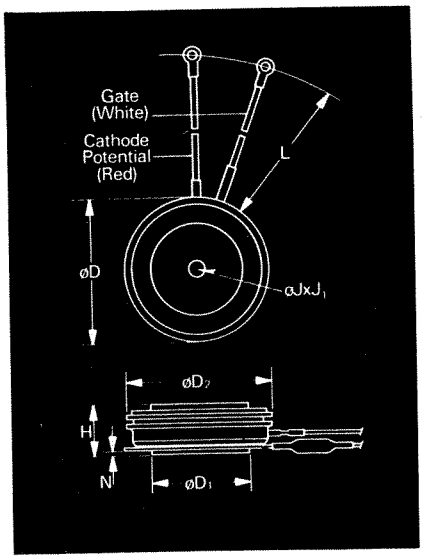
Fast Switching SCR T7SH__45

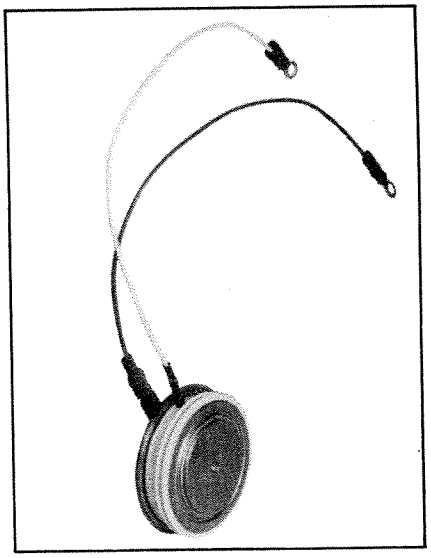
450A Avg. (700 RMS) Up to 1400 Volts 25-50 μs



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 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	450	45	25	B	150	4	T7S	DN
	200	02			30	5				
	300	03			40	4				
	400	04			50	3				
	500	05								
	600	06								
	700	07								
	800	08								
	900	09								
	1000	10								
	1100	11								
	1200	12								
	1400	14								

Example

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

Type T7SH rated at 450 A average with V_{DRM} = 1000V, I_{GT} = 150 ma, t_q = 40 μsec max. and leads—order as:

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

450A Avg. (700 RMS) Up to 1400 Volts 25-50 μs

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Voltage ②

Blocking State Maximums (T_J = 125°C)

	Symbol	100	200	300	400	500	600	700	800	900	1000	1100	1200	1400
Repetitive peak forward blocking voltage, V	V_{DRM}	100	200	300	400	500	600	700	800	900	1000	1100	1200	1400
Repetitive peak reverse voltage, V	V_{RRM}	100	200	300	400	500	600	700	800	900	1000	1100	1200	1400
Non-repetitive transient peak reverse voltage, t ≤ 5.0 msec, V	V_{RSM}	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1500
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__45
RMS forward current, A	$I_{T(rms)}$	700
Ave. forward current, A	$I_{T(av)}$	450
One-half cycle surge current③, A	I_{TSM}	8500
3 cycle surge current③, A	I_{TSM}	6125
10 cycle surge current③, A	I_{TSM}	5290
I^2t for fusing (for times ≥ 8.3 ms) A^2 sec.	I^2t	301,000
Forward voltage drop at ITM = 1500A and TJ = 25°C, V	V_{TM}	2.0
Min. repetitive di/dt ①④⑥ A/μsec	di/dt	600

Switching

(T_J = 25°C)	Symbol	
Max. turn-off time, IT = 1000A, TJ = 125°C tp = 100 μsec. dirR/dt = 50 A/μsec., reapplied dv/dt = 200V/μsec. linear to 0.8 VDRM, μsec. ⑤⑦	tq	25 to 50
Typ. delay time, ITM = 1000A TD = .8 VDRM④, μsec	td	.5
Min. critical dv/dt exponential to .8 VDRM, TJ = 125°C, V/μsec ②⑤	dv/dt	300
Min. di/dt, non-repetitive, A/μsec ①④⑥	di/dt	1200

