

HIGH SPEED Silicon Controlled Rectifier

C184, C185

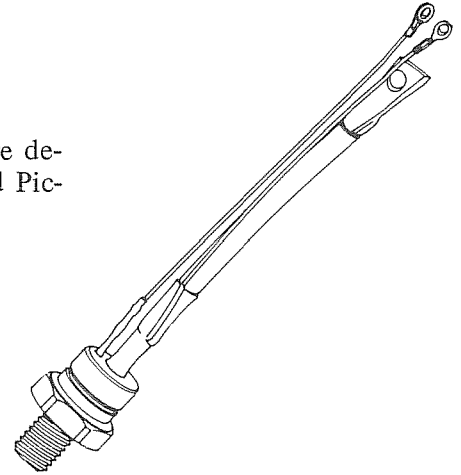
800 Volts

300A RMS

The General Electric C184 and C185 Silicon Controlled Rectifiers are designed for power switching at high frequencies. These are all-diffused Pic-Pac devices, employing the field-proven amplifying gate.

FEATURES:

- High di/dt Ratings.
- High dv/dt Capability.
- Excellent Surge and I²t Ratings Providing Easy Fusing.
- Guaranteed Maximum Turn-Off Time with Selections Available.
- Rugged Hermetic Package with Long Creepage Path.



MAXIMUM ALLOWABLE RATINGS

TYPES	REPETITIVE PEAK OFF-STATE VOLTAGE, V_{DRM}^1 $T_J = -40^\circ\text{C to } +125^\circ\text{C}$	REPETITIVE PEAK REVERSE VOLTAGE, V_{RRM}^1 $T_J = -40^\circ\text{C to } +125^\circ\text{C}$	NON-REPETITIVE PEAK REVERSE VOLTAGE, V_{RSM}^1 $T_J = +125^\circ\text{C}$
C184/C185A	100 Volts	100 Volts	200 Volts
C184/C185B	200	200	300
C184/C185C	300	300	400
C184/C185D	400	400	500
C184/C185E	500	500	600
C184/C185M	600	600	720
C185S	700	700	840
C185N	800	800	960

¹ Half sinewave waveform, 10 ms max. pulse width.

RMS On-State Current, $I_{T(RMS)}$	300 Amperes
Critical Rate-of-Rise of On-State Current, Non-Repetitive†	800 A/μs
Critical Rate-of-Rise of On-State Current, Repetitive†	500 A/μs
Peak One Cycle Surge (Non-Repetitive) On-State Current, I_{TSM} (60 Hz)	3500 Amperes
Peak One Cycle Surge (Non-Repetitive) On-State Current, I_{TSM} (50 Hz)	3200 Amperes
I ² t (for fusing) for times ≥ 1.5 milliseconds	35,000 (RMS Ampere) ² Seconds
I ² t (for fusing) for times ≥ 8.3 milliseconds	50,000 (RMS Ampere) ² Seconds
Average Gate Power Dissipation, $P_{G(AV)}$	2 Watts
Storage Temperature, T_{stg}	-40°C to +150°C
Operating Temperature, T_J	-40°C to +125°C
Stud Torque	300 Lb-In (Max.), 250 Lb-IN (Min.) 34 N-m (Max.), 28 N-m (Min.)

† di/dt ratings established in accordance with EIA-NEMA Standard RS-397, Section 5.2.2.6 for conditions of max. rated V_{DRM} ; 20 volts, wo ohms gate trigger source with 0.5μs short circuit trigger current rise time.

