

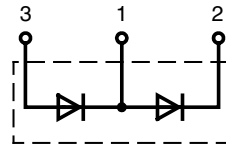
# High Power Diode Modules

$$I_{FRSM} = 2 \times 450 \text{ A}$$

$$I_{FAVM} = 2 \times 270 \text{ A}$$

$$V_{RRM} = 1200\text{-}1800 \text{ V}$$

$V_{RSM}$ V	$V_{RRM}$ V	Type
1300	1200	MDD 220-12N1
1500	1400	MDD 220-14N1
1700	1600	MDD 220-16N1
1900	1800	MDD 220-18N1



E72873

Symbol	Conditions	Maximum Ratings	
$I_{FRMS}$	$T_{VJ} = T_{VJM}$	450	A
$I_{FAVM}$	$T_C = 100^\circ\text{C}; 180^\circ \text{ sine}$	270	A
$I_{FSM}$	$T_{VJ} = 45^\circ\text{C}; t = 10 \text{ ms}$ (50 Hz)	8500	A
	$V_R = 0; t = 8.3 \text{ ms}$ (60 Hz)	9000	A
	$T_{VJ} = T_{VJM}; t = 10 \text{ ms}$ (50 Hz)	7500	A
	$V_R = 0; t = 8.3 \text{ ms}$ (60 Hz)	8000	A
$I^2t$	$T_{VJ} = 45^\circ\text{C}; t = 10 \text{ ms}$ (50 Hz)	360000	A <sup>2</sup> s
	$V_R = 0; t = 8.3 \text{ ms}$ (60 Hz)	340000	A <sup>2</sup> s
	$T_{VJ} = T_{VJM}; t = 10 \text{ ms}$ (50 Hz)	280000	A <sup>2</sup> s
	$V_R = 0; t = 8.3 \text{ ms}$ (60 Hz)	260000	A <sup>2</sup> s
$T_{VJ}$		-40...+150	°C
$T_{VJM}$		150	°C
$T_{stg}$		-40...+125	°C
$V_{ISOL}$	50/60 Hz, RMS $t = 1 \text{ min}$	3000	V~
	$I_{ISOL} \leq 1 \text{ mA}; t = 1 \text{ s}$	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  $\text{Al}_2\text{O}_3$  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

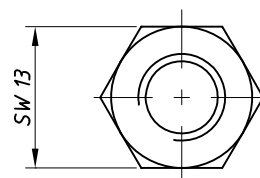
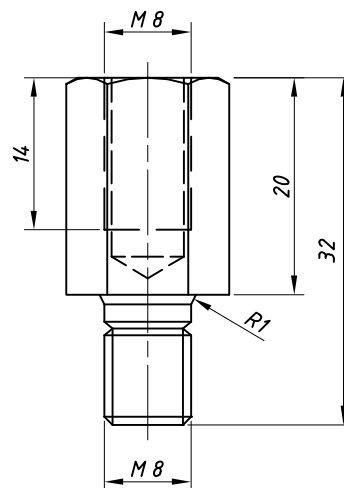
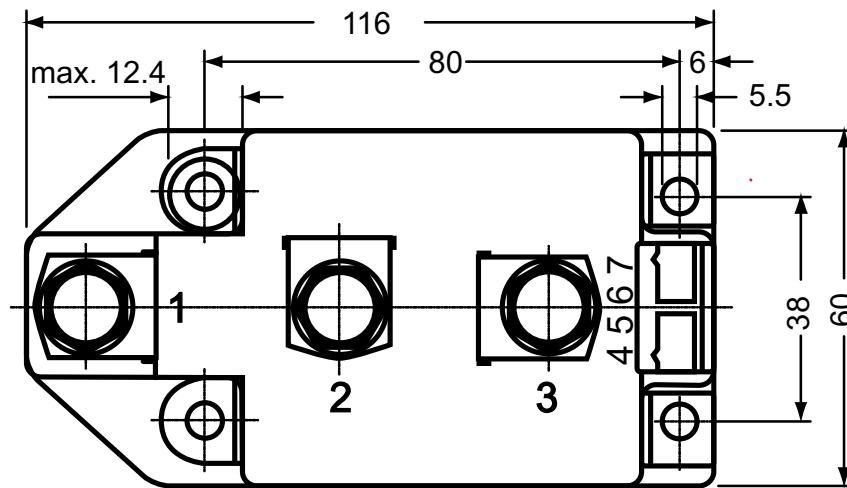
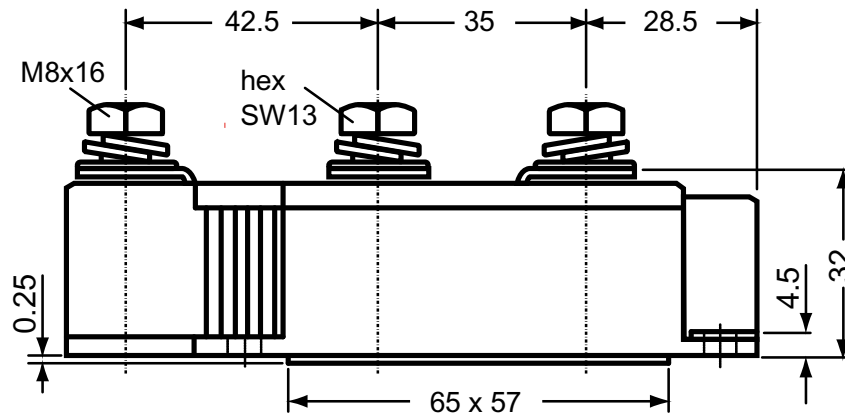
## Advantages

