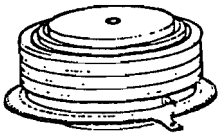
5.2 Condensed Electrical And Thermal Characteristics And Ratings



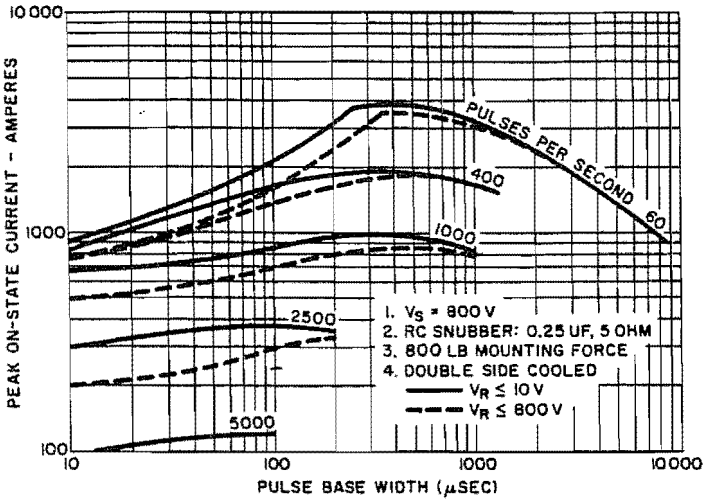
276

INVERTER SCRs
650 AMPERES

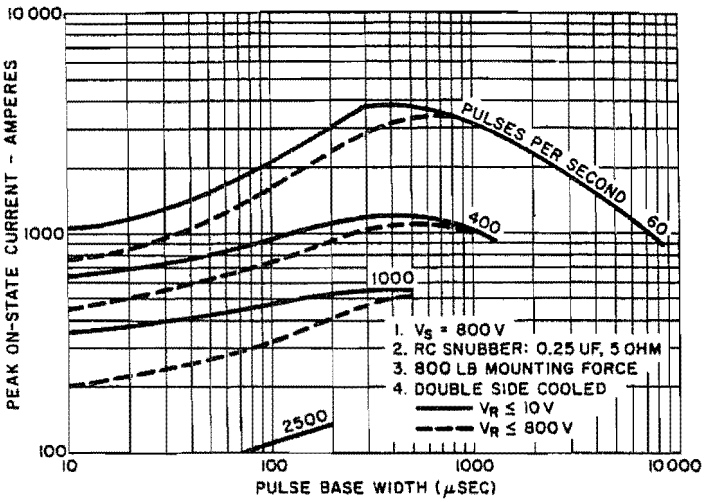
GE TYPE			C437/C438	C376	C377/C378	C397/C398
CONSTRUCTION			AMPLIFYING GATE	AMPLIFYING GATE	AMPLIFYING GATE	AMPLIFYING GATE
SPECIFICATIONS						
Voltage Range			500-1200	500-1400	500-1400	500-1200
Forward Conduction						
$I_{(RMS)}$	Max. forward conduction sinusoidal: @T_C = 65°C, 50% duty (A)					
	@ 60 Hz.		750	500	600	650
	@ 600 Hz.		585	500	600	610
	@ 1000 Hz.		500	500	600	—
	@ 1200 Hz.		425	500	600	400
	@ 2500 Hz.		200	480	500	250
	@ 5000 Hz.		—	400	440	150
	@ 10,000 Hz.		—	—	350	—
I_{TSM}	Max. peak one-cycle, non-repetitive surge current (A)	50 Hz.	7000	5800	7200/6800	7000
		60 Hz.	7500	6000	7500/7000	7500
I^2t	Max. I^2t for fusing 1.5 msec (A^2sec)		100,000	54,000	85,000/72,500	100,000
$R_{\Theta JC}$	Max. thermal impedance (°C/w)		.045	.06	.06	.06
t_q	Turn-off time @ rated voltage and T_J $V_R \geq$ = 50V (μsec) @ 20V/μsec reapplied		30	—	—	40 TYP.
	@ 100V/μsec reapplied			—	—	50
	@ 200V/μsec reapplied		40	20	40/30	60
	@ 400V/μsec reapplied		—	—	—	—
Q_{RR}	Max. reverse recovered charge(μs), T_J = 25°C		75	40	90	75
di/dt	Critical rate-of-rise of on-state current (A/μs)		800	800	800	800
T_J	Junction operating temperature range (°C)		−40 to +125°	−40 to +125°	−40 to +125°	−40 to +125°
dV/dt	Min. critical rate-of-rise of off-state voltage, exponential to rated V_{DRM} @ Max. T_J (V/μs)		200	200	200	200
I_{GT}	Max. required gate current to trigger (mA) @ −40°C		400	400	400	300
	@ +25°C		200	200	200	150
V_{GT}	Max. required voltage to trigger (V) from −40°C to +125°C		5	5	5	5
V_{TM}	Max. forward voltage[1] drop for the current range:	I_{MIN}(A)	500	300	300	200
		I_{MAX}(A)	4000	7000	7000	4000
		A	2.96	−2.32	3.04	.265
		B	−.45	1.09	−.31	.247
		C	9E-5	.0015	.0054	.00068
		D	.0667	−.137	.024	−.0176
$R_{\Theta JC}$	Transient thermal[2] resistance for time:	T_{MIN}(s)	.001	.001	.001	.001
		T_{MAX}(s)	.01	.01	.01	.01
		F	.292	.292	.292	.307
		G	.618	.618	.618	.628
Package Outline No.			276	276	276	276
Max. Mounting Force		Lbs	2000	2000	2000	2000
		KN	8.9	8.9	8.9	8.9
Expanded Electrical Characterization, see page:			216	187	188/189	200

