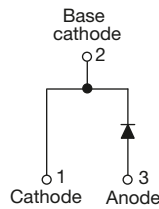


High Performance Schottky Rectifier, 20 A



TO-220AC 2L



FEATURES

- 125 °C T_J operation ($V_R < 5$ V)
- 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 according to JEDEC®-JESD47
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
 COMPLIANT
 HALOGEN
FREE

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	20 A
V_R	15 V
V_F at I_F	See Electrical table
I_{RM} max.	600 mA at 100 °C
T_J max.	125 °C
E_{AS}	10 mJ
Package	2L TO-220AC
Circuit configuration	Single

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.

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 A_{pk} , $T_J = 125$ °C (typical)	0.25	V
T_J	Range	-55 to +125	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-STPS20L15D-M3	UNITS
Maximum DC reverse voltage	V_R	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	$I_{F(AV)}$	50 % duty cycle, $T_C = 85$ °C, rectangular waveform	20	A
Maximum peak one cycle non-repetitive surge current See fig. 7	I_{FSM}	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	700
		10 ms sine or 6 ms rect. pulse		330
Non-repetitive avalanche energy	E_{AS}	$T_J = 25$ °C, $I_{AS} = 2$ A, $L = 6$ mH	10	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical	2	A



ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS
Forward voltage drop See fig. 1	$V_{FM}^{(1)}$	19 A	$T_J = 25\text{ }^\circ\text{C}$	-	0.41	V
		40 A		-	0.52	
		19 A	$T_J = 125\text{ }^\circ\text{C}$	0.25	0.33	
		40 A		0.37	0.50	
Reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	-	10	mA
		$T_J = 100\text{ }^\circ\text{C}$		-	600	
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		0.182		V
Forward slope resistance	r_t			7.6		m Ω
Maximum junction capacitance	C_T	$V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$		-	2000	pF
Typical series inductance	L_S	Measured lead to lead 5 mm from package body		8	-	nH
Maximum voltage rate of change	dV/dt	Rated V_R		10 000		V/ μ s

Note(1) Pulse width < 300 μ s, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction temperature range	T_J		-55 to +125	$^\circ\text{C}$
Maximum storage temperature range	T_{Stg}		-55 to +150	
Maximum thermal resistance, junction to case	R_{thJC}	DC operation See fig. 4	1.5	$^\circ\text{C}/\text{W}$
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased (for TO-220)	0.50	
Maximum thermal resistance, junction to ambient	R_{thJA}	DC operation (for D ² 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 2L TO-220AC	STPS20L15D	

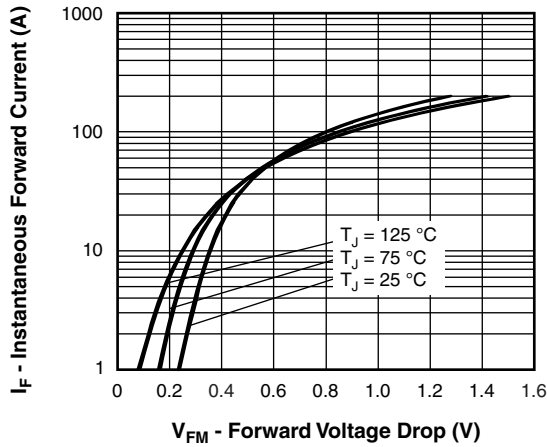


Fig. 1 - Maximum Forward Voltage Drop Characteristics

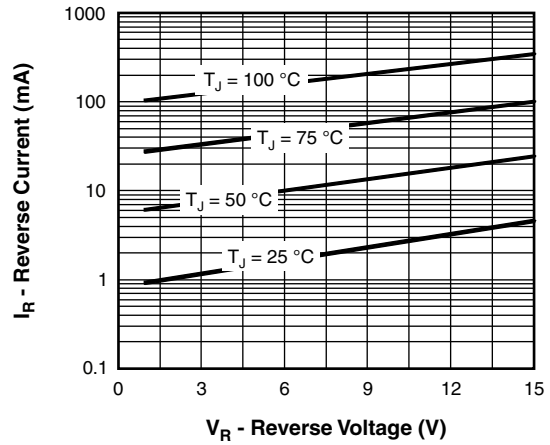


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

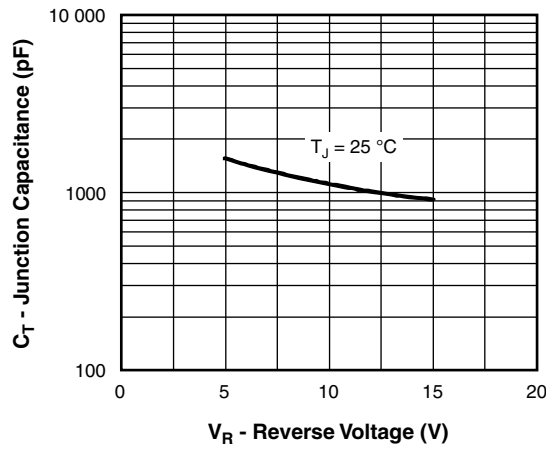


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

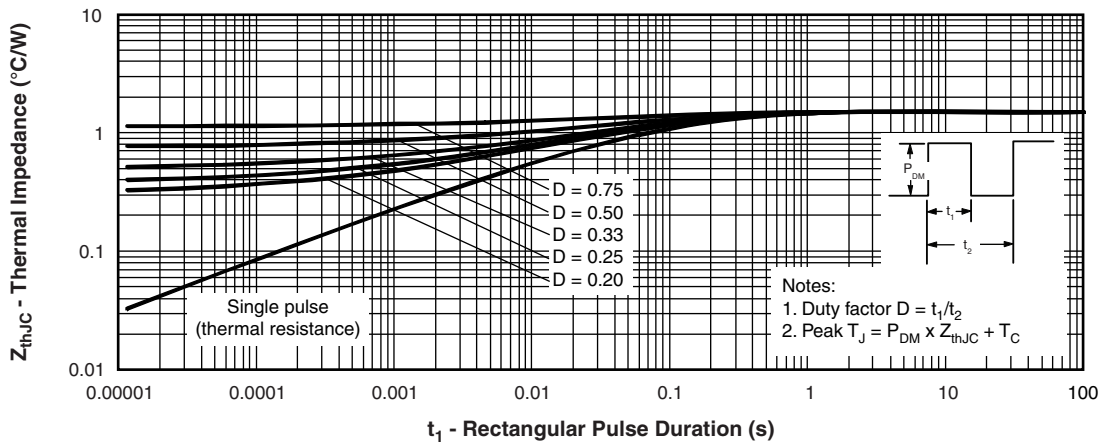


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

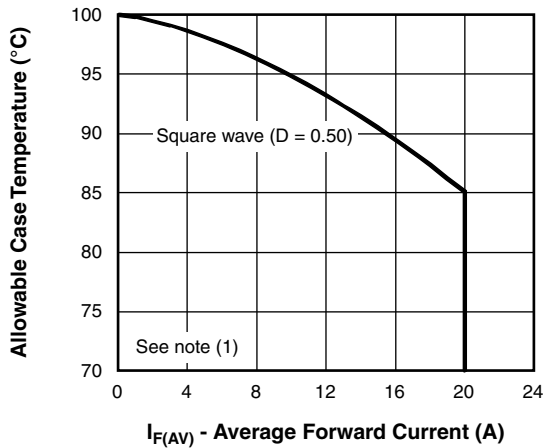


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

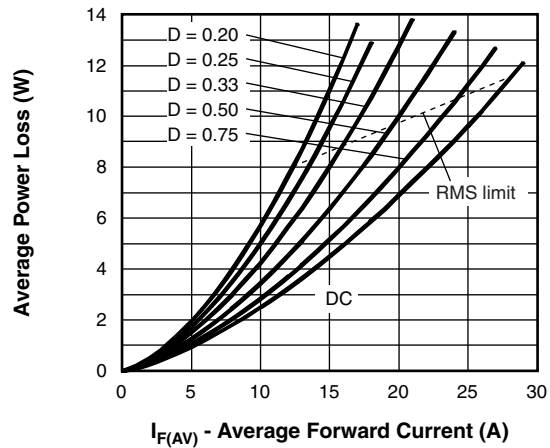


Fig. 6 - Forward Power Loss Characteristics

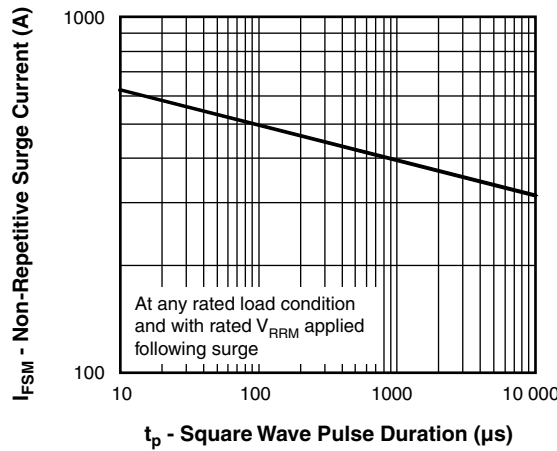


Fig. 7 - Maximum Non-Repetitive Surge Current

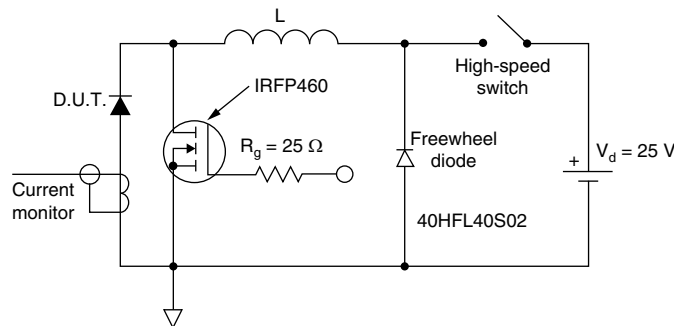


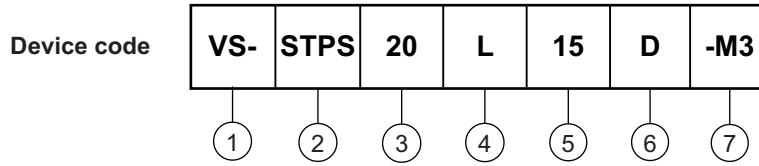
Fig. 8 - Unclamped Inductive Test Circuit

Note

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



ORDERING INFORMATION TABLE



- | |
|---|
| 1 |
|---|

 - Vishay Semiconductors product
 - | |
|---|
| 2 |
|---|

 - Schottky STPS series
 - | |
|---|
| 3 |
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 - Current rating (20 = 20 A)
 - | |
|---|
| 4 |
|---|

 - L = Low voltage drop
 - | |
|---|
| 5 |
|---|

 - Voltage rating (15 = 15 V)
 - | |
|---|
| 6 |
|---|

 - D = Essential part number
 - | |
|---|
| 7 |
|---|

 - Environmental digit
- M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free

ORDERING INFORMATION (Example)		
PREFERRED P/N	BASE QUANTITY	PACKAGING DESCRIPTION
VS-STPS20L15D-M3	50	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96156
Part marking information	www.vishay.com/doc?95391
SPICE model	www.vishay.com/doc?95305

TO-220AC 2L

DIMENSIONS in millimeters and inches



Conforms to JEDEC® outline TO-220AC

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.25	4.65	0.167	0.183	
A1	1.14	1.40	0.045	0.055	
A2	2.50	2.92	0.098	0.115	
b	0.69	1.01	0.027	0.040	
b1	0.38	0.97	0.015	0.038	4
b2	1.20	1.73	0.047	0.068	
b3	1.14	1.73	0.045	0.068	4
c	0.36	0.61	0.014	0.024	
c1	0.36	0.56	0.014	0.022	4
D	14.85	15.35	0.585	0.604	3
D1	8.38	9.02	0.330	0.355	
D2	11.68	13.30	0.460	0.524	6, 7
E	10.11	10.51	0.398	0.414	3, 6
E1	6.86	8.89	0.270	0.350	6
e	2.41	2.67	0.095	0.105	
e1	4.88	5.28	0.192	0.208	
H1	6.09	6.48	0.240	0.255	6
L	13.52	14.02	0.532	0.552	
L1	3.32	3.82	0.131	0.150	2
ΦP	3.54	3.91	0.139	0.154	
Q	2.60	3.00	0.102	0.118	

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension and finish uncontrolled in L1
- (3) Dimension D, D1, and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- (4) Dimension b1, b3, and c1 apply to base metal only
- (5) Controlling dimensions: inches
- (6) Thermal pad contour optional within dimensions E, H1, D2, and E1
- (7) Outline conforms to JEDEC® TO-220, except D2



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