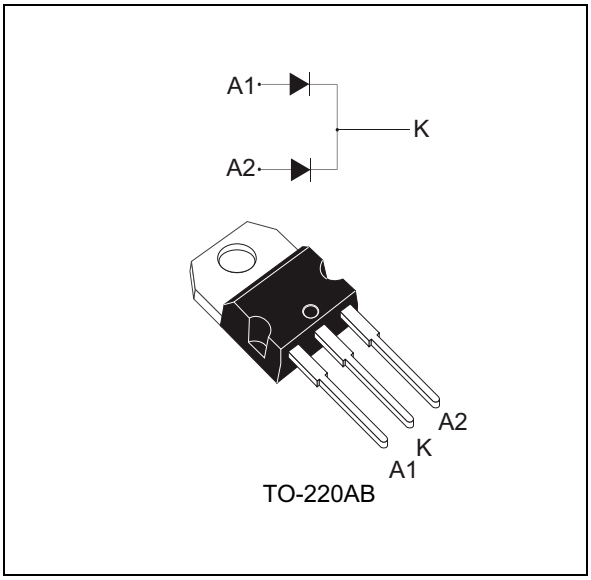
STPS60170C

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 (max)	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 T_{amb} = 25 °C unless otherwise stated)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			120	V
$I_{F(RMS)}$	Forward rms current			30	A
$I_{F(AV)}$	Average forward current, δ = 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 µs, T_j = 125 °C		TBD	W
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum operating junction temperature(1)			175	°C

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	per diode	1	°C/W
		total	0.7	
$R_{th(c)}$	Coupling		0.4	

When the two diodes 1 and 2 are used simultaneously:

ΔT_j(diode1) = P(diode1) x $R_{th(j-c)}$(per diode) + P(diode2) x $R_{th(c)}$

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	µA
		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	

