

## Thyristor Modules Thyristor/Diode Modules

PSKT 95  
PSKH 95

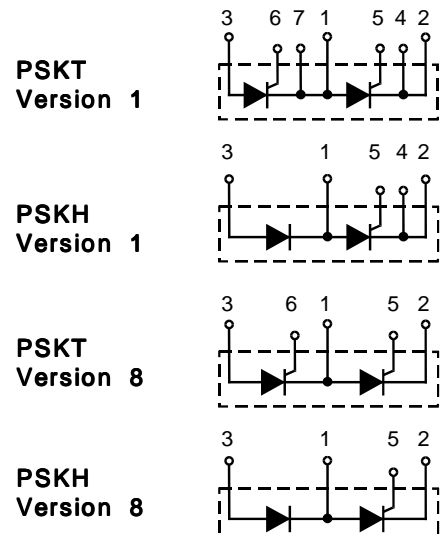
$I_{TRMS} = 2x 180 A$   
 $I_{TAVM} = 2x 116 A$   
 $V_{RRM} = 800-1800 V$

Preliminary Data Sheet

$V_{RSM}$ $V_{DSM}$ V	$V_{RRM}$ $V_{DRM}$ V	Type			
		Version 1		Version 8	
900	800	PSKT 95/08io1	--	PSKT 95/08io8	PSKH 95/08io8
1300	1200	PSKT 95/12io1	PSKH 95-12io1	PSKT 95/12io8	PSKH 95/12io8
1500	1400	PSKT 95/14io1	--	PSKT 95/14io8	PSKH 95/14io8
1700	1600	PSKT 95/16io1	PSKH 95-16io1	PSKT 95/16io8	PSKH 95/16io8
1900	1800	PSKT 95/18io1	--	PSKT 95/18io8	PSKH 95/18io8



Symbol	Test Conditions	Maximum Ratings	
$I_{TRMS}^1$ , $I_{FRMS}$ $I_{TAVM}^1$ , $I_{FAVM}$	$T_{VJ} = T_{VJM}$ $T_C = 85^\circ C$ ; 180° sine	180	A
$I_{TSM}^1$ , $I_{FSM}$	$T_{VJ} = 45^\circ C$ ; $V_R = 0$	t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine	2250 A 2400 A
	$T_{VJ} = T_{VJM}$ $V_R = 0$	t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine	2000 A 2150 A
$\int i^2 dt$	$T_{VJ} = 45^\circ C$ $V_R = 0$	t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine	25 300 A <sup>2</sup> s 23 900 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	20 000 A <sup>2</sup> s 19 100 A <sup>2</sup> s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ f = 50 Hz, t <sub>p</sub> = 200 μs $V_D = 2/3 V_{DRM}$ $I_G = 0.45 A$ di <sub>G</sub> /dt = 0.45 A/μs	repetitive, I <sub>T</sub> = 250 A non repetitive, I <sub>T</sub> = I <sub>TAVM</sub>	150 A/μs 500 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 <sub>T</sub> = I <sub>TAVM</sub>	t <sub>p</sub> = 30 μs t <sub>p</sub> = 300 μs	10 W 5 W
$P_{GAV}$			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 I <sub>ISOL</sub> ≤ 1 mA	t = 1 min t = 1 s	3000 V~ 3600 V~
$M_d$	Mounting torque (M5) Terminal connection torque (M5)		2.5-4.0/22-35 Nm/lb.in. 2.5-4.0/22-35 Nm/lb.in.
Weight	Typical including screws		90 g



### Features

- International standard package, JEDEC TO-240 AA
- 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
- Gate-cathode twin pins for version 1

### Applications

- DC motor control
- Softstart AC motor controller
- Light, heat and temperature control

