

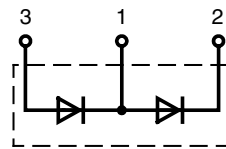
# High Power Diode Modules

$$I_{FRSM} = 2x\ 480\ A$$

$$I_{FAVM} = 2x\ 305\ A$$

$$V_{RRM} = 1200-2200\ V$$

$V_{RSM}$ V	$V_{RRM}$ V	Type
1300	1200	MDD 310-12N1
1500	1400	MDD 310-14N1
1700	1600	MDD 310-16N1
1900	1800	MDD 310-18N1
2100	2000	MDD 310-20N1
2300	2200	MDD 310-22N1



Symbol	Conditions	Maximum Ratings	
$I_{FRMS}$	$T_{VJ} = T_{VJM}$	480	A
$I_{FAVM}$	$T_C = 100^\circ C$ ; 180° sine	305	A
$I_{FSM}$	$T_{VJ} = 45^\circ C$ ; $t = 10\ ms$ (50 Hz)	11,5	kA
	$V_R = 0$ ; $t = 8.3\ ms$ (60 Hz)	12,2	kA
	$T_{VJ} = T_{VJM}$ ; $t = 10\ ms$ (50 Hz)	9,6	kA
	$V_R = 0$ ; $t = 8.3\ ms$ (60 Hz)	10,2	kA
$I^2t$	$T_{VJ} = 45^\circ C$ ; $t = 10\ ms$ (50 Hz)	662	kA <sup>2</sup> s
	$V_R = 0$ ; $t = 8.3\ ms$ (60 Hz)	620	kA <sup>2</sup> s
	$T_{VJ} = T_{VJM}$ ; $t = 10\ ms$ (50 Hz)	460	kA <sup>2</sup> s
	$V_R = 0$ ; $t = 8.3\ ms$ (60 Hz)	430	kA <sup>2</sup> s
$T_{VJ}$		-40...+150	°C
$T_{VJM}$		150	°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 - 5	Nm
	Terminal connection torque (M8)	12 - 15	Nm
<b>Weight</b>	Typical including screws	320	g

## Features

- Direct copper bonded Al<sub>2</sub>O<sub>3</sub> ceramic base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered, E 72873

## Applications

- Supplies for DC power equipment
- DC supply for PWM inverter
- Field supply for DC motors
- Battery DC power supplies

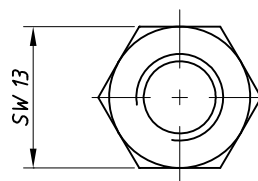
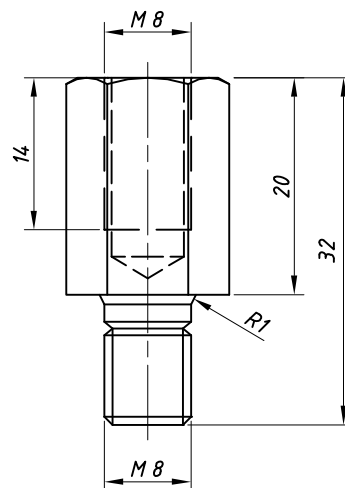
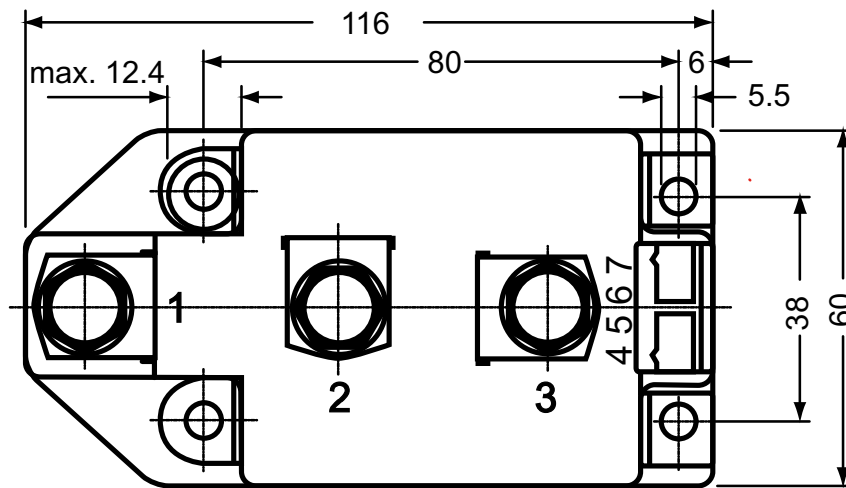
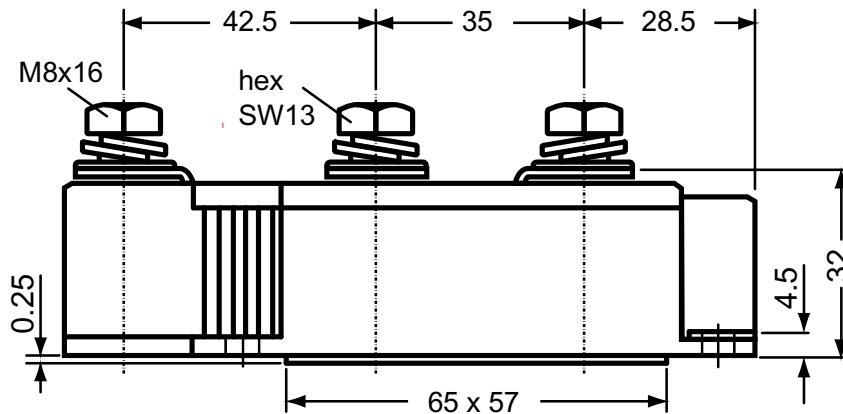
## Advantages

