



5SGS 12F2500

Old part no. TG 908-1200-25

Gate Turn-off Thyristor

Properties

- Full reverse voltage
- High reliability
- Suitable for drives and traction applications

Key Parameters

V_{DRM}, V_{RRM}	=	2 500	V
I_{TGQM}	=	1 200	A
I_{TAVm}	=	630	A
I_{TSM}	=	10 000	A
V_{TO}	=	1.498	V
r_T	=	1.386	mΩ

Types

	V_{DRM}, V_{RRM}
5SGS 12F2500	2 500 V
Conditions:	$T_j = -40 \div 125 \text{ }^\circ\text{C}$, half sine waveform, $f = 50\text{Hz}$

Mechanical Data

F_m	Mounting force	$10 \pm 2 \text{ kN}$
m	Weight	0.49 kg
D_s	Surface creepage distance	25 mm
D_a	Air strike distance	13 mm

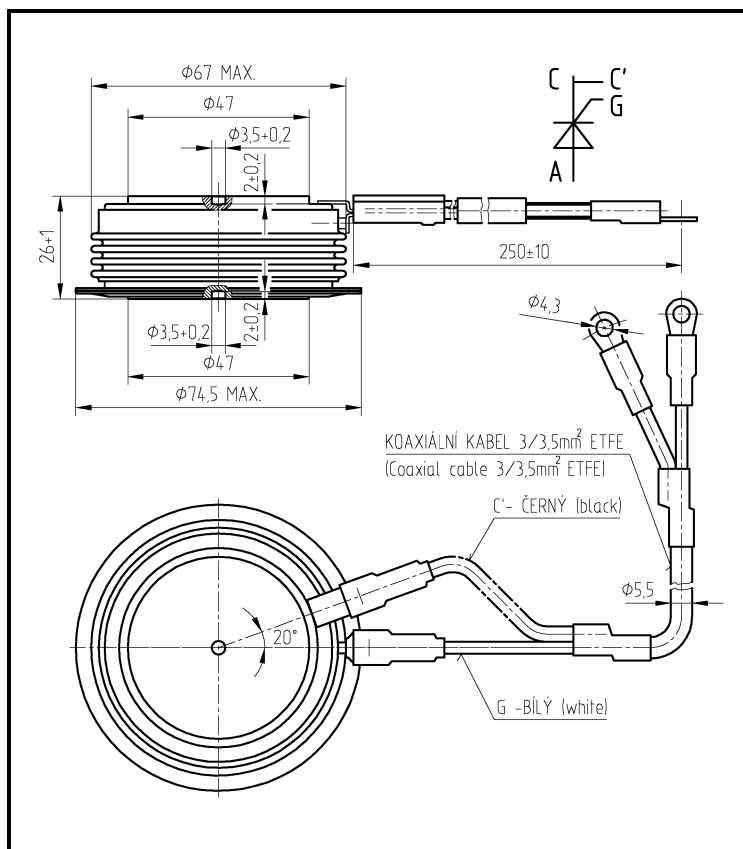


Fig. 1 Case



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Maximum Ratings		Maximum Limits	Unit
V_{DRM} V_{RRM}	Repetitive peak off-state and peak reverse voltage $T_j = -40 \div 125 \text{ }^\circ\text{C}$, $V_{GC} = -2 \text{ V}$	2 500	V
I_{TGQM}	Peak Turn-off current $T_j = -40 \div 125 \text{ }^\circ\text{C}$, $C_S = 3 \text{ } \mu\text{F}$, $di_{GC}/dt = -30 \text{ A}/\mu\text{s}$, $V_{DM} = 0.8 V_{DRM}$	1 200	A
I_{TRMS}	RMS on-state current $T_c = 70 \text{ }^\circ\text{C}$, <i>half sine waveform</i> , $f = 50 \text{ Hz}$	990	A
I_{TAVm}	Average on-state current $T_c = 70 \text{ }^\circ\text{C}$, <i>half sine waveform</i> , $f = 50 \text{ Hz}$	630	A
I_{TSM}	Peak non-repetitive surge <i>half sine pulse</i> , $t_p = 10 \text{ ms}$, $V_R = 0 \text{ V}$	10 000	A
I^2t	Limiting load integral <i>half sine pulse</i> , $t_p = 10 \text{ ms}$, $V_R = 0 \text{ V}$	500 000	A²s
$(di_T/dt)_{cr}$	Critical rate of rise of on-state current $I_T = I_{TGQM}$, $V_D = 2/3 V_{DRM}$, $f = 50 \text{ Hz}$	400	A/μs
$(dv_D/dt)_{cr}$	Critical rate of rise of off-state voltage $V_D = 2/3 V_{DRM}$, $V_{GC} = -2 \text{ V}$	1 000	V/μs
V_{DSP}	Peak turn-off voltage spike due to snubber	500	V
I_{FGCM}	Peak forward gate current	50	A
I_{GCMS}	RMS gate current	40	A
V_{GCM}	Peak reverse gate voltage	-16	V