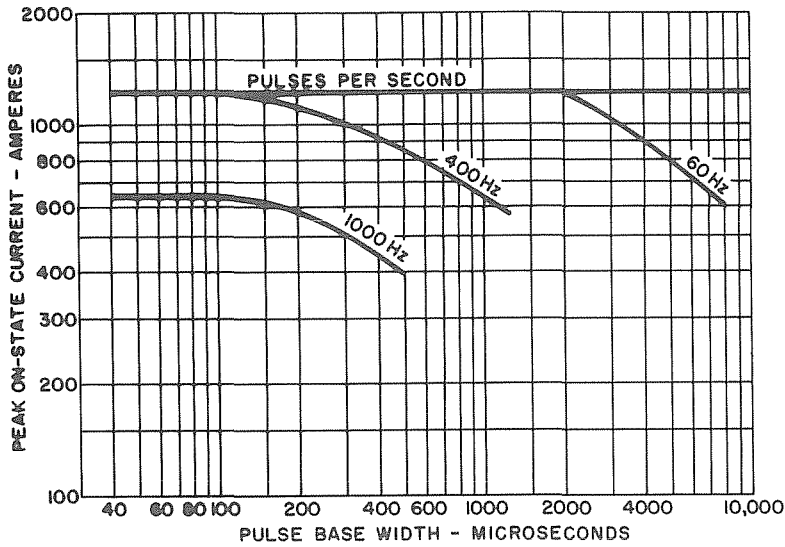
CHARACTERISTICS

TEST	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Repetitive Peak Reverse and Off-State Current	I_{RRM} and I_{DRM}	—	3	10	mA	$T_J = +25^\circ\text{C}$, $V = V_{DRM} = V_{RRM}$
Repetitive Peak Reverse and Off-State Current	I_{RRM} and I_{DRM}	—	15	20	mA	$T_J = 125^\circ\text{C}$, $V = V_{DRM} = V_{RRM}$
Thermal Resistance	$R_{\theta JC}$	—	.12	.15	$^\circ\text{C/Watt}$	Junction-to-Case
Critical Rate-of-Rise of Off-State Voltage (Higher values may cause device switching)	dv/dt	200	500	—	$\text{V}/\mu\text{sec}$	$T_J = +125^\circ\text{C}$, Gate Open, $V_{DRM} = \text{Rated}$, linear or exponential rising waveform. Exponential $dv/dt = \frac{V_{DRM}}{\tau}$ (.632)
Higher minimum dv/dt selections available — consult factory.						
Holding Current	I_H	—	75	500	mA dc	$T_C = +25^\circ\text{C}$, Anode Supply = 24 Vdc. Initial On-State Current = 2.5 Amps.
DC Gate Trigger Current	I_{GT}	—	125	300	mA dc	$T_C = +25^\circ\text{C}$, $V_D = 6 \text{ Vdc}$, $R_L = 3 \text{ Ohms}$
		—	175	500		$T_C = -40^\circ\text{C}$, $V_D = 6 \text{ Vdc}$, $R_L = 3 \text{ Ohms}$
		—	100	250		$T_C = +125^\circ\text{C}$, $V_D = 6 \text{ Vdc}$, $R_L = 3 \text{ Ohms}$
DC Gate Trigger Voltage	V_{GT}	—	—	5.0	Vdc	$T_C = -40^\circ\text{C}$ to 0°C , $V_D = 6 \text{ Vdc}$, $R_L = 3 \text{ Ohms}$
		—	—	3.0		$T_C = 0^\circ\text{C}$ to $+125^\circ\text{C}$, $V_D = 6 \text{ Vdc}$, $R_L = 3 \text{ Ohms}$
		0.15	—	—		$T_C = +125^\circ\text{C}$, V_{DRM} , $R_L = 1000 \text{ Ohms}$
Peak On-State Voltage	V_{TM}	—	2.3	2.85	Volts	$T_C = +25^\circ\text{C}$, $I_{TM} = 1500 \text{ Amps Peak}$. Duty Cycle $\leq .01\%$.
Turn-On Delay Time	t_d	—	1	—	μsec	$T_C = +25^\circ\text{C}$, $I_T = 50 \text{ Adc}$, V_{DRM} . Gate Supply: 20 Volt Open Circuit, 20 Ohm, 0.1 μsec max. Rise Time.
Conventional Circuit Commutated Turn-Off Time (with Reverse Voltage)	t_q	—	—	—	μsec	(1) $T_C = +125^\circ\text{C}$ (2) $I_{TM} = 250 \text{ Amps}$. (3) $V_R = 50 \text{ Volts Min}$. (4) V_{DRM} (Reapplied) (5) Rate-of-Rise of Reapplied Off-State Voltage = $200 \text{ V}/\mu\text{sec}$ (linear) (6) Commutation $di/dt = 12.5 \text{ Amps}/\mu\text{sec}$. (7) Duty Cycle $\leq .01\%$. (8) Gate Bias During Turn-Off Interval = 0 Volts, 100 Ohms.
	C184	—	8	10		
	C185	—	15	20		
Conventional Circuit Commutated Turn-Off Time (with Feedback Diode)	t_q (diode)	—	—	—	μsec	(1) $T_C = +125^\circ\text{C}$ (2) $I_{TM} = 250 \text{ Amps}$. (3) $V_R = 1 \text{ Volt}$ (4) V_{DRM} (Reapplied) (5) Rate-of-Rise of Reapplied Off-State Voltage = $200 \text{ V}/\mu\text{sec}$ (linear) (6) Commutation $di/dt = 12.5 \text{ Amps}/\mu\text{sec}$. (7) Duty Cycle $\leq .01\%$. (8) Gate Bias During Turn-Off Interval = 0 Volts, 100 Ohms.
	C184	—	10	†		
	C185	—	20	†		

