



STPS20L120C

Power Schottky rectifier

Features

- High junction temperature capability
- Avalanche capability specified
- Low forward voltage drop current
- High frequency operation
- Insulated package
 - TO-220FPAB
 - Insulating voltage = 1500 V rms
 - Typical package capacitance 12 pF

Description

Dual center tap Schottky rectifier suited for high frequency switch mode power supplies.

Packaged in TO-220AB and TO-220FPAB, this device provides the adaptor designers with an optimized price-performance ratio.

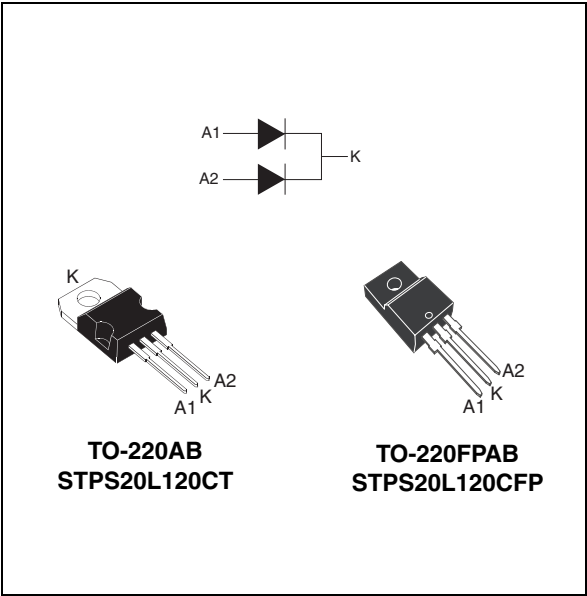


Table 1. Device summary

$I_{F(AV)}$	2 x 10 A
V_{RRM}	120 V
$T_{j(max)}$	150 °C
$V_{F(typ)}$	0.55 V

1 Characteristics

Table 2. Absolute ratings (limiting values, per diode)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		120	V
$I_{F(RMS)}$	Forward rms current		20	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	Total package	20	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10 \text{ ms}$ Sinusoidal	200	A
P_{ARM}	Repetitive peak avalanche power	$t_p = 1 \mu s$ $T_j = 25^\circ C$	8000	W
T_{stg}	Storage temperature range		-65 to + 175	$^\circ C$
T_j	Maximum operating junction temperature ⁽¹⁾		150	$^\circ C$

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

Table 3. Thermal parameters

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB	Per diode	2	$^\circ C/W$
			Total	1.1	
		TO-220FPAB	Per diode	4.9	
			Total	4.1	
$R_{th(c)}$	Coupling	TO-220AB	Total	0.2	
		TO-220FPAB		3.2	

When the diodes 1 and 2 are used simultaneously :

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

Table 4. Static electrical characteristics (per diode)

Symbol	Test conditions			Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25^\circ C$	$V_R = V_{RRM}$	-	-	120	μA
		$T_j = 125^\circ C$		-	8	25	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25^\circ C$	$I_F = 5 \text{ A}$	-	-	0.74	V
		$T_j = 125^\circ C$		-	0.55	0.605	
		$T_j = 25^\circ C$	$I_F = 10 \text{ A}$	-	-	0.86	
		$T_j = 125^\circ C$		-	0.63	0.69	
		$T_j = 25^\circ C$	$I_F = 20 \text{ A}$	-	-	1	
		$T_j = 125^\circ C$		-	0.72	0.785	

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

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

To evaluate the maximum conduction losses use the following equation :

$$P = 0.595 \times I_{F(AV)} + 0.0095 I_F^2(RMS)$$

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

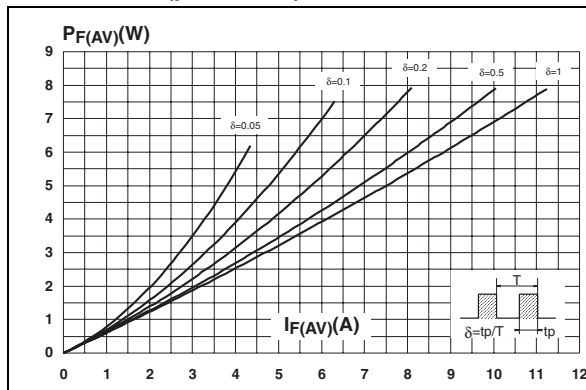


Figure 2. Average forward current vs. ambient temperature ($\delta = 0.5$, per diode)