$t_{on(min)}$	Minimum permissible on-time	50	μs
$t_{off(min)}$	Minimum permissible off-time	100	μs
$T_{jmin} - T_{jmax}$	Operating temperature range	-40 \div 125	$^\circ\text{C}$
$T_{stgmin} - T_{stgmax}$	Storage temperature range	-40 \div 125	$^\circ\text{C}$

Unless otherwise specified $T_j = 125 \text{ }^\circ\text{C}$

Type of GTO Thyristor	Recommended Diodes	
	SNUBBER	FREEWHEEL
5SGS 12F2500	5SDF 06D2504	5SDF 12F2505

Characteristics		Value			Unit
		min.	typ.	max.	
V_{TM}	Maximum peak on-state voltage $I_{GT} = 2 \text{ A}, I_{TM} = 1\,200 \text{ A}$			3.200	V
V_{T0}	Threshold voltage			1.498	V
r_T	Slope resistance $I_{T1} = 530 \text{ A}, I_{T2} = 1\,600 \text{ A}$			1.386	mΩ
I_L	Latching current $T_j = 25 \text{ °C}$		40		A
I_{DM}	Peak off-state current $V_D = V_{DRM}, V_{GC} = -2 \text{ V}$			75	mA
I_{RM}	Peak reverse current $V_R = V_{RRM}$			75	mA
I_{GCM}	Peak negative gate leakage current $V_{GC} = -16 \text{ V}$			50	mA
V_{GT}	Gate trigger voltage $T_j = -40 \div 125 \text{ °C}$			1.5	V
I_{GT}	Gate trigger current $V_D = 12 \text{ V}, R_L = 0.1 \Omega$	$T_j = -40 \text{ °C}$ $T_j = 25 \text{ °C}$ $T_j = 125 \text{ °C}$		9.0 1.0 0.8	A
t_f	Fall time	<i>Definitions as on Fig.9</i> $V_D = 2/3 V_{DRM},$ $I_{TGQ} = I_{TGQM}, C_S = 3 \mu F,$ $V_{GC} = -15 \text{ V},$ $di_{GC}/dt = -30 \text{ A}/\mu s$		1.5	μs
t_s	Storage time			14.5	
t_{gq}	Turn-off time			16	
t_{tail}	Tail time			30	

Unless otherwise specified $T_j = 125 \text{ °C}$

Thermal Parameters		Value	Unit
R_{thjc}	Thermal resistance junction to case <i>double side cooling</i>	24	K/kW
R_{thch}	Thermal resistance case to heatsink, <i>double side cooling</i>	8	K/kW

Transient Thermal Impedance

Analytical function for transient thermal impedance

$$Z_{thjc} = \sum_{i=1}^4 R_i (1 - \exp(-t / \tau_i))$$

Conditions:
 $F_m = 10 \pm 2$ kN, Double side cooled

<i>i</i>	1	2	3	4
R_i (K/kW)	5.92	4.09	8.35	5.65
τ_i (s)	0.4209	0.2289	0.0749	0.0149