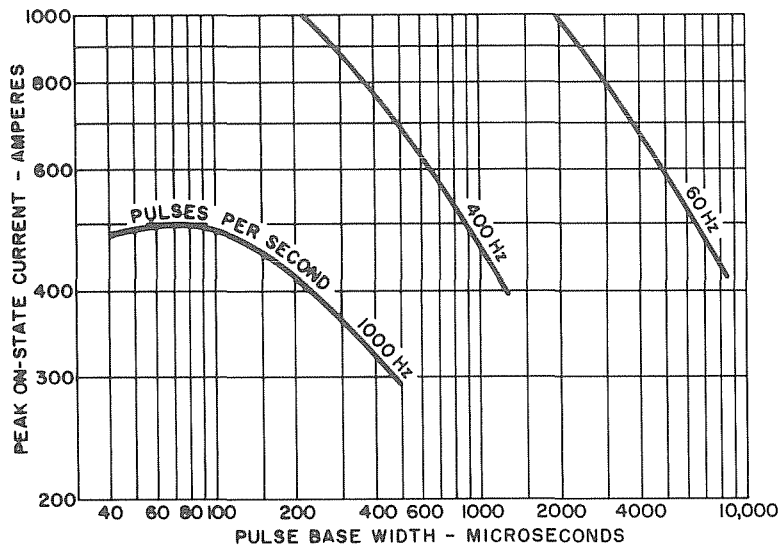
†Consult factory for maximum turn-off time.

SINE WAVE CURRENT RATING DATA

C184, C185



1. MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VS. PULSE WIDTH ($T_C = 65^\circ\text{C}$)

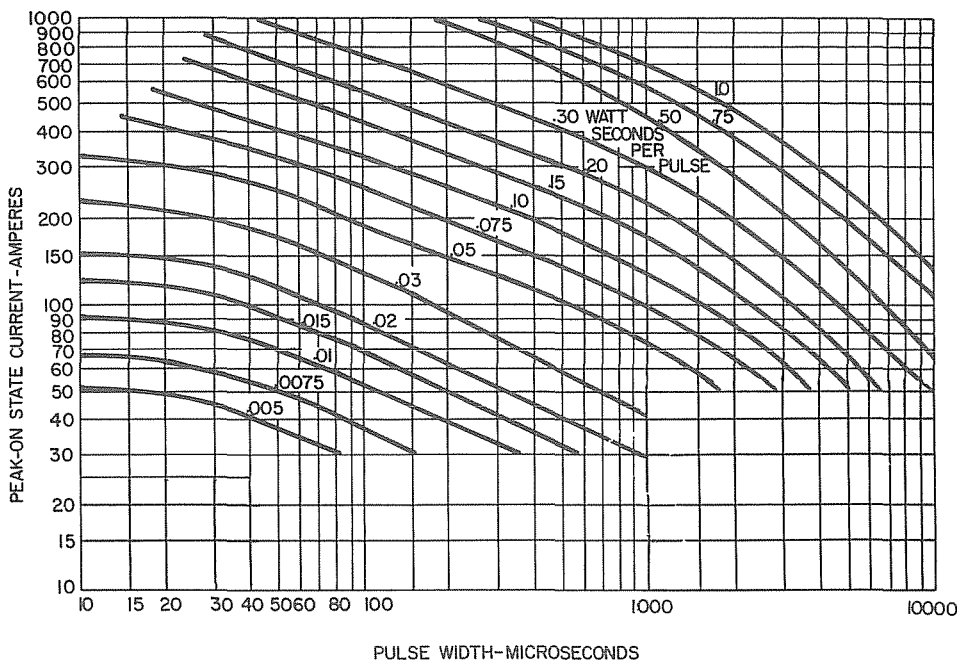


2. MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VS. PULSE WIDTH ($T_C = 90^\circ\text{C}$)

NOTES:

(Pertaining to Sine and Trapezoidal Wave Current Ratings)

1. Switching voltage ≤ 400 volts.
2. RC Snubber — .22 μf , 5 ohm.
3. Reverse voltage $V_R \leq 400$ volts.
4. Values of W-S/D are for $T_J = 125^\circ\text{C}$.