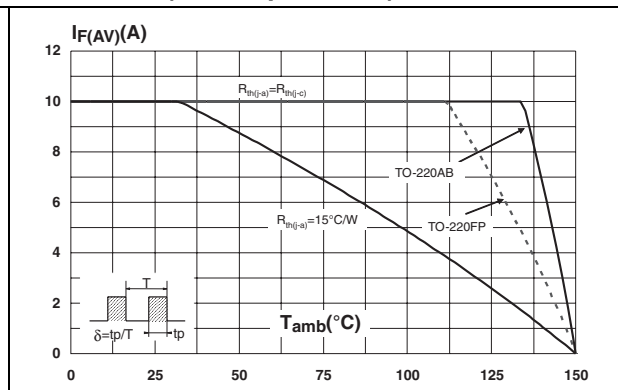


Figure 3. Normalized avalanche power derating vs. pulse duration

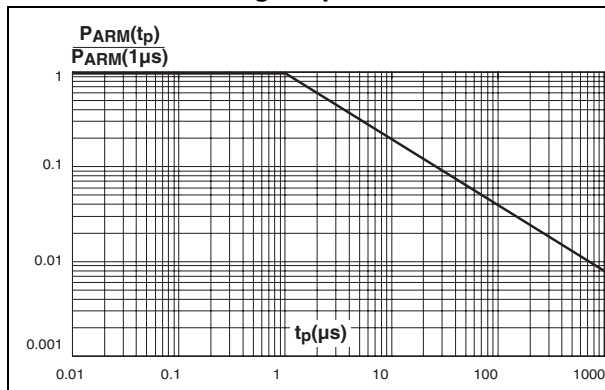


Figure 4. Normalized avalanche power derating vs. junction temperature

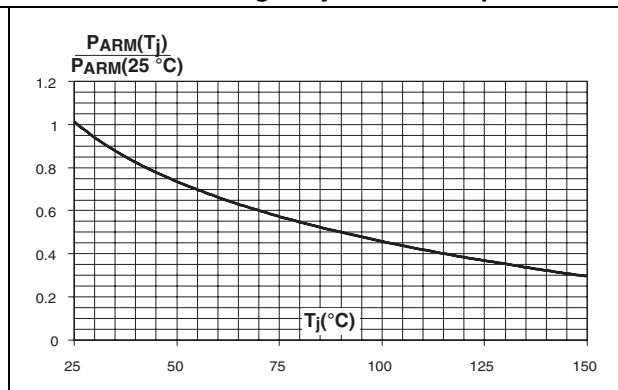


Figure 5. Non repetitive surge peak forward current vs. overload duration (max. values, per diode) (TO-220AB)

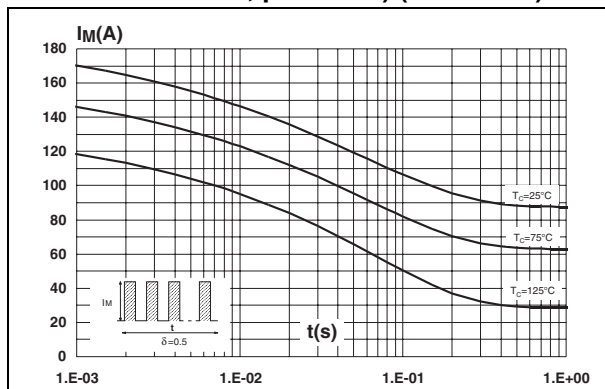


Figure 6. Non repetitive surge peak forward current vs. overload duration (max. values, per diode) (TO-220FPAB)

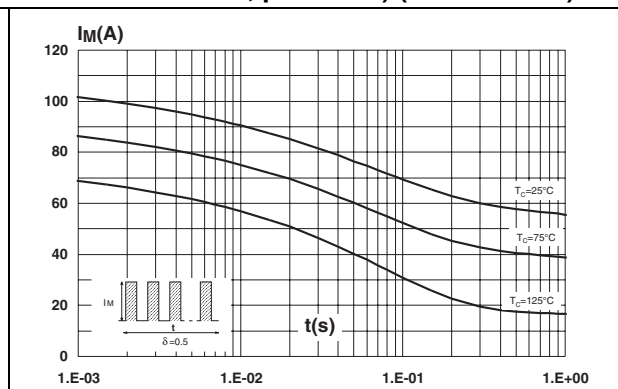


Figure 7. Relative variation of thermal impedance junction to case vs. pulse duration (TO-220AB)

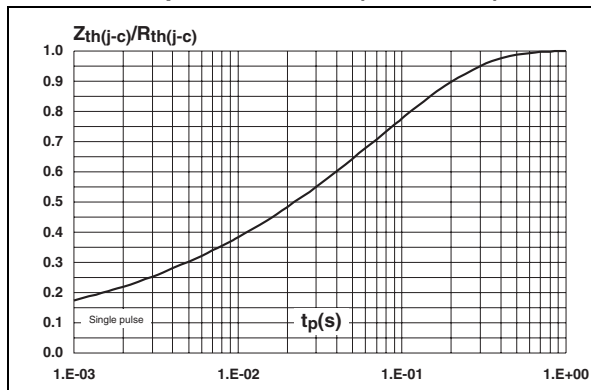


Figure 8. Relative variation of thermal impedance junction to case vs. pulse duration (TO-220FPAB)