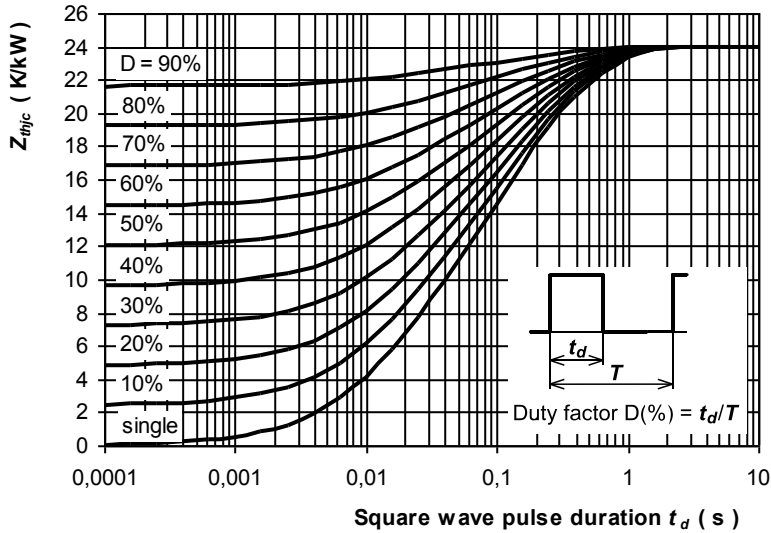


Fig.2 Transient thermal impedance junction to case (Double side cooled)