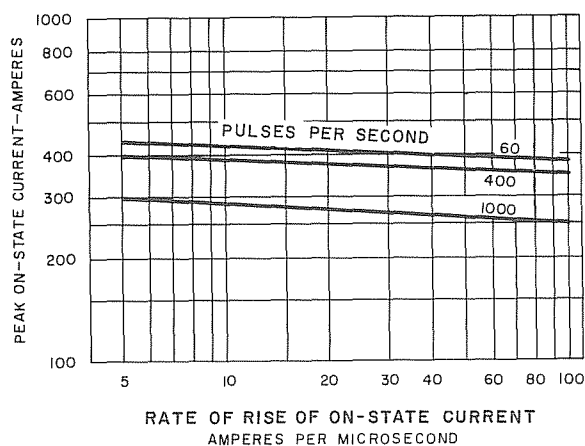


3. ENERGY PER PULSE FOR SINUSOIDAL PULSES

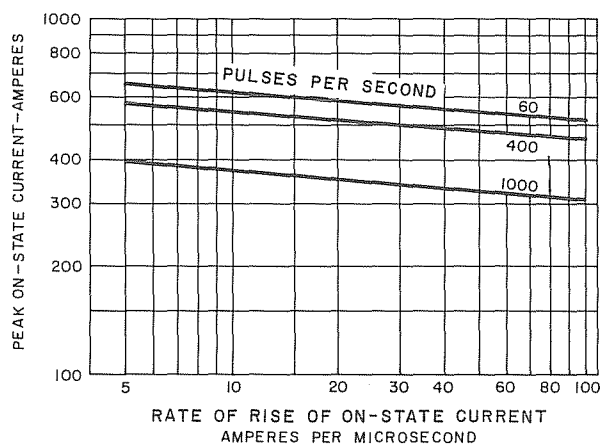
TRAPEZOIDAL WAVE CURRENT RATING DATA

DUTY CYCLE-50%

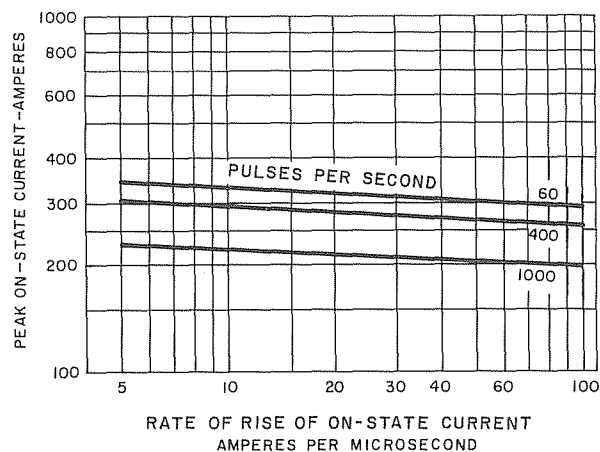
DUTY CYCLE-25%



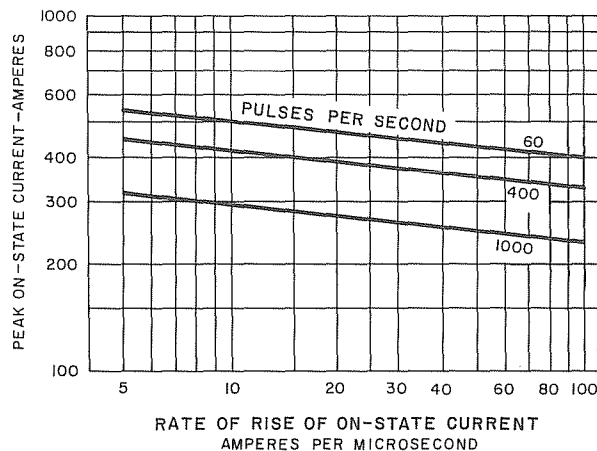
4. MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VS. di/dt ($T_C = 65^\circ\text{C}$)



