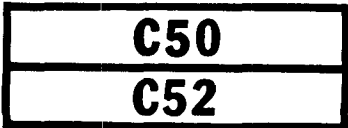


High Power Silicon Controlled Rectifier

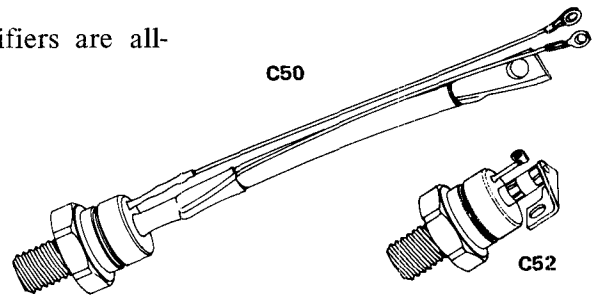
110 A RMS 25 to 1200 Volts



The General Electric C50 and C52 Silicon Controlled Rectifiers are all-diffused devices designed for phase control applications.

FEATURES:

- High dv/dt With Selection Available
- Excellent Surge and I²t Ratings Providing Easy Fusing
- Rugged Hermetic Package



MAXIMUM ALLOWABLE RATINGS

TYPE	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 $T_J = +125^\circ\text{C}$
C50U (2N1909) C52U	25 Volts	25 Volts	25 Volts
C50F (2N1910) C52F (2N1792)	50	50	75
C50A (2N1911) C52A (2N1793)	100	100	150
C50G (2N1912) C52G (2N1794)	150	150	225
C50B (2N1913) C52B (2N1795)	200	200	300
C50H (2N1914) C52H (2N1796)	250	250	350
C50C (2N1915) C52C (2N1797)	300	300	400
C50D (2N1916) C52D (2N1798)	400	400	500
C50E	500	500	600
C50M	600	600	720
C50S	700	700	840
C50N	800	800	960
C50T	900	900	1040
C50P	1000	1000	1200
C50PA	1100	1100	1320
C50PB	1200	1200	1440

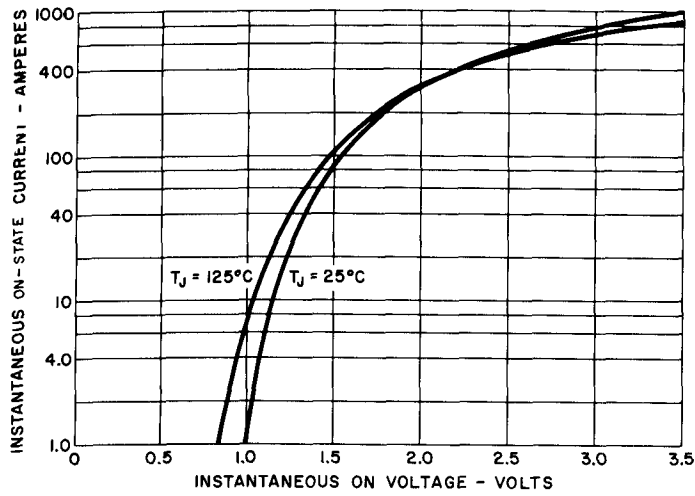
¹ Half sine wave waveform, 10 msec, maximum pulse width.

RMS On-State Current, $I_{T(RMS)}$	110 Amperes (All Conduction Angles)
Average On-State Current, $I_{T(AV)}$	Depends on Conduction Angles (See Charts 3 and 4)
Critical Rate-of-Rise of On-State Current (Non-Repetitive) di/dt:*	
Switching From 1200 Volts	100 Amperes Per Microsecond
Switching From 600 Volts	200 Amperes Per Microsecond
Peak One-Cycle Surge (Non-Repetitive) On-State Current, I_{TSM} (60 Hz)	1000 Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current, I_{TSM} (50 Hz)	910 Amperes
I ² t (for fusing), for times ≥ 8.3 milliseconds (See Figure 9)	4150 (RMS Ampere) ² Seconds
I ² t (for fusing), for times ≥ 1.5 milliseconds (See Figure 9)	2850 (RMS Ampere) ² Seconds
Peak Gate Power Dissipation, P_{GM} (See Figure 7)	100 Watts for 150 Microseconds
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 Lbs.-In. (Min.) – 150 Lbs.-In. (Max.) 14 N-m (Min.) – 17 N-m (Max.)