[1] Voltage Drop Model: $V_F = A + B \cdot L_N(I) + CI + D\sqrt{I}$.
[2] Transient Thermal Resistance Model: $R_{\Theta JC} = F \cdot t^G$

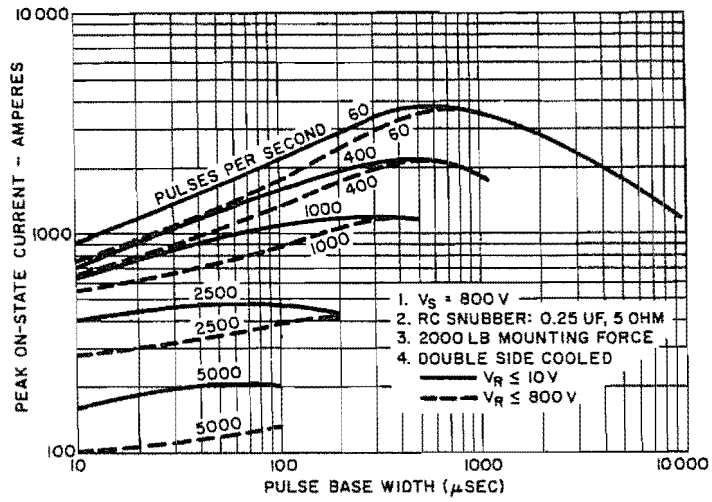
SINUSOIDAL CURRENT WAVEFORMS



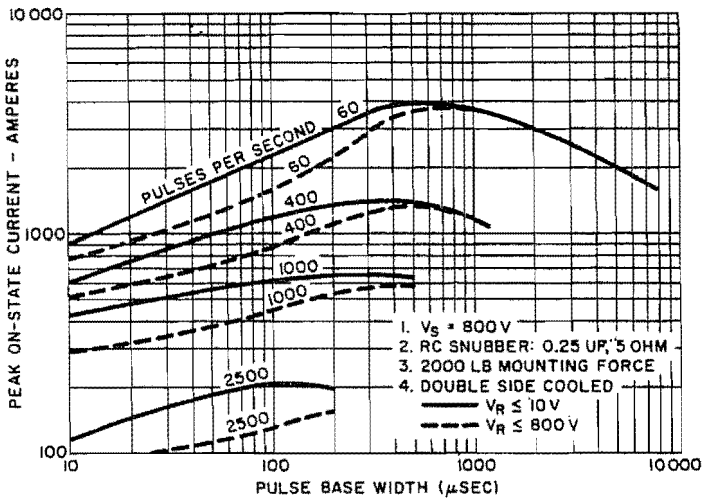
1. MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VS. PULSE WIDTH FOR T_C = 65°C & 800 LBS. MOUNTING



