TF913..C

FAST SWITCHING THYRISTOR

APPLICATIONS

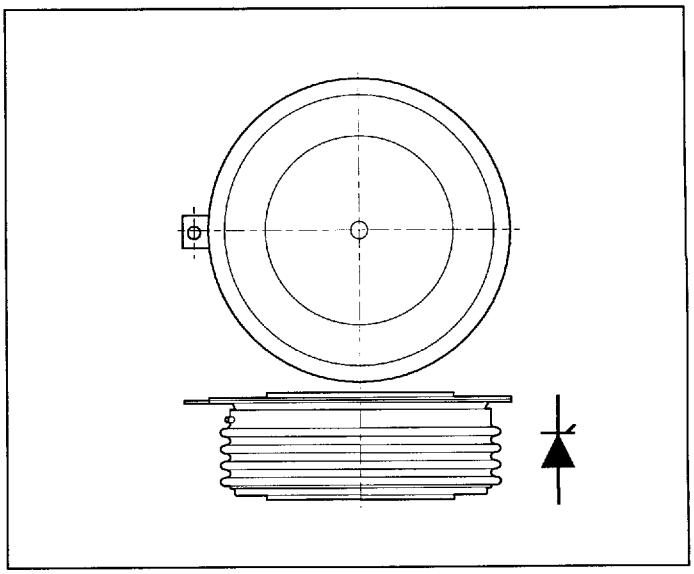
- High Power Inverters And Choppers.
- UPS.
- Railway Traction.
- Induction Heating.
- AC Motor Drives.
- Cycloconverters.

KEY PARAMETERS

V_{DRM}	2000V
$I_{T(RMS)}$	1300A
I_{TSM}	17000A
dV/dt	300V/µs
dI/dt	500A/µs
t_q	50µs

FEATURES

- Double Side Cooling.
- High Surge Capability.
- High Voltage.



Outline type code: MU169. See package outlines for further information.

VOLTAGE RATINGS

Type Number	Repetitive Peak Voltages V_{DRM} V_{RRM}	Conditions
TF913 20C TF913 18C TF913 16C	2000 1800 1600	$V_{RSM} = V_{RRM} + 100V$ $I_{DRM} = I_{RRM} = 60mA$ at V_{RRM} or V_{DRM} & T_{vj}

Lower voltage grades available.

CURRENT RATINGS

Symbol	Parameter	Conditions	Max.	Units
$I_{T(AV)}$	Mean on-state current	Half sinewave, 50Hz, T_{case} = 80°C	828	A
$I_{T(RMS)}$	RMS value	Half sinewave, 50Hz, T_{case} = 80°C	1300	A

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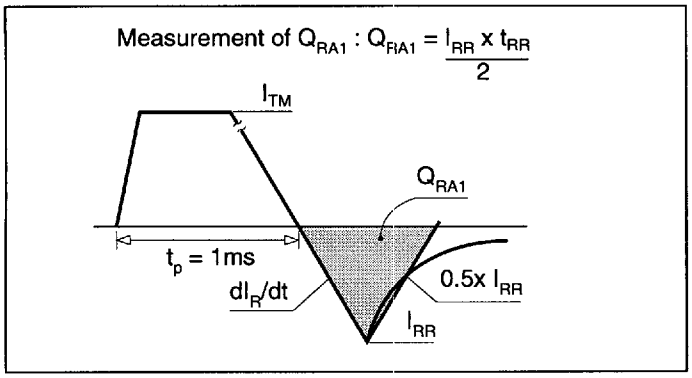
SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{TSM}	Surge (non-repetitive) on-state current	10ms half sine; V_R = 0% V_{RRM}, T_j = 125°C	17.0	kA
I^2t	I^2t for fusing	10ms half sine; V_R = 0% V_{RRM}, T_j = 125°C	1445 x 10^3	A^2s

THERMAL AND MECHANICAL DATA

Symbol	Parameter	Conditions		Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance - junction to case	Double side cooled	dc	-	0.020	°C/W
		Single side cooled	Anode dc	-	-	°C/W
			Cathode dc	-	-	°C/W
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 23.5kN with mounting compound	Double side	-	0.006	°C/W
			Single side	-	0.012	°C/W
T_{vj}	Virtual junction temperature	On-state (conducting)		-	125	°C
		Reverse (blocking)		-	125	°C
T_{stg}	Storage temperature range			-40	150	°C
-	Clamping force			22.3	24.6	kN