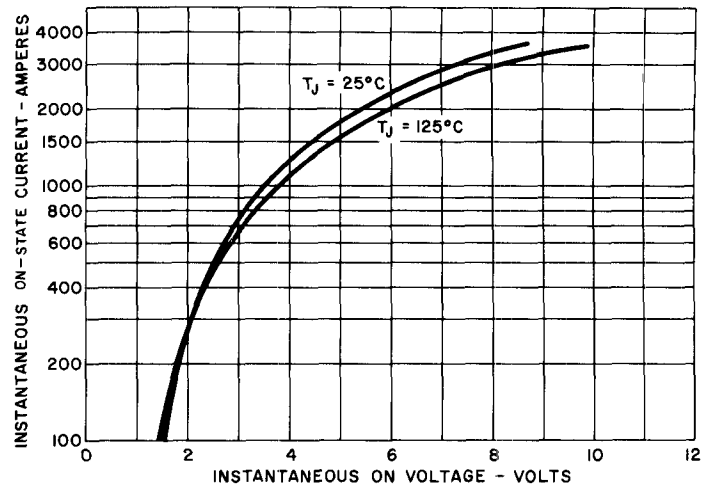
*di/dt ratings established in accordance with EIA-NEMA Standard RS-397, Section 5.2.2.6 for conditions of V_{DRM} stated above; 20 volts, 20 ohms gate trigger source with 0.5 μsec short circuit trigger current rise time.

CHARACTERISTICS

TEST	SYMBOL	MIN.	MAX.	UNITS	TEST CONDITIONS
Repetitive Peak Reverse and Off-State Current	I_{DRM} and I_{RRM}	—	10	mA	$T_J = -40^\circ\text{C}$ to $+125^\circ\text{C}$ $V_{DRM} = V_{RRM}$
C50, C52U (2N1909)					25 Volts Peak
C50, C52F					50
C50, C52A (2N1910) (2N1792)					100
C50, C52G (2N1911) (2N1793)					150
C50, C52B (2N1912) (2N1794)					200
C50, C52H					250
C50, C52C (2N1913) (2N1795)					300
C50, C52D (2N1914) (2N1796)					400
C50, C52E (2N1915) (2N1797)					500
C50, C52M					600
C50, C52S (2N1916) (2N1798)					700
C50, C52N					800
C50, C52T					900
C50, C52P					1000
C50, C52PA					1100
C50, C52PB					1200
DC Gate Trigger Current	I_{GT}	—	75	mAdc	$T_C = +25^\circ\text{C}$, $V_D = 6\text{ Vdc}$, $R_L = 3\text{ Ohms}$ $t_p \geq 20\ \mu\text{sec}$
		—	130		$T_C = -40^\circ\text{C}$, $V_D = 6\text{ Vdc}$, $R_L = 3\text{ Ohms}$ $t_p \geq 20\ \mu\text{sec}$
		—	40		$T_C = +125^\circ\text{C}$, $V_D = 6\text{ Vdc}$, $R_L = 3\text{ Ohms}$ $t_p \geq 20\ \mu\text{sec}$
DC Gate Trigger Voltage	V_{GT}	—	3.0	Vdc	$T_C = -40^\circ\text{C}$ to $+125^\circ\text{C}$, $V_D = 6\text{ Vdc}$, $R_L = 50\text{ Ohms}$, $t_p \geq 20\ \mu\text{sec}$
		.25	—		$T_C = +125^\circ\text{C}$, $V_D = \text{Rated}$, $R_L = 1000\text{ Ohms}$, $t_p = 20\ \mu\text{sec}$
Peak On-State Voltage	V_{TM}	—	2.5	Volts	$T_C = +25^\circ\text{C}$, $I_{TM} = 500\text{ Amps. Peak}$. Duty Cycle $\leq 0.01\%$
Holding Current	I_H	—	100	mAdc	$T_C = +25^\circ\text{C}$, Anode Supply = 24 Vdc. Initial Forward Current = 2 Amperes
Thermal Resistance	$R_{\theta JC}$	—	0.4	$^\circ\text{C/Watt}$	Junction-to-Case
Critical Rate-of-Rise of Off-State Voltage. (Higher values may cause device switching.)	dv/dt	200	—	Volts/ μsec	$T_J = +125^\circ\text{C}$, Rated V_{DRM} Using Linear Exponential Rising Waveform, Gate Open Circuited. Exponential dv/dt = V_{DRM} (.632).
Circuit Commutated Turn-Off Time (Typical)	t_q	—	80	μsec	(1) $T_C = +120^\circ\text{C}$ (2) $I_T = 50\text{ Amps.}$ (3) $V_R = 50\text{ Volts Min.}$ (4) V_{DRM} (Reapplied) = Rated (5) Rate-of-Rise of Reapplied Forward Blocking Voltage = $20\text{ V}/\mu\text{sec}$ (Linear) (6) Gate Bias; 0 Volts, 100 Ohms During Turn-Off Interval (7) Duty Cycle $\leq .01\%$.
Higher minimum dv/dt selections available, consult factory.					



