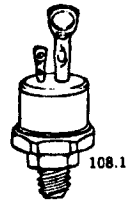
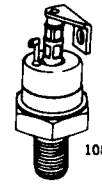


## INVERTER SCR's 63 TO 270 AMPERES



GE TYPE	C48/C148	C49/C149	C154, 156	C155, 157	C158, 159	C164, 165	C354, 355	C358
CONSTRUCTION	ALL DIFFUSED	ALL DIFFUSED	AMPLIFYING GATE	AMPLIFYING GATE	AMPLIFYING GATE	AMPLIFYING GATE	AMPLIFYING GATE	AMPLIFYING GATE
<b>ELECTRICAL SPECIFICATIONS</b>								
<b>VOLTAGE RANGE</b>	600-1200	100-600	100-600	100-600	500-1200	100-600	100-800	500-1200
<b>FORWARD CONDUCTION</b>								
$I_T$ (RMS)	Max. forward conduction sinusoidal @ $T_C = 65^\circ\text{C}$ , 50% duty (A)							
@ 60 Hz	110/63	110/63	110	110	110	110	270	225
@ 600 Hz	110/63	110/63	110	110	110	110	250	225
@ 1200 Hz	110/63	110/63	110	110	110	110	225	225
@ 2500 Hz	110/63	110/63	110	110	100	110	180	175
@ 5000 Hz	110/63	110/63	110	110	90	110	—	140
$I_{TSM}$	Max. peak one cycle, non-repetitive surge current (A)							
	700	1000	1800	1800	1600	1800	1800	1600
$I_{2t}$	Max. $I_{2t}$ for fusing for 5 to 8.3 msec ( $A^2$ sec)							
	2000	4150	13,200	13,200	10,500	13,500	13,200	10,500
$R_{\theta JC}$	Max. thermal impedance ( $^\circ\text{C}$ )							
	.35	.35	.3	.3	.3	.3	.13	.135
$t_d + t_r$	Typical turn-on time ( $\mu\text{sec}$ )							
	2	2	2	2	5	2.0	2	5
$t_q$	Turn-off time @ rated voltage and $T_J V_R = 50\text{V}$ min. ( $\mu\text{sec}$ ) @ 20V/ $\mu\text{sec}$ reapplied							
@ 100V/ $\mu\text{sec}$ reapplied	30, 40	10, 15	10	20	30	<10, 15	10	30
@ 200V/ $\mu\text{sec}$ reapplied	40, 50	20, 25	20	25	35	<10, 15	15, 25	35
$di/dt$	Critical rate-of-rise of on-state current (A/ $\mu\text{sec}$ )							
	100	100	100	100	500	500	100	500
$T_J$	Junction operating temperature range ( $^\circ\text{C}$ ) ← ————— 40 to 125 $^\circ\text{C}$ ————— →							
<b>BLOCKING</b>								
$dv/dt$	Critical rate-of-rise off-state voltage exponential to rated $V_{DRM}$ @ Max. $T$ (V/ $\mu\text{sec}$ )							
	200	200	200	100	200	200	200	200
<b>FIRING</b>								
$I_{GT}$	Max. required gate current to trigger (mA)							
@ $-40^\circ\text{C}$	300	300	200	200	300	400	200	300
@ $125^\circ\text{C}$	120	120	120	120	125	175	120	125
$V_{GT}$	Max. required voltage to trigger (V)							
@ $-40^\circ\text{C}$	3	3	3	3	5	5	3	5
@ $125^\circ\text{C}$ (Min.)	.15	.15	.15	.15	.15	.15	.15	.15
<b>VOLTAGE TYPES</b>								
Repetitive Peak Forward and Reverse Voltages								
100		C49A C149A	C154A C156A	C155A C157A		C164A C165A	C354A C355A	
150		C49G C149G	C154G C156G	C155G C157G			C354G C355G	
200		C49B C149B	C154B C156B	C155B C157B		C164B C165B	C354B C355B	
300		C49C C149C	C154C C156C	C155C C157C		C164C C165C	C354C C355C	
400		C49D C149D	C154D C156D	C155D C157D		C164D C165D	C354D C355D	
500		C49E C149E	C154E C156E	C155E C157E	C158E C159E	C164E C165E	C354E C355E	C358E
600	C48M C148M	C49M C149M	C154M C156M	C155M C157M	C158M C159M	C164M C165M	C354M C355M	C358M
700	C48S C148S				C158S C159S	C165S		C358S
800	C48N C148N				C158N C159N	C165N		C358N
900	C48T C148T				C158T C159T			C358T
1000	C48P C148P				C158P C159P			C358P
1100	C48PA C148PA				C158PA C159PA			C358PA
1200	C48PB C148PB				C158PB C159PB			C358PB
<b>PACKAGE TYPE</b>	$\frac{1}{2}$ "/ $\frac{1}{4}$ " STUD	$\frac{1}{2}$ "/ $\frac{1}{4}$ " STUD	$\frac{1}{2}$ " STUD	$\frac{1}{2}$ " STUD	$\frac{1}{2}$ " STUD	$\frac{1}{2}$ " STUD	$\frac{1}{4}$ " PRESS PAK	$\frac{1}{2}$ " PRESS PAK
<b>PACKAGE OUTLINE NO.</b>	109/108.1	109/108.1	109, 108	109, 108	109, 108	109	280	280

