SGS-THOMSON MICROELECTRONICS

TGF149-100A → 600A

FAST SWITCHING THYRISTORS

- GLASS PASSIVATED CHIP
- HIGH STABILITY AND RELIABILITY
- EXCELLENT SURGE CAPABILITY
- HIGH di/dt AND dv/dt RATINGS
- $t_q \leq 20\ \mu s$

TO 65
(Metal)

DESCRIPTION

SCR designed for high frequency power switching applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{T(RMS)}$	RMS on-state Current (1)	T_C = 65 °C	63	A
$I_{T(AV)}$	Mean on-state Current (1)	T_C = 65 °C	40	A
I_{TSM}	Non Repetitive Surge Peak on-state Current (T_j initial ≤ 125 °C) (2)	t = 8.3 ms	960	A
		t = 10 ms	920	
I^2t	I^2t Value for Fusing	t = 10 ms	4230	A^2s
di/dt	Critical Rate of Rise of on-state Current (3)		200	A/µs
T_{stg} T_j	Storage and Operating Junction Temperature Range		– 40 to 150 – 40 to 125	°C °C

Symbol	Parameter	TGF149-						Unit
		100A	200A	300A	400A	500A	600A	
V_{DRM} V_{RRM}	Repetitive Peak off-state Voltage (4)	100	200	300	400	500	600	V

(1) Single phase circuit, 180° conduction angle.
(2) Half sine wave.
(3) I_G = 1 A di_G/dt = 1 A/µs.
(4) T_j = 125 °C .

THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case for D.C.	1.08	°C/W
$R_{th\ (c-h)}$	Contact (case to heatsink)	0.30	°C/W

GATE CHARACTERISTICS (maximum values)

P_{GM} = 80 W (t_p = 500 µs) I_{FGM} = 10 A (t_p = 500 µs) V_{RGM} = 5 V

$P_{G(AV)}$ = 2 W V_{FGM} = 15 V (t_p = 500 µs)

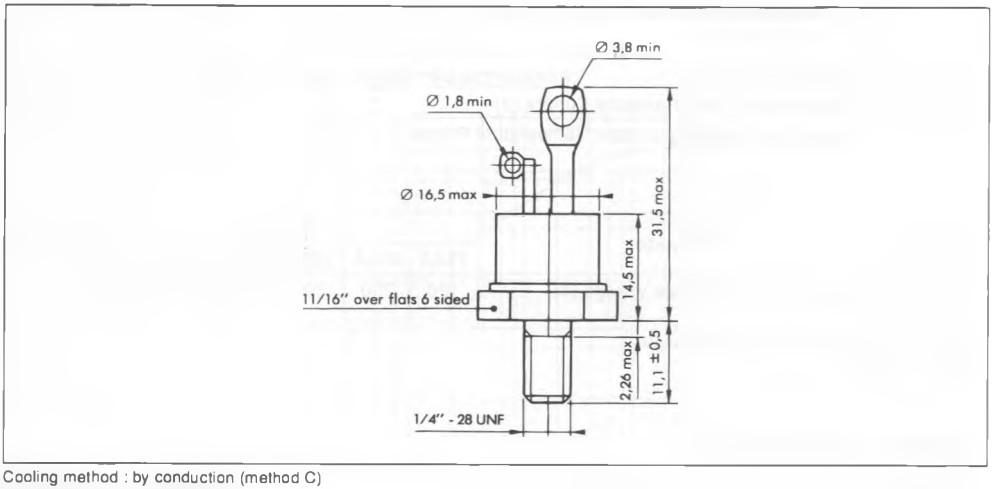
ELECTRICAL CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
I_{GT}	T_j = 25 °C Pulse Duration > 20 µs	V_D = 12 V	R_L = 33 Ω			150	mA
V_{GT}	T_j = 25 °C Pulse Duration > 20 µs	V_D = 12 V	R_L = 33 Ω			1.5	V
V_{GD}	T_j = 125 °C	V_D = V_{DRM}	R_L = 3.3 kΩ	0.2			V
I_H	T_j = 25 °C	I_T = 500 mA	Gate Open			200	mA
I_L	T_j = 25 °C Pulse Duration > 20 µs	V_D = 12 V	I_G = 300 mA			400	mA
V_{TM}	T_j = 25 °C	I_{TM} = 500 A	t_p = 10 ms			3	V
I_{DRM}	T_j = 125 °C	V_{DRM} Specified				12	mA
I_{RRM}	T_j = 125 °C	V_{RRM} Specified				12	mA
t_{gt}	T_j = 25 °C I_G = 1 A	V_D = V_{DRM} di_G/dt = 10 A/µs	I_T = 500 A		2		µs
t_q	T_j = 125 °C V_D = 67 % V_{DRM} dv/dt = 20 V/µs	I_T = 500 A di/dt = 30 A/µs Gate Open	V_R = 50 V			20	µs
dv/dt*	T_j = 125 °C Linear Slope up to V_D = 67 % V_{DRM}	Gate Open		200			V/µs