### Advantages

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

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

Symbol	Test Conditions	Characteristic Values
$I_{RRM}, I_{DRM}$	$T_{VJ} = T_{VJM}; V_R = V_{RRM}; V_D = V_{DRM}$	5 mA
$V_T, V_F$	$I_T, I_F = 300 \text{ A}; T_{VJ} = 25^\circ\text{C}$	1.5 V
$V_{T0}$	For power-loss calculations only ( $T_{VJ} = 125^\circ\text{C}$ )	0.8 V
$r_T$		2.4 mΩ
$V_{GT}$	$V_D = 6 \text{ V}; T_{VJ} = 25^\circ\text{C}$	2.5 V
	$T_{VJ} = -40^\circ\text{C}$	2.6 V
$I_{GT}$	$V_D = 6 \text{ V}; T_{VJ} = 25^\circ\text{C}$	150 mA
	$T_{VJ} = -40^\circ\text{C}$	200 mA
$V_{GD}$	$T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM}$	0.2 V
$I_{GD}$		10 mA
$I_L$	$T_{VJ} = 25^\circ\text{C}; t_p = 10 \mu\text{s}; V_D = 6 \text{ V}$ $I_G = 0.45 \text{ A}; di_G/dt = 0.45 \text{ A}/\mu\text{s}$	450 mA
$I_H$	$T_{VJ} = 25^\circ\text{C}; V_D = 6 \text{ V}; R_{GK} = \infty$	200 mA
$t_{gd}$	$T_{VJ} = 25^\circ\text{C}; V_D = 1/2 V_{DRM}$ $I_G = 0.45 \text{ A}; di_G/dt = 0.45 \text{ A}/\mu\text{s}$	2 μs
$t_q$	$T_{VJ} = T_{VJM}; I_T = 150 \text{ A}; t_p = 200 \mu\text{s}; -di/dt = 10 \text{ A}/\mu\text{s}$ typ. $V_R = 100 \text{ V}; dv/dt = 20 \text{ V}/\mu\text{s}; V_D = 2/3 V_{DRM}$	185 μs
$Q_S$	$T_{VJ} = T_{VJM}; I_T, I_F = 50 \text{ A}; -di/dt = 6 \text{ A}/\mu\text{s}$	170 μC
$I_{RM}$		45 A
$R_{thJC}$	per thyristor/diode; DC current per module	0.22 K/W
$R_{thJK}$	per thyristor/diode; DC current per module	0.11 K/W
	other values see Fig. 8/9	0.42 K/W
		0.21 K/W
$d_s$	Creepage distance on surface	12.7 mm
$d_A$	Strike distance through air	9.6 mm
$a$	Maximum allowable acceleration	50 m/s <sup>2</sup>

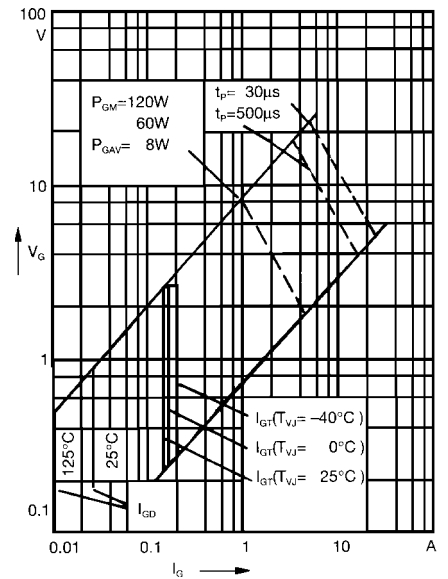


Fig. 1 Gate trigger characteristics

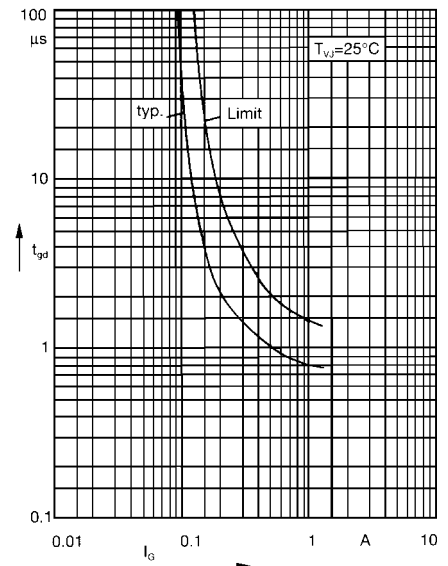
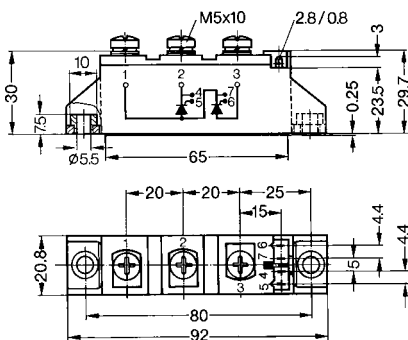