# HIGH SPEED Silicon Controlled Rectifier

**800Volts      110A RMS**

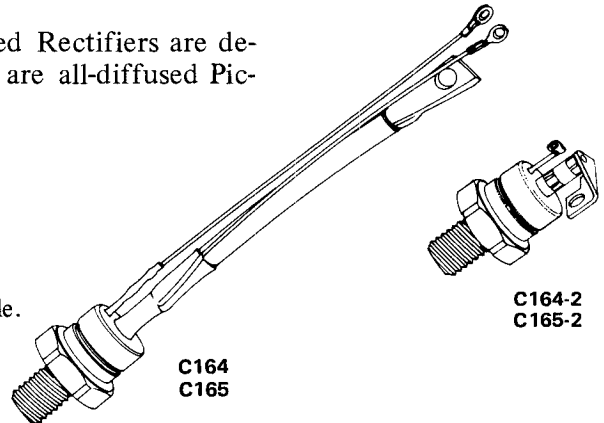
**C164 / C165**



The General Electric C164 and C165 Silicon Controlled Rectifiers are designed for power switching at high frequencies. These are all-diffused Pic-Pic devices, employing the field-proven amplifying gate.

**FEATURES:**

- High di/dt Ratings.
- High dv/dt Capability with Selections Available.
- Excellent Surge and I<sup>2</sup>t Ratings Providing Easy Fusing.
- Guaranteed Maximum Turn-Off Time with Selections Available.
- Rugged Hermetic Package with Long Creepage Path.



Equipment designers can use the C164 and C165 SCR's in demanding applications such as:

- Choppers
- Sonar Transmitters
- Cycloconverters
- Inverters
- Induction Heaters
- DC to DC Converters

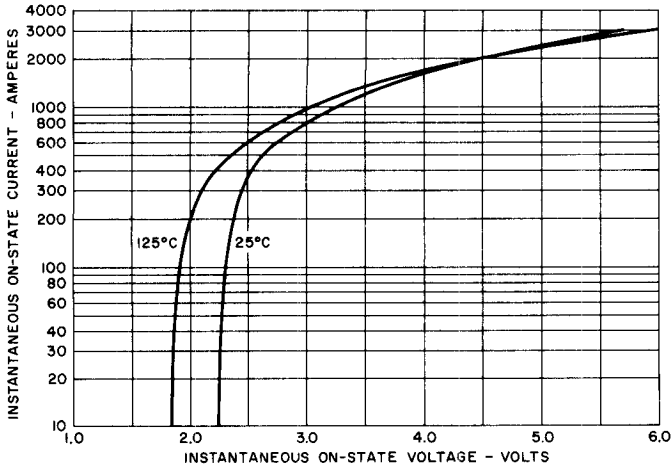
**MAXIMUM ALLOWABLE RATINGS**

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, $V_{RSM}^1$ $T_J = +125^\circ\text{C}$
C164/C165A	100 Volts	100 Volts	200 Volts
C164/C165B	200	200	300
C164/C165C	300	300	400
C164/C165D	400	400	500
C164/C165E	500	500	600
C164/C165M	600	600	720
C165S	700	700	840
C165N	800	800	960

