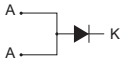
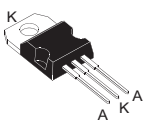
STPS30M100S

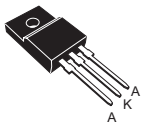
Datasheet

100 V power Schottky rectifier





TO-220AB



TO-220FPAB

Features

- Low forward voltage drop
- Good trade-off between leakage current and forward voltage drop
- High frequency operation
- Avalanche capability specified
- ECOPACK®2 compliant

Applications

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

Description

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

Housed in TO-220AB and TO-220FPAB packages the STPS30M100S is optimized for use in notebook and game station adapters, providing in these applications a good efficiency at both low and high load.

Product status link	
STPS30M100S	
Product summary	
Symbol	**Value**
$I_{F(AV)}$	30 A
V_{RRM}	100 V
T_j (max.)	150 °C
V_F (typ.)	0.605 V

1 Characteristics

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

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		100	V
$I_{F(RMS)}$	Forward rms current		60	A
$I_{F(AV)}$	Average forward current		30	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	300	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs , T_j = 125 °C	1900	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	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 parameters

Symbol	Parameter		Max. value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB	1	°C/W
		TO-220FPAB	4	

Table 3. Static electrical characteristics (anode terminals short circuited)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		175	µA
		T_j = 125 °C		-	20	50	mA
		T_j = 25 °C	V_R = 70 V	-		60	µA
		T_j = 125 °C		-	10	20	mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 5 A	-	0.475		V
		T_j = 125 °C		-	0.385		
		T_j = 25 °C	I_F = 10 A	-	0.555		
		T_j = 125 °C		-	0.475		
		T_j = 25 °C	I_F = 15 A	-	0.620	0.660	
		T_j = 125 °C		-	0.525	0.565	
		T_j = 25 °C	I_F = 30 A	-	0.740	0.800	
		T_j = 125 °C		-	0.605	0.655	

1. *Pulse test: t_p = 5 ms, δ < 2%*
2. *Pulse test: t_p = 380 µs, δ < 2%*

To evaluate the conduction losses, use the following equation:

$P = 0.475 \times I_{F(AV)} + 0.006 \times I_F{}^2{}_{(RMS)}$

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

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

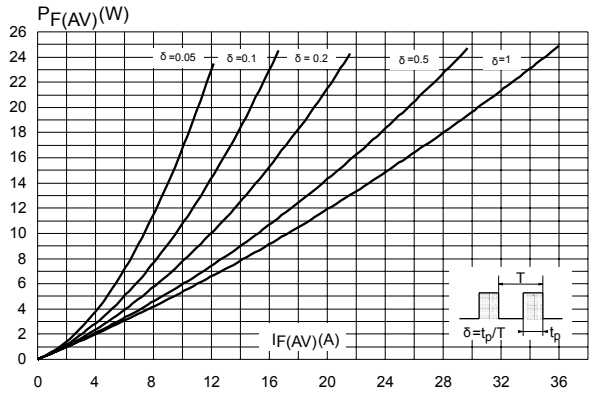


Figure 2. Average forward current versus ambient temperature (δ = 0.5, TO-220AB)