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

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

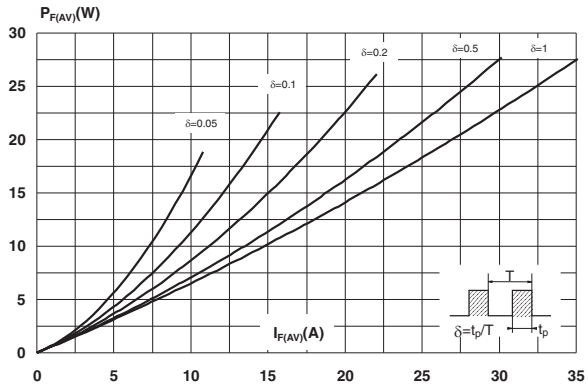


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

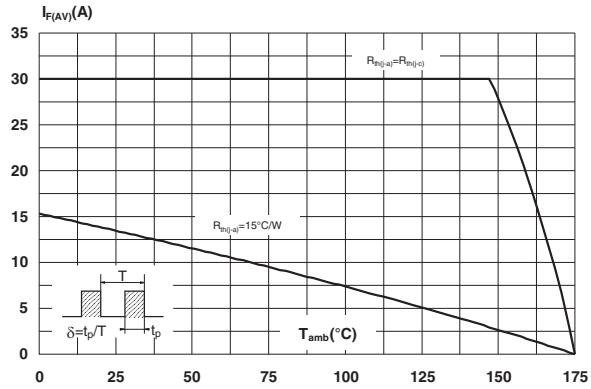


Figure 3. Normalized avalanche power derating versus pulse duration

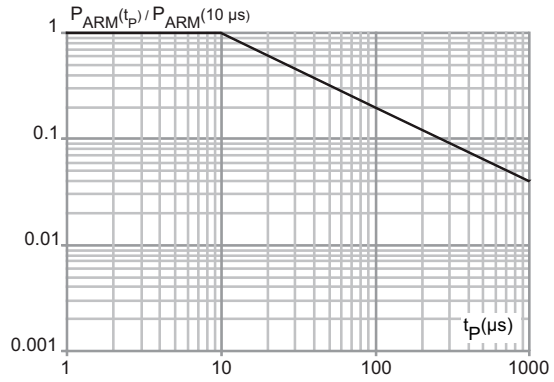


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

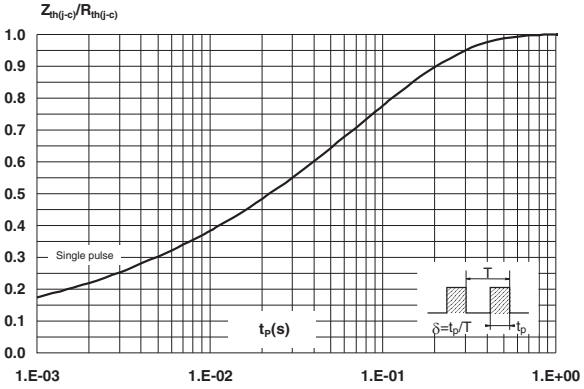


Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)

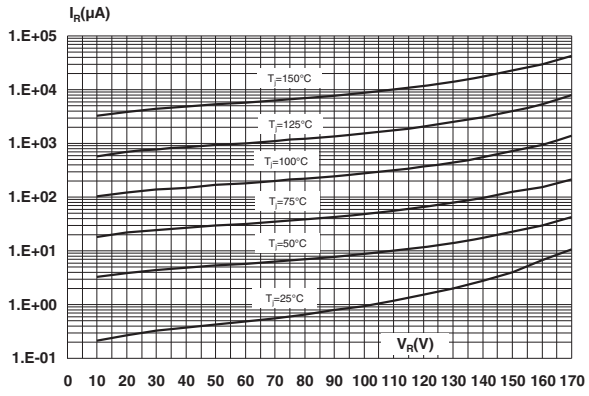


Figure 6. Junction capacitance vs. reverse voltage applied (typical values, per diode)

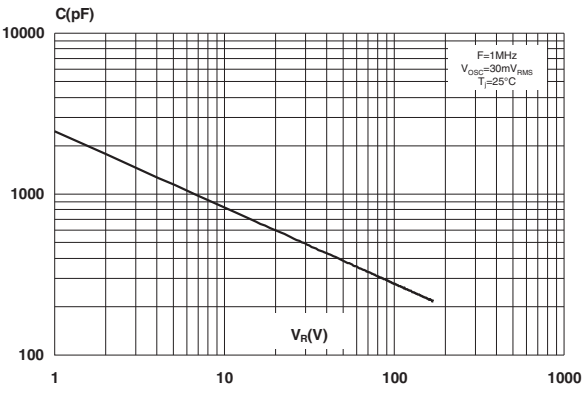


Figure 7. Forward voltage drop versus forward current (per diode, low level)

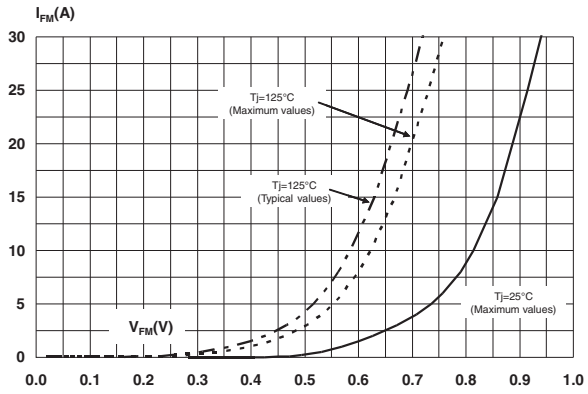
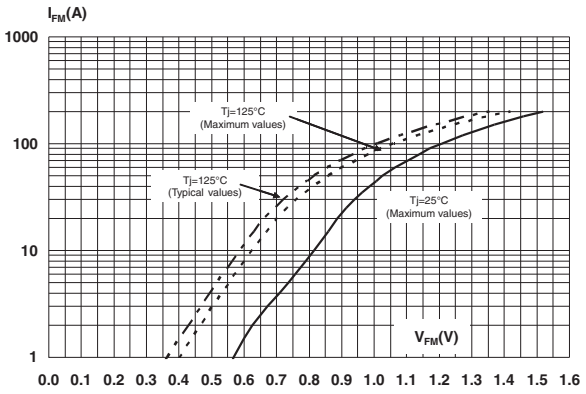


Figure 8. Forward voltage drop versus forward current (per diode, high level)



