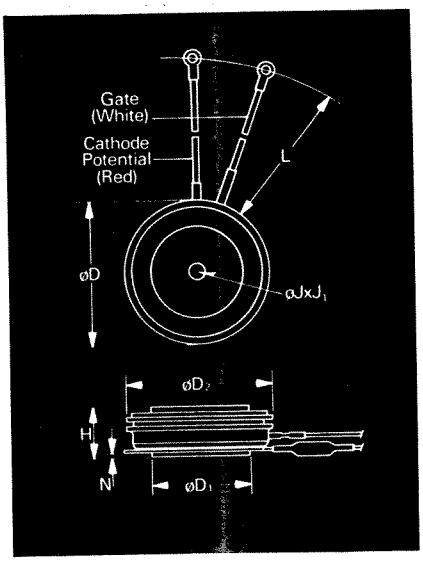
Fast Switching SCR T7SH__40

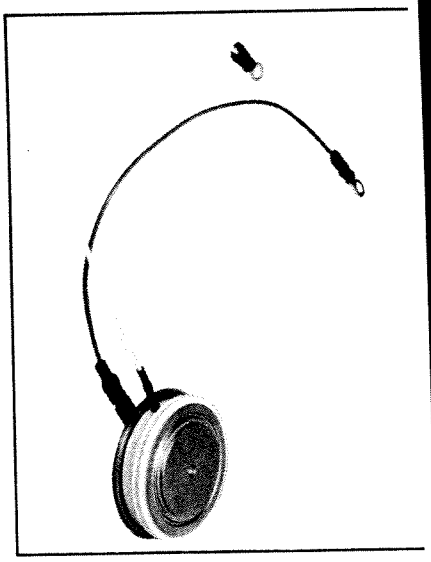
400A Avg. (700 RMS) Up to 1200 Volts 10-50 μs



T7S Outline

Symbol	Inches		Millimeters	
	Min.	Max.	Min.	Max.
øD	1.850	1.900	45.72	48.26
øD1	1.140	1.180	28.96	29.97
øD2	1.760	1.850	44.70	46.99
H	.545	.605	13.84	15.37
øJ	.135	.145	3.43	3.68
J1	.072	.082	1.83	2.08
L	7.75	8.50	196.85	215.90
N	.025		.64	

Creep Distance—.41 in. min. (10.41 mm).
Strike Distance—.35 in. min. (8.89 mm).
Finish-Nickel Plate.
Approx. Weight—4 oz. (113 g.)
1. Dimension "H" is a clamped dimension.



Features:
- Interdigitated, di/namic Gate structure
- Hard Commutation Turn-Off
- Forward Blocking Voltage Capabilities to 1200 Volts
- Low Switching Losses at High Frequency
- Soft Commutation (Feedback Diode) Testing Available
- High di/dt with softgate control

Applications:
- Induction Heating
- Transportation
- Inverters
- Crowbars
- Cycloconverters

Ordering Information

Type	Voltage		Current		Turn-off		Gate current		Leads	
Code	V_{DRM} and V_{RRM} (V)	Code	$I_{T(av)}$ (A)	Code	tq usec	Code	I_{GT} (ma)	Code	Case	Code
T7SH	100	01	400	40	10	8	150	4	T7S	DN
	200	02			15	7				
	300	03			20	6				
	400	04			25	B				
	500	05			30	5				
	600	06			40	4				
	700	07			50	3				
	800	08								
	900	09								
	1000	10								
	1100	11								
	1200	12								

Example

Obtain optimum device performance for your application by selecting proper Order Code.

Type T72H rated at 400A average with V_{DRM} = 1000V, I_{GT} = 150 ma, tq = 30 μsec max. and leads—order as:

Type				Voltage		Current		Turn Off	Gate Current	Leads	
T	7	S	H	1	0	4	0	5	4	D	N

400A Avg. (700 RMS) Up to 1200 Volts 10-50 μs

Fast Switching SCR T7SH__40

Voltage ②

Blocking State Maximums (T_J = 125°C)

	Symbol											
Repetitive peak forward blocking voltage, V	V_{DRM}	100	200	300	400	500	600	700	800	900	1000	1100	1200
Repetitive peak reverse voltage, V	V_{RRM}	100	200	300	400	500	600	700	800	900	1000	1100	1200
Non-repetitive transient peak reverse voltage, $t \leq 5.0$ msec, V	V_{RSM}	200	300	400	500	600	700	800	900	1000	1100	1200	1300
Forward leakage current, mA peak	I_{DRM}	← 35 →											
Reverse leakage current, mA peak	I_{RRM}	← 35 →											