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

Symbol	Conditions	Characteristics Values	
$I_{RRM}$	$V_R = V_{RRM}$ ; $T_{VJ} = T_{VJM}$	40	mA
$V_F$	$I_F = 600\ A$ ; $T_{VJ} = 25^\circ C$	1.2	V
$V_{T0}$	For power-loss calculations only	0.75	V
$r_t$	$T_{VJ} = T_{VJM}$	0.63	mΩ
$R_{thJC}$	per diode; DC current	0.129	K/W
	per module <i>other values</i>	0.065	K/W
$R_{thJK}$	per diode; DC current <i>see Fig. 6/7</i>	0.169	K/W
	per module	0.0845	K/W
$Q_S$	$T_{VJ} = 125^\circ C$ ; $I_F = 400\ A$ ; $-di/dt = 50\ A/\mu s$	760	μC
$I_{RM}$		275	A
$d_s$	Creeping distance on surface	12.7	mm
$d_A$	Creepage distance in air	9.6	mm
$a$	Maximum allowable acceleration	50	m/s <sup>2</sup>

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

Dimensions in mm (1 mm = 0.0394")



Threaded spacer for higher Anode / Cathode construction:

Type **ZY 250** (material brass)

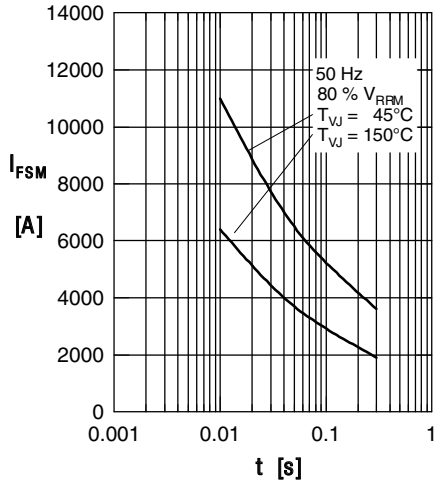


Fig. 1 Surge overload current  
 $I_{FSM}$ : Crest value,  $t$ : duration

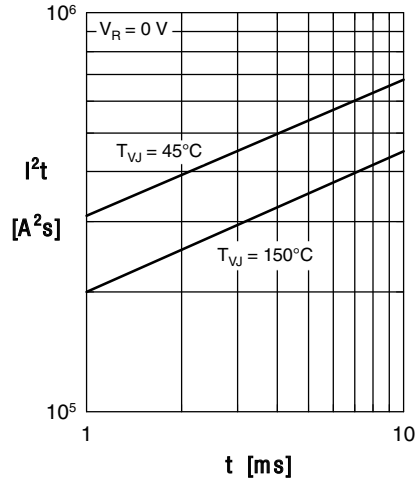


Fig. 2  $I^2t$  versus time (1-10 ms)

