

High voltage power Schottky rectifier

Main product characteristics

$I_{F(AV)}$	2 x 10 A
V_{RRM}	60 V
T_j (max)	150° C
V_F (max)	0.7 V

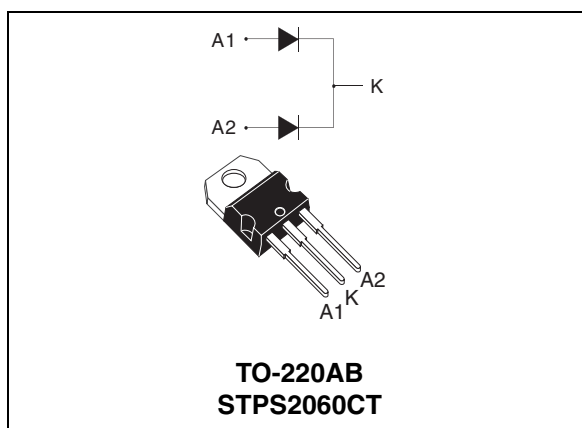
Description

High voltage dual Schottky rectifier suited for switch mode power supplies and other power converters.

Packaged in TO-220, this device is intended for use in medium voltage operation, and particularly, in high frequency circuitries where low switching losses and low noise are required.

Order code

Part Number	Marking
STPS2060CT	STPS2060CT



Features and benefits

- Negligible switching losses
- Low forward voltage drop
- Low capacitance
- High reverse avalanche surge capability
- Avalanche rated

Table 1. Absolute ratings (limiting values, per diode at 25° C, unless otherwise specified)

Symbol	Parameter		Value	Unit	
V_{RRM}	Repetitive peak reverse voltage		60	V	
$I_{F(RMS)}$	RMS forward current		Per diode 20	A	
$I_{F(AV)}$	Average forward current $\delta = 0.5$	$T_c = 135^\circ \text{C}$	Per diode	10	A
			Per device	20	
I_{FSM}	Surge non repetitive forward current	$t_p = 10 \text{ ms}$ sinusoidal	Per diode 200	A	
P_{ARM}	Repetitive peak avalanche power	$t_p = 1 \mu\text{s}$ $T_j = 25^\circ \text{C}$	Per device 10800	W	
T_{stg}	Storage temperature range		-65 to + 150	°C	
T_j	Maximum operating junction temperature ⁽¹⁾		150	°C	

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

1 Characteristics

Table 2. Thermal resistance

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	1.6	°C/W
		Total	0.9	
$R_{th(c)}$		Coupling	0.15	

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 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25^\circ \text{C}$	$V_R = V_{RRM}$			150	μA
		$T_j = 125^\circ \text{C}$				100	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25^\circ \text{C}$	$I_F = 10 \text{ A}$			0.80	V
		$T_j = 125^\circ \text{C}$	$I_F = 10 \text{ A}$		0.60	0.70	
		$T_j = 25^\circ \text{C}$	$I_F = 20 \text{ A}$			0.94	
		$T_j = 125^\circ \text{C}$	$I_F = 20 \text{ A}$		0.75	0.85	

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

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

To evaluate the conduction losses use the following equation:

$$P = 0.55 \times I_{F(AV)} + 0.015 I_{F(RMS)}^2$$

Figure 1. Conduction losses versus average current (per diode)

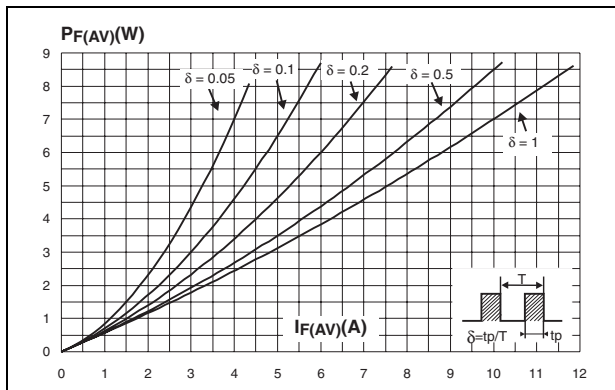


Figure 2. Average forward current ($\delta = 0.5$, per diode) versus ambient temperature

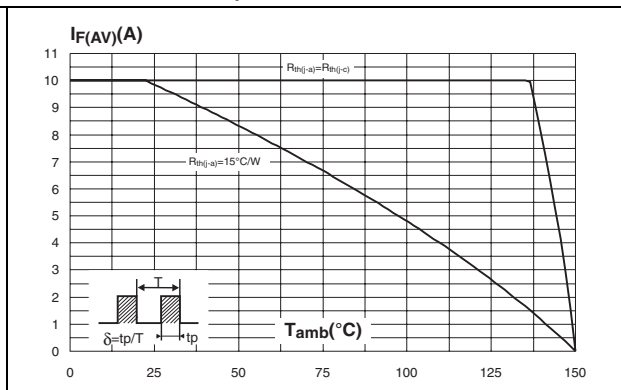


Figure 3. Normalized avalanche power derating versus pulse duration

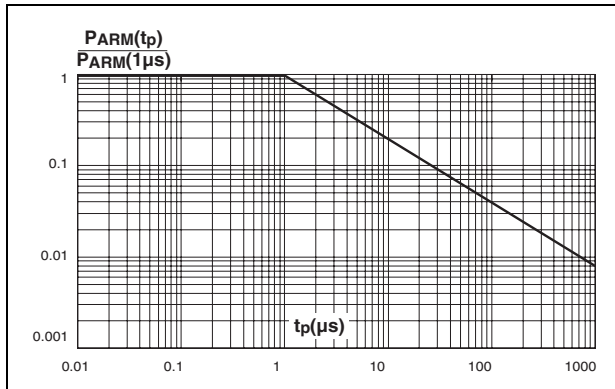


Figure 4. Normalized avalanche power derating versus junction temperature

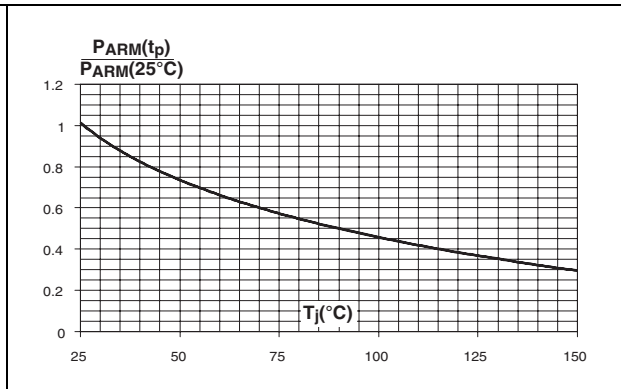


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

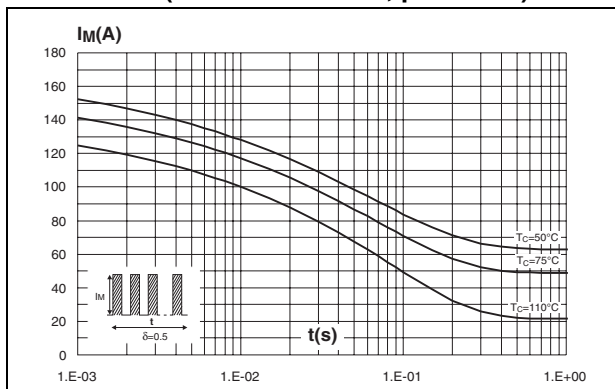


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

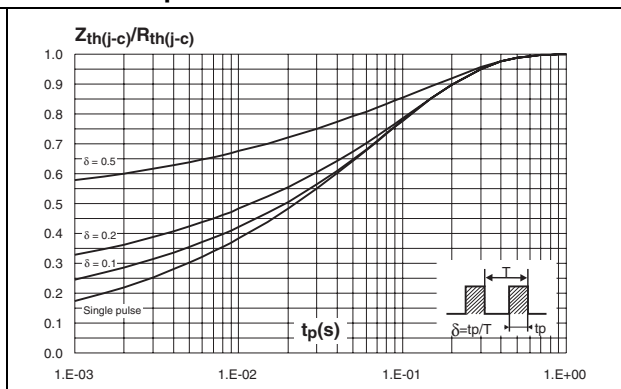


Figure 7. Reverse leakage current versus reverse voltage applied (typical values, per diode)

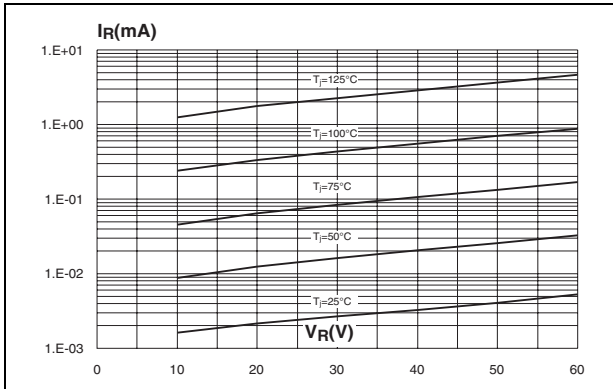


Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)

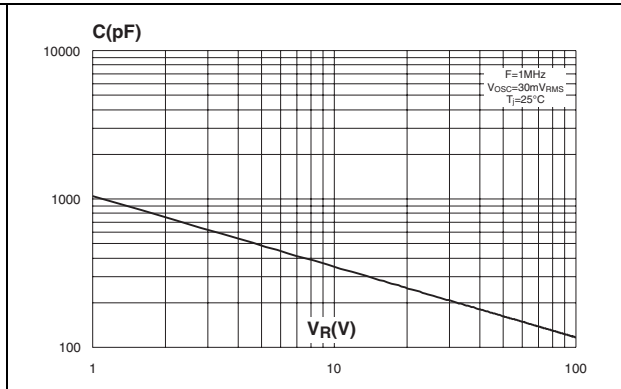
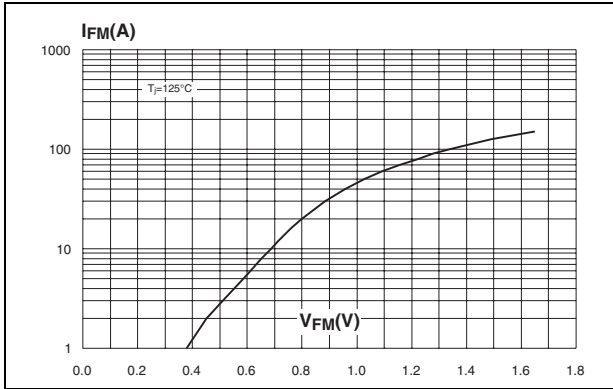


Figure 9. Forward voltage drop versus forward current (maximum values, per diode)



2 Package information

Epoxy meets UL94,V0

Table 4. 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

Cooling Method: C

Recommended torque value: 0.55 Nm

Maximum torque value: 0.70 Nm

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

3 Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS2060CT	STPS2060CT	TO-220AB	2.2 g	50	Tube

4 Revision History

Date	Revision	Changes
25-Jul-2006	1	First issue.

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