



**Fast Thyristor  
Type TFI253-800-22**

Low switching losses  
Low reverse recovery charge  
Distributed amplified gate for high  $di_T/dt$

Mean on-state current	$I_{TAV}$	800 A	
Repetitive peak off-state voltage	$V_{DRM}$	1800...2200 V	
Repetitive peak reverse voltage	$V_{RRM}$		
Turn-off time	$t_q$	20.0, 25.0, 32.0, 40.0 $\mu s$	
$V_{DRM}, V_{RRM}, V$	1800	2000	2200
Voltage code	18	20	22
$T_j, ^\circ C$	-60...+125		

**MAXIMUM ALLOWABLE RATINGS**

Symbols and parameters		Units	Values	Test conditions
<b>ON-STATE</b>				
$I_{TAV}$	Mean on-state current	A	800 819 1238	$T_c = 86^\circ C$ ; Double side cooled; $T_c = 85^\circ C$ ; Double side cooled; $T_c = 55^\circ C$ ; Double side cooled; 180° half-sine wave; 50 Hz
$I_{TRMS}$	RMS on-state current	A	1256	$T_c = 86^\circ C$ ; Double side cooled; 180° half-sine wave; 50 Hz
$I_{TSM}$	Surge on-state current	kA	21.0 24.0	$T_j = T_{jmax}$ $T_j = 25^\circ C$ 180° half-sine wave; $t_p = 10$ ms; single pulse; $V_D = V_R = 0$ V; Gate pulse: $I_G = I_{FGM}$ ; $V_G = 20$ V; $t_{GP} = 50$ $\mu s$ ; $di_G/dt = 1$ A/ $\mu s$
			22.0 25.0	$T_j = T_{jmax}$ $T_j = 25^\circ C$ 180° half-sine wave; $t_p = 8.3$ ms; single pulse; $V_D = V_R = 0$ V; Gate pulse: $I_G = I_{FGM}$ ; $V_G = 20$ V; $t_{GP} = 50$ $\mu s$ ; $di_G/dt = 1$ A/ $\mu s$
$I^2t$	Safety factor	$A^2s \cdot 10^3$	2200 2800	$T_j = T_{jmax}$ $T_j = 25^\circ C$ 180° half-sine wave; $t_p = 10$ ms; single pulse; $V_D = V_R = 0$ V; Gate pulse: $I_G = I_{FGM}$ ; $V_G = 20$ V; $t_{GP} = 50$ $\mu s$ ; $di_G/dt = 1$ A/ $\mu s$
			2000 2500	$T_j = T_{jmax}$ $T_j = 25^\circ C$ 180° half-sine wave; $t_p = 8.3$ ms; single pulse; $V_D = V_R = 0$ V; Gate pulse: $I_G = I_{FGM}$ ; $V_G = 20$ V; $t_{GP} = 50$ $\mu s$ ; $di_G/dt = 1$ A/ $\mu s$
<b>BLOCKING</b>				
$V_{DRM}, V_{RRM}$	Repetitive peak off-state and Repetitive peak reverse voltages	V	1800...2200	$T_{jmin} < T_j < T_{jmax}$ ; 180° half-sine wave; 50 Hz; Gate open
$V_{DSM}, V_{RSM}$	Non-repetitive peak off-state and Non-repetitive peak reverse voltages	V	1900...2300	$T_{jmin} < T_j < T_{jmax}$ ; 180° half-sine wave; single pulse; Gate open
$V_D, V_R$	Direct off-state and Direct reverse voltages	V	$0.6 \cdot V_{DRM}$ $0.6 \cdot V_{RRM}$	$T_j = T_{jmax}$ ; Gate open

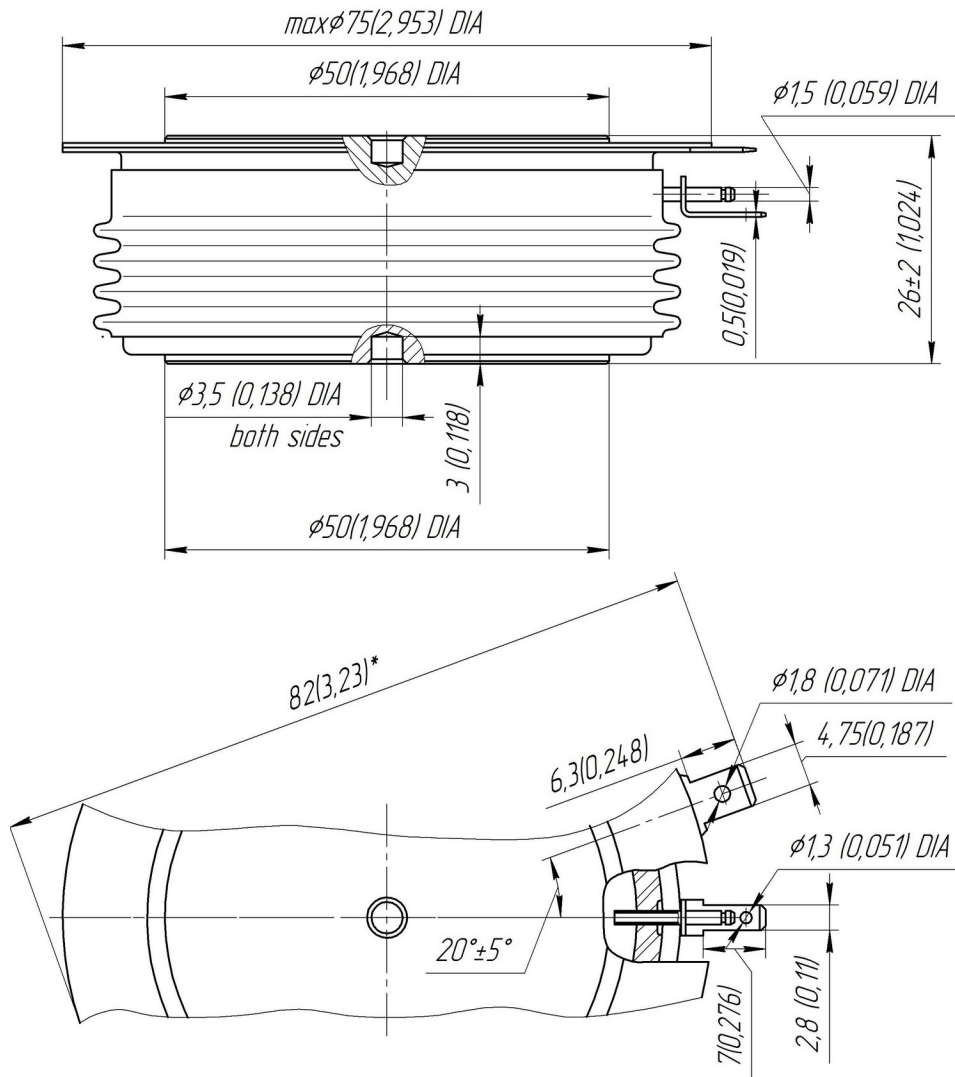
<b>TRIGGERING</b>				
$I_{FGM}$	Peak forward gate current	A	8	$T_j = T_{j\ max}$
$V_{RGM}$	Peak reverse gate voltage	V	5	
$P_G$	Gate power dissipation	W	8	$T_j = T_{j\ max}$ for DC gate current
<b>SWITCHING</b>				
$(di_T/dt)_{crit}$	Critical rate of rise of on-state current non-repetitive ( $f=1\ Hz$ )	A/ $\mu s$	2000	$T_j = T_{j\ max}$ ; $V_D = 0.67 \cdot V_{DRM}$ ; $I_{TM} = 2800\ A$ ; Gate pulse: $I_G = 2\ A$ ; $V_G = 20\ V$ ; $t_{GP} = 50\ \mu s$ ; $di_G/dt = 2\ A/\mu s$
<b>THERMAL</b>				
$T_{stg}$	Storage temperature	$^{\circ}C$	-60...+50	
$T_j$	Operating junction temperature	$^{\circ}C$	-60...+125	
<b>MECHANICAL</b>				
F	Mounting force	kN	24.0...28.0	
a	Acceleration	$m/s^2$	50	Device clamped

## CHARACTERISTICS

Symbols and parameters		Units	Values	Conditions	
<b>ON-STATE</b>					
$V_{TM}$	Peak on-state voltage, max	V	2.50	$T_j = 25\ ^{\circ}C$ ; $I_{TM} = 2512\ A$	
$V_{T(TO)}$	On-state threshold voltage, max	V	1.603	$T_j = T_{j\ max}$ ;	
$r_T$	On-state slope resistance, max	$m\Omega$	0.359	$0.5\ \pi\ I_{TAV} < I_T < 1.5\ \pi\ I_{TAV}$	
$I_H$	Holding current, max	mA	500	$T_j = 25\ ^{\circ}C$ ; $V_D = 12\ V$ ; Gate open	
<b>BLOCKING</b>					
$I_{DRM}, I_{RRM}$	Repetitive peak off-state and Repetitive peak reverse currents, max	mA	150	$T_j = T_{j\ max}$ ; $V_D = V_{DRM}$ ; $V_R = V_{RRM}$	
$(dv_D/dt)_{crit}$	Critical rate of rise of off-state voltage <sup>1)</sup> , min	V/ $\mu s$	200, 320, 500, 1000, 1600, 2000, 2500	$T_j = T_{j\ max}$ ; $V_D = 0.67 \cdot V_{DRM}$ ; Gate open	
<b>TRIGGERING</b>					
$V_{GT}$	Gate trigger direct voltage, max	V	3.00 2.50 1.50	$T_j = T_{j\ min}$ $T_j = 25\ ^{\circ}C$ $T_j = T_{j\ max}$	$V_D = 12\ V$ ; $I_D = 3\ A$ ; Direct gate current
$I_{GT}$	Gate trigger direct current, max	mA	500 300 150	$T_j = T_{j\ min}$ $T_j = 25\ ^{\circ}C$ $T_j = T_{j\ max}$	
$V_{GD}$	Gate non-trigger direct voltage, min	V	0.40	$T_j = T_{j\ max}$ ; $V_D = 0.67 \cdot V_{DRM}$ ;	
$I_{GD}$	Gate non-trigger direct current, min	mA	75.00	Direct gate current	
<b>SWITCHING</b>					
$t_{gd}$	Delay time, max	$\mu s$	0.90	$T_j = 25\ ^{\circ}C$ ; $V_D = 1000\ V$ ; $I_{TM} = I_{TAV}$ ; $di/dt = 200\ A/\mu s$ ;	
$t_{gt}$	Turn-on time <sup>2)</sup> , max	$\mu s$	2.00, 2.50, 3.20, 4.00	Gate pulse: $I_G = 2\ A$ ; $V_G = 20\ V$ ; $t_{GP} = 50\ \mu s$ ; $di_G/dt = 2\ A/\mu s$	
$t_q$	Turn-off time <sup>3)</sup> max	$\mu s$	20.0, 25.0, 32.0, 40.0	$dv_D/dt = 50\ V/\mu s$ ;	$T_j = T_{j\ max}$ ; $I_{TM} = I_{TAV}$ ; $di_R/dt = -10\ A/\mu s$ ; $V_R = 100V$ ; $V_D = 0.67 \cdot V_{DRM}$
			25.0, 32.0, 40.0, 50.0	$dv_D/dt = 200\ V/\mu s$ ;	
$Q_{rr}$	Total recovered charge, max	$\mu C$	400	$T_j = T_{j\ max}$ ; $I_{TM} = 800\ A$ ;	
$t_{rr}$	Reverse recovery time, typ	$\mu s$	5.0	$di_R/dt = -50\ A/\mu s$ ;	
$I_{rrM}$	Peak reverse recovery current, max	A	165	$V_R = 100\ V$	