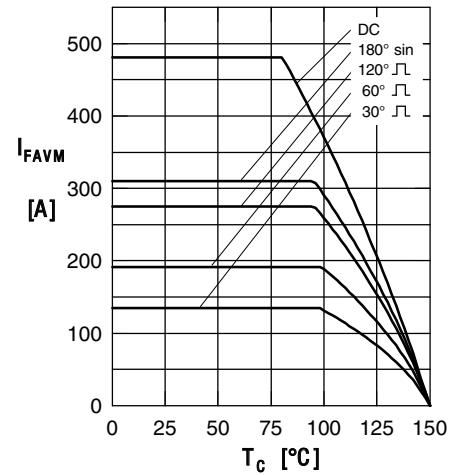


Fig. 3 Maximum forward current at case temperature

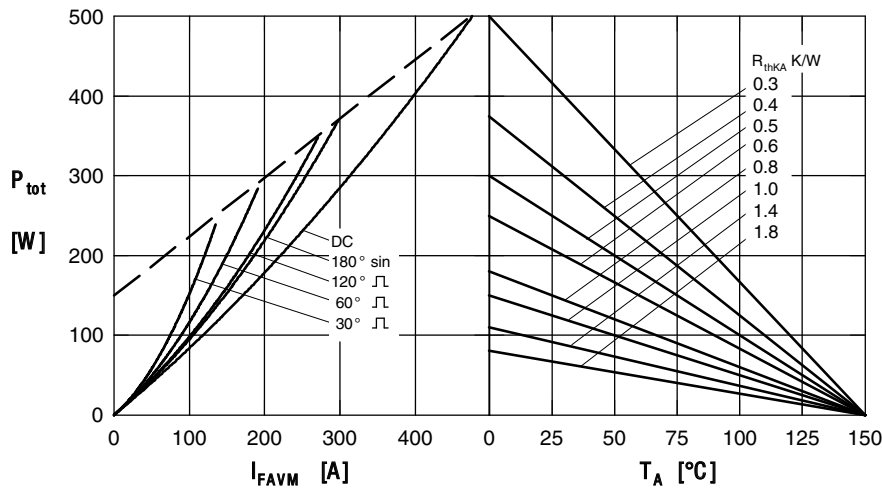


Fig. 4 Power dissipation versus forward current and ambient temperature (per diode)

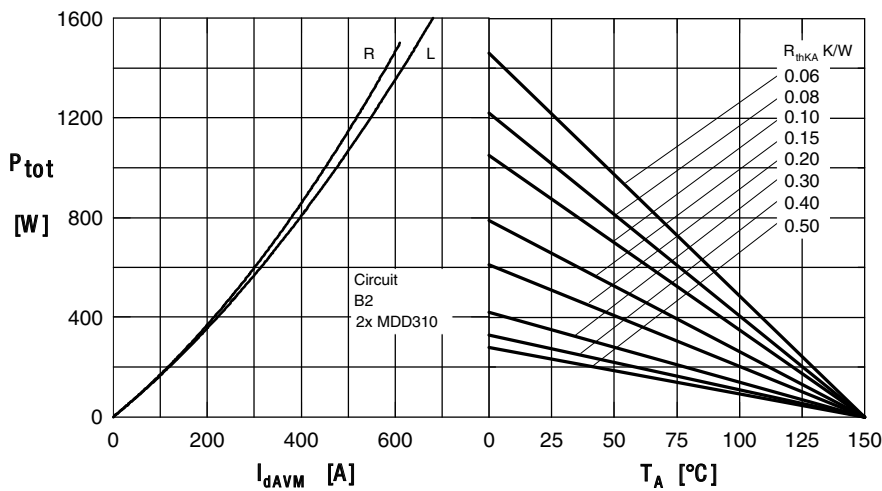


Fig. 5 Single phase rectifier bridge: Power dissipation vs. direct output current and ambient temperature  $R$  = resistive load,  $L$  = inductive load

