

## SENSITIVE GATE SCR

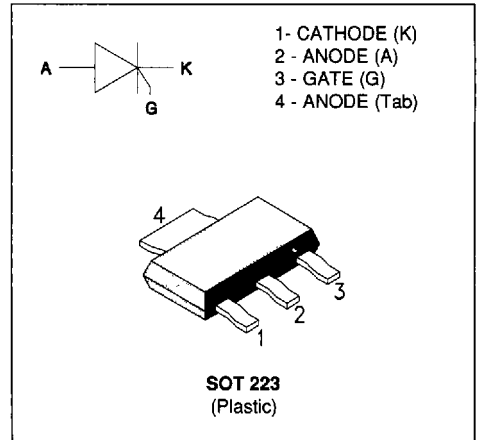
### FEATURES

- $I_T(\text{RMS}) = 1 \text{ A}$
- $V_{\text{DRM}} = 400 \text{ V} / 600 \text{ V} / 800 \text{ V}$
- $I_{\text{GT}} \leq 200 \mu\text{A}$

### DESCRIPTION

The TS120F high voltage series of Silicon Controlled Rectifiers use a high performance planar diffused PNPn, glass passivated sensitive gate technology. Packaged in SOT 223, suitable for surface mounting.

These parts are intended for general purpose switching and phase control applications.



### ABSOLUTE RATINGS (limiting values)

Symbol	Parameter	Value	Unit	
$I_T(\text{RMS})$	RMS on-state current Single phase circuit (180° conduction angle)	$T_{\text{tab}} = 95^\circ\text{C}$ 1	A	
$I_T(\text{AV})$	Mean on-state current Single phase circuit (180° conduction angle)	$T_{\text{tab}} = 95^\circ\text{C}$ 0.65	A	
$I_{\text{TSM}}$	Non repetitive surge peak on-state current ( $T_j$ initial = $25^\circ\text{C}$ )	$t_p = 8.3 \text{ ms}$	7.5	A
		$t_p = 10 \text{ ms}$	7	
$I^2t$	$I^2t$ Value for fusing	$t_p = 10 \text{ ms}$ 0.25	$\text{A}^2\text{s}$	
$di/dt$	Critical rate of rise of on-state current $I_G = 10 \text{ mA}$ $di_G/dt = 0.1 \text{ A}/\mu\text{s}$ .	50	$\text{A}/\mu\text{s}$	
$T_{\text{stg}}$ $T_j$	Storage and operating junction temperature range	- 40, + 125 - 40, + 125	$^\circ\text{C}$	
$T_l$	Maximum lead temperature for soldering during 10s	260	$^\circ\text{C}$	

Symbol	Parameter	TS120			Unit
		-400F	-600F	800F	
$V_{\text{DRM}}$ $V_{\text{RRM}}$	Repetitive peak off-state voltage $T_j = 125^\circ\text{C}$ $R_{\text{GK}} = 1\text{K}\Omega$	400	600	800	V

## THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
Rth (j - t)	Junction to tab for D.C	25	°C/W
Rth (j - a)	Junction to ambient with 5 cm <sup>2</sup> copper surface under tab	60	

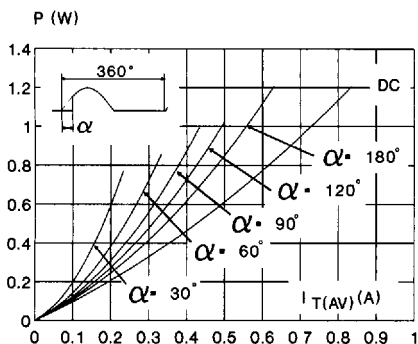
## GATE CHARACTERISTICS (maximum values)

$P_{GM} = 2 \text{ W}$  ( $t_p = 20 \mu\text{s}$ )  $P_G (AV) = 100 \text{ mW}$   $I_{FGM} = 1 \text{ A}$  ( $t_p = 20 \mu\text{s}$ )  $V_{FGM} = 10 \text{ V}$  ( $t_p = 20 \mu\text{s}$ )  $V_{RGM} = 5 \text{ V}$ .