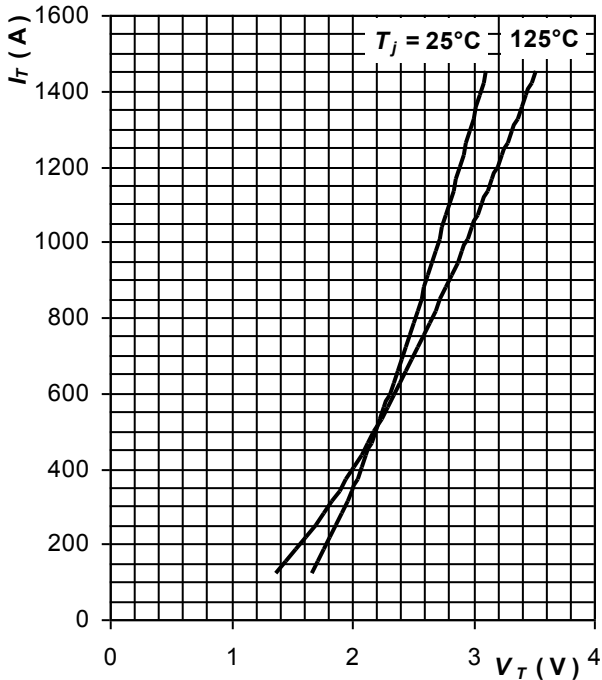


Fig.3 Maximum instantaneous on-state characteristics

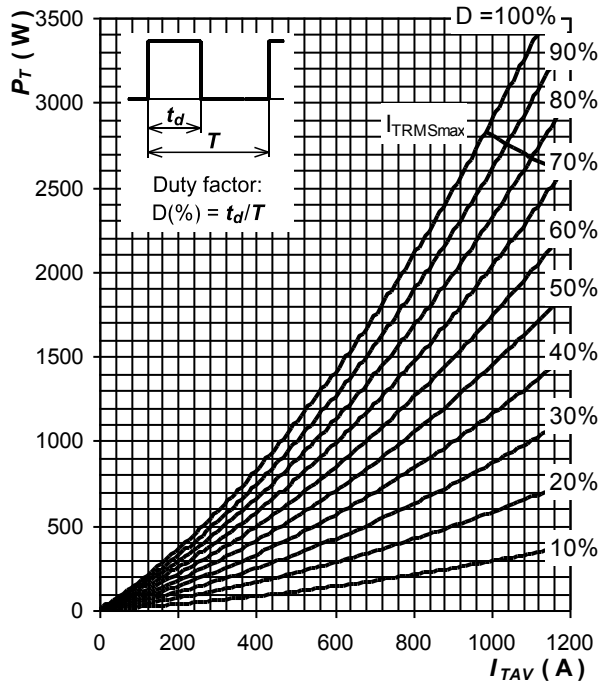


Fig.4 Power losses vs Rectangular pulse current

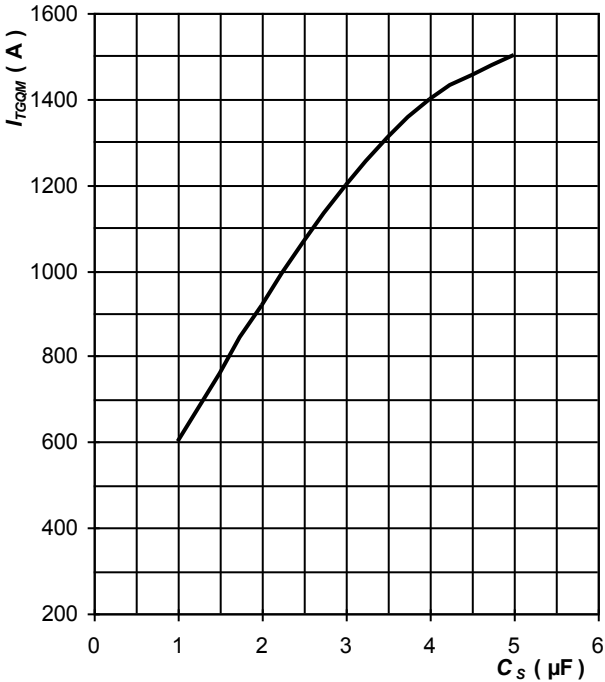


Fig.5 Maximum permissible turn-off current vs Snubber capacitance

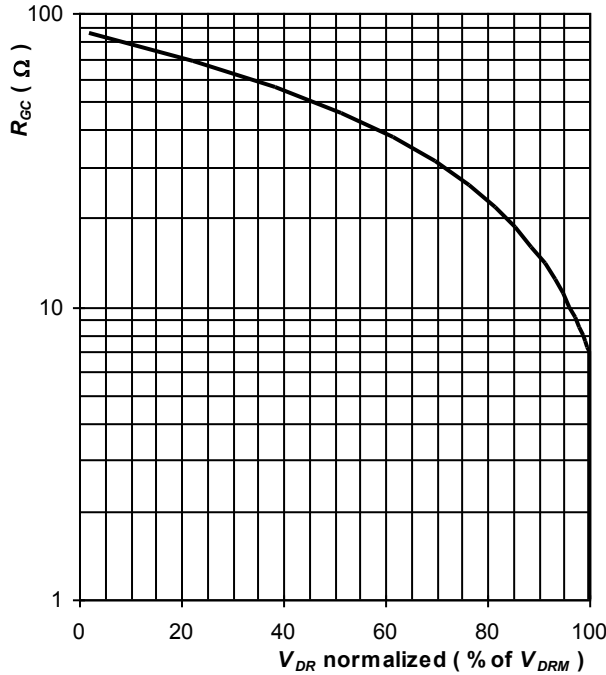