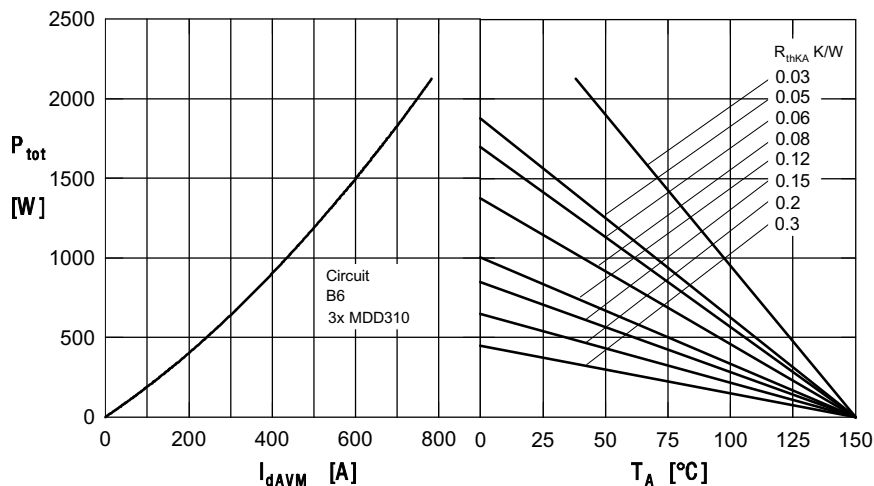
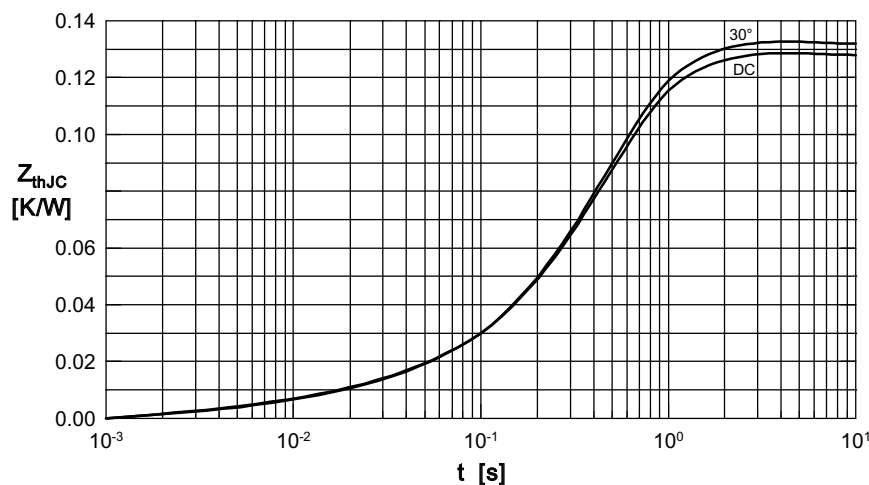


Fig.6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature



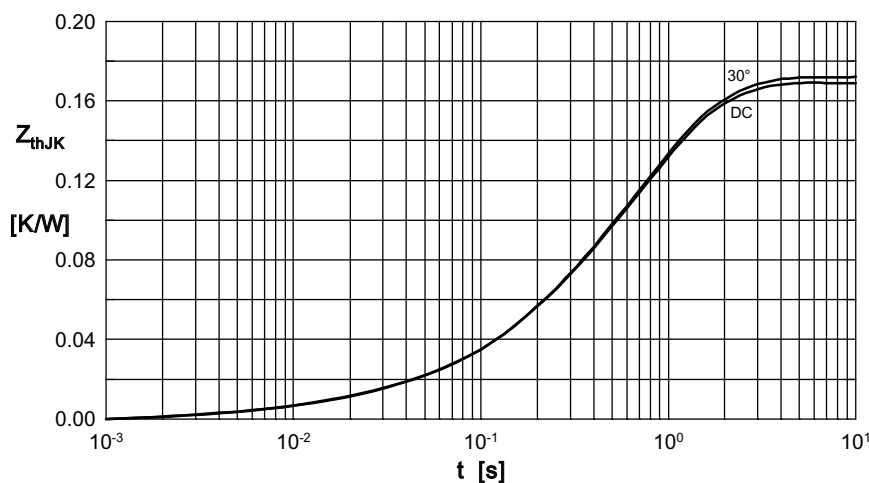
$R_{thJC}$  for various conduction angles  $d$ :

$d$	$R_{thJC}$ [K/W]
DC	0.129
180°	0.131
120°	0.132
60°	0.132
30°	0.133

Constants for  $Z_{thJC}$  calculation:

$i$	$R_{thi}$ [K/W]	$t_i$ [s]
1	0.0035	0.0099
2	0.0165	0.168
3	0.1091	0.456

Fig. 7 Transient thermal impedance junction to case (per diode)



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

$d$	$R_{thJK}$ (K/W)
DC	0.169
180°	0.171
120°	0.172
60°	0.172
30°	0.173

Constants for  $Z_{thJK}$  calculation:

$i$	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.0035	0.0099
2	0.0165	0.168
3	0.1091	0.456
4	0.04	1.36

Fig. 8 Transient thermal impedance junction to heatsink (per diode)

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