* For higher guaranteed values, please consult us.

PACKAGE MECHANICAL DATA

TO 65 Metal



Cooling method : by conduction (method C)
Marking : type number
Weight : 19 g without accessories
Polarity : anode to case
Stud torque : 3.5 mAN min - 3.8 mAN max.

SINUSOIDAL CURRENT PULSE DATA

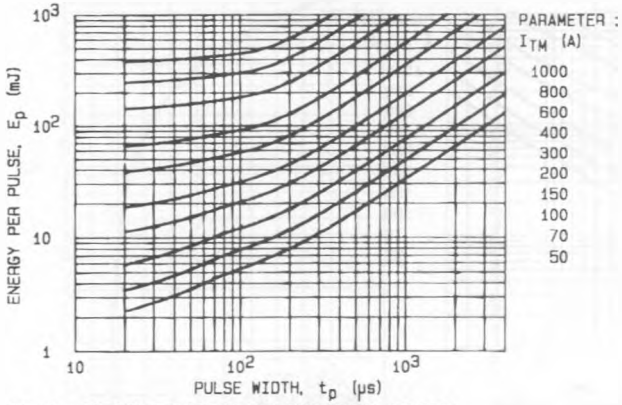
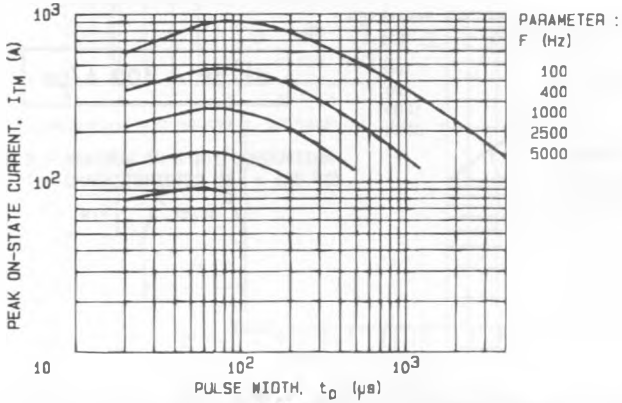


FIG.1 - ENERGY PER PULSE FOR SINUSOIDAL PULSES.



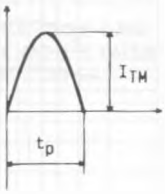
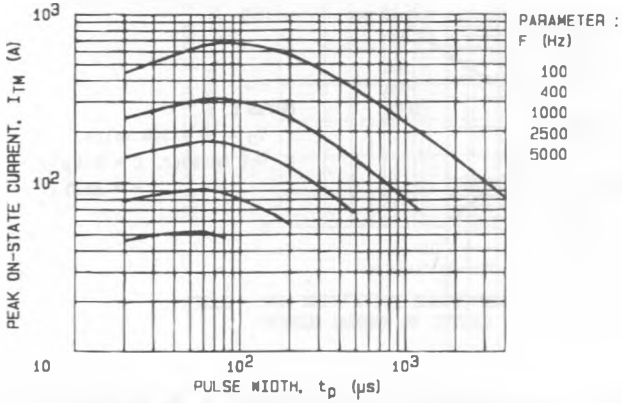


FIG.2 - MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VERSUS PULSE WIDTH FOR T_c = 85 °C.



NOTES :

1. $V_D = V_R$ = 300 Volts.
2. R.C Snubber, C = 0.1 µF, R = 33 Ω .

FIG.3 - MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VERSUS PULSE WIDTH FOR T_c = 80 °C.

