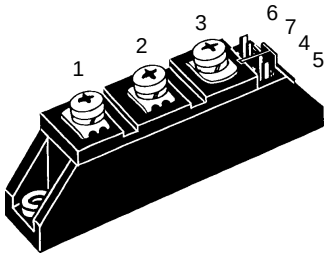
WESTCODE
SEMICONDUCTORS

Thyristor Modules
Thyristor/Diode Modules

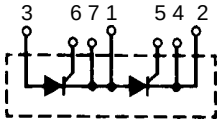
I_{TRMS} = 2 x 80 A
I_{TAVM} = 2 x 51 A
V_{RRM} = 800 - 1800 V

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type	
900	800	WPT 44-08	WPH 44-08
1300	1200	WPT 44-12	WPH 44-12
1500	1400	WPT 44-14	WPH 44-14
1700	1600	WPT 44-16	WPH 44-16
1900	1800	WPT 44-18	WPH 44-18

TO-240 AA



WPT 44



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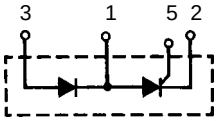


Symbol	Test Conditions		Maximum Ratings	
I_{TRMS}, I_{FRMS}	$T_{VJ} = T_{VJM}$		80	A
I_{TAVM}, I_{FAVM}	T_C = 83°C; 180° sine		51	A
	T_C = 85°C; 180° sine		49	A
I_{TSM}, I_{FSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	1150	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	1230	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	1000	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	1070	A
$\int i^2dt$	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	6600	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	6280	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	5000	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	4750	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$	repetitive, I_T = 150 A	150	A/µs
	f =50 Hz, t_P =200 µs			
	V_D = 2/3 V_{DRM}			
	I_G = 0.45 A	non repetitive, $I_T = I_{TAVM}$	500	A/µs
	di_G/dt = 0.45 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 = 30 µs	10	W
	$I_T = I_{TAVM}$	t_P = 300 µs	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	t = 1 min	3000	V~
	$I_{ISOL} \leq$ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque (M5)		2.5-4.0/22-35	Nm/lb.in.
	Terminal connection torque (M5)		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_2O_3 -ceramic base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- Gate-cathode twin pins for WPT

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

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 = 200 A; T_{VJ} = 25°C		1.75	V
V_{T0}	For power-loss calculations only (T_{VJ} = 125°C)		0.85	V
r_T			5.3	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	1.5	V
		T_{VJ} = -40°C	1.6	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	100	mA
		T_{VJ} = -40°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°C; t_P = 10 µs, V_D = 6 V I_G = 0.45 A; di_G/dt = 0.45 A/µs		450	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; R_{GK} = ∞		200	mA
t_{gd}	T_{VJ} = 25°C; V_D = 1/2 V_{DRM} I_G = 0.45 A; di_G/dt = 0.45 A/µs		2	µs
t_q	$T_{VJ} = T_{VJM}$; I_T = 120 A, t_P = 200 µs; -di/dt = 10 A/µs V_R = 100 V; dv/dt = 20 V/µs; V_D = 2/3 V_{DRM}	typ.	150	µs
Q_S	$T_{VJ} = T_{VJM}$; I_T, I_F = 50 A, -di/dt = 0.64 A/µs		90	µC
I_{RM}			11	A
R_{thJC}	per thyristor/diode; DC current	other values see Fig. 8/9	0.53	K/W
	per module		0.265	K/W
R_{thJK}	per thyristor/diode; DC current		0.73	K/W
	per module		0.365	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^2

Optional accessories for module-type WPT
Keyed gate/cathode twin plugs with wire length = 350 mm, gate = yellow, cathode = red
Type **U9910** UL 758, style 1385,
CSA class 5851, guide 460-1-1