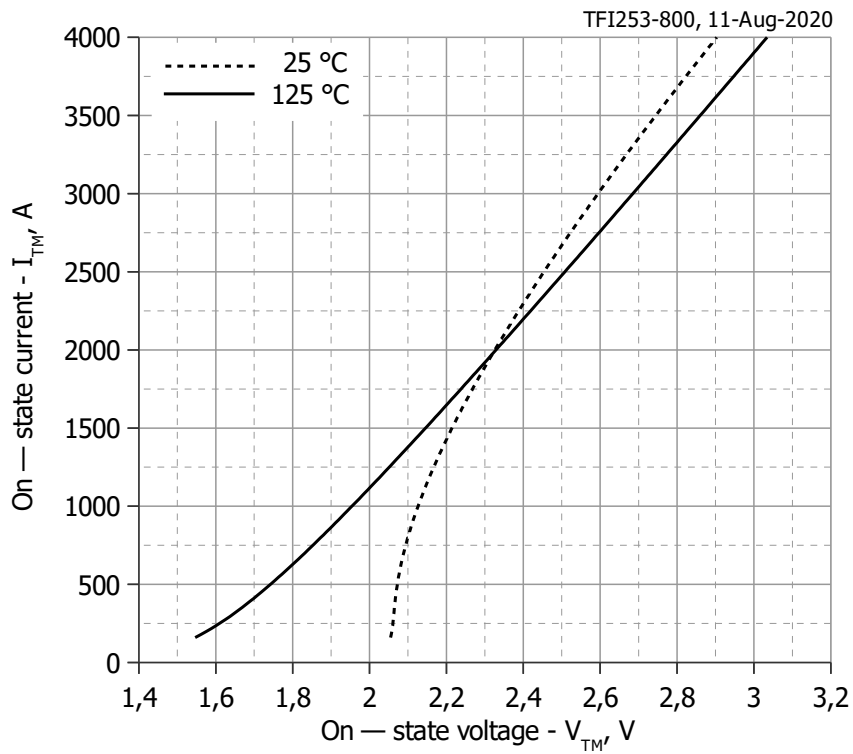
THERMAL					
$R_{thjc}$	Thermal resistance, junction to case, max	°C/W	0.0210	Direct current	Double side cooled
$R_{thjc-A}$			0.0462		Anode side cooled
$R_{thjc-K}$			0.0378		Cathode side cooled
$R_{thck}$	Thermal resistance, case to heatsink, max	°C/W	0.0040	Direct current	
MECHANICAL					
w	Weight, max	g	510		
$D_s$	Surface creepage distance	mm (inch)	31.60 (1.244)		
$D_a$	Air strike distance	mm (inch)	16.50 (0.649)		

PART NUMBERING GUIDE								NOTES																							
TFI	253	800	22	A2	H3	H4	N	1) Critical rate of rise of off-state voltage																							
1	2	3	4	5	6	7	8	<table border="1"> <thead> <tr> <th>Symbol of Group</th> <th>P2</th> <th>K2</th> <th>E2</th> <th>A2</th> <th>T1</th> <th>P1</th> <th>M1</th> </tr> </thead> <tbody> <tr> <td><math>(dv_D/dt)_{crit}</math>, V/<math>\mu</math>s</td> <td>200</td> <td>320</td> <td>500</td> <td>1000</td> <td>1600</td> <td>2000</td> <td>2500</td> </tr> </tbody> </table>								Symbol of Group	P2	K2	E2	A2	T1	P1	M1	$(dv_D/dt)_{crit}$ , V/ $\mu$ s	200	320	500	1000	1600	2000	2500
Symbol of Group	P2	K2	E2	A2	T1	P1	M1																								
$(dv_D/dt)_{crit}$ , V/ $\mu$ s	200	320	500	1000	1600	2000	2500																								
1. TFI — fast inverter thyristor								2) Turn-on time																							
2. Design version								<table border="1"> <thead> <tr> <th>Symbol of group</th> <th>P4</th> <th>M4</th> <th>K4</th> <th>H4</th> </tr> </thead> <tbody> <tr> <td><math>t_{gt}</math>, <math>\mu</math>s</td> <td>2.00</td> <td>2.50</td> <td>3.20</td> <td>4.00</td> </tr> </tbody> </table>								Symbol of group	P4	M4	K4	H4	$t_{gt}$ , $\mu$ s	2.00	2.50	3.20	4.00						
Symbol of group	P4	M4	K4	H4																											
$t_{gt}$ , $\mu$ s	2.00	2.50	3.20	4.00																											
3. Mean on-state current, A								3) Turn-off time ( $dv_D/dt=50$ V/ $\mu$ s)																							
4. Voltage code								<table border="1"> <thead> <tr> <th>Symbol of group</th> <th>P3</th> <th>M3</th> <th>K3</th> <th>H3</th> </tr> </thead> <tbody> <tr> <td><math>t_{gr}</math>, <math>\mu</math>s</td> <td>20.0</td> <td>25.0</td> <td>32.0</td> <td>40.0</td> </tr> </tbody> </table>								Symbol of group	P3	M3	K3	H3	$t_{gr}$ , $\mu$ s	20.0	25.0	32.0	40.0						
Symbol of group	P3	M3	K3	H3																											
$t_{gr}$ , $\mu$ s	20.0	25.0	32.0	40.0																											
5. Critical rate of rise of off-state voltage																															
6. Group of turn-off time ( $dv_D/dt=50$ V/ $\mu$ s)																															
7. Group of turn-on time																															
8. Ambient conditions: N – normal; T – tropical																															



All dimensions in millimeters (inches)

The information contained herein is confidential and protected by Copyright.  
 In the interest of product improvement, Proton-Electrotex reserves the right to change data sheet without notice.

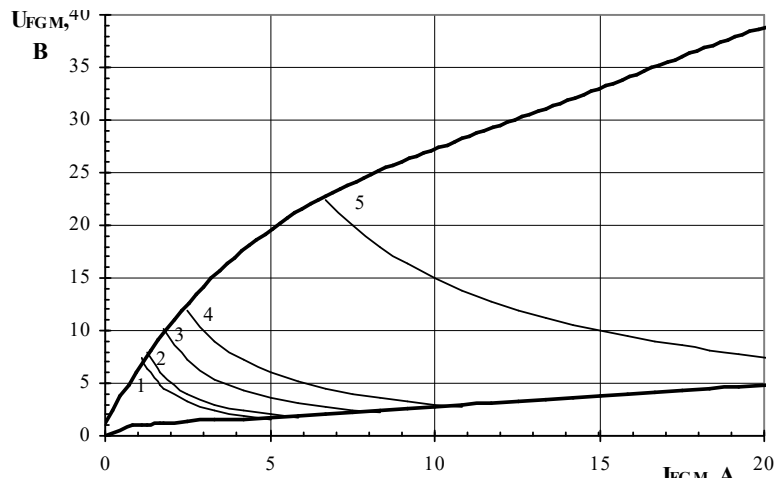


Analytical function for On-state characteristic:

$$V_T = A + B \cdot i_T + C \cdot \ln(i_T + 1) + D \cdot \sqrt{i_T}$$

	Coefficients for max curves	
	$T_j = 25^\circ\text{C}$	$T_j = T_{j\text{max}}$
<b>A</b>	1.58988676	1.06727369
<b>B</b>	0.00058595	0.00034281
<b>C</b>	0.16861691	0.08919647
<b>D</b>	-0.03840570	-0.00227965

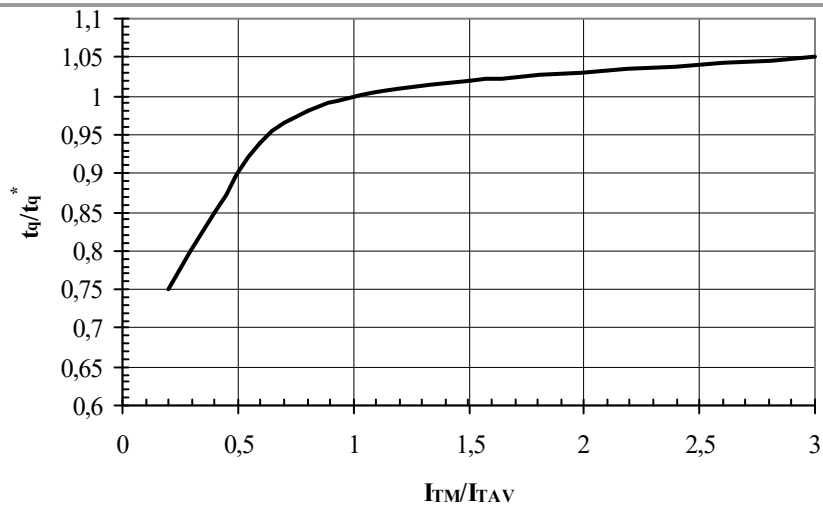
**Fig. 1** On-state characteristics of Limit device



