

High Power Silicon Controlled Rectifier

1300 VOLTS 400A RMS

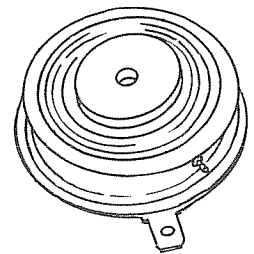
C380



The General Electric C380 Silicon Controlled Rectifier is designed for phase control applications. This is an all-diffused Press-Pak device, employing the field-proven amplifying gate.

FEATURES:

- High di/dt Ratings
- High dv/dt Capability with Selections Available
- Excellent Surge and I²t Ratings Providing Easy Fusing
- Guaranteed Maximum Turn-Off Time with Selections Available
- Rugged Hermetic Glazed Ceramic 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 $T_J = +125^\circ\text{C}$
C380A	100 Volts	100 Volts	200 Volts
C380B	200	200	300
C380C	300	300	400
C380D	400	400	500
C380E	500	500	600
C380M	600	600	720
C380S	700	700	840
C380N	800	800	950
C380T	900	900	1075
C380P	1000	1000	1200
C380PA	1100	1100	1325
C380PB	1200	1200	1450
C380PC	1300	1300	1550

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

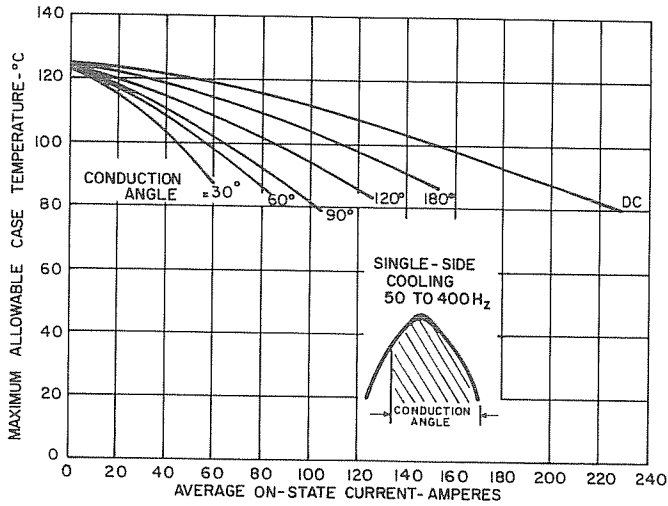
Average On-State Current, $I_{T(AV)}$	Depends on Conduction Angle. (See Charts 1 and 3)
Peak One-Cycle Surge (Non-Repetitive) On-State Current, I_{TSM} (60 Hz)	3500 Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current, I_{TSM} (50 Hz)	3200 Amperes
Critical Rate-of-Rise of On-State Current (Non-Repetitive)*	800 A/ μ s
Critical Rate-of-Rise of On-State Current (Repetitive)*	500 A/ μ s
I ² t (for fusing) (for times \geq 1.5 milliseconds)	32,000 (RMS Ampere) ² Seconds
I ² t (for fusing) (at 8.3 milliseconds)	50,000 (RMS Ampere) ² Seconds
Peak Gate Power Dissipation, P_{GM}	10 Watts
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
Mounting Force Required	800 Lbs. \pm 10%
	3.56 KN \pm 10%

*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 μ sec short circuit trigger current rise time.