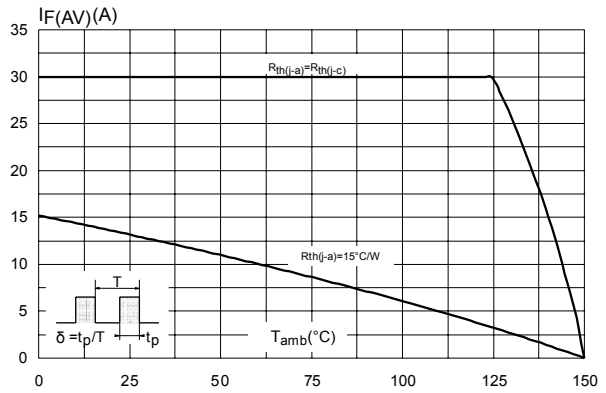


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

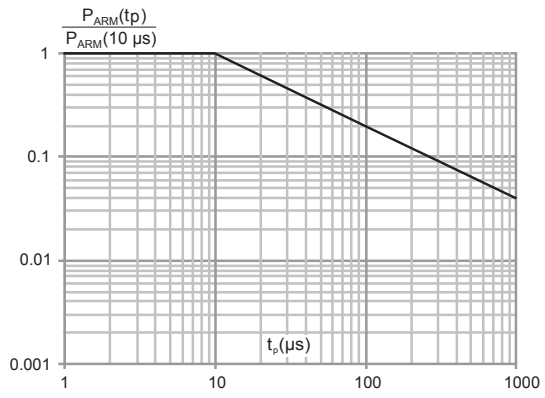


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB)

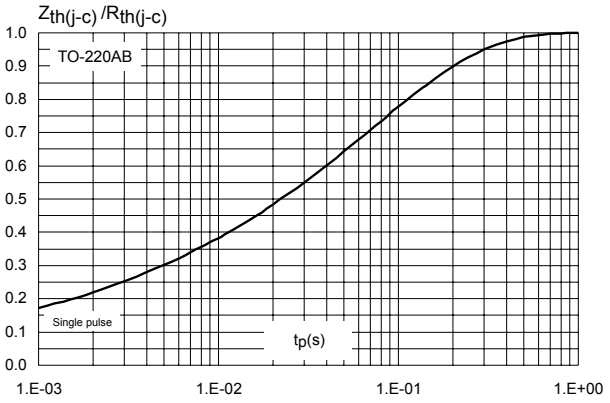


Figure 5. Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB)

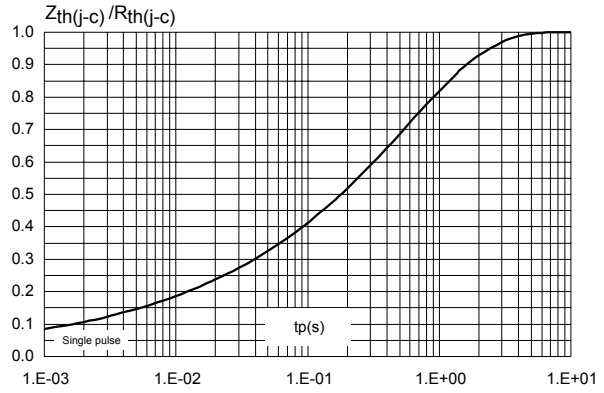


Figure 6. Reverse leakage current versus reverse voltage applied (typical values)

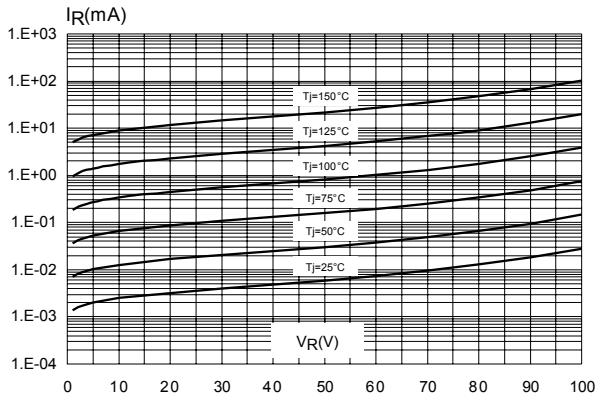


Figure 7. Junction capacitance versus reverse voltage applied (typical values)

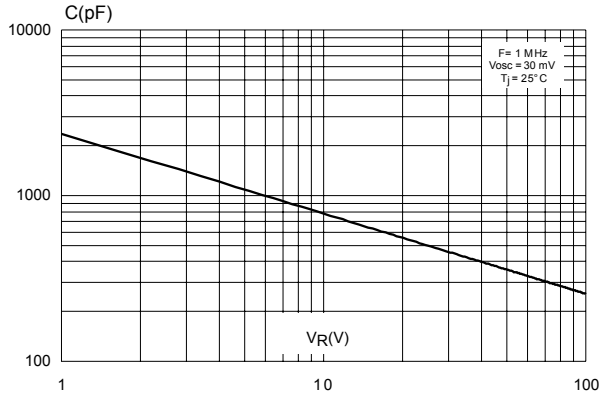


Figure 8. Forward voltage drop versus forward current (high level)