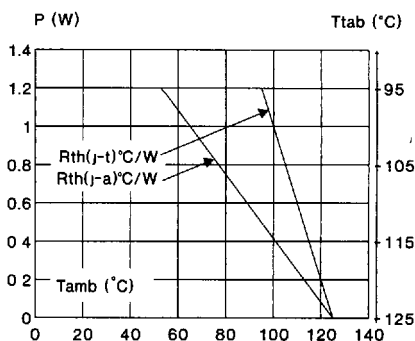
## ELECTRICAL CHARACTERISTICS

Symbol	Test Conditions			Value	Unit	
I <sub>GT</sub>	V <sub>D</sub> =12V (DC) R <sub>L</sub> =140Ω	T <sub>J</sub> = 25°C	MAX	200	μA	
V <sub>GT</sub>	V <sub>D</sub> =12V (DC) R <sub>L</sub> =140Ω	T <sub>J</sub> = 25°C	MAX	0.8	V	
V <sub>GD</sub>	V <sub>D</sub> =V <sub>DRM</sub> R <sub>L</sub> =3.3kΩ R <sub>GK</sub> = 1 KΩ	T <sub>J</sub> = 125°C	MIN	0.1	V	
t <sub>gd</sub>	V <sub>D</sub> =V <sub>DRM</sub> I <sub>G</sub> = 10mA dI <sub>G</sub> /dt = 0.15A/μs	T <sub>J</sub> = 25°C	MAX	0.5	μs	
I <sub>L</sub>	I <sub>G</sub> =1mA R <sub>GK</sub> = 1 KΩ	T <sub>J</sub> = 25°C	TYP	6	mA	
			MAX	8		
I <sub>H</sub>	I <sub>T</sub> = 50mA R <sub>GK</sub> = 1 KΩ	T <sub>J</sub> = 25°C	TYP	4	mA	
			MAX	6		
V <sub>TM</sub>	I <sub>TM</sub> = 2A t <sub>p</sub> = 380μs	T <sub>J</sub> = 25°C	MAX	2.1	V	
I <sub>DRM</sub> I <sub>RRM</sub>	V <sub>DRM</sub> Rated V <sub>RRM</sub> Rated	TS120-400F	T <sub>J</sub> = 125°C	MAX	0.1	mA
		TS120-600F			0.1	
		TS120-800F			0.5	
t <sub>q</sub>	I <sub>T</sub> = 2A V <sub>R</sub> =35V V <sub>D</sub> =67%V <sub>DRM</sub> dI <sub>T</sub> /dt=30A/μs R <sub>GK</sub> = 1 KΩ	T <sub>J</sub> = 125°C	MAX	200	μs	
dV/dt	Linear slope up to V <sub>D</sub> =67%V <sub>DRM</sub>	R <sub>GK</sub> = 1 KΩ	T <sub>J</sub> = 125°C	MIN	50	V/μs
		R <sub>GK</sub> = 1 KΩ C <sub>GK</sub> =4.7nF		MIN	500	

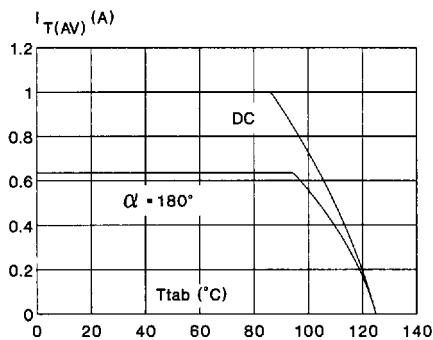
**Fig.1** : Maximum average power dissipation versus average on-state current.



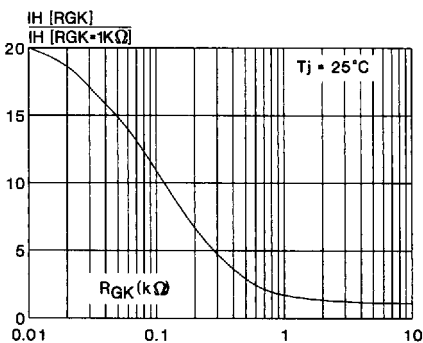
**Fig.2** : Correlation between maximum average power dissipation and maximum allowable temperatures ( $T_{amb}$  and  $T_{tab}$ ).



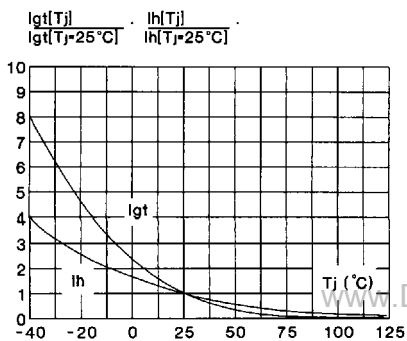
**Fig.3** : Average on-state current versus tab temperature.



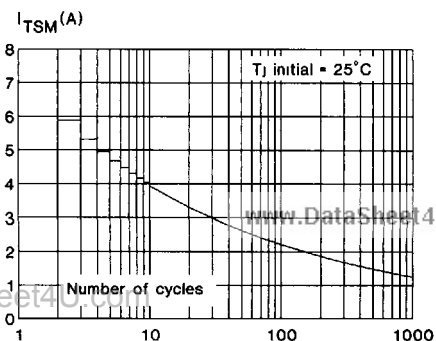
**Fig.4** : Relative variation of holding current versus gate-cathode resistance (typical values).



