

# TG 918-1200-45

## Gate Turn-off Thyristor

### Properties

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

### Key Parameters

$V_{DRM}, V_{RRM}$	=	4 500	V
$I_{TGQM}$	=	1 200	A
$I_{TAVm}$	=	442	A
$I_{TSM}$	=	7 600	A
$V_{TO}$	=	2.285	V
$r_T$	=	1.796	mΩ

### Types

	$V_{DRM}, V_{RRM}$
TG 918-1200-45	4 500 V
TG 918-1200-40	4 000 V
TG 918-1200-36	3 600 V
Conditions:	$T_j = -40 \div 115 \text{ }^\circ\text{C}$ , half sine waveform, $f = 50 \text{ Hz}$

### Mechanical data

$F_m$	Mounting force	10 ± 2 kN
$m$	Weight	0.49 kg
$D_s$	Surface creepage distance	25 mm
$D_a$	Air strike distance	13 mm

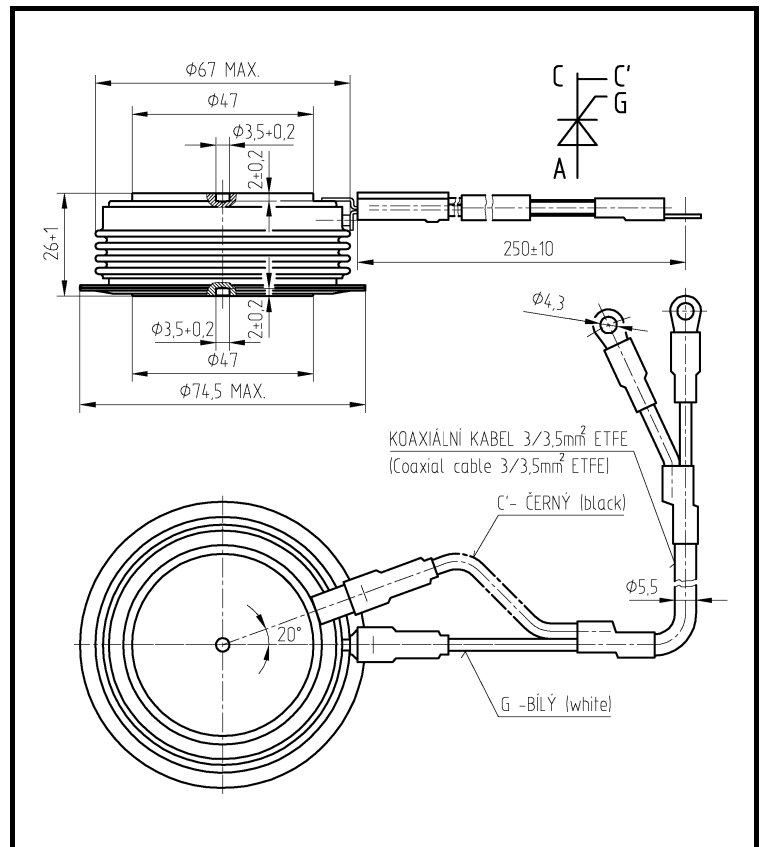


Fig. 1 Case

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<b>Maximum Ratings</b>			<b>Maximum Limits</b>	<b>Unit</b>
$V_{DRM}$ $V_{RRM}$	<b>Repetitive peak off-state and peak reverse voltage</b> $T_j = -40 \div 115 \text{ }^\circ\text{C}$ , $V_{GK} = -2 \text{ V}$	TG 918-1200-45 TG 918-1200-40 TG 918-1200-36	4 500 4 000 3 600	V
$I_{TGQM}$	<b>Peak Turn-off current</b> $T_j = -40 \div 115 \text{ }^\circ\text{C}$ , $C_S = 3 \text{ } \mu\text{F}$ , $di_{GC}/dt = -30 \text{ A}/\mu\text{s}$ , $V_{DM} = 0.8 V_{DRM}$		1 200	A
$I_{TRMS}$	<b>RMS on-state current</b> $T_c = 70 \text{ }^\circ\text{C}$ , half sine waveform, $f = 50 \text{ Hz}$		694	A
$I_{TAVm}$	<b>Average on-state current</b> $T_c = 70 \text{ }^\circ\text{C}$ , half sine waveform, $f = 50 \text{ Hz}$		442	A
$I_{TSM}$	<b>Peak non-repetitive surge</b> half sine pulse, $t_p = 10 \text{ ms}$ , $V_R = 0 \text{ V}$		10 000	A
$I^2t$	<b>Limiting load integral</b> half sine pulse, $t_p = 10 \text{ ms}$ , $V_R = 0 \text{ V}$		500 000	A <sup>2</sup> s
$(di_T/dt)_{cr}$	<b>Critical rate of rise of on-state current</b> $I_T = I_{TGQM}$ , $V_D = 2/3 V_{DRM}$ , $f = 50 \text{ Hz}$		400	A/ $\mu\text{s}$
$(dv_D/dt)_{cr}$	<b>Critical rate of rise of off-state voltage</b> $V_D = 2/3 V_{DRM}$ , $V_{GC} = -2 \text{ V}$		1 000	V/ $\mu\text{s}$
$V_{DSP}$	<b>Peak turn-off voltage spike due to snubber</b>		500	V
$I_{FGCM}$	<b>Peak forward gate current</b>		50	A
$I_{GCMS}$	<b>RMS gate current</b>		40	A
$V_{GCM}$	<b>Peak reverse gate voltage</b>		-16	V
$t_{on(min)}$	<b>Minimum permissible on-time</b>		50	$\mu\text{s}$
$t_{off(min)}$	<b>Minimum permissible off-time</b>		100	$\mu\text{s}$
$T_{jmin} - T_{jmax}$	<b>Operating temperature range</b>		-40 $\div$ 115	$^\circ\text{C}$
$T_{stgmin} - T_{stgmax}$	<b>Storage temperature range</b>		-40 $\div$ 115	$^\circ\text{C}$

Unless otherwise specified  $T_j = 115 \text{ }^\circ\text{C}$

Type of GTO Thyristor	Recommended Diodes	
	SNUBBER	FREEWHEEL
TG 918-1200-45	DM 827-500-45	DM 827-500-45
TG 918-1200-40	DM 827-500-40	DM 827-500-40
TG 918-1200-36	DM 827-500-36	DM 827-500-36

