

High voltage power Schottky rectifier

Features

- High junction temperature capability
- Good trade-off between leakage current and forward voltage drop
- Low leakage current
- Avalanche capability specified
- Insulated package TO-220FPAB
 - Insulated voltage: 2000 V_{RMS}
 - Typical package capacitance: 12 pF

Description

Dual center tap Schottky rectifier designed for high frequency switched mode power supplies.

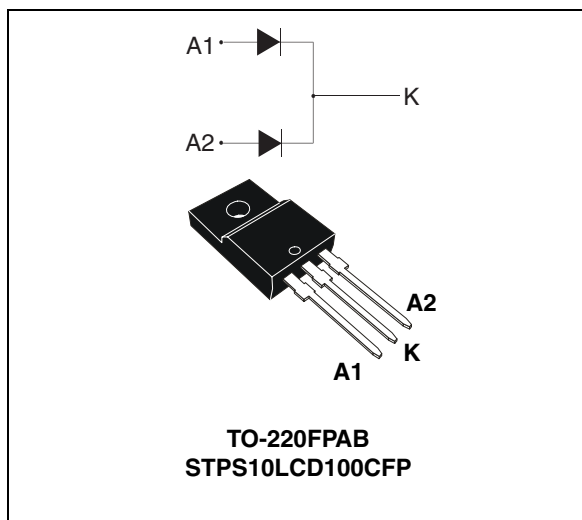


Table 1. Device summary

$I_{F(AV)}$	2 X 5 A
V_{RRM}	100 V
T_j	175 °C
V_F (typ)	0.64 V

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		100	V
$I_{F(RMS)}$	RMS forward current		30	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	per diode $T_c = 145\text{ °C}$	5	A
		per device $T_c = 135\text{ °C}$	10	
I_{FSM}	Surge non repetitive forward current	$t_p = 8.3\text{ ms sinusoidal}$	155	A
		$t_p = 10\text{ ms sinusoidal}$	150	
P_{ARM}	Repetitive peak avalanche power	$t_p = 1\text{ }\mu\text{s } T_j = 25\text{ °C}$	3360	W
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j	Maximum operating junction temperature ⁽¹⁾		175	°C
dV/dt	Critical rate of rise of reverse voltage		10000	V/ μs

1. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ 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	6.8	°C/W
		per device	4.9	
$R_{th(c)}$	Coupling		3.0	

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$			1.5	μA
		$T_j = 125\text{ °C}$			0.4	1	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 5\text{ A}$			0.84	V
		$T_j = 125\text{ °C}$			0.64	0.70	
		$T_j = 25\text{ °C}$	$I_F = 10\text{ A}$			0.93	V
		$T_j = 125\text{ °C}$			0.72	0.78	

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:

$$P = 0.62 \times I_{F(AV)} + 0.016 \times I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current

