



5STP 08D2801

Old part no. TV 907-800-28

Phase Control Thyristor

Properties

- High operational capability
- Possibility of serial and parallel connection

Applications

- Controlled rectifiers
- AC drives

Key Parameters

V_{DRM}, V_{RRM}	$= 2\,800$	V
I_{TAVm}	$= 792$	A
I_{TSM}	$= 10\,600$	A
V_{TO}	$= 1.062$	V
r_T	$= 0.492$	mΩ

Types

	V_{RRM}, V_{DRM}
5STP 08D2801	2 800 V
Conditions:	$T_j = -40 \div 125\text{ °C}$, half sine waveform, $f = 50\text{ Hz}$

Mechanical Data

F_m	Mounting force	$10 \pm 2\text{ kN}$
m	Weight	0.26 kg
D_s	Surface creepage distance	25 mm
D_a	Air strike distance	14 mm

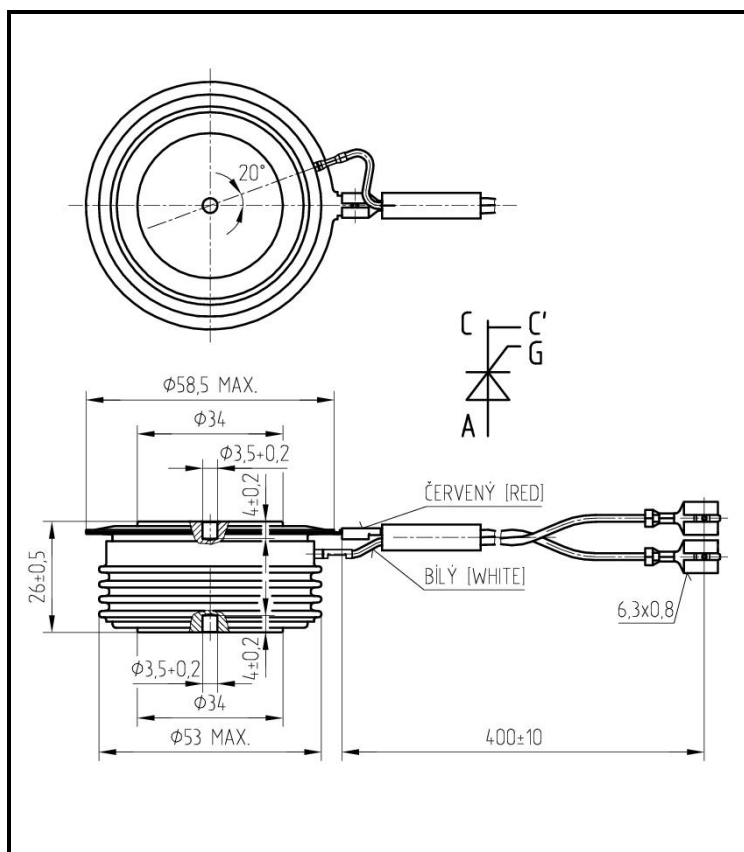


Fig. 1 Case



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Maximum Ratings			Maximum Limits	Unit
V_{RRM} V_{DRM}	Repetitive peak reverse and off-state voltage $T_j = -40 \div 125\text{ }^{\circ}\text{C}$		2 800	V
I_{TRMS}	RMS on-state current $T_c = 70\text{ }^{\circ}\text{C}$, half sine waveform, $f = 50\text{ Hz}$		1 244	A
I_{TAVm}	Average on-state current $T_c = 70\text{ }^{\circ}\text{C}$, half sine waveform, $f = 50\text{ Hz}$		792	A
I_{TSM}	Peak non-repetitive surge half sine pulse, $V_R = 0\text{ V}$	$t_p = 10\text{ ms}$ $t_p = 8.3\text{ ms}$	10 600 11 300	A
I^2t	Limiting load integral half sine pulse, $V_R = 0\text{ V}$	$t_p = 10\text{ ms}$ $t_p = 8.3\text{ ms}$	561 800 530 000	A²s
$(di_T/dt)_{cr}$	Critical rate of rise of on-state current $I_T = I_{TAVm}$, half sine waveform, $f = 50\text{ Hz}$, $V_D = 2/3 V_{DRM}$, $t_r = 0.3\text{ }\mu\text{s}$, $I_{GT} = 2\text{ A}$		200	A/μs
$(dv_D/dt)_{cr}$	Critical rate of rise of off-state voltage $V_D = 2/3 V_{DRM}$		1 000	V/μs
P_{GAVm}	Maximum average gate power losses		3	W
I_{FGM}	Peak gate current		10	A
V_{FGM}	Peak gate voltage		12	V
V_{RGM}	Reverse peak gate voltage		10	V
$T_{jmin} - T_{jmax}$	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 $T_j = 125\text{ }^{\circ}\text{C}$

