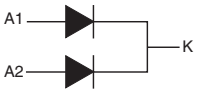
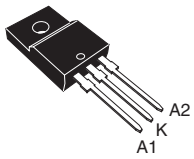
STPS20L40C

Low drop power Schottky rectifier

Main product characteristics

$I_{F(AV)}$	2 x 10 A
V_{RRM}	40 V
T_j (max)	150° C
V_F(max)	0.5 V





TO-220FPAB
STPS20L40CFP

Features and benefits

- Low forward voltage drop meaning very small conduction losses
- Low dynamic losses as a result of the schottky barrier
- Insulated package: TO-220FPAB
  insulating voltage = 200 V DC
  capacitance = 12 pF
- Avalanche capability specified

Description

Dual center tap Schottky rectifiers designed for high frequency switched mode power supplies and DC to DC converters.

These devices are intended for use in low voltage, high frequency inverters, free-wheeling and polarity protection applications.

1 Characteristics

Table 1. Absolute Ratings (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			40	V
$I_{F(RMS)}$	RMS forward voltage			30	A
$I_{F(AV)}$	Average forward current	T_c = 115° C δ = 0.5	Per diode Per device	10 20	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms Sinusoidal		180	A
I_{RRM}	Peak repetitive reverse current	t_p = 2 µs square F = 1 kHz		1	A
I_{RSM}	Non repetitive peak reverse current	t_p = 100 µs square		2	A
P_{ARM}	Repetitive peak avalanche power	t_p = 1 µs T_j = 25°C		4000	W
T_{stg}	Storage temperature range			-65 to + 150	°C
T_j	Maximum operating junction temperature (1)			150	°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

Table 2. Thermal resistances

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode Total Coupling	4.5 3.5 2.5	°C/W

When the diodes 1 and 2 are used simultaneously :
ΔTj(diode 1) = P(diode1) x $R_{th(j-c)}$(Per diode) + P(diode 2) x $R_{th(c)}$.

Table 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25° C	$V_R = V_{RRM}$			0.7	mA
		T_j = 100° C			15	35	mA
V_F (1)	Forward voltage drop	T_j = 25° C	I_F = 10 A			0.55	V
		T_j = 125° C	I_F = 10 A		0.44	0.5	
		T_j = 25° C	I_F = 20 A			0.73	
		T_j = 125° C	I_F = 20 A		0.62	0.72	

