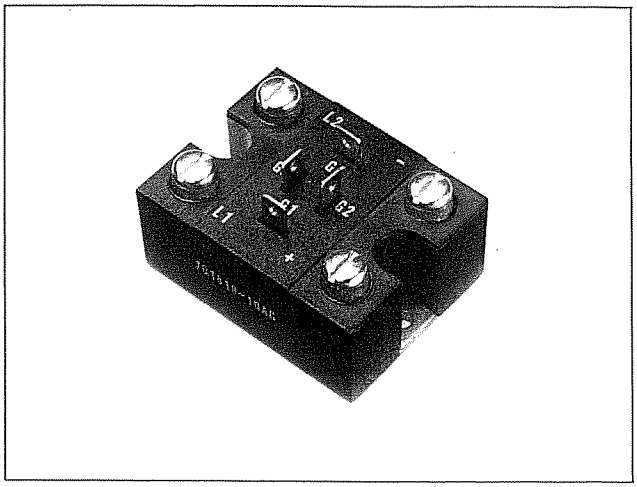
SILICON POWER CUBE

M50 SERIES 50A-100A POWER SCR/DIODE MODULES



FEATURES

- **Eight standard circuit configurations available**
- **Ultra-High surge current cabability assures long lifetime and reliable performance**
- **2500VAC RMS terminal-to-base isolation**
- **Utilizes SPC's power hybrid technology for highly efficient thermal management.**
- **UL Component Recognition**
- **Available in standard 120VAC, 240 VAC, 320VAC, 440VAC and 480VAC ratings (Higher voltages are available. Consult factory.)**

PARAMETER	SYM.	UNITS	SPECIFICATION LIMITS			CONDITIONS
DC Output Current (Max.)	I_O	A	**50**	**80**	**100**	$T_C = 85°C$ (Circuits 1, 2, 3 & 6)
One-Cycle Surge Current (Peak)	I_{TSM}	A	600	1200	1500	60Hz Sine Wave, Non-Repetitive (Fig. 6)
I^2t for Fusing (Max.)	I^2t	A^2S	1500	6000	9350	60Hz Sine Wave with Full Reapplied Voltage
Rate-of-Rise of On-State Current (Max.)	di/dt	A/μS	100			Max. V_{DRM}, Peak On-State Current = 9 × I_O (Avg.)
Rate-of-Rise of Off-State Voltage (Max.)	dv/dt	V/μS	200*			Exponential Rise to 80% V_{DRM} Gate Open Circuit, $T_C = 125°C$
Repetitive Peak Off-State and Reverse Blocking Voltage (Max.)	V_{DRM} & V_{RRM}	V	300V for $120V_{RMS}$ (-1) 600V for $240V_{RMS}$ (-2) 800V for $320V_{RMS}$ (-3) 1000V for $440V_{RMS}$ (-4) *1200V for $480V_{RMS}$ (-5)			$T_J = 125°C$
Isolation Voltage (Min.)	V_{ISOL}	Vrms	2500			Any Terminal-to-Base
Junction Operating Temp. Range	T_J	°C	−40 to 125			
Storage Temperature Range	T_{STG}	°C	−40 to 125			
Thermal Resistance (Case-to-Sink)	$R\theta_{C-S}$	°C/W	.07			With Thermal Grease
Thermal Resistance (Junction-to-Case)	$R\theta_{J-C}$	°C/W	0.56	0.36	0.36	Per Device
Forward Gate Current (Peak)	I_{FGM}	A	5			See Fig. 7
Forward Gate Voltage (Peak)	V_{FGM}	V	25			
Reverse Gate Voltage (Peak)	V_{RGM}	V	5			
Gate Power (Peak)	P_{GM}	W	20			10 μS Duration
Gate Current Required to Fire all Devices (Max.)	I_{GT}	mA	150			$T_C = 25°C$
Gate Voltage Required to Fire all Devices (Max.)	V_{GT}	V	3			
Latching Current (Max.)	I_L	mA	300			
Holding Current (Max.)	I_H	mA	150			
Leakage Current	I_{DRM} & I_{DM}	mA	10			$T_J = 125°C$ at Peak Rated Voltage
Case Style			**M50**			**See following page for circuit configurations and outline dimensions**

*Higher values are available. Consult Factory.

