POWERSEM

Three Phase Full Controlled Bridges
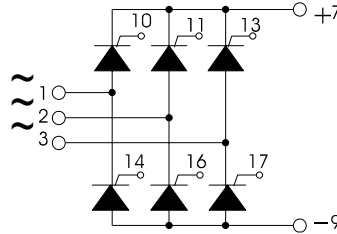
PSDT 90

I_{TAVM} = 100A
V_{RRM} = 400-1600 V

Preliminary Data Sheet

V_{RSM} V_{DSM}	V_{RRM} V_{DRM}	Type
500	400	PSDT 90/04
900	800	PSDT 90/08
1300	1200	PSDT 90/12
1500	1400	PSDT 90/14
*1700	*1600	PSDT 90/16

* Delivery on request

Symbol	Test Conditions			Maximum Ratings	
I_{TAVM}, I_{FAVM}	T_C = 85 °C	per module		100	A
I_{TSM}, I_{FSM}	T_{VJ} = 45°C	t = 10 ms	(50 Hz), sine	1150	A
	V_R = 0	t = 8.3 ms	(60 Hz), sine	1230	A
	T_{VJ} = T_{VJM}	t = 10 ms	(50 Hz), sine	1000	A
	V_R = 0	t = 8.3 ms	(60 Hz), sine	1070	A
$\int i^2\,dt$	T_{VJ} = 45°C	t = 10 ms	(50 Hz), sine	6600	$A^2 s$
	V_R = 0	t = 8.3 ms	(60 Hz), sine	6280	$A^2 s$
	T_{VJ} = T_{VJM}	t = 10 ms	(50 Hz), sine	5000	$A^2 s$
	V_R = 0	t = 8.3 ms	(60 Hz), sine	4750	$A^2 s$
$(di/dt)_{cr}$	T_{VJ} = T_{JVM}	repetitive, I_T = 150 A		100	A/μs
	f = 50Hz, t_P = 200μs				
	V_D = 2/3 V_{DRM}				
	I_G = 0.3 A	non repetitive, I_T = I_{TAVM}		500	A/μs
	di_G/dt = 0.3 A/μs				
$(dv/dt)_{cr}$	T_{VJ} = T_{VJM}	V_{DR} = 2/3 V_{DRM}		1000	V/μs
	R_{GK} = ∞, method 1 (linear voltage rise)				
P_{GM}	T_{VJ} = T_{VJM}	t_P = 30μs		10	W
	I_T = I_{TAVM}	t_P = 300μs		5	W
P_{GAVM}				0.5	W
V_{RGM}				10	V
T_{VJ}				-40 ... + 125	°C
T_{VJM}				125	°C
T_{stg}				-40 ... + 125	°C
V_{ISOL}	50/60 HZ, RMS	t = 1 min		2500	V ~
	I_{ISOL} ≤ 1 mA	t = 1 s		3000	V ~
M_d	Mounting torque	(M5)		5	Nm
	Terminal connection torque	(M3)		1.5	Nm
		(M5)		5	Nm
Weight	typ.			220	g

Features

- Package with screw terminals
- Isolation voltage 3000 V~
- Planar glasspassivated chips
- Low forward voltage drop
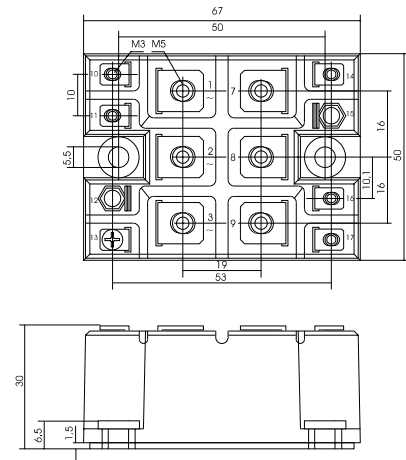- UL registered E 148688

Applications

- Heat and temperature control for industrial furnaces and chemical processes
- Lighting control
- Motor control
- Power converter

Advantages

- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling capability
- High power density

Package, style and outline

Dimensions in mm (1mm = 0.0394")