Characteristics			Value			Unit
			min.	typ.	max.	
V_{TM}	Maximum peak on-state voltage $I_{TM} = 1\,500\text{ A}$				1.800	V
V_{T0}	Threshold voltage				1.062	V
r_T	Slope resistance $I_{T1} = 1\,000\text{ A}, I_{T2} = 3\,000\text{ A}$				0.492	mΩ
I_{DM}	Peak off-state current $V_D = V_{DRM}$				70	mA
I_{RM}	Peak reverse current $V_R = V_{RRM}$				70	mA
t_{gd}	Delay time $T_j = 25\text{ °C}, V_D = 0.4\text{ V}_{DRM}, I_{TM} = I_{TAVm},$ $t_r = 0.3\text{ μs}, I_{GT} = 2\text{ A}$				2	μs
t_q	Turn-off time $I_T = 1500\text{ A}, di_T/dt = 12.5\text{ A/μs},$ $V_D = 2/3\text{ V}_{DRM}, dv_D/dt = 50\text{ V/μs}$			200		μs
Q_{rr}	Recovery charge the same conditions as at t_q			1 600		μC
I_H	Holding current	$T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$		170 90		mA
I_L	Latching current	$T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$		450 350		mA
V_{GT}	Gate trigger voltage $V_D = 12\text{ V}, I_T = 4\text{ A}$	$T_j = -40\text{ °C}$ $T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$	0.25		4 3 2	V
I_{GT}	Gate trigger current $V_D = 12\text{ V}, I_T = 4\text{ A}$	$T_j = -40\text{ °C}$ $T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$	10		500 250 150	mA

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

Thermal Parameters			Value	Unit
R_{thjc}	Thermal resistance junction to case double side cooling		32.0	K/kW
	anode side cooling		52.0	
	cathode side cooling		83.0	
R_{thch}	Thermal resistance case to heatsink double side cooling		10.0	K/kW
	single side cooling		20.0	

Transient Thermal Impedance

Analytical function for transient thermal impedance

$$Z_{thjc} = \sum_{i=1}^5 R_i (1 - \exp(-t / \tau_i))$$

Conditions:

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

Correction for periodic waveforms

180° sine: add 2.3 K/kW

180° rectangular: add 3.1 K/kW

120° rectangular: add 5.2 K/kW

60° rectangular: add 8.7 K/kW

i	1	2	3	4	5
τ_i (s)	0.4857	0.2162	0.0762	0.0043	0.0006
R_i (K/kW)	13.07	8.03	8.20	2.57	0.13