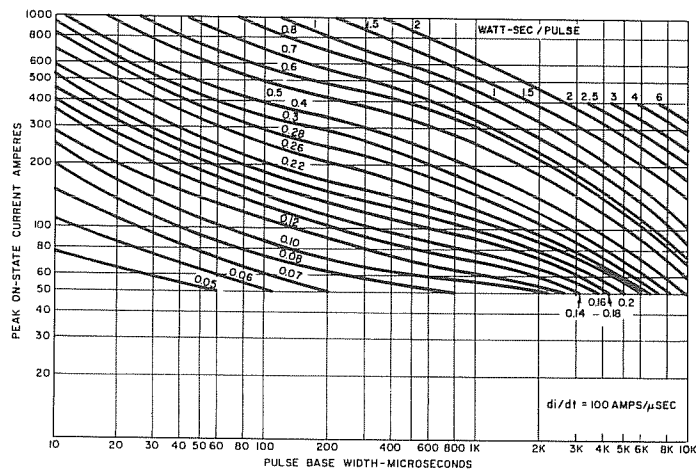
6. MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VS. di/dt ($T_C = 65^\circ\text{C}$)



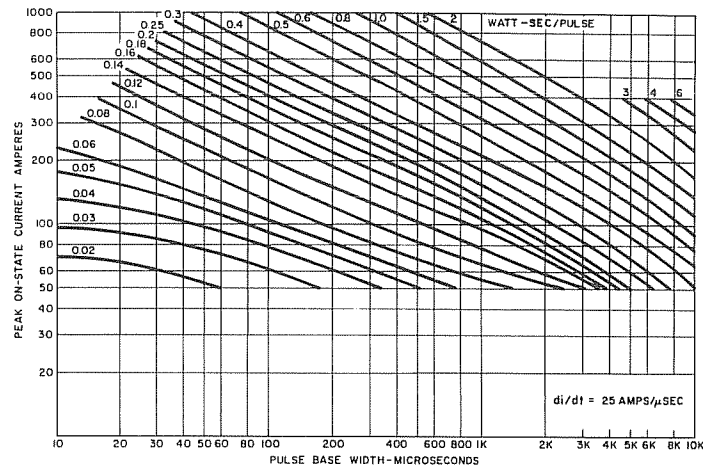
5. MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VS. di/dt ($T_C = 90^\circ\text{C}$)



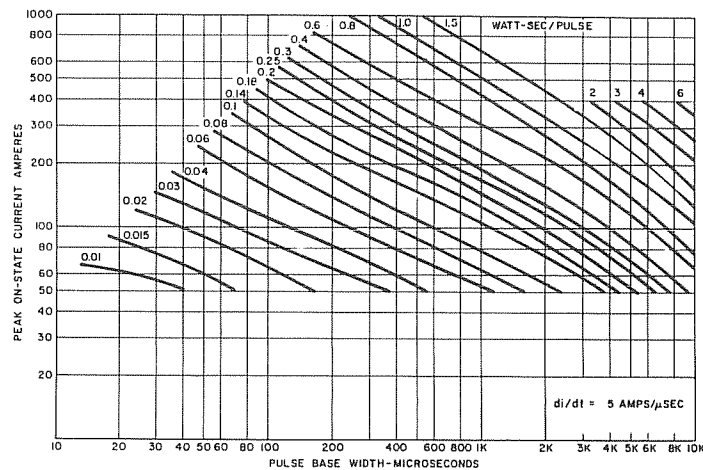
7. MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VS. di/dt ($T_C = 90^\circ\text{C}$)



