Series
TFI371-200

Fast Stud Mounted Thyristor Type TFI371-200

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

Maximum mean on-state current					ITAV	**200 A**		
Maximum repetitive peak off-state and reverse voltage					UDRM URRM	**1200 ÷2200 V**		
Turn-off time					tq	**20; 25; 32 µs**		
UDRM , URRM , V	1200	1300	1400	1500	1600	1800	2000	2200
Voltage code	12	13	14	15	16	18	20	22
Tvj, °C	- 60 ÷ 125							

MAXIMUM ALLOWABLE RATINGS					
Symbols and parameters		Units	TFI371-200	Conditions	
ITAV	Mean on-state current	A	200	Tc=85 °C, 180° half-sine wave, 50 Hz	
ITRMS	RMS on-state current	A	314	Tc=85 °C	
ITSM	Surge on-state current	kA	6,3 7,0	Tvj=125°C Tvj=25°C	tp=10 ms UR=0
I^2t	Limiting load integral	kA^2s	198 245	Tvj=125°C Tvj=25°C	
UDRM,URRM	Repetitive peak off-state and reverse voltage	V	1200÷2200	Tj min≤Tvj≤TjM 180° half-sine wave, 50 Hz Gate open	
UDSM,URSM	Non-repetitive peak off-state and reverse voltage	V	1300÷2300	Tj min≤Tvj≤TjM 180° half-sine wave tp=10 ms, Single pulse Gate open	
(diT/dt) crit	Critical rate of rise of on-state current : non - repetitive repetitive	A/µs	 1600 800	Tvj=125°C ; UD=0,67 UDRM, Gate pulse : 10V,5 Ω, 1µs rise time, 10 µs	
URGM	Peak reverse gate voltage	V	5	Tj min≤Tvj≤TjM	
Tstg	Storage temperature	°C	-60÷80		
Tvj	Junction temperature	°C	-60÷125		
CHARACTERISTICS					
UTM	Peak on-state voltage	V	2,3	Tvj=25°C, ITM=3,14 ITAV	
UT(TO)	Threshold voltage	V	1,5	Tvj=125°C 1,57 ITAV< IT <4,71 ITAV	
RT	On-state slope resistance	mΩ	1,22		
IDRM IRRM	Repetitive peak off-state and reverse current	mA	50 50	Tvj=125°C, UD = UDRM UR= URRM	