MEASUREMENT OF RECOVERED CHARGE - Q_{RA1}



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DYNAMIC CHARACTERISTICS

Symbol	Parameter	Conditions		Min.	Max.	Units
V_{TM}	Maximum on-state voltage	At 2000A peak, T_{case} = 25°C		-	2.15	V
I_{RRM}/I_{DRM}	Peak reverse and off-state current	At V_{RRM}/V_{DRM}, T_{case} = 125°C		-	60	mA
dV/dt	Maximum linear rate of rise of off-state voltage	Linear to 60% V_{DRM} T_j = 125°C, Gate open circuit		-	300	V/µs
dI/dt	Rate of rise of on-state current	Gate source 20V, 20Ω	Repetitive 50Hz	-	500	A/µs
		$t_r \leq 0.5\mu s$, T_j = 125°C	Non-repetitive	-	800	A/µs
$V_{T(TO)}$	Threshold voltage	At T_{vj} = 125°C		-	1.25	V
r_T	On-state slope resistance	At T_{vj} = 125°C		-	0.45	mΩ
t_{gd}	Delay time	T_j = 25°C, I_T = 50A, V_D = 300V, I_G = 1A, dI/dt = 50A/µs, dI_G/dt = 1A/µs		4*	-	µs
$t_{(ON)TOT}$	Total turn-on time			2*	-	µs
I_H	Holding current	T_j = 25°C, I_{TM} = 1A, V_D = 12V		100*	-	mA
I_L	Latching current	T_j = 25°C, I_G = 0.5A, V_D = 12V		300*	-	mA
t_q	Turn-off time	T_j = 125°C, I_T = 250A, V_R = 50V, dV/dt = 20V/µs (Linear to 60% V_{DRM}), dI_R/dt = 50A/µs, Gate open circuit	t_q code: C	-	50	µs

**Typical value.*

GATE TRIGGER CHARACTERISTICS AND RATINGS

Symbol	Parameter	Conditions	Typ.	Max.	Units
V_{GT}	Gate trigger voltage	V_{DRM} = 12V, T_{case} = 25°C, R_L = 6Ω	-	3.0	V
I_{GT}	Gate trigger current	V_{DRM} = 12V, T_{case} = 25°C, R_L = 6Ω	-	200	mA
V_{GD}	Gate non-trigger voltage	At V_{DRM} T_{case} = 125°C, R_L = 1kΩ	-	0.2	V
V_{RGM}	Peak reverse gate voltage		-	5.0	V
I_{FGM}	Peak forward gate current	Anode positive with respect to cathode	-	10	A
P_{GM}	Peak gate power		-	50	W
$P_{G(AV)}$	Mean gate power		-	3	W

