

STARPOWER

SEMICONDUCTOR

Rectifier Diode

RD150FPJ180K7S

1800V/150A in one-package

General Description

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

Features

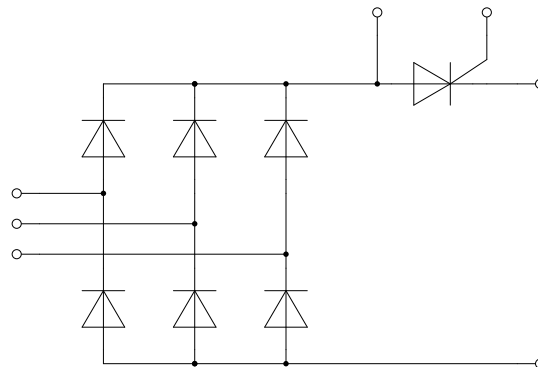
- Low forward voltage drop
- Small temperature coefficient
- High Surge Capacity
- Low inductance
- Isolated Copper Baseplate Using DBC Technology



Typical Applications

- Input bridge rectifier
- AC/DC motor control
- Power supply

Equivalent Circuit Schematic



Absolute Maximum Ratings $T_C=25^{\circ}\text{C}$ unless otherwise noted**Rectifier Diode**

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	1800	V
V_{RSM}	Non-repetitive Peak Reverse Voltage	1900	V
I_F	Forward Current $T_C=95^{\circ}\text{C}$	150	A
I_{FSM}	Surge Forward Current $V_R=0\text{V}, t_p=10\text{ms}, T_j=25^{\circ}\text{C}$	6300	A
	$V_R=0\text{V}, t_p=10\text{ms}, T_j=125^{\circ}\text{C}$	5250	
I^2t	I^2t -value $V_R=0\text{V}, t_p=10\text{ms}, T_j=25^{\circ}\text{C}$	198450	A^2s
	$V_R=0\text{V}, t_p=10\text{ms}, T_j=125^{\circ}\text{C}$	137813	

Thyristor

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	1800	V
V_{RSM}	Non-repetitive Peak Reverse Voltage	1900	V
I_{TAV}	Average On-state Current $T_C=80^{\circ}\text{C}$	150	A
I_{TSM}	Surge Forward Current $V_R=0\text{V}, t_p=10\text{ms}, T_j=25^{\circ}\text{C}$	4935	A
	$V_R=0\text{V}, t_p=10\text{ms}, T_j=125^{\circ}\text{C}$	4200	
I^2t	I^2t -value $V_R=0\text{V}, t_p=10\text{ms}, T_j=25^{\circ}\text{C}$	121771	A^2s
	$V_R=0\text{V}, t_p=10\text{ms}, T_j=125^{\circ}\text{C}$	88200	
$(di/dt)_{cr}$	Critical Rate of Rise of On-state Current $T_j=125^{\circ}\text{C}$	150	$\text{A}/\mu\text{s}$
$(dv/dt)_{cr}$	Critical Rate of Rise of On-State Voltage $T_j=125^{\circ}\text{C}$	1000	$\text{V}/\mu\text{s}$

Module

Symbol	Description	Value	Unit
T_{jmax}	Maximum Junction Temperature	150	$^{\circ}\text{C}$
T_{jop}	Operating Junction Temperature	-40 to +150	$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-40 to +125	$^{\circ}\text{C}$
V_{ISO}	Isolation Voltage RMS, $f=50\text{Hz}, t=1\text{min}$	4000	V

Rectifier Diode $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	$I_F=500\text{A}$	$T_j=25^\circ\text{C}$			1.45	V
			$T_j=135^\circ\text{C}$			1.40	
I_R	Diode Reverse Current	$V_R=V_{RRM}$	$T_j=135^\circ\text{C}$			9.00	mA

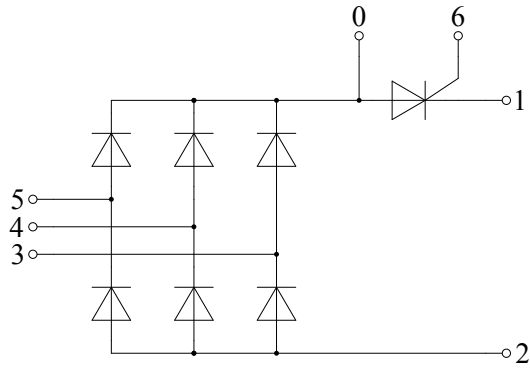
Thyristor Diode $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_T	Forward Voltage	$I_T=500\text{A}$	$T_j=25^\circ\text{C}$			1.75	V
			$T_j=125^\circ\text{C}$			1.75	
I_D	Reverse Current	$V_R=V_{RRM}$	$T_j=25^\circ\text{C}$			0.10	mA
			$T_j=125^\circ\text{C}$			25.0	
V_{GT}	Gate Trigger Current	$V_D=12\text{V}, T_j=25^\circ\text{C}$				2.0	V
I_{GT}	Gate Trigger Voltage	$V_D=12\text{V}, T_j=25^\circ\text{C}$		20		150	mA
V_{GD}	Gate Non-trigger Current	$T_j=125^\circ\text{C}$		0.25			V
I_H	Holding Current	$T_j=25^\circ\text{C}$				250	mA
I_L	Latching Current	$I_G=1.2I_{GT}, T_j=25^\circ\text{C}$				300	mA

