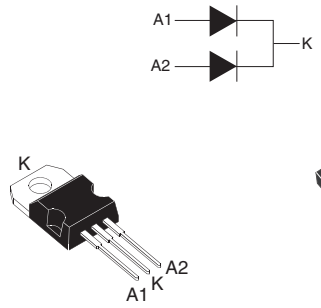
STPS10120C

Power Schottky rectifier

Table 1. Main product characteristics

$I_{F(AV)}$	2 x 5 A
V_{RRM}	120 V
$T_{j(max)}$	175° C
$V_{F(typ)}$	0.64 V



TO-220AB
STPS10120CT

TO-220FPAB
STPS10120CFP

Feature and benefits

- High junction temperature capability
- Good trade-off between leakage current and forward voltage drop
- Low leakage current
- Avalanche capability specified
- Insulated package
  - TO-220FPAB
    Insulating voltage = 2000 V
    Typical package capacitance 12 pF

Description

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

Table 2. Order code

Part number	Marking
STPS10120CT	STPS10120CT
STPS10120CFP	STPS10120CFP

Table 3. Absolute ratings (limiting values, per diode)

Symbol	Parameter				Value	Unit
V_{RRM}	Repetitive peak reverse voltage				120	V
$I_{F(RMS)}$	RMS forward current				30	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	TO-220AB	T_c = 160° C	Per diode	5	A
			T_c = 150° C	Per device	10	
		TO-220FPAB	T_c = 150° C	Per diode	5	
			T_c = 135° C	Per device	10	
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms Sinusoidal		120	A
P_{ARM}	Repetitive peak avalanche power		t_p = 1 µs T_j = 25° C		3000	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. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

1 Characteristics

Table 4. Thermal parameters

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB	Per diode Total	3.8 2.3	° C/W
		TO-220FPAB	Per diode Total	6.6 5.2	
$R_{th(c)}$	Coupling	TO-220AB	Total	0.7	
		TO-220FPAB		3.7	

When the diodes 1 and 2 are used simultaneously :
T_j(diode 1) = P(diode 1) x $R_{th(j-c)}$(per diode) + P(diode 2) x $R_{th(c)}$

Table 5. Static electrical characteristics (per diode)

Symbol	Test conditions			Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25° C	$V_R = V_{RRM}$			6	µA
		T_j = 125° C			1	3	mA
V_F(2)	Forward voltage drop	T_j = 25° C	I_F = 5 A			0.85	V
		T_j = 125° C			0.64	0.7	
		T_j = 25° C	I_F = 10 A			0.96	
		T_j = 125° C			0.73	0.8	

1. Pulse test : tp = 5 ms, δ < 2%
2. Pulse test : tp = 380 µs, δ < 2%

To evaluate the maximum conduction losses use the following equation :
$P = 0.60 \times I_{F(AV)} + 0.02\ I_F{}^2{}_{(RMS)}$

