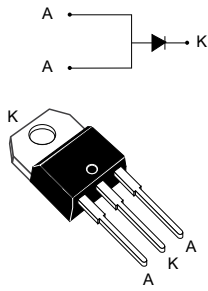


## 100 V power Schottky rectifier



TO-220AB

### Features

- Low  $V_F$
- Good trade-off between leakage current and forward voltage drop
- High frequency operation
- Avalanche capability specified
- ECOPACK<sup>®</sup>2 compliant

### Applications

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

### Description

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

Housed in a TO-220AB package, the [STPS30100ST](#) is optimized for use in notebook and game station adaptors, providing an improved efficiency at both low and high load.

Product status link	
<a href="#">STPS30100ST</a>	
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 with terminals 1 and 3 short circuited at  $T_{amb} = 25\text{ °C}$ , unless otherwise specified)**

Symbol	Parameter	Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage	100	V
$I_{F(RMS)}$	RMS forward current	60	A
$I_{F(AV)}$	Average forward current	$T_c = 125\text{ °C}, \delta = 0.5$	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms sinusoidal}$	A
$P_{ARM}$	Repetitive peak avalanche power	$t_p = 10\text{ }\mu\text{s}, T_j = 125\text{ °C}$	W
$T_{stg}$	Storage temperature range	-65 to +175	°C
$T_j$	Maximum operating junction temperature <sup>(1)</sup>	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	1	°C/W

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

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

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

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

To evaluate the conduction losses, use the following equation:

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

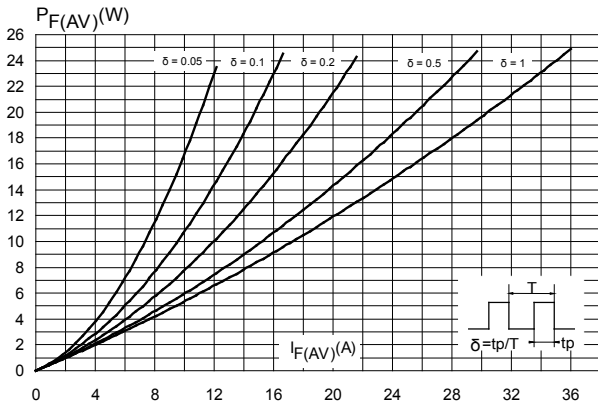
For more information, please refer to the following application notes related to the power losses :

- AN604: Calculation of conduction losses in a power rectifier

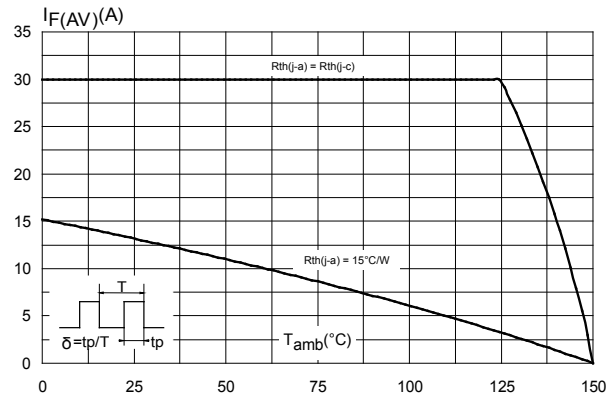
- AN4021: Calculation of reverse losses on a power diode

## 1.1 Characteristics (curves)

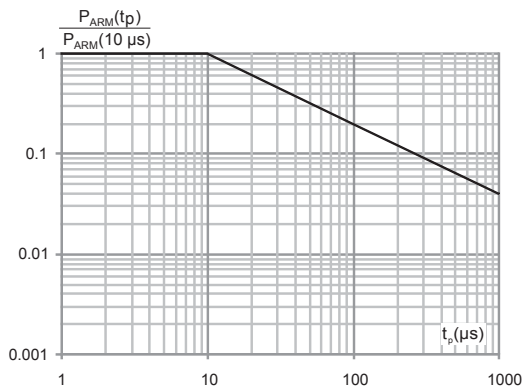
**Figure 1. Average forward power dissipation versus average forward current**