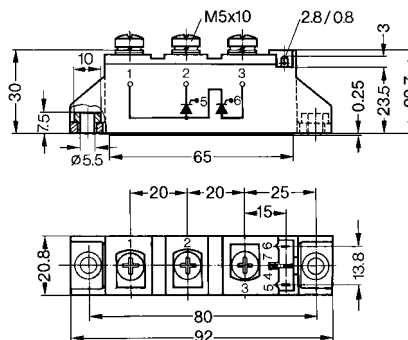
Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")

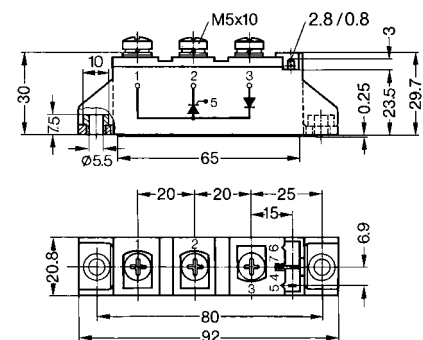
### PSKT/ PSKH Version 1



### PSKT Version 8



### PSKH Version 8



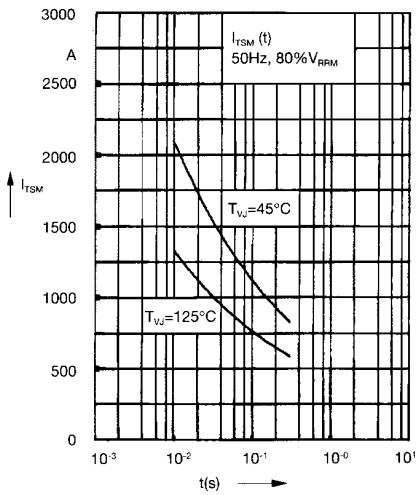


Fig. 3 Surge overload current  
 $I_{TSM}$ ,  $I_{FSM}$ : Crest value,  $t$ : duration

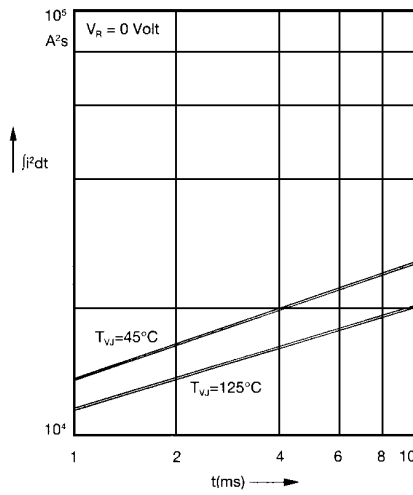


Fig. 4  $\int j^2 dt$  versus time (1-10 ms)

