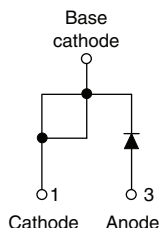


## Schottky Rectifier, 20 A


**TO-220AC**


### FEATURES

- 125 °C  $T_J$  operation ( $V_R < 5$  V)
- Center tap module
- Optimized for OR-ing applications
- Ultra low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Designed and qualified for industrial level

### DESCRIPTION

The Schottky rectifier module has been optimized for ultra low forward voltage drop specifically for the OR-ing of parallel power supplies. The proprietary barrier technology allows for reliable operation up to 125 °C junction temperature. Typical applications are in parallel switching power supplies, converters, reverse battery protection, and redundant power subsystems.

### PRODUCT SUMMARY

$I_{F(AV)}$	20 A
$V_R$	15 V
$I_{RM}$	600 mA at 100 °C

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	20	A
$V_{RRM}$		15	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	700	A
$V_F$	19 Apk, $T_J = 125$ °C (typical)	0.25	V
$T_J$	Range	- 55 to 125	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	STPS20L15D	UNITS
Maximum DC reverse voltage	$V_R$	$T_J = 100$ °C	15	V
Maximum working peak reverse voltage	$V_{RWM}$			

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current See fig. 5	I <sub>F(AV)</sub>	50 % duty cycle, T <sub>C</sub> = 85 °C, rectangular waveform		20	A
Maximum peak one cycle non-repetitive surge current See fig. 7	I <sub>FSM</sub>	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V <sub>RRM</sub> applied	700	A
		10 ms sine or 6 ms rect. pulse		330	
Non-repetitive avalanche energy	E <sub>AS</sub>	T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 2 A, L = 6 mH		10	mJ
Repetitive avalanche current	I <sub>AR</sub>	Current decaying linearly to zero in 1 μs Frequency limited by T <sub>J</sub> maximum V <sub>A</sub> = 1.5 x V <sub>R</sub> typical		2	A

ELECTRICAL SPECIFICATIONS							
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS	
Forward voltage drop See fig. 1	V <sub>FM</sub> <sup>(1)</sup>	19 A	T <sub>J</sub> = 25 °C	-	0.41	V	
		40 A		-	0.52		
		19 A	T <sub>J</sub> = 125 °C	0.25	0.33		
		40 A		0.37	0.50		
Reverse leakage current See fig. 2	I <sub>RM</sub> <sup>(1)</sup>	T <sub>J</sub> = 25 °C	V <sub>R</sub> = Rated V <sub>R</sub>	-	10	mA	
		T <sub>J</sub> = 100 °C		-	600		
Threshold voltage	V <sub>F(TO)</sub>	T <sub>J</sub> = T <sub>J</sub> maximum		0.182		V	
Forward slope resistance	r <sub>t</sub>			7.6		mΩ	
Maximum junction capacitance	C <sub>T</sub>	V <sub>R</sub> = 5 V <sub>DC</sub> (test signal range 100 kHz to 1 MHz) 25 °C		-	2000	pF	
Typical series inductance	L <sub>S</sub>	Measured lead to lead 5 mm from package body		8	-	nH	
Maximum voltage rate of change	dV/dt	Rated V <sub>R</sub>		10 000		V/μs	

**Note**(1) Pulse width < 300  $\mu\text{s}$ , duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction temperature range	T <sub>J</sub>		- 55 to 125	°C
Maximum storage temperature range	T <sub>Stg</sub>		- 55 to 150	
Maximum thermal resistance, junction to case	R <sub>thJC</sub>	DC operation See fig. 4	1.5	°C/W
Typical thermal resistance, case to heatsink	R <sub>thCS</sub>	Mounting surface, smooth and greased (For TO-220)	0.50	
Maximum thermal resistance, junction to ambient	R <sub>thJA</sub>	DC operation (For D <sup>2</sup> PAK)	40	
Approximate weight			2	g
			0.07	oz.
Mounting torque	minimum	Non-lubricated threads	6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style TO-220AC	STPS20L15D	

