

## Power Schottky rectifier

### Main product characteristics

$I_{F(AV)}$	2 x 5 A
$V_{RRM}$	60 V
$T_j(max)$	150° C
$V_F(max)$	0.52 V

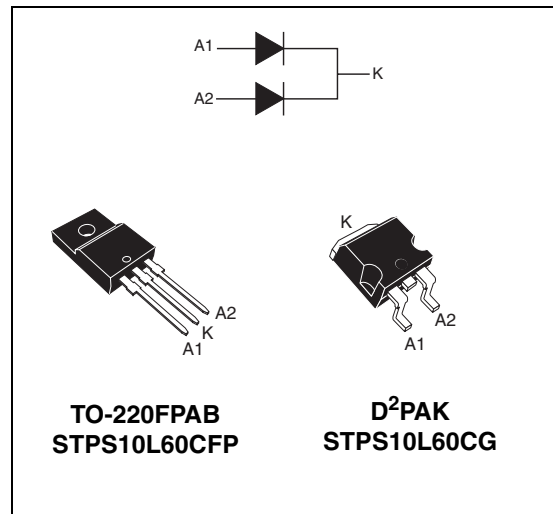
### Features and benefits

- Low forward voltage drop
- Negligible switching losses
- Insulated package: TO-220FPAB  
Insulating voltage = 2000 V DC  
Capacitance = 12 pF
- Avalanche capability specified

### Description

Dual center tap Schottky rectifier suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in TO-220FPAB and D<sup>2</sup>PAK, this device is intended for use in high frequency inverters.



# 1 Characteristics

Symbol	Parameter				Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage				60	V
$I_{F(RMS)}$	RMS forward current				30	A
$I_{F(AV)}$	Average forward current	TO220FPAB	$T_C = 130^\circ\text{C}$ $\delta = 0.5$	Per diode Per device	5 10	A
$I_{FSM}$	Surge non repetitive forward current		tp = 10 ms Sinusoidal		180	A
$I_{RRM}$	Repetitive peak reverse current		tp = 2 $\mu\text{s}$ square F=1 kHz		1	A
$P_{ARM}$	Repetitive peak avalanche power		tp = 1 $\mu\text{s}$ $T_j = 25^\circ\text{C}$		4000	W
$T_{stg}$	Storage temperature range				-65 to +175	$^\circ\text{C}$
$T_j$	Maximum operating junction temperature <sup>(1)</sup>				150	$^\circ\text{C}$
dV/dt	Critical rate of rise reverse voltage				10000	V/ $\mu\text{s}$

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

**Table 1. Thermal resistance**

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	4.5	$^\circ\text{C/W}$
	TO-220FPAB	Total	3.5	
$R_{th(c)}$	Coupling		2.5	$^\circ\text{C/W}$

When the diodes 1 and 2 are used simultaneously :

$$\Delta T_j(\text{diode } 1) = P(\text{diode } 1) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode } 2) \times R_{th(c)}$$

**Table 2. Static electrical characteristics (per diode)**

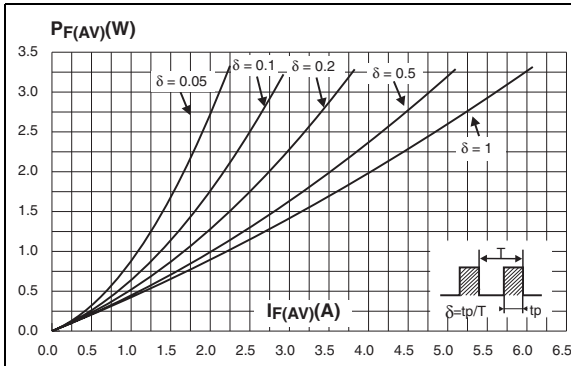
Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			220	$\mu\text{A}$
		$T_j = 125^\circ\text{C}$			45	60	mA
$V_F^{(1)}$	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 5\text{ A}$			0.55	V
		$T_j = 125^\circ\text{C}$	$I_F = 5\text{ A}$		0.43	0.52	
		$T_j = 25^\circ\text{C}$	$I_F = 10\text{ A}$			0.67	
		$T_j = 125^\circ\text{C}$	$I_F = 10\text{ A}$		0.55	0.64	

