

## Thyristor Modules Thyristor/Diode Modules

**PSKT 220**  
**PSKH 220**

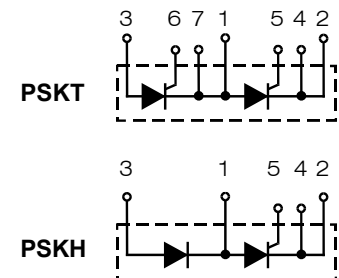
$I_{TRMS} = 2x\ 400\ A$   
 $I_{TAVM} = 2x\ 250\ A$   
 $V_{RRM} = 800-1600\ V$

Preliminary Data Sheet

$V_{RSM}$	$V_{RRM}$	Type	
$V_{DSM}$	$V_{DRM}$	Version 1	
V	V	Version 1	Version 1
900	800	PSKT 220/08io1	PSKH 220/08io1
1300	1200	PSKT 220/12io1	PSKH 220/12io1
1500	1400	PSKT 220/14io1	PSKH 220/14io1
1700	1600	PSKT 220/16io1	PSKH 220/16io1



Symbol	Test Conditions	Maximum Ratings	
$I_{TRMS}$ , $I_{FRMS}$	$T_{VJ} = T_{VJM}$ $T_C = 85^\circ C$ ; 180° sine	400	A
$I_{TAVM}$ , $I_{FAVM}$		250	A
$I_{TSM}$ , $I_{FSM}$	$T_{VJ} = 45^\circ C$ ; $V_R = 0$	t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine	8500 A 9000 A
	$T_{VJ} = T_{VJM}$ $V_R = 0$	t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine	7000 A 7600 A
$i_j^2 dt$	$T_{VJ} = 45^\circ C$ $V_R = 0$	t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine	360 000 A <sup>2</sup> s 336 000 A <sup>2</sup> s
	$T_{VJ} = T_{VJM}$ $V_R = 0$	t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine	245 000 A <sup>2</sup> s 240 000 A <sup>2</sup> s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ f = 50 Hz, t <sub>p</sub> = 200 μs $V_D = 2/3 V_{DRM}$ $I_G = 1\ A$ di <sub>G</sub> /dt = 1 A/μs	repetitive, I <sub>T</sub> = 750 A non repetitive, I <sub>T</sub> = 250 A	100 A/μs 800 A/μs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$ R <sub>GK</sub> = ∞; method 1 (linear voltage rise)	$V_{DR} = 2/3 V_{DRM}$	1000 V/μs
$P_{GM}$	$T_{VJ} = T_{VJM}$ $I_T = I_{TAVM}$	t <sub>p</sub> = 30 μs t <sub>p</sub> = 500 μs	120 W 60 W
$P_{GAV}$			20 W
$V_{RGM}$			10 V
$T_{VJ}$			-40...+140 °C
$T_{VJM}$			140 °C
$T_{stg}$			-40...+125 °C
$V_{ISOL}$	50/60 Hz, RMS I <sub>ISOL</sub> ≤ 1 mA	t = 1 min t = 1 s	3000 V~ 3600 V~
$M_d$	Mounting torque (M5) Terminal connection torque (M8)		2.5-5/22-44 Nm/lb.in. 12-15/106-132 Nm/lb.in.
<b>Weight</b>	Typical including screws		320 g



### Features

- International standard package
- Direct copper bonded Al<sub>2</sub>O<sub>3</sub>-ceramic base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered, E 148688
- Keyed gate/cathode twin pins

### Applications

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

### Advantages

- Space and weight savings
- Simple mounting with two screws
- Improved temperature and power cycling capability
- Reduced protection circuits

Data according to IEC 60747 and refer to a single thyristor/diode unless otherwise stated.