Current

Conducting State Maximums (T_J = 125°C)	Symbol	T7SH__40
RMS forward current, A	$I_{T(rms)}$	628
Ave. forward current, A	$I_{T(av)}$	400
One-half cycle surge current③, A	I_{TSM}	8000
3 cycle surge current③, A	I_{TSM}	5765
10 cycle surge current③, A	I_{TSM}	4980
I^2t for fusing (for times ≥ 8.3 ms) A^2 sec.	I^2t	267,000
Forward voltage drop at I_{TM} = 1500A and T_J = 25°C, V	V_{TM}	3.15
Min. repetitive di/dt ①④⑥ A/μsec	di/dt	500

Switching

(T_J = 25°C)	Symbol	
Max. turn-off time, I_T = 1000A, T_J = 125°C tp = 100 μsec. dirR/dt = 50 A/μsec., reapplied dv/dt = 200V/μsec. linear to 0.8 V_{DRM}, μsec. ⑤①	tq	10 to 50
Typ. delay time, I_{TM} = 1000A T_D = .8 V_{DRM} ④, μsec	td	.5
Min. critical dv/dt exponential to .8 V_{DRM}, T_J = 125°C, V/μsec ⑦⑤	dv/dt	300
Min. di/dt, non-repetitive, A/μsec ①④⑥	di/dt	1200

Gate

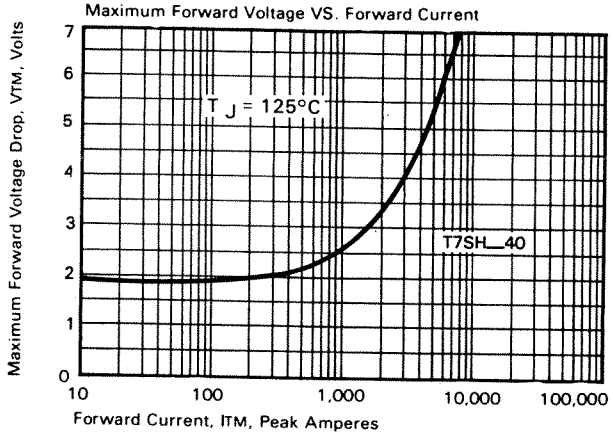
Maximum Parameters (T_J = 25°C)	Symbol	
Gate current to trigger at V_D = 12V, mA	I_{GT}	150
Gate voltage to trigger at V_D = 12V, V	V_{GT}	3
Non-triggering gate voltage, T_J = 125°C, and rated V_{DRM}, V	V_{GDM}	.25
Peak forward gate current, A	I_{GTM}	4
Peak reverse gate voltage, V	V_{GRM}	5
Peak gate power, Watts	P_{GM}	16
Average gate power, Watts	$P_{G(av)}$	3

Thermal and Mechanical

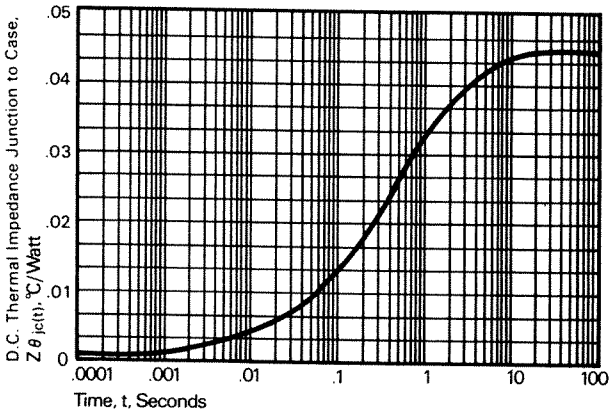
	Symbol	
Min., Max. oper. junction temp., °C	T_J	−40 to +125
Min., Max. storage temp., °C	Tstg	−40 to +150
Max. mounting force, lb. ... ①		2000 to 2400
Thermal resistance ⑦, double-side cooling, junction to case, °C/Watt	$R_{\theta JC}$	.045
Case to sink, lubricated, °C/Watt	$R_{\theta CS}$	.02

① Consult recommended mounting procedures.
② Applies for zero or negative gate bias.
③ Per JEDEC RS-397, 5.2.2.1.
④ With recommended gate drive.
⑤ Higher dv/dt ratings available, consult factory.
⑥ Per JEDEC standard RS-397, 5.2.2.6.
⑦ For operation with antiparallel diode, consult factory.