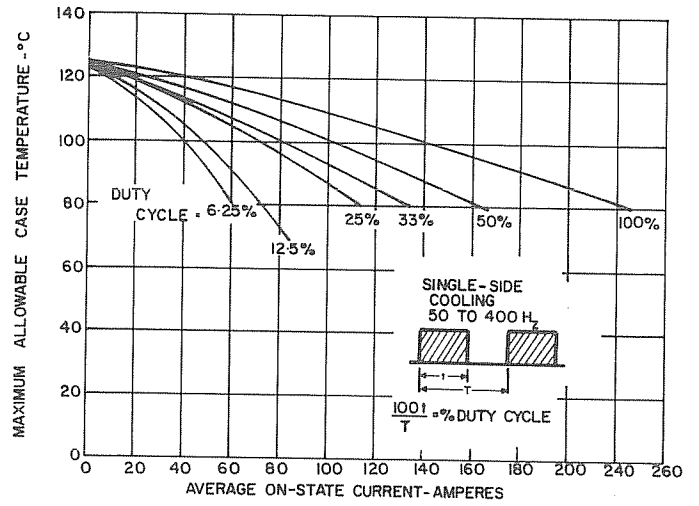
CHARACTERISTICS

TEST	SYMBOL	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Repetitive Peak Reverse and Off-State Current	I _{DRM} and I _{RRM}				mA	T _J = 25°C V _{DRM} = V _{RRM} = C380
C380A		—	3	10		100 Volts Peak
C380B		—	3	10		200
C380C		—	3	10		300
C380D		—	3	10		400
C380E		—	3	10		500
C380M		—	3	10		600
C380S		—	3	10		700
C380N		—	3	10		800
C380T		—	3	9		900
C380P		—	3	7		1000
C380PA		—	3	7		1100
C380PB		—	3	6		1200
C380PC		—	3	5		1300
Repetitive Peak Reverse and Off-State Current	I _{DRM} and I _{RRM}				mA	T _J = 125°C V _{DRM} = V _{RRM} =
C380A		—	15	20		100 Volts Peak
C380B		—	15	20		200
C380C		—	15	20		300
C380D		—	15	20		400
C380E		—	15	20		500
C380M		—	15	20		600
C380S		—	15	20		700
C380N		—	15	20		800
C380T		—	15	18		900
C380P		—	12	15		1000
C380PA		—	11	14		1100
C380PB		—	10	13		1200
C380PC		—	8	11		1300
Thermal Resistance	R _{θJC}	—	—	0.19	°C/Watt	Junction-to-Case (Single-Side Cooling)
		—	—	0.095		Junction-to-Case (Double-Side Cooling)
Critical Rate-of-Rise of Off-State Voltage. (Higher values may cause device switching.)	dv/dt	200	500	—	V/μsec	T _J = 125°C. Gate Open Circuited. V _{DRM} = Rated, Using Linear or Exponential Rising Waveform. Exponential dv/dt = $\frac{V_{DRM}}{\tau} = (.632)$
Higher minimum dv/dt selection available – consult factory.						
Holding Current	I _H	—	100	—	mAdc	T _C = +25°C, Anode Supply = 24 Vdc. Initial On-State Current = 2.5 Amps.
Turn-On Delay Time	t _d	—	1	—	μsec	T _C = +25°C, I _T = 100 Adc, V _{DRM} = Rated Gate Supply: 10 Volt Open Circuit, 25 Ohm, 0.1 μsec max. rise time.
DC Gate Trigger Current	I _{GT}	—	10	150	mAdc	T _C = +25°C, V _D = 6 Vdc, R _L = 3 Ohms
		—	20	200		T _C = -40°C, V _D = 6 Vdc, R _L = 3 Ohms
		—	4	125		T _C = +125°C, V _D = 6 Vdc, R _L = 3 Ohms
DC Gate Trigger Voltage	V _{GT}	—	1.25	3.0	Vdc	T _C = -40°C to +125°C, V _D = 6 Vdc, R _L = 3 Ohms
						T _C = +125°C, V _D = 6 Vdc, R _L = 3 Ohms
Peak On-State Voltage	V _{TM}	—	2.3	2.85	Volts	T _C = +25°C, I _{TM} = 1500 Amps Peak. Duty Cycle ≤ 0.01%.
Circuit Commutated Turn-Off Time	t _q *	—	200	—	μsec	(1) T _C = +120°C, (2) I _{TM} = 250 Amps (3) V _R = 50 Volts Min. (4) V _{DRM} (Reapplied) (5) Rate-of-Rise of Reapplied Off-State Voltage = 20Volts/μsec (Linear) (6) Gate Bias During Turn-Off Interval = 0 Volts, 100 Ohms. Duty Cycle ≤ 0.01%.