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

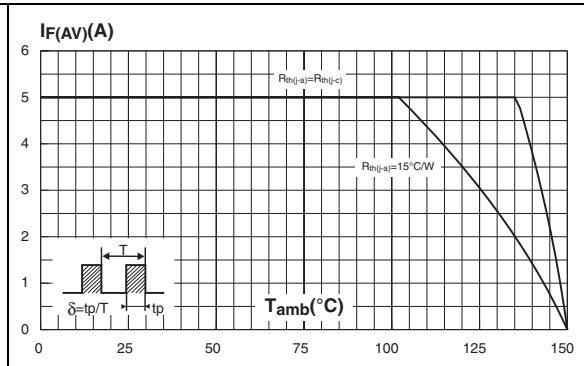
To evaluate the conduction losses use the following equation:

$$P = 0.44 \times I_{F(AV)} + 0.0091 \times I_{F(RMS)}^2$$

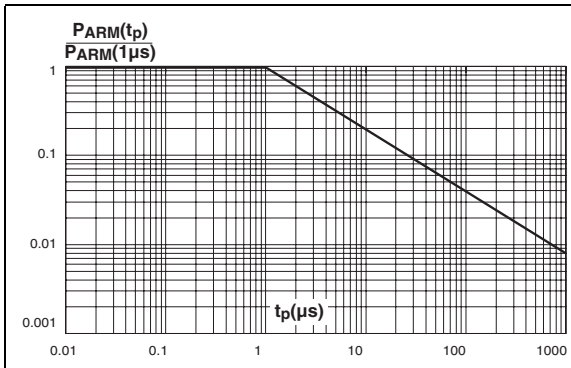
**Figure 1. Average forward power dissipation versus average forward current (per diode)**



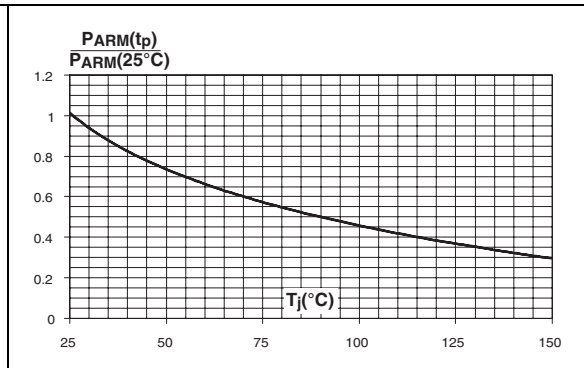
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ ) (per diode)**



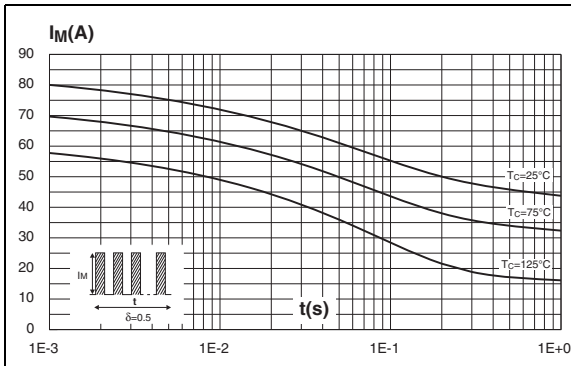
**Figure 3. Normalized avalanche power derating versus pulse duration**



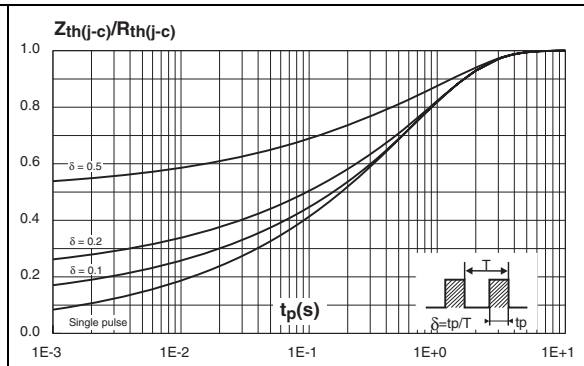
**Figure 4. Normalized avalanche power derating versus junction temperature**



