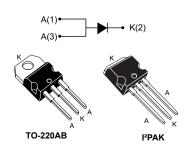




100 V power Schottky rectifier



Features

- · High current capability
- Avalanche rated
- · Low forward voltage drop
- High frequency operation
- ECOPACK[®]2 compliant

Applications

- Switching diode
- SMPS
- DC/DC converter
- LED lighting
- · Desktop power supply

Description

This single Schottky rectifier is suited for high frequency switch mode power supply.

Packaged in TO-220AB and I²PAK, the STPS20SM100S is intended to be used in notebook, game station and desktop adaptors, providing in these applications a good efficiency at both low and high load.

Product status link
STPS20SM100S

Product summary			
I _{F(AV)}	20 A		
V _{RRM}	100 V		
T _j (max.)	150 °C		
V _F (typ.) 0.63 ∨			



1 Characteristics

Table 1. Absolute ratings (limiting values, with terminals 1 and 3 short circuited, at 25 °C, unless otherwise specified)

Symbol	Parameter	Value	Unit	
V _{RRM}	Repetitive peak reverse voltage	100	V	
I _{F(RMS)}	Forward rms current	30	Α	
I _{F(AV)}	Average forward current δ = 0.5, square wave	20	Α	
I _{FSM}	Surge non repetitive forward current $t_p = 10 \text{ ms sinusoidal}$		350	Α
P _{ARM}	Repetitive peak avalanche power	1080	W	
T _{stg}	Storage temperature range	-65 to +150	°C	
Tj	Maximum operating junction temperature (1)	150	°C	

^{1.} $(dP_{tot}/dT_j) < (1/R_{th(j-a)})$ condition to avoid thermal runaway for a diode on its own heatsink.

Table 2. Thermal resistance parameter

Symbol	Parameter	Max. value	Unit
R _{th(j-c)}	Junction to case	1.3	°C/W

For more information, please refer to the following application note:

AN5088: Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics (with terminals 1 and 3 short circuited)

Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
		T _j = 25 °C	V _R = V _{RRM}	-	10	30	μA
I_ (1)	Deverse leekage gurrent	T _j = 125 °C		-	10	30	mA
IR (")	I _R ⁽¹⁾ Reverse leakage current	T _j = 25 °C	\/_ = 70 \/	-	5		μA
		T _j = 125 °C	V _R = 70 V	-	5		mA
		T _j = 25 °C	I _F = 5 A	-	565		
		T _j = 125 °C		-	480		
V _F ⁽²⁾	Forward voltage drap	T _j = 25 °C		-	685		
v _F (=) Forward voit	Forward voltage drop	T _j = 125 °C	I _F = 10 A	-	560	620	mV
		T _j = 25 °C	I _F = 20 A	-	800	900	
		T _j = 125 °C	1F - 20 A	-	630	700	

^{1.} Pulse test: $t_p = 5$ ms, $\delta < 2\%$

To evaluate the conduction losses, use the following equation:

$$P = 0.6 \times I_{F(AV)} + 0.005 \times I_{F}^{2} (RMS)$$

For more information, please refer to the following application notes related to the power losses:

• AN604: Calculation of conduction losses in a power rectifier

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^{2.} Pulse test: $t_p = 380 \ \mu s, \ \delta < 2\%$



AN4021: Calculation of reverse losses on a power diode

1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current (terminals 1 and 3 short circuited)

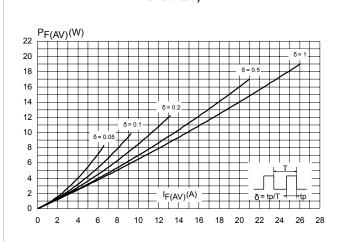


Figure 2. Average forward current versus ambient temperature (δ = 0.5, terminals 1 and 3 short circuited)

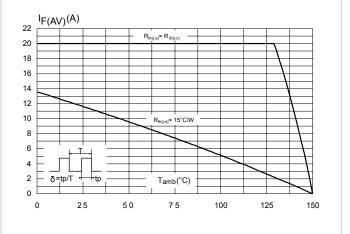


Figure 3. Normalized avalanche power derating versus pulse duration ($T_j = 125 \, ^{\circ}\text{C}$)

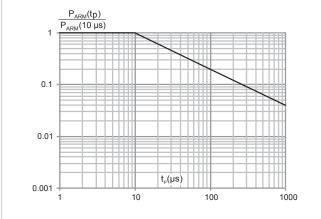
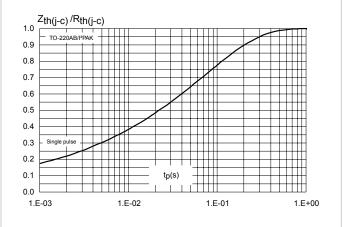