- 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
$V_F$	$I_F = 600 \text{ A}; T_{VJ} = 25^\circ\text{C}$	1.4	V
$V_{T0}$	For power-loss calculations only	0.75	V
$r_t$	$T_{VJ} = T_{VJM}$	0.9	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
$Q_S$	$T_{VJ} = 125^\circ\text{C}; I_F = 400 \text{ A}; -di/dt = 50 \text{ A}/\mu\text{s}$	760	μC
$I_{RM}$		275	A
$d_s$	Creeping distance on surface	12.7	mm
$d_A$	Creepage distance in air	9.6	mm
<b>a</b>	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)

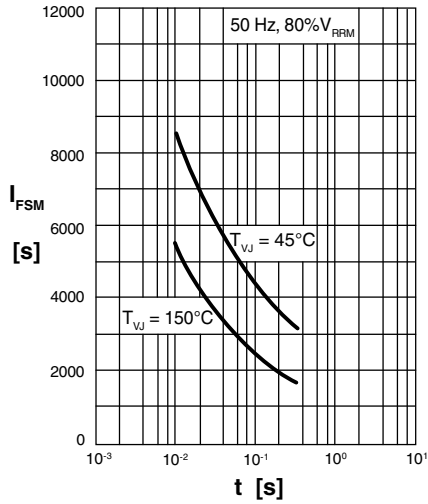


Fig. 1 Surge overload current  
 $I_{FSM}$ : Crest value,  $t$ : duration

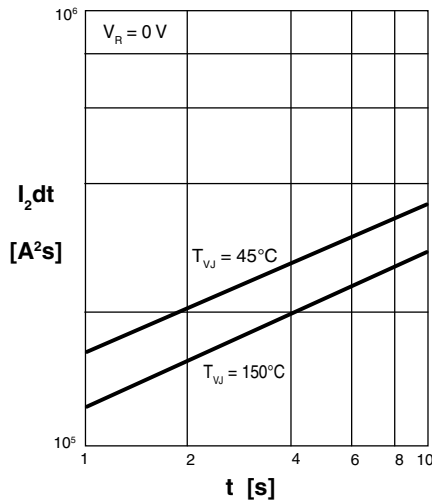


Fig. 2  $I^2dt$  versus time (1-10 ms)