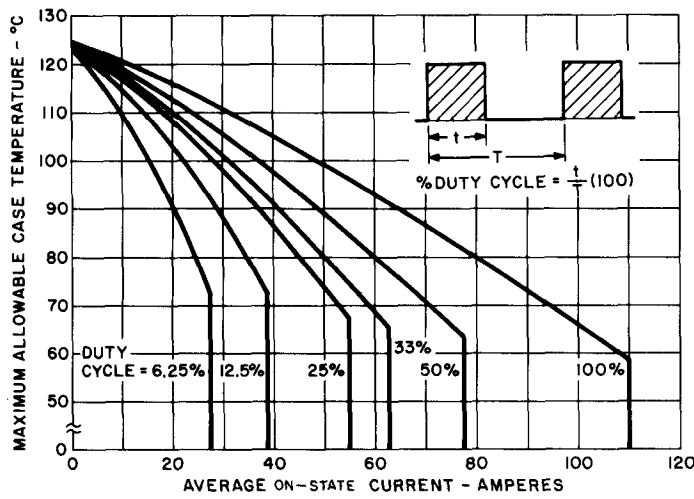
1. MAXIMUM ON-STATE CHARACTERISTICS



2. MAXIMUM ON-STATE CHARACTERISTICS (HIGH CURRENT LEVEL)

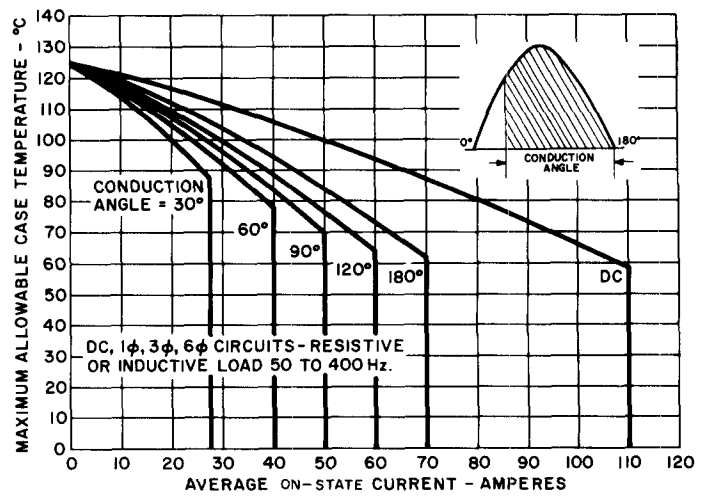
50 TO 400 Hz AC LINE OPERATION

SQUARE WAVE

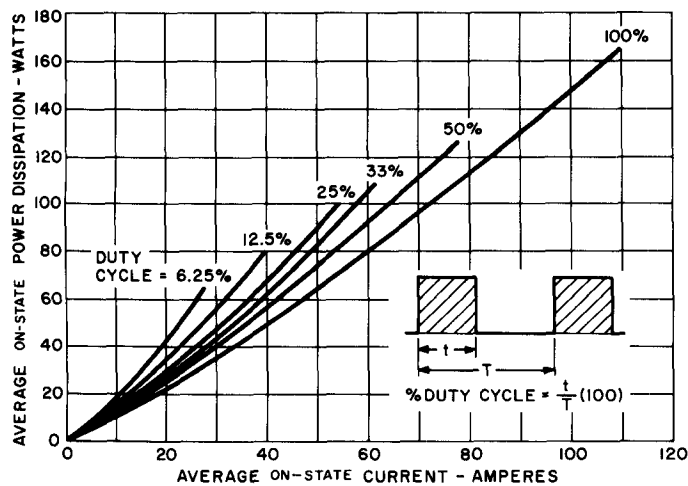


3. MAXIMUM ALLOWABLE CASE TEMPERATURE FOR RECTANGULAR CURRENT WAVEFORM

