

### Three Phase Rectifier Bridge with IGBT and Fast Recovery Diode for Braking System

### PSDM 33/05

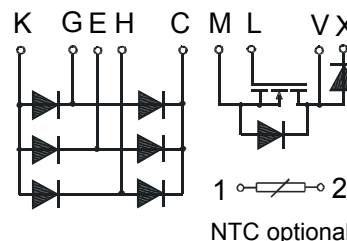
$I_{D25} = 35 \text{ A}$   
 $V_{DSS} = 500 \text{ V}$   
 $R_{DS(on)} = 0.12 \Omega$

Preliminary Data Sheet

$V_{RSM}$ (V)	$V_{RRM}$ (V)	Type
600	500	PSDM 33/05

#### MOSFET

Symbol	Test Conditions	Maximum Ratings
$V_{DSS}$	$T_{VJ} = 25 \text{ °C to } 150 \text{ °C}$	500 V
$V_{DGR}$	$T_{VJ} = 25 \text{ °C to } 150 \text{ °C}, R_{GS} = 10 \Omega$	500 V
$V_{GS}$	continuous	$\pm 20$ V
$I_D$	$T_s = 85 \text{ °C}$	24 A
$I_D$	$T_s = 25 \text{ °C}$	35 A
$I_{DM}$	$T_s = 25 \text{ °C}$ , pulse width limited by $T_{VJ}$	95 A
$P_D$	$T_s = 85 \text{ °C}$	170 W
$I_S$	$V_{GS} = 0 \text{ V}, T_s = 25 \text{ °C}$	24 A
$I_{SM}$	$V_{GS} = 0 \text{ V}, T_s = 25 \text{ °C}$ , pulse width limited by $T_{VJ}$	95 A



#### Symbol Test Conditions Characteristic Values

$T_{VJ} = 25 \text{ °C}$ , unless otherwise specified

$V_{DSS}$	$V_{GS} = 0 \text{ V}, I_D = 2 \text{ mA}$	min. 500 V
$V_{GS(th)}$	$V_{DS} = 20 \text{ V}, I_D = 20 \text{ mA}$	min. 2 V
$V_{GS(th)}$	$V_{DS} = 20 \text{ V}, I_D = 20 \text{ mA}$	max. 5 V
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$	max. $\pm 500$ nA
$I_{DSS}$	$V_{DS} = 500 \text{ V}, V_{GS} = 0 \text{ V}$	max. 2 mA
$R_{DS(on)}$	$T_{VJ} = 25 \text{ °C}$	max. 0.12 $\Omega$
$R_{Gint}$	$T_{VJ} = 25 \text{ °C}$	max. 1.5 $\Omega$
$g_{fs}$	$V_{DS} = 15 \text{ V}, I_{DS} = 12 \text{ A}$	typ. 30 S
$V_{DS}$	$I_{DS} = 24 \text{ V}, V_{GS} = 0 \text{ V}$	max. 1.5 V
$t_{d(on)}$	$V_{DS} = 250 \text{ V}, I_{DS} = 12 \text{ A}, V_{GS} = 10 \text{ V}$ $Z_{gen} = 1 \Omega, L\text{-load}$	max. 100 ns
$t_{d(off)}$		max. 220 ns
$C_{iss}$	$V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}, V_{GS} = 0 \text{ V}$	typ. 8.5 nF
$C_{oss}$		typ. 0.9 nF
$C_{rss}$		typ. 0.3 nF
$Q_g$	$V_{DS} = 250 \text{ V}, I_D = 12 \text{ A}, V_{GS} = 10 \text{ V}$	typ. 350 nC
$R_{thJH}$		max. 0.38 K/W

#### Module

Symbol	Test Conditions	Maximum Ratings
$T_{VJ}$		-40...+150 °C
$T_{JM}$		150 °C
$T_{stg}$		-40...+150 °C
$V_{isol}$	50/60 Hz $t = 1 \text{ min}$	3000 V~
	$I_{isol} \leq 1 \text{ mA}$ $t = 1 \text{ s}$	3600 V~
$M_d$	Mounting torque (M 4)	1.5-2.0 Nm
Weight	typ.	24 g

#### Features

- High level of integration - only one power semiconductor module required
- Isolation voltage 3000 V~
- Planar glass passivated chips
- Ultrafast boost diode
- Leads suitable for PC board soldering
- Thermistor (optional)
- UL registered, E 148688

#### Applications

- Drive Inverters with brake system

#### Advantages

- Easy to mount with two screws
- Space and weight savings
- high temperature and power cycling capability
- Small and light weight
- 2 functions in one package

**Caution:** These Devices are sensitive to electrostatic discharge. Users should observe proper ESD handling precautions.