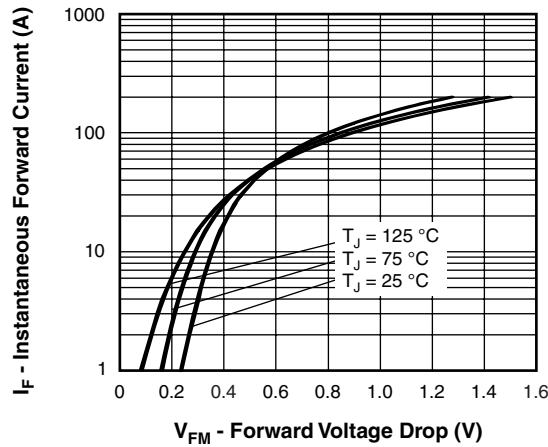


Fig. 1 - Maximum Forward Voltage Drop Characteristics

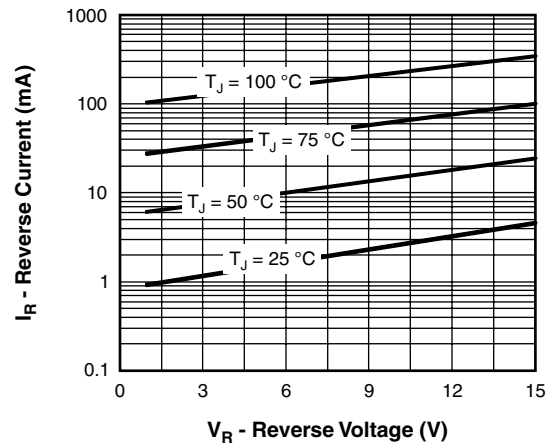


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

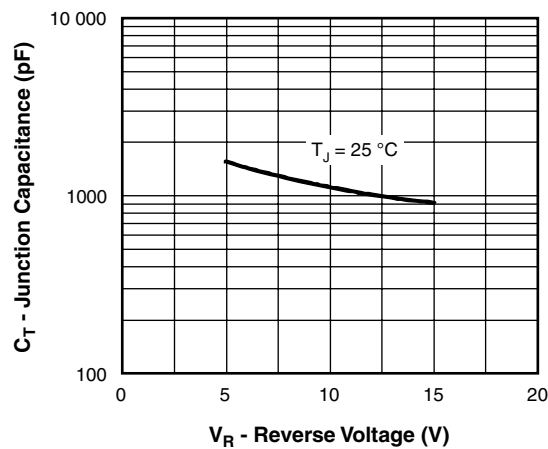
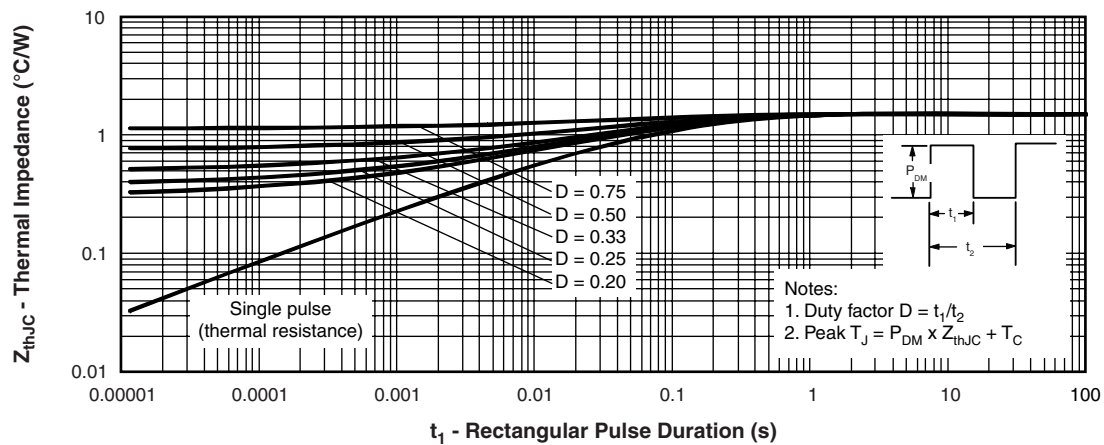


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

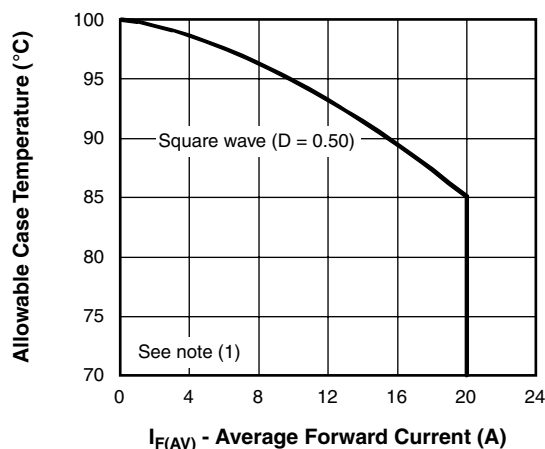


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

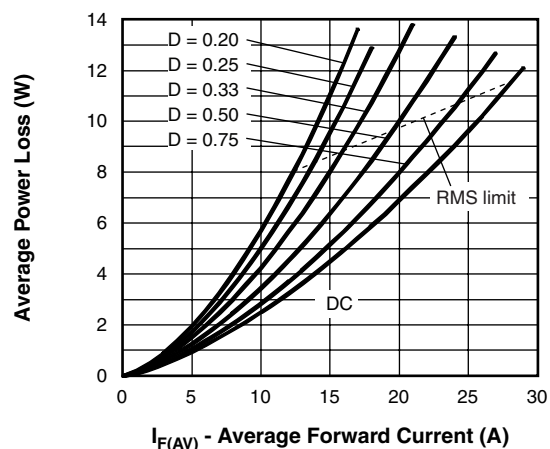


Fig. 6 - Forward Power Loss Characteristics

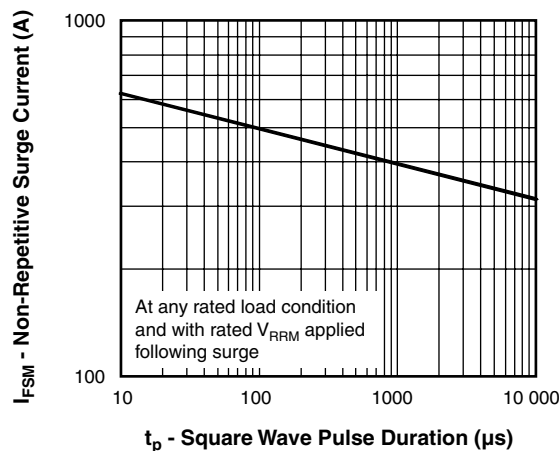


Fig. 7 - Maximum Non-Repetitive Surge Current

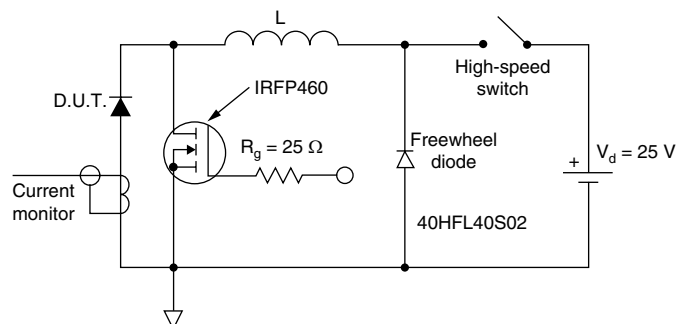


Fig. 8 - Unclamped Inductive Test Circuit

## Note

- (1) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;  
 $P_d$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  
 $P_{d_{REV}}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 80\%$  rated  $V_R$

**ORDERING INFORMATION TABLE**

Device code	STPS	20	L	15	D	-
	1	2	3	4	5	6

- |          |   |  |
|----------|---|--|
| <b>1</b> | - | Schottky STPS series                                   |
| <b>2</b> | - | Current rating (20 = 20 A)                             |
| <b>3</b> | - | L = Low voltage drop                                   |
| <b>4</b> | - | Voltage rating (15 = 15 V)                             |
| <b>5</b> | - | D = TO-220   |
| <b>6</b> | - | • None = Standard production<br>• PbF = Lead (Pb)-free |

Tube standard pack quantity: 50 pieces

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95221">http://www.vishay.com/doc?95221</a>
Part marking information	<a href="http://www.vishay.com/doc?95224">http://www.vishay.com/doc?95224</a>
SPICE model	<a href="http://www.vishay.com/doc?95305">http://www.vishay.com/doc?95305</a>



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