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N·m
- Maximum torque value: 0.7 N·m

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

Figure 9. TO-220AB package outline

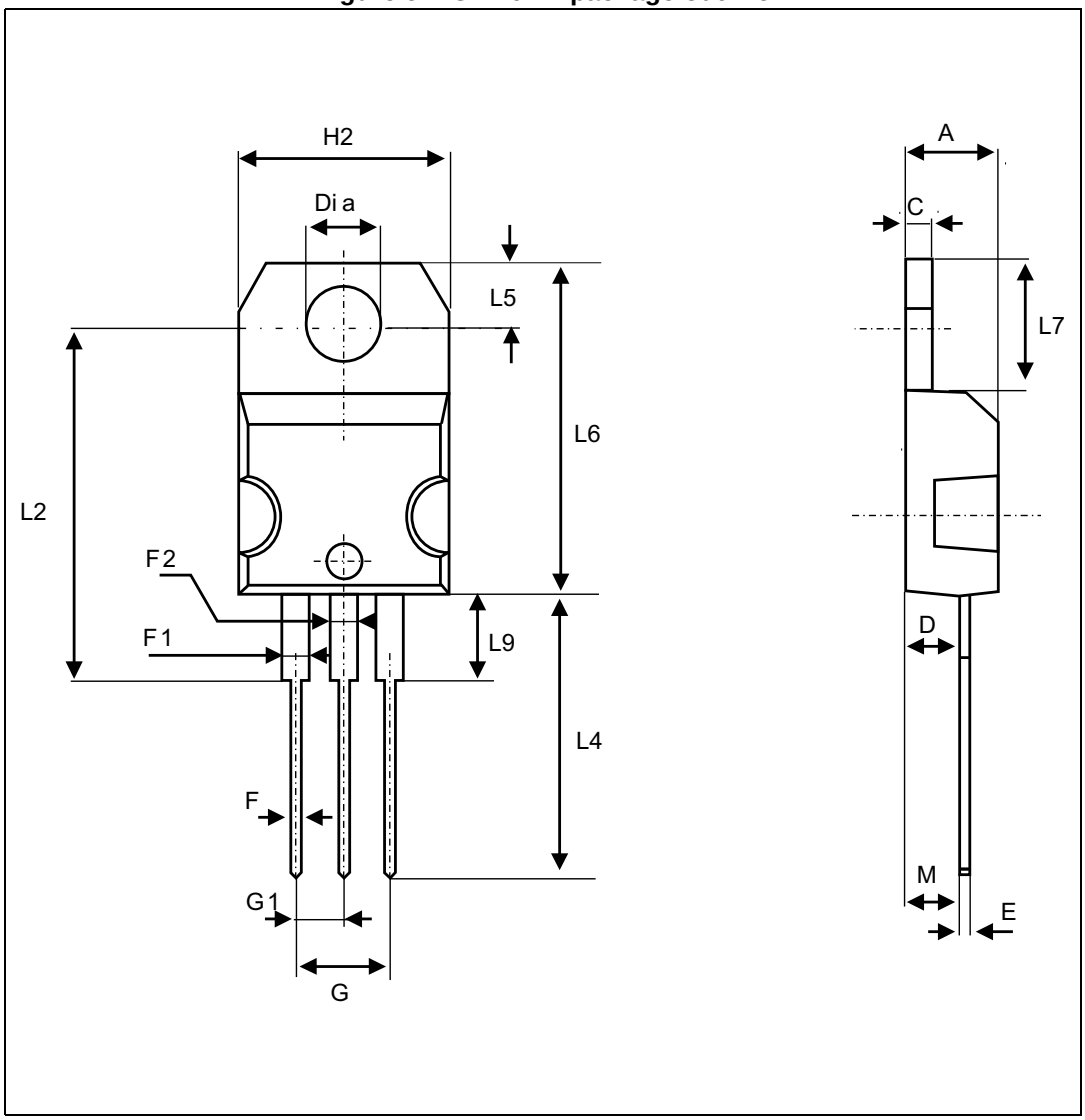


Table 5. TO-220AB package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	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

3 Ordering information

Table 6. Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS60170CT	STPS60170CT	TO-220AB	2.2 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.

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