Symbol	Test Conditions	Characteristic Values
$I_{RRM}$ $I_{DRM}$	$T_{VJ} = T_{VJM}; V_R = V_{RRM}; V_D = V_{DRM}$	70 mA 40 mA
$V_T, V_F$	$I_T, I_F = 600 A; T_{VJ} = 25^\circ C$	1.53 V
$V_{T0}$ $r_T$	For power-loss calculations only ( $T_{VJ} = 140^\circ C$ )	0.9 V 1.0 mΩ
$V_{GT}$	$V_D = 6 V; T_{VJ} = 25^\circ C$ $T_{VJ} = -40^\circ C$	2 V 3 V
$I_{GT}$	$V_D = 6 V; T_{VJ} = 25^\circ C$ $T_{VJ} = -40^\circ C$	150 mA 200 mA
$V_{GD}$ $I_{GD}$	$T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM}$	0.25 V 10 mA
$I_L$	$T_{VJ} = 25^\circ C; t_p = 30 \mu s; V_D = 6 V$ $I_G = 0.45 A; di_G/dt = 0.45 A/\mu s$	200 mA
$I_H$	$T_{VJ} = 25^\circ C; V_D = 6 V; R_{GK} = \infty$	150 mA
$t_{gd}$	$T_{VJ} = 25^\circ C; V_D = 1/2 V_{DRM}$ $I_G = 1 A; di_G/dt = 1 A/\mu s$	2 μs
$t_q$	$T_{VJ} = T_{VJM}; I_T = 300 A, t_p = 200 \mu s; -di/dt = 10 A/\mu s$ typ. $V_R = 100 V; dv/dt = 50 V/\mu s; V_D = 2/3 V_{DRM}$	200 μs
$Q_S$ $I_{RM}$	$T_{VJ} = 125^\circ C; I_T, I_F = 400 A, -di/dt = 50 A/\mu s$	760 μC 275 A
$R_{thJC}$ $R_{thJK}$	per thyristor/diode; DC current per module per thyristor/diode; DC current per module	0.139 KW 0.0695 KW 0.179 KW 0.0895 KW
$d_s$ $d_A$ $a$	Creepage distance on surface Strike distance through air Maximum allowable acceleration	12.7 mm 9.6 mm 50 m/s <sup>2</sup>

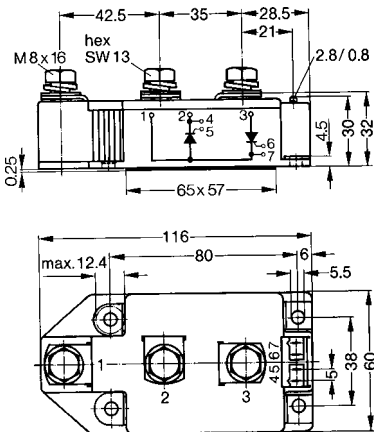
Optional accessories for modules

Keyed gate/cathode twin plugs with wire length = 350 mm, gate = yellow, cathode = red

Type ZY 180L (L = Left for pin pair 4/5) } UL 758, style 1385,  
Type ZY 180R (R = right for pin pair 6/7) } CSA class 5851, guide 460-1-1

## Dimensions in mm (1 mm = 0.0394")

### PSKT



### PSKH

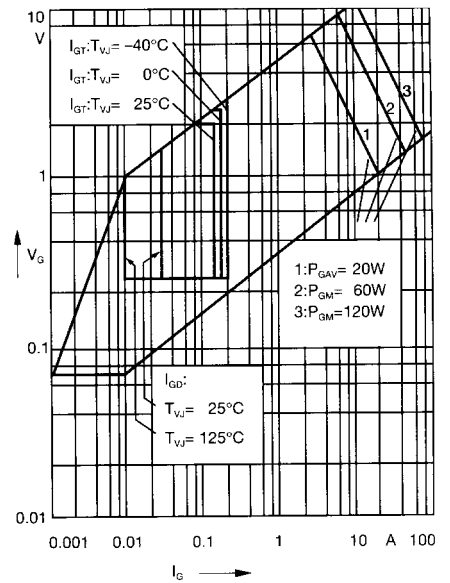
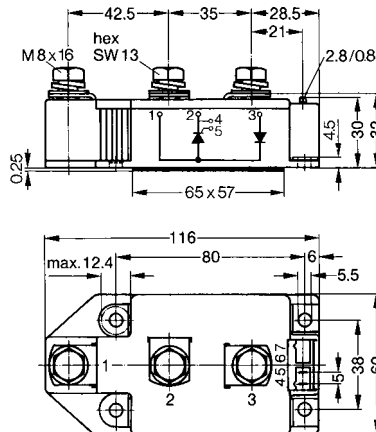