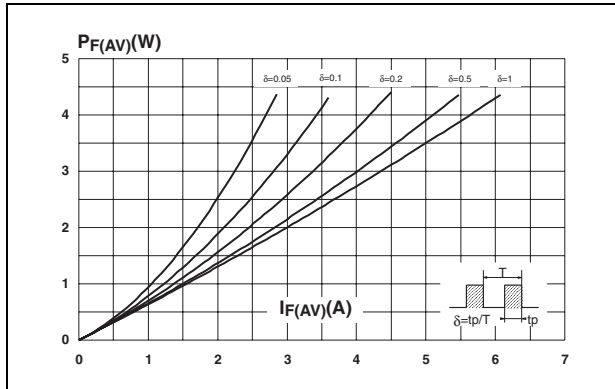


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

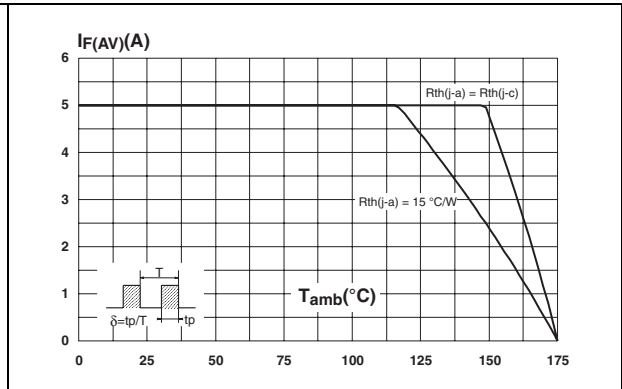


Figure 3. Normalized avalanche power derating versus pulse duration

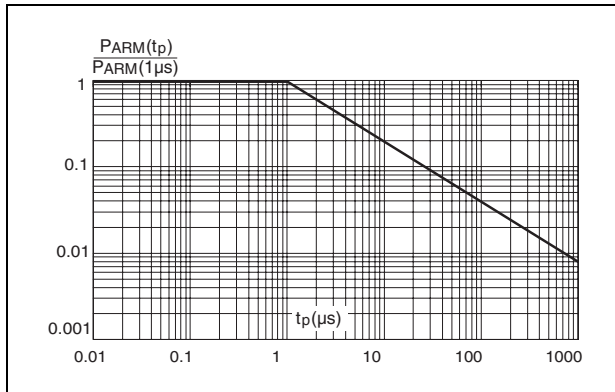


Figure 4. Normalized avalanche power derating versus junction temperature

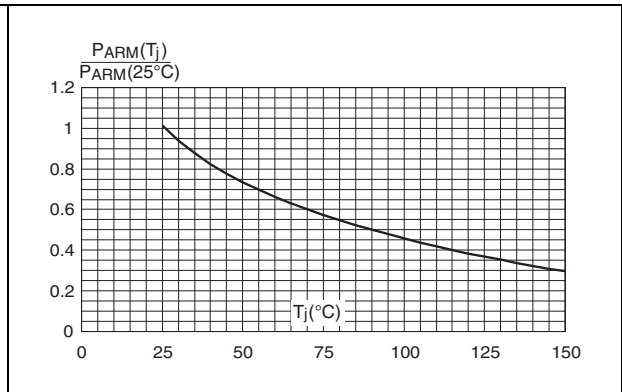


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

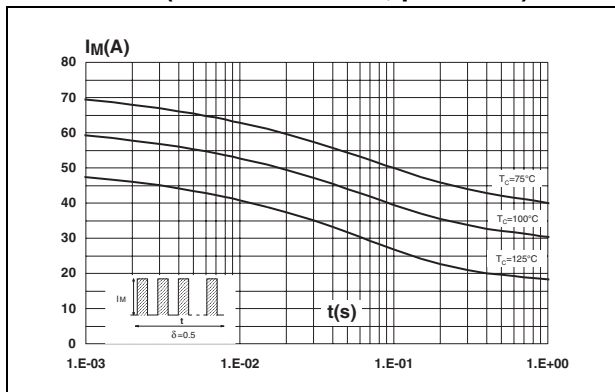


Figure 6. Relative variation of thermal impedance junction to ambient versus pulse duration

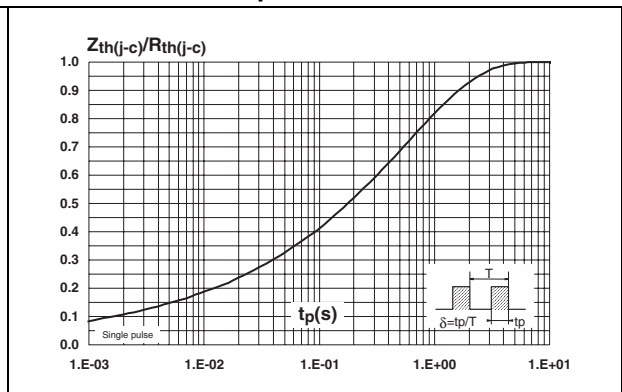


Figure 7. Reverse leakage current versus reverse voltage applied (typical values, per diode)