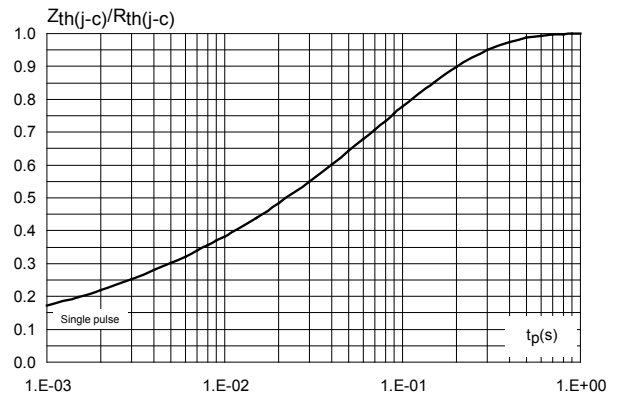
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



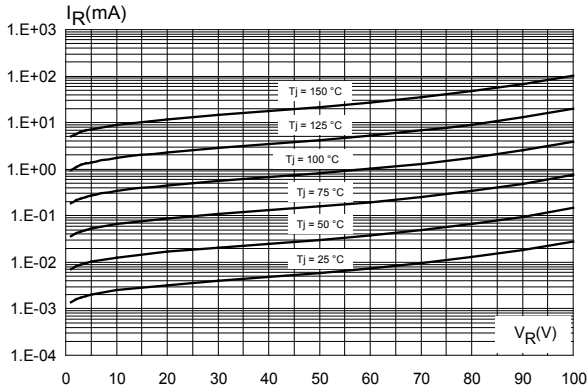
**Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125$  °C)**



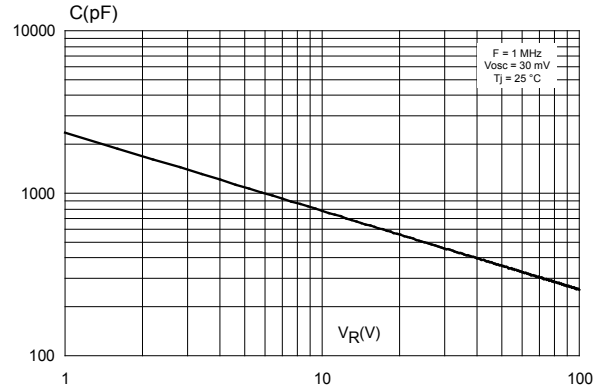
**Figure 4. Relative variation of thermal impedance junction to case versus pulse duration**



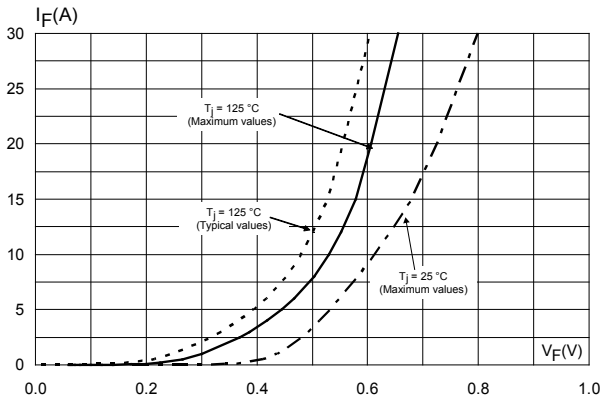
**Figure 5. Reverse leakage current versus reverse voltage applied (typical values)**