1. Pulse test: tp = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.28 \times I_{F(AV)} + 0.022\ I_F{}^2{}_{(RMS)}$

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

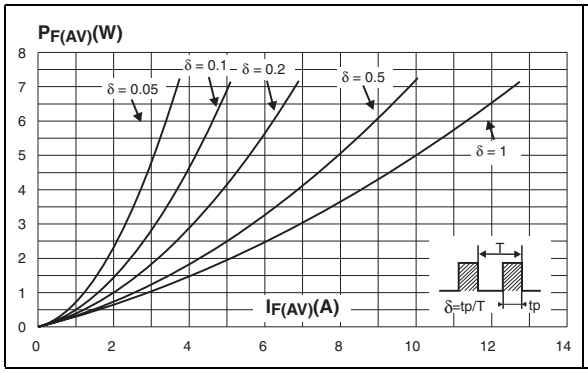


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

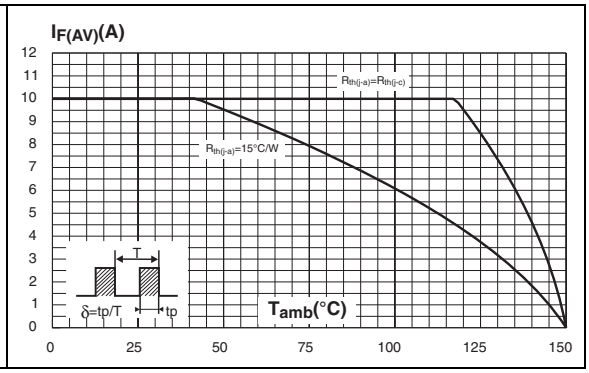


Figure 3. Normalized avalanche power derating versus pulse duration

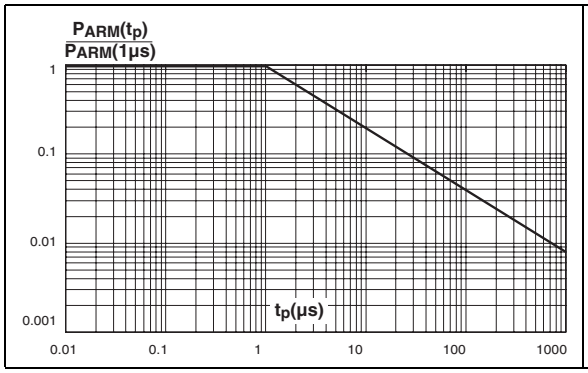


Figure 4. Normalized avalanche power derating versus junction temperature

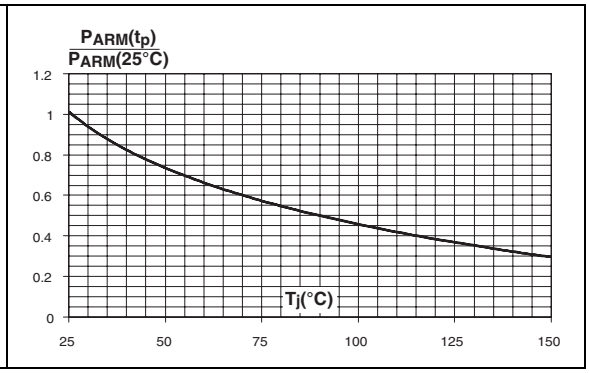


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

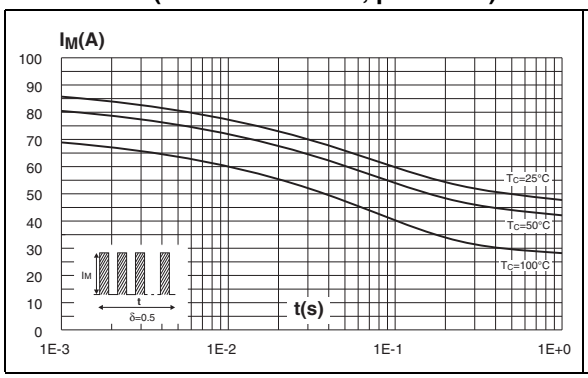


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

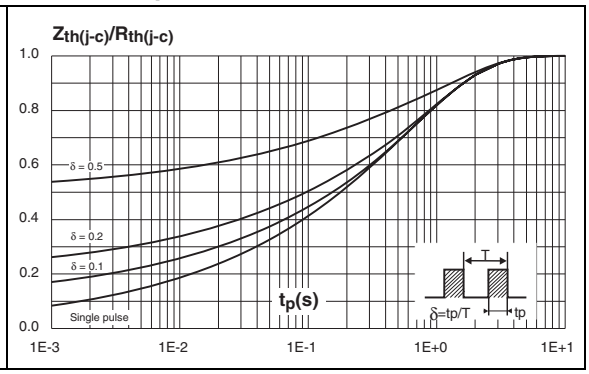


Figure 7. Reverse leakage current versus reverse voltage applied (typical values, per diode)

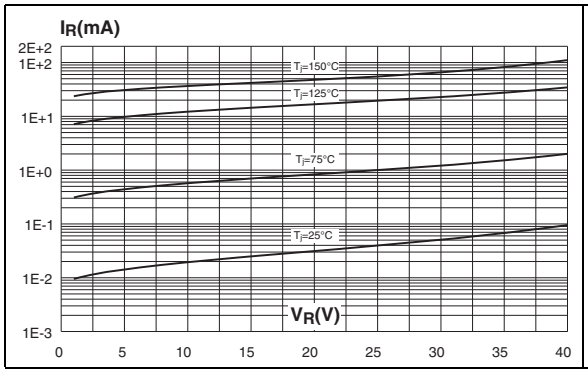


Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)

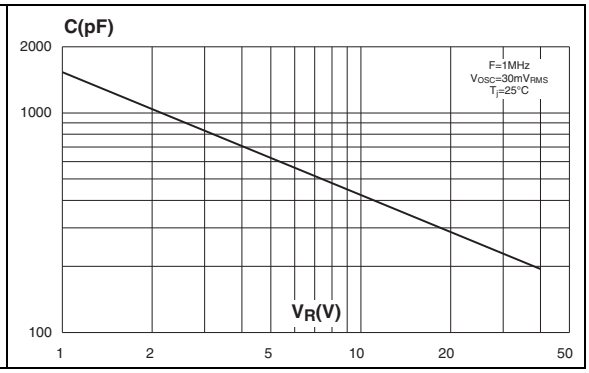
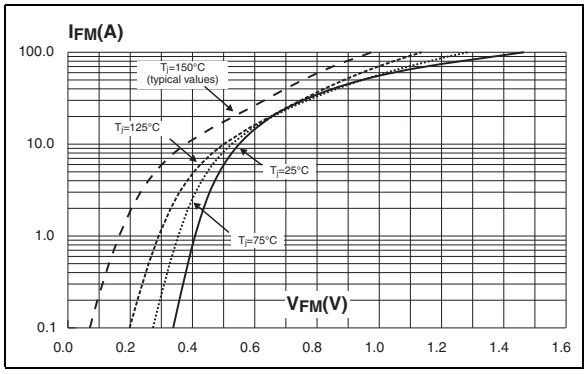


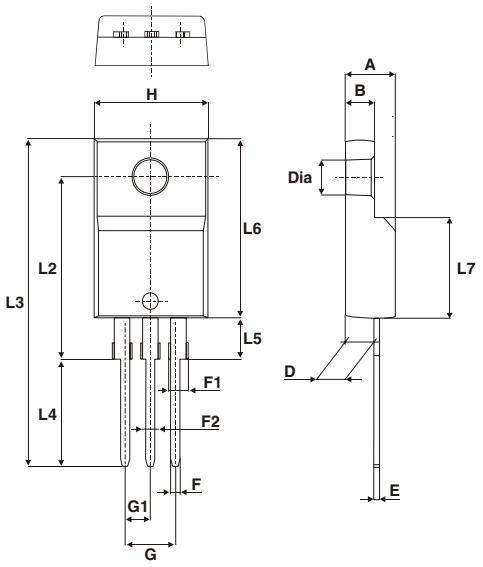
Figure 9. Forward voltage drop versus forward current (maximum values) (per diode)



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 4. 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

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
STPS20L40CFP	STPS20L40CFP	TO-220FPAB	2 g	50	Tube

4 Revision history

Date	Revision	Description of Changes
Jul_2003	4B	Last release.
26-Mar-2007	5	Removed ISOWATT, TO-220AB and TO-247 packages.

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