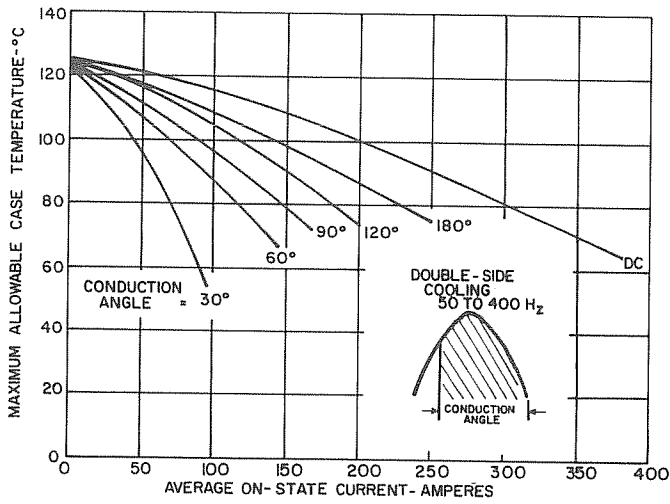
*Consult factory for maximum t_q specifications.



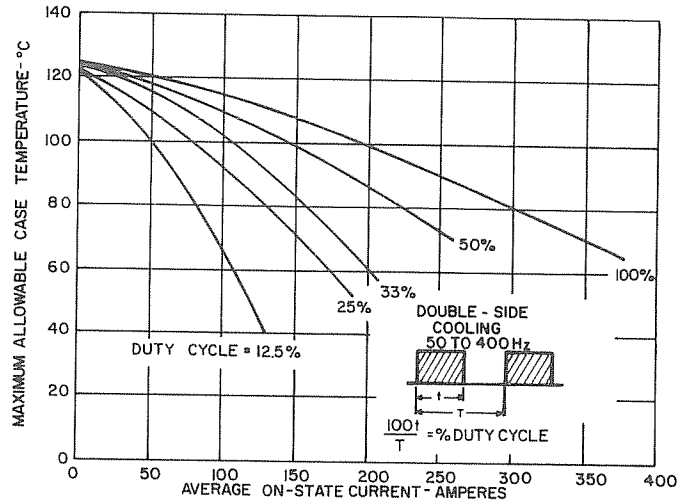
1. MAXIMUM ALLOWABLE CASE TEMPERATURE FOR SINUSOIDAL CURRENT WAVEFORM



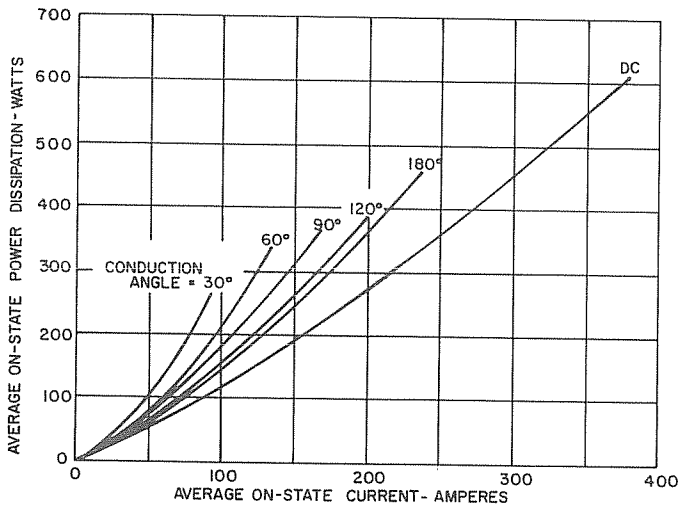
2. MAXIMUM ALLOWABLE CASE TEMPERATURE FOR RECTANGULAR CURRENT WAVEFORM



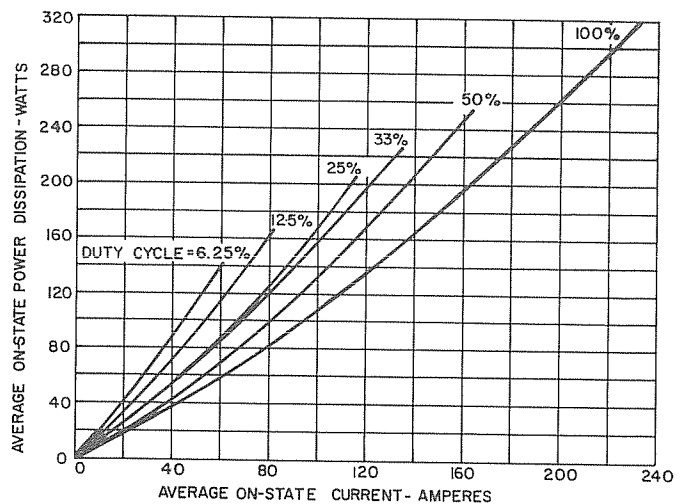