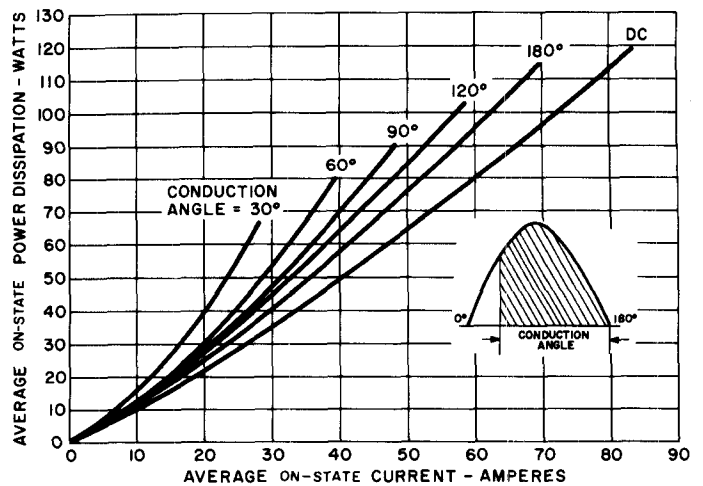
SINUSOIDAL



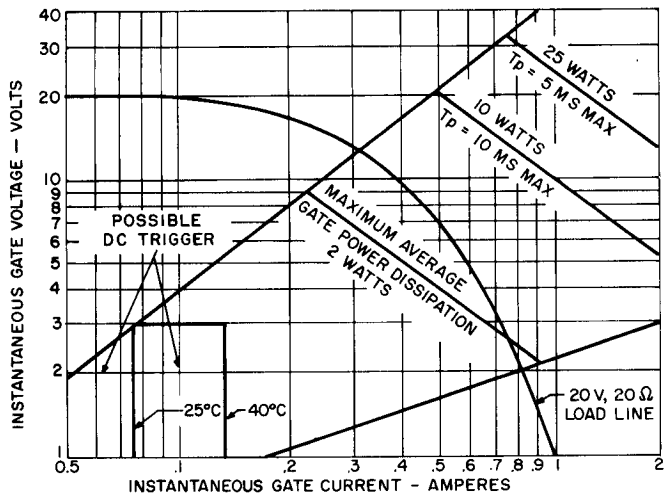
4. MAXIMUM ALLOWABLE CASE TEMPERATURE FOR SINUSOIDAL CURRENT WAVEFORM



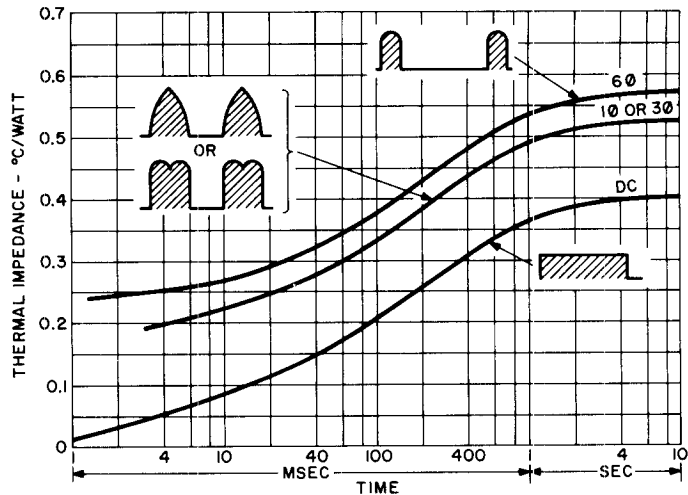
5. MAXIMUM ON-STATE POWER DISSIPATION FOR RECTANGULAR CURRENT WAVEFORM