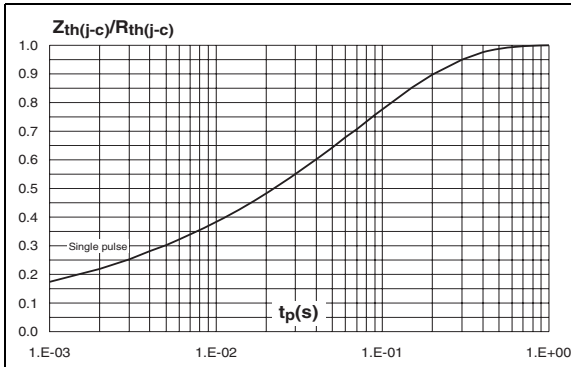
**Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TO-220FPAB)**



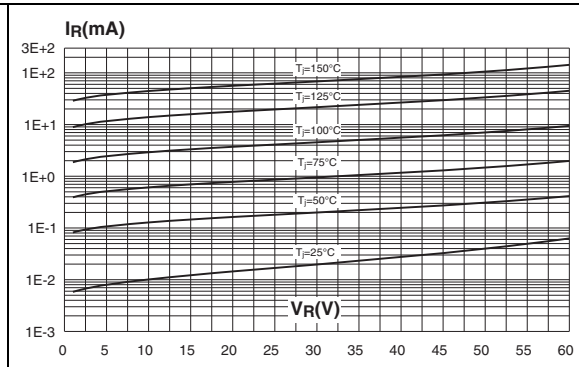
**Figure 6. Relative variation of thermal transient impedance junction to case versus pulse duration (TO-220FPAB)**



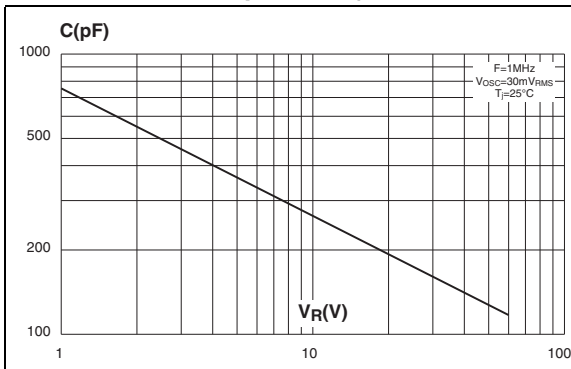
**Figure 7. Relative variation of thermal transient impedance junction to case versus pulse duration (D<sup>2</sup>PAK)**



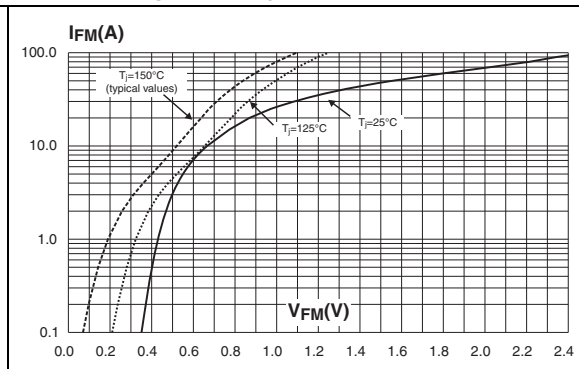
**Figure 8. Reverse leakage current versus reverse voltage applied (typical values, per diode)**