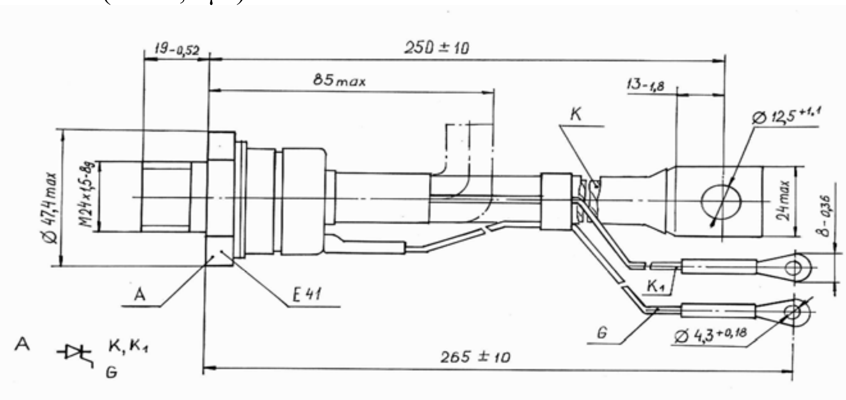
CHARACTERISTICS

Symbols and parameters		Units	TFI371-200	Conditions
I_L	Latching current	A	5	Tvj=25°C,U_D=12V Gate pulse : 10V, 5Ω, 1 µs rise time, 10µs
I_H	Holding current	A	0,5	Tvj=25°C,U_D=12V, Gate open
U_{GT}	Gate trigger direct voltage	V	2,5 5,0	Tvj=25°C, Tvj=-60°C U_D=12V
I_{GT}	Gate trigger direct current	A	0,3 0,85	Tvj=25°C, Tvj=-60°C U_D=12V
U_{GD}	Gate non-trigger direct voltage	V	0,25	Tvj=125°C, U_D = 0,67 U_{DRM} Direct gate current
I_{GD}	Gate non-trigger direct current	мA	10	
t_{gd}	Delay time	µs	1,6	Tvj=25°C,U_D=500V I_{TM} = 200 A Gate pulse : 10V, 5Ω, 1 µs rise time, 10µs
t_{gt}	Turn-on time	µs	2,5	
t_q	Turn-off time	µs	20÷32 25÷40	Tvj=125°C, I_{TM} =200 A di_R/dt =10 A/µs, U_R=100V U_D = 0,67 U_{DRM} du_D/dt=50 V/µs du_D/dt=200 V/µs
Q_{rr}	Recovered charge	µC	300	Tvj=125°C, I_{TM} =200 A di_R/dt =50 A/µs, U_R=100V