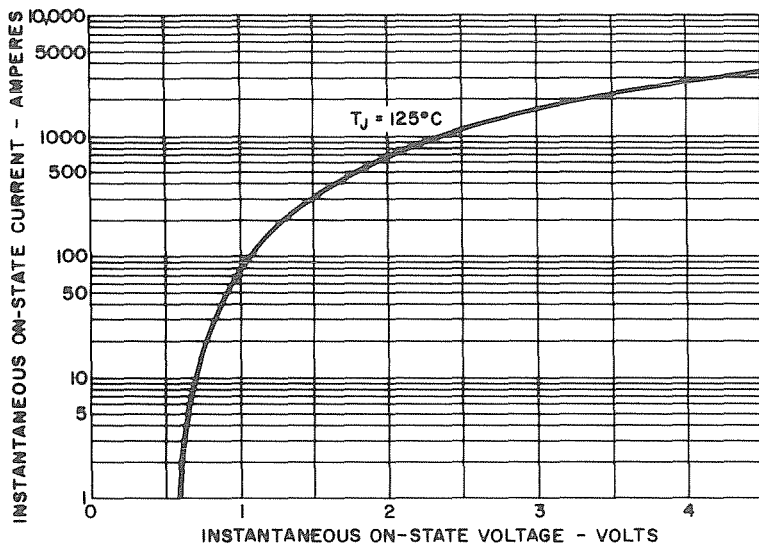
8. ENERGY PER PULSE VS. PEAK CURRENT
AND PULSE WIDTH ($di/dt = 100 \text{ A}/\mu\text{sec.}$)



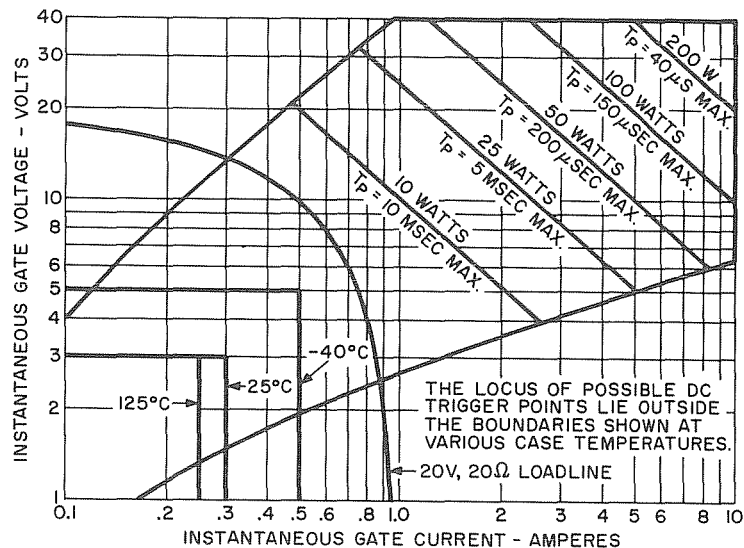
9. ENERGY PER PULSE VS. PEAK CURRENT
AND PULSE WIDTH ($di/dt = 25 \text{ A}/\mu\text{sec.}$)



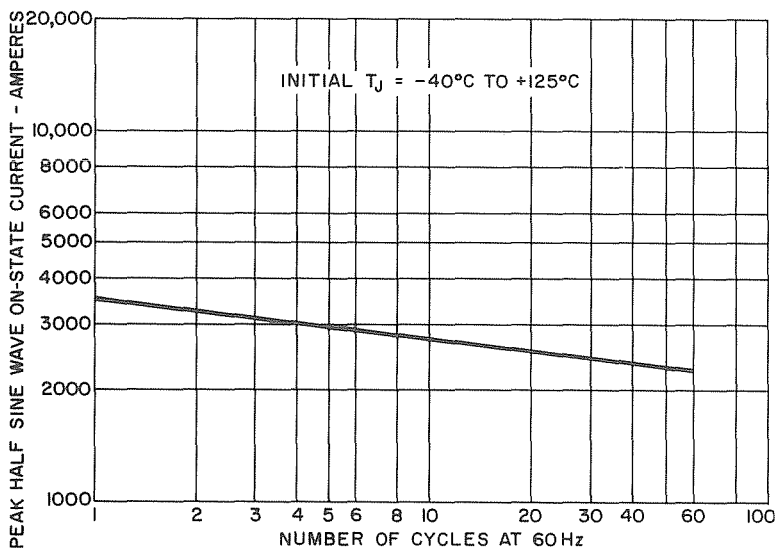
10. ENERGY PER PULSE VS. PEAK CURRENT
AND PULSE WIDTH ($di/dt = 5 \text{ A}/\mu\text{sec.}$)



