

# STARPOWER

SEMICONDUCTOR™

## Rectifier with Chopper

### RD100PBS160C5S

**Preliminary****Molding Type Module****1600V/100A Rectifier Module**

#### General Description

STARPOWER Rectifier Diode Power Module provides ultra low conduction loss. They are designed for the applications such as inverters.

#### Features

- Planar Passivated Chips
- High Surge Capacity
- Dual Diodes Cascaded Circuit
- Isolated Copper Baseplate Using DBC Technology



#### Typical Applications

- Input Bridge Rectifier For Inverter
- AC/DC Motor Control
- Power Supply

**DIODE-rectifier**  $T_C=25^\circ\text{C}$  unless otherwise noted**Maximum Rated Values**

Symbol	Description	RD100PBS160C5S	Units
$V_{RRM}$	Collector-Emitter Voltage @ $T_j=25^\circ\text{C}$	1600	V
$I_{FRMSM}$	RMS Forward Current Maximum Per Diode @ $T_C=80^\circ\text{C}$	78	A
$I_{RMSM}$	Maximum RMS Current at Rectifier output @ $T_C=100^\circ\text{C}$	110	A
$I_{FSM}$	Surge Forward Current $V_R=0\text{V}$ , $t_p=10\text{ms}$ , $T_j=45^\circ\text{C}$ $T_j=150^\circ\text{C}$	1100 990	A
$I^2t$	$I^2t$ -value, $V_R=0\text{V}$ , $t_p=10\text{ms}$ , $T_j=45^\circ\text{C}$ $T_j=150^\circ\text{C}$	6050 4725	$\text{A}^2\text{s}$

**Characteristics Values**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_F$	Diode Forward Voltage	$I_F=100\text{A}$ , $T_j=25^\circ\text{C}$		1.19		V
$I_R$	Reverse Current	$T_j=150^\circ\text{C}$ , $V_R=1600\text{V}$			2.0	mA

**IGBT-brake-chopper**  $T_C=25^\circ\text{C}$  unless otherwise noted**Maximum Rated Values**

Symbol	Description	RD100PBS160C5S	Units
$V_{CES}$	Collector-Emitter Voltage @ $T_j=25^\circ\text{C}$	1200	V
$V_{GES}$	Gate-Emitter Voltage	$\pm 20$	V
$I_C$	Collector Current @ $T_C=80^\circ\text{C}$	50	A
$I_{CM}$	Pulsed Collector Current $t_p=1\text{ms}$	100	A
$P_{tot}$	Total Power Dissipation @ $T_j=150^\circ\text{C}$	412	W

**Off Characteristics**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	$T_j=25^\circ\text{C}$	1200			V
$I_{CES}$	Collector Cut-Off Current	$V_{CE}=V_{CES}$ , $V_{GE}=0\text{V}$ , $T_j=25^\circ\text{C}$			5.0	mA
$I_{GES}$	Gate-Emitter Leakage Current	$V_{GE}=V_{GES}$ , $V_{CE}=0\text{V}$ , $T_j=25^\circ\text{C}$			400	nA

## On Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=2.0mA, V_{CE}=V_{GE}, T_j=25^\circ C$	5.0	6.3	7.0	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=50A, V_{GE}=15V, T_j=25^\circ C$		1.90	2.35	V
		$I_C=50A, V_{GE}=15V, T_j=125^\circ C$		2.10		
$C_{ies}$	Input Capacitance	$V_{CE}=25V, f=1Mhz, V_{GE}=0V$		4.29		pF
$C_{oes}$	Output Capacitance			0.30		pF
$C_{res}$	Reverse Transfer Capacitance			0.20		pF

## DIODE-brake-chopper $T_C=25^\circ C$ unless otherwise noted

### Maximum Rated Values

Symbol	Description	RD100PBS160C5S	Units
$V_{RRM}$	Collector-Emitter Voltage @ $T_j=25^\circ C$	1200	V
$I_F$	DC Forward Current @ $T_C=80^\circ C$	50	A
$I_{FRM}$	Repetitive Peak Forward Current $t_p=1ms$	100	A