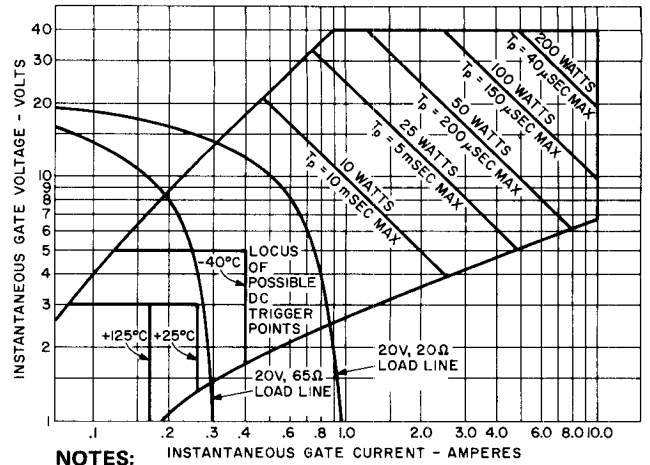
<sup>1</sup> Half sine wave waveform, 10 ms max. pulse width.

RMS On-State Current, $I_{T(RMS)}$ . . . . .	110 Amperes
Peak One Cycle Surge (Non-Repetitive) On-State Current, $I_{TSM}$ (60 Hz) . . . . .	1800 Amperes
Peak One Cycle Surge (Non-Repetitive) On-State Current, $I_{TSM}$ (50 Hz) . . . . .	1700 Amperes
I <sup>2</sup> t (for fusing) for times $\geq 1.5$ milliseconds . . . . .	9,500 (RMS Ampere) <sup>2</sup> Seconds
I <sup>2</sup> t (for fusing) for times $\geq 8.3$ milliseconds . . . . .	13,500 (RMS Ampere) <sup>2</sup> Seconds
Critical Rate-of-Rise of On-State Current, Non-Repetitive† . . . . .	800 A/ $\mu$ s
Critical Rate-of-Rise of On-State Current, Repetitive† . . . . .	500 A/ $\mu$ s
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 . . . . .	125-150 In-Lb 14-17 N-m

†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, 20 ohms gate trigger source with 0.5 $\mu$ s short circuit trigger current rise time.

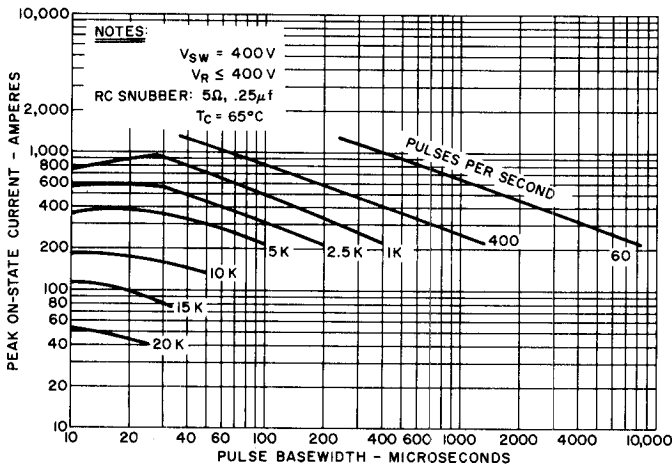


1. MAXIMUM ON-STATE CHARACTERISTICS

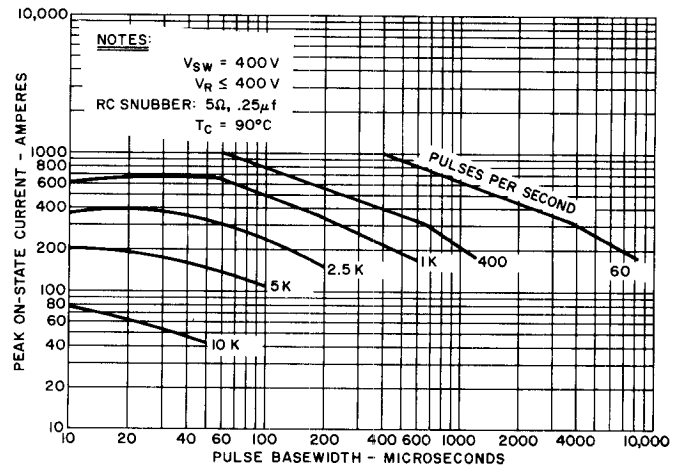


NOTES:

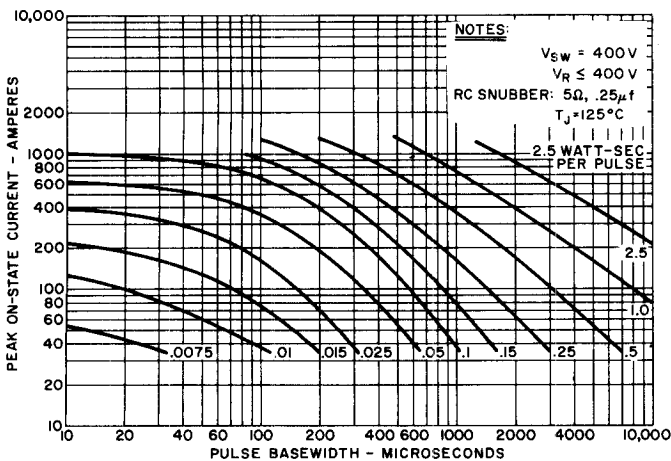
1. The locus of possible DC trigger points lies outside the boundaries shown at various case temperatures.
2. GATE TRIGGER CHARACTERISTICS AND POWER RATINGS



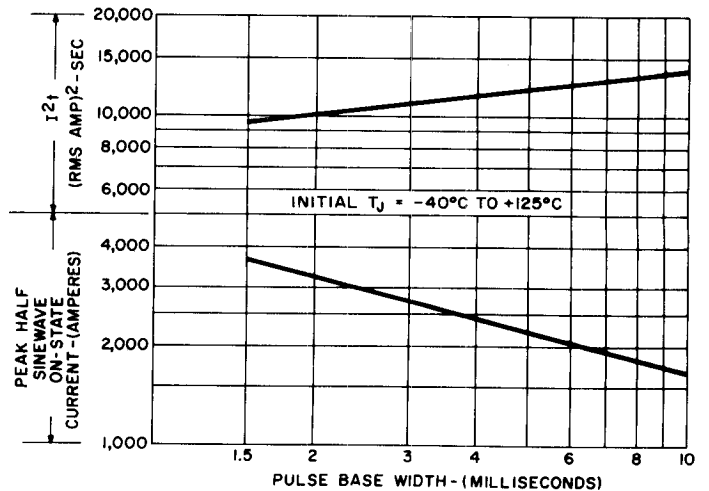
3. MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VS. PULSE WIDTH ( $T_c = 65^\circ\text{C}$ )



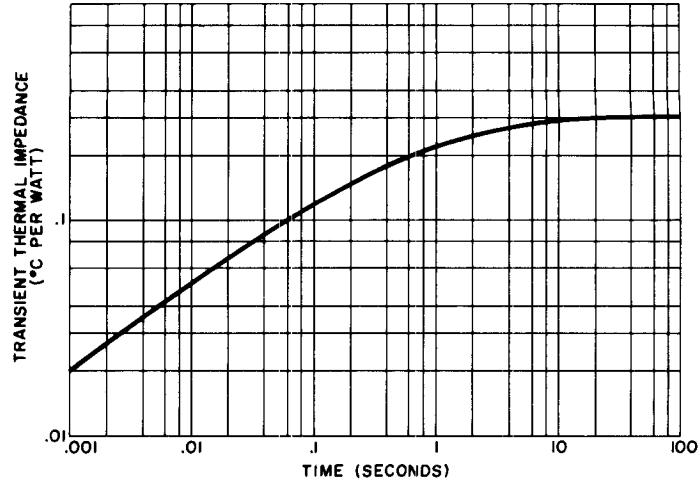
4. MAXIMUM ALLOWABLE PEAK ON-STATE CURRENT VS. PULSE WIDTH ( $T_c = 90^\circ\text{C}$ )