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CURVES

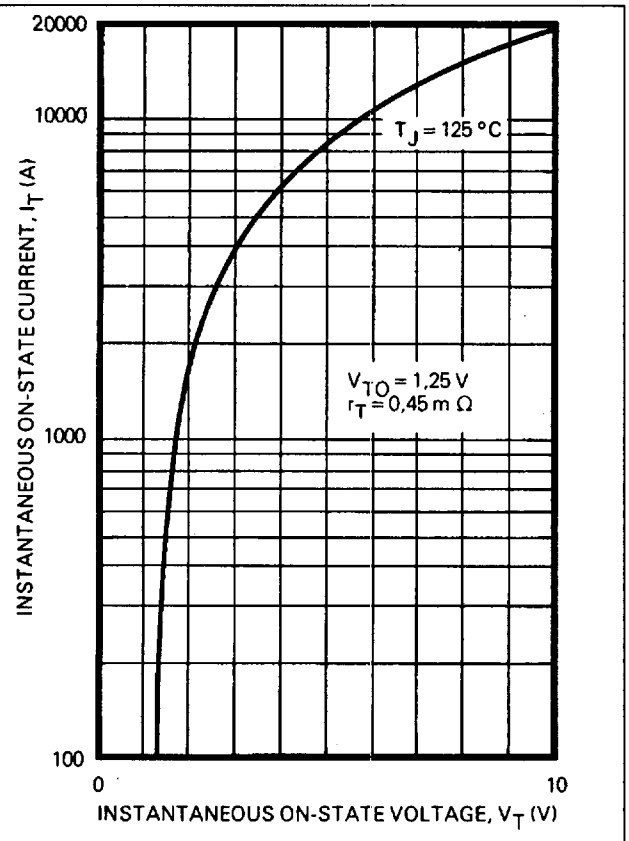

FIG.1 MAXUMUM (LIMIT) ON-STATE CHARACTERISTICS

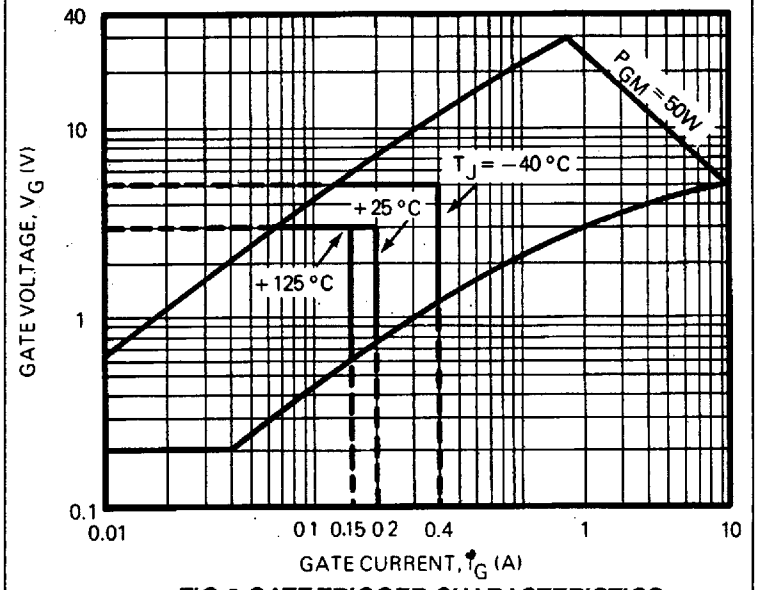

FIG.2 GATE TRIGGER CHARACTERISTICS

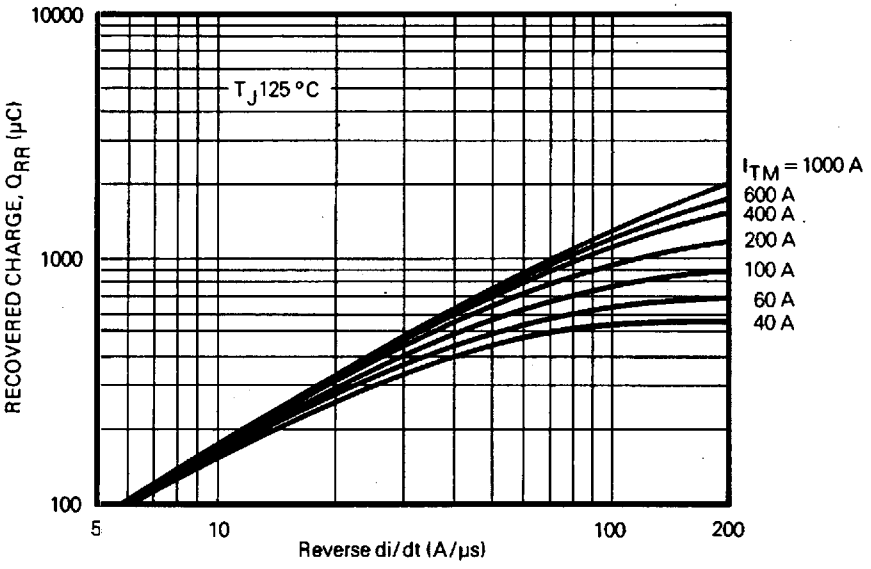

FIG.3 TYPICAL RECOVERED CHARGE (TRAPEZOIDAL CURRENT WAVEFORM)

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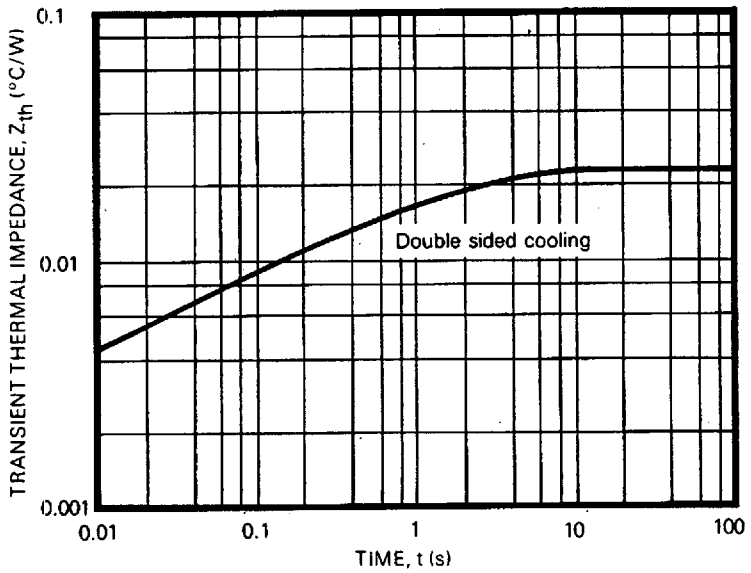