Fig.6 Maximum forward blocking voltage vs External gate-cathode resistance

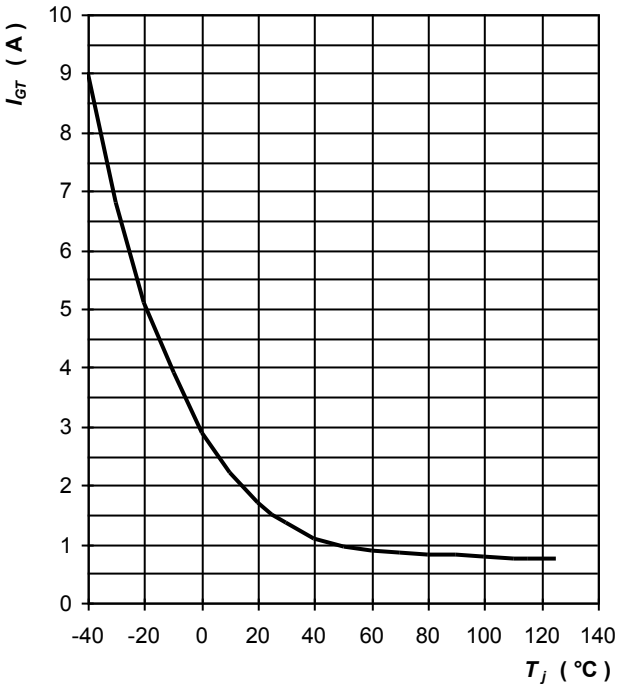


Fig.7 Maximum gate trigger current vs Junction temperature

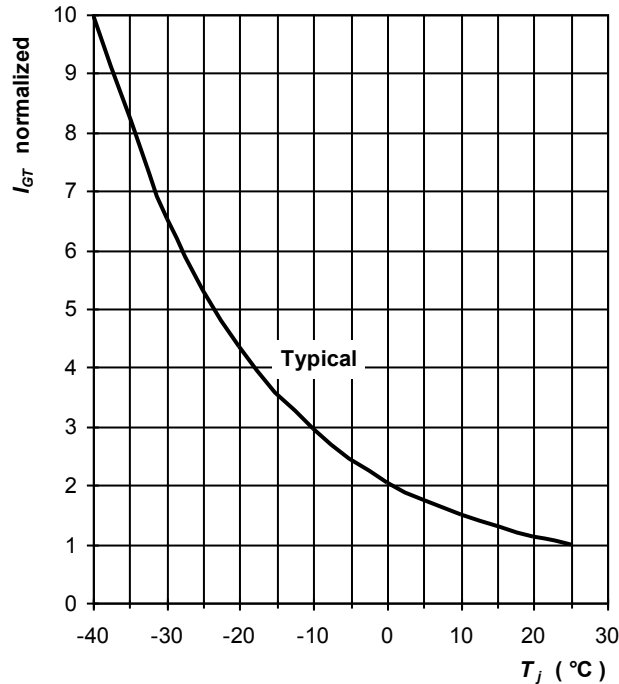


Fig.8 Gate trigger current normalized to I_{GT} by 25°C vs Junction temperature

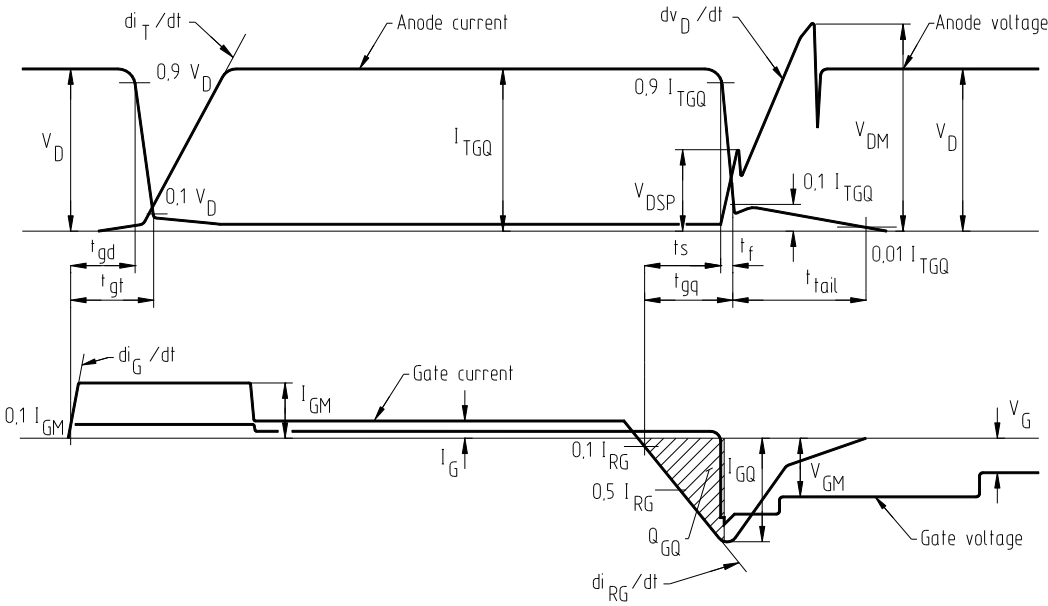


Fig.9 Turn-off waveform diagram

Notes: