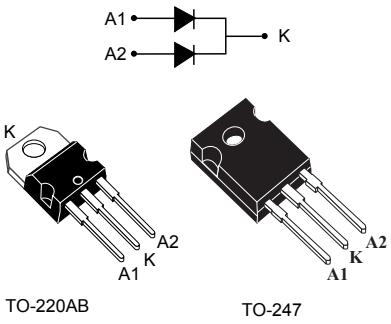
STPS30H100C

Datasheet

100 V power Schottky rectifier



TO-220AB TO-247

Features

- Negligible switching losses
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Avalanche rated
- ECOPACK®2 compliant

Applications

- Switching diode
- SMPS
- DC/DC converter
- LED lighting

Description

This dual Schottky rectifier is designed for high frequency miniature switch mode power supplies such as adaptors and on-board DC-DC converters.

Packaged in TO-200AB and TO-247, this STPS30H100C is optimized for use in high frequency inverters.

Product status link	
STPS30H100C	
Product summary	
$I_{F(AV)}$	2 x 15 A
V_{RRM}	100 V
T_j (max)	175 °C
V_F (typ)	0.64 V

1 Characteristics

Table 1. Absolute Ratings (limiting values 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	A
$I_{F(AV)}$	Average forward current, δ = 0.5	T_C = 155 °C	Per diode	15	A
		T_C = 150 °C	Per device	30	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		250	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs , T_j = 125 °C		778	W
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature(1)			+175	°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		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	1.6	°C/W
		Total	0.9	
$R_{th(c)}$	Coupling		0.10	°C/W

When the diodes 1 and 2 are used simultaneously :
ΔTj(diode 1) = P(diode1) x $R_{th(j-c)}$(Per diode) + P(diode 2) x $R_{th(c)}$

Table 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		5	µA
		T_j = 125 °C		-	2	6	mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 15 A	-		0.80	V
		T_j = 125 °C		-	0.64	0.67	
		T_j = 25 °C	I_F = 30 A	-		0.93	
		T_j = 125 °C		-	0.74	0.80	

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:

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

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

1.2 Characteristics (curves)

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

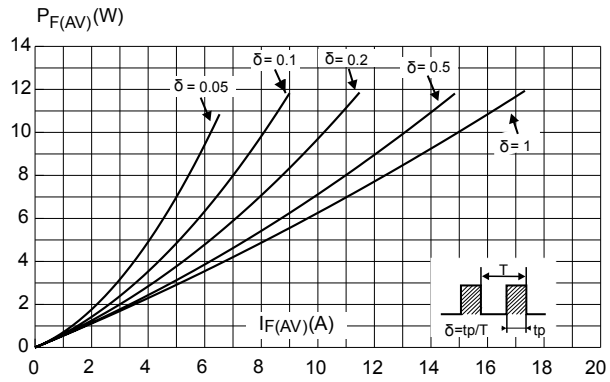


Figure 2. Average forward current versus ambient temperature (δ= 0.5, per diode)

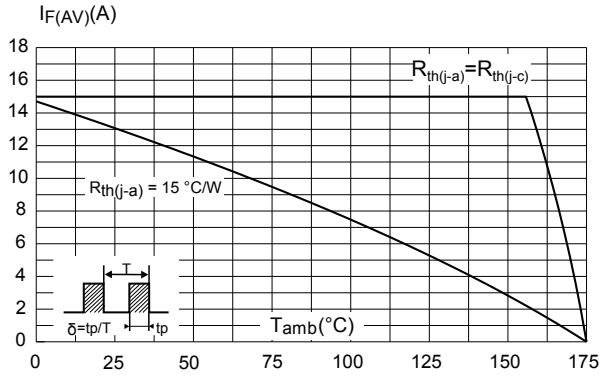


Figure 3. Normalized avalanche power derating versus pulse duration (T_j= 125 °C)

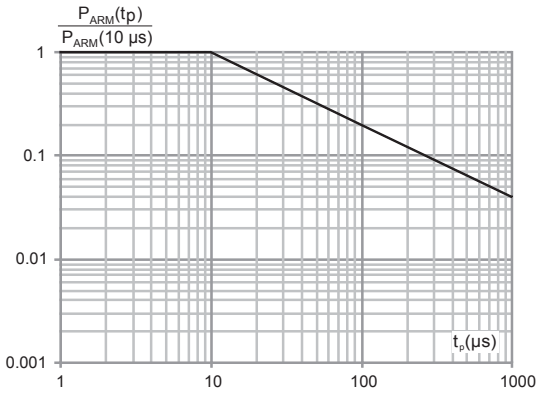


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

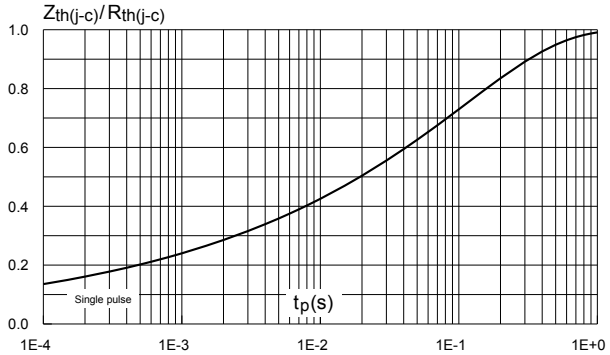


Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)

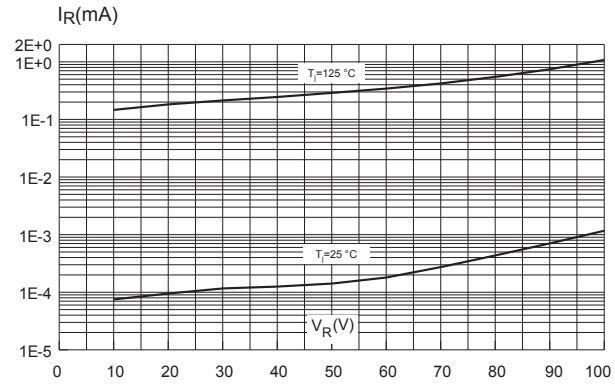


Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)

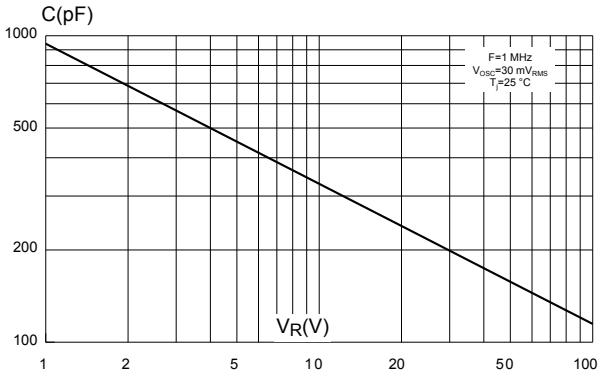
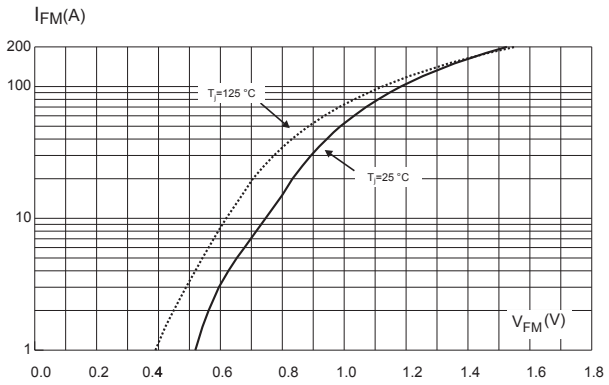


Figure 7. Forward voltage drop versus forward current (maximum values, per diode)



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-247 package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 N·m
- Maximum torque value: 1.0 N·m

Figure 8. TO-247 package outline

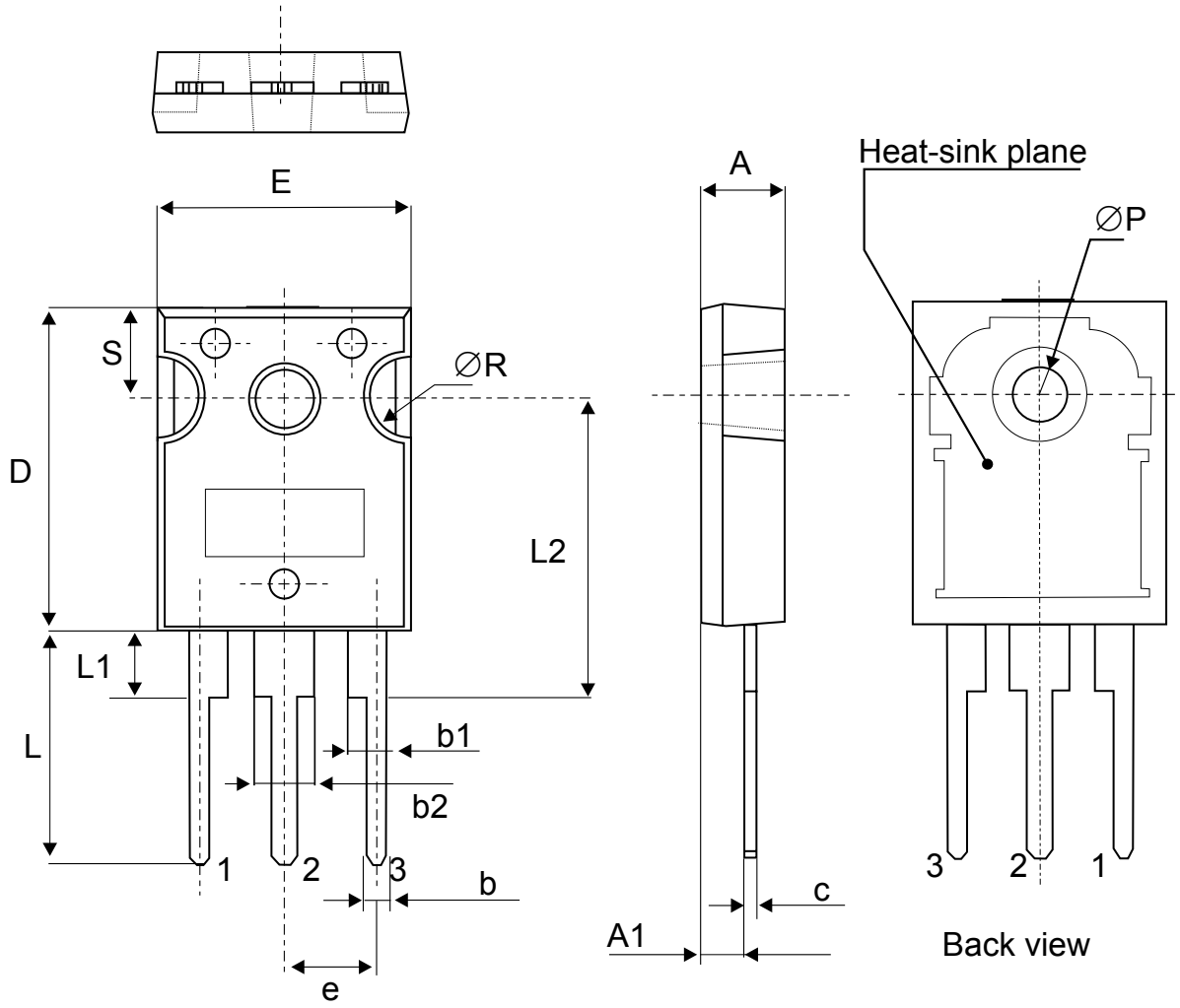


Table 4. **TO-247 package mechanical data**

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	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			0.728	
ØP	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. *Inches dimensions given for reference only*

2.2 TO-220AB package information

- Cooling method: by conduction (C)
- Epoxy meets UL 94,V0
- Recommended torque value: 0.55 N·m
- Maximum torque value: 0.70 N·m