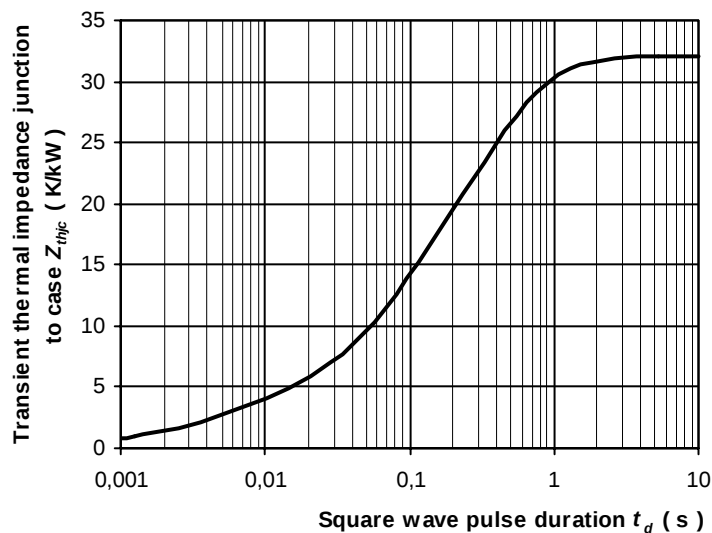


Fig. 2 Dependence transient thermal impedance junction to case on square pulse

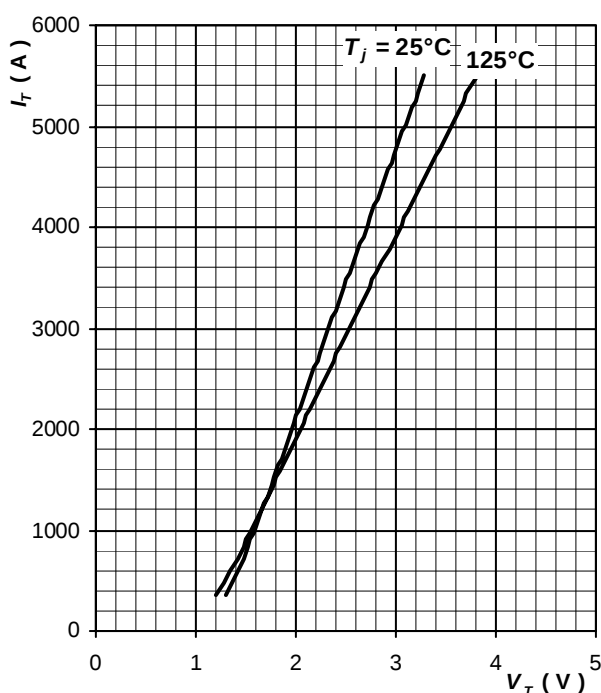


Fig. 3 Maximum on-state characteristics

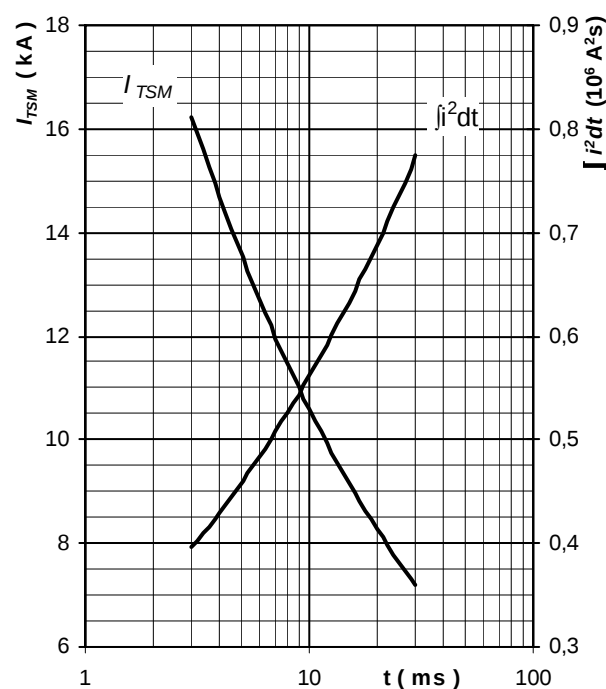


Fig. 4 Surge on-state current vs. pulse length, half sine wave, single pulse, $V_R = 0$ V, $T_j = T_{jmax}$

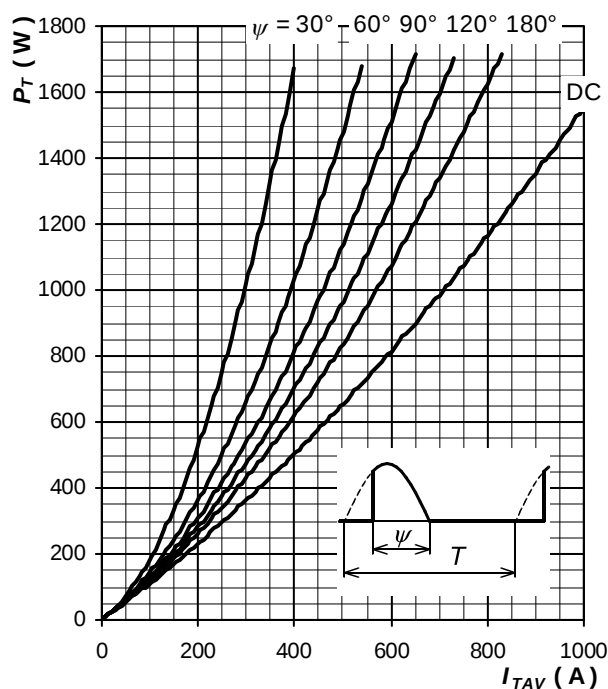


Fig. 5 On-state power loss vs. average on-state current, sine waveform, $f = 50$ Hz, $T = 1/f$