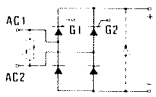
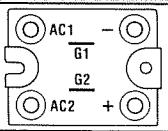
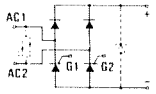
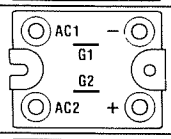
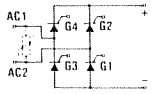
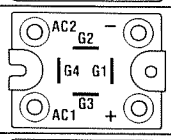
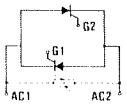
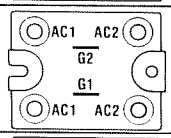
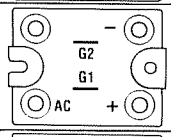
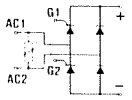
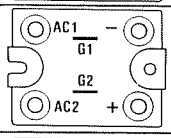
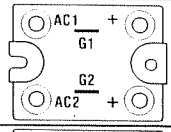
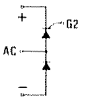
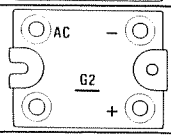
PART NUMBER DESIGNATION CODE

M50 50 3 2 FV

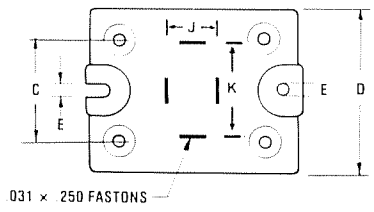
- **M50** — CASE STYLE M50
- **50** — DC OUTPUT CURRENT 50, 80, OR 100A (M50 CASE)
- **3** — CIRCUIT DESIGNATION
- **2** — *VOLTS AC (RMS)
  - 1-120V
  - 2-240V
  - 3-320V
  - 4-440V
  - 5-480V
- **FV** — V - VOLTAGE SUPPRESSOR; F - FREE WHEELING DIODE; FV - BOTH

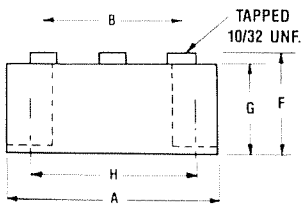
* Consult Factory for higher voltages

M50 CIRCUIT CONFIGURATIONS (See page 51 for characteristic curves)

CIRCUIT TYPE	CIRCUIT DESIGNATION	CIRCUIT SCHEMATICS	CIRCUIT OPTIONS	TERMINAL LOCATIONS
HYBRID BRIDGE COMMON CATHODE SCRS	CIRCUIT 1		VOLTAGE SUPPRESSOR FREE WHEELING DIODE	
HYBRID BRIDGE COMMON ANODE SCRS	CIRCUIT 2		VOLTAGE SUPPRESSOR FREE WHEELING DIODE	
FULL SCR BRIDGE	CIRCUIT 3		VOLTAGE SUPPRESSOR	
AC SWITCH	CIRCUIT 4		VOLTAGE SUPPRESSOR	
SCR DOUBLER	CIRCUIT 5			
HYBRID BRIDGE DOUBLER	CIRCUIT 6		VOLTAGE SUPPRESSOR	
SCR CENTER TAP COMMON CATHODE	CIRCUIT 7			
HYBRID DOUBLER	CIRCUIT 8			

M50 OUTLINE/MOUNTING DIMENSIONS





DIM.	INCHES		MILLIMETERS	
	MAX.	MIN.	MAX.	MIN.
A	2.300	2.240	58.4	56.9
B	1.645	1.605	41.8	40.7
C	1.085	1.055	27.6	26.8
D	1.800	1.740	45.7	44.2
E	0.182	0.172	4.6	4.4
F	1.140	1.100	29.0	27.9
G	1.015	0.985	25.8	25.0
H	1.890	1.870	48.0	47.5
J	0.438	0.313	11.1	8.0
K	1.063	0.934	27.0	23.7

MOUNTING TORQUE REQUIRED:
(A) Mounting Screws (not included) 20 in-lb.
(B) Terminal Studs (screws included, unmounted) 30 in.-lb.

M50 CHARACTERISTIC CURVES (See page 48 & 49 for product data)

