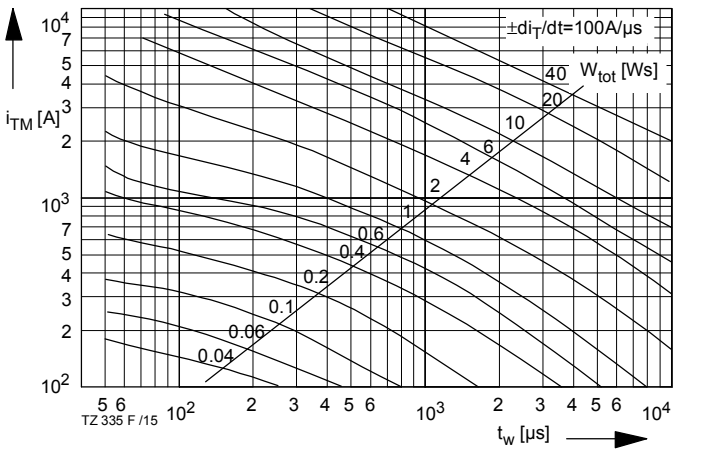
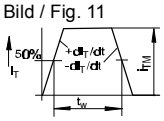
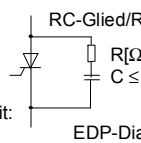


Bild / Fig. 11





Steuergenerator / Pulse generator:
i_G =1A
di_G/dt =1A/µs

Lastkreis /Load circuit:
v_{DM} ≤ 67% V_{DRM}
v_{RM} ≤ 50 V
dv_R/dt ≤ 100V/µs

EDP-Diagramm /EDP-diagram
Gesamtenergie W_{tot} je Durchlaßstromplus /
Total energy W_{tot} per on-state current pulse

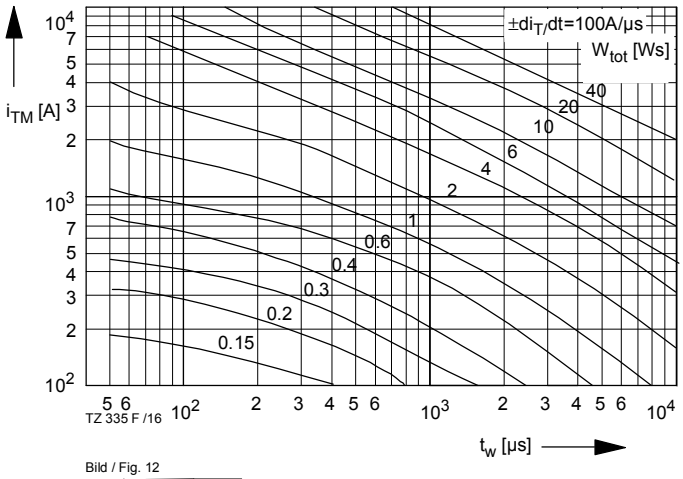
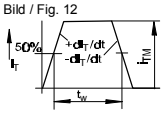
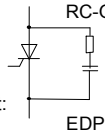


Bild / Fig. 12





RC-Glied/RC-network:

R[Ω] ≥ 0,02 *v_{DM}[V]
C ≤ 0,33µF

Steuergenerator / Pulse generator:
i_G =1A
di_G/dt =1A/µs

Lastkreis /Load circuit:
v_{DM} ≤ 67% V_{DRM}
v_{RM} ≤ 67% V_{RRM}
dv_R/dt ≤ 600V/µs

EDP-Diagramm /EDP-diagram
Gesamtenergie W_{tot} je Durchlaßstromplus /
Total energy W_{tot} per on-state current pulse