Maximum Forward Voltage VS. Forward Current



Transient Thermal Impedance VS. Time

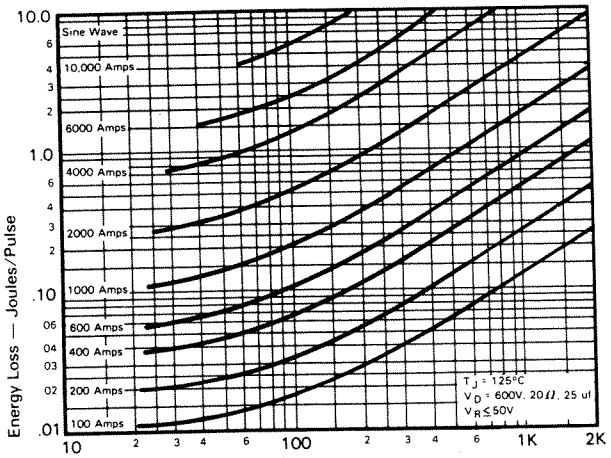


FAST SWITCHING THYRISTORS

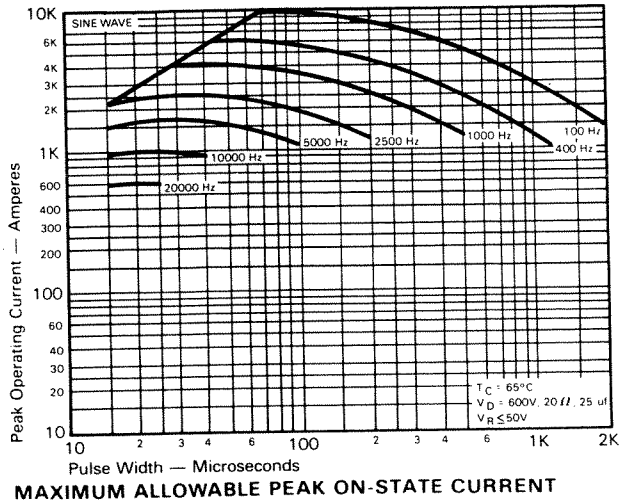
Fast Switching SCR T7SH__40

400A Avg. (700 RMS) Up to 1200 Volts 10-50 μs

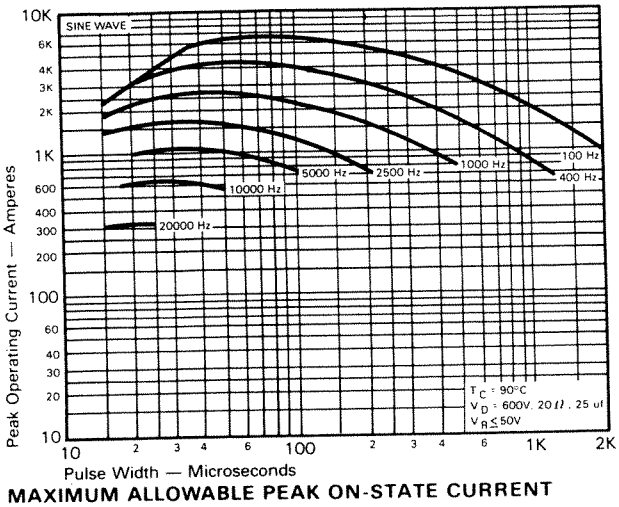
Sinusoidal Current Data



ENERGY PER PULSE FOR SINUSOIDAL PULSES

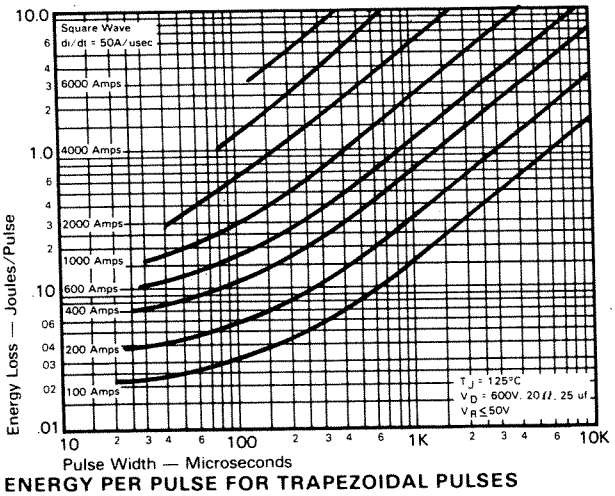


MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH (T_C = 65°C)