Gate

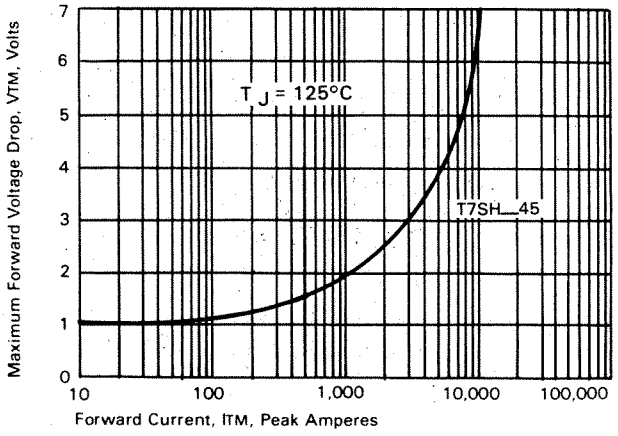
Maximum Parameters (T_J = 25°C)	Symbol	
Gate current to trigger at V_D = 12V, mA	I_{GT}	150
Gate voltage to trigger at V_D = 12V, V	V_{GT}	3
Non-triggering gate voltage, T_J = 125°C, and rated V_{DRM}, V	V_{GDM}	.25
Peak forward gate current, A	I_{GTM}	4
Peak reverse gate voltage, V	V_{GRM}	5
Peak gate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

Thermal and Mechanical

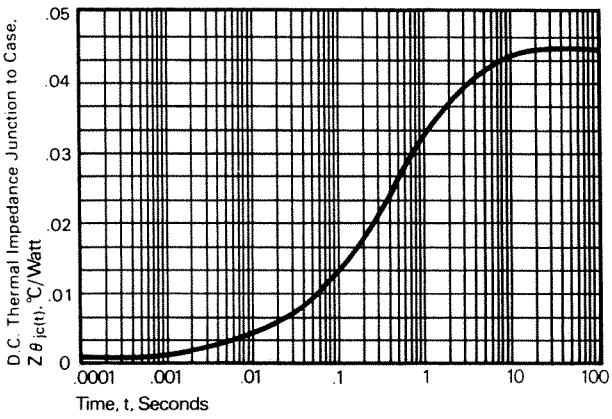
	Symbol	
Min., Max. oper. junction temp., °C	T_J	−40 to +125
Min., Max. storage temp., °C	Tstg	−40 to +150
Max. mounting force, lb. ... ①		2000 to 2400
Thermal resistance①, double-side cooling, junction to case, °C/Watt	$R_{\theta JC}$	.045
Case to sink, lubricated, °C/Watt	$R_{\theta CS}$	.02

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

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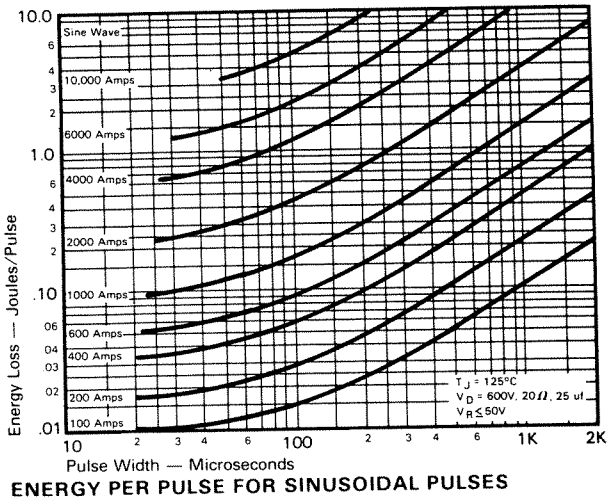
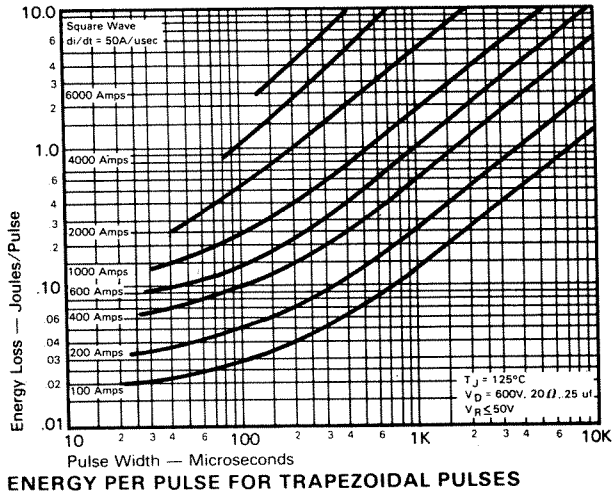
Sinusoidal Current Data

