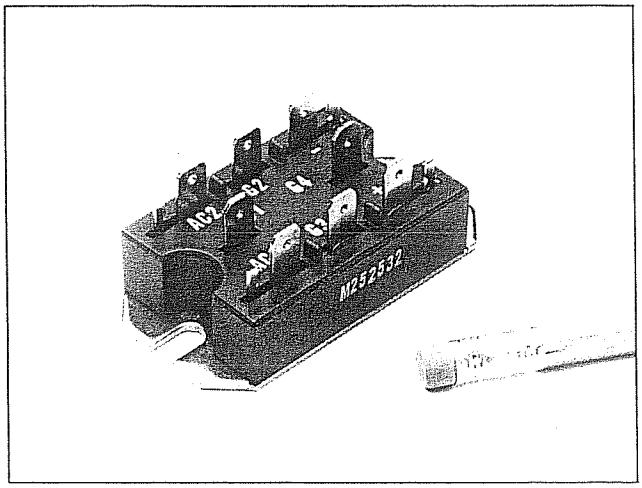
SILICON POWER CUBE

M25 SERIES 25A/40A POWER SCR/DIODE MODULES



FEATURES

- Eight standard circuit configurations available
- Ultra-High surge current cababilities
- 2500VAC RMS terminal-to-base isolation
- Insulated terminal barrier available, M25E case.
- 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.

PARAMETER	SYM.	UNITS	SPECIFICATION LIMITS		CONDITIONS
DC Output Current (Max.)	I_O	A	**25**	**40**	$T_C = 85°C$ (Circuits 1, 2, 3 & 6)
One-Cycle Surge Current (Peak)	I_{TSM}	A	300	400	60Hz Sine Wave, Non-Repetitive (Fig. 6)
I^2t for Fusing (Max.)	I^2t	A^2S	370	660	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	0.1		With Thermal Grease
Thermal Resistance (Junction-to-Case)	$R\theta_{J-C}$	°C/W	1.15	0.75	Per Device
Forward Gate Current (Peak)	I_{FGM}	A	3		See Fig. 7
Forward Gate Voltage (Peak)	V_{FGM}	V	10		
Reverse Gate Voltage (Peak)	V_{RGM}	V	5		
Gate Power (Peak)	P_{GM}	W	5		10 μS Duration
Gate Current Required to Fire all Devices (Max.)	I_{GT}	mA	50		$T_C = 25°C$
Gate Voltage Required to Fire all Devices (Max.)	V_{GT}	V	2.5		
Latching Current (Max.)	I_L	mA	150		
Holding Current (Max.)	I_H	mA	75		
Leakage Current	I_{DRM} & I_{DM}	mA	10		$T_J = 125°C$ at Peak Rated Voltage
Case Style			**M25 or M25E**		**See following page for circuit configurations and outline dimensions**

* Higher values are available. Consult Factory.

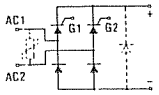
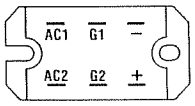
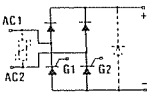
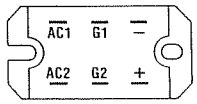
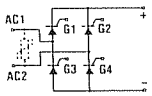
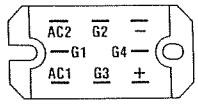
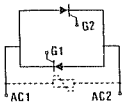
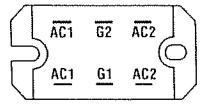
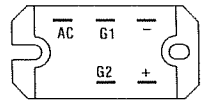
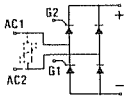
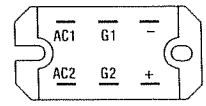
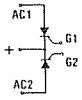
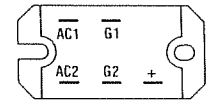
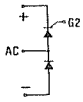
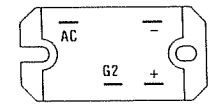
PART NUMBER DESIGNATION CODE

M25 40 3 2 FV

- **M25** — CASE STYLE: M25 OR M25E (INSULATED TERMINAL BARRIER)
- **40** — DC OUTPUT CURRENT: 25 OR 40A (M25 or M25E 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

