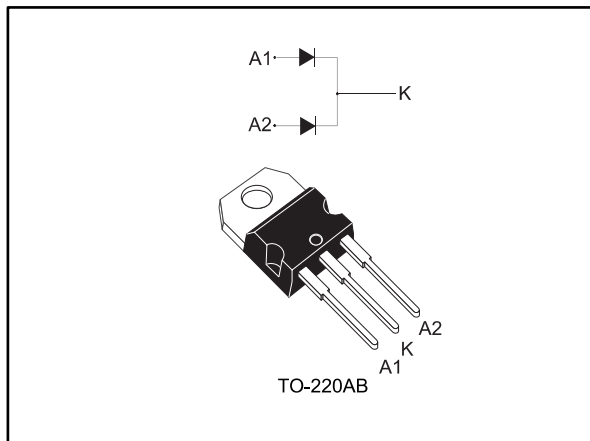


High voltage power Schottky rectifier

Datasheet - production data



Description

This dual diode Schottky rectifier is suited for high frequency switched mode power supplies.

Packaged in TO-220AB this device is intended for use to enhance the reliability of the application.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	2 x 30 A
V_{RRM}	170 V
T_J (max.)	175 °C
V_F (typ.)	0.76 V

Features

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

1 Characteristics

Table 2: Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V _{RRM}	Repetitive peak reverse voltage			170	V
I _{F(RMS)}	Forward rms current			45	A
I _{F(AV)}	Average forward current $\delta = 0.5$, square wave	T _C = 150 °C	Per diode	30	A
			Per device	60	
I _{FSM}	Surge non repetitive forward current		t _p = 10 ms sinusoidal	270	A
P _{ARM}	Repetitive peak avalanche power		t _p = 10 μ s, T _j = 125 °C	985	W
T _{stg}	Storage temperature range			-65 to +175	°C
T _j	Maximum operating junction temperature ⁽¹⁾			175	

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

Table 3: Thermal parameters

Symbol	Parameter		Max. value	Unit
R _{th(j-c)}	Junction to case	Per diode	1.0	°C/W
		Total	0.7	
R _{th(c)}	Coupling		0.4	

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j (\text{diode1}) = P_{(\text{diode1})} \times R_{th(j-c)} (\text{per diode}) + P_{(\text{diode2})} \times R_{th(c)}$$

Table 4: 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}	-		35	μ A
		T _j = 125 °C		-	8	35	mA
V _F ⁽²⁾	Forward voltage drop	T _j = 25 °C	I _F = 30 A	-		0.94	V
		T _j = 125 °C		-	0.72	0.76	
		T _j = 25 °C	I _F = 60 A	-	0.97	1.05	
		T _j = 125 °C		-	0.86	0.92	

Notes:
⁽¹⁾Pulse test: t_p = 5 ms, $\delta < 2\%$
⁽²⁾Pulse test: t_p = 380 μ s, $\delta < 2\%$

To evaluate the conduction losses, use the following equation:

$$P = 0.60 \times I_{F(AV)} + 0.0053 \times I_{F(RMS)}^2$$

1.1 Characteristics (curves)

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

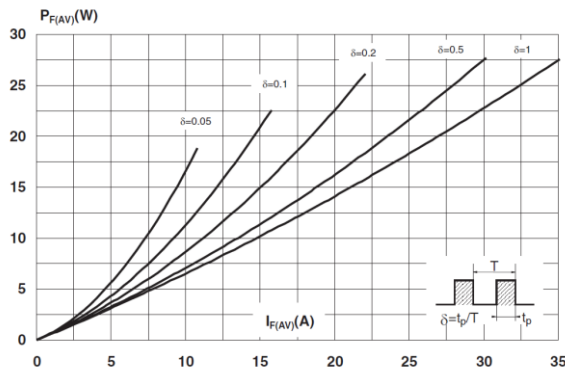


Figure 2: Average forward current versus ambient temperature ($\delta = 0.5$, per diode)

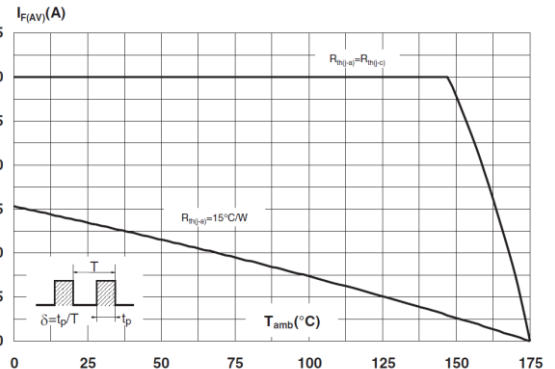


Figure 3: Normalized avalanche power derating versus pulse duration ($T_j = 125^\circ\text{C}$)