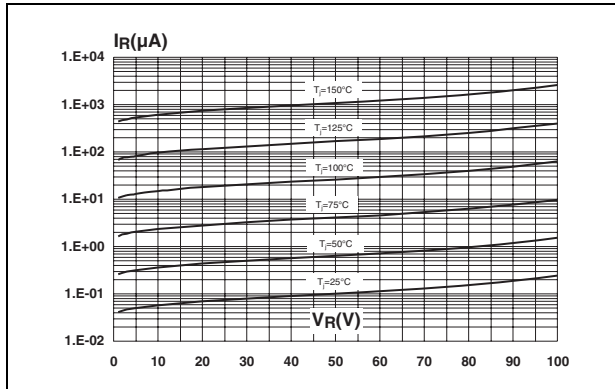


Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)

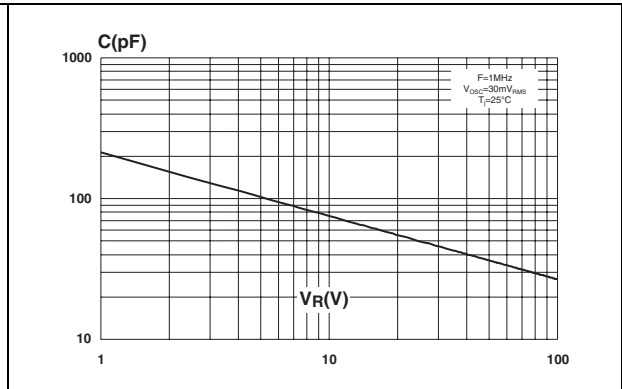
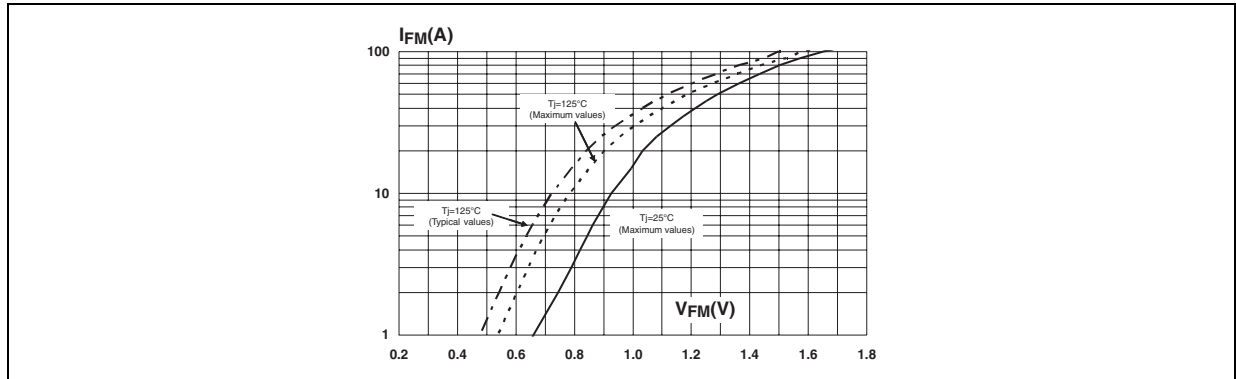


Figure 9. Forward voltage drop versus forward current (per diode)



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.4 N·m to 0.6 N·m

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.

Table 5. TO-220FPAB 3 leads in-line dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.9	0.173	0.192
B	2.5	2.9	0.098	0.114
D	2.45	2.75	0.096	0.108
E	0.4	0.7	0.016	0.028
F	0.6	1	0.024	0.039
F1	1.15	1.5	0.045	0.059
F2	1.15	1.5	0.045	0.059
G	4.95	5.2	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.7	0.394	0.421
L2	16 Typ.		0.630 Typ.	
L3	28.6	30.6	1.126	1.205
L4	9.8	10.7	0.386	0.421
L6	15.8	16.4	0.622	0.646
L7	9	9.9	0.354	0.390
Dia.	2.9	3.5	0.114	0.138

3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS10LCD100CFP	STPS10LCD100C	TO-220FPAB	2.0 g	50	Tube

4 Revision history

Table 7. Document revision history

Date	Revision	Description of changes
23-May-2008	1	First issue.

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