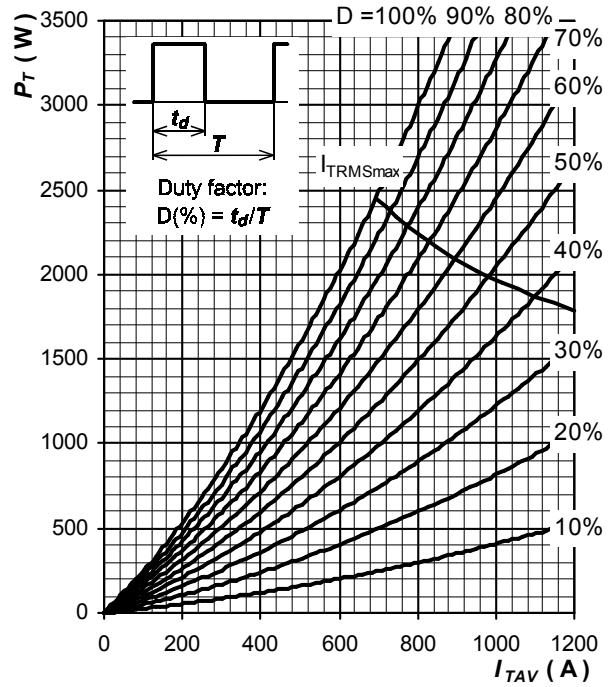
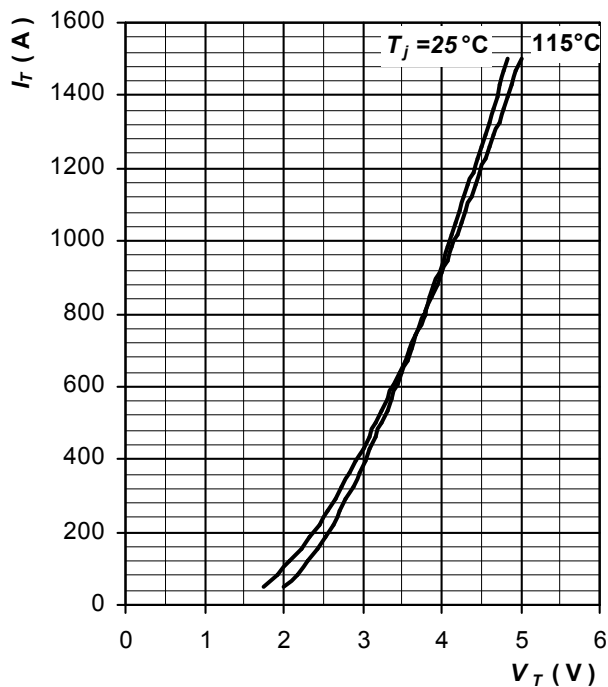
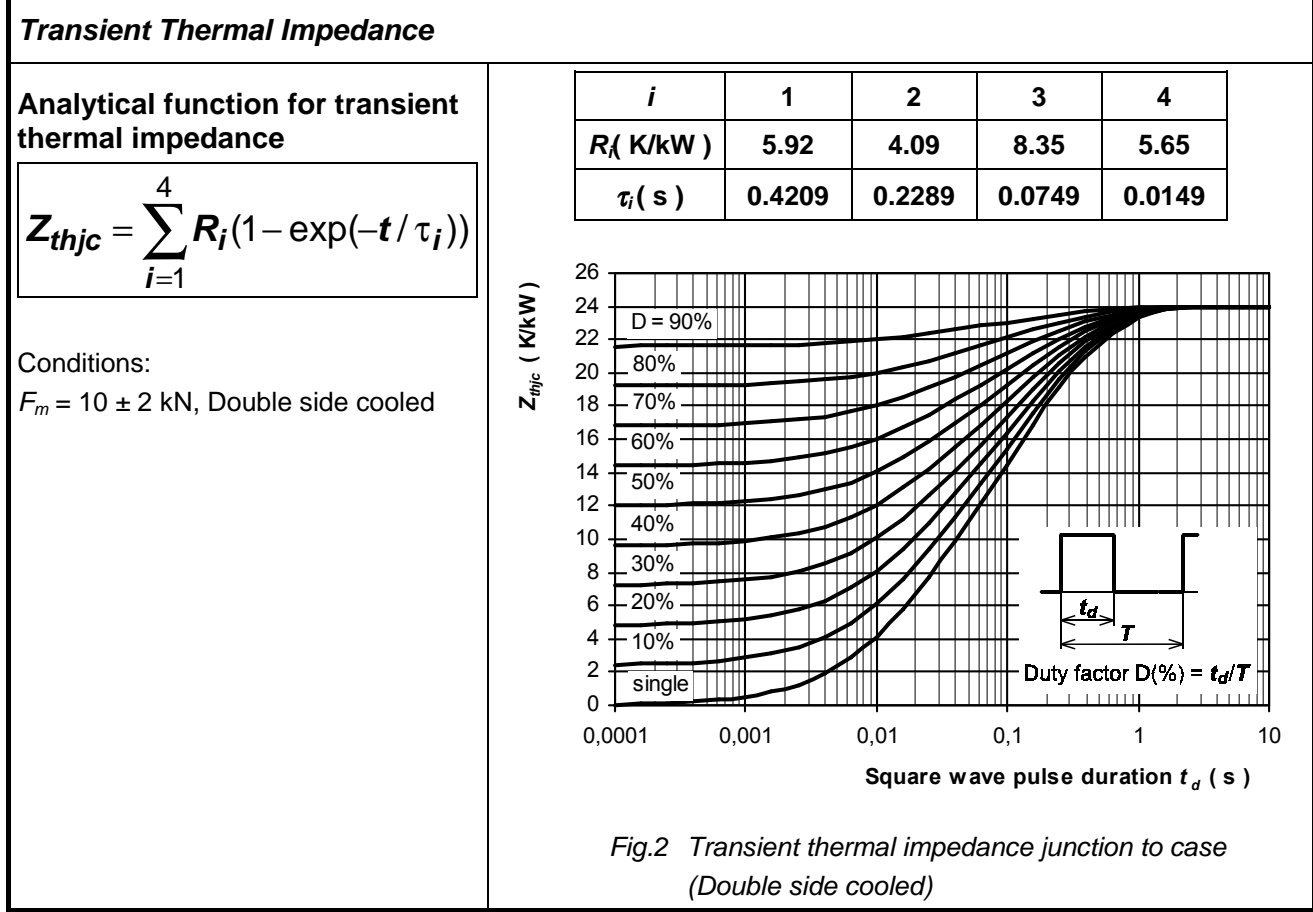
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Characteristics		Value			Unit
		min.	typ.	max.	
$V_{TM}$	<b>Maximum peak on-state voltage</b> $I_{GT} = 2 \text{ A}, I_{TM} = 1\,200 \text{ A}$			4.500	V
$V_{T0}$	<b>Threshold voltage</b>			2.285	V
$r_T$	<b>Slope resistance</b> $I_{T1} = 533 \text{ A}, I_{T2} = 1\,600 \text{ A}$			1.796	mΩ
$I_L$	<b>Latching current</b> $T_j = 25 \text{ °C}$			40	A
$I_{DM}$	<b>Peak off-state current</b> $V_D = V_{DRM}, V_{GC} = -2 \text{ V}$			75	mA
$I_{RM}$	<b>Peak reverse current</b> $V_R = V_{RRM}$			75	mA
$I_{GCM}$	<b>Peak negative gate leakage current</b> $V_{GC} = -16 \text{ V}$			50	mA
$V_{GT}$	<b>Gate trigger voltage</b> $T_j = -40 \div 115 \text{ °C}$			1.5	V
$I_{GT}$	<b>Gate trigger current</b> $V_D = 12 \text{ V}, R_L = 0.1 \text{ } \Omega$	$T_j = -40 \text{ °C}$ $T_j = 25 \text{ °C}$ $T_j = 125 \text{ °C}$		9.0 1.0 0.8	A
$t_f$	<b>Fall time</b>	Definitions as on Fig.9 $V_D = 2/3 V_{DRM},$ $I_{TGQ} = I_{TGQM}, C_S = 3 \mu F,$ $V_{GC} = -15 \text{ V},$ $di_{GC}/dt = -30 \text{ A}/\mu s$		1.5	μs
$t_s$	<b>Storage time</b>			14.5	
$t_{gq}$	<b>Turn-off time</b>			16	
$t_{tail}$	<b>Tail time</b>			30	