t_{rr}	Reverse recovery time	µs	4,6	
I_{rrM}	Peak reverse recovery current	A	130	
$(du_D/dt)_{crit}$	Critical rate of rise of off-state voltage	V/µs	500 1000	Tvj=125°C, U_D = 0,67 U_{DRM} Gate open
R_{thjc}	Thermal resistance junction to case	°C/W	0,075	Direct current

ORDERING

	TFI	**371**	**200**	**20**	**7**	**6**	**3**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	

1. Fast thyristor with interdigitated gate structure.
2. Design version.
3. Mean on-state current, A.
4. Voltage code (20=2000V).
5. Critical rate of rise of off-state voltage (6 ≥ 500 V/µs, 7 ≥1000 V/µs)
6. Group of turn-off time (du_D/dt=50 V/µs, 4 ≤ 32 µs , 5 ≤ 25 µs, 6 ≤ 20 µs)
7. Group of turn-on time (3 ≤ 2,5 µs).



Tightening torgue : 40 ÷ 60 Nm
Weight : 480 grams

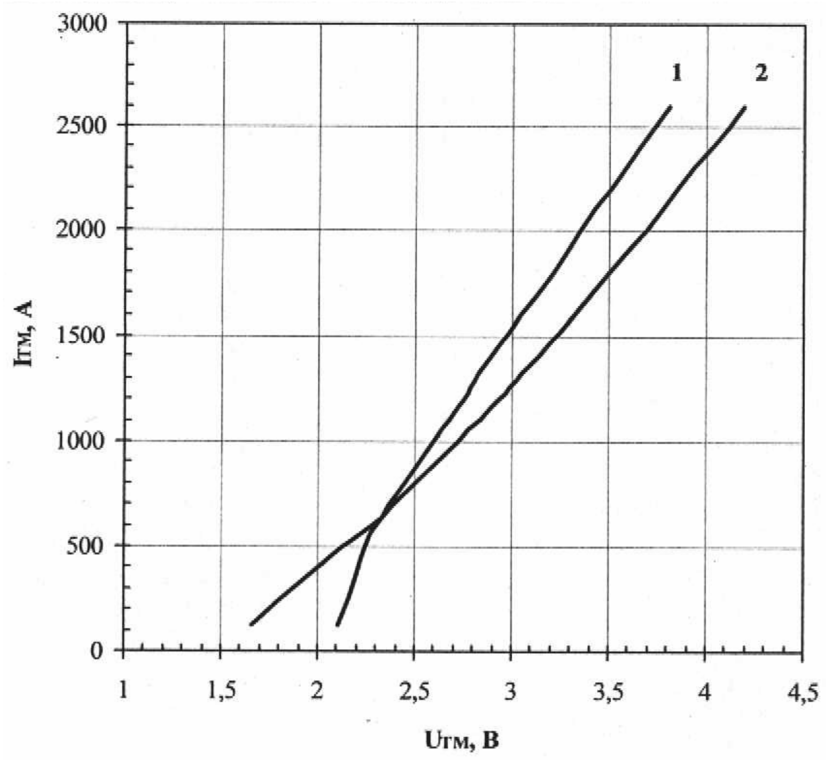
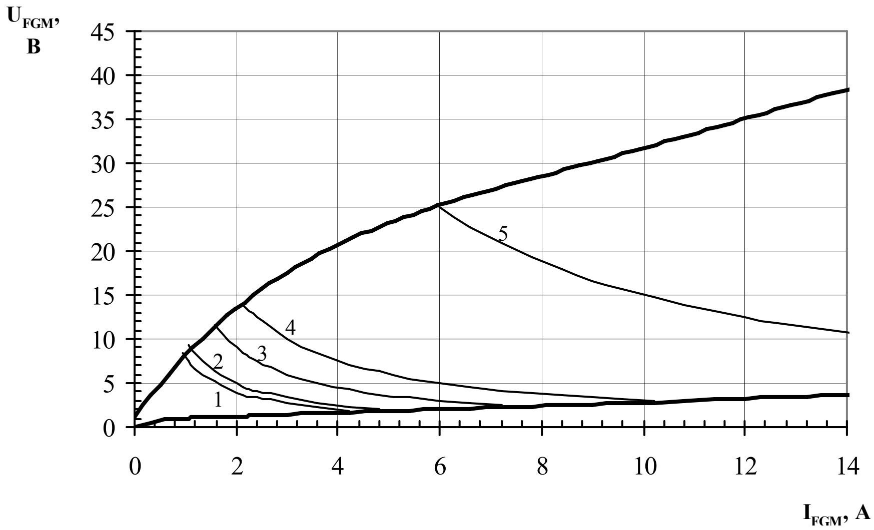