Symbol	Test Conditions			Characteristic Value	
I_D, I_R	$T_{VJ} = T_{VJM}$, $V_R = V_{RRM}$, $V_D = V_{DRM}$		$\leq$	5	mA
V_T	$I_T = 150A$, $T_{VJ} = 25°C$		$\leq$	1.57	V
V_{TO}	For power-loss calculations only ($T_{VJ} = T_{VJM}$)			0.85	V
r_T				5.33	mΩ
V_{GT}	$V_D = 6V$	$T_{VJ} = 25°C$	$\leq$	1.0	V
		$T_{VJ} = -40°C$	$\leq$	1.6	V
I_{GT}	$V_D = 6V$	$T_{VJ} = 25°C$	$\leq$	100	mA
		$T_{VJ} = -40°C$	$\leq$	150	mA
V_{GD}	$T_{VJ} = T_{VJM}$	$V_D = 2/3\ V_{DRM}$	$\leq$	0.2	V
I_{GD}	$T_{VJ} = T_{VJM}$	$V_D = 2/3\ V_{DRM}$	$\leq$	5	mA
I_L	$T_{VJ} = 25°C$, $t_P = 10\mu s$		$\leq$	200	mA
	$I_G = 0.3A$, $di_G/dt = 0.3A/\mu s$				
I_H	$T_{VJ} = 25°C$, $V_D = 6V$, $R_{GK} = \infty$		$\leq$	150	mA
t_{gd}	$T_{VJ} = 25°C$, $V_D = ½\ V_{DRM}$		$\leq$	2	μs
	$I_G = 0.3A$, $di_G/dt = 0.3A/\mu s$				
t_q	$T_{VJ} = T_{VJM}$, $I_T = 20A$, $t_P = 200\mu s$, $V_R = 100V$			150	μs
	-di/dt = $10A/\mu s$, dv/dt = $15V/\mu s$, $V_D = 2/3\ V_{DRM}$				
R_{thJC}	per thyristor; sine 180°el			0.6	K/W
	per module			0.10	K/W
R_{thJK}	per thyristor; sine 180° el			0.8	K/W
	per module			0.133	K/W
d_S	Creeping distance on surface			8.0	mm
d_A	Creeping distance in air			4.5	mm
a	Max. allowable acceleration			50	m/s^2

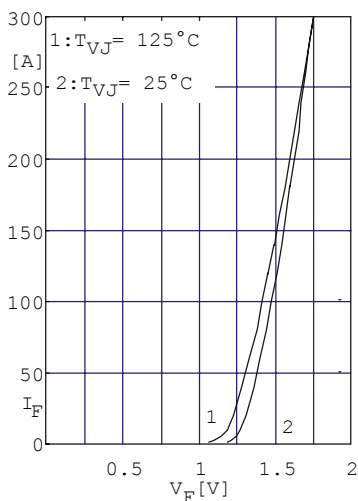
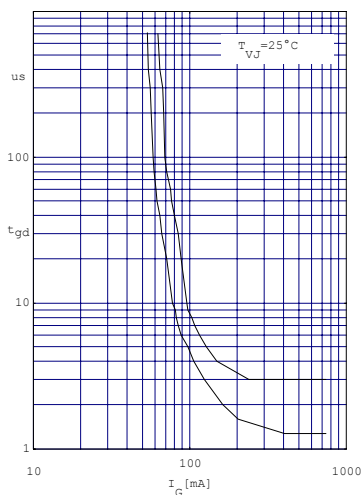Fig. 1 Forward current vs. voltage drop per diode or thyristor
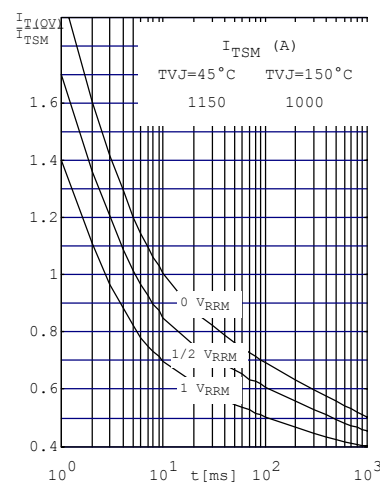