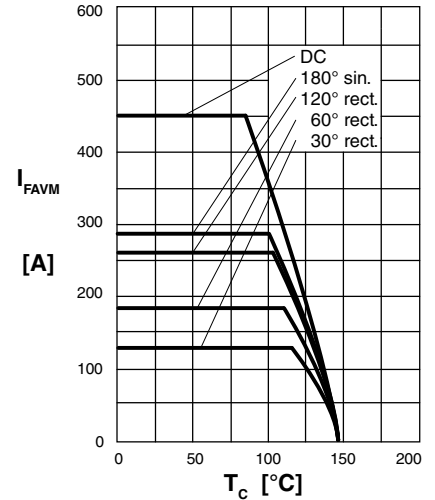


Fig. 2a Maximum forward current  
 at case temperature

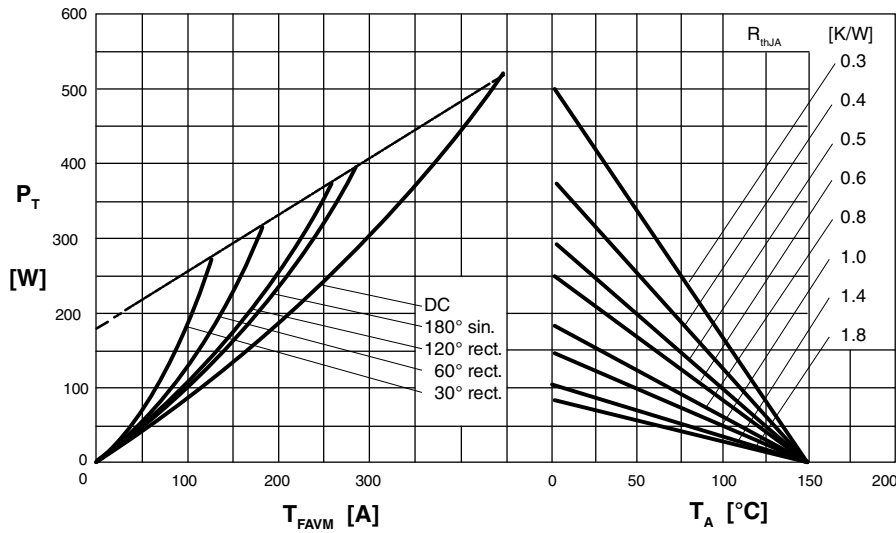
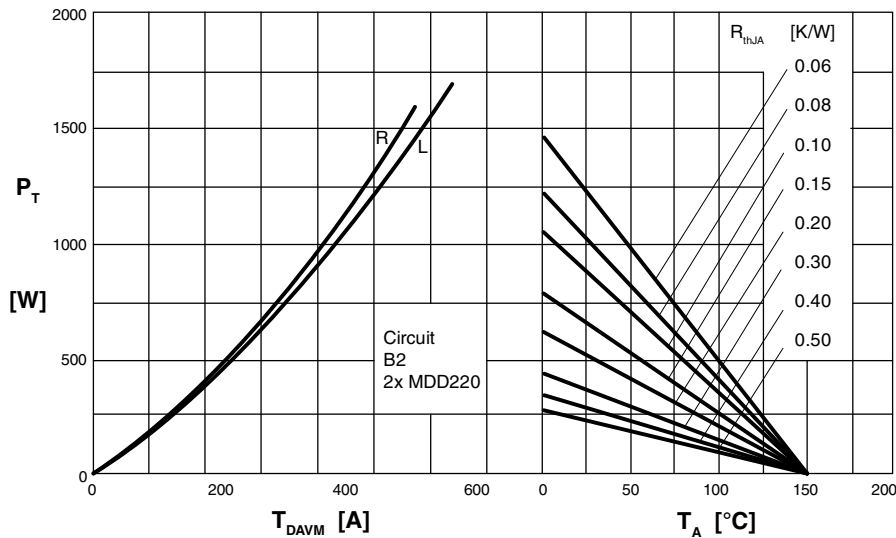


Fig. 3 Power dissipation vs. forward current and ambient temperature (per diode)



R = resistive load  
 L = inductive load

Fig. 4 Single phase rectifier bridge: Power dissipation vs. direct output current and ambient

