



# TRIAC

## TS242-80

- ◆  $V_{DRM} = \underline{100 \div 1300 \text{ V}}$
- ◆  $I_{TRMS} = \underline{80 \text{ A}}$  ( $T_C = 85 \text{ }^\circ\text{C}$ )
- ◆  $I_{TSM} = \underline{0.58 \text{ kA}}$  ( $T_{Vj} = 125 \text{ }^\circ\text{C}$ )

- ◆ AC switch with one gate terminal on one Si - wafer
- ◆ double polar drive
- ◆ threaded stud design



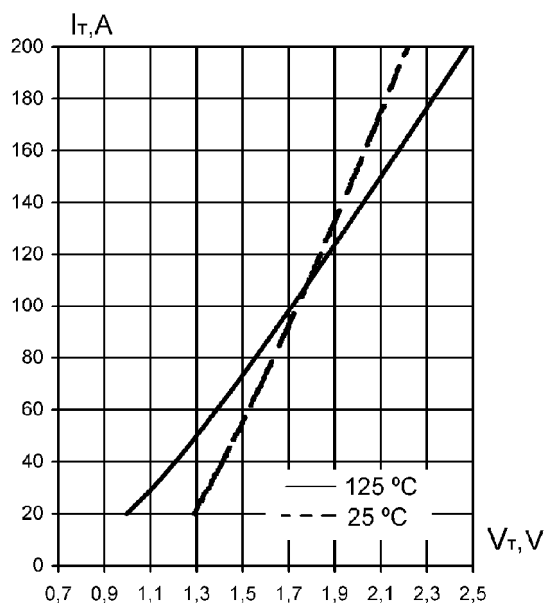
### MAXIMUM RATED VALUES

Parameter and conditions	Symbol	Values			Units
		min.	typ.	max.	
Repetitive peak off-state voltage, $T_{Vj} = -60 \text{ }^\circ\text{C} \dots +125 \text{ }^\circ\text{C}$	$V_{DRM}$	100	-	1300	V
Non-repetitive peak off-state voltage, $T_{Vj} = -60 \text{ }^\circ\text{C} \dots +125 \text{ }^\circ\text{C}$	$V_{DSM}$	200	-	1400	
Repetitive peak off-state current, $T_{Vj} = 125 \text{ }^\circ\text{C}$ , $V_D = V_{DRM}$	$I_{DRM}$	-	-	7	mA
Max. average on-state current, $f = 50 \text{ Hz}$ , $T_C = 85 \text{ }^\circ\text{C}$	$I_{TRMS}$	-	-	80	A
Surge non-repetitive current, $T_{Vj} = 125 \text{ }^\circ\text{C}$ , $t_p = 20 \text{ ms}$	$I_{TSM}$	-	-	0.58	kA
Critical rate of rise of on-state current, $V = 0,67V_{DRM}$ , $I_T = 160 \text{ A}$ , $I_{FG} = 1 \text{ A}$ , $t_r = 1 \text{ } \mu\text{s}$ , $f = 50 \text{ Hz}$ , $T_{Vj} = 125 \text{ }^\circ\text{C}$	$(di_T/dt)_{crit}$	-	-	63	A/ $\mu\text{s}$
Critical rate of rise of switching voltage, $V_D = 0,67V_{DRM}$ , $T_{Vj} = 125 \text{ }^\circ\text{C}$ , $I_T = I_{TRMS}$ , $t_p = 10 \text{ ms}$	$(dV_D/dt)_{com}$	2.5	-	100	V/ $\mu\text{s}$
Gate power loss, DC	$P_{GM}$	-	-	1	W
Control quadrants		1, 3, 4			
Operation junction temperature range	$T_{Vj}$	- 60	-	+ 125	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	- 60	-	+ 50	