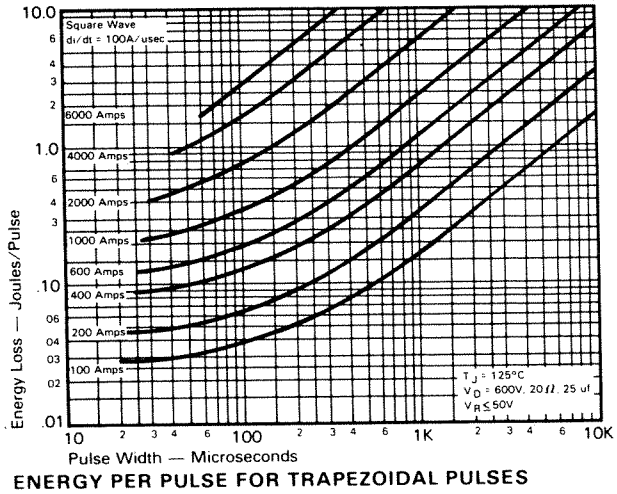


MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH (T_C = 90°C)

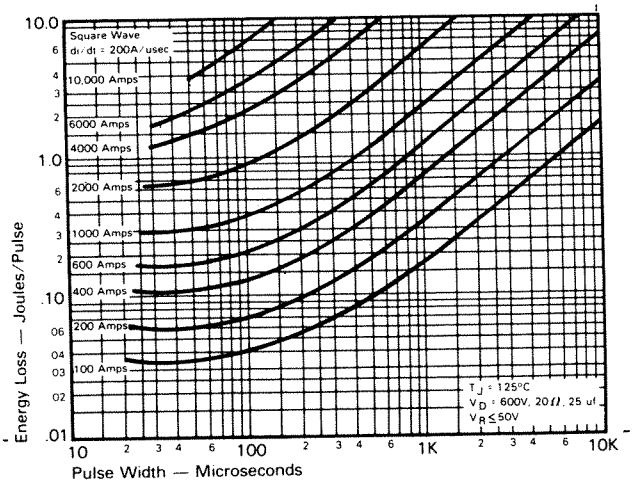
Trapezoidal Wave Current Data



ENERGY PER PULSE FOR TRAPEZOIDAL PULSES (di/dt = 50A/usec)



ENERGY PER PULSE FOR TRAPEZOIDAL PULSES (di/dt = 100A/usec)



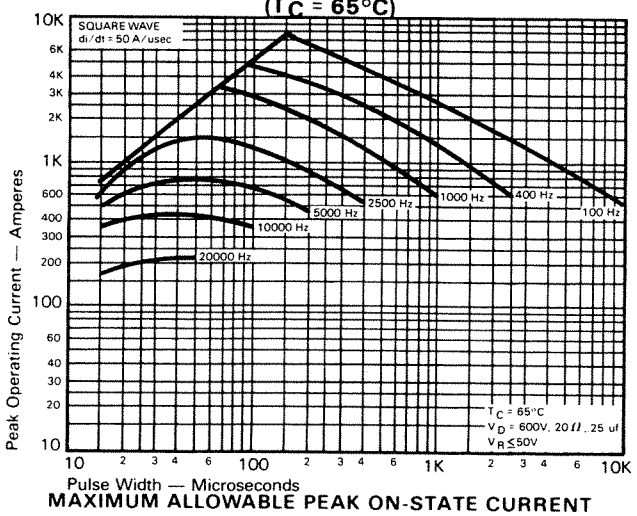
ENERGY PER PULSE FOR TRAPEZOIDAL PULSES (di/dt = 200A/usec)

FAST SWITCHING THYRISTORS

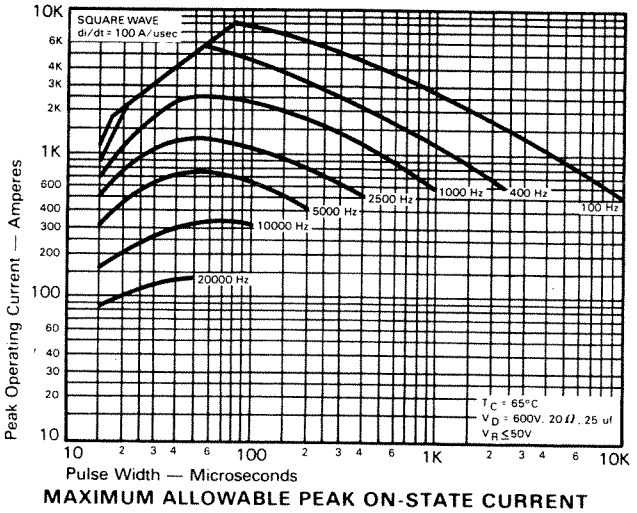
400A Avg. (700 RMS) Up to 1200 Volts 10-50 μs