TRAPEZOIDAL CURRENT PULSE DATA

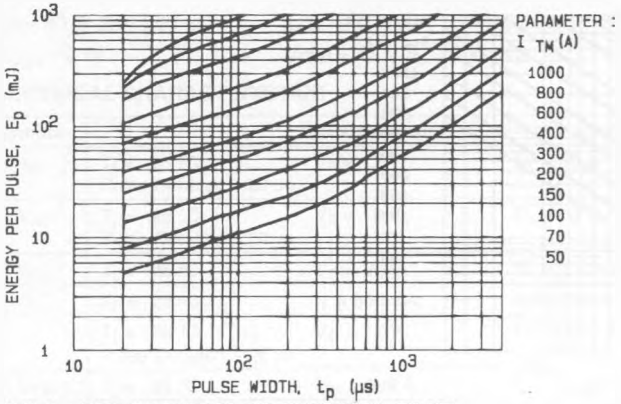


FIG.4 - ENERGY PER PULSE FOR TRAPEZOIDAL PULSES.

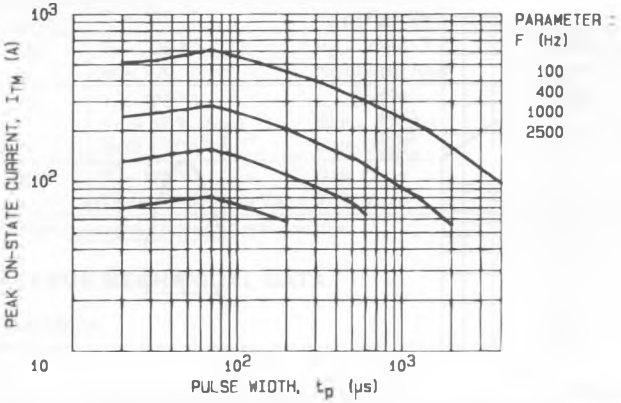
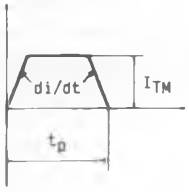


FIG.5 - MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VERSUS PULSE WIDTH FOR T_c = 85 °C.

di/dt = 100 A/µs



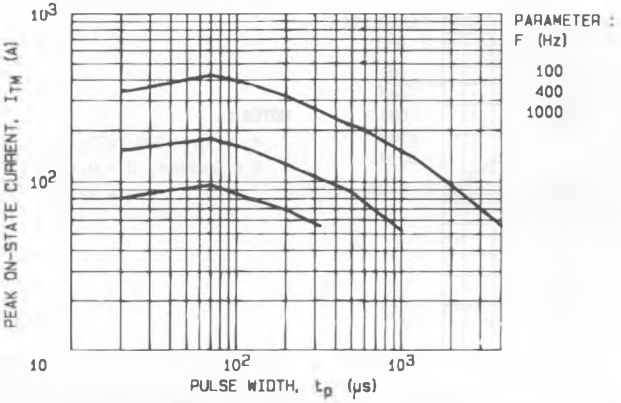


FIG.6 - MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VERSUS PULSE WIDTH FOR T_c = 80 °C.

NOTES :

1. $V_D = V_R$ = 300 Volts.
2. R.C Snubber, C = 0.1 µF, R = 33 Ω .

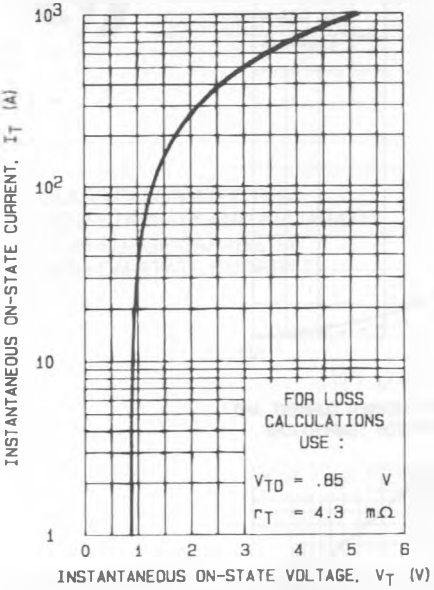


FIG.7 - MAXIMUM ON-STATE CONDUCTION CHARACTERISTIC (T_J = 125 °C).