3. MAXIMUM ALLOWABLE CASE TEMPERATURE FOR SINUSOIDAL CURRENT WAVEFORM



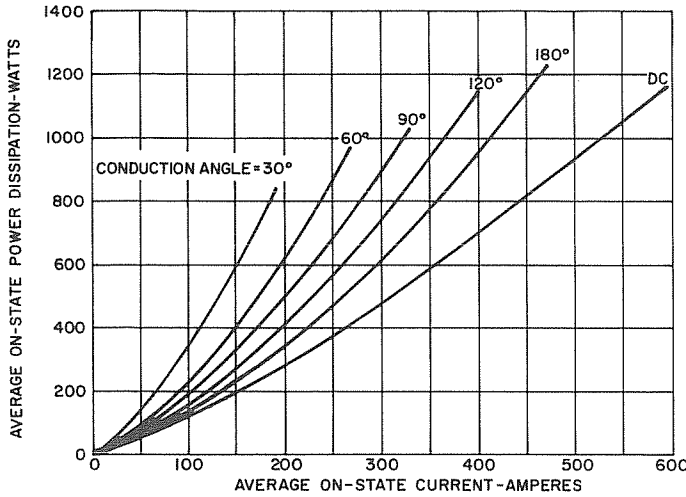
4. MAXIMUM ALLOWABLE CASE TEMPERATURE FOR RECTANGULAR CURRENT WAVEFORM



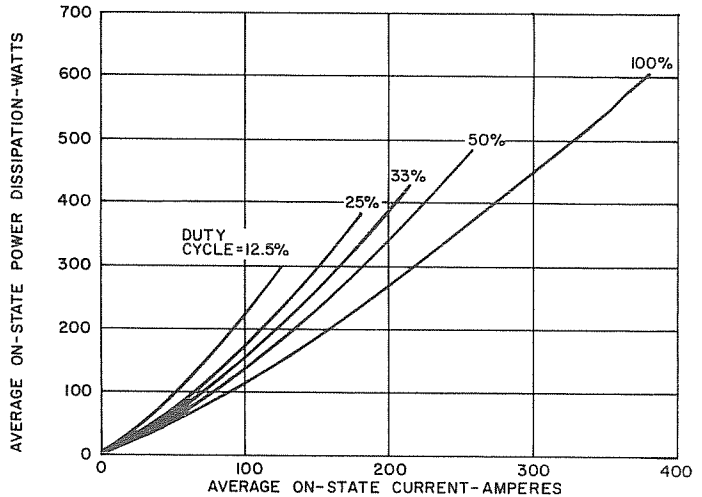
5. MAXIMUM ON-STATE POWER DISSIPATION FOR SINUSOIDAL CURRENT WAVEFORM



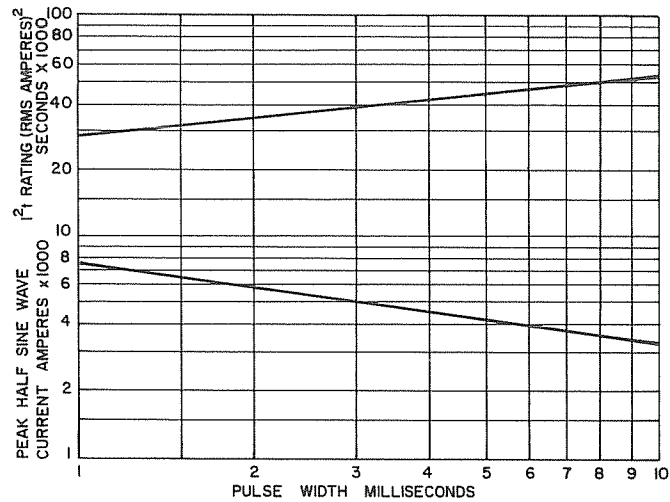
