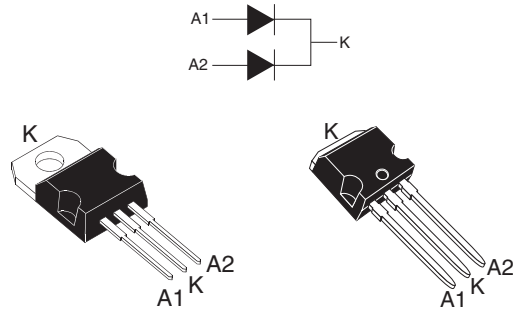
STPS40120C

Power Schottky rectifier

Main product characteristics

$I_{F(AV)}$	2 x 20 A
V_{RRM}	120 V
$T_{j(max)}$	175° C
$V_{F(typ)}$	0.57 V



TO-220AB
STPS40120CT

I^2PAK
STPS40120CR

Feature and benefits

- High junction temperature capability
- Avalanche rated
- Low leakage current
- Good trade-off between leakage current and forward voltage drop

Description

Dual center tap Schottky rectifier suited for high frequency Switch Mode Power Supply.

Packaged in TO-220AB and I^2PAK, this device is intended to be used in notebook and LCD adaptors, desktop SMPS, providing in these applications a margin between the remaining voltages applied on the diode and the voltage capability of the diode.

Order code

Part Number	Marking
STPS40120CT	STPS40120CT
STPS40120CR	STPS40120CR

Table 1. Absolute ratings (limiting values, per diode)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			120	V
$I_{F(RMS)}$	RMS forward voltage			30	A
$I_{F(AV)}$	Average forward current	$\delta = 0.5$ $Tc = 145°$ C	Per diode Per device	20 40	A
I_{FSM}	Surge non repetitive forward current		$t_p = 10$ ms Sinusoidal	200	A
P_{ARM}	Repetitive peak avalanche power		$t_p = 1$ µs $T_j = 25°$ C	10500	W
T_{stg}	Storage temperature range			-65 to + 175	° C
T_j	Maximum operating junction temperature(1)			175	° C

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid runaway for a diode on its own heatsink

1 Characteristics

Table 2. Thermal parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode Total	1.6 0.85	° C/W
$R_{th(c)}$	Coupling	Total	0.1	° C/W

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

Table 3. Static electrical characteristics (per diode)

Symbol	Test conditions			Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25° C	$V_R = V_{RRM}$			25	µA
		T_j = 125° C			4	12	mA
V_F(2)	Forward voltage drop	T_j = 25° C	I_F = 7.5 A			0.73	V
		T_j = 125° C			0.57	0.61	
		T_j = 25° C	I_F = 20A			0.9	
		T_j = 125° C			0.69	0.73	
		T_j = 25° C	I_F = 40 A			1	
		T_j = 125° C			0.83	0.88	

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 :
$P = 0.58 \times I_{F(AV)} + 0.0075\ I_{F\ (RMS)}^2$