FIG.4 TRANSIENT THERMAL IMPEDANCE - JUNCTION TO CASE

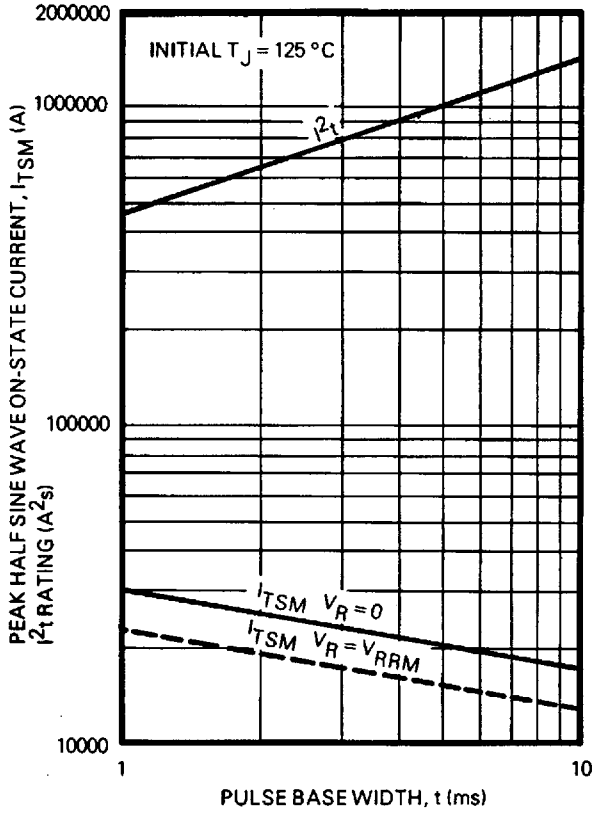

FIG.5 NON-REPETITIVE SUB-CYCLE SURGE ON-STATE CURRENT AND I2t RATING

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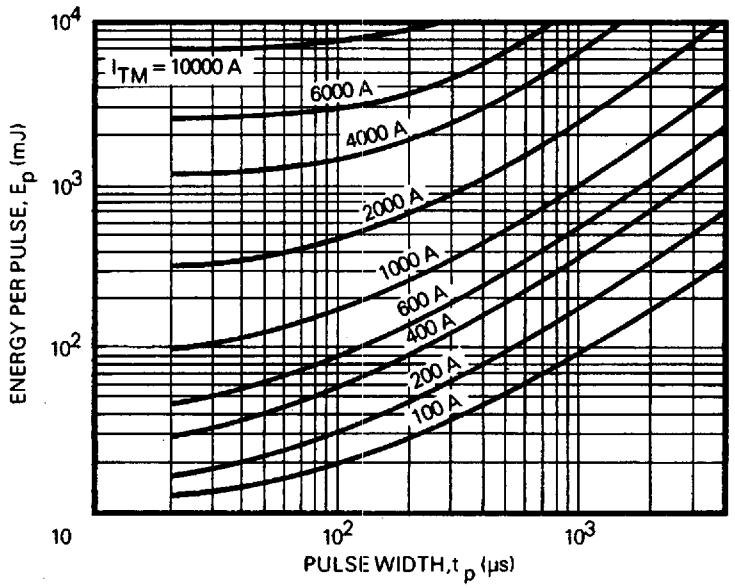
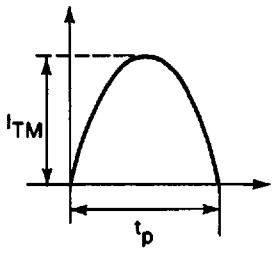


FIG.6 ENERGY PER PULSE FOR SINUSOIDAL PULSES

NOTES:
1. $V_D \leq 600V$.
2. $V_R \leq 10V$.
3. R.C Snubber, C = 0.22μF, R = 4.7Ω



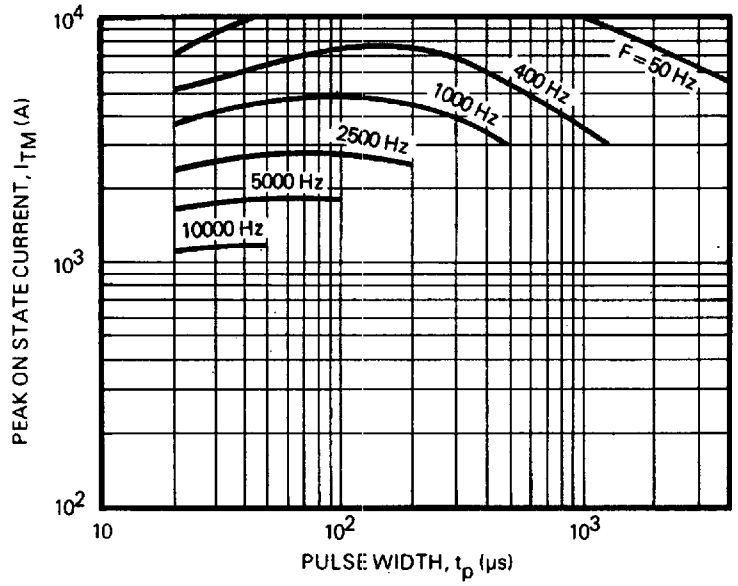
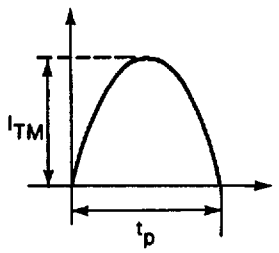


FIG.7 MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs PULSE WIDTH FOR Tc = 65°C

NOTES:
1. $V_D \leq 600V$.
2. $V_R \leq 10V$.
3. R.C Snubber, C = 0.22μF, R = 4.7Ω



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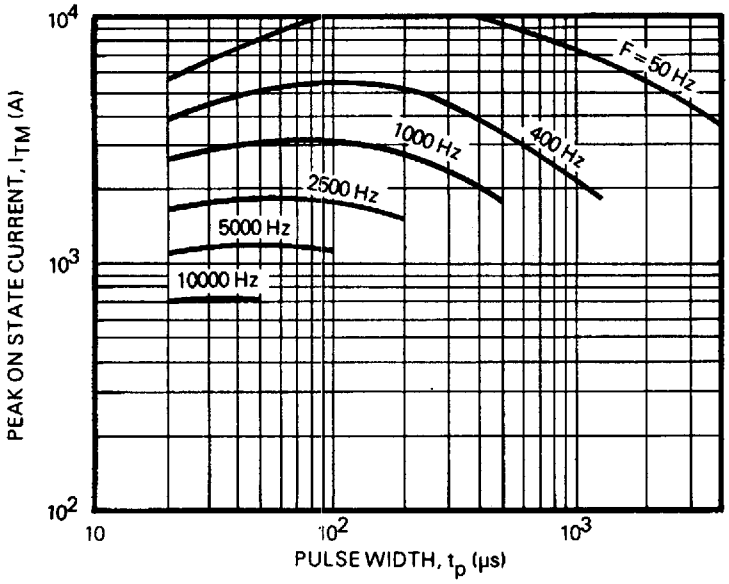
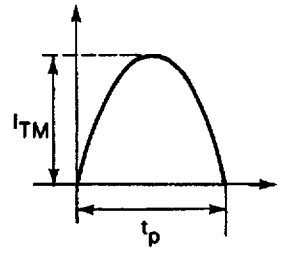


