imall

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from, Europe, America and south Asia, supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts, Customers Priority, Honest Operation, and Considerate Service", our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip, ALPS, ROHM, Xilinx, Pulse, ON, Everlight and Freescale. Main products comprise IC, Modules, Potentiometer, IC Socket, Relay, Connector. Our parts cover such applications as commercial, industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832 Email & Skype: info@chipsmall.com Web: www.chipsmall.com Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





STPS30SM100S

Power Schottky rectifier

Features

- High current capability
- Avalanche rated
- Low forward voltage drop current
- High frequency operation
- Insulated package:
 - Insulation voltage 2000 V rms
 - Package capacitance = 12 pF

Description

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

Packaged in TO-220AB, TO-220AB narrow leads, TO-220FPAB, D²PAK and I²PAK, this device 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.





a. $\,V_{ARM}\,\text{and}\,I_{ARM}\,\text{must}$ respect the reverse safe operating area defined in Figure 13. V_{AB} and I_{AB} are pulse measurements (t_p < 1 μ s). V_R, I_R, V_{RRM} and V_F, are static characteristics



I _{F(AV)}	30 A
V _{RRM}	100 V
T _j (max)	150 °C
V _F (typ)	0.420 V

September 2011

Doc ID 15517 Rev 4

1 Characteristics

Table 2.	Absolute ratings	(limiting values	with terminals 1	and 3 short circuited)	

Symbol	Parameter Val				
V _{RRM}	Repetitive peak reverse voltage		100	V	
I _{F(RMS)}	Forward current rms		60	Α	
$I_{F(AV)}$ Average forward current $\delta = 0.5$		TO-220AB, TO-220AB narrow leads, D ² PAK, I ² PAK, T _c = 125 °C	30	А	
		TO-220FPAB, T _c = 80 °C			
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms sinusoidal, terminals 1 and 3 short circuited	530	А	
P _{ARM} ⁽¹⁾	Repetitive peak avalanche power	$t_p = 1 \ \mu s \ T_j = 25 \ ^\circ C$	21500	W	
V _{ARM} ⁽²⁾	Maximum repetitive peak avalanche voltage	t _p < 1 μs T _j < 150 °C I _{AR} < 53.8 A	120	V	
V _{ASM} ⁽²⁾	Maximum single pulse peak avalanche voltage	t _p < 1 μs T _j < 150 °C I _{AR} < 53.8 A	120	V	
T _{stg}	Storage temperature range -65 to			°C	
Тj	Maximum operating junction tempera	ture ⁽³⁾	150	°C	

1. For temperature or pulse time duration deratings, refer to *Figure 4*. and *Figure 5*.. More details regarding the avalanche energy measurements and diode validation in the avalanche are provided in the application notes AN1768 and AN2025.

2. Refer to *Figure 13.*

3. $\frac{dPtot}{dT_j} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3.Thermal resistance

Symbol		Parameter	Value	Unit
R _{th(i-c)}	Junction to case	TO-220AB, TO-220AB narrow leads, D ² PAK, I ² PAK	1	°C/W
		TO-220FPAB	4	

Table 4. Static electrical characteristics (terminals 1 and 3 short circuited)

Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
I_(1)	Bovorso loakago current	T _j = 25 °C	VV			45	μA
'R`´	Reverse leakage current	T _j = 125 °C	VR = VRRM		15	45	mA
	$\begin{array}{c} T_{j} = 25 \text{ °C} \\ T_{j} = 125 \text{ °C} \end{array} \qquad I_{F} = 5 \text{ A} \end{array}$	1 - 5 4		500			
		T _j = 125 °C	$I_F = 5 A$		420		
V ⁽²⁾	Forward valtage drep	T _j = 25 °C	I _F = 10A		600	670	m\/
VF` /	VF ⁽⁻⁾ Forward Voltage drop	T _j = 125 °C			505	560	IIIV
		T _j = 25 °C			780	870	
	T _j = 125 °C	F = 30 A		630	690		

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

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

To evaluate the conduction losses use the following equation: P = 0.580 x $I_{F(AV)}$ + 0.0033 x ${I_{F}}^{2}_{(RMS)}$





Figure 2. Average forward power dissipation Figure 3. versus average forward current





Figure 4. Normalized avalanche power derating versus pulse duration

Figure 5. Normalized avalanche power derating versus junction temperature



Figure 6. Non repetitive surge peak forward Figure 7. current versus overload duration, maximum values

Non repetitive surge peak forward current versus overload duration, maximum values (TO-220FPAB)





Figure 8. Relative variation of thermal impedance junction to case versus pulse duration





Figure 10. Reverse leakage current versus reverse voltage applied (typical values)



Figure 12. Forward voltage drop versus forward current (terminals 1 and 3 short circuited)





Figure 13. Reverse safe operating area $(t_p < 1 \ \mu s \ and \ T_j < 150 \ ^\circ C)$





57

2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.4 to 0.6 N·m

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: <u>www.st.com</u>. ECOPACK[®] is an ST trademark.