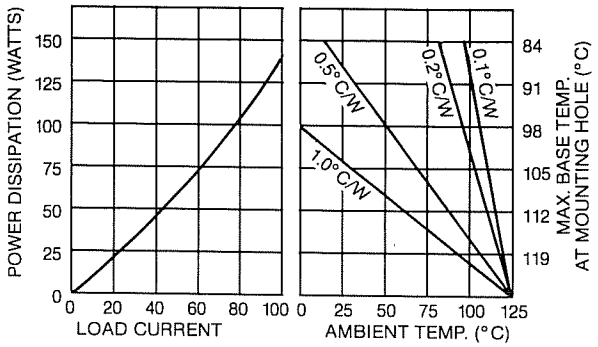


FIGURE 1 — THERMAL DERATING CURVES, M5050 CIRCUITS 4,5,7 & 8

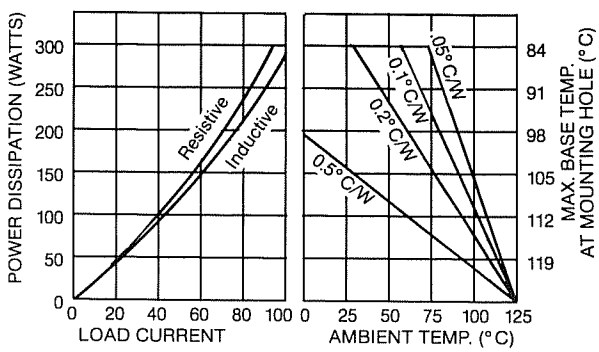


FIGURE 2 — THERMAL DERATING CURVES, M5050 CIRCUITS 1,2,3 & 6

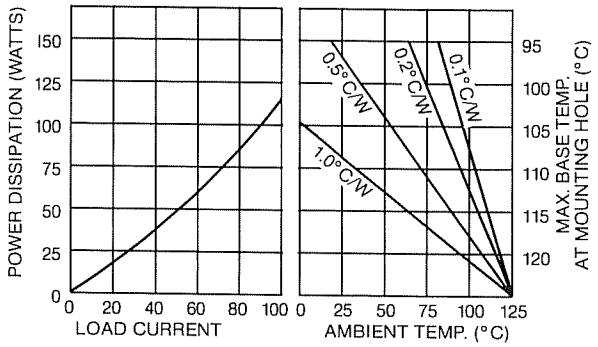


FIGURE 3 — THERMAL DERATING CURVES, M5080 CIRCUITS 4,5,7 & 8

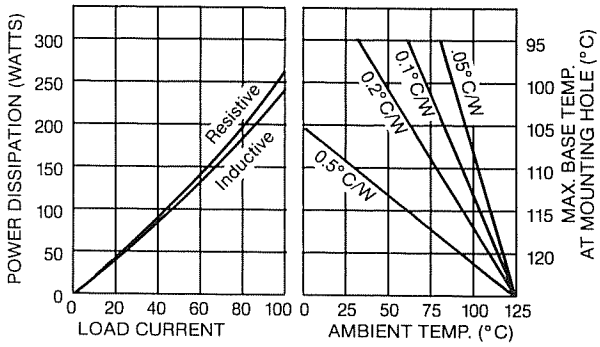


FIGURE 4 — THERMAL DERATING CURVES, M5080 CIRCUITS 1,2,3 & 6

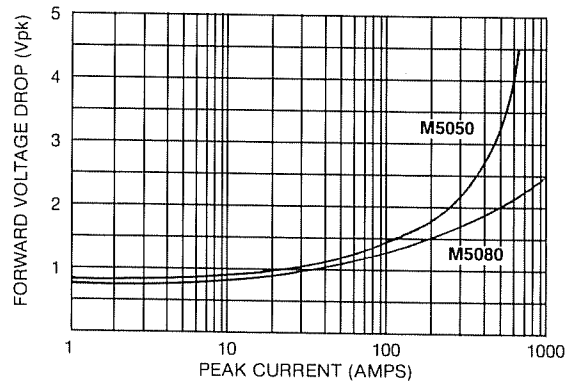


FIGURE 5 — FORWARD VOLTAGE DROP VS. PEAK CURRENT (@ 125°C)

▲ **EXAMPLE:**
Knowing maximum output current and maximum ambient temperature, use derating curves to determine required heat sink and maximum allowable base plate temperature. On left hand power dissipation curve, locate the point corresponding to maximum output current. Extend a line to the right from that point to the intersection of vertical line on right hand chart corresponding to maximum ambient temperature. From heat sink curve, read directly or extrapolate required heat sink size. Extend the line farther to the right and read on the right hand scale the maximum allowable base plate temperature.

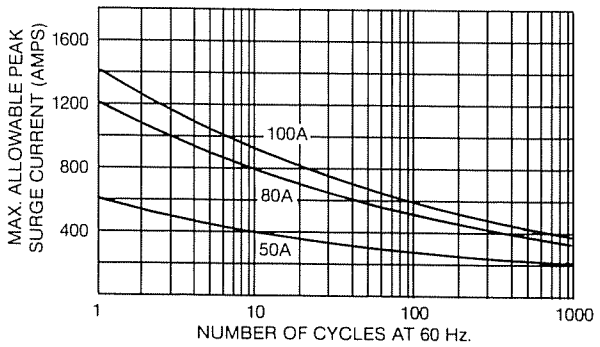


FIGURE 6 — MAXIMUM NON-REPETITIVE SURGE CURRENT VS. DURATION

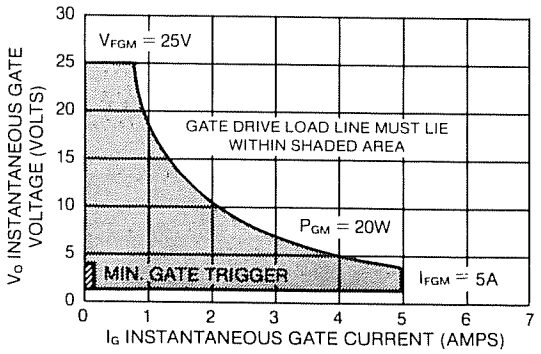


FIGURE 7 — GATE CHARACTERISTICS