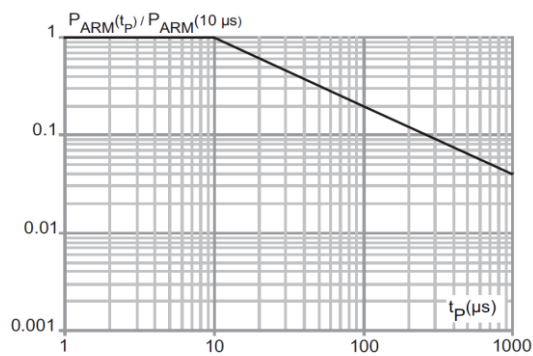


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration

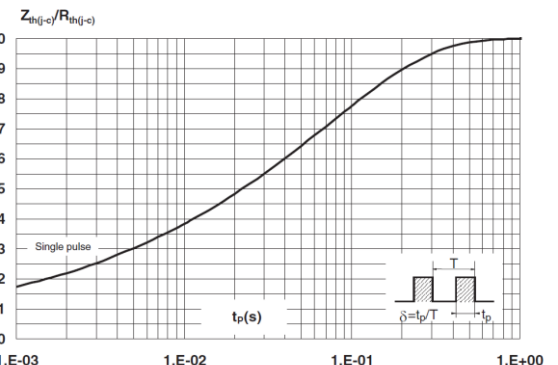


Figure 5: Reverse leakage current versus reverse voltage applied (typical values, per diode)

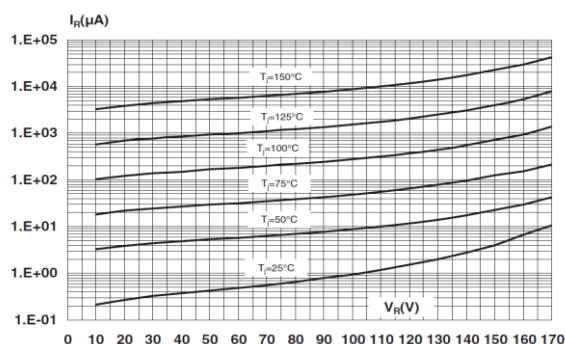


Figure 6: Junction capacitance versus reverse voltage applied (typical values, per diode)

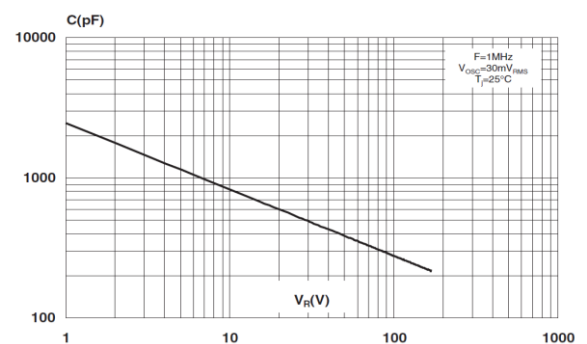
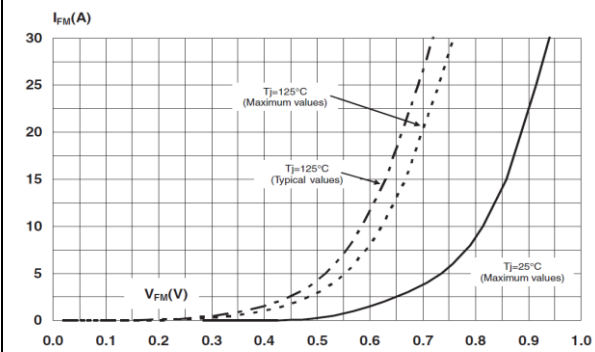
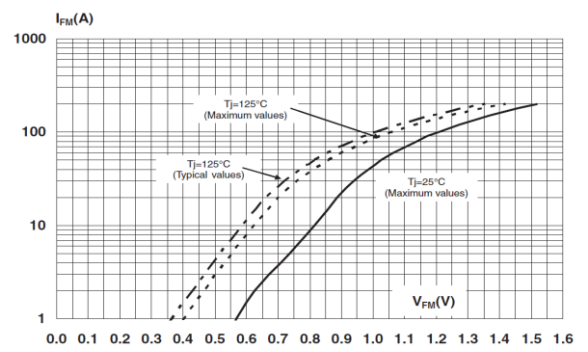


Figure 7: Forward voltage drop versus forward current (per diode, low level)**Figure 8: Forward voltage drop versus forward current (per diode, high level)**

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. ECOPACK® is an ST trademark.

