STPS16170C

High voltage power Schottky rectifier

Main product characteristics

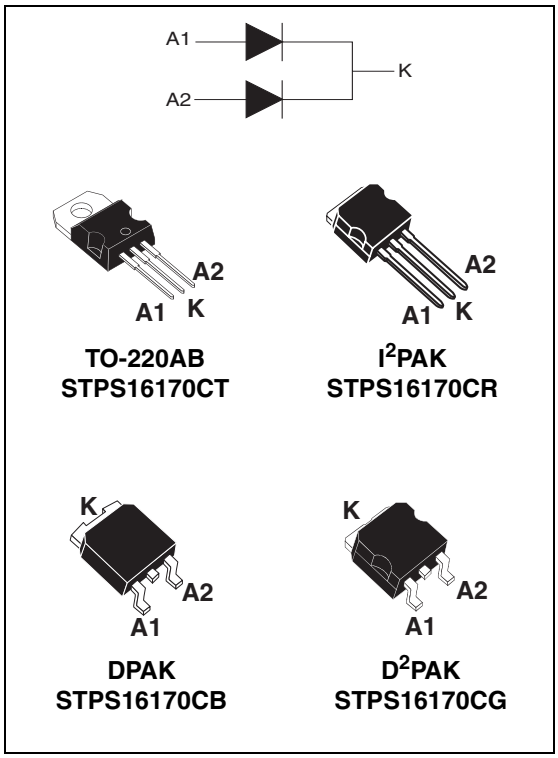
$I_{F(AV)}$	2 x 8 A
V_{RRM}	170 V
T_j	175° C
V_F (typ)	0.70 V

Features and benefits

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

Description

Dual centre tab Schottky rectifier designed for high frequency switch mode power supplies.



Order codes

Part Number	Marking
STPS16170CT	STPS16170CT
STPS16170CG	STPS16170CG
STPS16170CG-TR	STPS16170CG
STPS16170CR	STPS16170CR
STPS16170CB-TR	PS16170CB
STPS16170CB	PS16170CB

1 Characteristics

Table 1. Absolute ratings (limiting values per diode, T_{amb} = 25° C unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			170	V
$I_{F(RMS)}$	RMS forward current			20	A
$I_{F(AV)}$	Average forward current, δ = 0.5	T_c = 150° C	Per diode	8	A
			Total package	16	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms Sinusoidal		75	A
P_{ARM}	Releative peak avalanche power	T_j = 25° C	t_p = 1µs	4700	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			10 000	V/µs

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

Table 2. Thermal parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	3	°C/W
		Total	1.8	
$R_{th(c)}$	Coupling		0.6	

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25° C	$V_R = V_{RRM}$			15	µA
		T_j = 125° C				15	mA
V_F(2)	Forward voltage drop	T_j = 25° C	I_F = 8 A			0.92	V
		T_j = 125° C			0.70	0.75	
		T_j = 25° C	I_F = 16 A			1	
		T_j = 125° C			0.8	0.86	

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

To evaluate the conduction losses use the following equation:
$P = 0.64 \times I_{F(AV)} + 0.014 \times I_F{}^2{}_{(RMS)}$

Figure 1. Conduction losses versus average forward current (per diode)