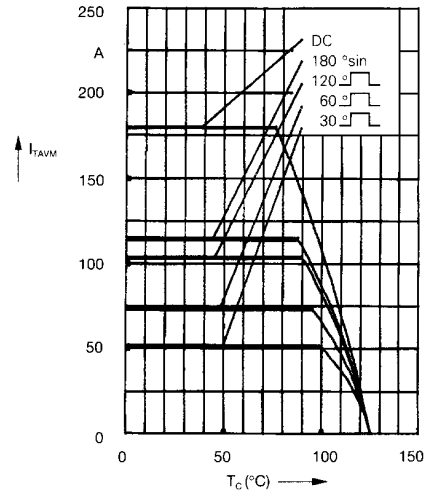


Fig. 4a Maximum forward current at case temperature

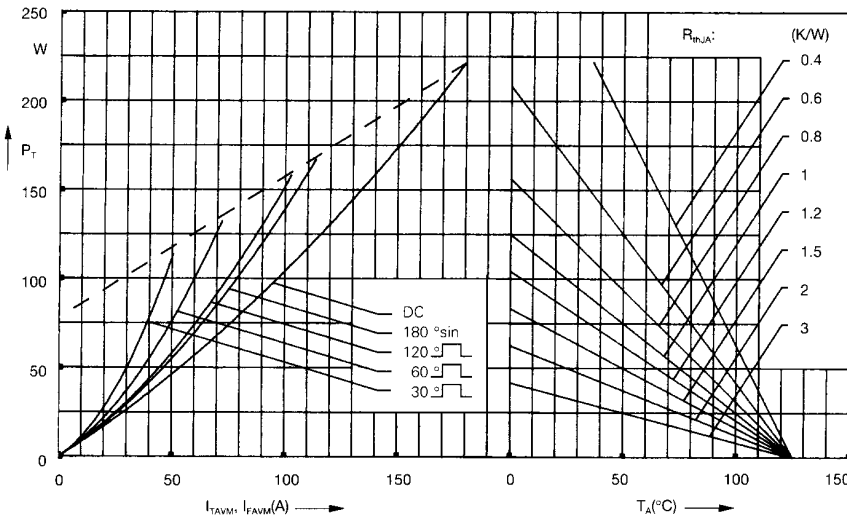


Fig. 5 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

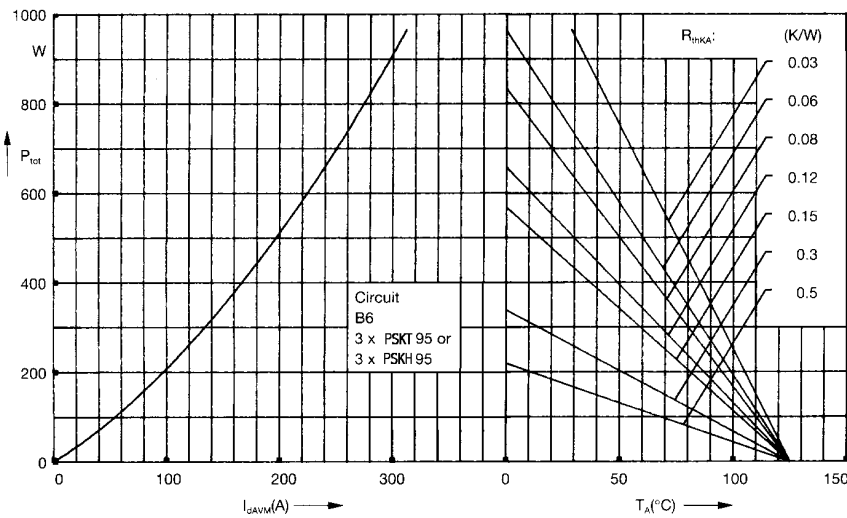


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

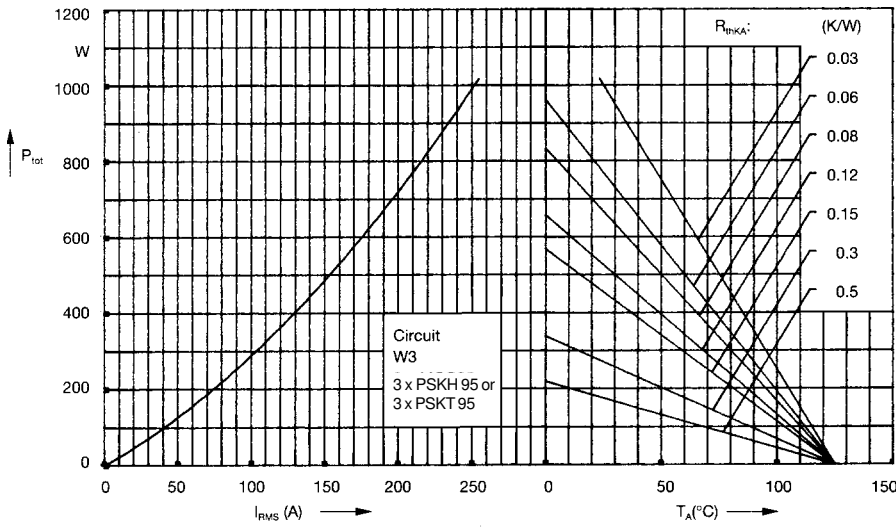


Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

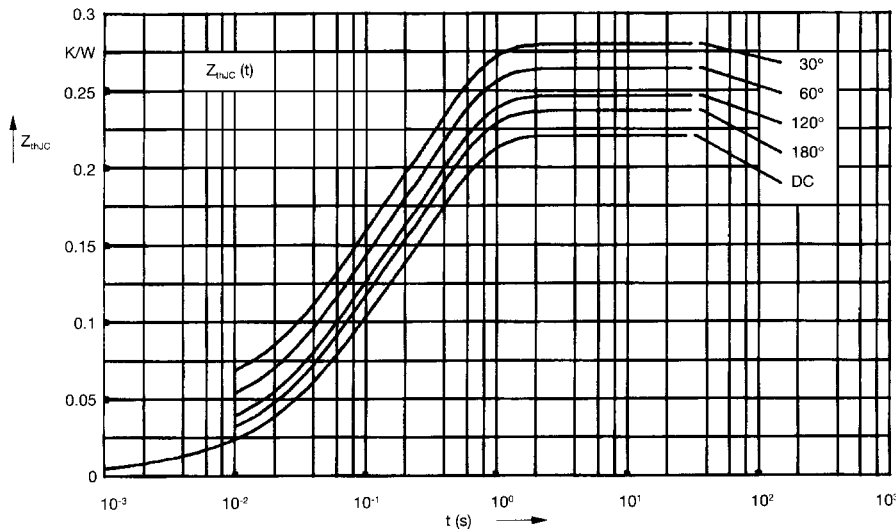


Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

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