Maximum peak gate power loss

Position	On-Off time ratio	Gate pulse length, ms	Gate Pulse Power, W
1	1	DC	8
2	2	10	10
3	20	1	18
4	40	0.5	30
5	200	0.1	150

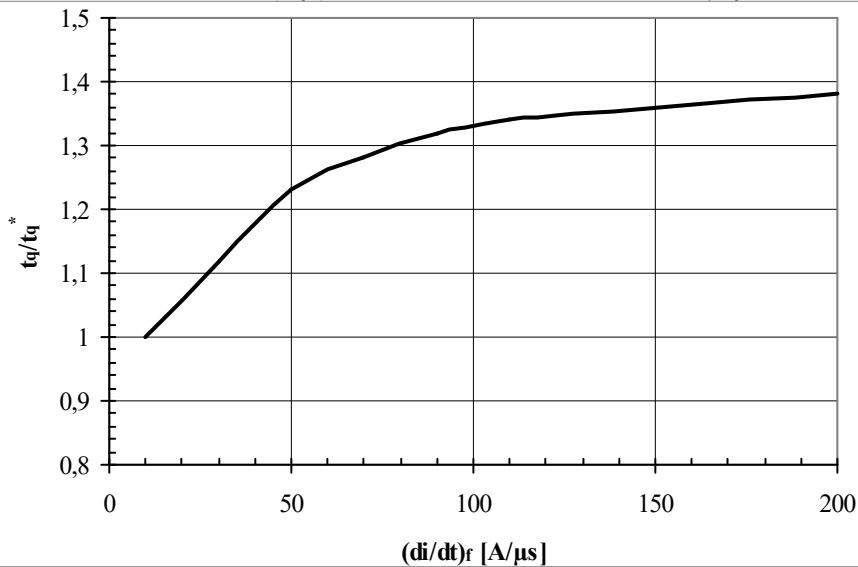
**Fig. 2** Gate characteristics



**Fig. 3** Turn-off time  $t_q$  vs. On-state peak current  $I_{TM}$

Conditions:  $T_j=T_{j\ max}$ ;  $di_R/dt=10\ A/\mu s$ ;  $V_R=100\ V$ ;  $dv_D/dt=50\ V/\mu s$ ;  $V_D=0.67\cdot V_{DRM}$

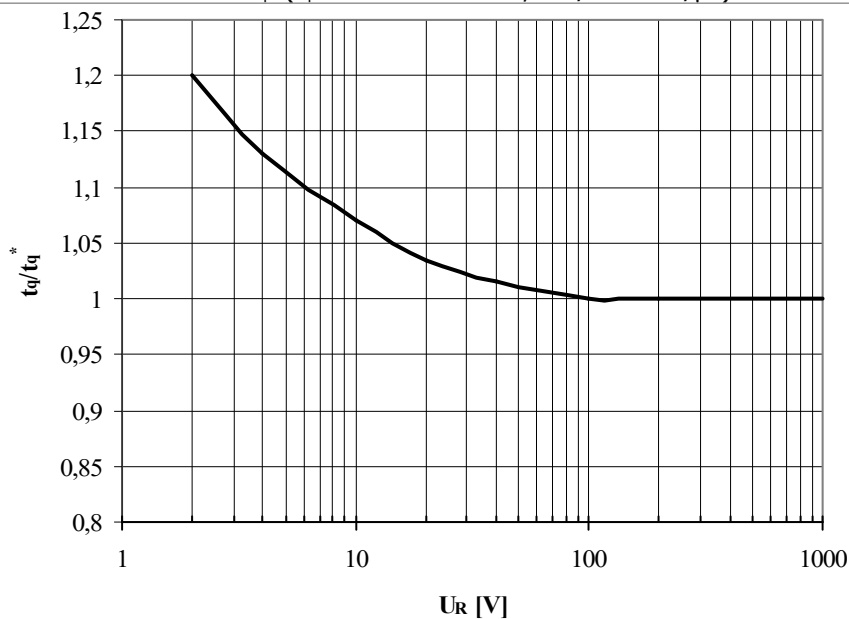
Typical changes of  $t_q$  are normalized to the  $t_q^*$  ( $t_q^*$  – see data sheet,  $dv_D/dt=50\ V/\mu s$ )



**Fig. 4** Turn-off time  $t_q$  vs. Rate of fall of on-state current  $di_R/dt$

Conditions:  $T_j=T_{j\ max}$ ;  $I_{TM}=I_{TAV}$ ;  $V_R=100\ V$ ;  $dv_D/dt=50\ V/\mu s$ ;  $V_D=0.67\cdot V_{DRM}$

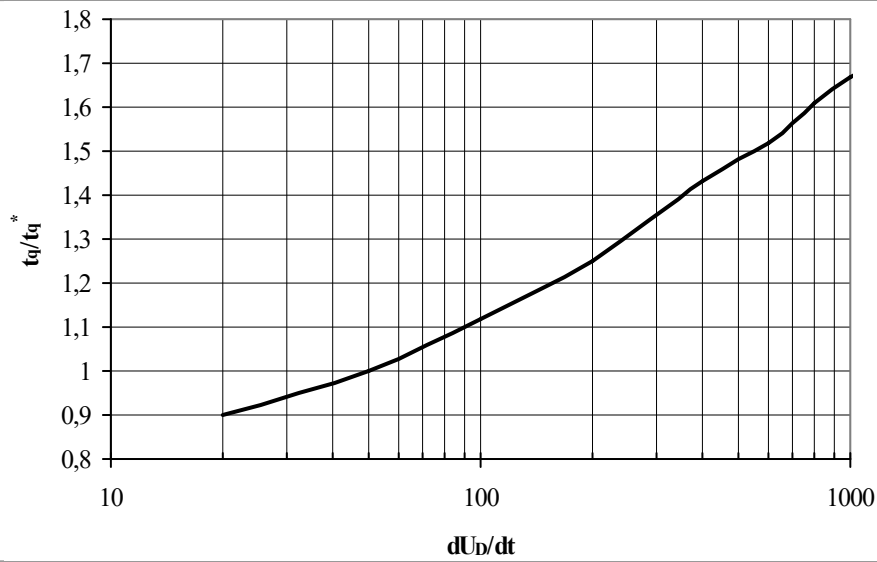
Typical changes of  $t_q$  are normalized to the  $t_q^*$  ( $t_q^*$  – see data sheet,  $dv_D/dt=50\ V/\mu s$ )



**Fig. 5** Turn-off time  $t_q$  vs. Reverse voltage  $V_R$

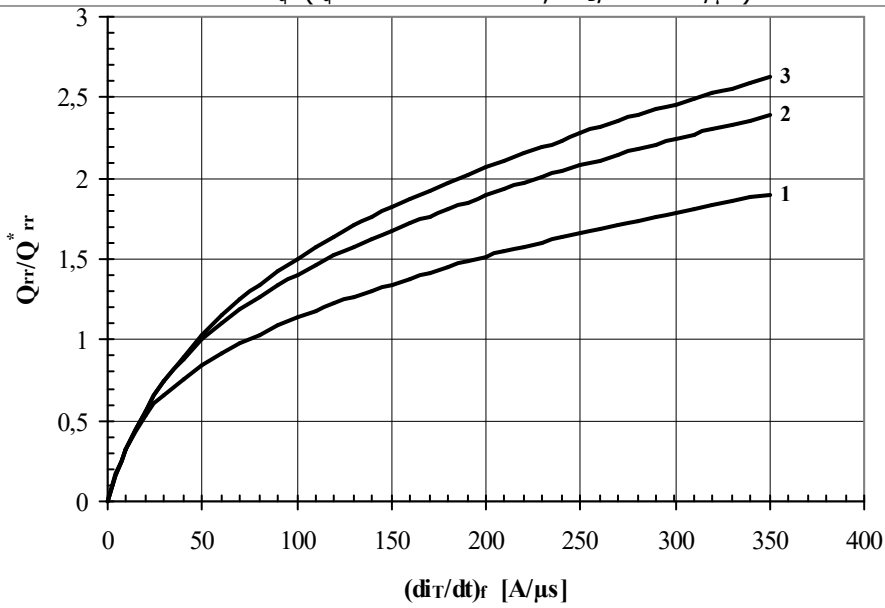
Conditions:  $T_j=T_{j\ max}$ ;  $I_{TM}=I_{TAV}$ ;  $di_R/dt=10\ A/\mu s$ ;  $dv_D/dt=50\ V/\mu s$ ;  $V_D=0.67\cdot V_{DRM}$

Typical changes of  $t_q$  are normalized to the  $t_q^*$  ( $t_q^*$  – see data sheet,  $dv_D/dt=50\ V/\mu s$ )