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

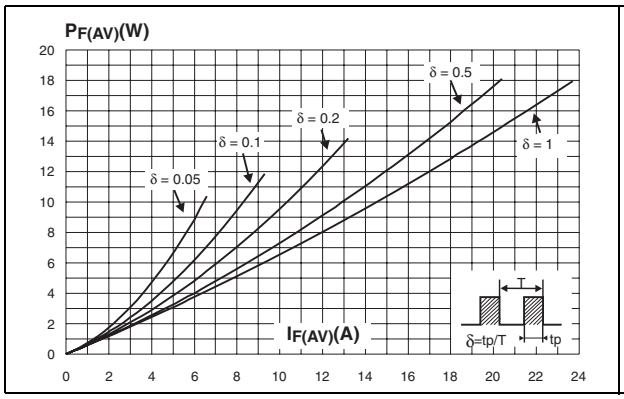


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

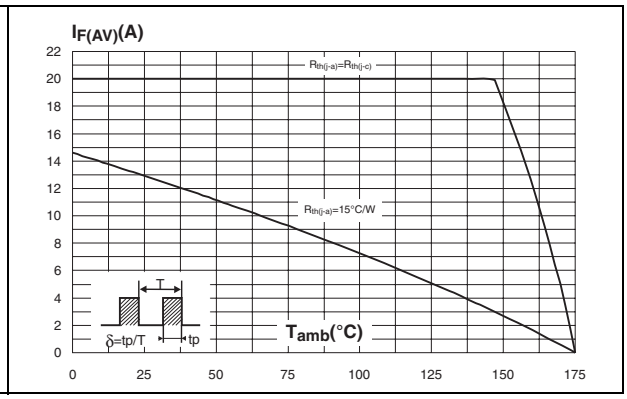


Figure 3. Normalized avalanche power derating versus pulse duration

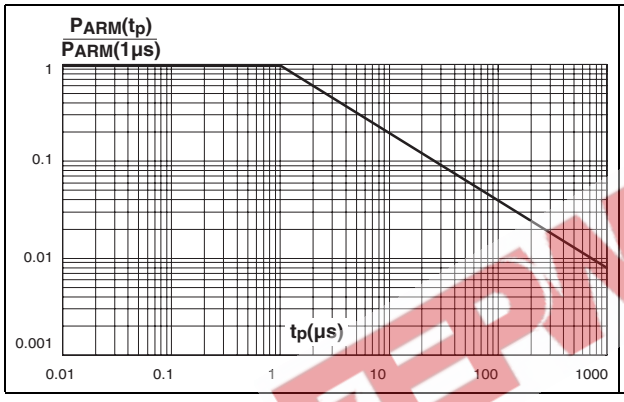


Figure 4. Normalized avalanche power derating versus junction temperature

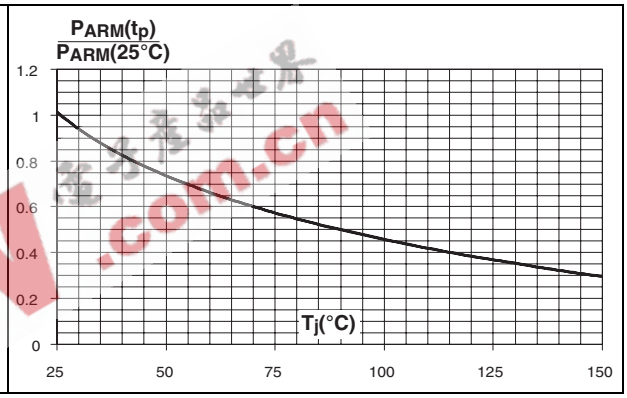


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

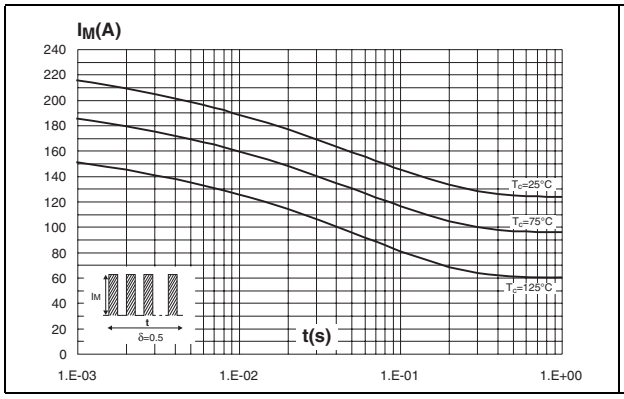


Figure 6. Relative variation of thermal impedance junction to ambient versus pulse duration

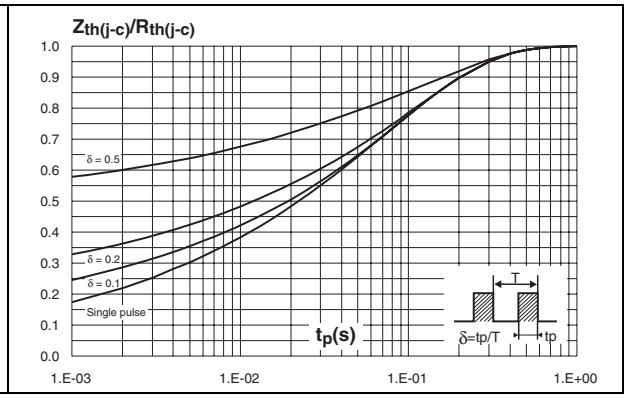


Figure 7. Reverse leakage current versus reverse voltage applied (typical values, per diode)

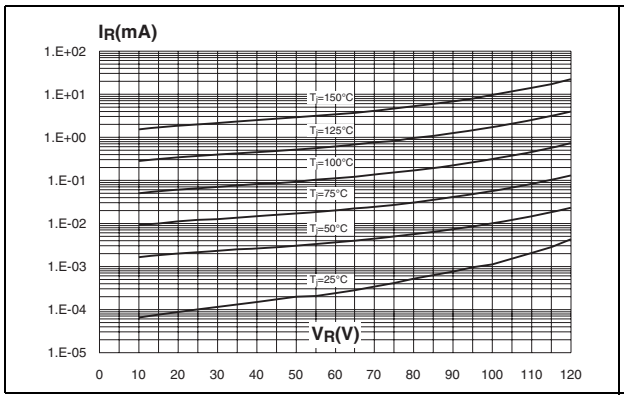


Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)