Fig. 1 On-state characteristics of Limit device

1 – T_j=25 °C

2 – T_j=125 °C



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

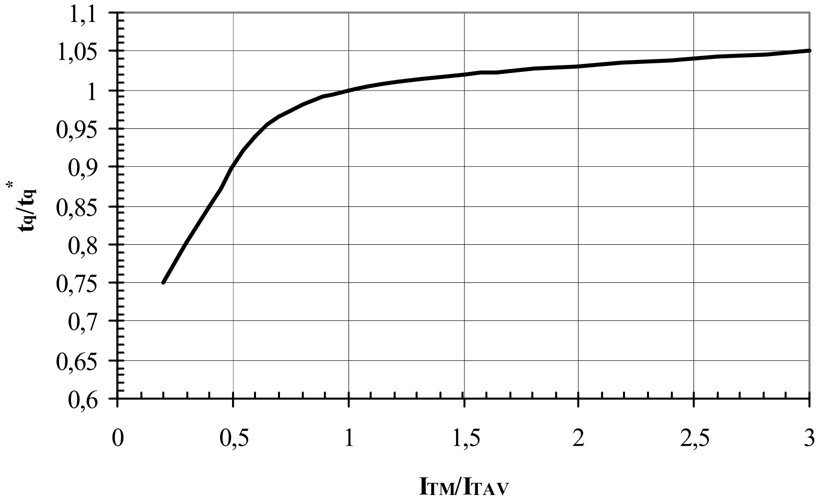


Fig. 3 Turn-off time t_q vs. On-state peak current I_{TM}

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

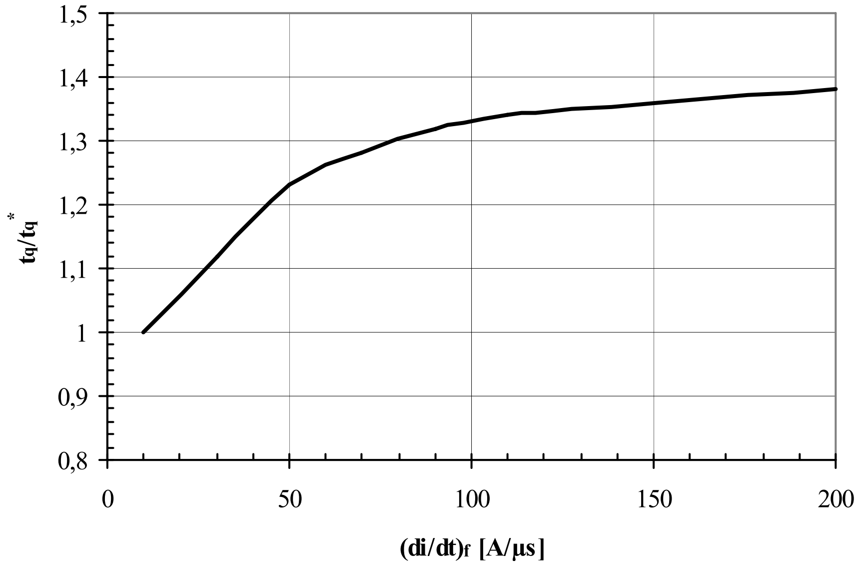


Fig. 4 Turn-off time t_q vs. Rate of fall of on-state current di_R/dt

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

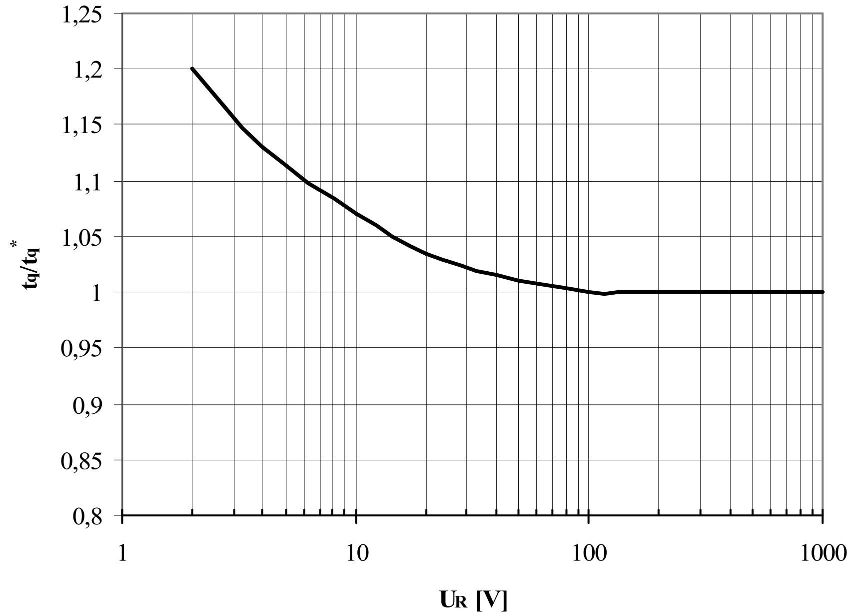


Fig. 5 Turn-off time t_q vs. Reverse voltage V_R

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

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

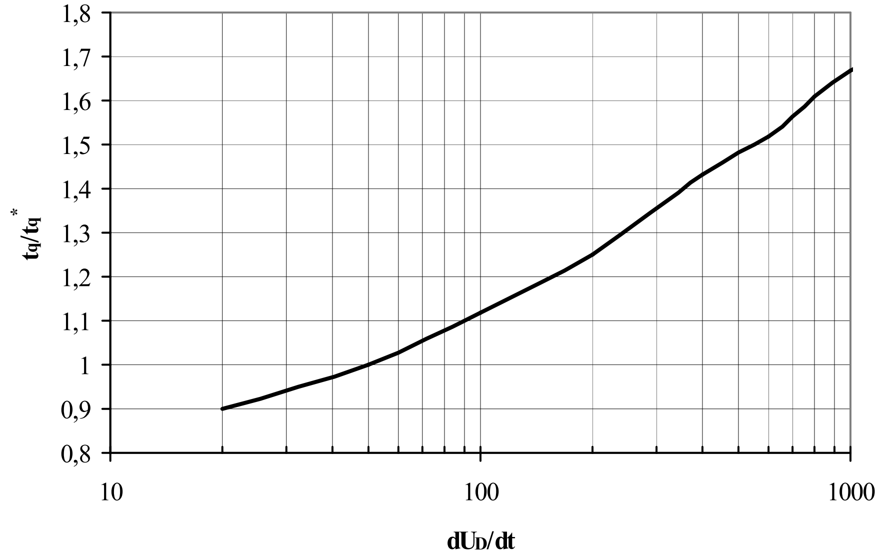


Fig. 6 Turn-off time t_q vs. Rate of rise of commutating voltage dv_D/dt

Conditions: $T_j=T_{j\,max}$; $I_{TM}=I_{TAV}$; di_R/dt=10 A/µs; V_R=100 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 V/µs)