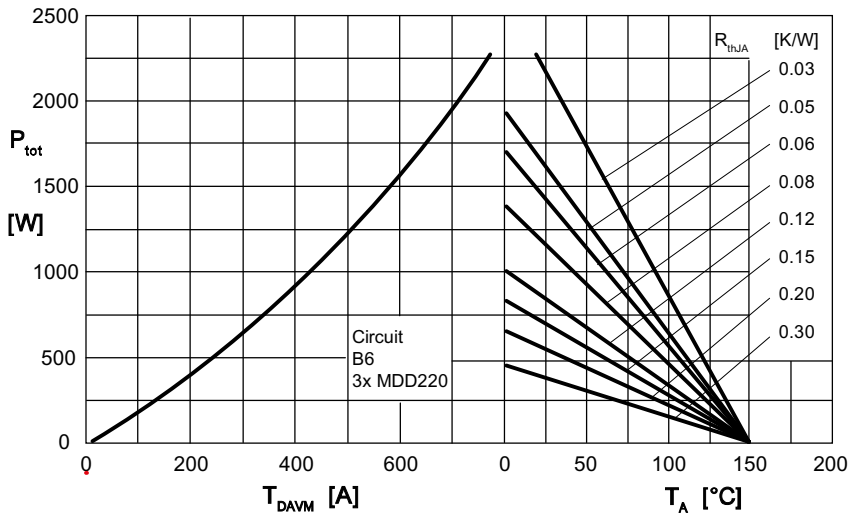
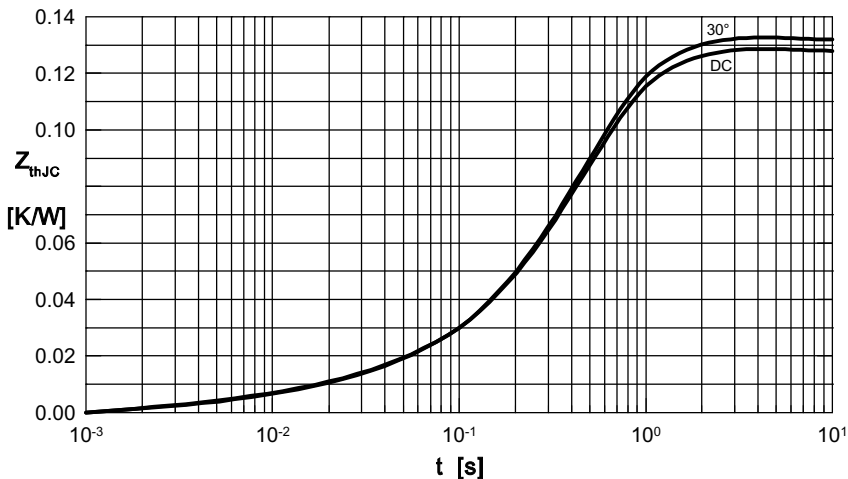


Fig. 5 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature



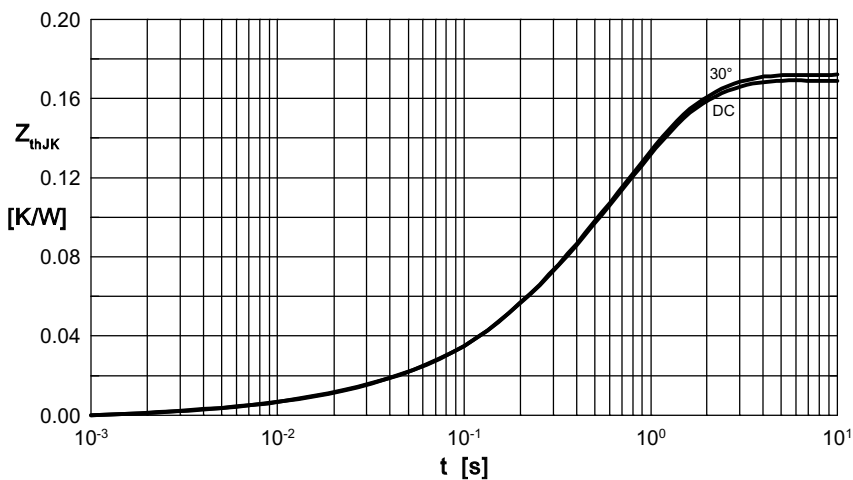
$R_{thJC}$  for various conduction angles  $d$ :

$d$	$R_{thJC}$ [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. 6 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. 7 Transient thermal impedance junction to heatsink (per diode)