FIG.8 MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs PULSE WIDTH FOR Tc = 90°C

NOTES:
1. $V_D \leq 600V$.
2. $V_R \leq 10V$.
3. R.C Snubber, C = 0.22µF, R = 4.7Ω



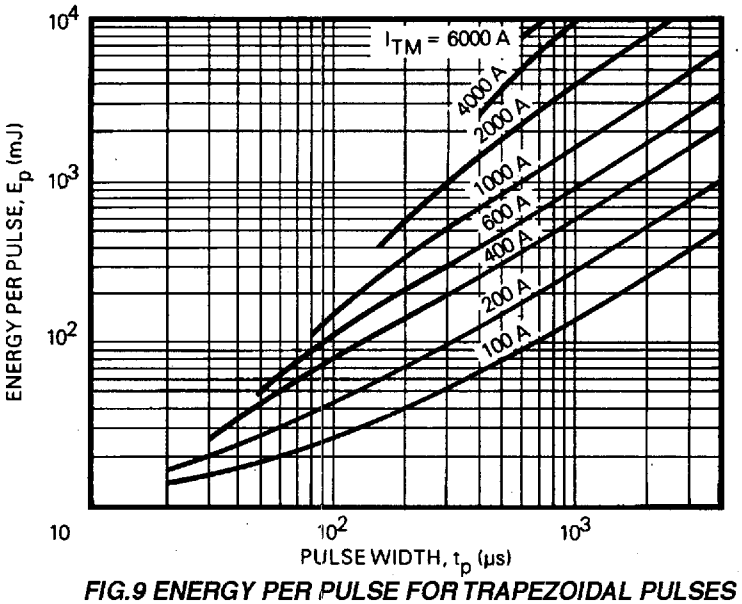
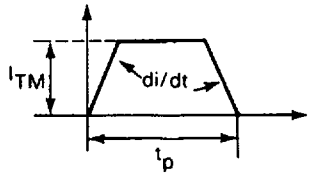


FIG.9 ENERGY PER PULSE FOR TRAPEZOIDAL PULSES

NOTES:
1. dI/dt = 25A/µs
2. $V_D \leq 600V$.
3. $V_R \leq 10V$.
4. R.C Snubber, C = 0.22µF, R = 4.7Ω



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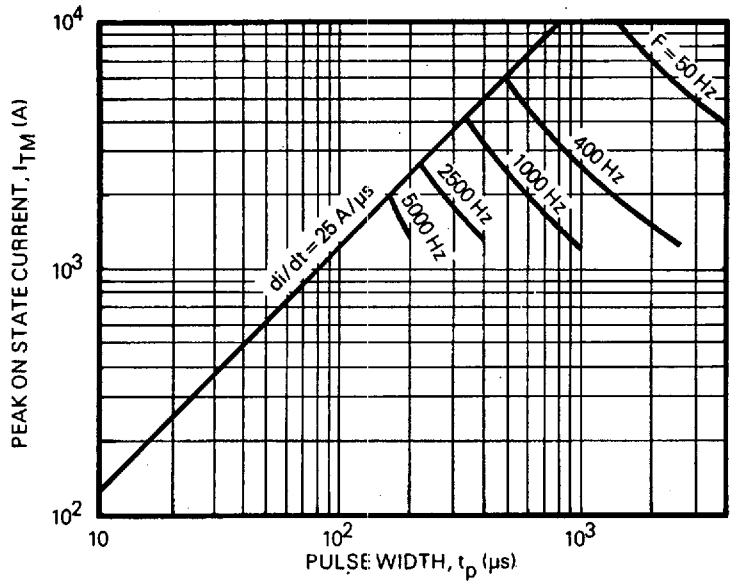
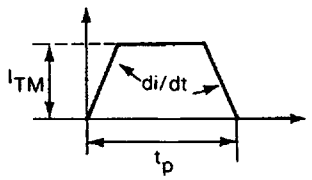


FIG.10 MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs PULSE WIDTH FOR Tc = 65°C

NOTES:
1. dI/dt = 25A/μs
2. $V_D \leq 600V$.
3. $V_R \leq 10V$.
4. R.C Snubber, C = 0.22μF, R = 4.7Ω