Fig. 1 Gate trigger characteristics

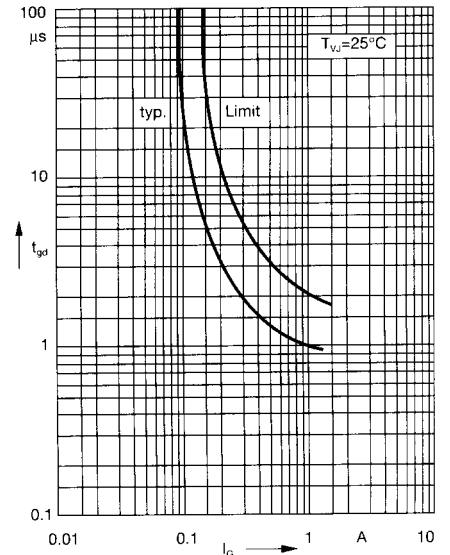
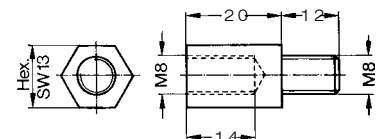


Fig. 2 Gate trigger delay time

Threaded spacer for higher Anode/Cathode construction:  
Type ZY 250, material brass



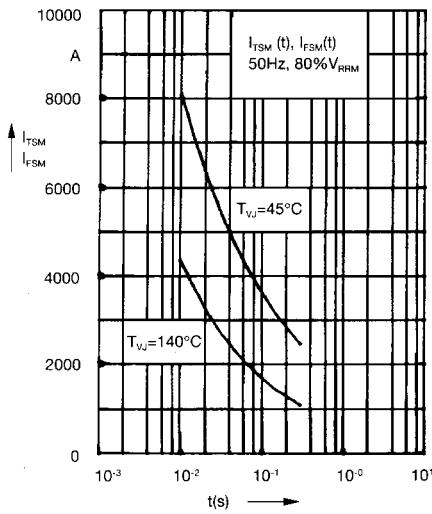


Fig. 3 Surge overload current  
 $I_{TSM}$ ,  $I_{FSM}$ : Crest value,  $t$ : duration

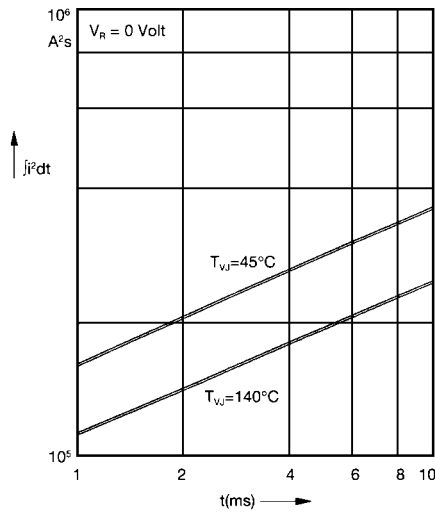


Fig. 4  $j^2dt$  versus time (1-10 ms)