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

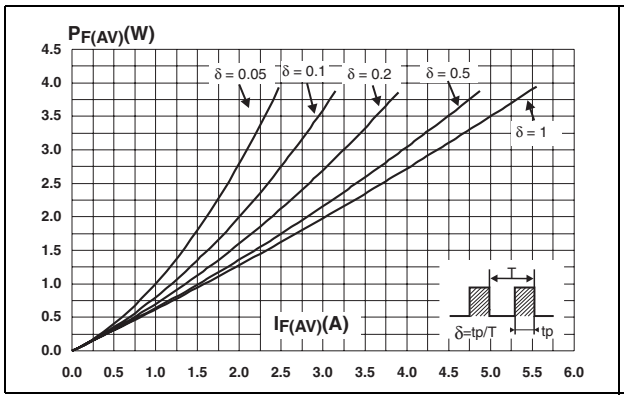


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

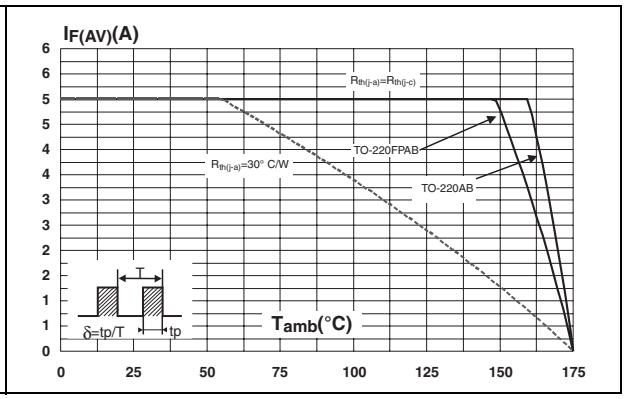


Figure 3. Normalized avalanche power derating versus pulse duration

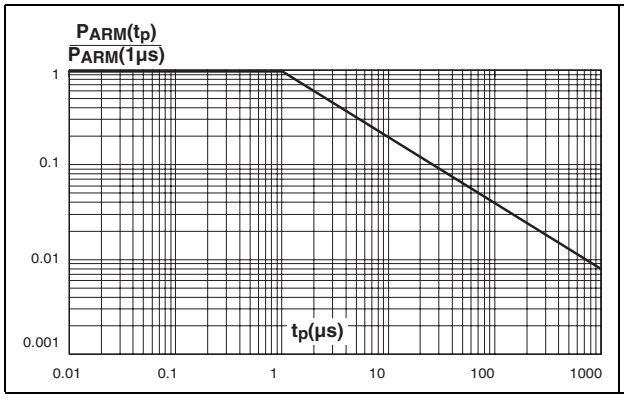


Figure 4. Normalized avalanche power derating versus junction temperature

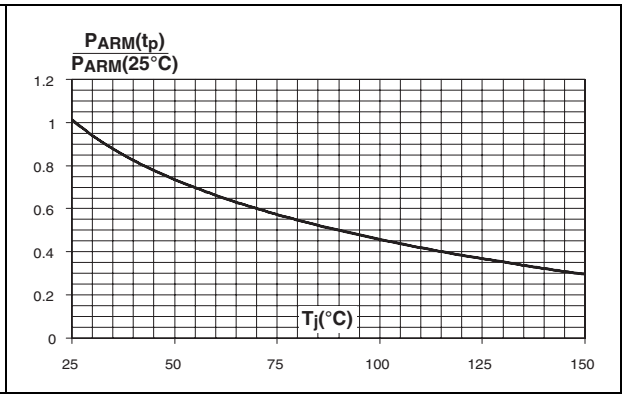


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TO-220AB)

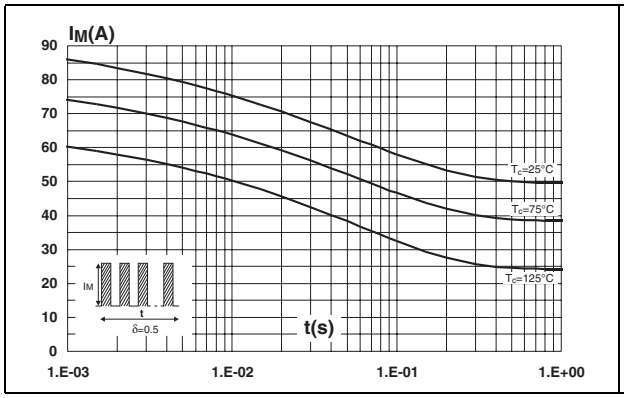


Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TO-220FPAB)

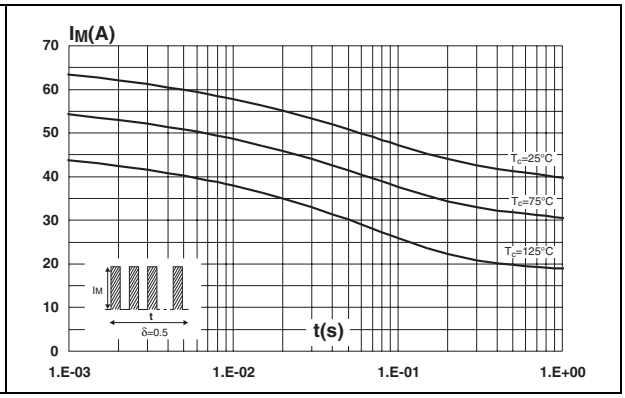


Figure 7. Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB)

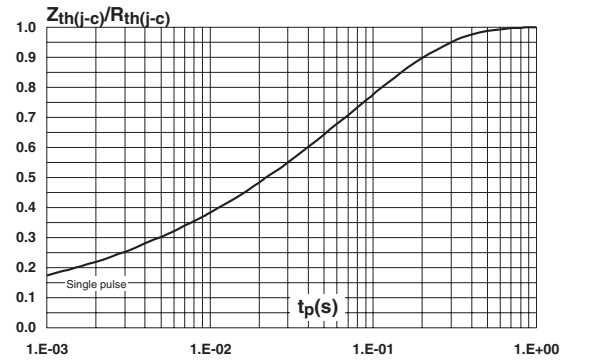


Figure 8. Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB)

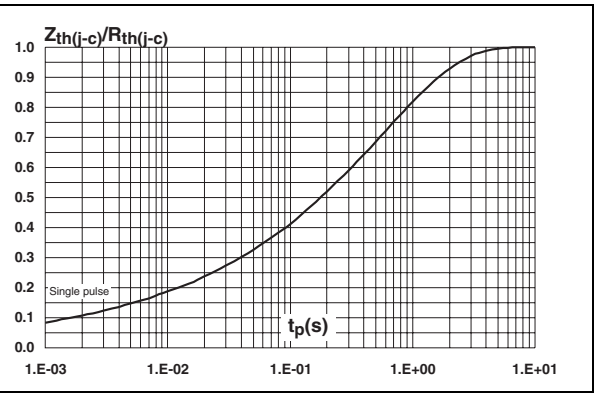


Figure 9. Reverse leakage current versus reverse voltage applied (typical values, per diode)