Figure 9. TO-220AB package outline

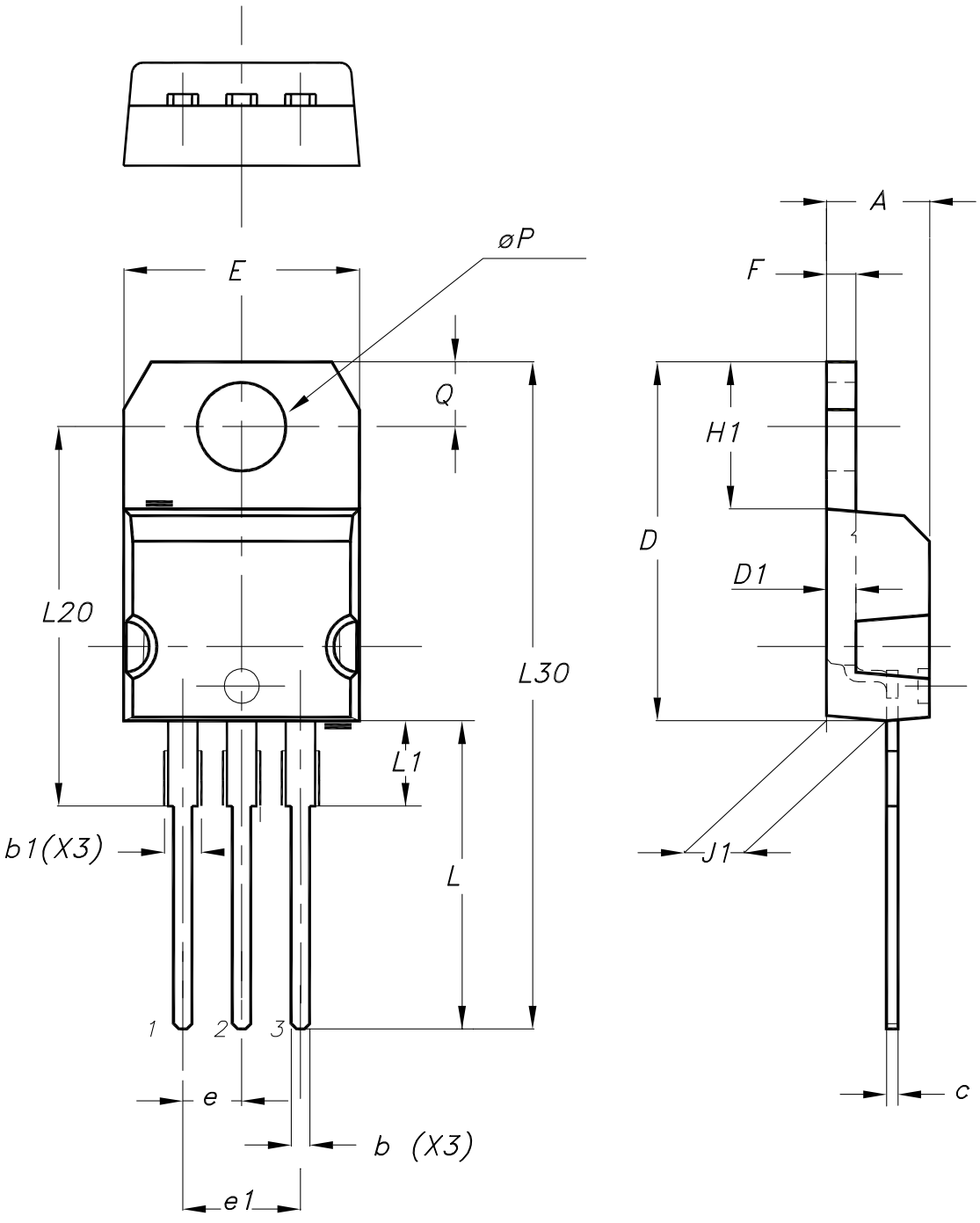


Table 5. TO-220AB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	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

3 Ordering information

Table 6. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS30H100CT	STPS30H100CT	TO-220AB	1.95 g	50	Tube
STPS30H100CW	STPS30H100CW	TO-247	4.36 g	30	Tube

Revision history

Table 7. **Document revision history**

Date	Revision	Changes
Jul-2003	5E	Previous release
30-Mar-2011	6	Added I^2PAK package.
15-Sep-2011	7	Added TO-220AB narrow leads package. Updated Table 5.
21-Jun-2012	8	Added minimum value for T_j in Table 2.
01-Jun-2018	9	Updated P_{ARM} value and removed "Normalized avalanche power derating" curves. Removed I^2PAK package information.

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