Table 5. TO-220AB dimensions

		Dimensions				
		Ref.	Millim	neters	Inches	
			Min.	Max.	Min.	Max.
		А	4.40	4.60	0.173	0.181
10	•	С	1.23	1.32	0.048	0.051
		D	2.40	2.72	0.094	0.107
		Е	0.49	0.70	0.019	0.027
L5	L7	F	0.61	0.88	0.024	0.034
L6	+	F1	1.14	1.70	0.044	0.066
L2		F2	1.14	1.70	0.044	0.066
F2	D →	G	4.95	5.15	0.194	0.202
		G1	2.40	2.70	0.094	0.106
L4		H2	10	10.40	0.393	0.409
F		L2	16.4	typ.	0.64	5 typ.
G1	M ↔ E	L4	13	14	0.511	0.551
	→□	L5	2.65	2.95	0.104	0.116
G		L6	15.25	15.75	0.600	0.620
		L7	6.20	6.60	0.244	0.259
		L9	3.50	3.93	0.137	0.154
		М	2.6	typ.	0.102	2 typ.
		Diam.	3.75	3.85	0.147	0.151

					Dimer	nsions		
		Ref.	М	illimete	rs		Inches	
			Min.	Тур.	Max.	Min.	Тур.	Max.
		А	4.40		4.60	0.17		0.18
- D	- - -A	b	0.61		0.88	0.024		0.034
E E	F	b1	0.95		1.20	0.037		0.047
		С	0.48		0.70	0.019		0.027
		D	15.25		15.75	0.60		0.62
		D1		1.27			0.05	
		Ш	10.00		10.40	0.39		0.41
		е	2.40		2.70	0.094		0.106
t [] [] ti		e1	4.95		5.15	0.19		0.20
	_ ∠J1- 4	F	1.23		1.32	0.048		0.052
		H1	6.20		6.60	0.24		0.26
	- -	J1	2.40		2.72	0.095		0.107
	C C	L	13.00		14.00	0.51		0.55
		L1	2.60		2.90	0.102		0.114
		L20		15.40			0.61	
		L30		28.90			1.14	
		ØP	3.75		3.85	0.147		0.151
		Q	2.65		2.95	0.104		0.116

 Table 6.
 TO-220AB narrow leads dimensions



			Dimer	sions	
	Ref.	Millin	neters	Inc	hes
		Min.	Max.	Min.	Max.
	А	4.4	4.6	0.173	0.181
	В	2.5	2.7	0.098	0.106
	D	2.5	2.75	0.098	0.108
	E	0.45	0.70	0.018	0.027
Dia	F	0.75	1	0.030	0.039
	F1	1.15	1.70	0.045	0.067
L2 L7	F2	1.15	1.70	0.045	0.067
	G	4.95	5.20	0.195	0.205
	G1	2.4	2.7	0.094	0.106
	Н	10	10.4	0.393	0.409
\downarrow \downarrow $F2$	L2	16	Тур.	0.63 Тур.	
	L3	28.6	30.6	1.126	1.205
	L4	9.8	10.6	0.386	0.417
' € G	L5	2.9	3.6	0.114	0.142
	L6	15.9	16.4	0.626	0.646
	L7	9.00	9.30	0.354	0.366
	Dia.	3.00	3.20	0.118	0.126

Table 7. TO-220FPAB dimensions



Devices in I²PAK with nickel-plated back frame must NOT be mounted by frame soldering like SMDs. Such devices are intended to be through-hole mounted ONLY and in no circumstances shall ST be held liable for any lack of performance or damage arising out of soldering of nickel-plated back frames.



Table 8.I²PAK dimensions



				Dimer	nsions	
		Ref.	Millim	neters	Inches	
			Min.	Max.	Min.	Max.
		А	4.40	4.60	0.173	0.181
		A1	2.49	2.69	0.098	0.106
		A2	0.03	0.23	0.001	0.009
	В	0.70	0.93	0.027	0.037	
		B2	1.14	1.70	0.045	0.067
		С	0.45	0.60	0.017	0.024
↓ [↑] ¥ ∦		C2	1.23	1.36	0.048	0.054
$\rightarrow \qquad B^2$		D	8.95	9.35	0.352	0.368
G		E	10.00	10.40	0.393	0.409
		G	4.88	5.28	0.192	0.208
		L	15.00	15.85	0.590	0.624
	M↓ ★↓ V2	L2	1.27	1.40	0.050	0.055
	* ELAT ZONE NO LESS THAN 2mm	L3	1.40	1.75	0.055	0.069
	TEAT ZONE NO LEGO THAN ZIIIII	М	2.40	3.20	0.094	0.126
		R	0.40	typ.	0.016	6 typ.
		V2	0°	8°	0°	8°

Table 9	² ΡΔκ	dimensions
Table 9.		aimensions

Figure 14. D²PAK footprint (dimensions in mm)



3 Ordering information

Table 10.Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS30SM100ST	PS30SM100ST	TO-220AB	2.2 g	50	Tube
STPS30SM100SFP	PS30SM100SFP	TO-220FPAB	1.70 g	50	Tube
STPS30SM100SR	PS30SM100SR	I ² PAK	1.49 g	50	Tube
STPS30SM100SG-TR	PS30SM100SG	D ² PAK	1.48 g	1000	Tape and reel
STPS30SM100STN	PS30SM100STN	TO-220AB narrow leads	1.9 g	50	Tube

4 Revision history

Table 11. 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> .
28-Jan-2011	3	Added warning paragraph above Table 8.
15-Sep-2011	4	Added TO-220AB narrow leads package.



Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY TWO AUTHORIZED ST REPRESENTATIVES, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2011 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan -Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com



Doc ID 15517 Rev 4