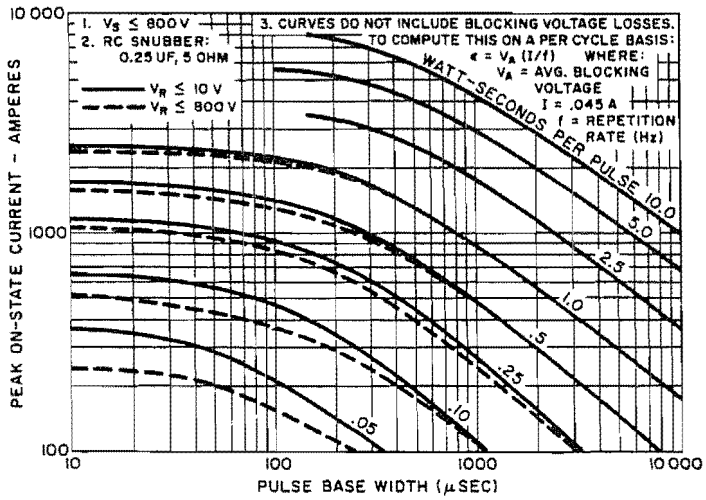
2. MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VS. PULSE WIDTH FOR T_C = 90°C & 800 LBS. MOUNTING



3. MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VS. PULSE WIDTH FOR T_C = 65°C & 2000 LBS. MOUNTING



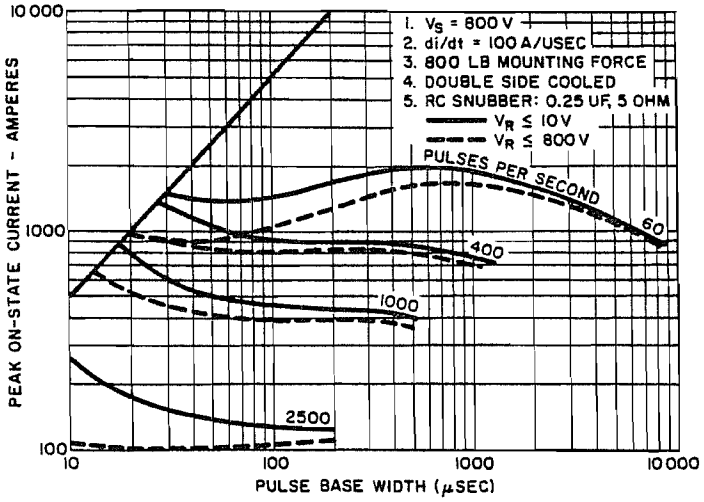
4. MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VS. PULSE WIDTH FOR T_C = 90°C & 2000 LBS. MOUNTING



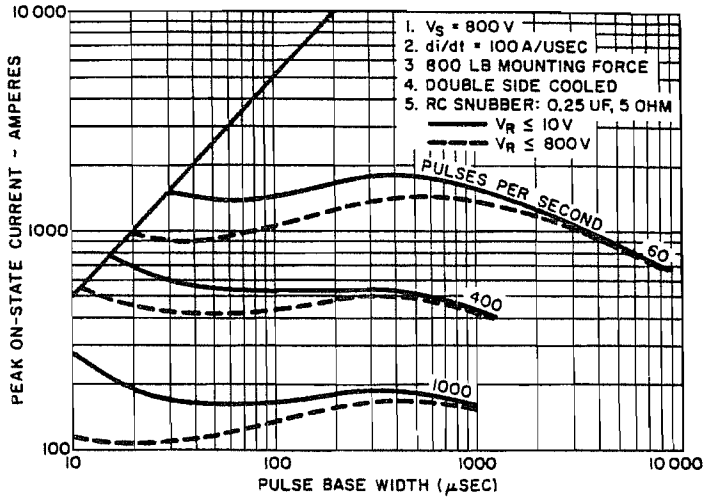
5. ENERGY PER PULSE FOR SINUSOIDAL PULSES

NOTES:
1. Switching Voltage ≤ 800 Volts.
2. Reverse Voltage Applied = V_R T 800 Volts.
3. R-C Snubber Circuit = .25μf, 15Ω.
4. Double-Side Cooled.

