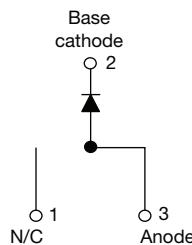


Schottky Rectifier, 20 A


D²PAK


FEATURES

- 125 °C T_J operation ($V_R < 5$ V)
- Center tap module
- Optimized for OR-ing applications
- Ultralow 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
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Halogen-free according to IEC 61249-2-21 definition
- Compliant to RoHS directive 2002/95/EC
- AEC-Q101 qualified



RoHS
COMPLIANT
HALOGEN
FREE

PRODUCT SUMMARY

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

DESCRIPTION

The Schottky rectifier module has been optimized for ultralow 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}	$t_p = 5$ µs 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	VS-STPS20L15GPbF	UNITS
Maximum DC reverse voltage	V_R			
Maximum working peak reverse voltage	V_{RWM}	$T_J = 100$ °C	15	V

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 85$ °C, rectangular waveform	20	
Maximum peak one cycle non-repetitive surge current See fig. 7	I_{FSM}	5 µs sine or 3 µs rect. pulse	700	A
		10 ms sine or 6 ms rect. pulse Following any rated load condition and with rated V_{RRM} applied	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 °C	-	0.41	V	
		40 A		-	0.52		
		19 A	T _J = 125 °C	0.25	0.33		
		40 A		0.37	0.50		
Reverse leakage current See fig. 2	I _{RM} ⁽¹⁾	T _J = 25 °C	V _R = Rated V _R	-	10	mA	
		T _J = 100 °C		-	600		
Threshold voltage	V _{F(TO)}	T _J = T _J maximum		0.182		V	
Forward slope resistance	r _f			7.6		mΩ	
Maximum junction capacitance	C _T	V _R = 5 V _{DC} (test signal range 100 kHz to 1 MHz), 25 °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/μs	

Note

(1) Pulse width < 300 μs, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction temperature range	T _J		- 55 to 125	°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	°C/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	°C/W
Approximate weight			2	g
			0.07	
Mounting torque	minimum	Non-lubricated threads	6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style D ² PAK	STPS20L15G	

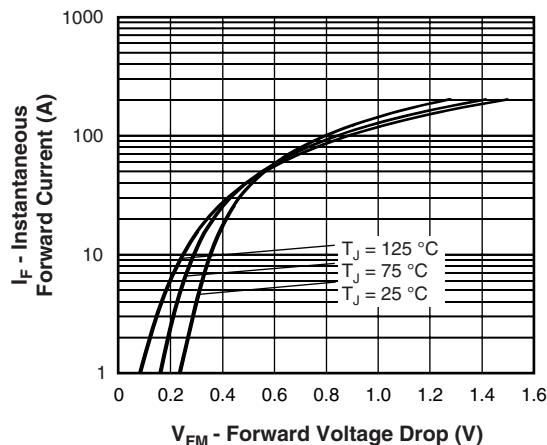


Fig. 1 - Maximum Forward Voltage Drop Characteristics

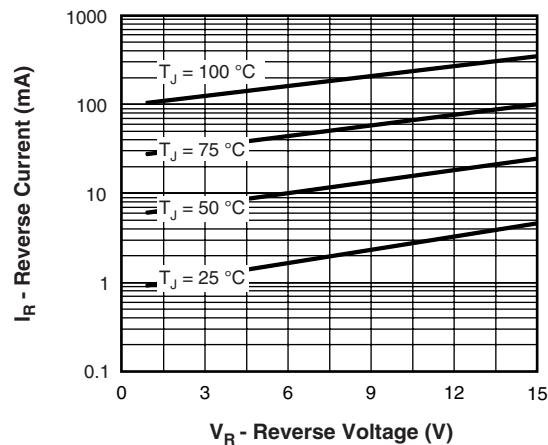


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

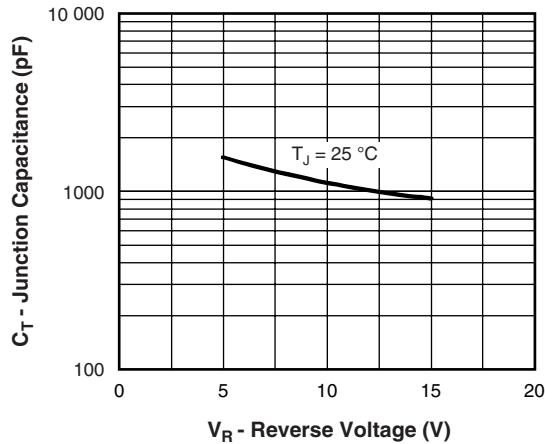


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

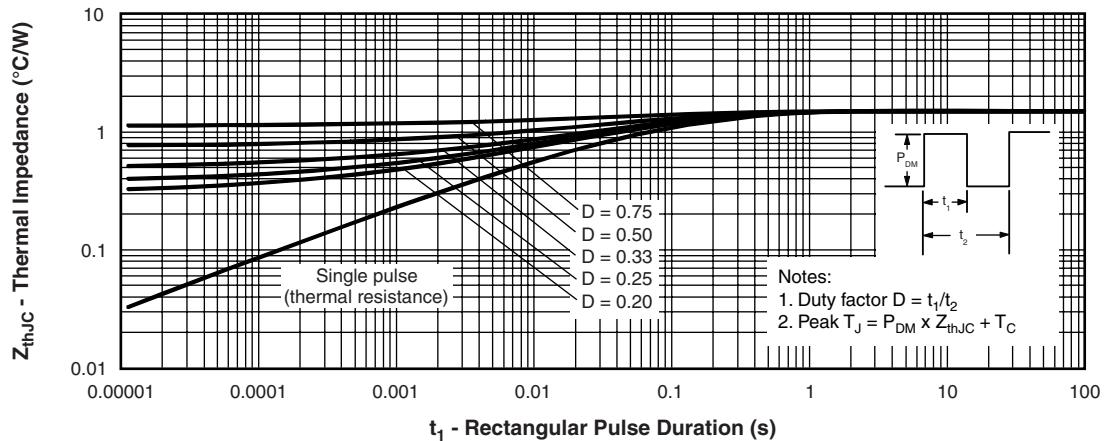


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

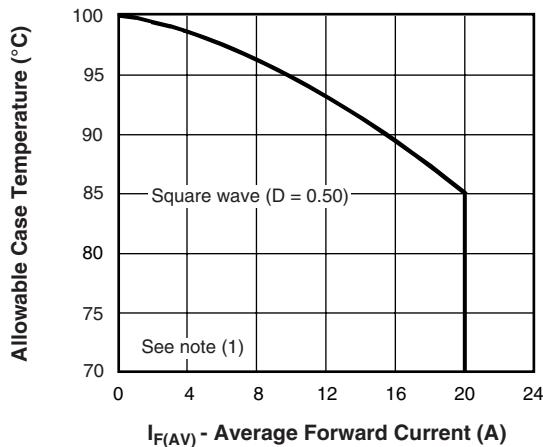


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

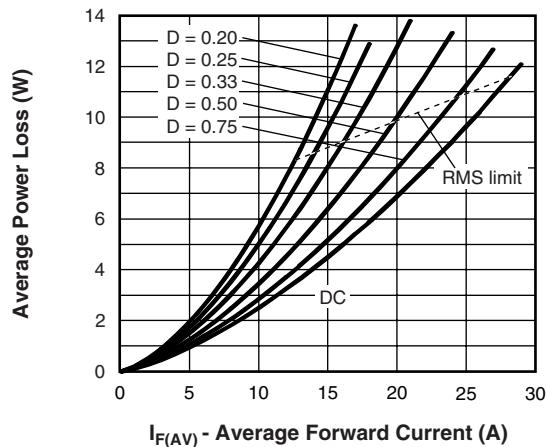


Fig. 6 - Forward Power Loss Characteristics

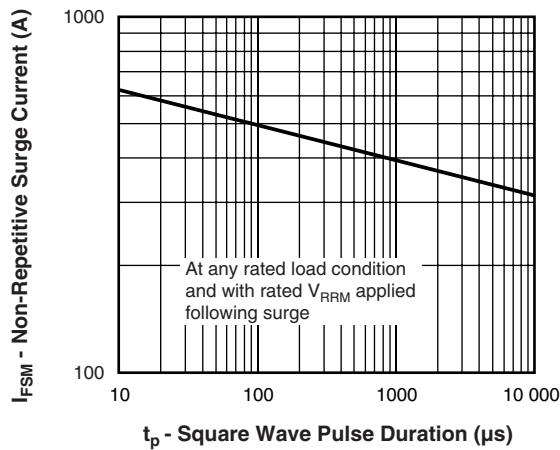


Fig. 7 - Maximum Non-Repetitive Surge Current

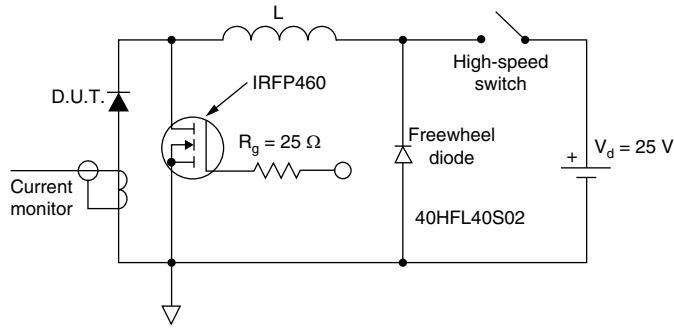


Fig. 8 - Unclamped Inductive Test Circuit

Note

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

ORDERING INFORMATION TABLE

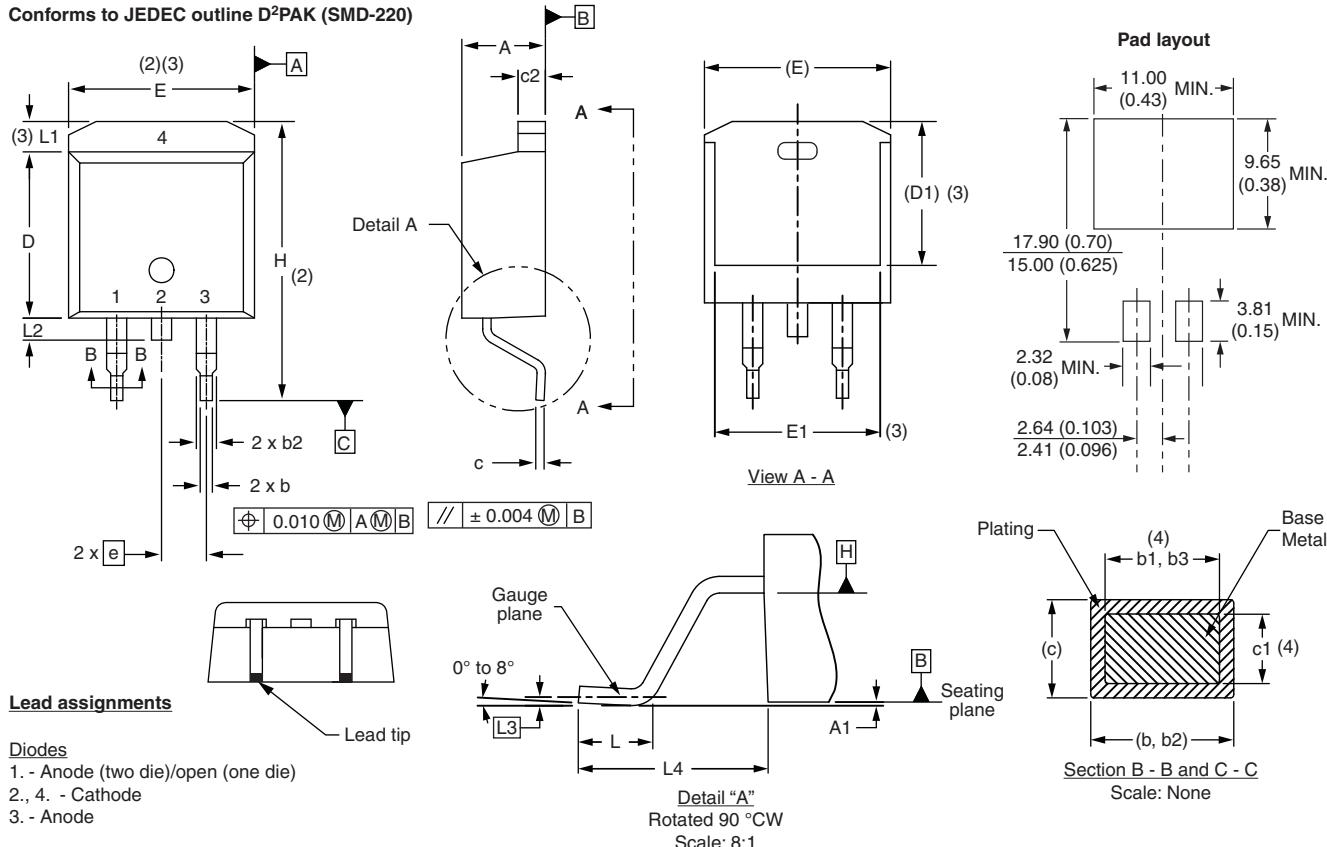
Device code	VS-	STPS	20	L	15	G	TRL	PbF
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 - HPP product suffix								
2 - Essential part number								
3 - Current rating (20 = 20 A)								
4 - Low voltage								
5 - Voltage rating (15 = 15 V)								
6 - G = D ² PAK package								
7 - • None = Tube (50 pieces) • TRL = Tape and reel (left oriented) • TRR = Tape and reel (right oriented)								
8 - • PbF = Lead (Pb)-free (for D ² PAK tube) • P = Lead (Pb)-free (for D ² PAK TRR and TRL)								

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95046
Part marking information	www.vishay.com/doc?95054
Packaging information	www.vishay.com/doc?95032

D²PAK

DIMENSIONS in millimeters and inches

Conforms to JEDEC outline D²PAK (SMD-220)



SYMBOL	MILLIMETERS		INCHES		NOTES		SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.				MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190			D1	6.86	8.00	0.270	0.315	3
A1	0.00	0.254	0.000	0.010			E	9.65	10.67	0.380	0.420	2, 3
b	0.51	0.99	0.020	0.039			E1	7.90	8.80	0.311	0.346	3
b1	0.51	0.89	0.020	0.035	4		e	2.54 BSC		0.100 BSC		
b2	1.14	1.78	0.045	0.070			H	14.61	15.88	0.575	0.625	
b3	1.14	1.73	0.045	0.068	4		L	1.78	2.79	0.070	0.110	
c	0.38	0.74	0.015	0.029			L1	-	1.65	-	0.066	3
c1	0.38	0.58	0.015	0.023	4		L2	1.27	1.78	0.050	0.070	
c2	1.14	1.65	0.045	0.065			L3	0.25 BSC		0.010 BSC		
D	8.51	9.65	0.335	0.380	2		L4	4.78	5.28	0.188	0.208	

Notes

- (1) Dimensioning and tolerancing per ASME Y14.5 M-1994
- (2) Dimension D 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 outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1
- (4) Dimension b1 and c1 apply to base metal only
- (5) Datum A and B to be determined at datum plane H
- (6) Controlling dimension: inch
- (7) Outline conforms to JEDEC outline TO-263AB

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