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<b>ELECTRICAL CHARACTERISTICS</b>					
Maximum peak on-state voltage, $I_T = 113 \text{ A}$ , $T_{Vj} = 25 \text{ °C}$	$V_{TM}$	-	-	1.80	V
On-state threshold voltage, $T_{Vj} = 125 \text{ °C}$ , $I_T = 50 \div 170 \text{ A}$	$V_{(TO)}$	-	-	0.90	
On-state slope resistance, $T_{Vj} = 125 \text{ °C}$ , $I_T = 50 \div 170 \text{ A}$	$r_T$	-	-	8	mΩ
Gate trigger voltage, $V_D = 12 \text{ V}$ , $T_{Vj} = -60 \text{ °C}$ $T_{Vj} = 25 \text{ °C}$ $T_{Vj} = 125 \text{ °C}$	$V_{GT}$	-	-	8.5 5.0 2.5	V
Gate trigger current, $V_D = 12 \text{ V}$ , $T_{Vj} = -60 \text{ °C}$ $T_{Vj} = 25 \text{ °C}$ $T_{Vj} = 125 \text{ °C}$	$I_{GT}$	-	-	700 200 150	mA
Gate non-trigger voltage, $V_D = 0,67V_{DRM}$ , $T_{Vj} = 125 \text{ °C}$	$V_{GD}$	0.25	-	-	V
<b>THERMAL PARAMETERS</b>					
Thermal resistance junction to case	$R_{th(j-c)}$	-	-	0.34	°C/W
Thermal resistance case to heatsink	$R_{th(c-h)}$	-	-	0.15	
<b>MECHANICAL PARAMETERS</b>					
Weight	w	-	0.05	-	kg
Torque	$M_d$	9	-	11	Nm

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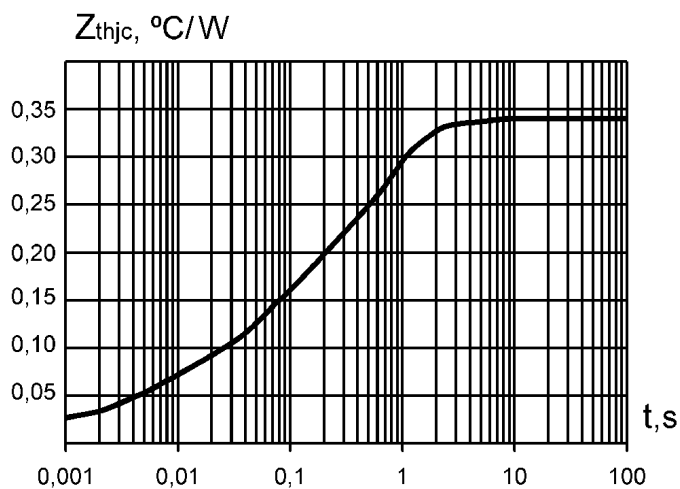
**Fig. 1. Maximum on-state characteristics**  
(Limit device, 10 ms, half sine)

### On-state characteristics model

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

Valid for  $I_T = 20 \div 200\text{ A}$

	$T_{Vj} = 125\text{ }^\circ\text{C}$	$T_{Vj} = 25\text{ }^\circ\text{C}$
A	0.464	1.113
B	0.007532	0.003196
C	0.162	-0.027
D	-0.025	0.043



**Fig. 2. Transient thermal impedance junction to case**

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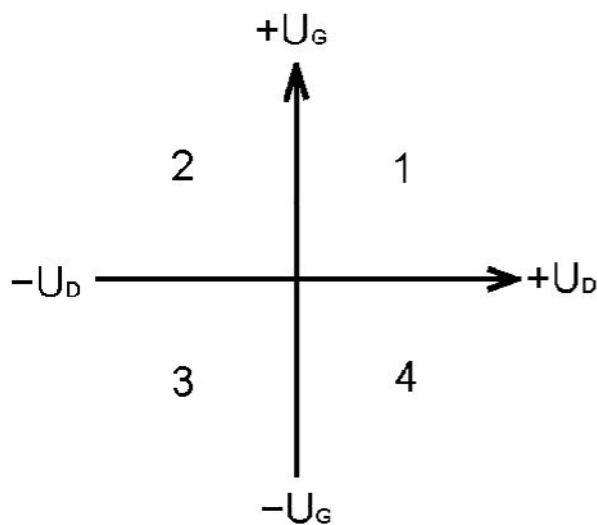