Fast Switching SCR T7SH__40

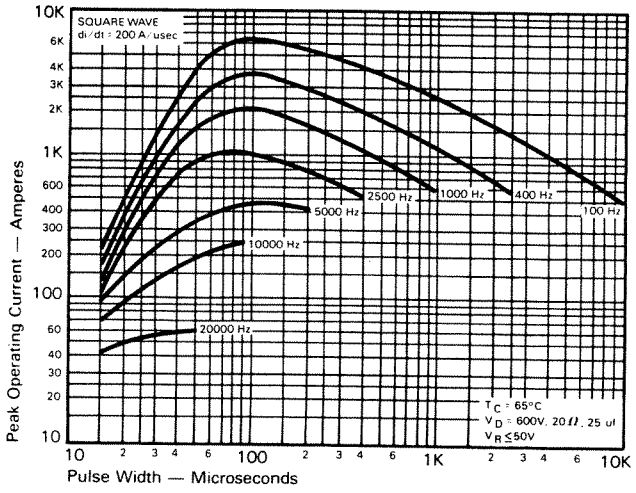
Trapezoidal Wave Current Data (T_C = 65°C)



MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH (di/dt = 50A/usec)

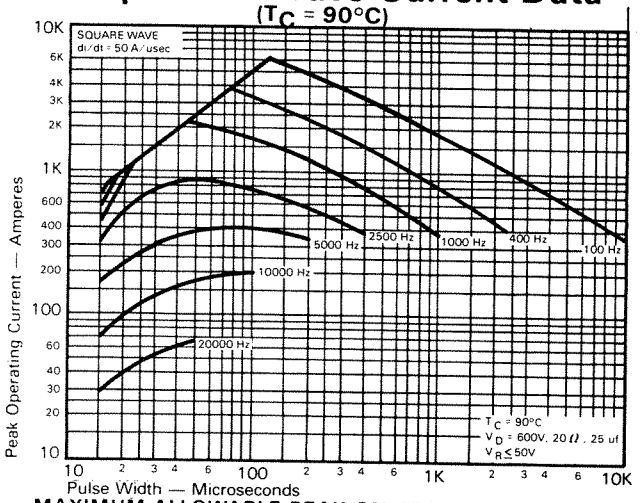


MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH (di/dt = 100A/usec)

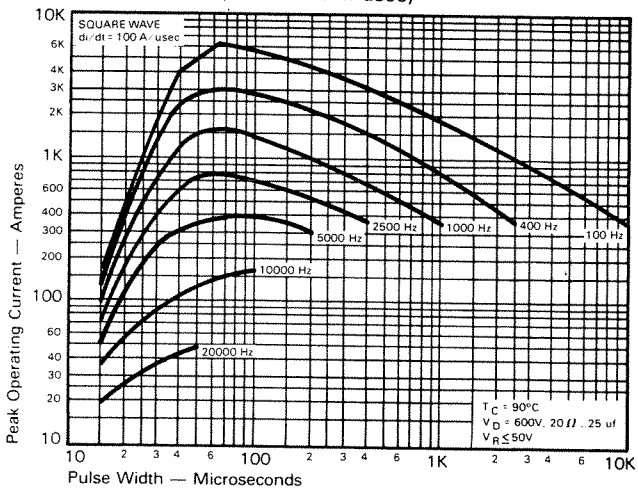


MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH (di/dt = 200A/usec)

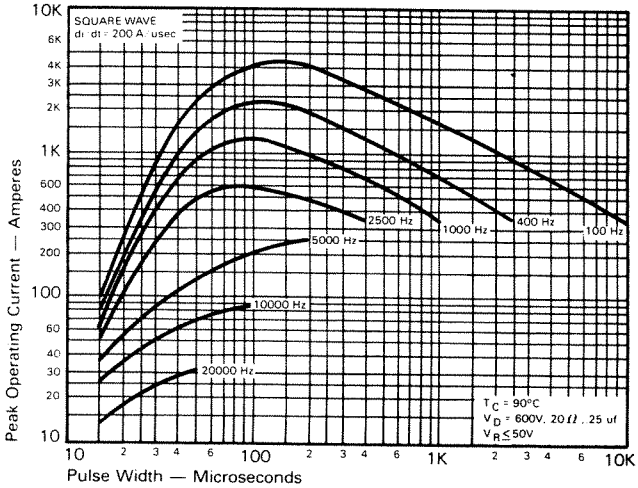
Trapezoidal Wave Current Data (T_C = 90°C)



MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH (di/dt = 50A/usec)



MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH (di/dt = 100A/usec)



MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH (di/dt = 200A/usec)