6. MAXIMUM ON-STATE POWER DISSIPATION FOR RECTANGULAR CURRENT WAVEFORM



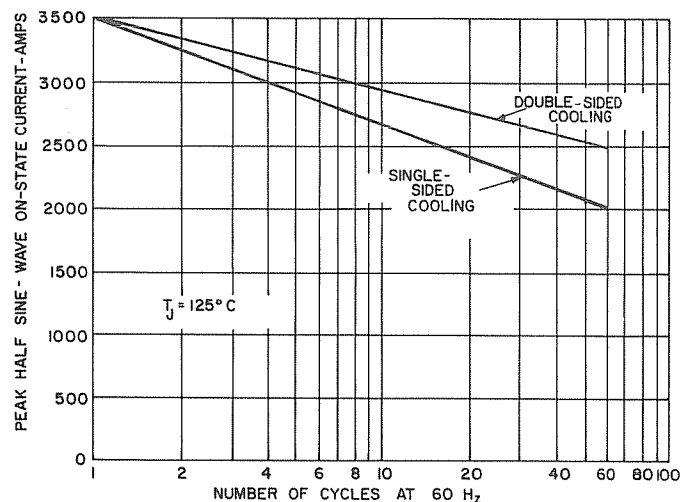
7. MAXIMUM ON-STATE POWER DISSIPATION FOR SINUSOIDAL CURRENT WAVEFORM (EXTENDED RANGE)



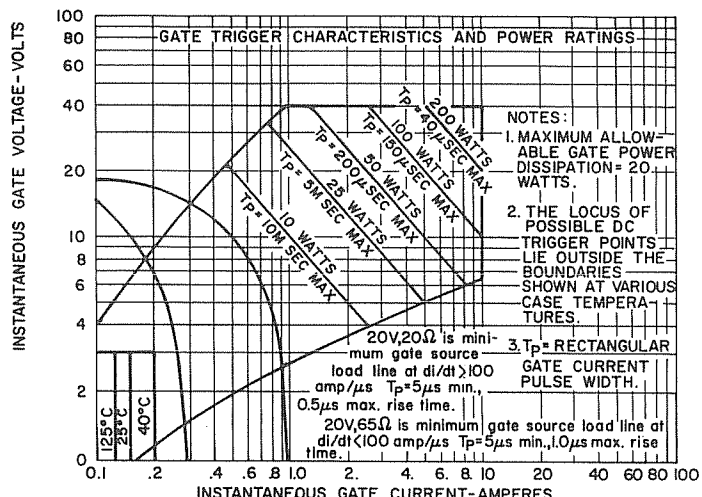
8. MAXIMUM ON-STATE POWER DISSIPATION FOR RECTANGULAR CURRENT WAVEFORM (EXTENDED RANGE)