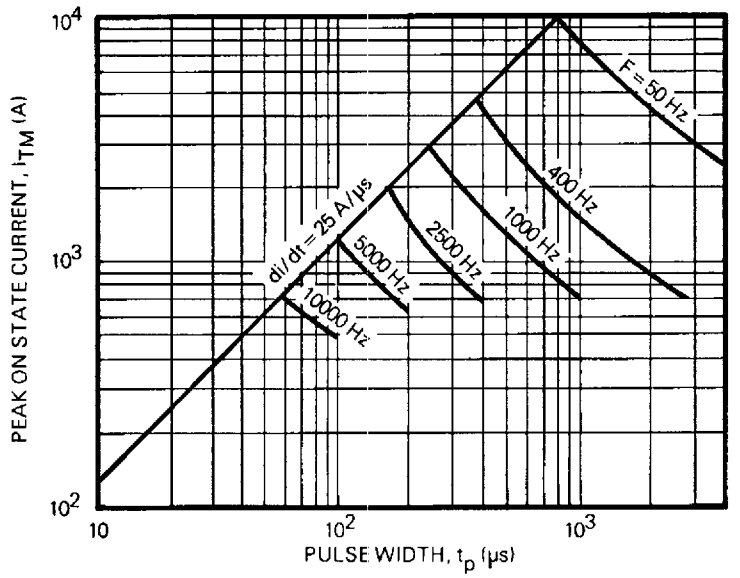
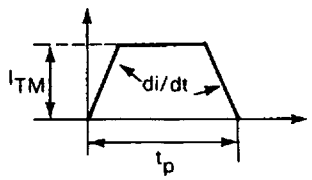


FIG.11 MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs PULSE WIDTH FOR Tc = 90°C

NOTES:
1. dI/dt = 25A/μs
2. $V_D \leq 600V$.
3. $V_R \leq 10V$.
4. R.C Snubber, C = 0.22μF, R = 4.7Ω



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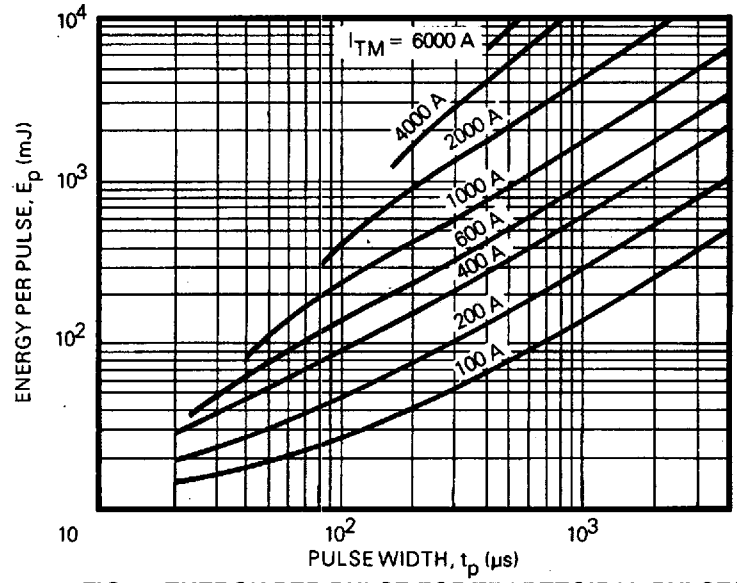
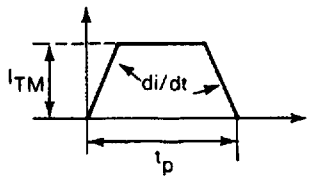


FIG.12 ENERGY PER PULSE FOR TRAPEZOIDAL PULSES

NOTES:
1. dI/dt = 50A/µs
2. $V_D \leq 600V$.
3. $V_R \leq 10V$.
4. R.C Snubber, C = 0.22µF, R = 4.7Ω



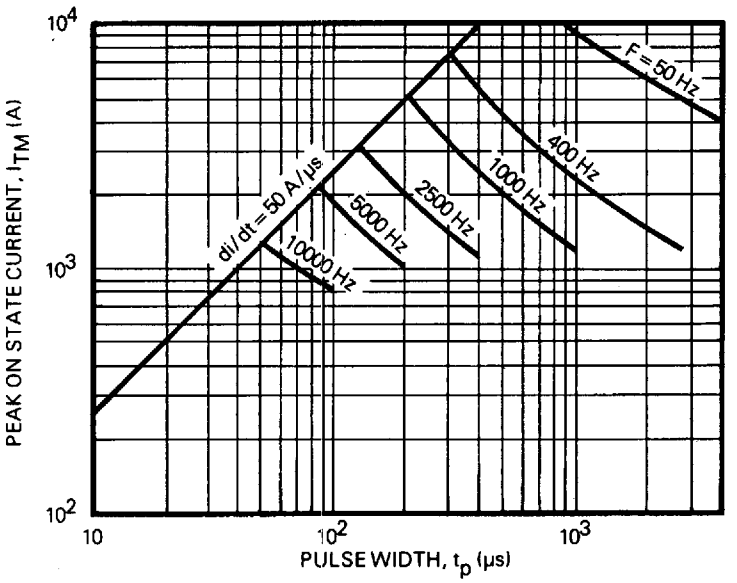
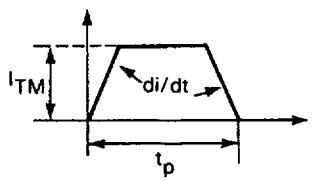


FIG.13 MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs PULSE WIDTH FOR Tc = 65°C