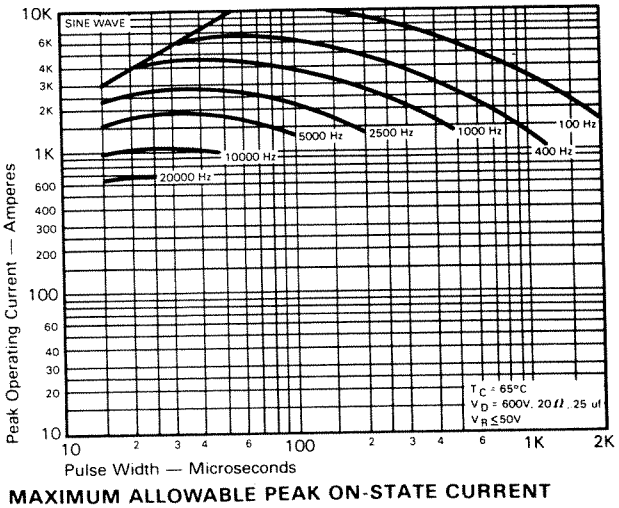


ENERGY PER PULSE FOR SINUSOIDAL PULSES

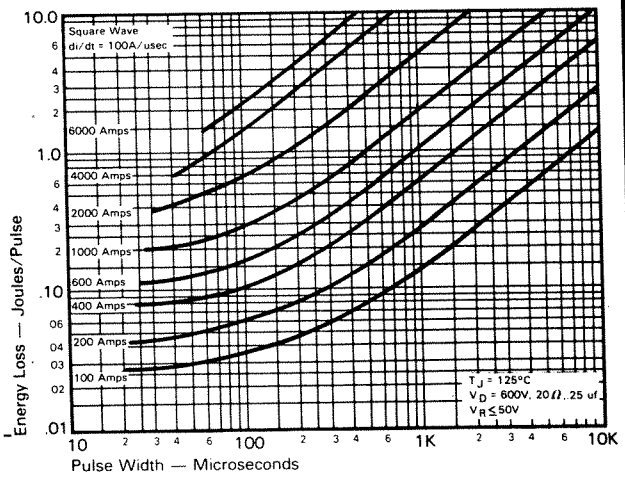
Trapezoidal Wave Current Data



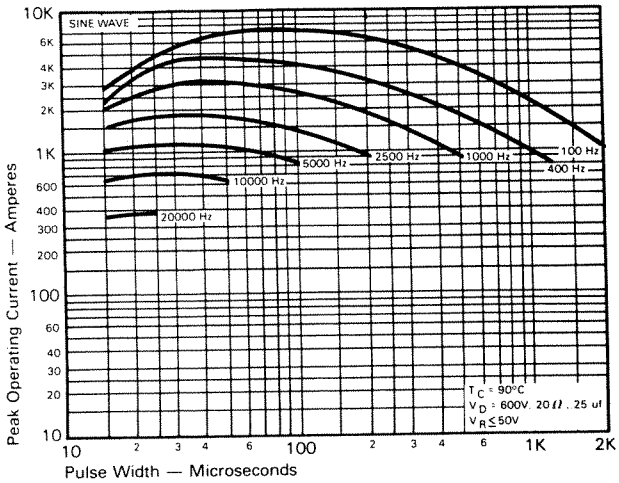
ENERGY PER PULSE FOR TRAPEZOIDAL PULSES (di/dt = 50A/usec)