Module Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

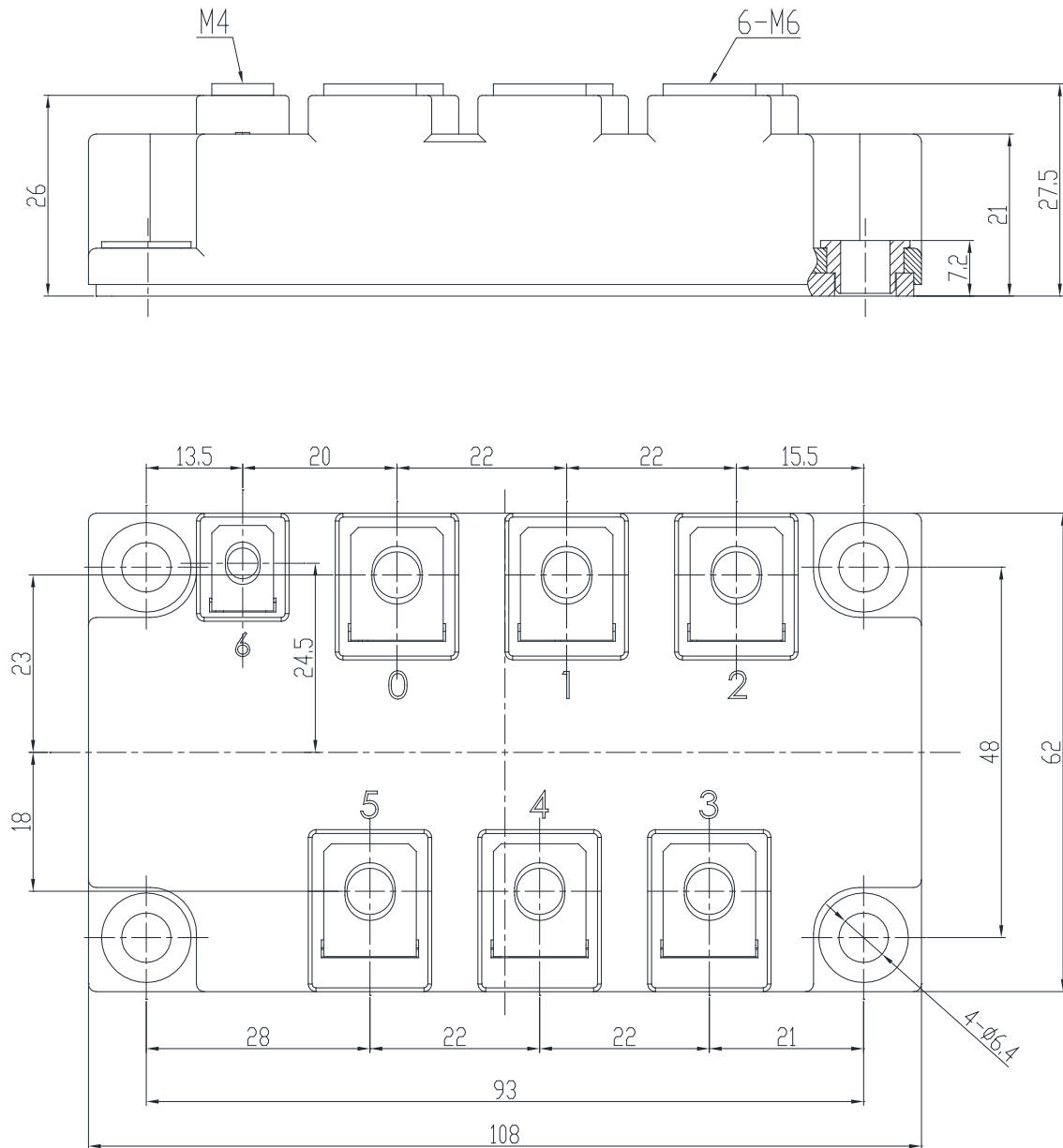
Symbol	Parameter	Min.	Typ.	Max.	Unit
R_{thC}	Junction-to-Case (per Rectifier)			0.338	K/W
	Junction-to-Case (per Thyristor)			0.164	
R_{thCH}	Case-to-Heatsink (per Rectifier)		0.298		K/W
	Case-to-Heatsink (per Thyristor)		0.145		
	Case-to-Heatsink (per Module)		0.037		
M	Terminal Connection Torque, Screw M4		2.0		N.m
	Terminal Connection Torque, Screw M6		5.0		
	Mounting Torque, Screw M6		5.0		
G	Weight of Module		320		g

Circuit Schematic



Package Dimensions

Dimensions in Millimeters



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