NOTES:
1. dI/dt = 50A/µs
2. $V_D \leq 600V$.
3. $V_R \leq 10V$.
4. R.C Snubber, C = 0.22µF, R = 4.7Ω



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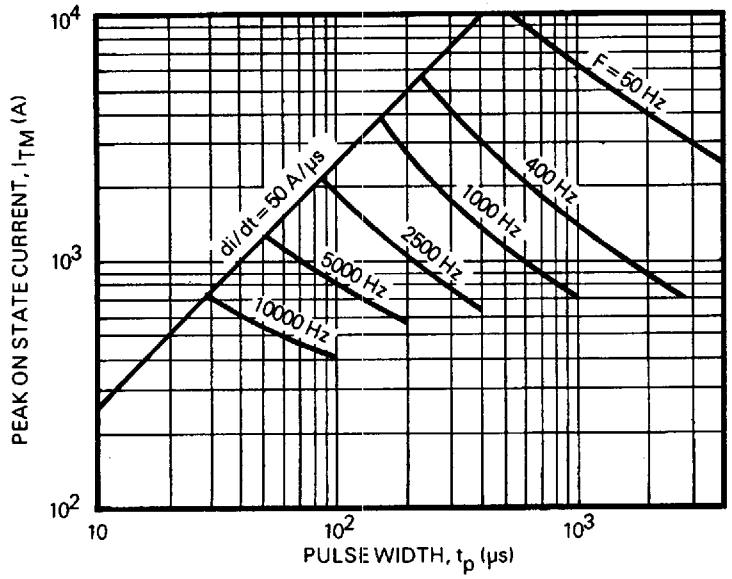
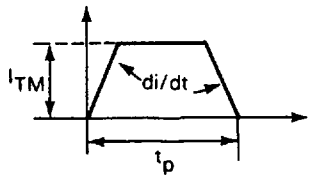


FIG.14 MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs PULSE WIDTH FOR Tc = 90°C

NOTES:
1. dI/dt = 50A/µs
2. $V_D \leq 600V$.
3. $V_R \leq 10V$.
4. R.C Snubber, C = 0.22µF, R = 4.7Ω



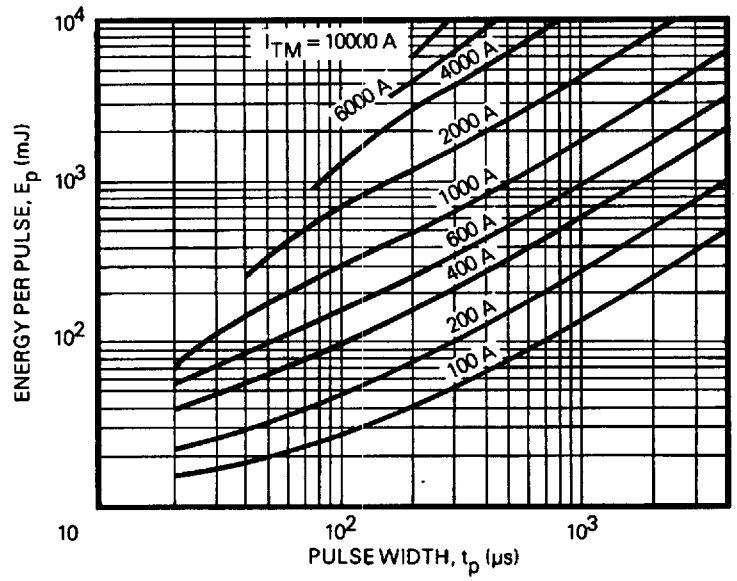
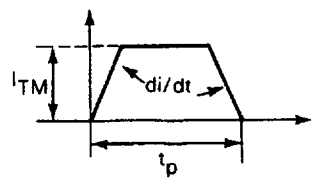


FIG.15 ENERGY PER PULSE FOR TRAPEZOIDAL PULSES

NOTES:
1. dI/dt = 100A/µs
2. $V_D \leq 600V$.
3. $V_R \leq 10V$.
4. R.C Snubber, C = 0.22µF, R = 4.7Ω



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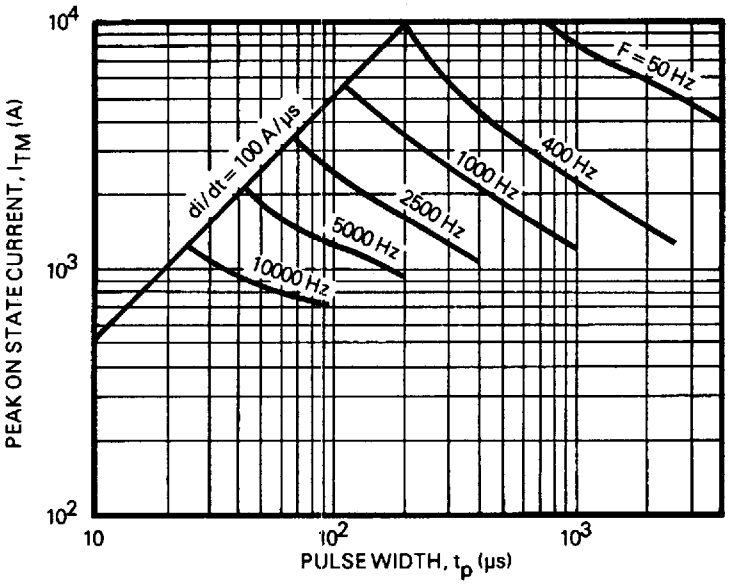
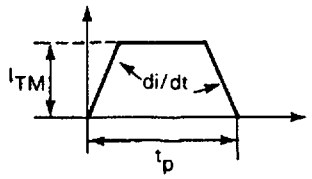