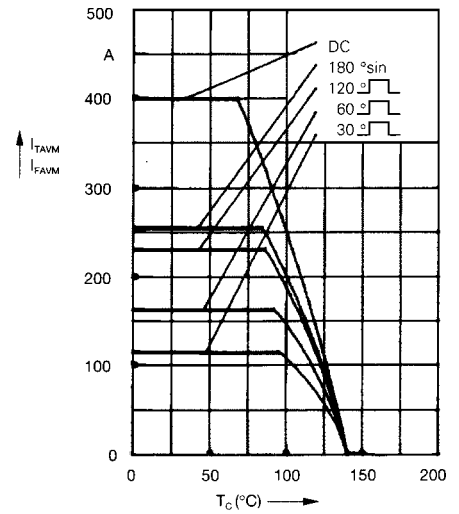


Fig. 4a Maximum forward current at case temperature

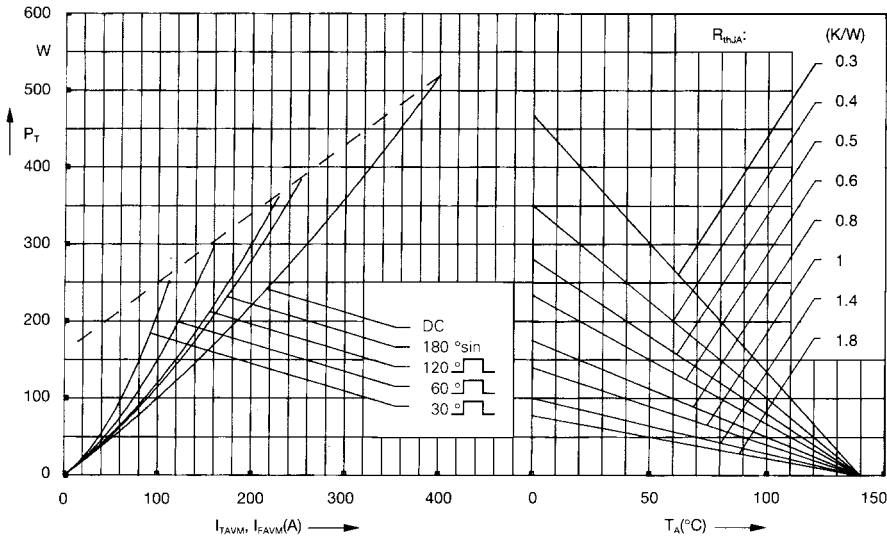


Fig. 5 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

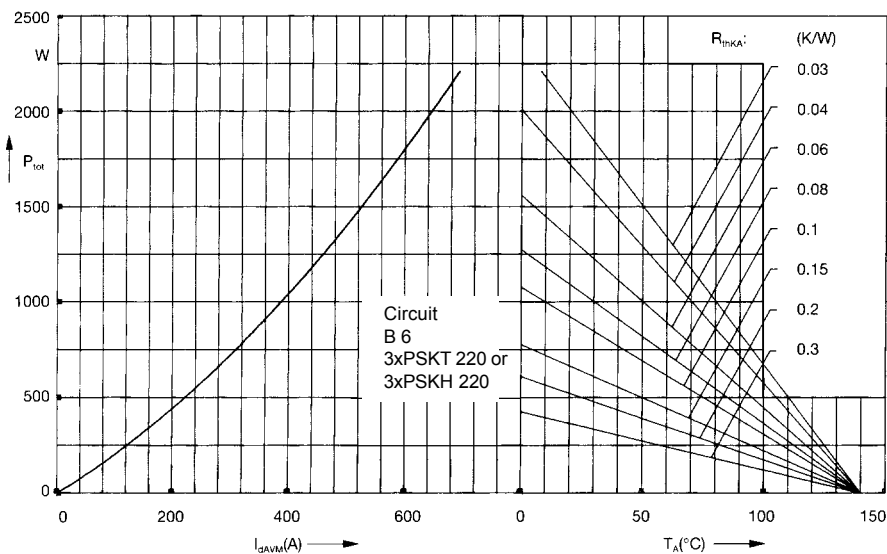


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

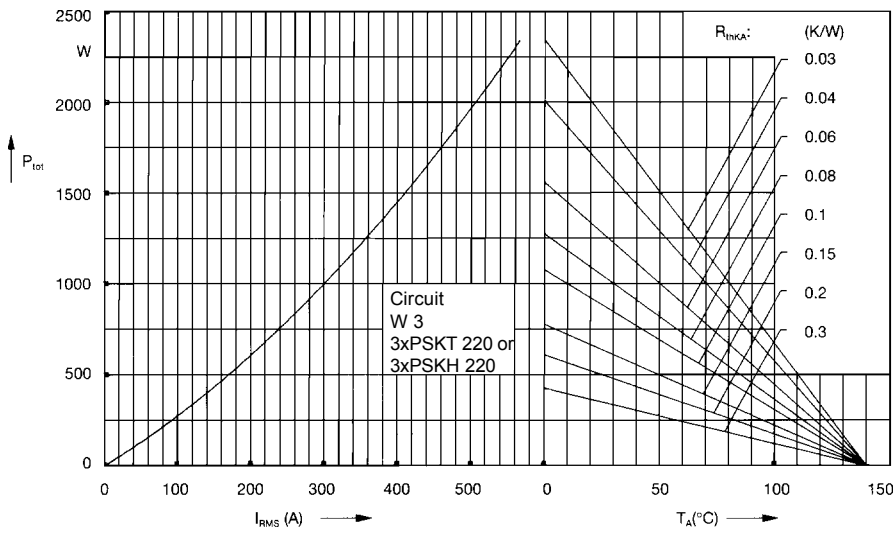


Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

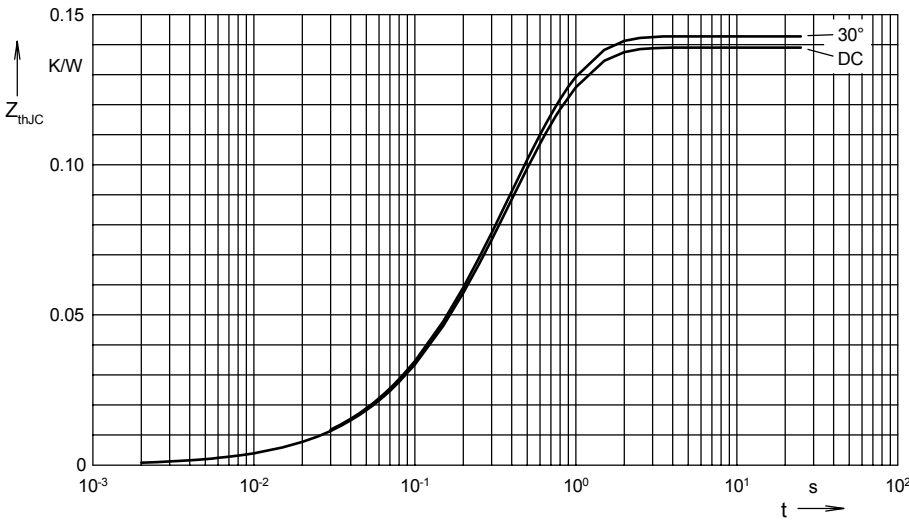


Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

$R_{thJC}$  for various conduction angles  $d$ :

$d$	$R_{thJC}$ (K/W)