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

## Boost Diode

Symbol	Test Conditions	Maximum Ratings
$V_{RRM}$		600 V
$I_{FAV}$	$T_S = 85\text{ °C}$ , rectangular $\delta = 0.5$	33 A
$I_{FSM}$	$T_{VJ} = 45\text{ °C}$ , $T = 10\text{ ms}$ (50Hz)	300 A
		$T = 8.3\text{ ms}$ (60Hz)
	$T_{VJ} = 150\text{ °C}$ , $T = 10\text{ ms}$ (50Hz)	260 A
		$T = 8.3\text{ ms}$ (60Hz)
<b>P</b>	$T_S = 85\text{ °C}$	36 W

Symbol	Test Conditions	Characteristic Values
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$T_{VJ} = 25\text{ °C}$ , unless otherwise specified

$V_F$	$I_F = 22\text{ A}$ , $T_{VJ} = 25\text{ °C}$	max.	1.65	V	
		$T_{VJ} = 150\text{ °C}$	max.	1.4	V
$I_R$	$V_R = 600\text{ V}$ , $T_{VJ} = 25\text{ °C}$	max.	1.5	mA	
		$V_R = 480\text{ V}$ , $T_{VJ} = 25\text{ °C}$	max.	0.25	mA
		$T_{VJ} = 125\text{ °C}$	max.	7	mA
$V_{T0}$	for power-loss calculations only	max.	1.14	V	
$r_T$	$T_{VJ} = 125\text{ °C}$	max.	10	mΩ	
$I_{RM}$	$I_F = 30\text{ A}$ , $-di_F/dt = 240\text{ A}/\mu\text{s}$	max.	11	A	
	$V_R = 350\text{ V}$ , $T_{VJ} = 100\text{ °C}$	typ.	10	A	
$R_{thJH}$		max.	1.8	K/W	

## Rectifier Diodes

Symbol	Test Conditions	Maximum Ratings
$V_{RRM}$		800 V
$I_{dAV}$	$T_S = 85\text{ °C}$ , sinus $180\text{ °}$	54 A
$I_{FSM}$	$T_{VJ} = 45\text{ °C}$ , $T = 10\text{ ms}$ (50Hz)	300 A
		$T = 8.3\text{ ms}$ (60Hz)
	$T_{VJ} = 150\text{ °C}$ , $T = 10\text{ ms}$ (50Hz)	260 A
		$T = 8.3\text{ ms}$ (60Hz)

Symbol	Test Conditions	Characteristic Values
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$T_{VJ} = 25\text{ °C}$ , unless otherwise specified

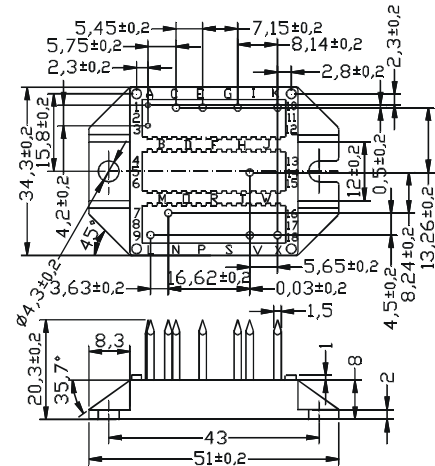
$V_F$	$I_F = 20\text{ A}$ , $T_{VJ} = 25\text{ °C}$	max.	1.4	V
		$T_{VJ} = 125\text{ °C}$	max.	1.4
$I_R$	$V_R = 800\text{ V}$ , $T_{VJ} = 25\text{ °C}$	max.	0.25	mA
		$V_R = 640\text{ V}$ , $T_{VJ} = 125\text{ °C}$	max.	2
$V_{T0}$	for power-loss calculations only	max.	1.05	V
$r_T$	$T_{VJ} = 125\text{ °C}$	max.	16	mΩ
$R_{thJH}$		max.	2.0	K/W

## Module

Symbol	Test Conditions	Characteristic Values
$d_s$	Creeping distance on surface	11.2 mm
$d_A$	Creeping distance in air	5.6 mm
<b>a</b>	Max. allowable acceleration	50 m/s <sup>2</sup>
$R_{25}^*$	NTC @ $25\text{ °C}$	470.000 Ω

## Package style and outline

Dimensions in mm (1mm = 0.0394")



\*NTC will be changed in future to 5.000 Ω.