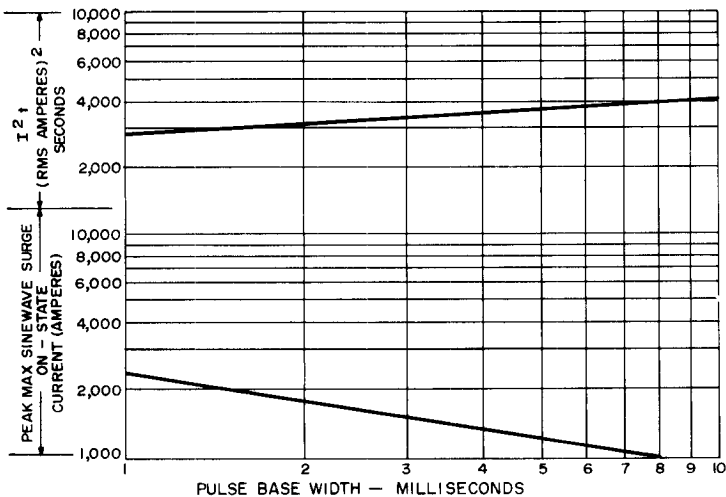
6. MAXIMUM ON-STATE POWER DISSIPATION FOR SINUSOIDAL CURRENT WAVEFORM



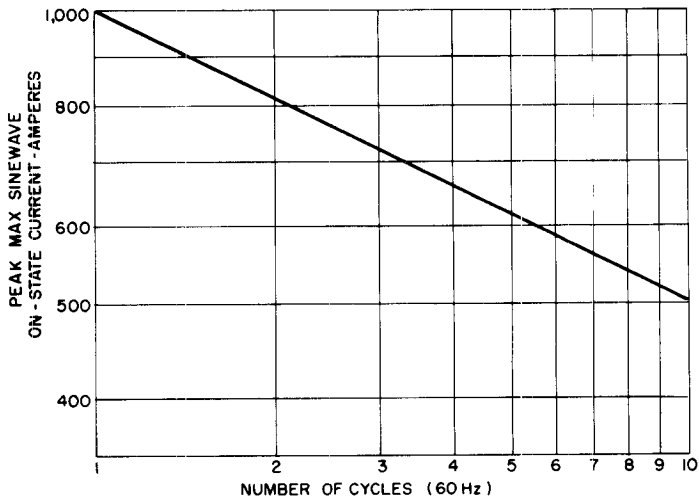
7. GATE TRIGGERING CHARACTERISTICS AND POWER RATINGS



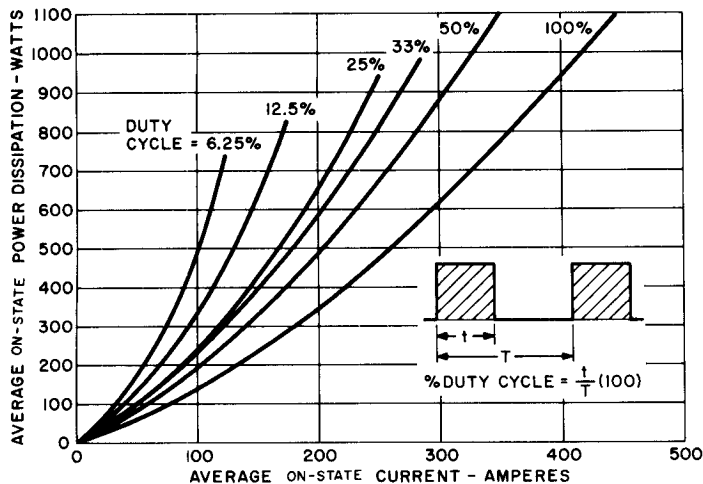
8. TRANSIENT THERMAL IMPEDANCE - JUNCTION-TO-CASE