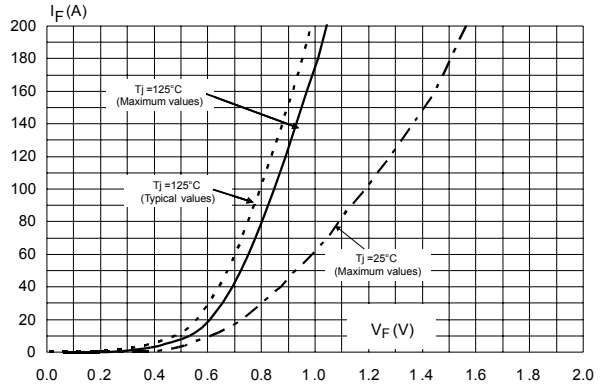
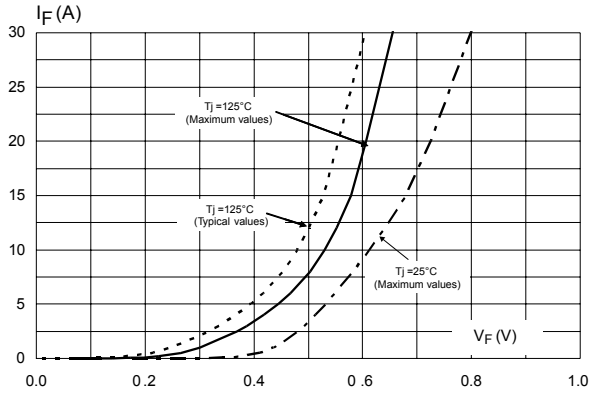


Figure 9. Forward voltage drop versus forward current (low level)



2 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 10. TO-220AB package outline