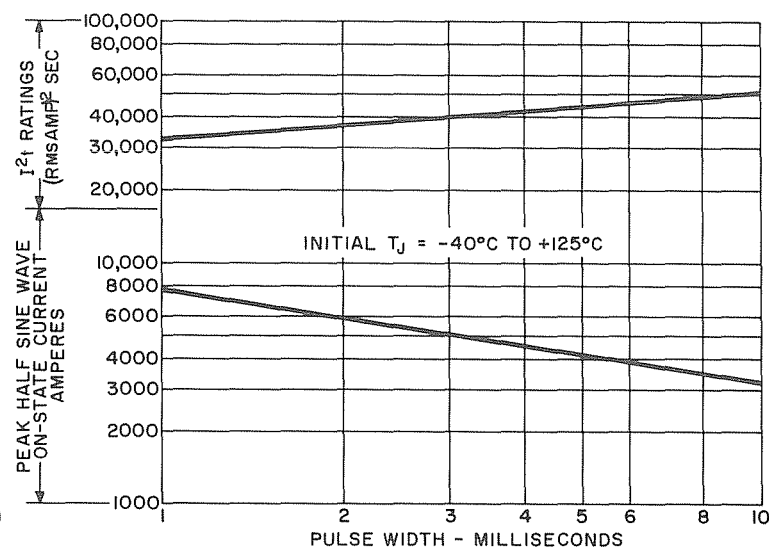
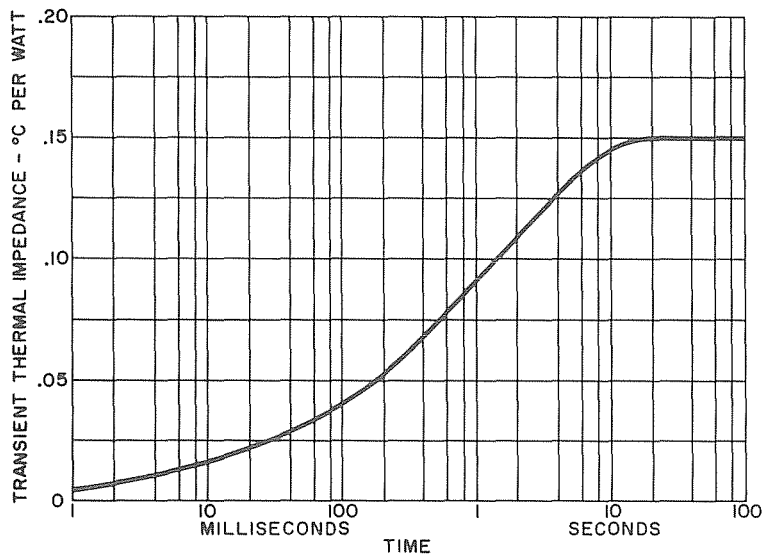
11. MAXIMUM ON-STATE CHARACTERISTICS