DC	0.139
180°C	0.141
120°C	0.142
60°C	0.142
30°C	0.143

Constants for  $Z_{thJC}$  calculation:

$i$	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.0037	0.0099
2	0.0177	0.168
3	0.1175	0.456

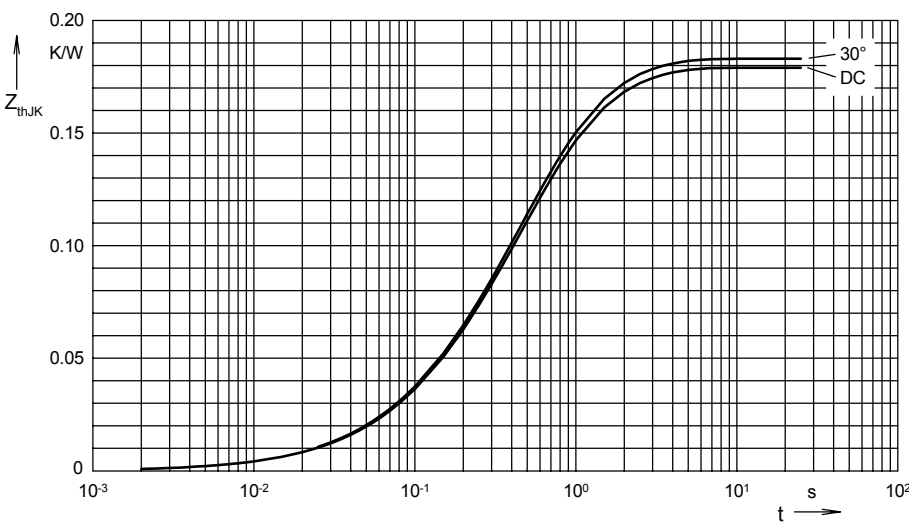


Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

$R_{thJK}$  for various conduction angles  $d$ :

$d$	$R_{thJK}$ (K/W)
DC	0.179
180°C	0.181
120°C	0.182
60°C	0.183
30°C	0.183

Constants for  $Z_{thJK}$  calculation:

$i$	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.0037	0.0099
2	0.0177	0.168
3	0.1175	0.456
4	0.04	1.36