**Fig. 6** Turn-off time  $t_q$  vs. Rate of rise of commutating voltage  $dv_D/dt$

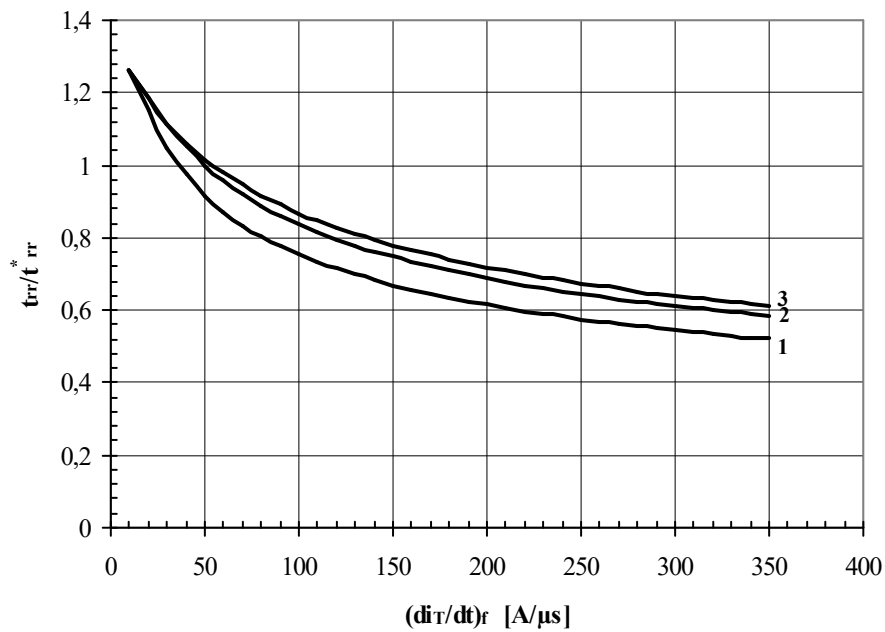
Conditions:  $T_j = T_{j \max}$ ;  $I_{TM} = I_{TAV}$ ;  $di_R/dt = 10 \text{ A}/\mu\text{s}$ ;  $V_R = 100 \text{ V}$ ;  $V_D = 0.67 \cdot V_{DRM}$   
 Typical changes of  $t_q$  are normalized to the  $t_q^*$  ( $t_q^*$  – see data sheet,  $dv_D/dt = 50 \text{ V}/\mu\text{s}$ )



**Fig. 7** Reverse recovery charge  $Q_{rr}$  vs. Rate of fall of on-state current  $di_R/dt$

- 1 –  $I_{TM} = 0.5 \cdot I_{TAV}$
- 2 –  $I_{TM} = I_{TAV}$
- 3 –  $I_{TM} = 1.5 \cdot I_{TAV}$

Conditions:  $T_j = T_{j \max}$ ;  $V_R = 100 \text{ V}$   
 Typical changes of  $Q_{rr}$  are normalized to the  $Q_{rr}^*$  ( $Q_{rr}^*$  – see data sheet)



**Fig. 8** Reverse recovery time  $t_{rr}$  vs. Rate of fall of on-state current  $di_R/dt$

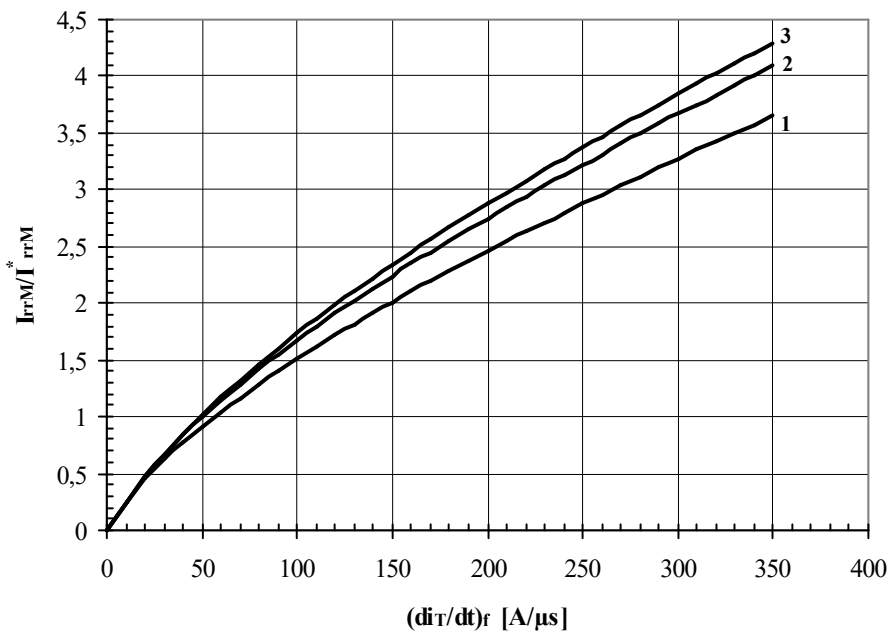
1 -  $I_{TM} = 0.5 \cdot I_{TAV}$

2 -  $I_{TM} = I_{TAV}$ ,

3 -  $I_{TM} = 1.5 \cdot I_{TAV}$

Conditions:  $T_j = T_{j \max}$ ;  $V_R = 100$  V

Typical changes of  $t_{rr}$  are normalized to the  $t_{rr}^*$  ( $t_{rr}^*$  – see data sheet)



**Fig. 9** Peak reverse recovery current  $I_{rrM}$  vs. Rate of fall of on-state current  $di_R/dt$

1 -  $I_{TM} = 0.5 \cdot I_{TAV}$

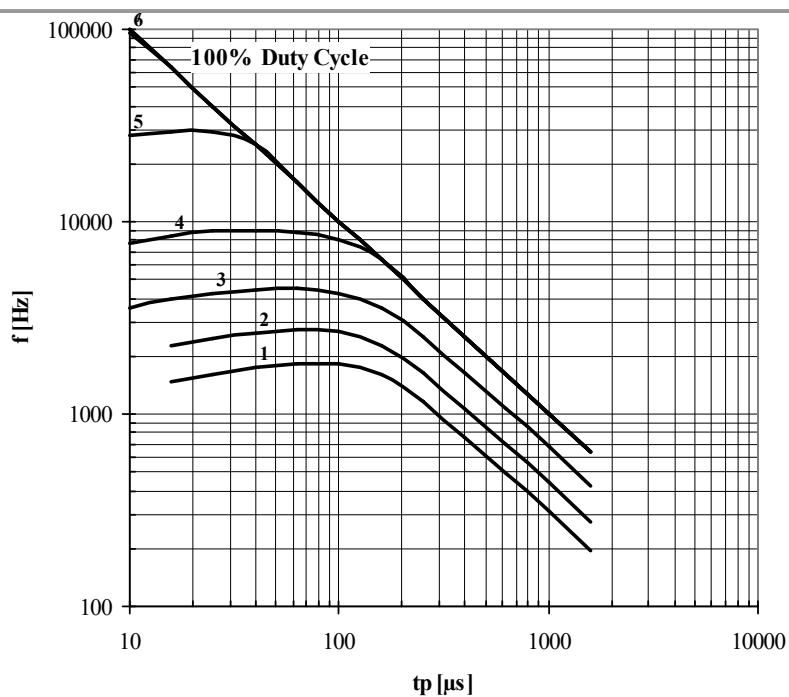
2 -  $I_{TM} = I_{TAV}$ ,

3 -  $I_{TM} = 1.5 \cdot I_{TAV}$

Conditions:  $T_j = T_{j \max}$ ;  $V_R = 100$  V

Typical changes of  $I_{rrM}$  are normalized to the  $I_{rrM}^*$  ( $I_{rrM}^*$  – see data sheet)

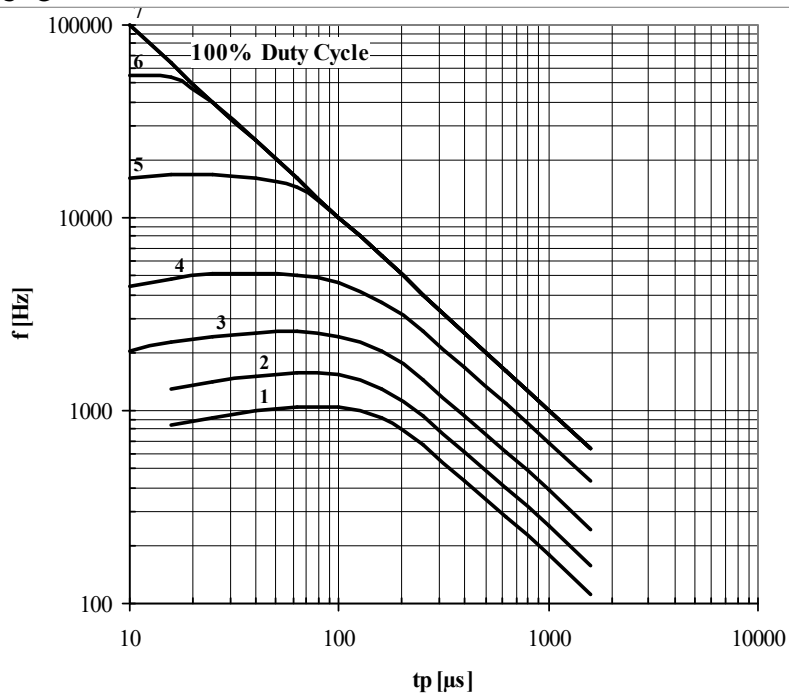




**Fig. 10** Sine wave frequency ratings

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A

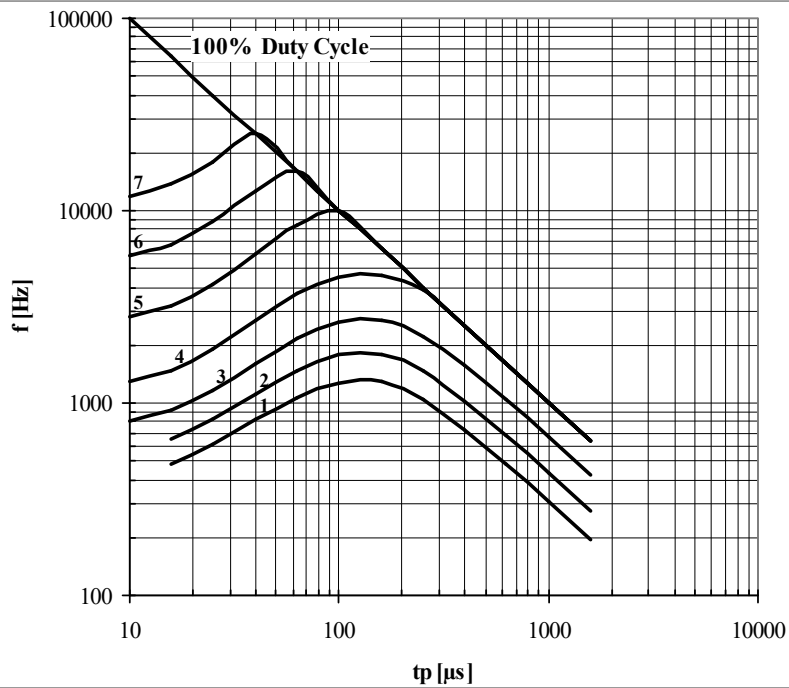
Conditions:  $V_R \leq 3$  V;  $T_C = 55$  °C