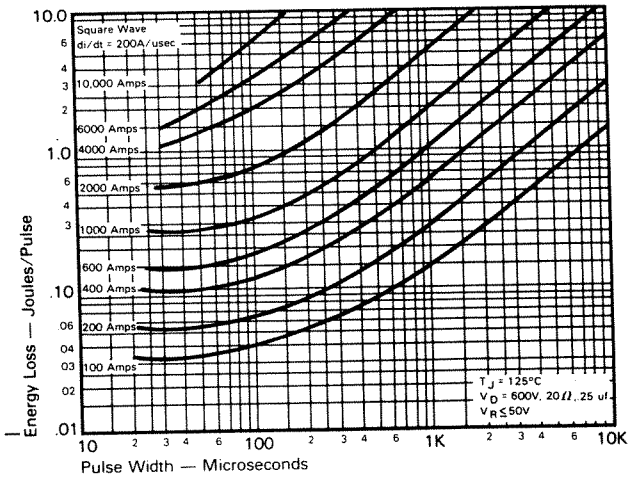
MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT vs. PULSE WIDTH (T_C = 65°C)



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



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



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

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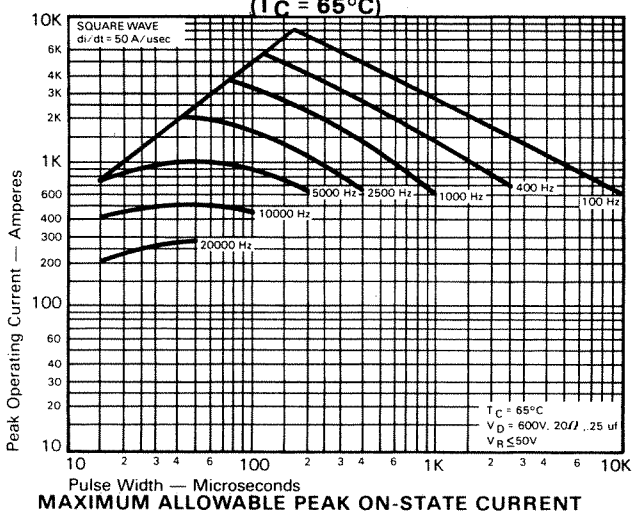
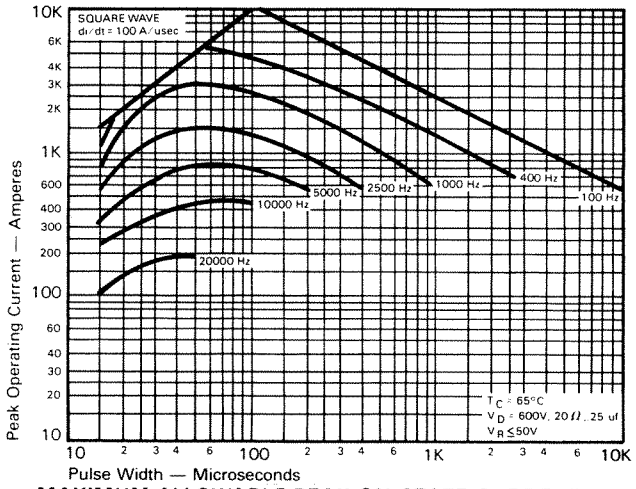
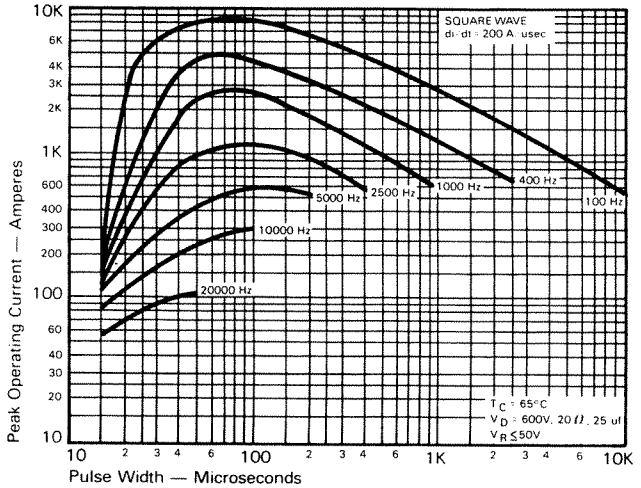
Trapezoidal Wave Current Data (T_C = 65°C)