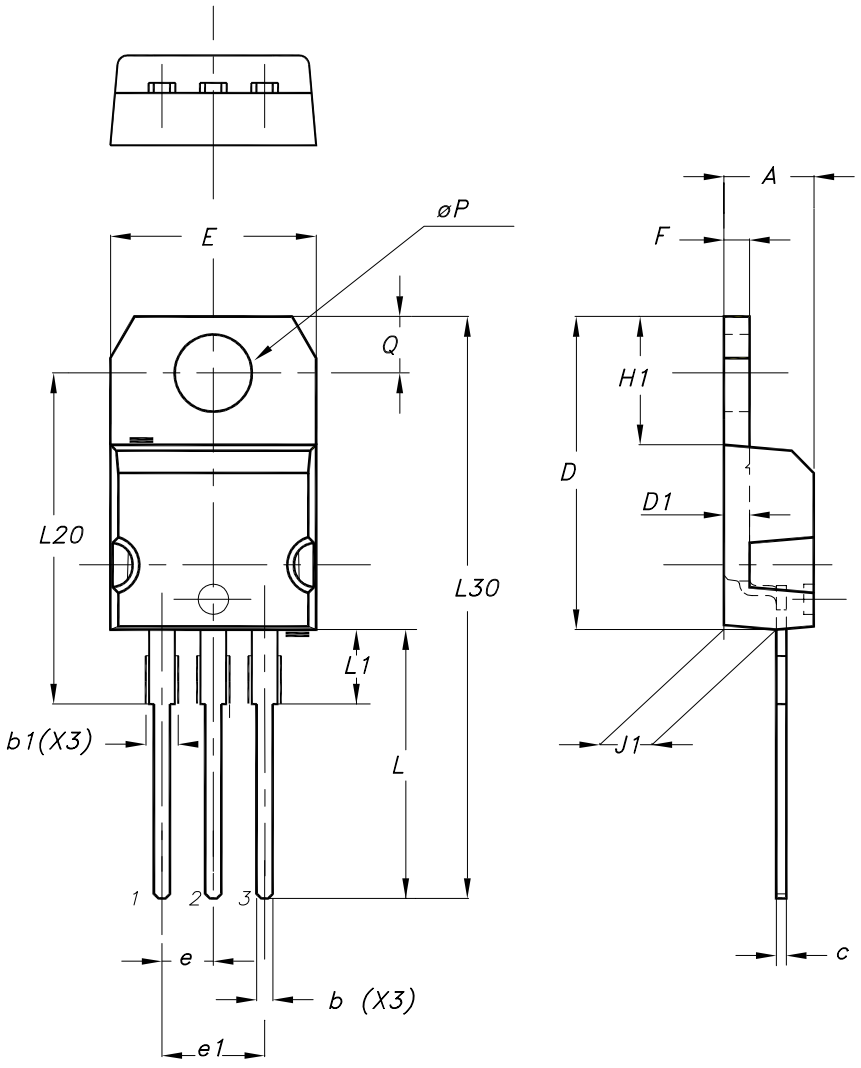


Table 4. TO-220AB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A	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
c	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
e	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.	
θP	3.75	3.85	0.148	0.152
Q	2.65	2.95	0.104	0.116

2.2 TO-220FPAB package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N·m
- Maximum torque value: 0.70 N·m

Figure 11. TO-220FPAB package outline

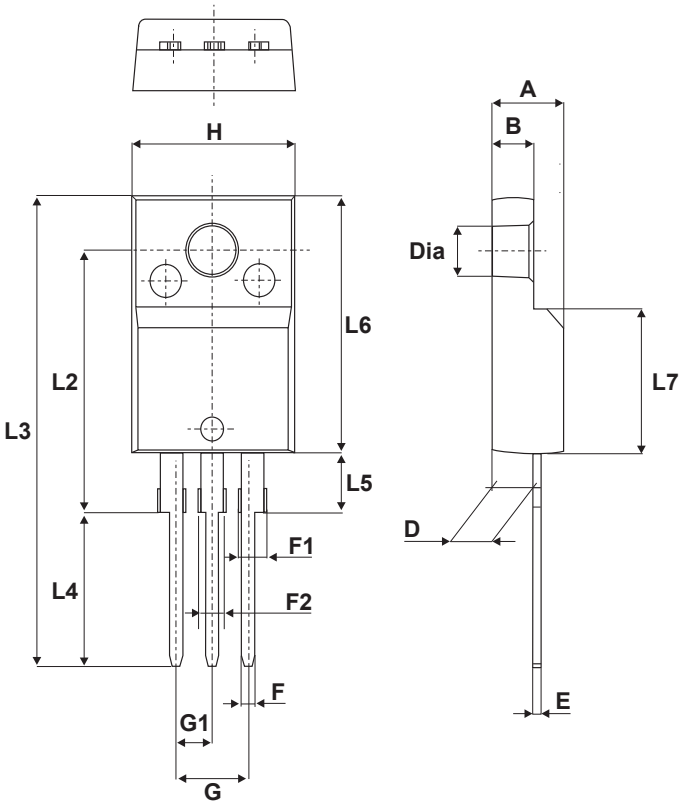


Table 5. TO-220FPAB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
B	2.50	2.70	0.098	0.106
D	2.50	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1.00	0.03	0.039

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
F1	1.15	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.40	2.70	0.094	0.106
H	10.00	10.40	0.393	0.409
L2	16.00 typ.		0.63 typ.	
L3	28.60	30.60	1.126	1.205
L4	9.80	10.60	0.386	0.417
L5	2.90	3.60	0.114	0.142
L6	15.90	16.40	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia	3.00	3.20	0.118	0.126

3 Ordering information

Table 6. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS30M100ST	STPS30M100ST	TO-220AB	1.95 g	50	Tube
STPS30M100SFP	STPS30M100SFP	TO-220FPAB	1.9 g	50	Tube

Revision history

Table 7. **Document revision history**

Date	Version	Changes
25-Mar-2009	1	First issue.
15-Apr-2010	2	Updated package graphic on front page. Updated Table 3, Table 5, Table 6, and Table 7.
28-Jan-2011	3	Added warning paragraph above Table 7.
28-Jun-2018	4	Removed I²PAK package, figure 5, figure 6, figure 8 and figure 14. Updated Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified, anode terminals short circuited) and Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C). Minor text changes to improve readability.

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