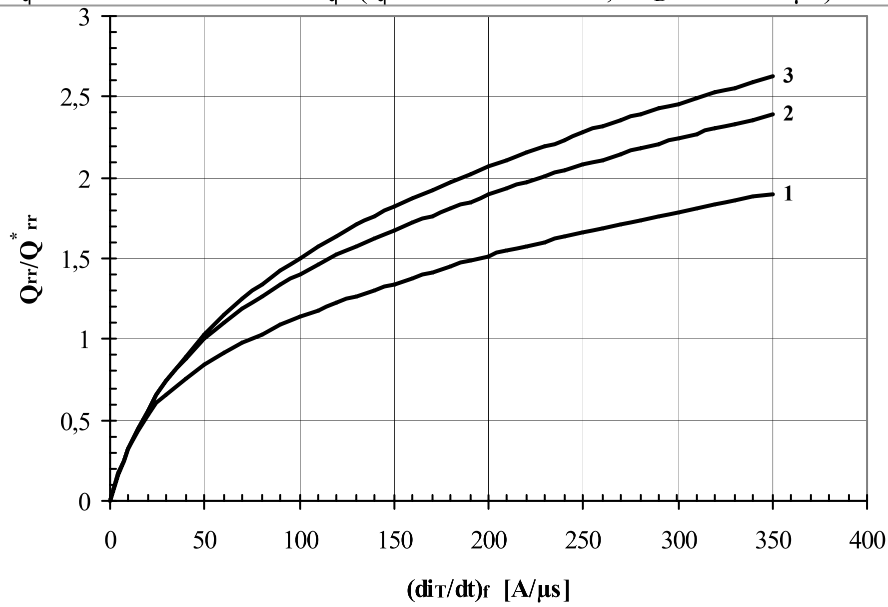


Fig. 7 Reverse recovery charge Q_{rr}, vs. Rate of fall of on-state current di_R/dt
1 – $I_{TM} = 0.5 \cdot I_{TAV}$
2 – $I_{TM} = I_{TAV}$,
3 – $I_{TM} = 1.5 \cdot I_{TAV}$

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

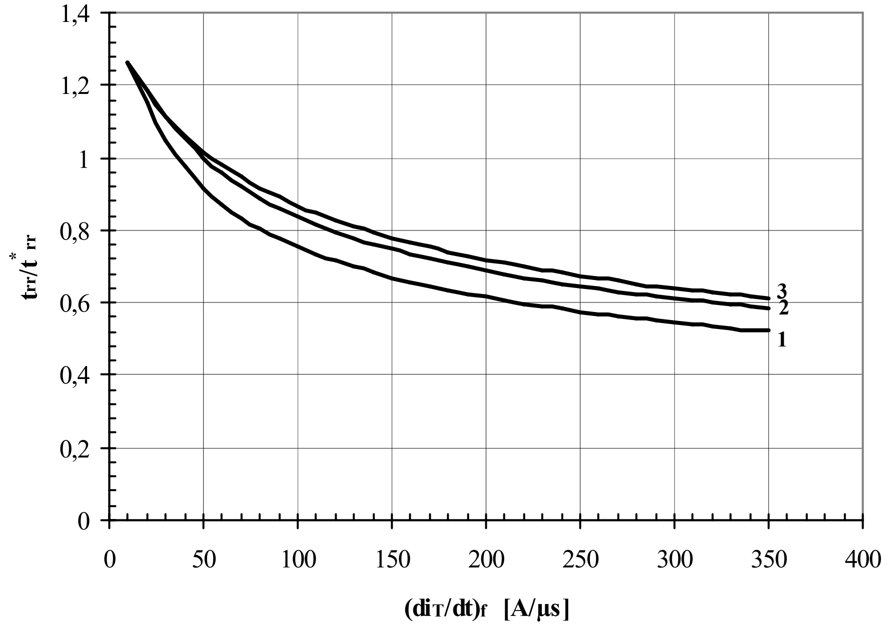


Fig. 8 Reverse recovery time t_{rr} vs. Rate of fall of on-state current di_R/dt

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)