d	$R_{thJC}$ (K/W)
DC	0.22
180°	0.23
120°	0.25
60°	0.27
30°	0.28

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.0066	0.0019
2	0.0678	0.0477
3	0.1456	0.344

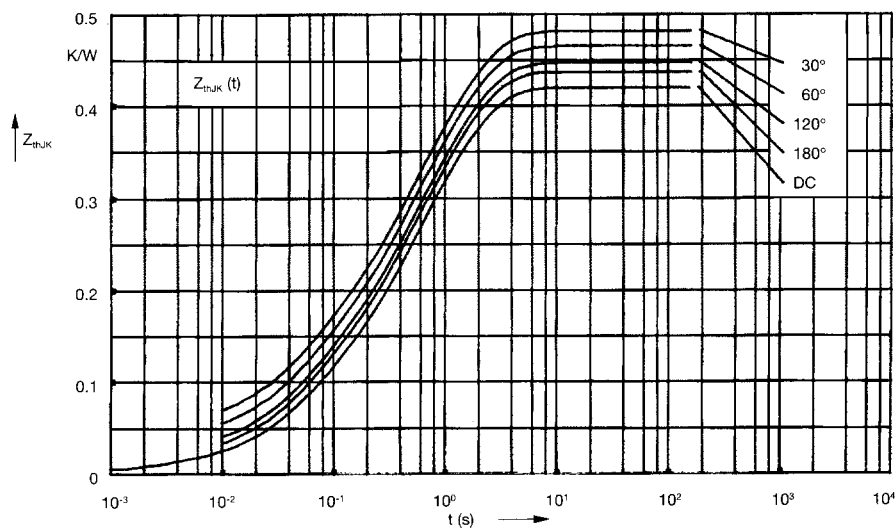


Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

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

d	$R_{thJK}$ (K/W)
DC	0.42
180°	0.43
120°	0.45
60°	0.47
30°	0.48

Constants for  $Z_{thJK}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.0066	0.0019
2	0.0678	0.0477
3	0.1456	0.344
4	0.2	1.32