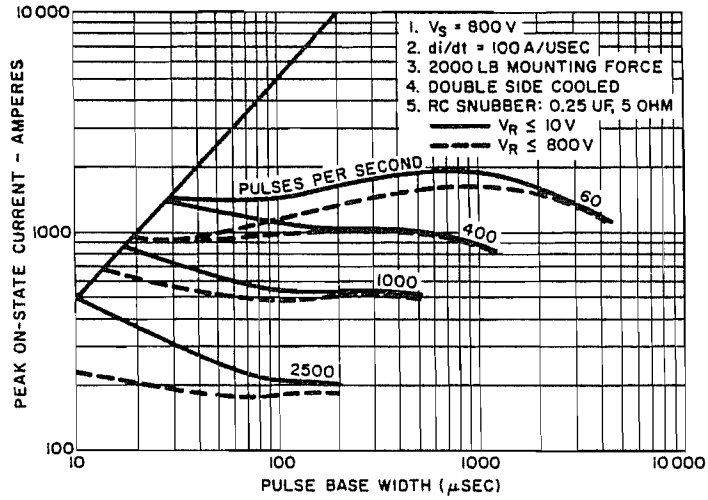
TRAPEZOIDAL CURRENT WAVEFORMS



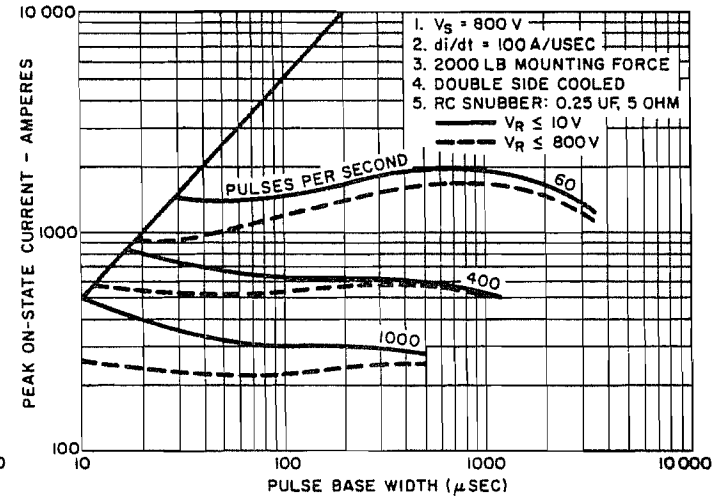
6. MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VS. PULSE WIDTH FOR T_C = 65°C & 800 LBS. MOUNTING



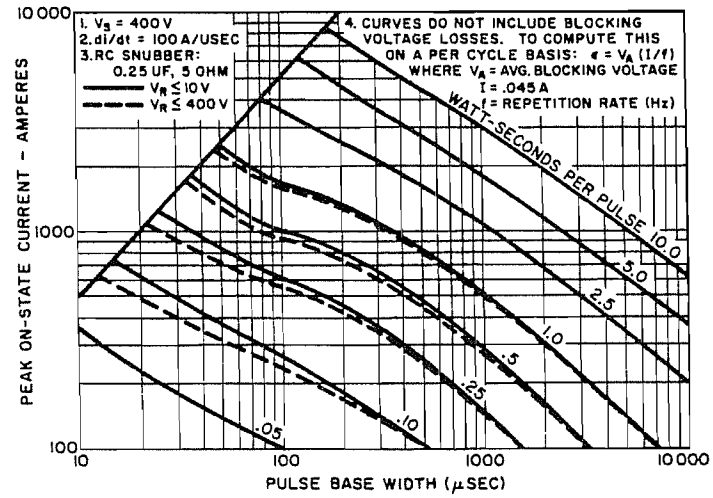
7. MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VS. PULSE WIDTH FOR T_C = 90°C & 800 LBS. MOUNTING



8. MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VS. PULSE WIDTH FOR T_C = 65°C & 2000 LBS. MOUNTING



9. MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VS. PULSE WIDTH FOR T_C = 90°C & 2000 LBS. MOUNTING



10. ENERGY PER PULSE FOR TRAPEZOIDAL CURRENT PULSES