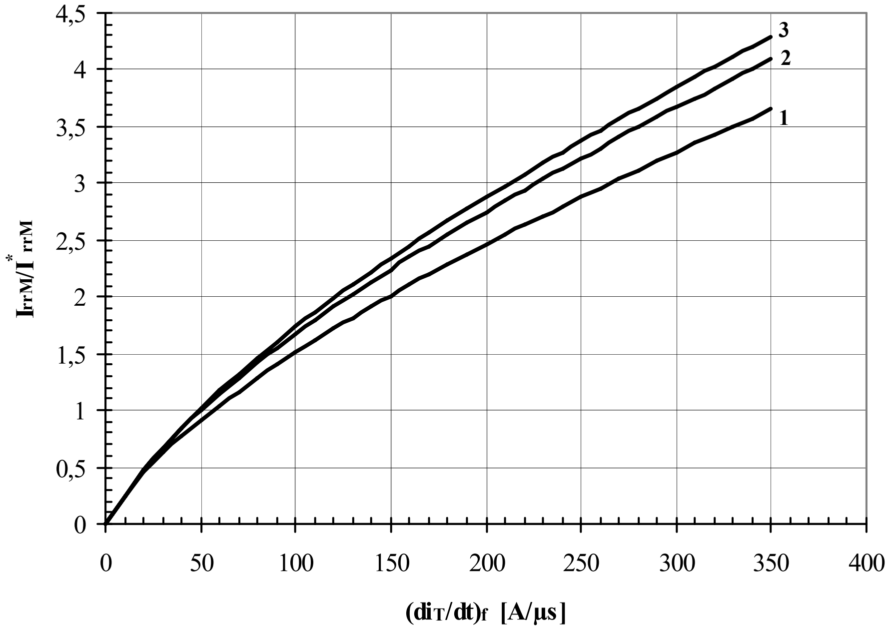


Fig. 9 Peak reverse recovery current I_{rrM} vs. Rate of fall of on-state current di_R/dt

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)

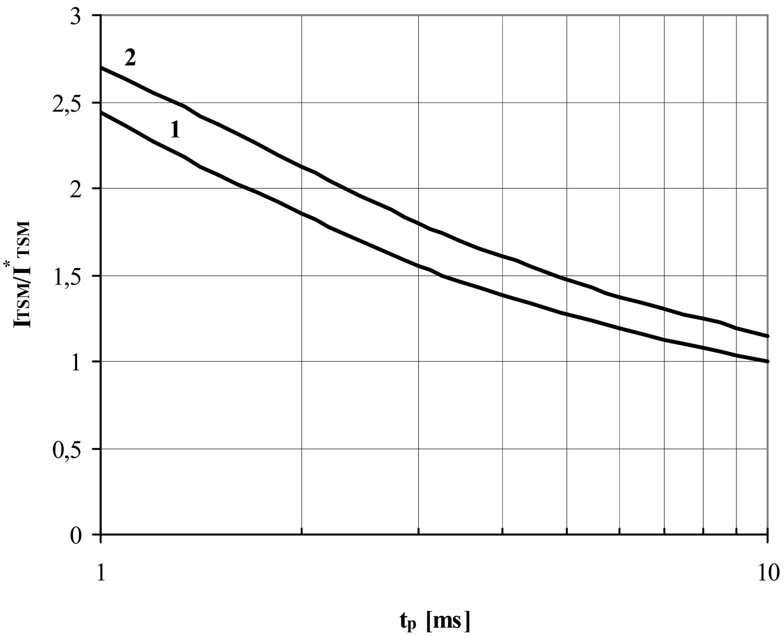


Fig. 10 The surge current I_{TSM} vs. Duration of surge t_p for a half-sine wave

1 – T_j=125 °C

2 – T_j=25 °C

Conditions: V_R=0 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=$T_{j\,max}$)

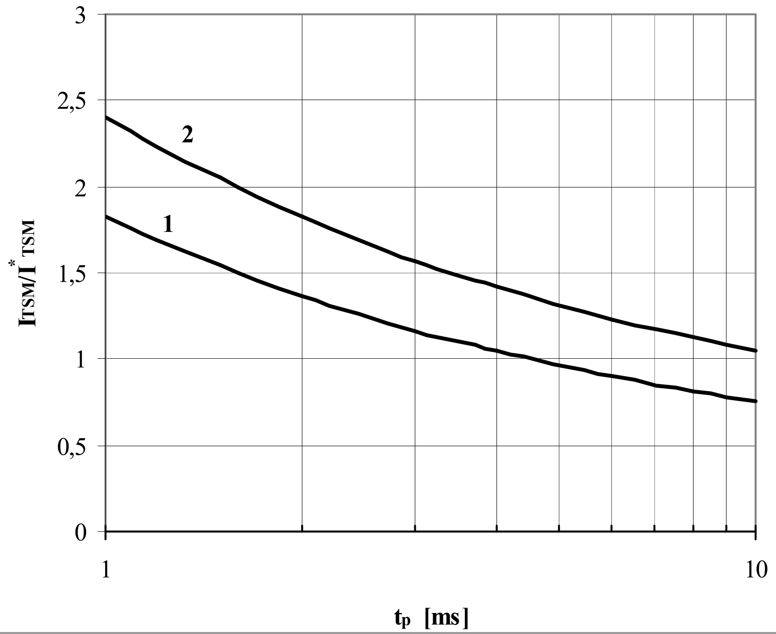


Fig. 11 The surge current I_{TSM} vs. Duration of surge t_p for a half-sine wave

1 – T_j=125 °C

2 – T_j=25 °C

Conditions: V_R=0.8·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=$T_{j\,max}$)