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

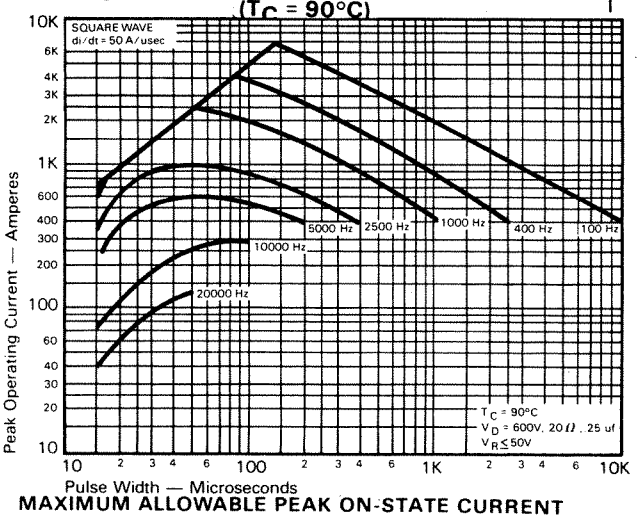


MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT
vs. PULSE WIDTH (di/dt = 100A/usec)

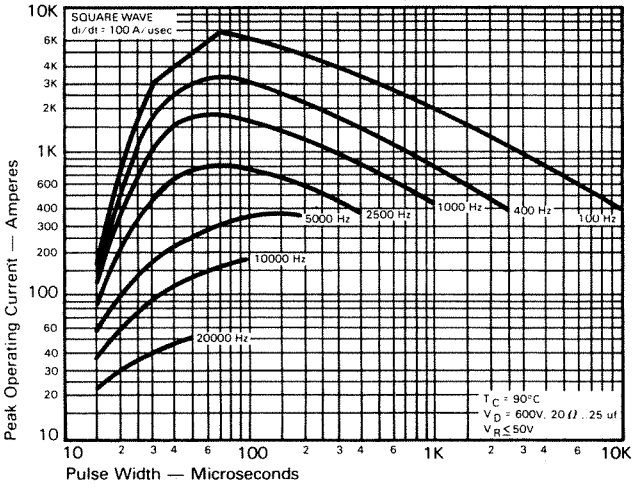


MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT
vs. PULSE WIDTH (di/dt = 200A/usec)

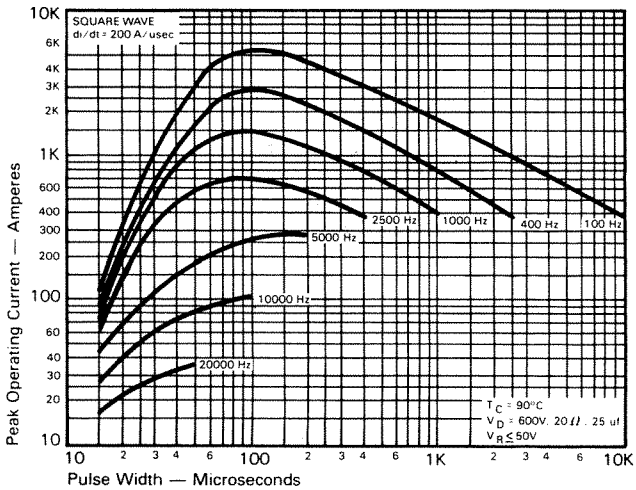
Trapezoidal Wave Current Data (T_C = 90°C)



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)

FAST SWITCHING THYRISTORS