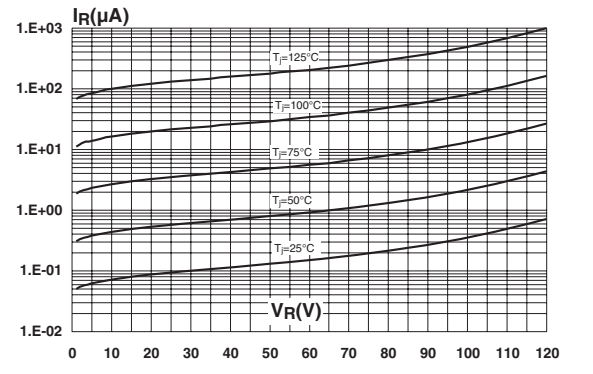


Figure 10. Junction capacitance versus reverse voltage applied (typical values, per diode)

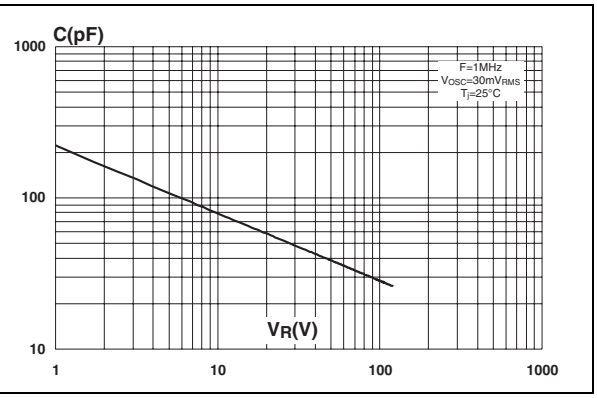
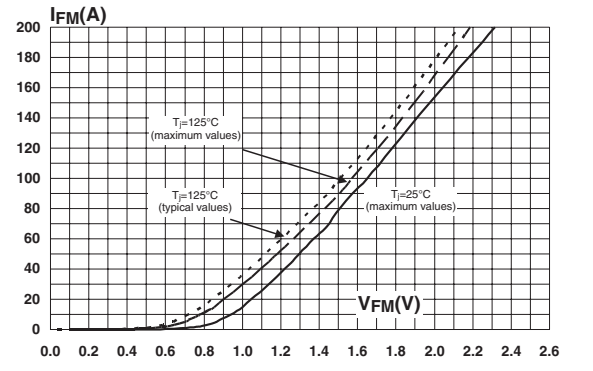


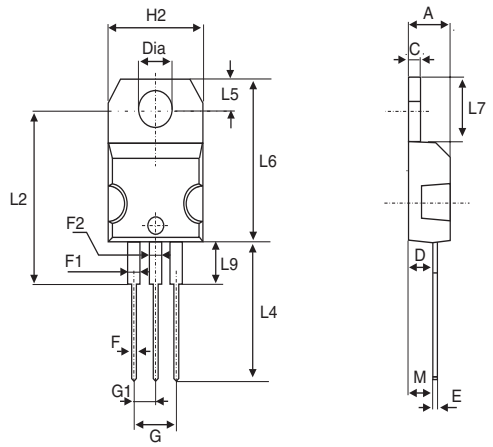
Figure 11. Forward voltage drop versus forward current (per diode)



2 Package information

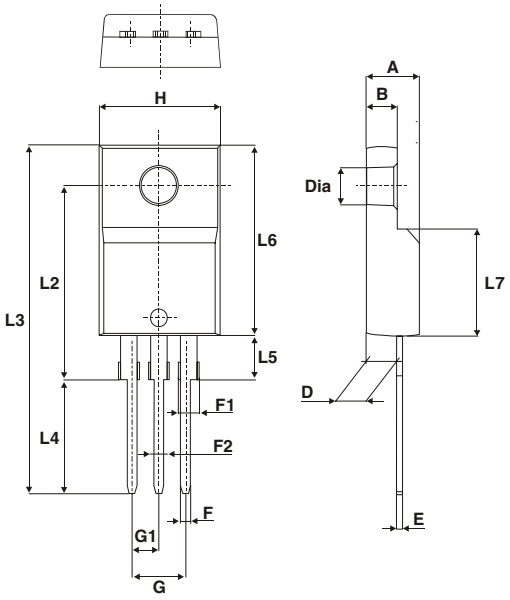
- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.4 to 0.6 Nm

Table 6. 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 7. 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	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	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

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3 Ordering information

Table 8. Ordering information

Part number	Marking	Package	Weight	Base qty	Delivery mode
STPS10120CT	STPS10120CT	TO-220AB	2.2 g	50	Tube
STPS10120CFP	STPS10120CFP	TO-220FPAB	2.0 g	50	Tube

4 Revision history

Table 9. Revision history

Date	Revision	Changes
11-Jul-2007	1	First issue

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