

## High voltage power Schottky rectifier

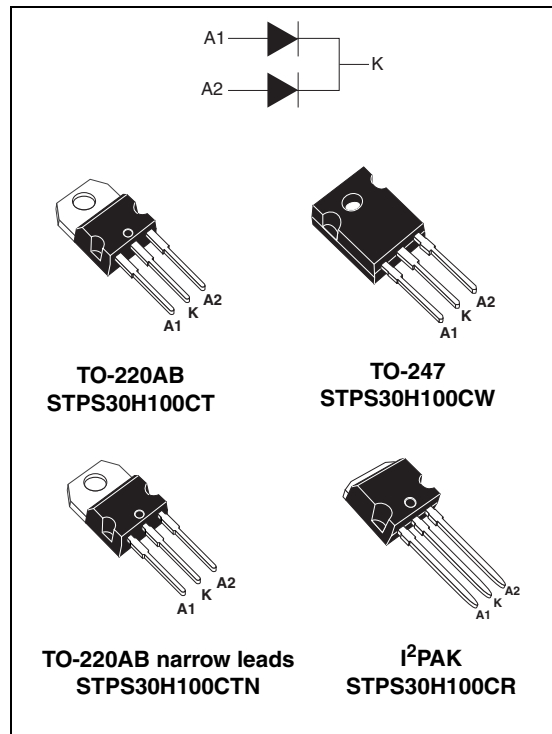
### Features

- Negligible switching losses
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Low thermal resistance
- Avalanche capability specified

### Description

Dual center tap Schottky rectifier suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in TO-200AB, TO-220AB narrow leads, TO-247, and I<sup>2</sup>PAK this device is intended for use in high frequency inverters.



**Table 1. Device summary**

$I_{F(AV)}$	2 x 15 A
$V_{RRM}$	100 V
$T_j$ (max)	175 °C
$V_F$ (max)	0.67 V

# 1 Characteristics

**Table 2. Absolute ratings (limiting values, per diode)**

Symbol	Parameter		Value	Unit	
V <sub>RRM</sub>	Repetitive peak reverse voltage		100	V	
I <sub>F(RMS)</sub>	Forward rms current		30	A	
I <sub>F(AV)</sub>	Average forward current	T <sub>c</sub> = 155 °C	Per diode	15	A
		δ = 0.5	Per device	30	
I <sub>FSM</sub>	Surge non repetitive forward current		t <sub>p</sub> = 10 ms sinusoidal	250	A
I <sub>RRM</sub>	Repetitive peak reverse current		t <sub>p</sub> = 2 μs square, F= 1 kHz	1	A
I <sub>RSM</sub>	Non repetitive peak reverse current		t <sub>p</sub> = 100 μs square	3	A
P <sub>ARM</sub>	Repetitive peak avalanche power		t <sub>p</sub> = 1 μs T <sub>j</sub> = 25 °C	10800	W
T <sub>stg</sub>	Storage temperature range		-65 to + 175	°C	
T <sub>j</sub>	Maximum operating junction temperature <sup>(1)</sup>		175	°C	
dV/dt	Critical rate of rise of reverse voltage		10000	V/μs	

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

**Table 3. Thermal resistance**

Symbol	Parameter		Value	Unit
R <sub>th(j-c)</sub>	Junction to case	Per diode	1.6	°C/W
		Total	0.9	
R <sub>th(c)</sub>	Coupling		0.1	

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j(\text{diode 1}) = P(\text{diode1}) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode 2}) \times R_{th(c)}$$

**Table 4. Static electrical characteristics (per diode)**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage current	T <sub>j</sub> = 25 °C	V <sub>R</sub> = V <sub>RRM</sub>			5	μA
		T <sub>j</sub> = 125 °C			2	6	mA
V <sub>F</sub> <sup>(2)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 15 A			0.80	V
		T <sub>j</sub> = 125 °C			0.64	0.67	
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 30 A			0.93	
		T <sub>j</sub> = 125 °C			0.74	0.8	

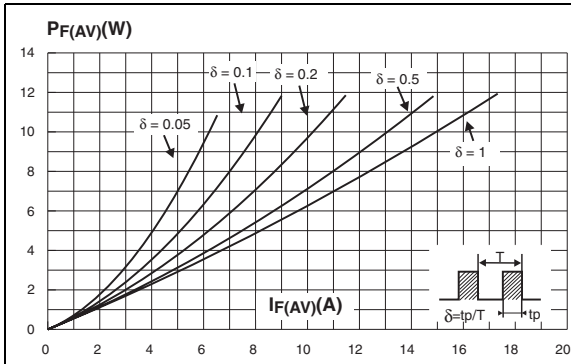
1. Pulse test: t<sub>p</sub> = 5 ms, δ < 2%

2. Pulse test: t<sub>p</sub> = 380 μs, δ < 2%

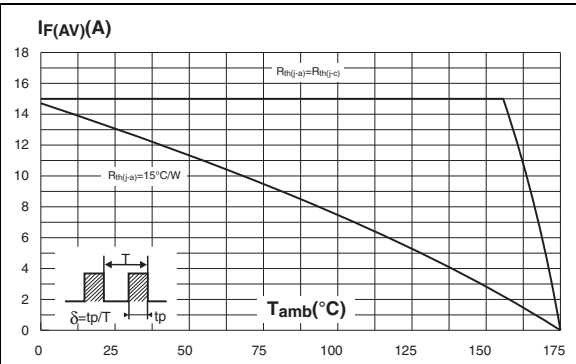
To evaluate the conduction losses use the following equation:

$$P = 0.54 \times I_{F(AV)} + 0.0086 I_{F(RMS)}^2$$

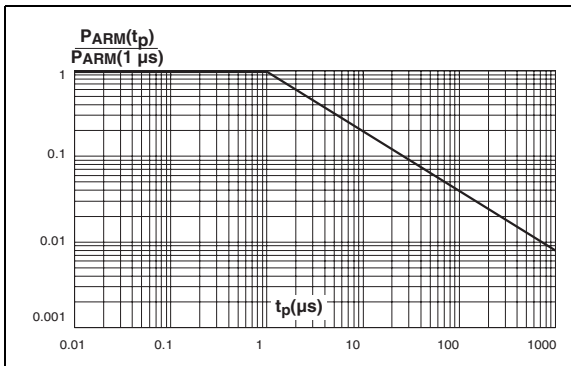
**Figure 1. Average forward power dissipation versus average forward current (per diode)**



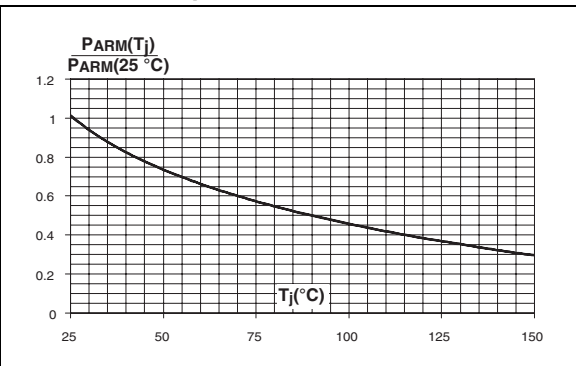
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)**



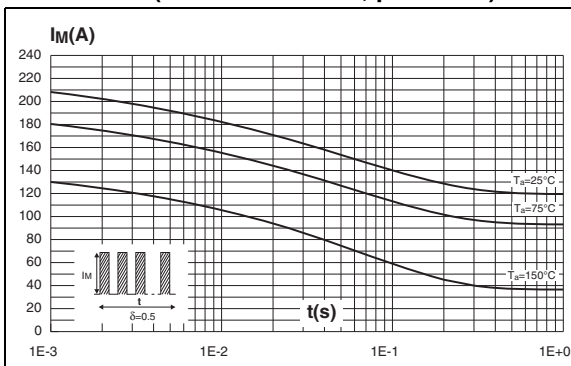
**Figure 3. Normalized avalanche power derating versus pulse duration**



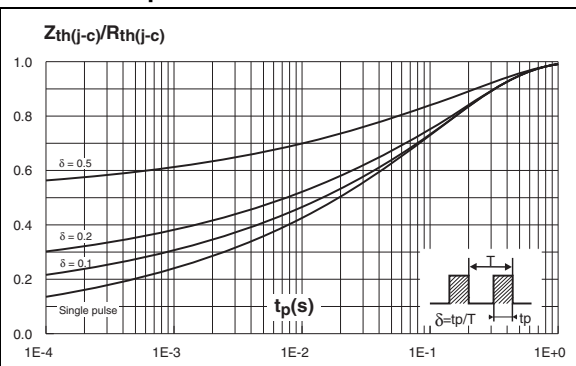
**Figure 4. Normalized avalanche power derating versus junction temperature**



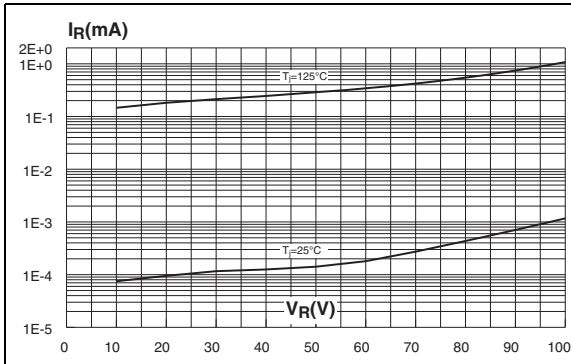
**Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)**



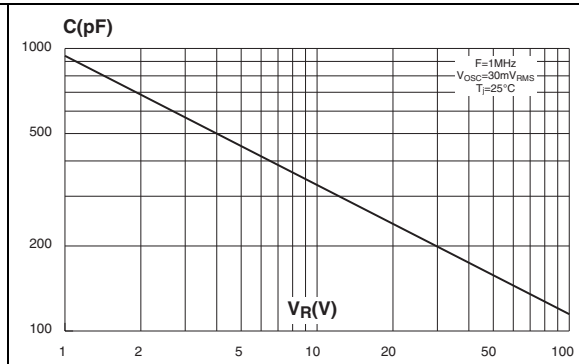
**Figure 6. Relative variation of thermal impedance junction to case versus pulse duration**



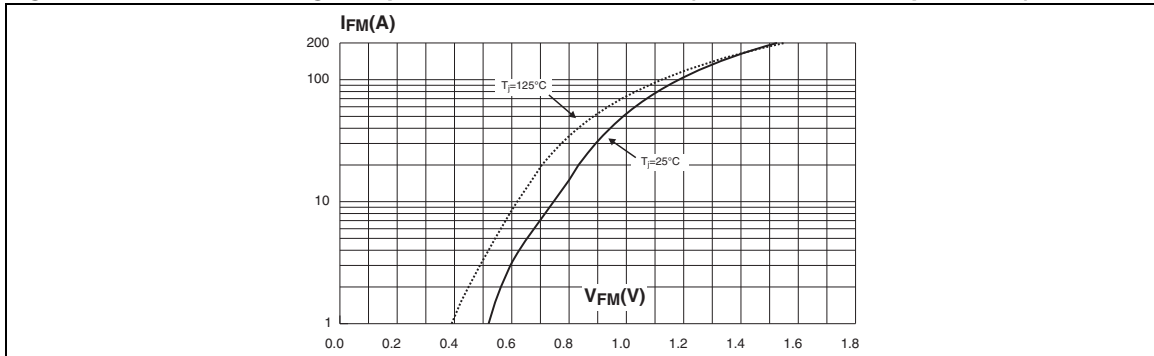
**Figure 7. Reverse leakage current versus reverse voltage applied (typical values, per diode)**



**Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)**



**Figure 9. Forward voltage drop versus forward current (maximum values, per diode)**



## 2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.4 to 0.6 N·m (TO-220AB), 0.55 N·m (TO-247)
- Maximum torque value: 1.0 N·m (TO-247)

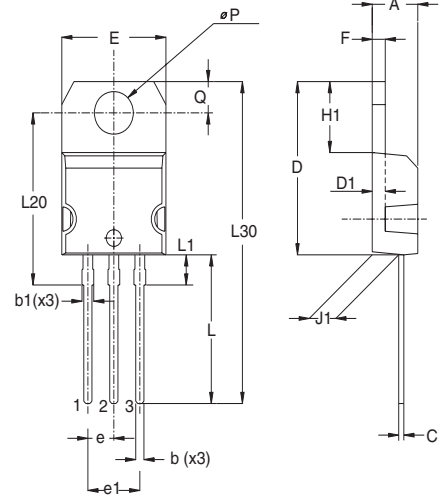
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

**Table 5. TO-247 dimensions**

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
A1	2.20		2.60	0.086		0.102
b	1.00		1.40	0.039		0.055
b1	2.00		2.40	0.078		0.094
b2	3.00		3.40	0.118		0.133
c	0.40		0.80	0.015		0.031
D <sup>(1)</sup>	19.85		20.15	0.781		0.793
E	15.45		15.75	0.608		0.620
e	5.30	5.45	5.60	0.209	0.215	0.220
L	14.20		14.80	0.559		0.582
L1	3.70		4.30	0.145		0.169
L2	18.50 typ.			0.728 typ.		
ØP <sup>(2)</sup>	3.55		3.65	0.139		0.143
ØR	4.50		5.50	0.177		0.217
S	5.30	5.50	5.70	0.209	0.216	0.224

1. Dimension D plus gate protrusion does not exceed 20.5 mm
2. Resin thickness around the mounting hole is not less than 0.9 mm

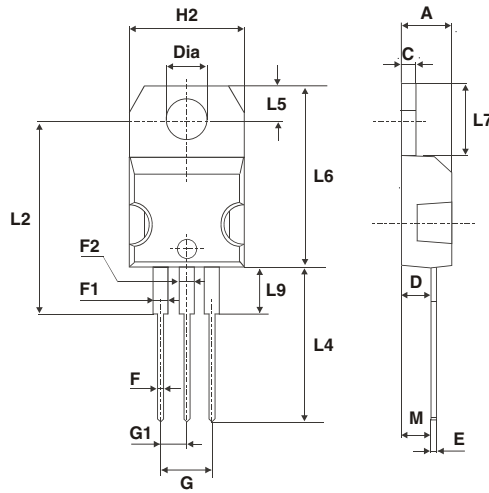
Table 6. TO-220AB narrow leads dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.17		0.18
b	0.61		0.88	0.024		0.034
b1	0.95		1.20	0.037		0.047
c	0.48		0.70	0.019		0.027
D	15.25		15.75	0.60		0.62
D1	1.27			0.05		
E	10.00		10.40	0.39		0.41
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.19		0.20
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
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		
∅P	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116

Table 7. TO-220AB dimensions

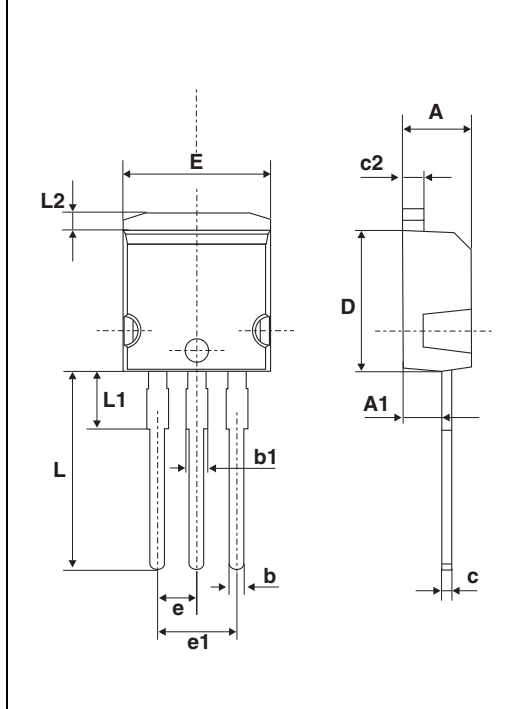
Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
F2	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
G1	2.40	2.70	0.094	0.106
H2	10	10.40	0.393	0.409
L2	16.4 typ.		0.645 typ.	
L4	13	14	0.511	0.551
L5	2.65	2.95	0.104	0.116
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
M	2.6 typ.		0.102 typ.	
Diam.	3.75	3.85	0.147	0.151



Devices in I<sup>2</sup>PAK 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. I<sup>2</sup>PAK dimensions**

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	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
c	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
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.195	0.203
E	10	10.40	0.394	0.409
L	13	14	0.512	0.551
L1	3.50	3.93	0.138	0.155
L2	1.27	1.40	0.050	0.055





### 3 Ordering information

Table 9. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS30H100CW	STPS30H100CW	TO-247	4.36 g	30	Tube
STPS30H100CT	STPS30H100CT	TO-220AB	2.20 g	50	Tube
STPS30H100CR	STPS30H100CR	I <sup>2</sup> PAK	1.49 g	50	Tube
STPS30H100CTN	PS30H100CTN	TO-220AB narrow leads	1.9 g	50	Tube

### 4 Revision history

Table 10. Revision history

Date	Revision	Changes
Jul-2003	5E	Previous release.
30-Mar-2011	6	Added I <sup>2</sup> PAK package.
15-Sep-2011	7	Added TO-220AB narrow leads package. Updated <a href="#">Table 5</a> .

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