**Fig. 11** Sine wave frequency ratings

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A
- 6 -  $I_{TM} = 500$  A
- 7 -  $I_{TM} = 250$  A

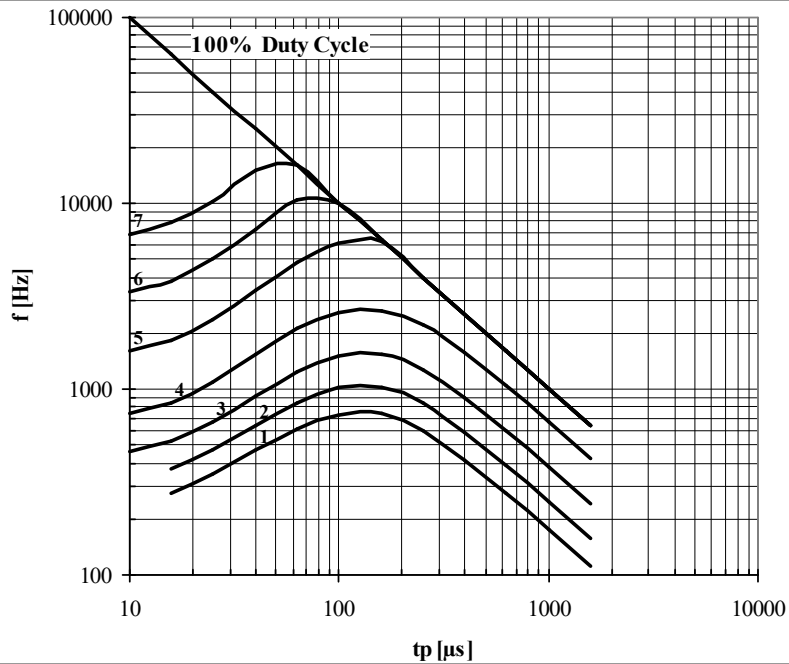
Conditions:  $V_R \leq 3$  V;  $T_C = 85$  °C



**Fig. 12** Sine wave frequency ratings

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A
- 6 -  $I_{TM} = 500$  A
- 7 -  $I_{TM} = 250$  A

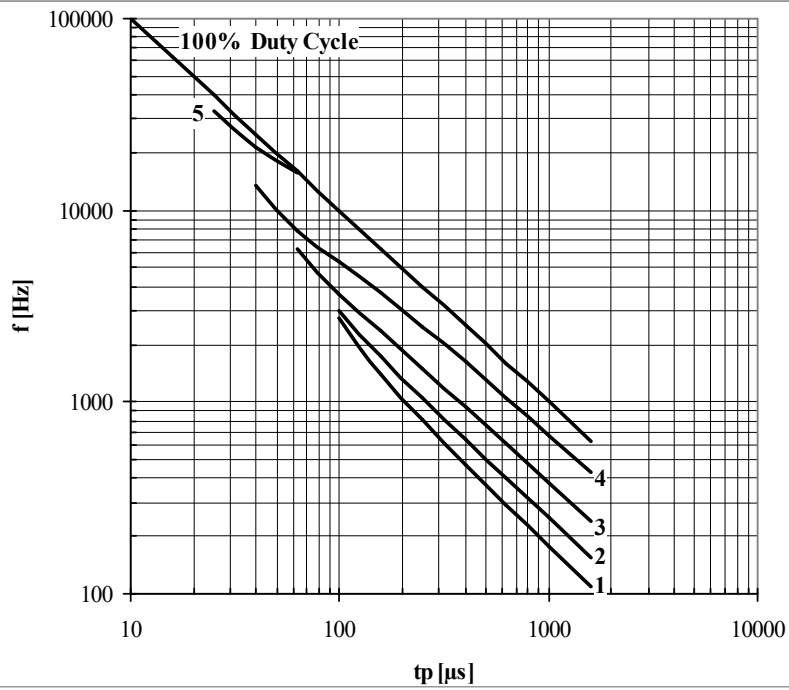
Conditions:  $V_R = 0.67 \cdot V_{RRM}$ ;  $T_C = 55$  °C



**Fig. 13** Sine wave frequency ratings

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A
- 6 -  $I_{TM} = 500$  A
- 7 -  $I_{TM} = 250$  A

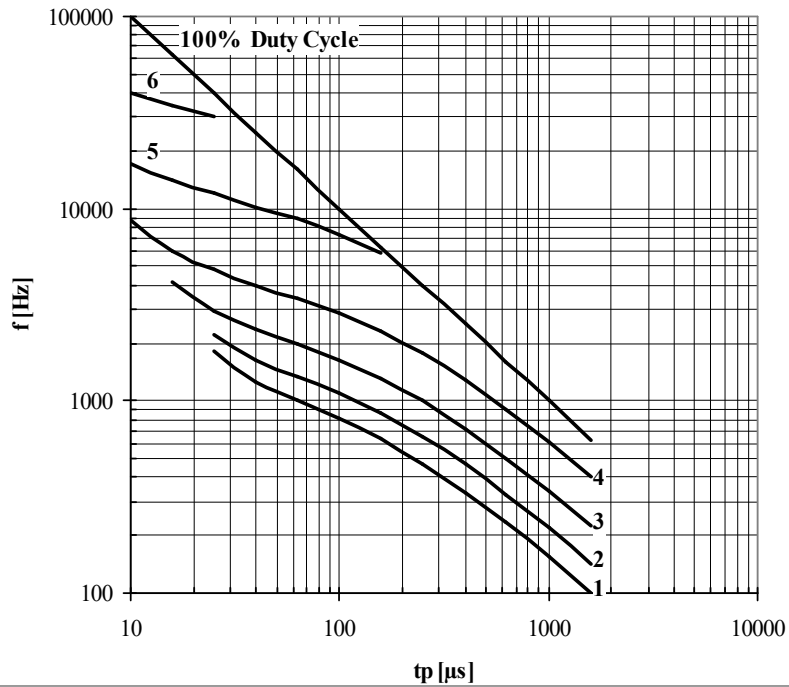
Conditions:  $V_R = 0.67 \cdot V_{RRM}$ ;  $T_C = 85$  °C



**Fig. 14** Square wave frequency ratings

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A

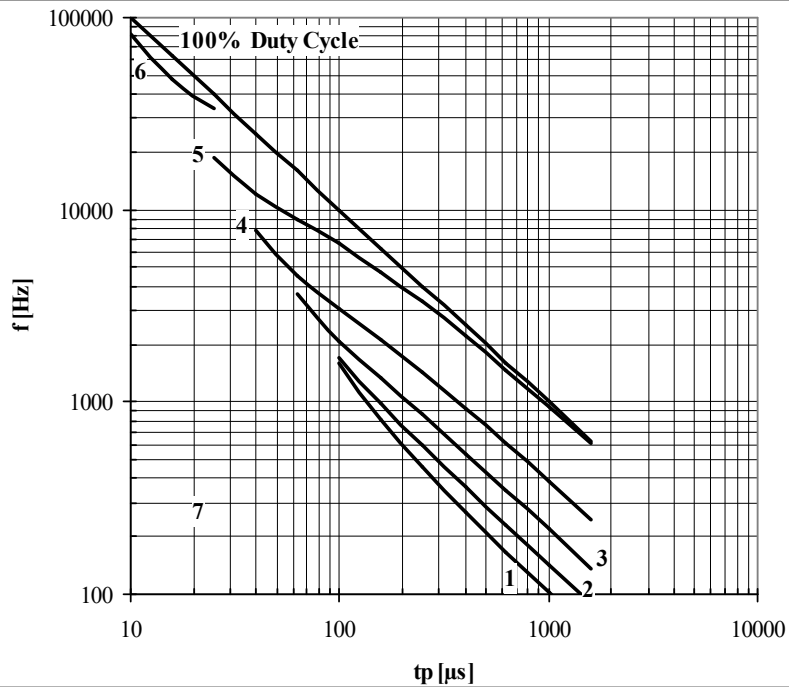
Conditions:  $V_R \leq 3$  V;  $T_C = 55$  °C;  $di_F/dt = di_R/dt = 100$  A/ $\mu$ s



**Fig. 15** Square wave frequency ratings

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A
- 6 -  $I_{TM} = 500$  A

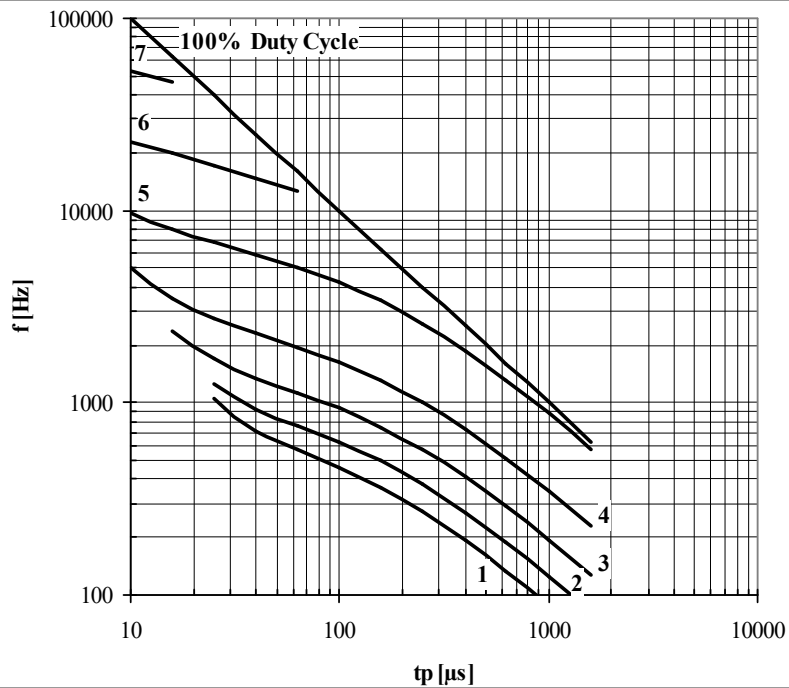
Conditions:  $V_R \leq 3$  V;  $T_C = 55$  °C;  $di_F/dt = di_R/dt = 500$  A/ $\mu$ s