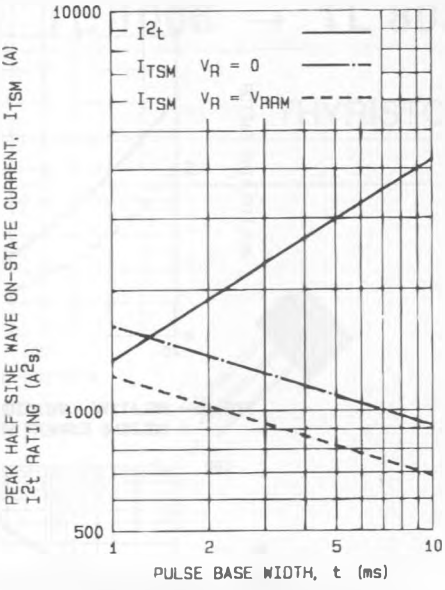


FIG.8 - NON REPETITIVE SUB-CYCLE SURGE ON-STATE CURRENT AND I^2t RATING (INITIAL T_J = 125 °C).

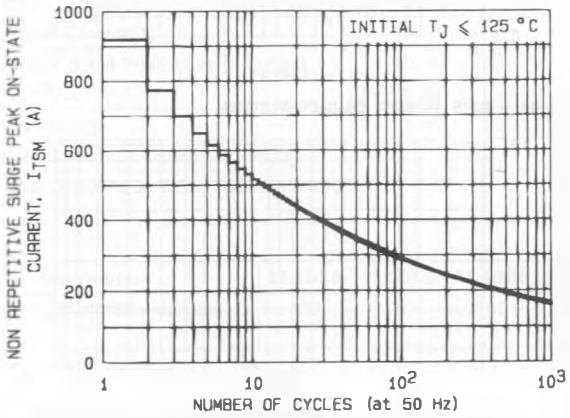


FIG.9 - NON REPETITIVE SURGE PEAK ON-STATE CURRENT VERSUS NUMBER OF CYCLES.

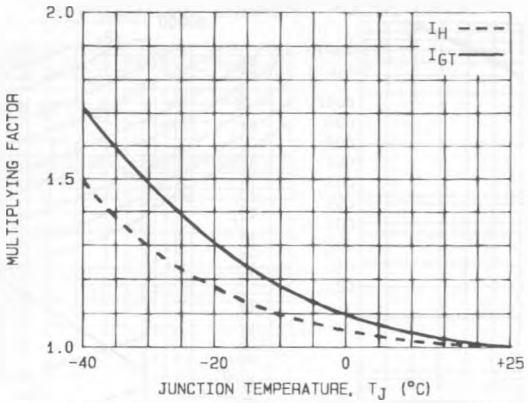


FIG.10 - RELATIVE VARIATION OF GATE TRIGGER CURRENT AND HOLDING CURRENT VERSUS JUNCTION TEMPERATURE.

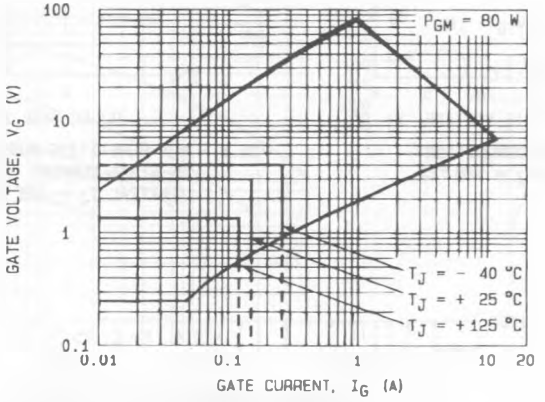


FIG.11 - GATE TRIGGER CHARACTERISTICS.

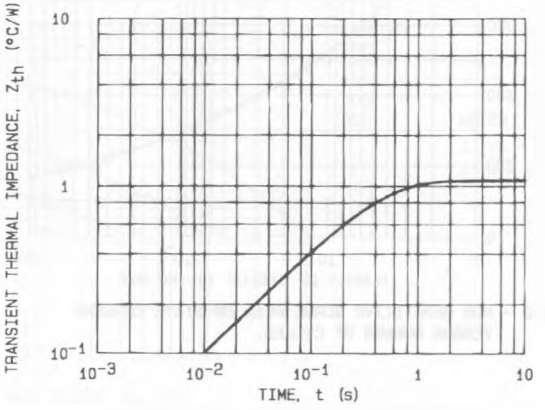


FIG.12 - TRANSIENT THERMAL IMPEDANCE JUNCTION TO CASE.