5. ENERGY PER PULSE FOR SINUSOIDAL PULSES

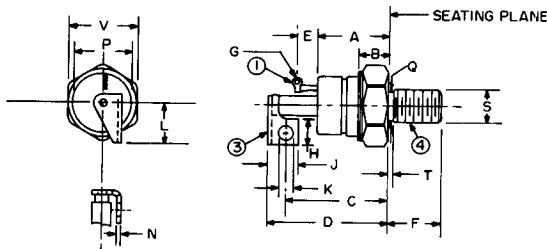


6. SUB-CYCLE SURGE (NON-REPETITIVE) ON-STATE CURRENT AND  $I^2t$  RATING



7. TRANSIENT THERMAL IMPEDANCE – JUNCTION-TO-CASE

OUTLINE DRAWING

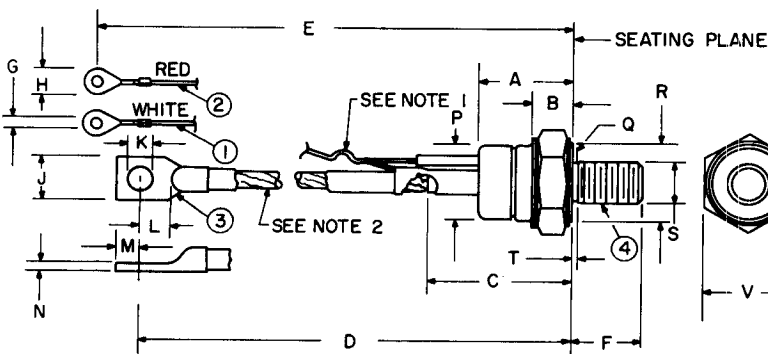


MODEL	TERMINAL ①	TERMINAL ③	TERMINAL ④	S THREAD SIZE
C164-2 C165-2	GATE	CATHODE +	ANODE -	1/2-20 UNF-2A

NOTES:

- ONE NUT AND ONE LOCKWASHER SUPPLIED WITH EACH UNIT. MATERIAL OF HARDWARE IS STEEL, CAD PLATED.
- "T" DIM. IS AREA OF UNTHREADED PORTION. COMPLETE THDS. ARE WITHIN 2.5 THREADS OF SEATING PLANE.
- ANGULAR ORIENTATION OF TERMINALS IS UNDEFINED.

SYM.	INCHES		METRIC MM		SYM.	INCHES		METRIC MM		NOTES
	MIN.	MAX.	MIN.	MAX.		MIN.	MAX.	MIN.	MAX.	
A	1.020	1.140	25.90	28.96	L	.590	.640	14.98	16.26	
B	.390	.500	9.90	12.70						
C	1.460	REF.	7.92	REF.	N	.058	.070	1.47	1.78	
D	1.660	1.800	42.16	45.72						
E	.312	REF.	7.92	REF.	P	.840	.910	21.33	23.11	
F	.797	.827	20.24	21.01						
G	.060	.075	1.52	1.91	Q	.425	.499	10.79	12.67	
H	.385	.415	9.77	10.54	T	—	.060	—	1.52	2
J	.445	.485	11.30	12.32	V	1.052	1.063	26.72	27.00	
K	.198	.212	5.02	5.38						



SYM.	INCHES		METRIC MM		SYM.	INCHES		METRIC MM		NOTES
	MIN.	MAX.	MIN.	MAX.		MIN.	MAX.	MIN.	MAX.	
A	1.020	1.140	25.90	28.96	L	.330	—	8.38	—	
B	.390	.500	9.90	12.70	M	.275	.325	6.98	8.26	
C	1.570	1.750	39.87	44.45	N	.065	.095	1.65	2.41	
D	6.000	6.390	152.40	162.31	P	.840	.910	21.33	23.11	
E	6.850	7.500	173.99	190.50	Q	.425	.499	10.79	12.67	
F	.797	.827	20.24	21.01	R	.920	—	23.36	—	4
G	.140	.150	3.55	3.81	T	—	.060	—	1.57	5
H	—	.300	—	7.62						
J	.500	.610	12.70	15.49	V	1.052	1.063	26.72	27.00	
K	.260	.281	6.60	7.14						

MODEL	TERMINAL ①	TERMINAL ②	TERMINAL ③	TERMINAL ④	S THREAD SIZE
C164 C165	GATE	AUX CATHODE	CATHODE +	ANODE -	1/2 20UNF-2A

NOTES:

- GATE & AUX. CATHODE LEADS SUPPLIED LIGHTLY TWISTED TOGETHER.
- FLEXIBLE COPPER LEAD.
- ONE NUT AND ONE LOCKWASHER SUPPLIED WITH EACH UNIT. MATERIAL OF HARDWARE IS STEEL, CAD PLATED.
- "R" DIM. IS DIA. OF EFFECTIVE SEATING AREA.
- "T" DIM. IS AREA OF UNTHREADED PORTION. COMPLETE THDS. ARE WITHIN 2.5 THREADS OF SEATING PLANE.
- ANGULAR ORIENTATION OF TERMINALS IS UNDEFINED.