- Cooling method: by conduction (C)
- Epoxy meets UL 94,V0
- Recommended torque value: 0.55 N·m
- Maximum torque value: 0.7 N·m

2.1 TO-220AB package information

Figure 9: TO-220AB package outline

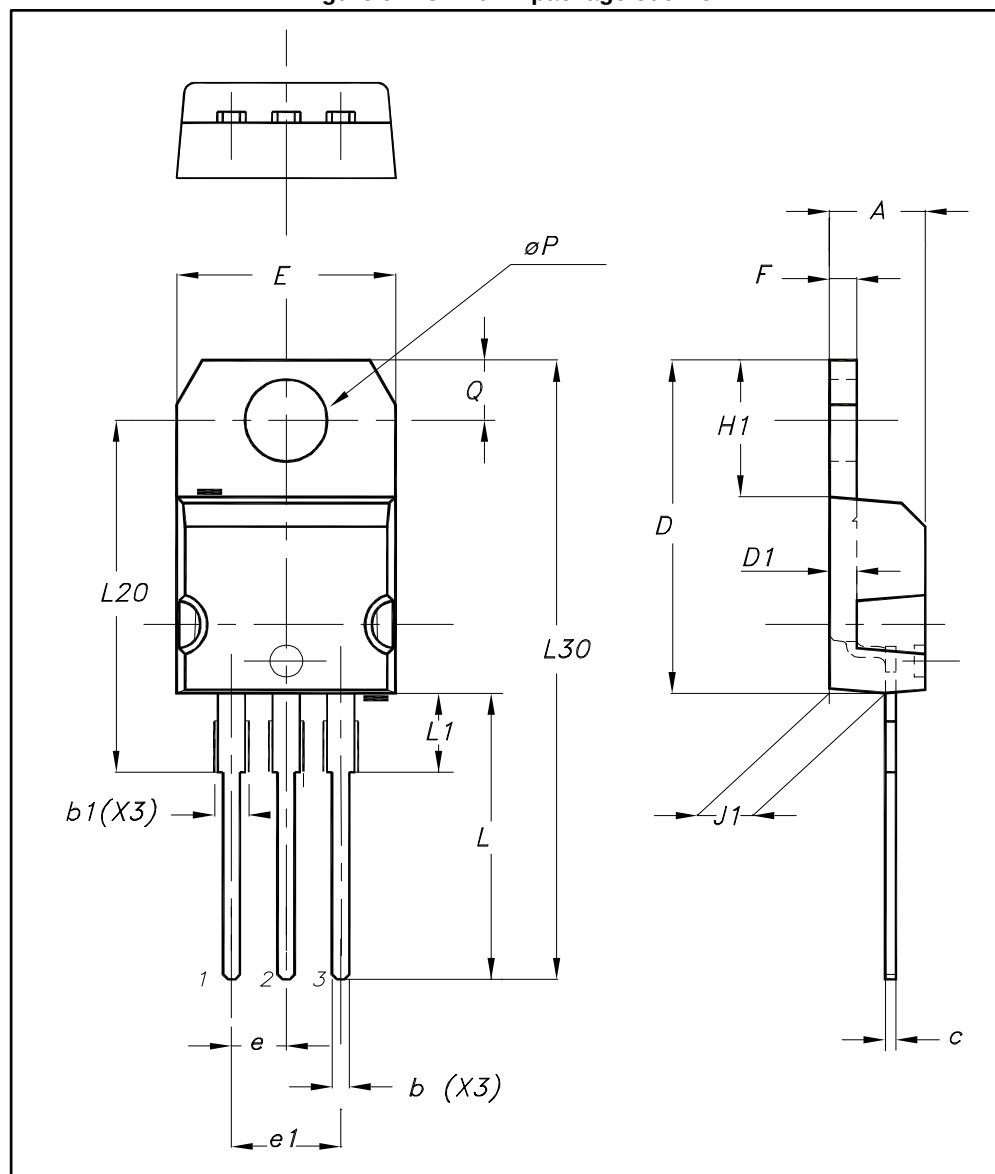


Table 5: TO-220AB package mechanical data

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	1.70	0.045	0.067
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
STPS60170CT	STPS60170CT	TO-220AB	1.95 g	50	Tube

4 Revision history

Table 7: Document revision history

Date	Revision	Changes
18-Feb-2005	1	First issue.
11-Dec-2015	2	Updated conduction losses equation values and reformatted to current standard.
15-Jan-2018	3	Updated Table 2: "Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified)" .

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