Fig. 2 Gate trigger delay time

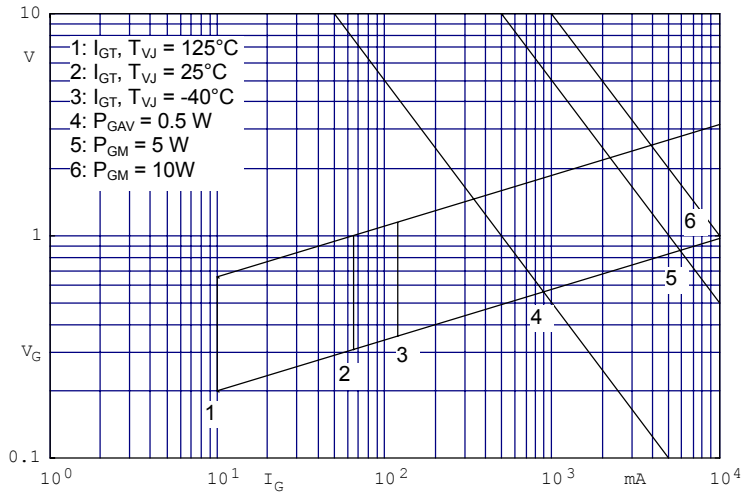Fig. 3 Surge overload current per diode (or thyristor) I_{FSM}, I_{TSM}: Crest value t: duration
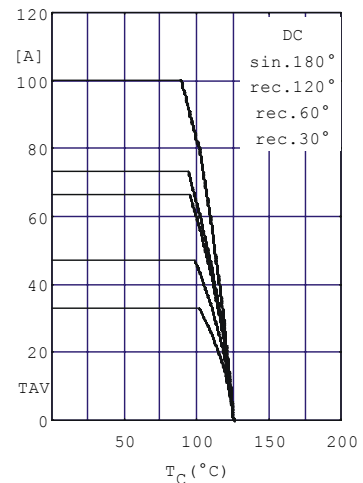
Fig.4 Gate trigger characteristic

1: I_{GT}, T_{VJ} = 125°C
2: I_{GT}, T_{VJ} = 25°C
3: I_{GT}, T_{VJ} = -40°C
4: P_{GAV} = 0.5 W
5: P_{GM} = 5 W
6: P_{GM} = 10W

Fig.5 Maximum forward current at case temperature

DC
sin.180°
rec.120°
rec.60°
rec.30°

Fig.6 Transient thermal impedance per thyristor or diode (calculated)

Z_{thJK}

Z_{thJC}

PSDT 90

0.14 0.08 = RTHCA [K/W]
0.2
0.31
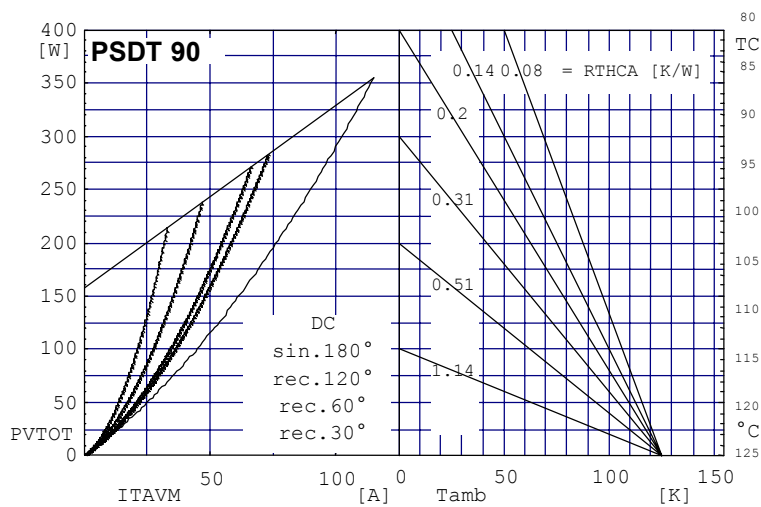0.51
1.14

DC
sin.180°
rec.120°
rec.60°
rec.30°

Fig. 7 Power dissipation vs. direct output current and ambient temperature