9. SUB-CYCLE SURGE (NON-REPETITIVE) ON-STATE CURRENT FOLLOWING RATED LOAD CONDITIONS



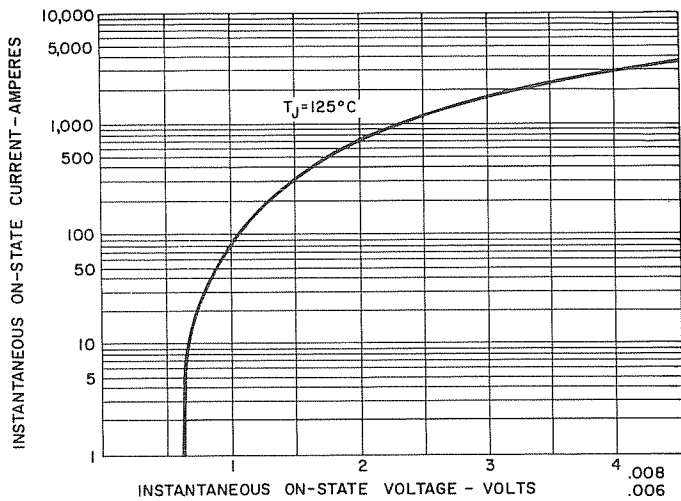
10. MAXIMUM ALLOWABLE SURGE (NON-REPETITIVE) ON-STATE CURRENT RATING



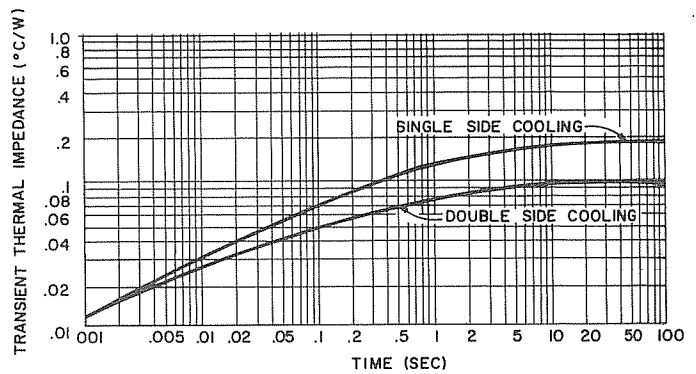
11. GATE TRIGGER CHARACTERISTICS AND POWER RATINGS

- NOTES:
1. Maximum allowable gate power dissipation = 2 watts.
 2. The locus of possible DC trigger points lie outside the boundaries shown at various case temperatures.
 3. T_p = Rectangular Gate Current Pulse Width.

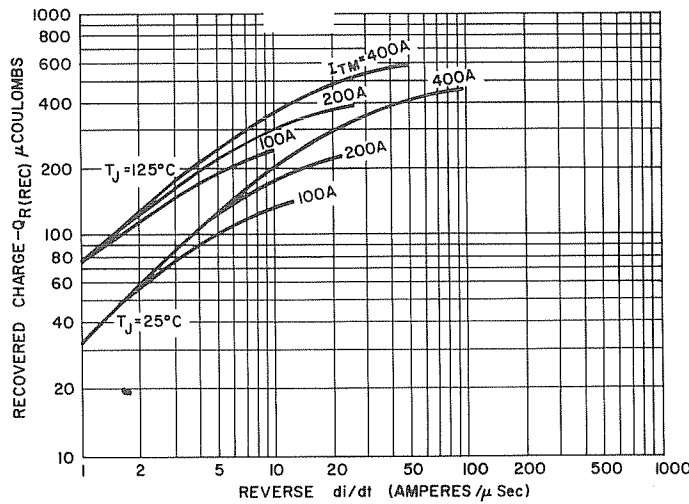
C380



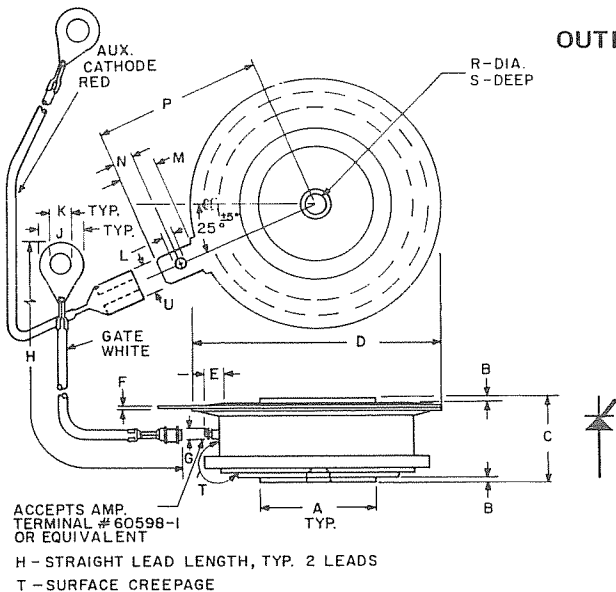
12. MAXIMUM ON-STATE CHARACTERISTICS



13. TRANSIENT THERMAL IMPEDANCE - JUNCTION-TO-CASE



14. MAXIMUM RECOVERED CHARGE (SINUSOIDAL WAVEFORM)



OUTLINE DRAWING

TABLE OF DIMENSIONS
Conversion Table

SYM	DECIMAL INCHES		METRIC MM	
	MIN.	MAX.	MIN.	MAX.
A	.744	.752	18.897	19.101
B	.030	.060	.762	1.524
C	.515	.565	13.081	14.351
D	1.600	1.656	40.64	42.06
E	.110	—	2.794	—
F	.031	.017	.330	.432
G	.057	.059	1.447	1.449
H	7.980	8.115	202.70	206.11
J	—	.300	—	7.620
K	.137	.153	3.479	3.886
L	.065	.070	1.651	1.778
M	.245	.260	6.223	6.604
N	.120	.140	3.048	3.556
P	1.090	1.125	27.69	28.55
R	.135	.145	3.429	3.683
S	.067	.083	1.701	2.108
T	.340	—	8.636	—
U	.186	.189	4.724	4.801

FOR MOUNTING HARDWARE SEE SELECTOR GUIDE