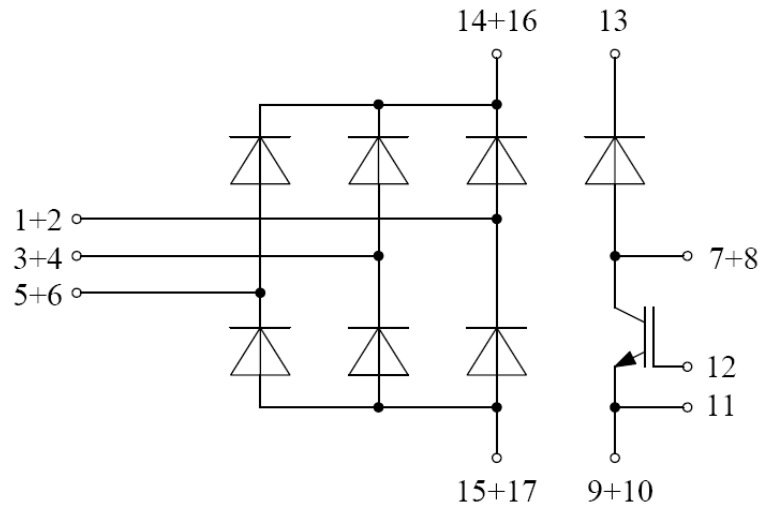
### Characteristics Values

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_F$	Diode Forward Voltage	$I_F=50A, V_{GE}=0V$	$T_j=25^\circ C$	1.82	2.22	V
			$T_j=125^\circ C$		1.95	
$Q_r$	Recovered Charge	$I_F=50A,$	$T_j=25^\circ C$	3.3		$\mu C$
			$T_j=125^\circ C$	6.5		
$I_{RM}$	Peak Reverse Recovery Current	$V_R=600V,$ $di/dt=-830A/\mu s,$	$T_j=25^\circ C$	34		A
			$T_j=125^\circ C$	47		
$E_{rec}$	Reverse Recovery Energy	$V_{GE}=-15V$	$T_j=25^\circ C$	0.76		mJ
			$T_j=125^\circ C$	1.81		

**Module**

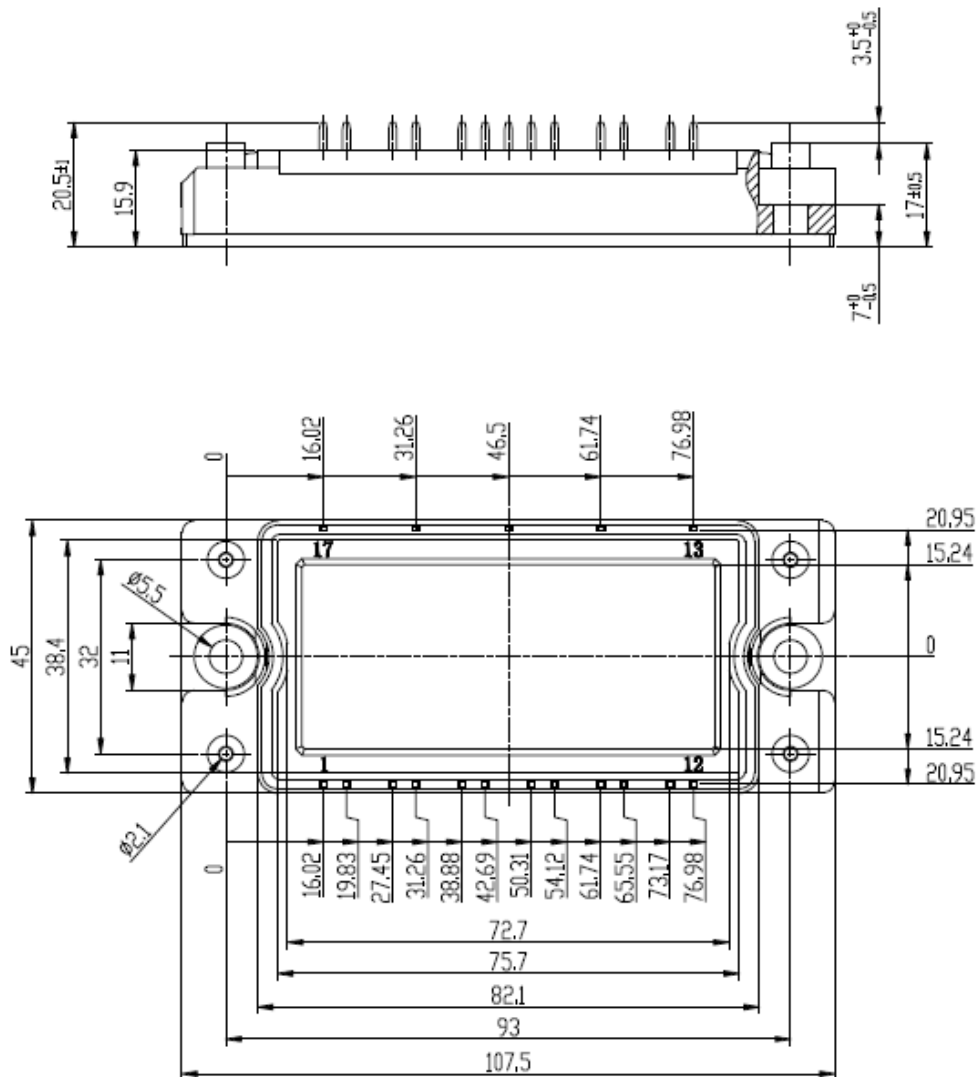
Symbol	Parameter	Min.	Typ.	Max.	Units
V <sub>ISO</sub>	Isolation Voltage RMS,f=50Hz,t=1min	2500			V
R <sub>θJC</sub>	Junction-to-Case (per DIODE-rectifier)			0.469	K/W
	Junction-to-Case (per IGBT-brake-chopper)			0.303	
	Junction-to-Case (per DIODE-brake-chopper)			0.500	
R <sub>θCS</sub>	Case-to-Sink (Conductive grease applied)		0.02		K/W
T <sub>j</sub>	Junction Temperature	-40		150	°C
T <sub>STG</sub>	Storage Temperature Range	-40		125	°C
Mounting Torque	Mounting Screw:M5	3.0		6.0	N.m
G	Weight of Module		200		g

### Equivalent Circuit Schematic



### Package Dimension

Dimensions in Millimeters



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