**Fig.5** : Relative variation of gate trigger current and holding current versus junction temperature.

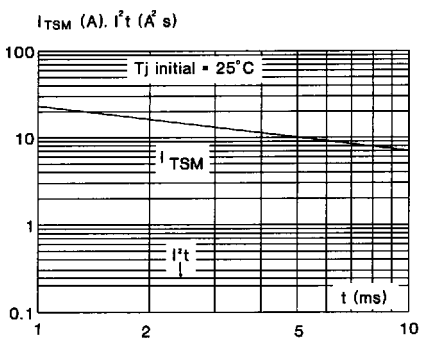


**Fig.6** : Non Repetitive surge peak on-state current versus number of cycles.

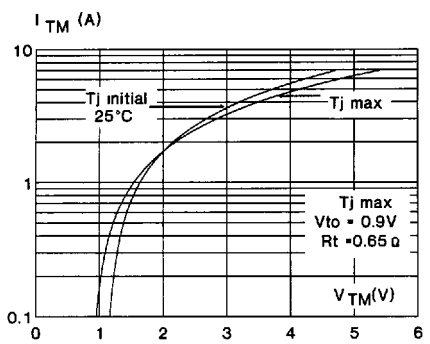


# TS120 F

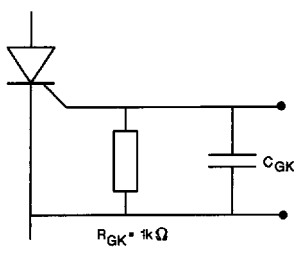
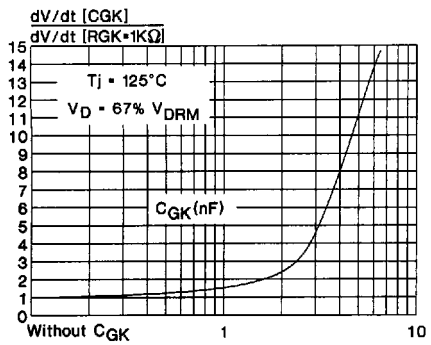
**Fig.7 :** Non repetitive surge peak on-state current for a sinusoidal pulse with width :  $t \leq 10\text{ms}$ , and corresponding value of  $I^2t$ .



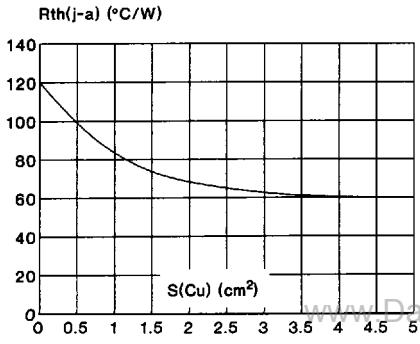
**Fig.8 :** On-state characteristics (maximum values).



**Fig.9 :** Relative variation of  $dV/dt$  immunity versus gate-cathode capacitance (typical values).



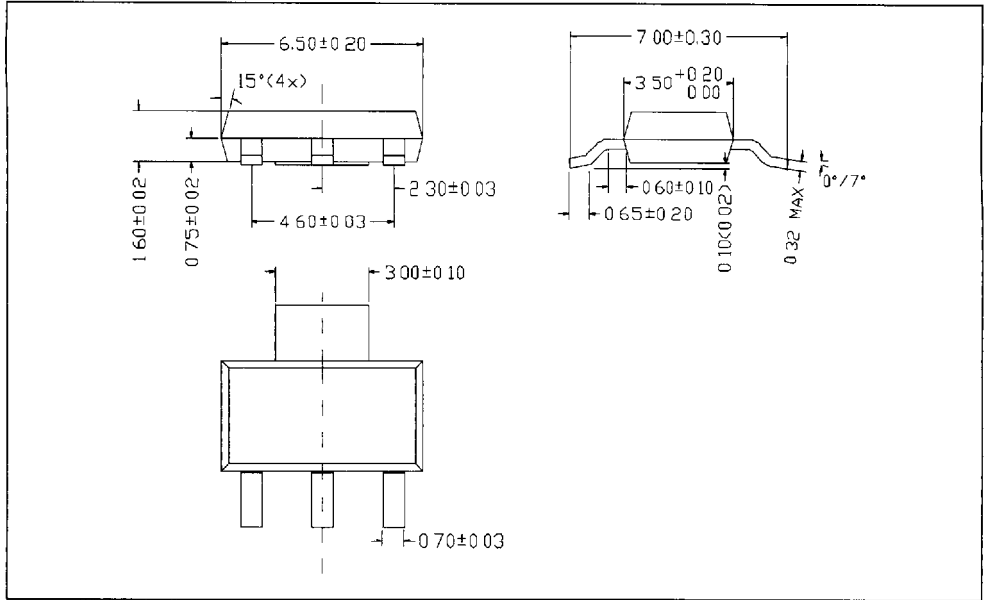
**Fig.10 :** Thermal resistance junction to ambient versus copper surface under tab.



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**PACKAGE MECHANICAL DATA** (in millimeters)  
SOT 223 Plastic



Cooling method : C  
 Marking : Type number  
 Weight : 0.11 g  
 Polarity : N A  
 Stud torque : N A