FIG.16 MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs PULSE WIDTH FOR Tc = 65°C

NOTES:
1. dI/dt = 100A/µs
2. $V_D \leq 600V$.
3. $V_R \leq 10V$.
4. R.C Snubber, C = 0.22µF, R = 4.7Ω



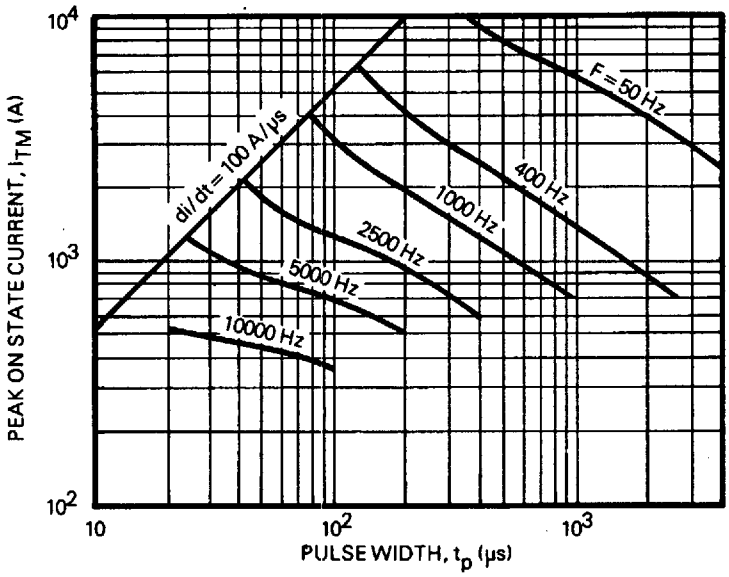
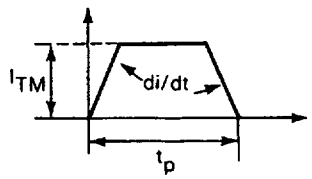


FIG.17 MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs PULSE WIDTH FOR Tc = 90°C

NOTES:
1. dI/dt = 100A/µs
2. $V_D \leq 600V$.
3. $V_R \leq 10V$.
4. R.C Snubber, C = 0.22µF, R = 4.7Ω



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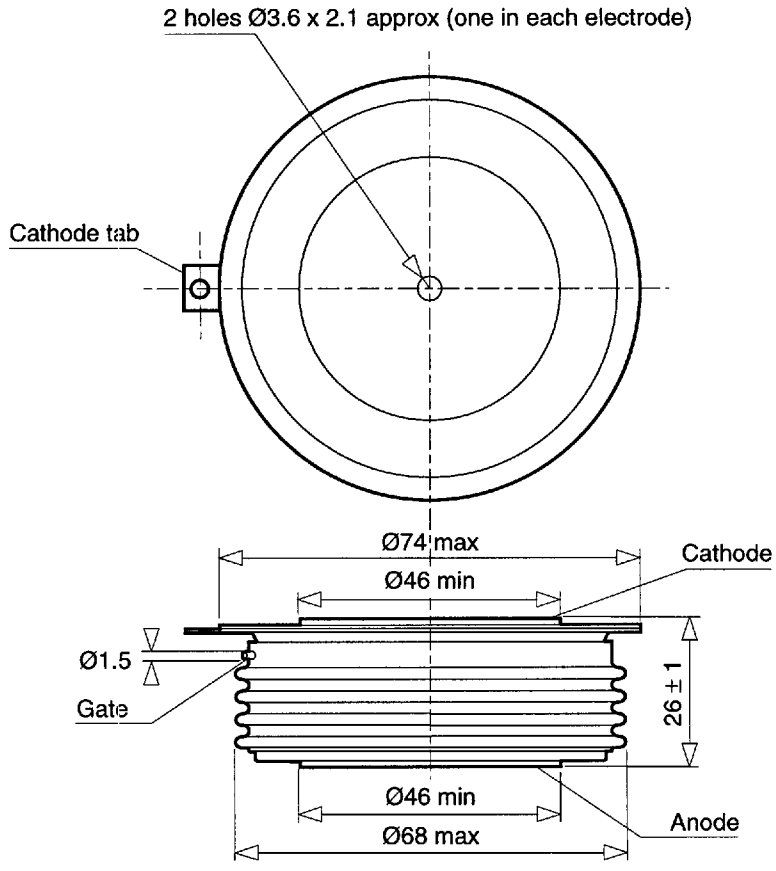
PACKAGE DETAILS - MU169

For further package information, please contact your local Customer Service Centre. All dimensions in mm, unless stated otherwise. DO NOT SCALE.



Weight: 500g

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