12. GATE TRIGGER CHARACTERISTICS AND POWER RATINGS

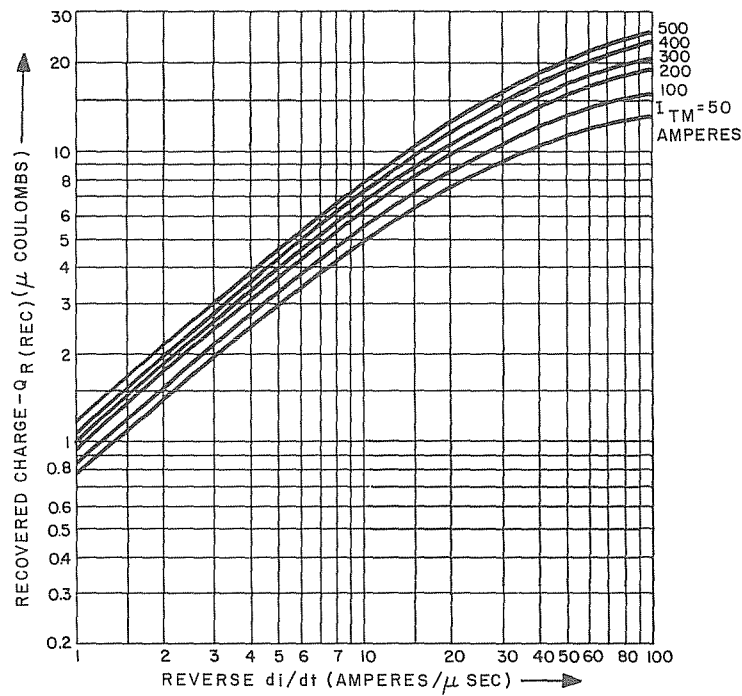


13. SURGE (NON-REPETITIVE) ON-STATE CURRENT

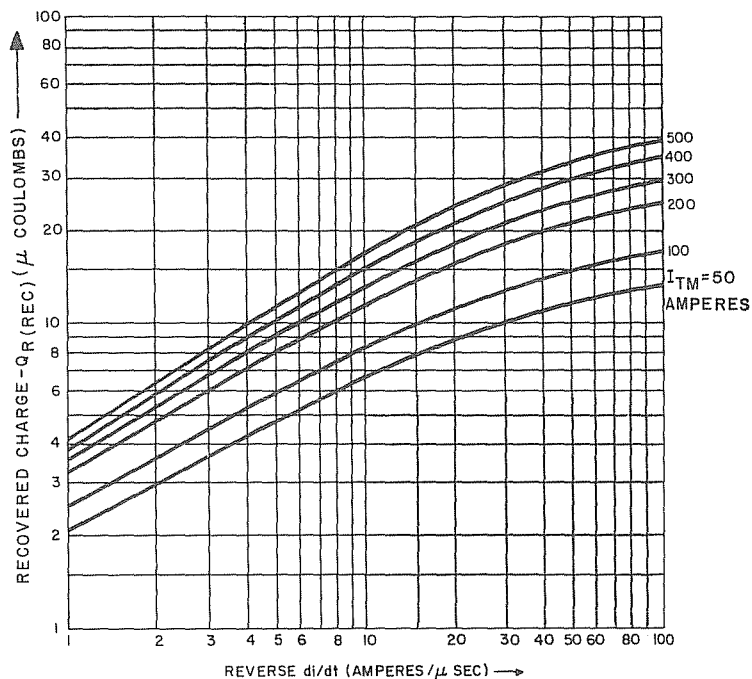
14. SUB-CYCLE SURGE (NON-REPETITIVE) ON-STATE CURRENT AND I^2t RATINGS

15. TRANSIENT THERMAL IMPEDANCE - JUNCTION-TO-CASE

C185 RECOVERED CHARGE DATA

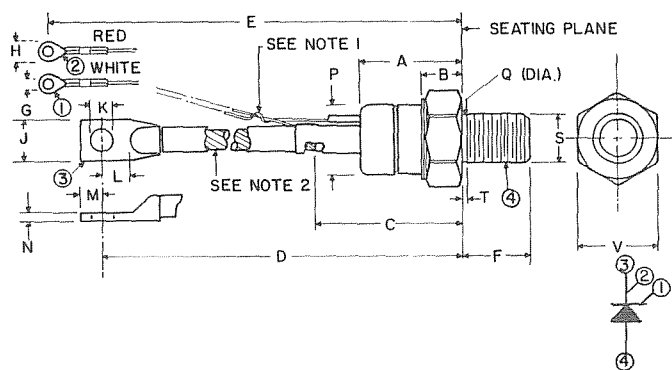


16. TYPICAL RECOVERED CHARGE DATA AT 25°C SINEWAVE CURRENT WAVEFORM



17. TYPICAL RECOVERED CHARGE DATA AT 125°C SINEWAVE CURRENT WAVEFORM

OUTLINE DRAWING



MODEL	TERMINAL ①	TERMINAL ②	TERMINAL ③	TERMINAL ④	S
C 180 C 185		AUX. CATHODE	CATHODE +	ANODE -	
C 186	GATE				3/4-16 UNF-2A

SYM.	INCHES		METRIC (MM)		NOTE	SYM.	INCHES		METRIC (MM)		NOTE
	MIN.	MAX.	MIN.	MAX.			MIN.	MAX.	MIN.	MAX.	
A	1.450	1.550	36.83	39.37		L	.437	-	11.09	-	
B	.500	.750	12.70	19.05		M	.325	.360	8.25	9.14	
C	2.300	2.500	58.42	63.50		N	.093	.125	2.36	3.18	
D	7.350	8.100	186.69	205.74		P	1.060	1.100	26.92	27.94	
E	7.350	8.100	186.69	205.74		Q	.660	.749	16.76	19.02	
F	1.047	1.077	26.59	27.36							
G	.140	.150	3.55	3.81		T	-	.156	-	3.96	4
H	.215	.300	5.46	7.62							
J	.530	.687	13.46	17.45		V	1.240	1.250	31.49	31.75	
K	.322	.333	8.17	8.46							