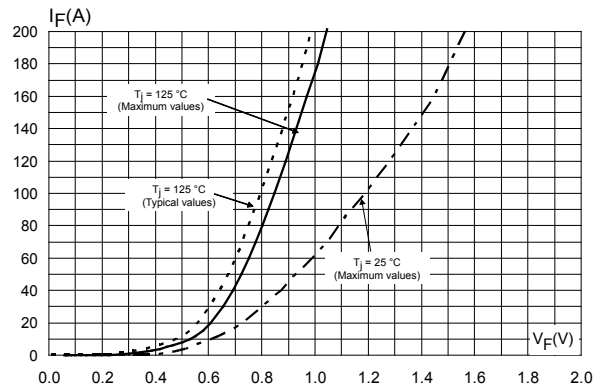
**Figure 6. Junction capacitance versus reverse voltage applied (typical values)**



**Figure 7. Forward voltage drop versus forward current (low level)**



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



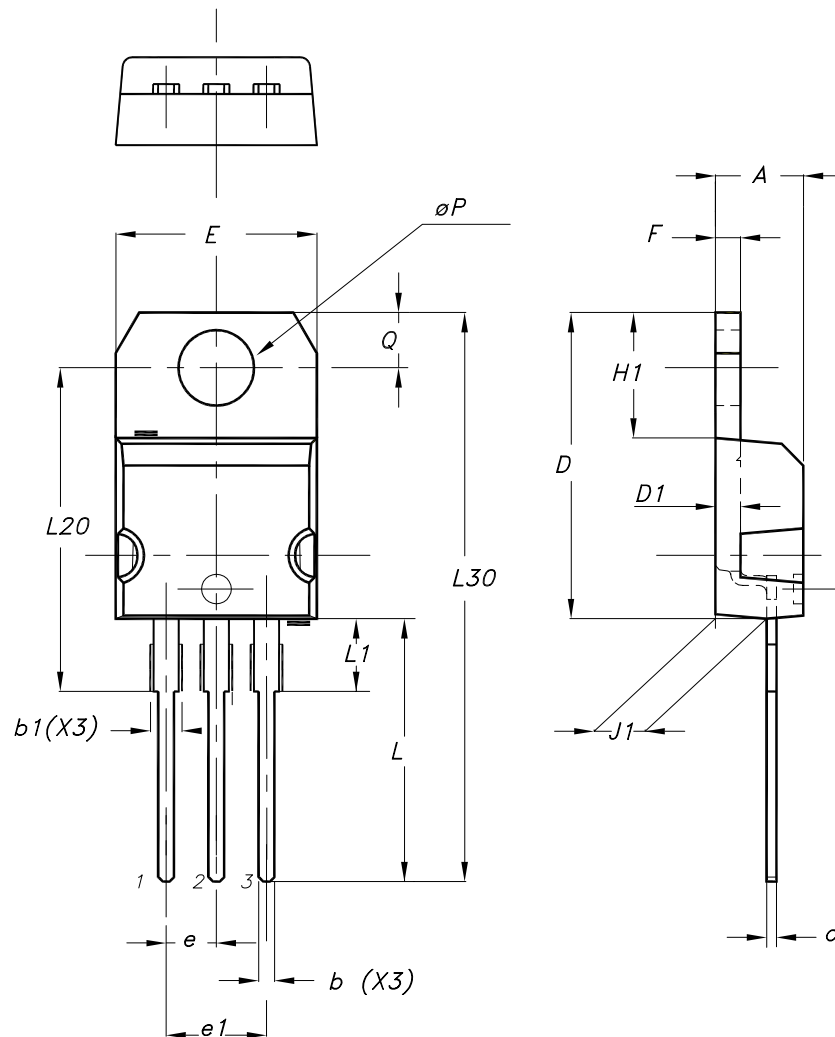
## 2 Package information

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](http://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 9. TO-220AB package outline



**Table 4. 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 5. Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS30100ST	STPS30100ST	TO-220AB	1.95 g	50	Tube

## Revision history

**Table 6. Document revision history**

Date	Version	Changes
24-Oct-2006	1	First issue
11-May-2018	2	Minor text changes to improve readability. Updated Table 1. Absolute ratings (limiting values with terminals 1 and 3 short circuited at $T_{amb} = 25\text{ °C}$ , unless otherwise specified). Removed figure 4 and figure 5. Updated Section 1.1 Characteristics (curves).



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