Unless otherwise specified  $T_j = 115 \text{ °C}$

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



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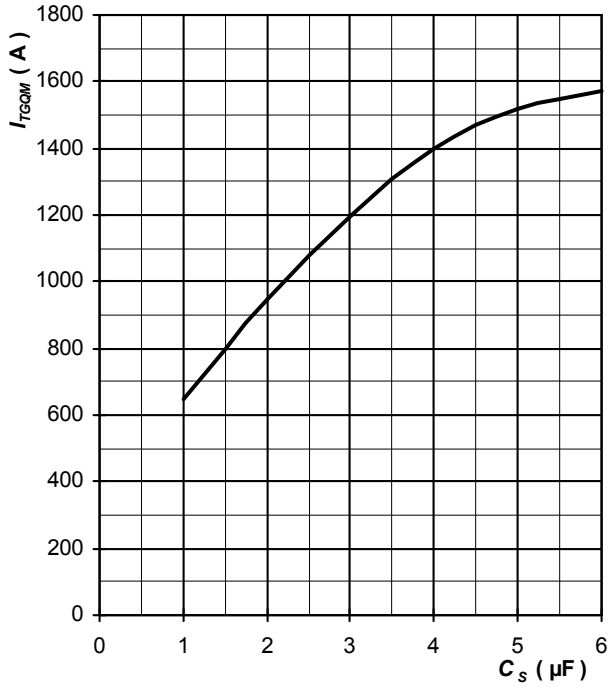