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration



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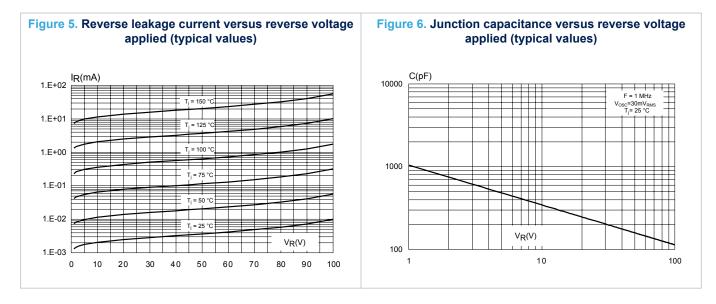
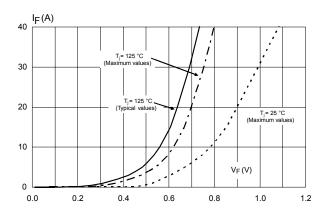


Figure 7. Forward voltage drop versus forward current (terminals 1 and 3 short circuited)



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Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

2.1 TO-220AB package information

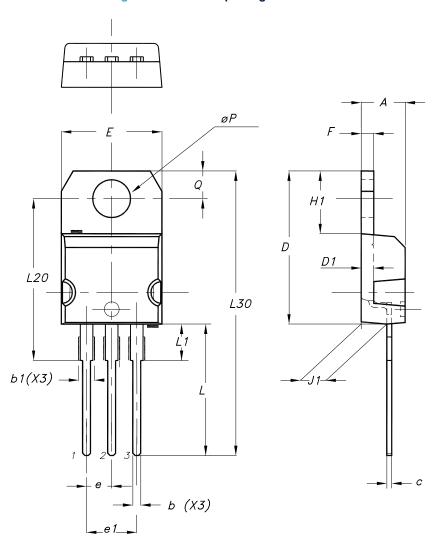
Epoxy meets UL 94,V0

• Cooling method: by conduction (C)

Recommended torque value: 0.55 N·m

Maximum torque value: 0.70 N·m

Figure 8. TO-220AB package outline



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Table 4. TO-220AB package mechanical data

	Dimensions				
Ref.	Millimeters		Inches (for reference only)		
	Min.	Max.	Min.	Max.	
Α	4.40	4.60	0.173	0.181	
b	0.61	0.88	0.240	0.035	
b1	1.14	1.55	0.045	0.061	
С	0.48	0.70	0.019	0.028	
D	15.25	15.75	0.600	0.620	
D1	1.27	' typ.	0.050	typ.	
E	10.00	10.40	0.394	0.409	
е	2.40	2.70	0.094	0.106	
e1	4.95	5.15	0.195	0.203	
F	1.23	1.32	0.048	0.052	
H1	6.20	6.60	0.244	0.260	
J1	2.40	2.72	0.094	0.107	
L	13.00	14.00	0.512	0.551	
L1	3.50	3.93	0.138	0.155	
L20	16.40 typ.		0.646 typ.		
L30	28.90 typ.		1.138	typ.	
θР	3.75	3.85	0.148	0.152	
Q	2.65	2.95	0.104	0.116	

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2.2 I²PAK package information

- Cooling method: by conduction (C)
- Epoxy meets UL 94,V0

Figure 9. I²PAK package outline

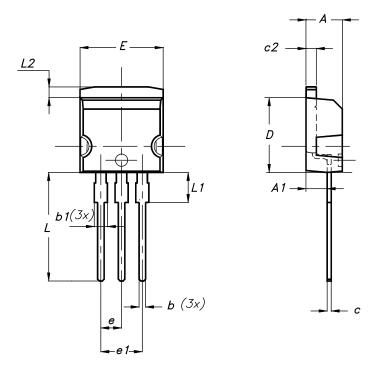


Table 5. I²PAK package mechanical data

	Dimensions				
Ref.	Millimeters		Inches (for reference only)		
	Min.	Max.	Min.	Max.	
Α	4.40	4.60	0.173	0.181	
A1	2.40	2.72	0.094	0.107	
b	0.61	0.88	0.024	0.035	
b1	1.14	1.70	0.044	0.067	
С	0.49	0.70	0.019	0.028	
c2	1.23	1.32	0.048	0.052	
D	8.95	9.35	0.352	0.368	
е	2.40	2.70	0.094	0.106	
e1	4.95	5.15	0.195	0.203	
E	10.00	10.40	0.394	0.409	
L	13.00	14.00	0.512	0.551	
L1	3.50	3.93	0.138	0.155	
L2	1.27	1.40	0.050	0.055	

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3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS20SM100ST	PS20SM100ST	TO-220AB	1.95 g	50	Tube
STPS20SM100SR	PS20SM100SR	I ² PAK	1.50 g	50	Tube

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Revision history

Table 7. Document revision history

Date	Revision	Changes
25-Mar-2009	1	First issue.
16-Apr-2010	2	Updated package graphic for TO-220AB on front page and in <i>Table 5</i> .
11-May-2017	3	Removed TO-220FPAB and D²PAK packages.
17-Oct-2018	4	Updated cover page and Table 1. Absolute ratings (limiting values, with terminals 1 and 3 short circuited, at 25 °C, unless otherwise specified). Removed figure 1 and figure 9. Minor text changes to improve readability.

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