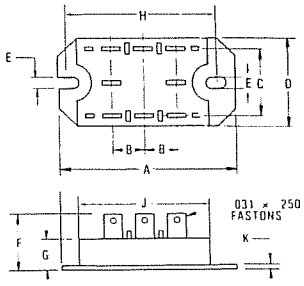
* Consult Factory for higher voltages

M25/M25E CIRCUIT CONFIGURATIONS (See page 50 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			

M25/M25E OUTLINE/MOUNTING DIMENSIONS

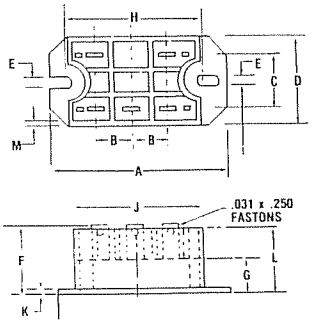
M25 CASE DIMENSIONS



DIM.	INCHES		MILLIMETERS	
	MAX.	MIN.	MAX.	MIN.
A	2.510	2.490	63.80	63.20
B	0.510	0.490	13.00	12.40
C	0.880	0.860	22.40	21.80
D	1.255	1.245	31.90	31.60
E	0.205	0.195	5.20	4.95
F	1.010	0.940	25.60	23.90
G	0.590	0.560	14.99	14.22
H	1.970	1.940	50.00	49.30
J	1.930	1.900	49.00	48.20
K	0.067	0.057	1.70	1.44

MOUNTING TORQUE REQUIRED
(A) Mounting Screws . . . . . 20 in.-lb.

M25E CASE DIMENSIONS



Case M25E, which features an insulated terminal barrier, can be substituted for case M25 as all electrical specifications are identical.

DIM.	INCHES		MILLIMETERS	
	MAX.	MIN.	MAX.	MIN.
A	2.510	2.490	63.80	63.20
B	0.510	0.490	13.00	12.40
C	0.880	0.860	22.40	21.80
D	1.255	1.245	31.90	31.60
E	0.205	0.195	5.20	4.95
F	1.010	0.940	25.60	23.90
G	0.590	0.560	14.99	14.22
H	1.970	1.940	50.00	49.30
J	1.930	1.900	49.00	48.20
K	0.067	0.057	1.70	1.44
L	0.940	0.860	23.88	21.85
M	0.052	0.048	1.32	1.22

MOUNTING TORQUE REQUIRED
Mounting Screws . . . . . 20 in.-lb.

M25 CHARACTERISTIC CURVES (See page 46 & 47 for product data)