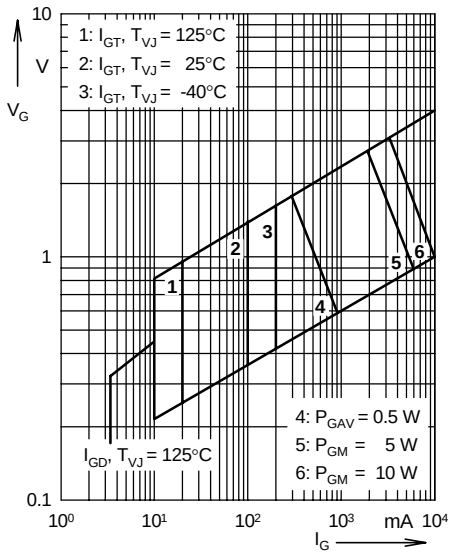


Fig. 1 Gate trigger characteristics

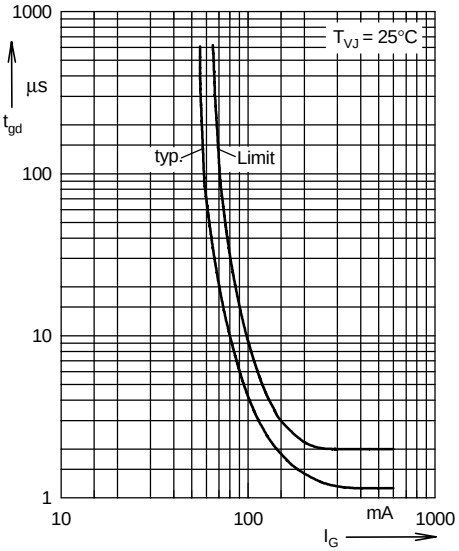
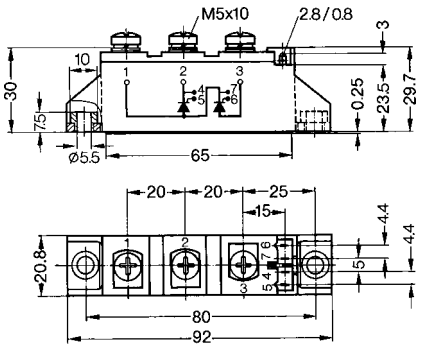


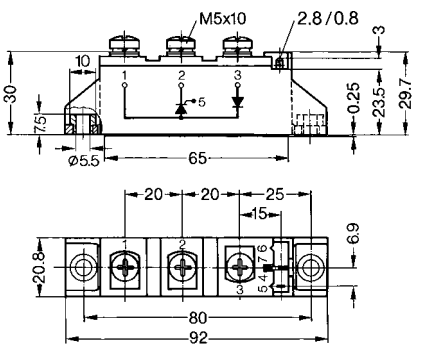
Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")

WPT 44



WPH 44



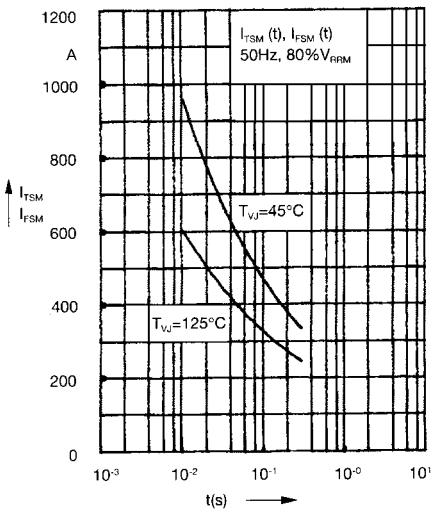


Fig. 3 Surge overload current
I_{TSM}, I_{FSM}: Crest value, t: duration

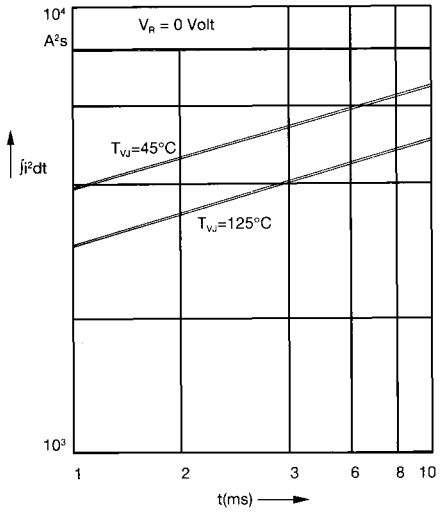


Fig. 4 $\int i^2dt$ versus time (1-10 ms)