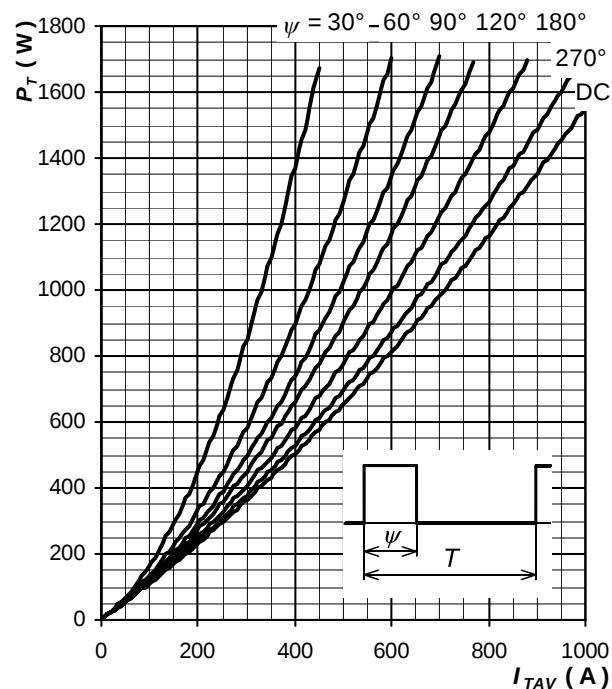


Fig. 6 On-state power loss vs. average on-state current, square waveform, $f = 50$ Hz, $T = 1/f$

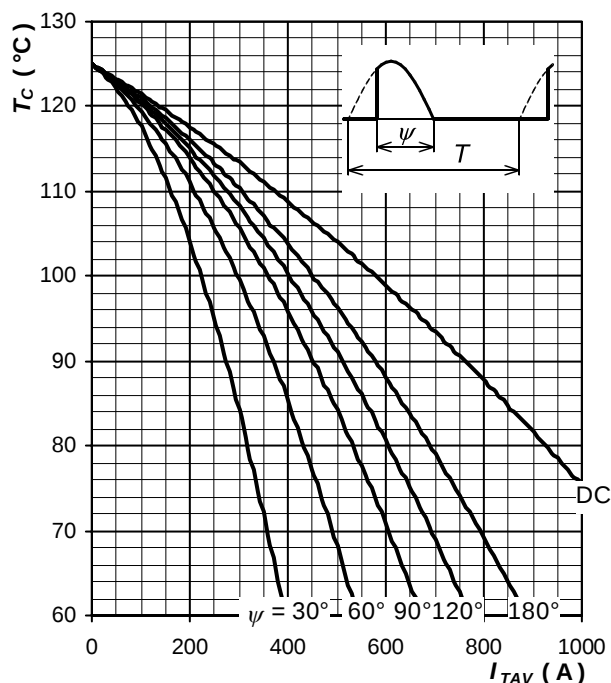


Fig. 7 Max. case temperature vs. aver. on-state current, sine waveform, $f = 50$ Hz, $T = 1/f$

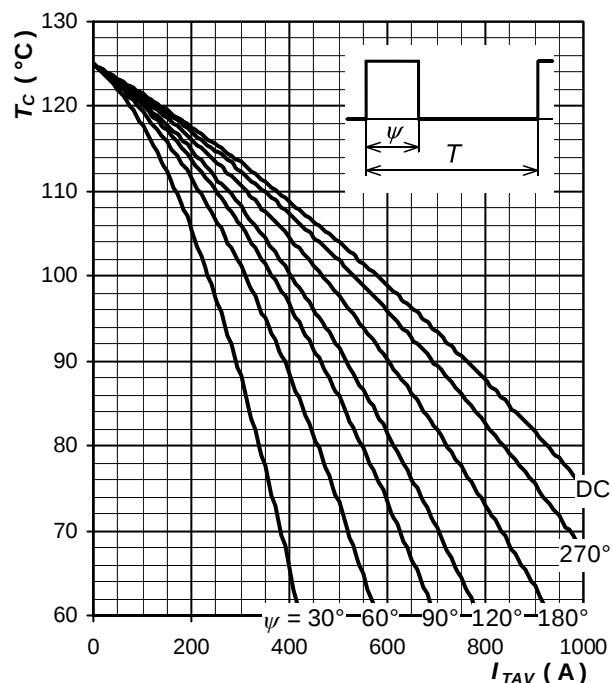


Fig. 8 Max. case temperature vs. aver. on-state current, square waveform, $f = 50$ Hz, $T = 1/f$

Notes: