

High Current Density Surface-Mount Schottky Barrier Rectifier

Ultra Low $V_F = 0.32\text{ V}$ at $I_F = 5\text{ A}$



FlatPAK 5 x 6

1, 2, 3, 4 5, 6, 7, 8

LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	20 A
V_{RRM}	40 V
I_{FSM}	400 A
V_F at $I_F = 20\text{ A}$ ($T_J = 125\text{ °C}$)	0.50 V
T_J max.	150 °C
Package	FlatPAK 5 x 6
Circuit configuration	Single

FEATURES

- Guardring for overvoltage protection
- Low power losses, high efficiency
- Low forward voltage drop
- Enhanced for high surge endurance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
 - Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

TYPICAL APPLICATIONS

For use in low voltage high frequency DC/DC converters, freewheeling diodes, and polarity protection applications.

MECHANICAL DATA

Case: FlatPAK 5 x 6

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free, RoHS-compliant

Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 and HM3 suffix meets JESD 201 class 2 whisker test

MAXIMUM RATINGS ($T_A = 25\text{ °C}$ unless otherwise noted)			
PARAMETER	SYMBOL	SS20K42	UNIT
Device marking code		S2042	
Maximum repetitive peak reverse voltage	V_{RRM}	40	V
Maximum average forward rectified current (fig.1)	$I_{F(AV)}^{(1)}$	20	A
	$I_{F(AV)}^{(2)}$	4.8	
Non-repetitive peak forward surge current 8.3 ms half-sine wave superimposed on rated load 100 μ s square pulse	I_{FSM}	400	A
		1400	
Operating junction temperature range	$T_J^{(3)}$	-40 to +150	°C
Storage temperature range	T_{STG}	-55 to +150	

Notes

- (1) With infinite heatsink
- (2) Free air, mounted on recommended copper pad area, 2 oz., FR4 PCB
- (3) The heat generated must be less than the thermal conductivity from junction-to-ambient: $dP_D/dT_J < 1/R_{\theta JA}$



ELECTRICAL CHARACTERISTICS (T _J = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I _F = 5 A	T _J = 25 °C	V _F ⁽¹⁾	0.43	-	V
	I _F = 10 A			0.48	-	
	I _F = 20 A			0.55	0.61	
	I _F = 5 A	T _J = 125 °C		0.32	-	
	I _F = 10 A			0.39	-	
	I _F = 20 A			0.50	0.55	
Reverse current	V _R = 40 V	T _J = 25 °C	I _R ⁽²⁾	-	0.6	mA
		T _J = 125 °C		19	40	
Typical junction capacitance	4.0 V, 1 MHz		C _J	630	-	pF

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
- (2) Pulse test: pulse width ≤ 5 ms

THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Thermal resistance	R _{θJA} ⁽¹⁾⁽²⁾	75	-	°C/W
	R _{θJM} ⁽³⁾	2.5	3.5	

Notes

- (1) The heat generated must be less than thermal conductivity from junction to ambient: dP_D/dT_J < 1/R_{θJA}
- (2) Free air, mounted on recommended copper pad area; thermal resistance R_{θJA} - junction-to-ambient
- (3) Mounted on infinite heatsink; thermal resistance R_{θJM} - junction-to-mount

ORDERING INFORMATION TABLE

Device code

SS	20	K	4	2	H	M3
①	②	③	④	⑤	⑥	⑦

- 1** - Vishay planar Schottky product
- 2** - Current rating (20 = 20 A)
- 3** - Package type (K = FlatPAK 5 x 6)
- 4** - Voltage rating (4 = 40 V)
- 5** - Planar Schottky generation option (2 = Gen 2)
- 6** - Quality grade (H = AEC-Q101 qualified, otherwise = industry grade)
- 7** - Material / environmental category (M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free)

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SS20K42-M3/H	0.10	H	1500	7" diameter plastic tape and reel
SS20K42-M3/I	0.10	I	6000	13" diameter plastic tape and reel
SS20K42-M3/IE ⁽²⁾	0.10	IE	6000	13" diameter plastic tape and reel
SS20K42HM3/H ⁽¹⁾	0.10	H	1500	7" diameter plastic tape and reel
SS20K42HM3/I ⁽¹⁾	0.10	I	6000	13" diameter plastic tape and reel
SS20K42HM3/IE ⁽¹⁾⁽²⁾	0.10	IE	6000	13" diameter plastic tape and reel

Note

- (1) AEC-Q101 qualified
- (2) Component rotate 90° in cavity

RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)

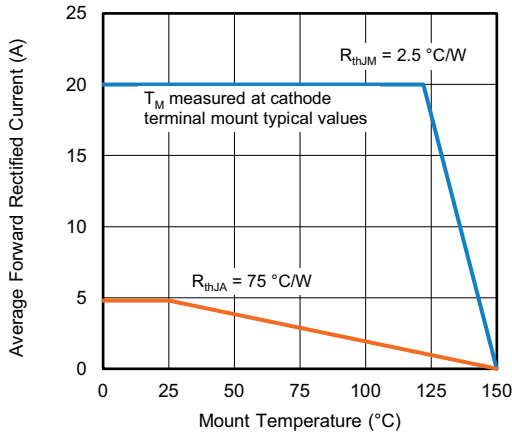


Fig. 1 - Maximum Forward Current Derating Curve

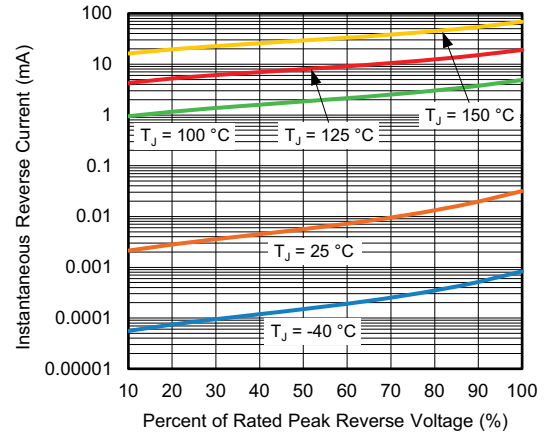


Fig. 4 - Typical Reverse Leakage Characteristics

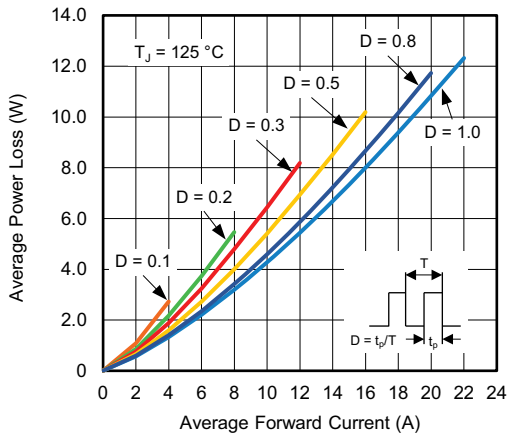


Fig. 2 - Forward Power Loss Characteristics

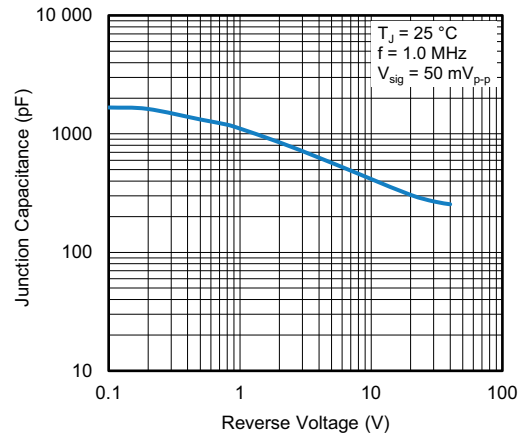


Fig. 5 - Typical Junction Capacitance

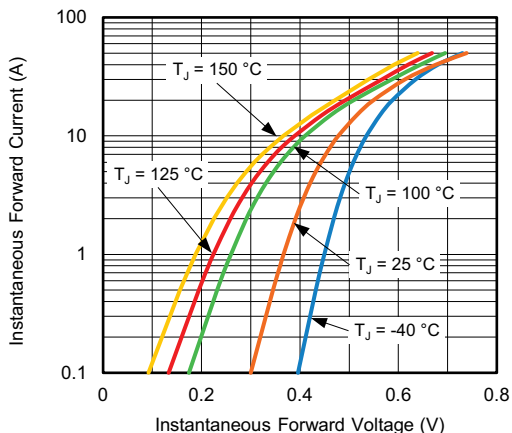


Fig. 3 - Typical Instantaneous Forward Characteristics

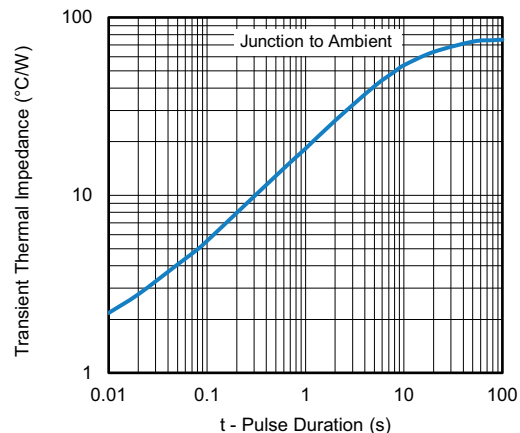
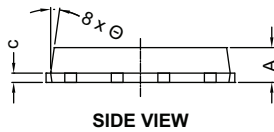
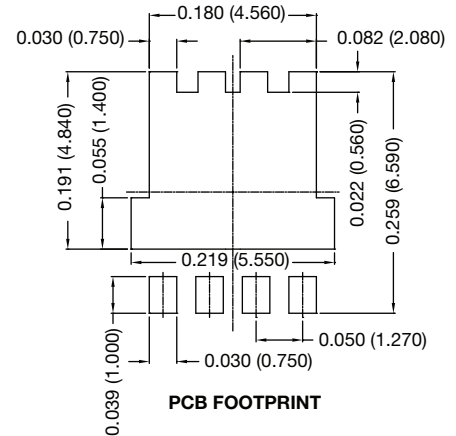
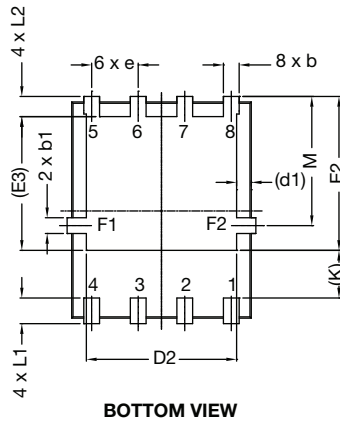
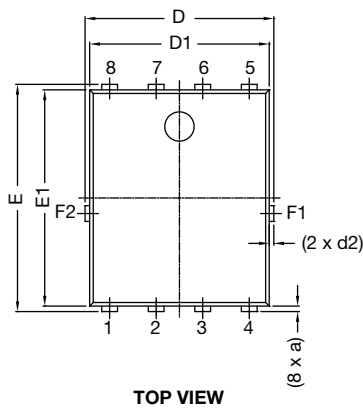


Fig. 6 - Typical Transient Thermal Impedance



DIMENSIONS in inches (millimeters)

FlatPAK 5 x 6



DIM.	INCHES			MILLIMETERS		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.035	0.039	0.043	0.89	0.99	1.09
(a)	-	0.006	-	-	0.15	-
b	0.013	0.017	0.020	0.32	0.43	0.52
b1	0.013	0.017	0.020	0.32	0.43	0.52
c	0.008	-	0.014	0.20	-	0.35
D	0.197	0.203	0.209	5.00	5.15	5.30
D1	0.189	0.193	0.197	4.80	4.90	5.00
D2	0.154	0.161	0.169	3.90	4.10	4.30
(d1)	-	0.016	-	-	0.40	-
(d2)	-	0.005	-	-	0.125	-
E	0.238	0.244	0.250	6.05	6.20	6.35
E1	0.228	0.232	0.236	5.80	5.90	6.00
E2	0.157	0.165	0.173	4.00	4.20	4.40
(E3)	-	0.144	-	-	3.65	-
e	0.050 BSC			1.27 BSC		
(K)	0.039	-	-	1.00	-	-
L1	0.019	-	0.043	0.48	-	1.10
L2	0.012	-	0.031	0.30	-	0.80
M	0.128	0.138	0.148	3.25	3.50	3.75
θ	0°	-	10°	0°	-	10°

Notes

- Dimensioning and tolerancing per ASME Y14.5-2009
- Dimensions D1 and E1 do not include mold flash or gate burrs
- Dimension (XX) means reference only



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