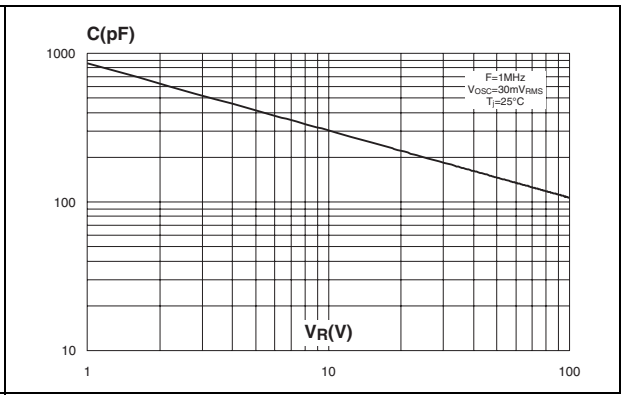
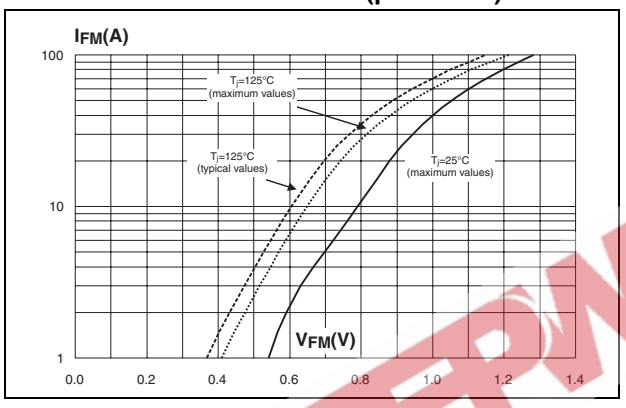


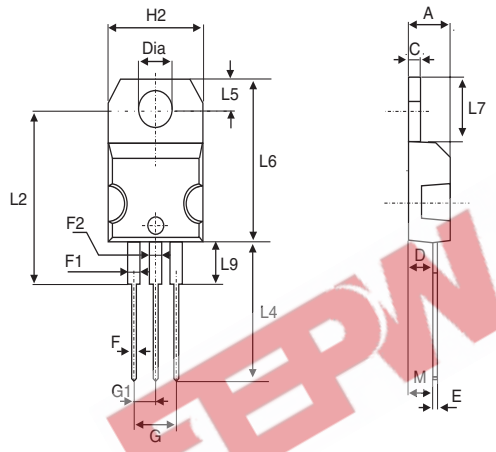
Figure 9. Forward voltage drop versus forward current (per diode)



2 Package information

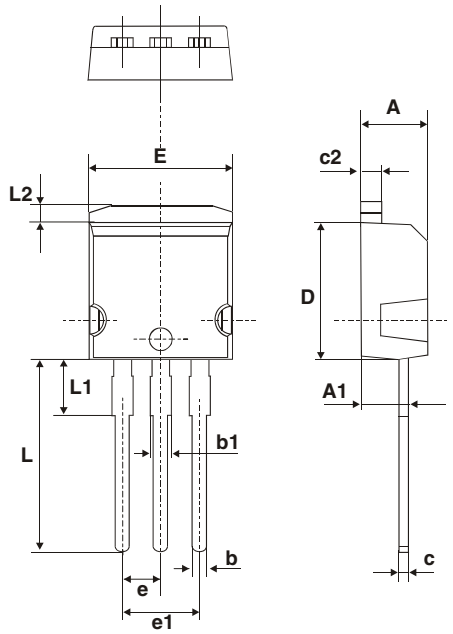
- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 Nm
- Maximum torque value: 1.0 Nm

Figure 10. 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 4. I^2PAK dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.40	2.72	0.094	0.107
b	0.61	0.88	0.024	0.035
b1	1.14	1.70	0.044	0.067
c	0.49	0.70	0.019	0.028
c2	1.23	1.32	0.048	0.052
D	8.95	9.35	0.352	0.368
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.195	0.203
E	10	10.40	0.394	0.409
L	13	14	0.512	0.551
L1	3.50	3.93	0.138	0.155
L2	1.27	1.40	0.050	0.055

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
STPS40120CT	STPS40120CT	TO-220AB	2.23 g	50	Tube
STPS40120CR	STPS40120CR	I^2PAK	1.49 g	50	Tube

4 Revision history

Date	Revision	Description of Changes
18-Feb-2005	1	First issue
1-Dec-2006	2	Reformatted to current standards. Added I^2PAK.

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