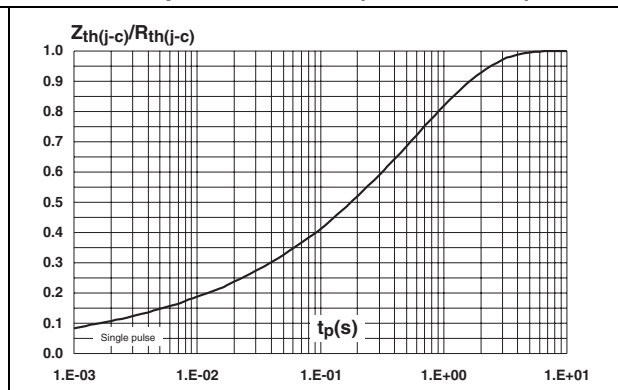


Figure 9. Reverse leakage current vs. reverse voltage applied (typical values, per diode)

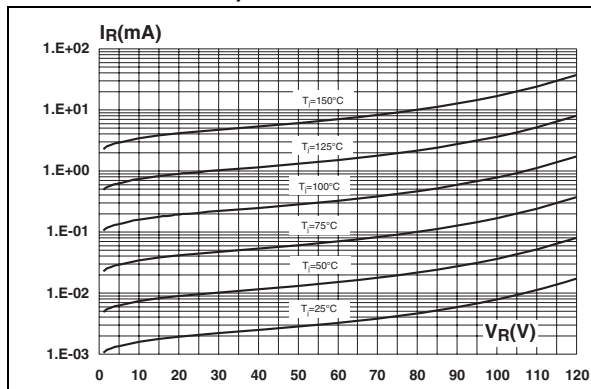


Figure 10. Junction capacitance vs. reverse voltage applied (typical values, per diode)

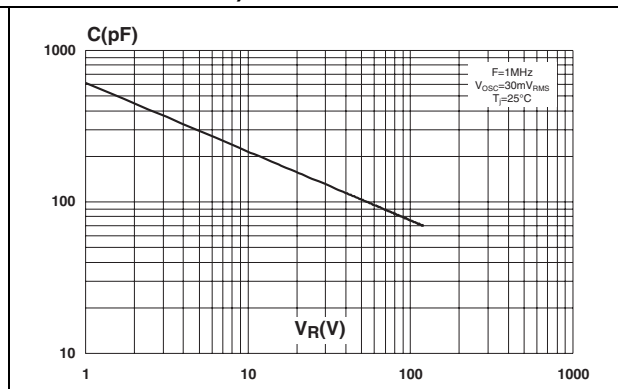
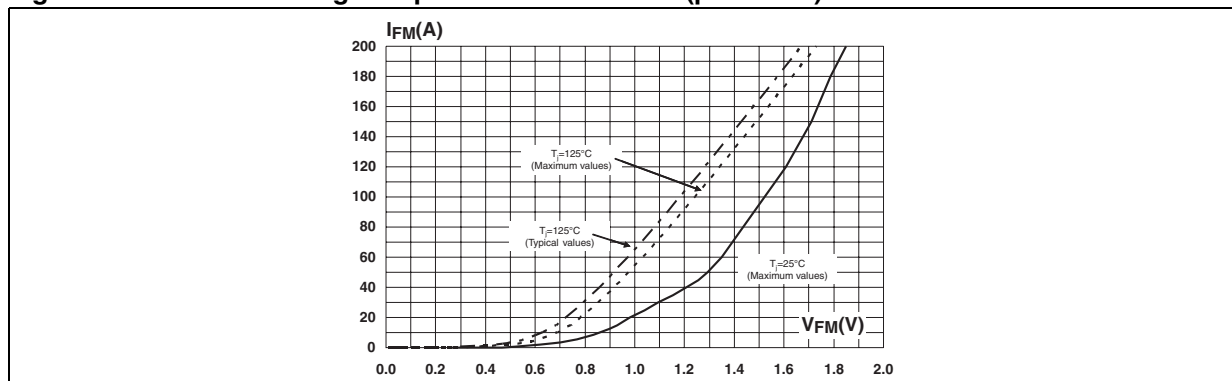


Figure 11. Forward voltage drop vs. forward current (per diode)



2 Package information

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

Table 5. 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

Table 6. TO-220FPAB dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.50	0.045	0.059
F2	1.15	1.50	0.045	0.059
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		0.63 Typ.	
L3	28.6	30.6	1.126	1.205
L4	9.8	10.6	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.9	16.4	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia.	3.00	3.20	0.118	0.126

3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS20L120CT	STPS20L120CT	TO-220AB	2.2 g	50	Tube
STPS20L120CFP	STPS20L120CFP	TO-220FPAB	2.0 g	50	Tube

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
20-May-2009	1	First issue

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