**Fig. 16** Square wave frequency ratings

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A
- 6 -  $I_{TM} = 500$  A

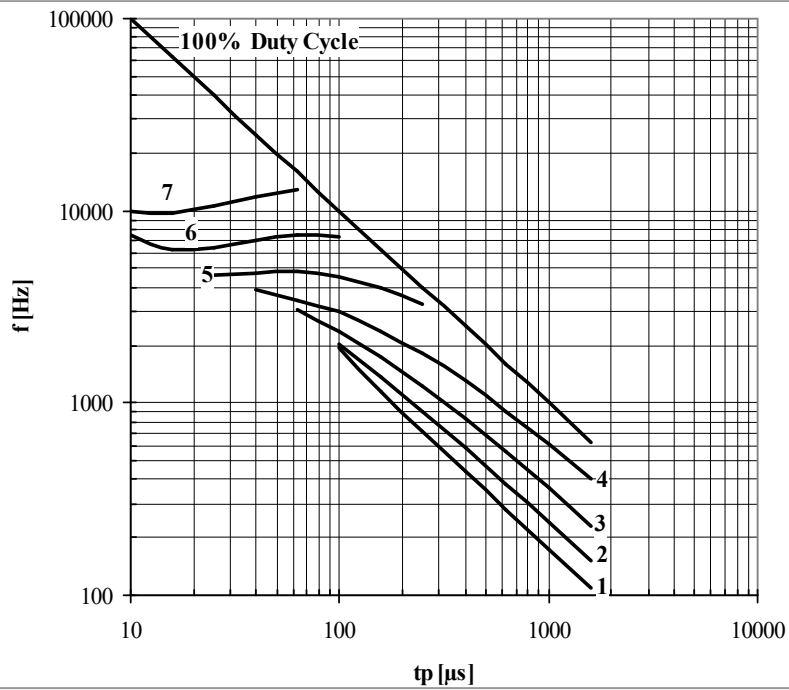
Conditions:  $V_R \leq 3$  V;  $T_C = 85$  °C;  $di_F/dt = di_R/dt = 100$  A/ $\mu$ s



**Fig. 17** Square wave frequency ratings

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A
- 6 -  $I_{TM} = 500$  A
- 7 -  $I_{TM} = 250$  A

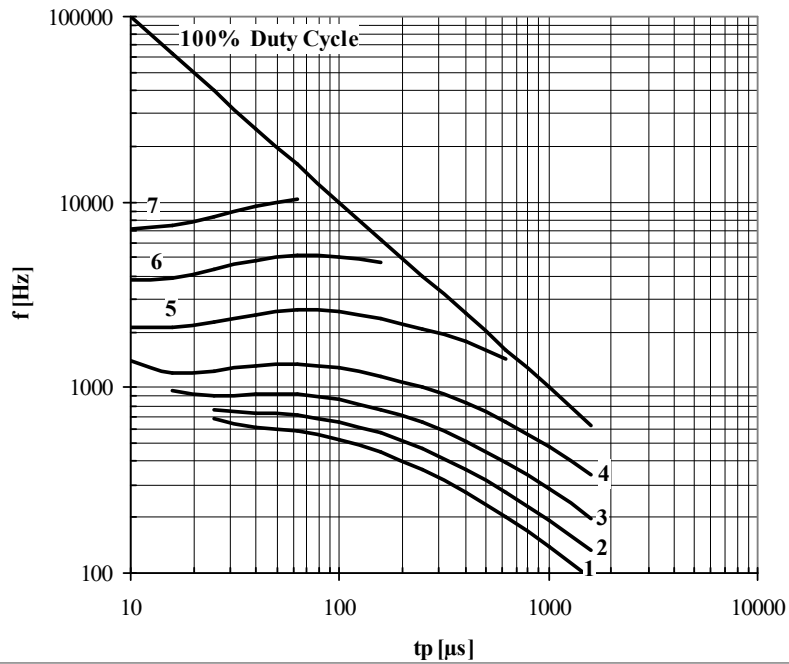
Conditions:  $V_R \leq 3$  V;  $T_C = 85$  °C;  $di_F/dt = di_R/dt = 500$  A/ $\mu$ s



**Fig. 18** Square wave frequency ratings

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A
- 6 -  $I_{TM} = 500$  A
- 7 -  $I_{TM} = 250$  A

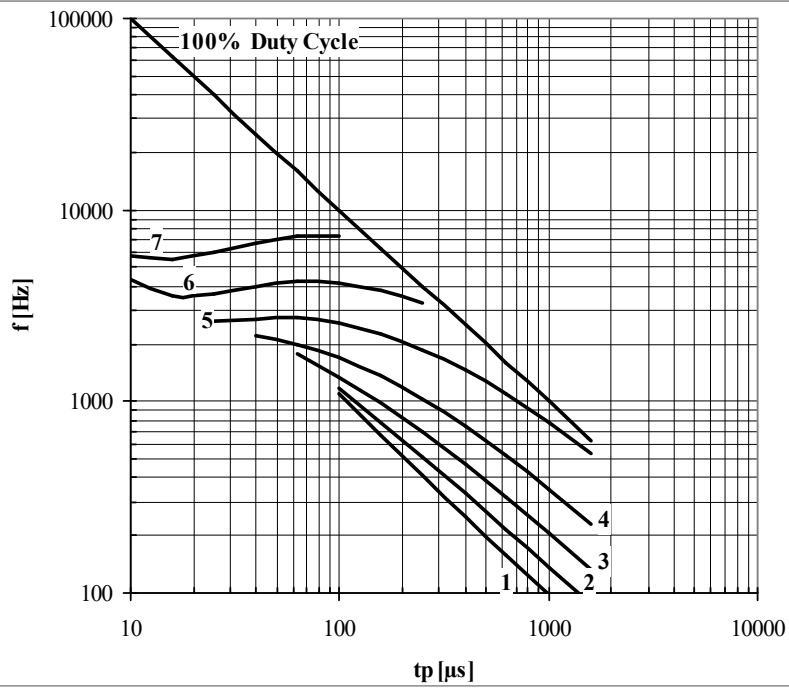
Conditions:  $V_R = 0.67 \cdot V_{RRM}$ ;  $T_C = 55$  °C;  $di_F/dt = di_R/dt = 100$  A/ $\mu$ s



**Fig. 19** Square wave frequency ratings

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A
- 6 -  $I_{TM} = 500$  A
- 7 -  $I_{TM} = 250$  A

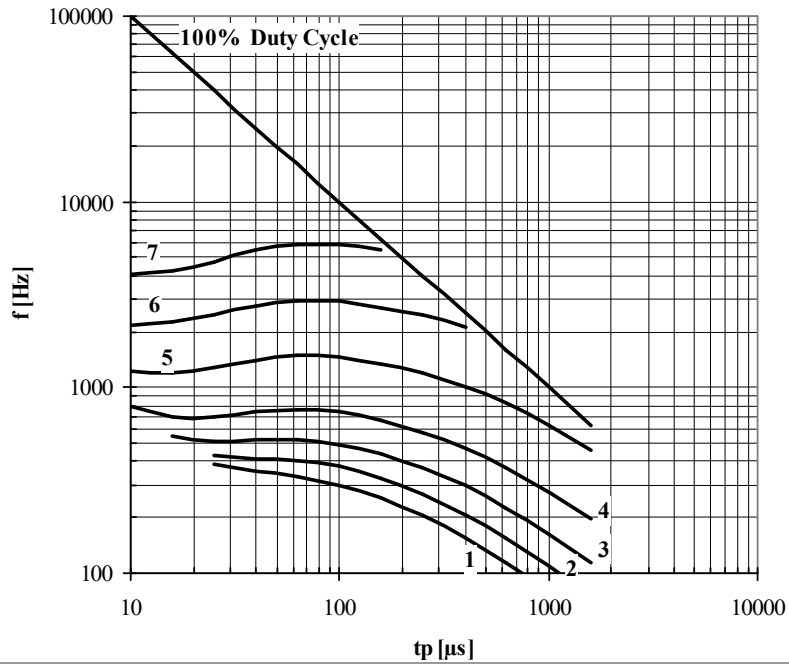
Conditions:  $V_R = 0.67 \cdot V_{RRM}$ ;  $T_C = 55$  °C;  $di_F/dt = di_R/dt = 500$  A/ $\mu$ s



**Fig. 20** Square wave frequency ratings

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A
- 6 -  $I_{TM} = 500$  A
- 7 -  $I_{TM} = 250$  A

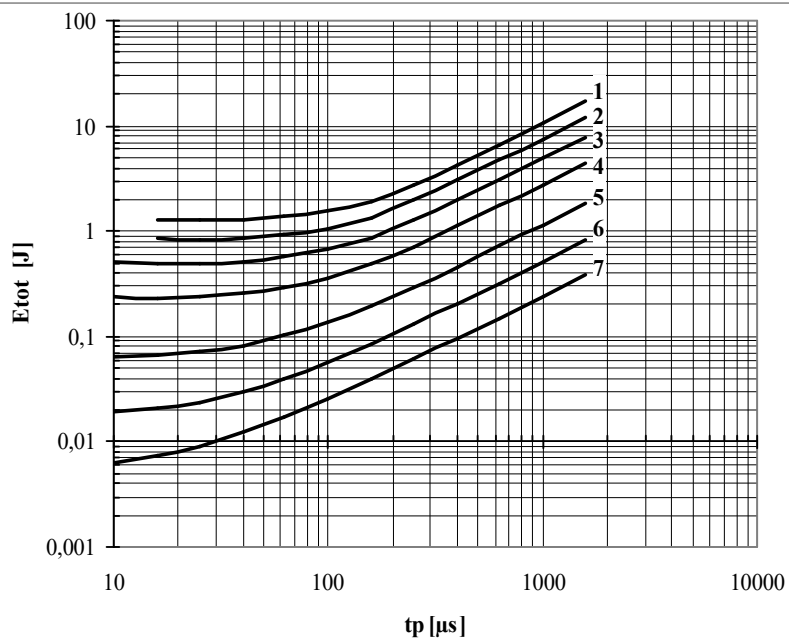
Conditions:  $V_R = 0.67 \cdot V_{RRM}$ ;  $T_C = 85$  °C;  $di_F/dt = di_R/dt = 100$  A/ $\mu$ s