Fig.5 Maximum permissible turn-off current vs Snubber capacitance

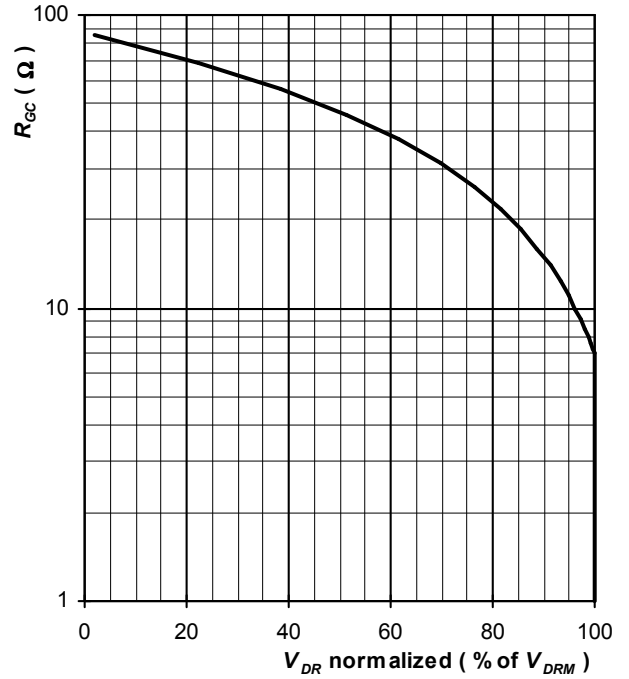


Fig.6 Maximum forward blocking voltage vs External gate-cathode resistance

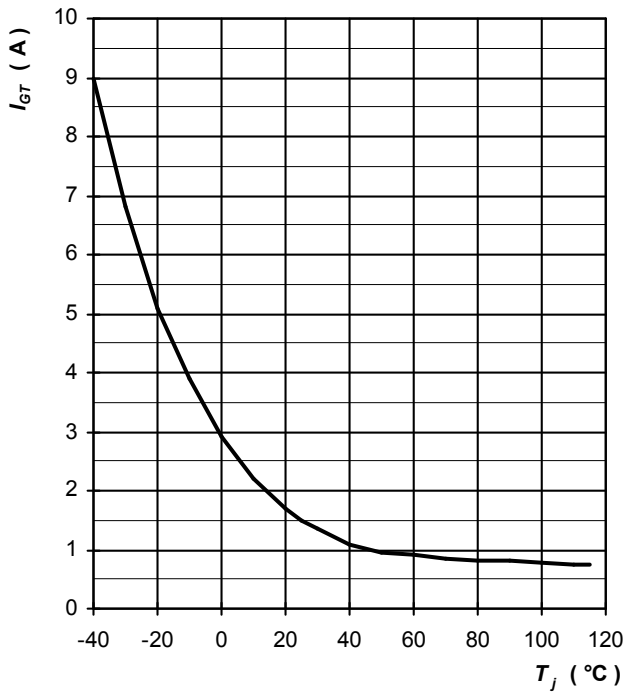