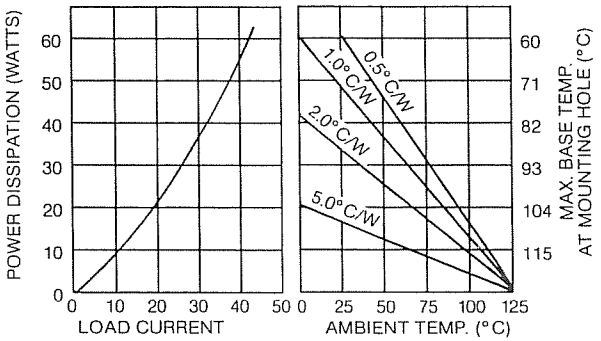


FIGURE 1 — THERMAL DERATING CURVES, M2540 CIRCUITS 4,5,7 & 8

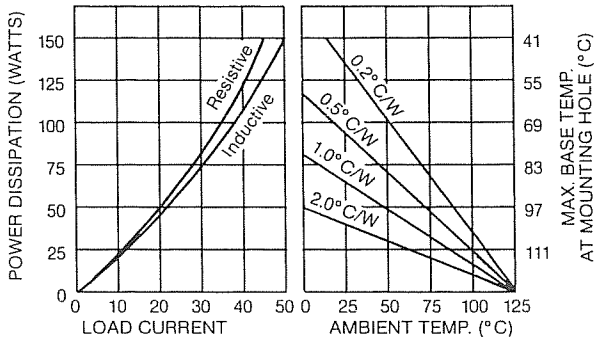


FIGURE 2 — THERMAL DERATING CURVES, M2540 CIRCUITS 1,2,3 & 6

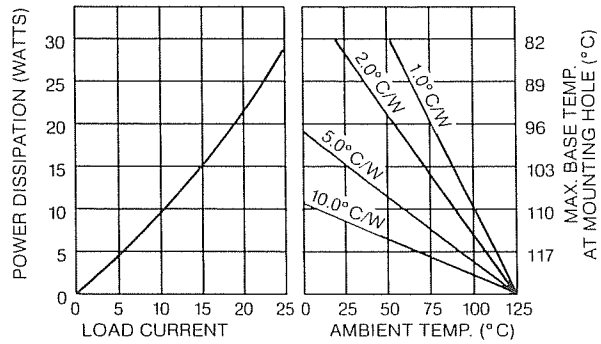


FIGURE 3 — THERMAL DERATING CURVES, M2525 CIRCUITS 4,5,7 & 8

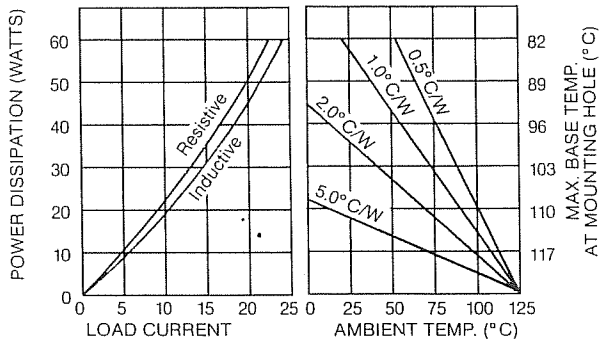


FIGURE 4 — THERMAL DERATING CURVES, M2525 CIRCUITS 1,2,3 & 6

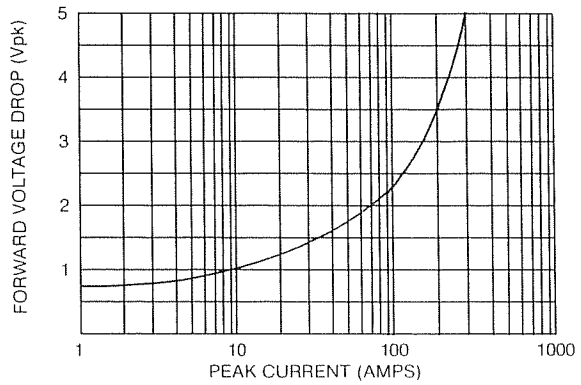


FIGURE 5 — FORWARD VOLTAGE DROP VS. PEAK CURRENT (@ 125° C)

▲ **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.

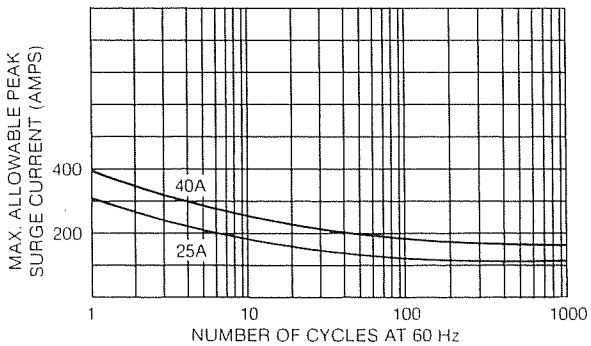


FIGURE 6 — MAXIMUM NON-REPETITIVE SURGE CURRENT VS. DURATION

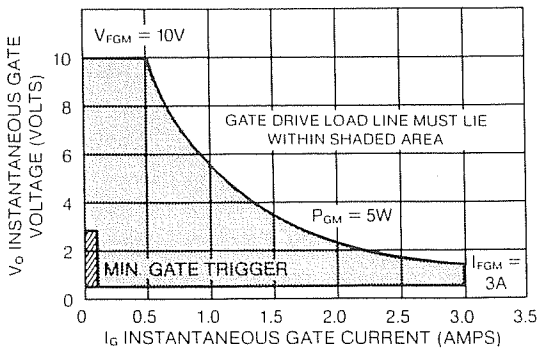


FIGURE 7 — GATE CHARACTERISTICS