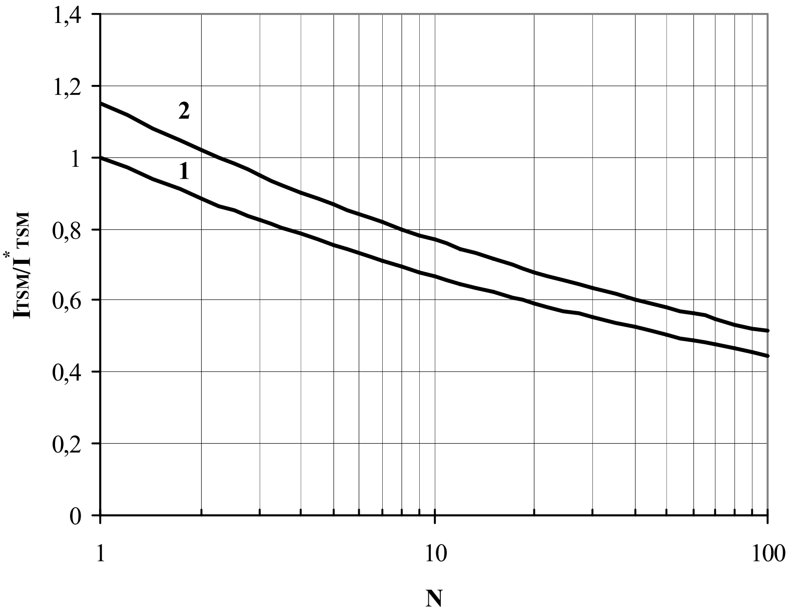


Fig. 12 The surge current I_{TSM} vs. Number of half-sine waves at 50 Hz
1 – T_j=125 °C
2 – T_j=25 °C

Conditions: V_R=0 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=$T_{j\,max}$)

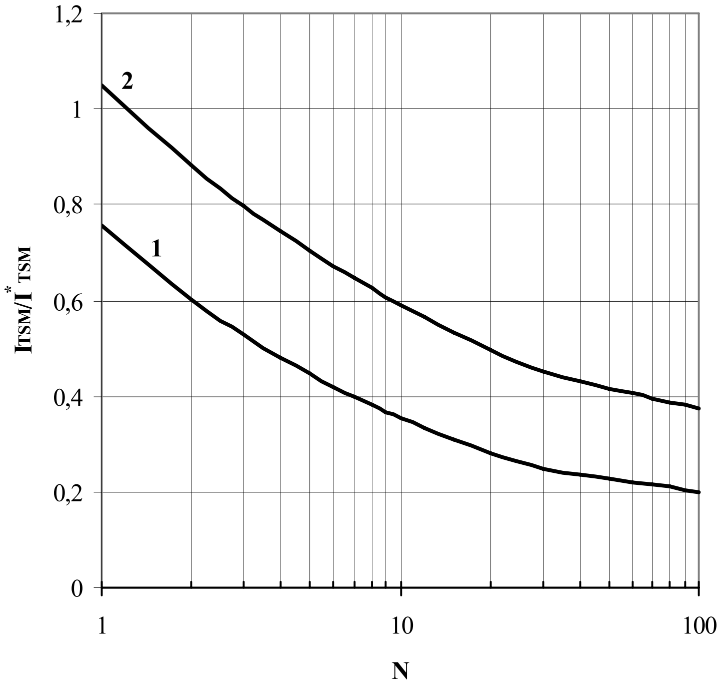


Fig. 13 The surge current I_{TSM} vs. Number of half-sine waves at 50 Hz
1 – T_j=125°C
2 – T_j=25°C

Conditions: V_R=0.8·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=$T_{j\,max}$)