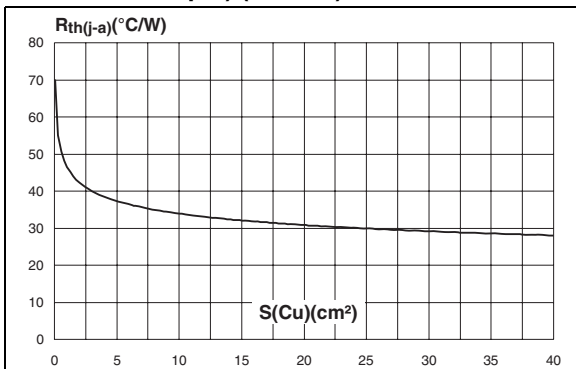
**Figure 9. Junction capacitance versus reverse voltage applied (typical values, per diode)**



**Figure 10. Forward voltage drop versus forward current (maximum values, per diode)**



**Figure 11. Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35  $\mu\text{m}$ ) (D<sup>2</sup>PAK)**



## 2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 Nm
- Maximum torque value: 0.70 Nm

**Table 3. TO-220FPAB dimensions**

REF.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
B	2.50	2.70	0.098	0.106
D	2.50	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1.00	0.030	0.039
F1	1.15	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.40	2.70	0.094	0.106
H	10.00	10.40	0.393	0.409
L2	16.00 Typ.		0.630 Typ.	
L3	28.60	30.60	1.126	1.205
L4	9.80	10.60	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.90	16.40	0.626	0.646
L7	9.00	9.30	0.354	0.366
Diam	3.00	3.20	0.118	0.126

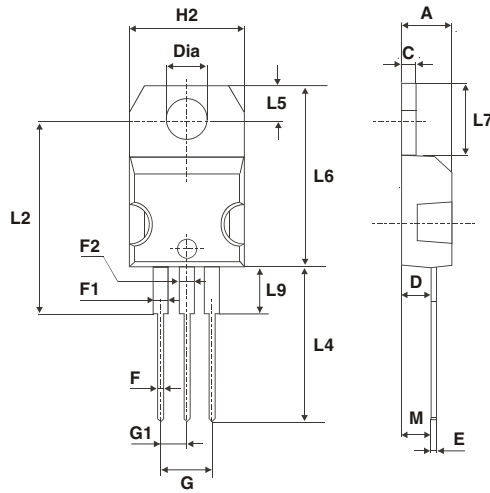
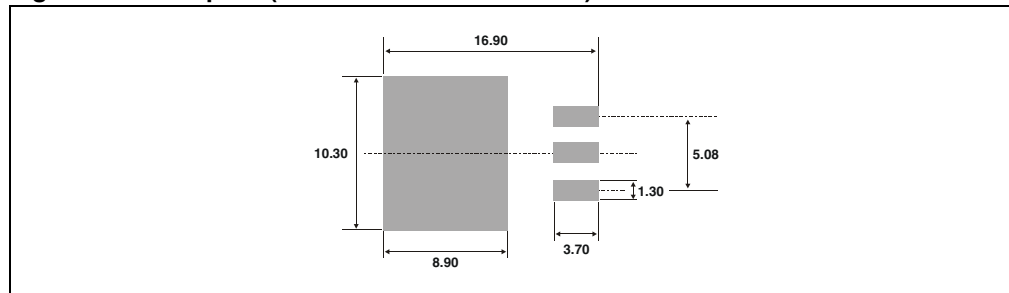


Table 4. D<sup>2</sup>PAK dimensions

Ref	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	0.208
L	15.00	15.85	0.590	0.624
L2	1.27	1.40	0.050	0.055
L3	1.40	1.75	0.055	0.069
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

Figure 12. Footprint (dimensions in millimeters)



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](http://www.st.com).

### 3 Ordering information

Type	Marking	Package	Weight	Base qty	Delivery mode
STPS10L60CFP	STPS10L60CFP	TO-220FPAB	2 g	50	Tube
STPS10L60CG	STPS10L60CG	D <sup>2</sup> PAK	1.48 g	50	Tube
STPS10L60CG-TR	STPS10L60CG	D <sup>2</sup> PAK	1.48 g	1000	Tape and reel

### 4 Revision history

Date	Revision	Description of Changes
Jul-2003	3C	Last release.
26-Mar-2007	4	Removed ISOWATT package. Added D <sup>2</sup> PAK package.

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