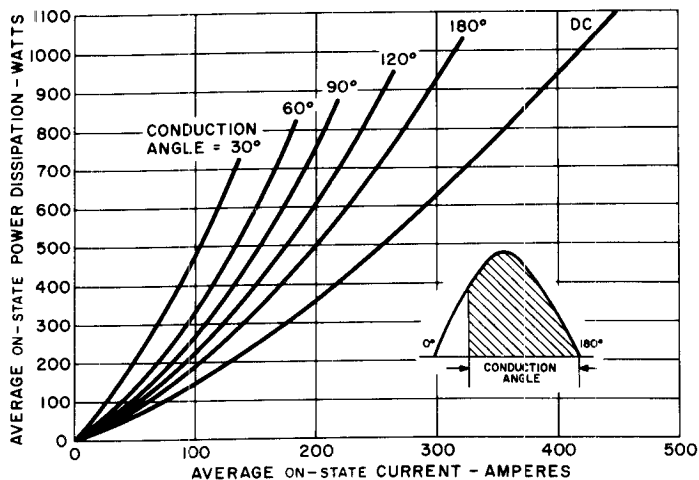
9. SUB-CYCLE SURGE (NON-REPETITIVE) ON-STATE CURRENT AND I^2t RATING



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

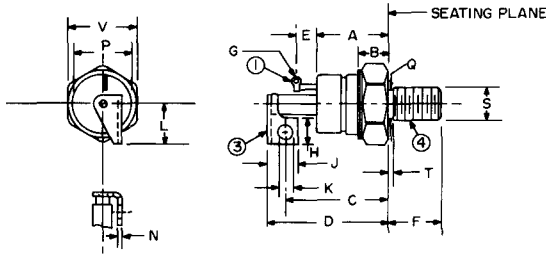


11. MAXIMUM ON-STATE POWER DISSIPATION FOR RECTANGULAR CURRENT WAVEFORM (EXTENDED RANGE)



12. MAXIMUM ON-STATE POWER DISSIPATION FOR SINUSOIDAL CURRENT WAVEFORM (EXTENDED RANGE)

OUTLINE DRAWINGS

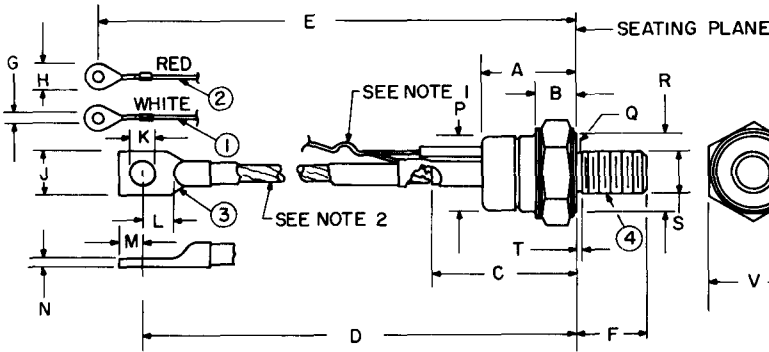


MODEL	TERMINAL ①	TERMINAL ③	TERMINAL ④	S THREAD SIZE
C52	GATE	CATHODE +	ANODE -	1/2-20 UNF-2A

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						

NOTES:

- One nut and one lockwasher supplied with each unit. Material of hardware is steel, cad plated.
- "T" dimension is area of unthreaded portion. Complete threads are within 2.5 threads of seating plane.
- Angular orientation of terminals is undefined.



MODEL	TERMINAL ①	TERMINAL ②	TERMINAL ③	TERMINAL ④	S THREAD SIZE
C50	GATE	AUX CATHODE	CATHODE +	ANODE -	1/2 20UNF-2A

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						



NOTES:

- Gate and auxiliary 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" dimension is diameter of effective seating area.
- "T" dimension is area of unthreaded portion. Complete threads are within 2.5 threads of seating plane.
- Angular orientation of terminals is undefined.

NOTES:

UNIT	WITH HARDWARE		WITHOUT HARDWARE	
	OUNCES	GRAMS	OUNCES	GRAMS
C50	4.25	120	3.50	99
C52	3.50	99	2.75	78