Fig. 3. Control quadrants

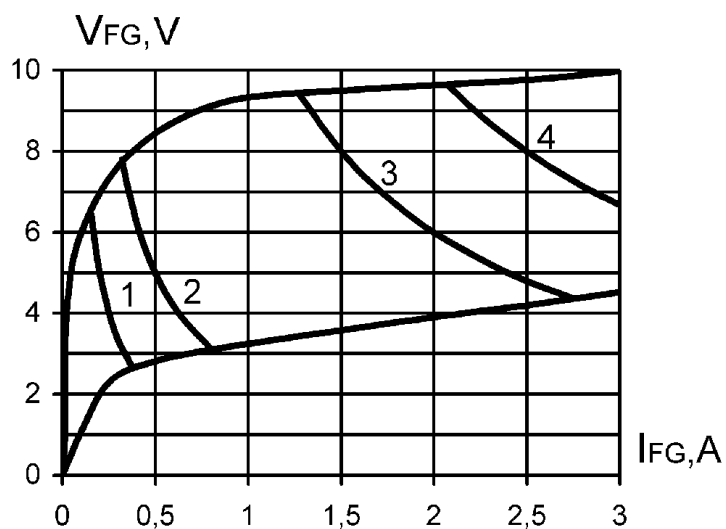
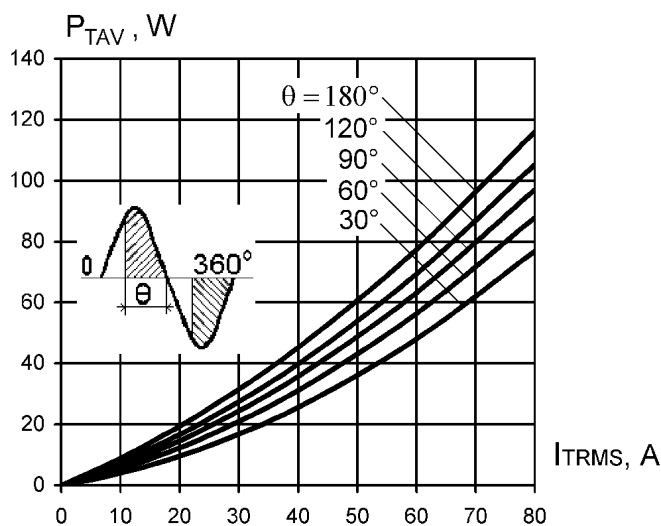


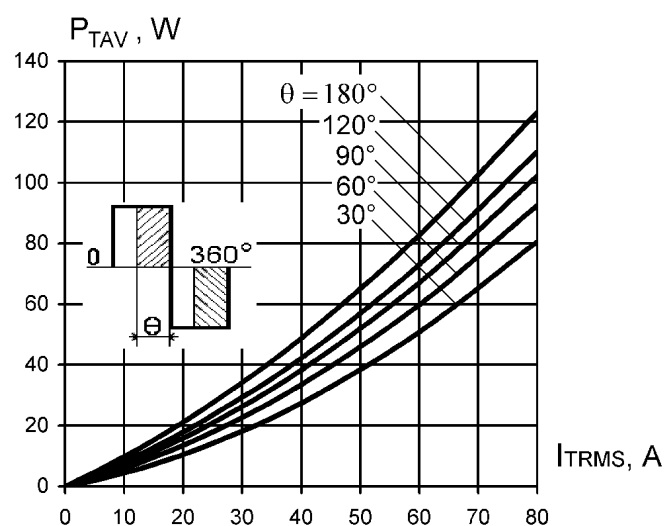
Fig. 4. Maximum peak gate power losses

Position at fig. 4	Duty cycle, $D = f \cdot t_p$	Gate pulse length, $t_p$ , ms	Maximum gate pulse power $P_{GM}$ , W
1	1	DC	1
2	2	10	2,5
3	20	1,0	12
4	40	0,5	20

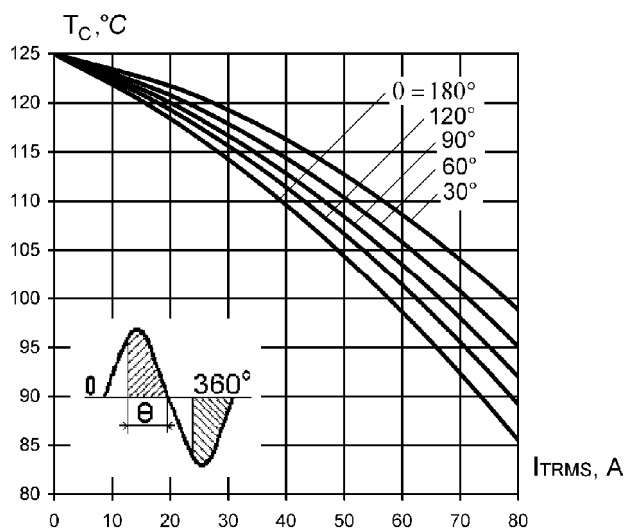
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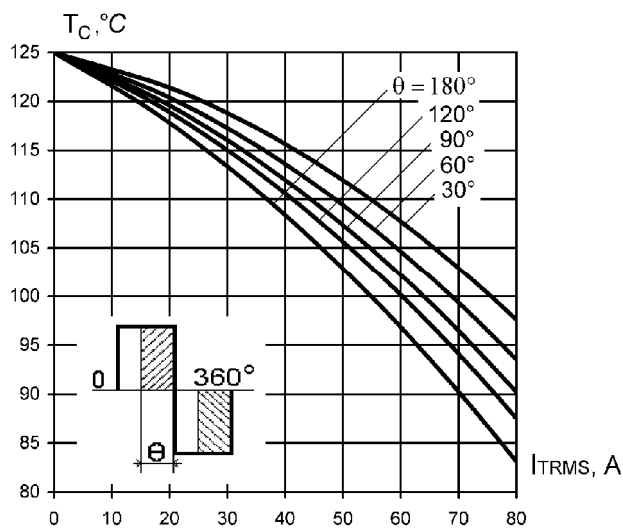
**Fig. 5. Mean power of losses (sine)**