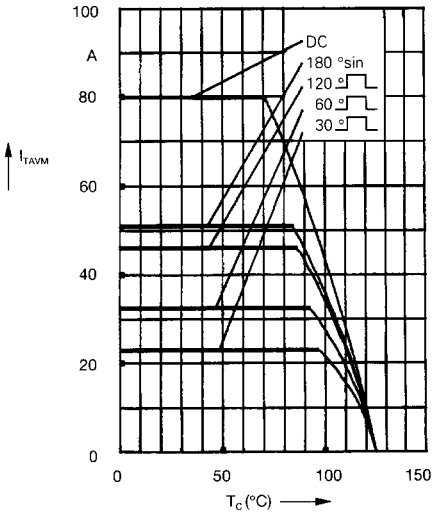


Fig. 4a Maximum forward current at case temperature

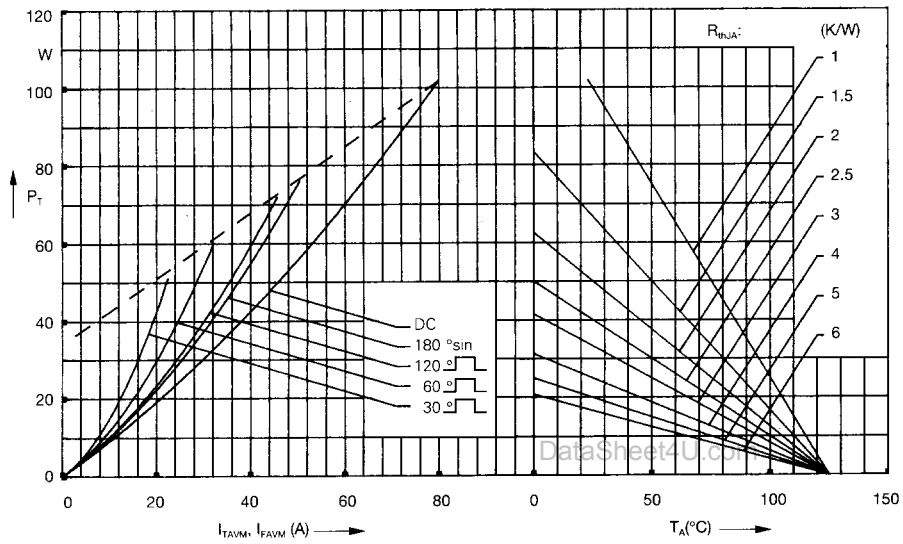


Fig. 5 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

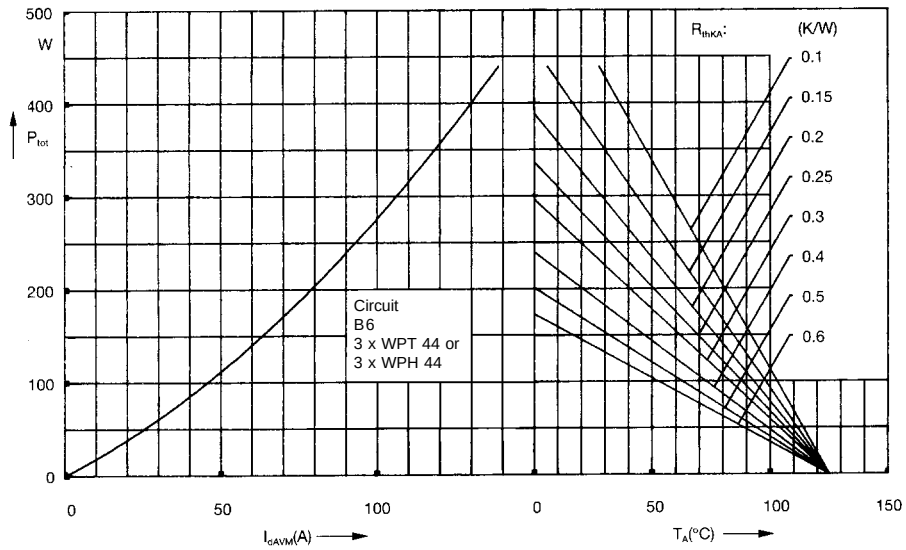


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

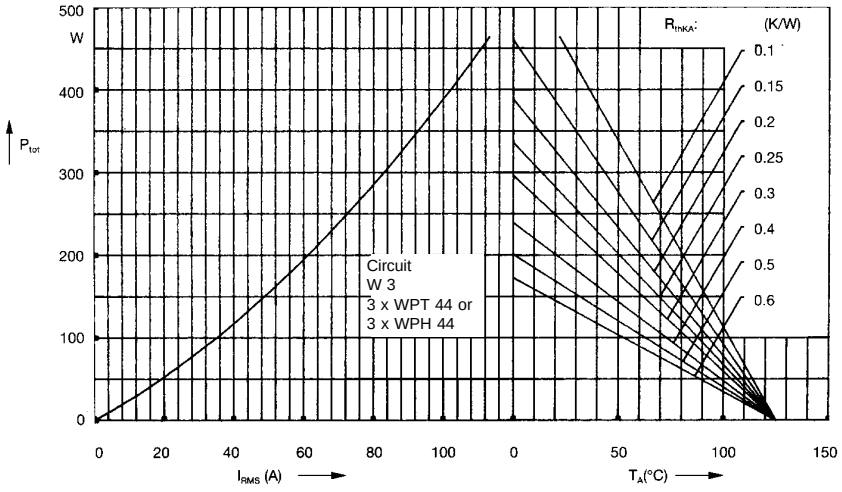


Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

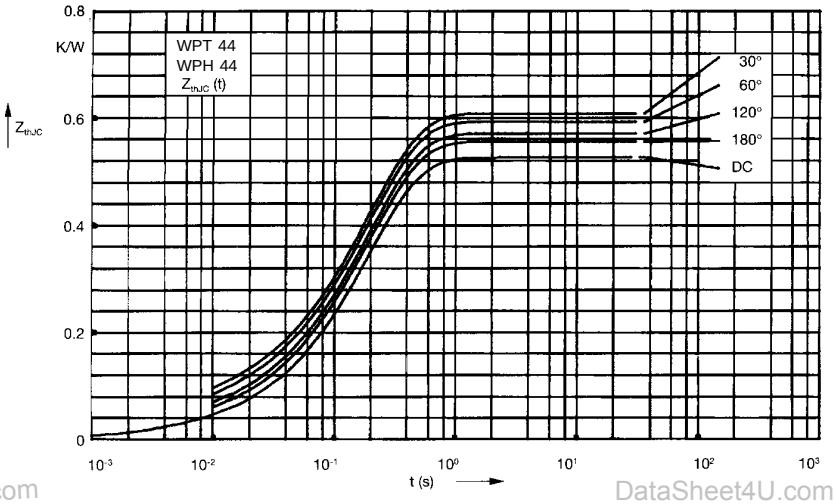


Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

R_{thJC} for various conduction angles d:

d	R_{thJC} (K/W)
DC	0.53
180°	0.55
120°	0.58
60°	0.6
30°	0.62

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.015	0.0035
2	0.026	0.02
3	0.489	0.195

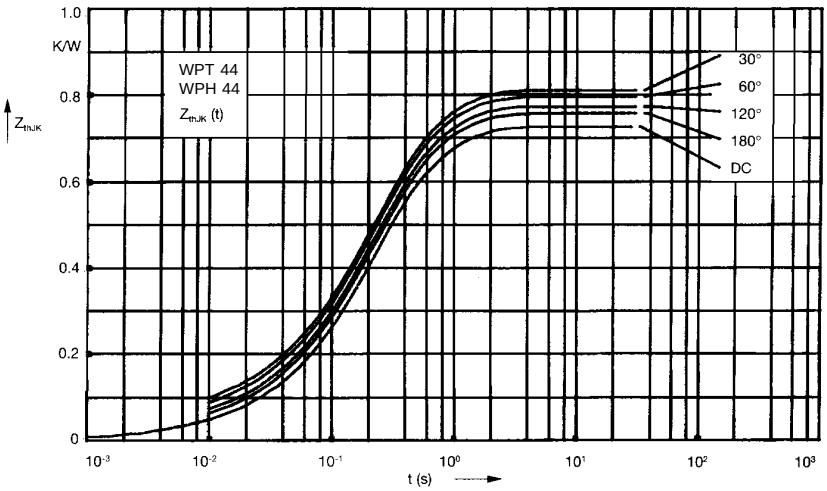


Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

R_{thJK} for various conduction angles d:

d	R_{thJK} (K/W)
DC	0.73
180°	0.75
120°	0.78
60°	0.8
30°	0.82

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.015	0.0035
2	0.026	0.02
3	0.489	0.195
4	0.2	0.68

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