**Fig. 21** Square wave frequency ratings

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A
- 6 -  $I_{TM} = 500$  A
- 7 -  $I_{TM} = 250$  A

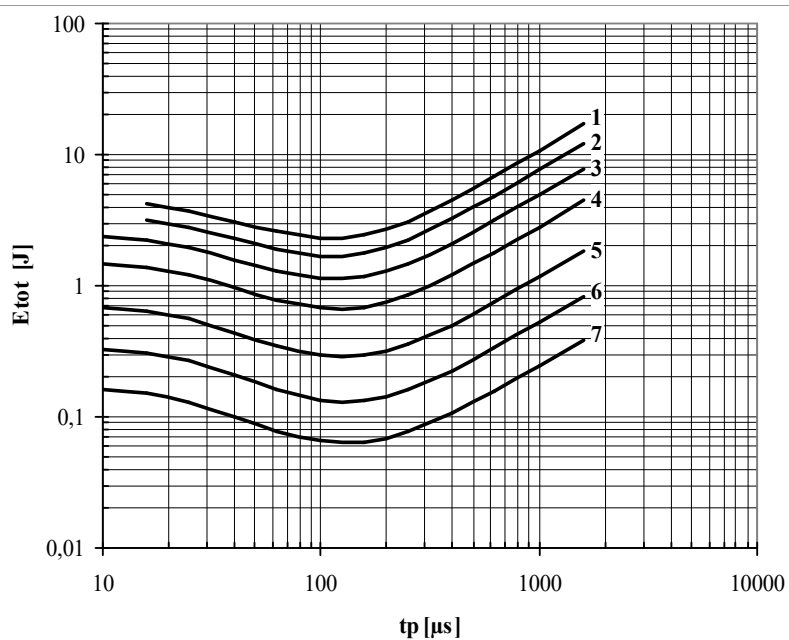
Conditions:  $V_R = 0.67 \cdot V_{RRM}$ ;  $T_C = 85$  °C;  $di_F/dt = di_R/dt = 500$  A/ $\mu$ s



**Fig. 22** Sine wave loss energy per pulse

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A
- 6 -  $I_{TM} = 500$  A
- 7 -  $I_{TM} = 250$  A

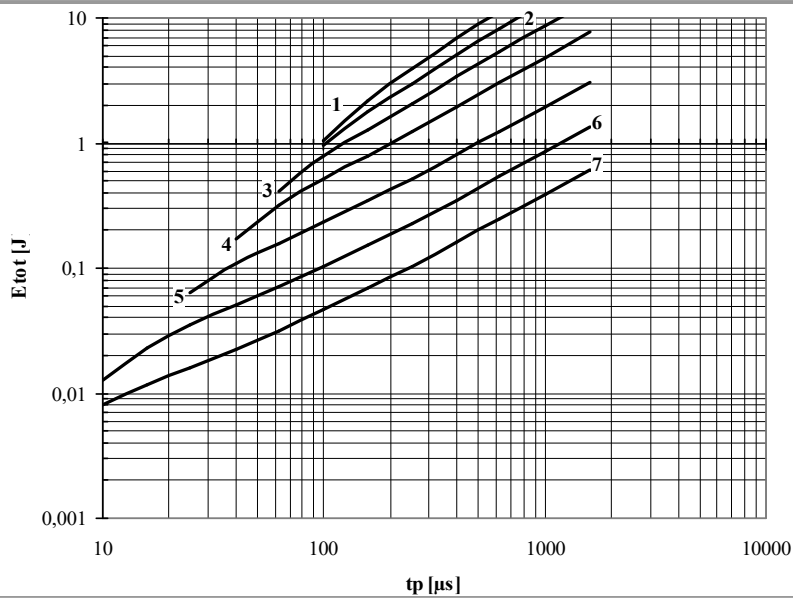
Conditions:  $V_R \leq 3$  V



**Fig. 23** Sine wave loss energy per pulse

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A
- 6 -  $I_{TM} = 500$  A
- 7 -  $I_{TM} = 250$  A

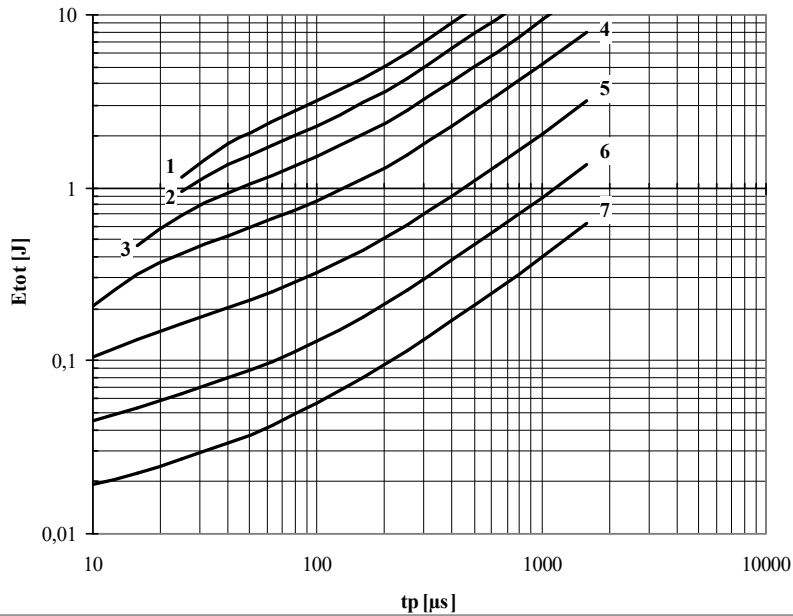
Conditions:  $V_R = 0.67 \cdot V_{RRM}$



**Fig. 24** Square wave loss energy per pulse

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A
- 6 -  $I_{TM} = 500$  A
- 7 -  $I_{TM} = 250$  A

Conditions:  $V_R \leq 3$  V;  $di_F/dt = di_R/dt = 100$  A/ $\mu$ s

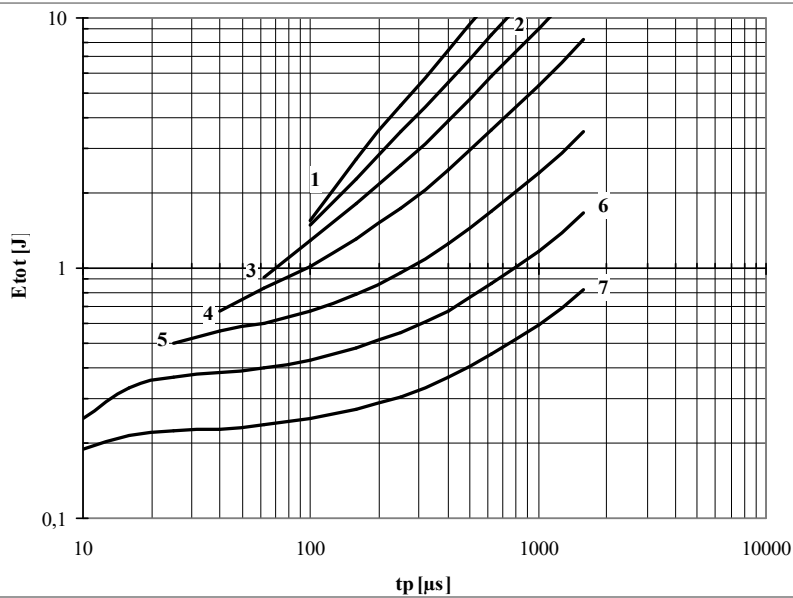


**Fig. 25** Square wave loss energy per pulse

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A
- 6 -  $I_{TM} = 500$  A
- 7 -  $I_{TM} = 250$  A

Conditions:  $V_R \leq 3$  V;  $di_F/dt = di_R/dt = 500$  A/ $\mu$ s

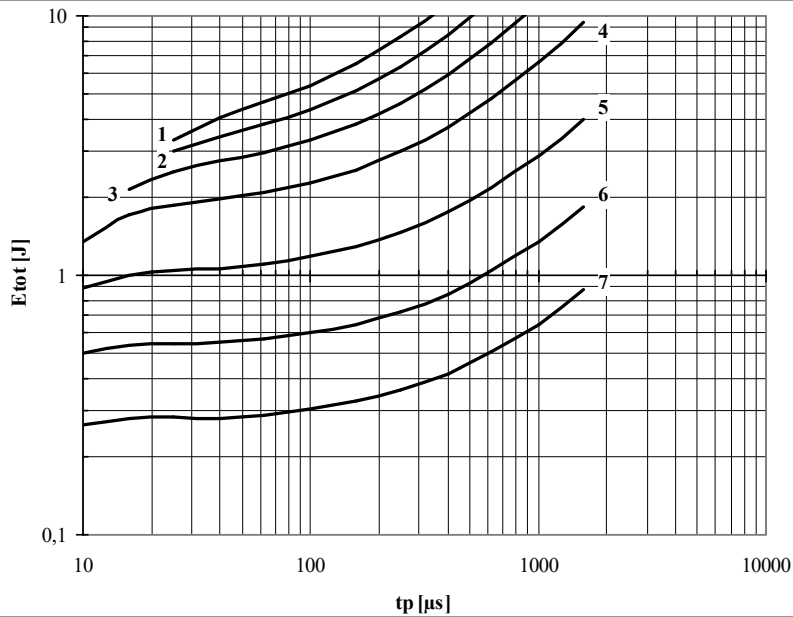




**Fig. 26** Square wave loss energy per pulse

- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A
- 6 -  $I_{TM} = 500$  A
- 7 -  $I_{TM} = 250$  A