Fig.7 Maximum gate trigger current vs Junction temperature

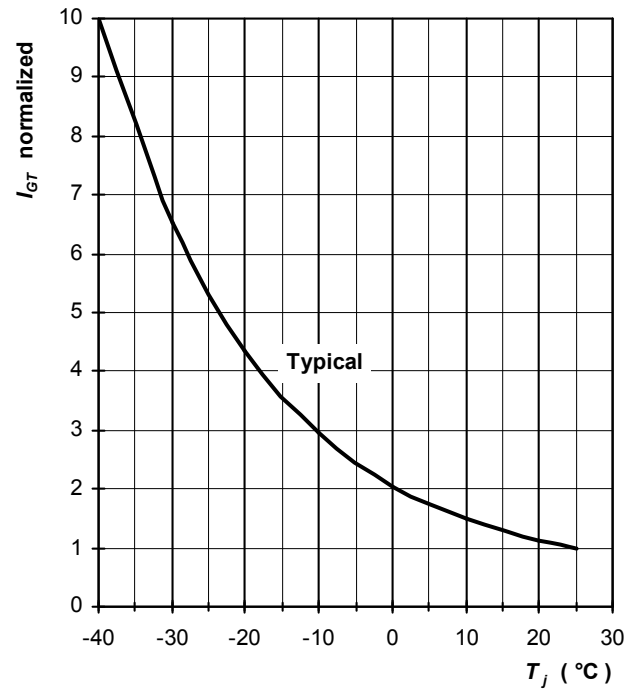


Fig.8 Gate trigger current normalized to  $I_{GT}$  by 25 $^{\circ}C$  vs Junction temperature

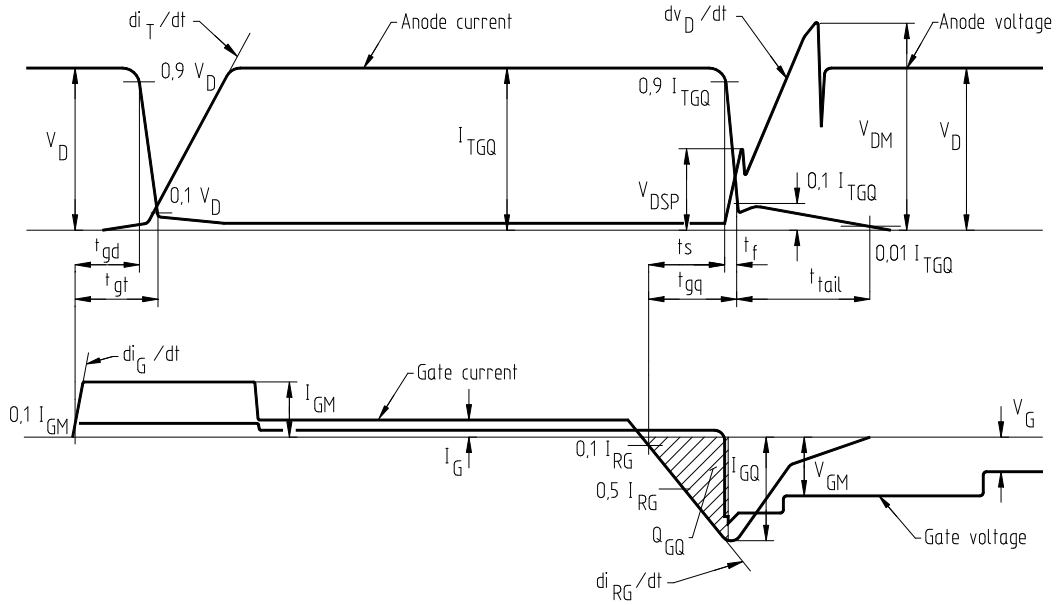


Fig.9 Turn-off waveform diagram

Notes