**Fig. 6. Mean power of losses (rectangular)**



**Fig. 7. Maximum allowable case temperature (sine)**



**Fig. 8. Maximum allowable case temperature (rectangular)**

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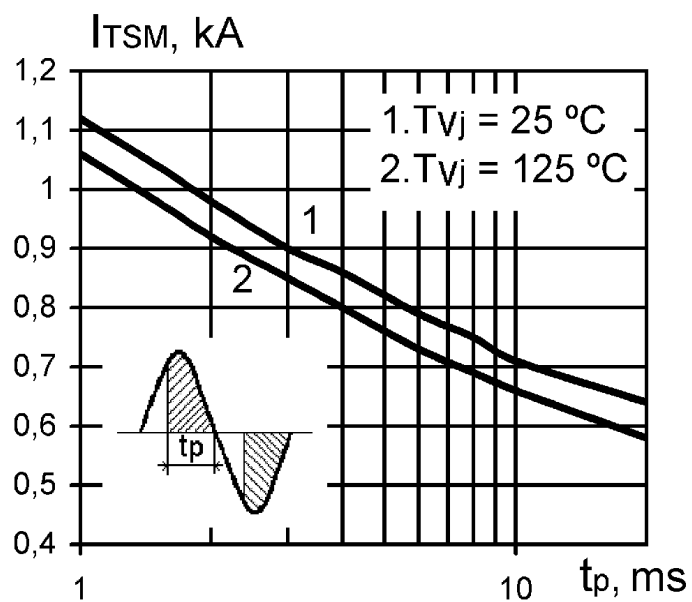


Fig. 9. Surge on-state current vs. pulse length



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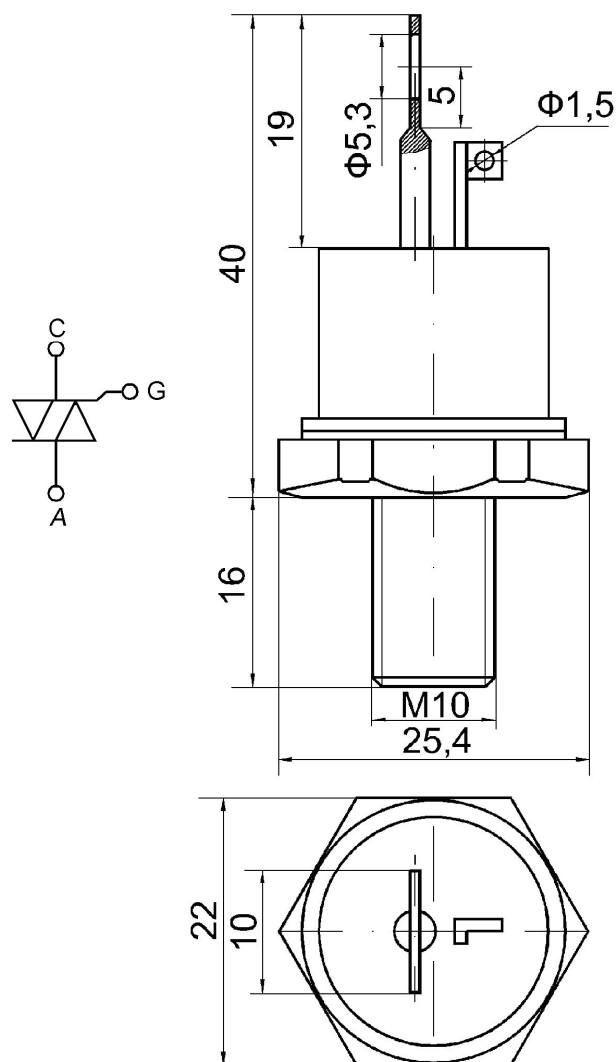


Fig. 10. Device Outline Drawing  
(dimensions in mm)

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