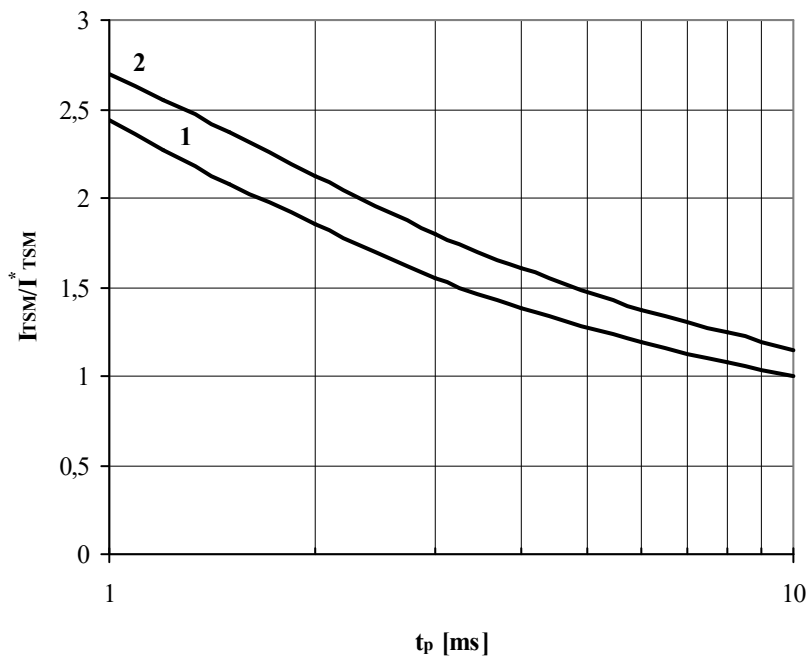
Conditions:  $V_R = 0.67 \cdot V_{RRM}$ ;  $di_F/dt = di_R/dt = 100$  A/ $\mu$ s



**Fig. 27** Square wave loss energy per pulse

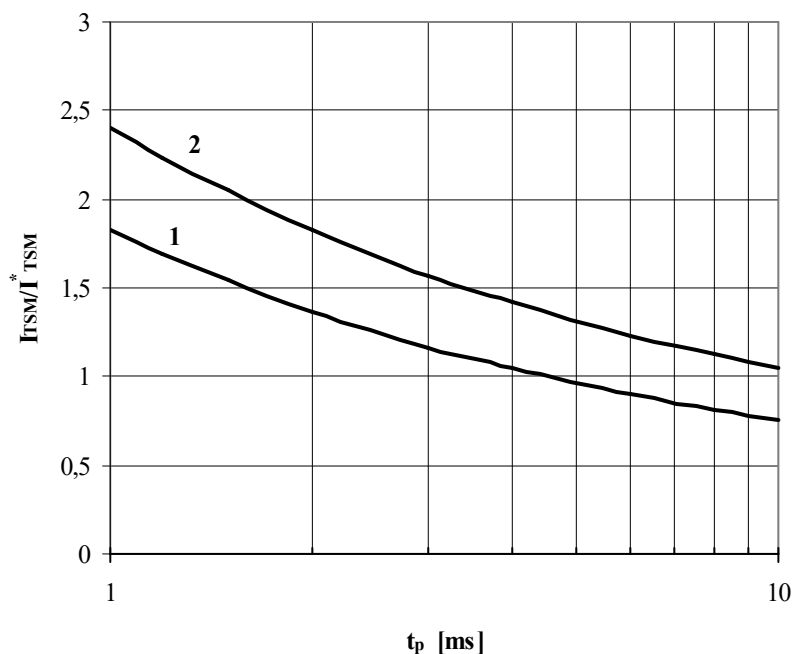
- 1 -  $I_{TM} = 5000$  A
- 2 -  $I_{TM} = 4000$  A
- 3 -  $I_{TM} = 3000$  A
- 4 -  $I_{TM} = 2000$  A
- 5 -  $I_{TM} = 1000$  A
- 6 -  $I_{TM} = 500$  A
- 7 -  $I_{TM} = 250$  A

Conditions:  $V_R = 0.67 \cdot V_{RRM}$ ;  $di_F/dt = di_R/dt = 500$  A/ $\mu$ s



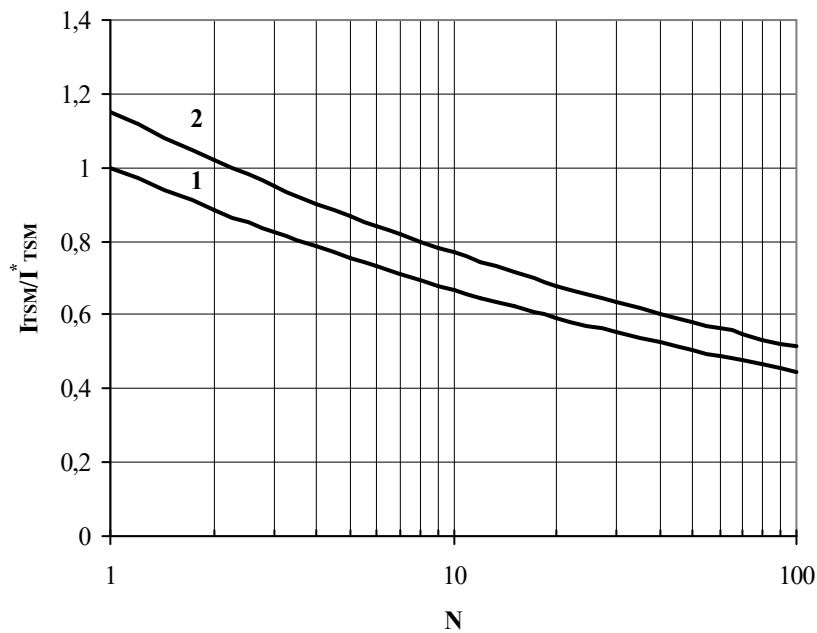
**Fig. 28** The surge current  $I_{TSM}$  vs. Duration of surge  $t_p$  for a half-sine wave  
 1 –  $T_j=125\text{ °C}$   
 2 –  $T_j=25\text{ °C}$

Conditions:  $V_R=0\text{ V}$  – the peak value of reverse voltage which is applied immediately after the surge current  
 Typical changes of  $I_{TSM}$  are normalized to the  $I_{TSM}^*$  ( $I_{TSM}^*$  – see data sheet,  $T_j=T_{j\text{ max}}$ )



**Fig. 29** The surge current  $I_{TSM}$  vs. Duration of surge  $t_p$  for a half-sine wave  
 1 –  $T_j=125\text{ °C}$   
 2 –  $T_j=25\text{ °C}$

Conditions:  $V_R=0.8V_{RRM}$  – the peak value of reverse voltage which is applied immediately after the surge current  
 Typical changes of  $I_{TSM}$  are normalized to the  $I_{TSM}^*$  ( $I_{TSM}^*$  – see data sheet,  $T_j=T_{j\text{ max}}$ )

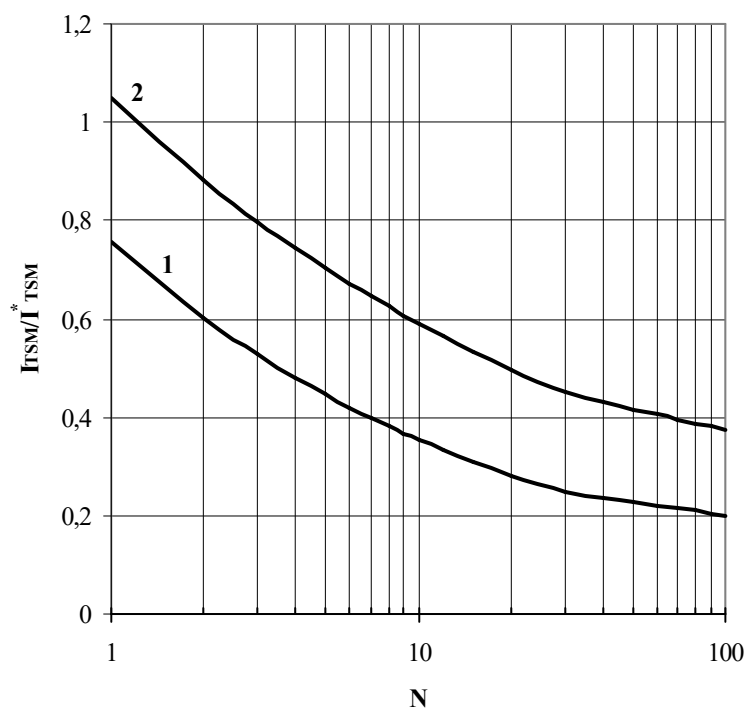


**Fig. 30** The surge current  $I_{TSM}$  vs. Number of half-sine waves at 50 Hz

1 –  $T_j = 125^\circ\text{C}$

2 –  $T_j = 25^\circ\text{C}$

Conditions:  $V_R = 0\text{ V}$  – the peak value of reverse voltage which is applied immediately after the surge current  
 Typical changes of  $I_{TSM}$  are normalized to the  $I_{TSM}^*$  ( $I_{TSM}^*$  – see data sheet,  $T_j = T_{j\text{max}}$ )



**Fig. 31** The surge current  $I_{TSM}$  vs. Number of half-sine waves at 50 Hz

1 –  $T_j = 125^\circ\text{C}$

2 –  $T_j = 25^\circ\text{C}$

Conditions:  $V_R = 0.8 \cdot V_{RRM}$  – the peak value of reverse voltage which is applied immediately after the surge current  
 Typical changes of  $I_{TSM}$  are normalized to the  $I_{TSM}^*$  ( $I_{TSM}^*$  – see data sheet,  $T_j = T_{j\text{max}}$ )