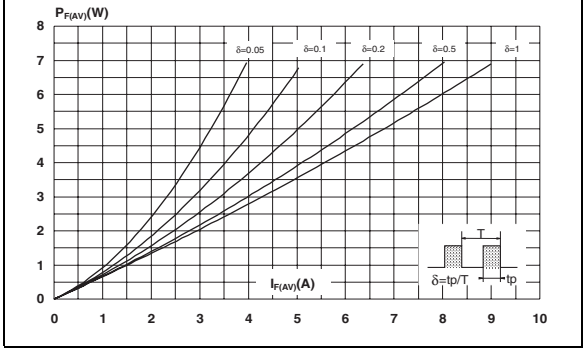


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

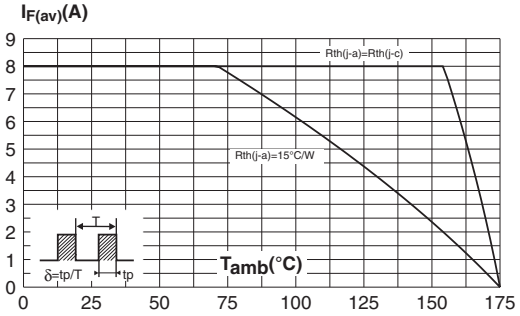


Figure 3. Normalized avalanche power derating versus pulse duration

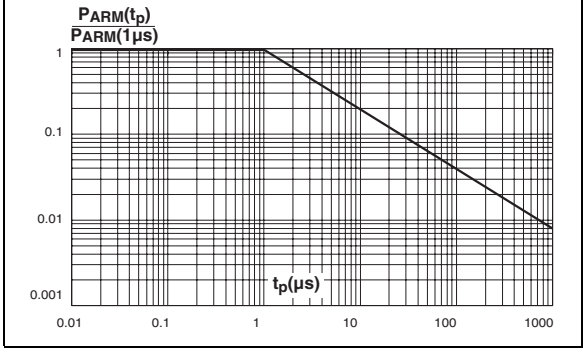


Figure 4. Normalized avalanche power derating versus junction temperature

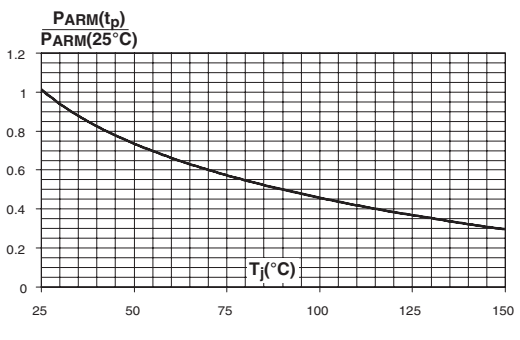


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

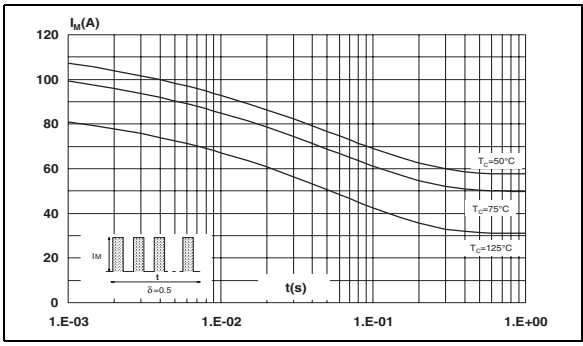


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

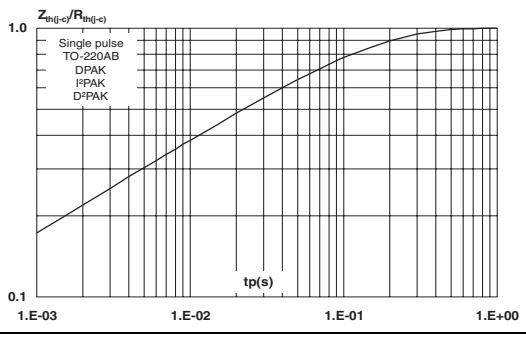


Figure 7. Reverse leakage current versus reverse voltage applied (typical values, per diode)

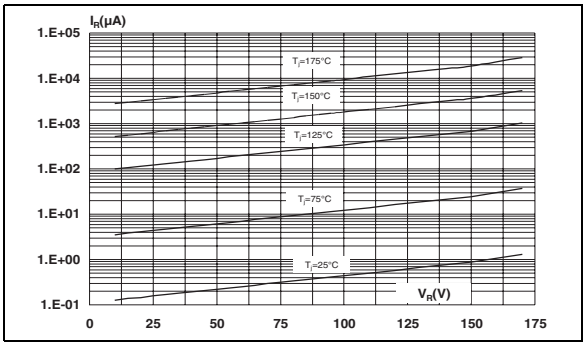


Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)

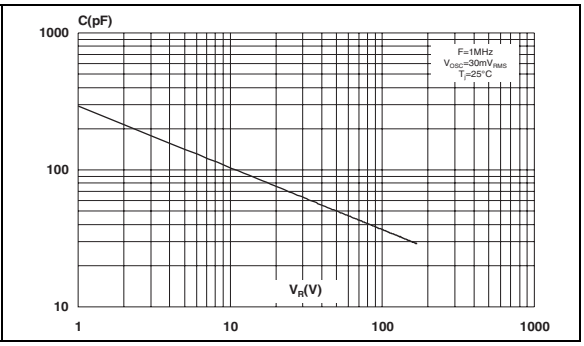


Figure 9. Forward voltage drop versus forward current (per diode)

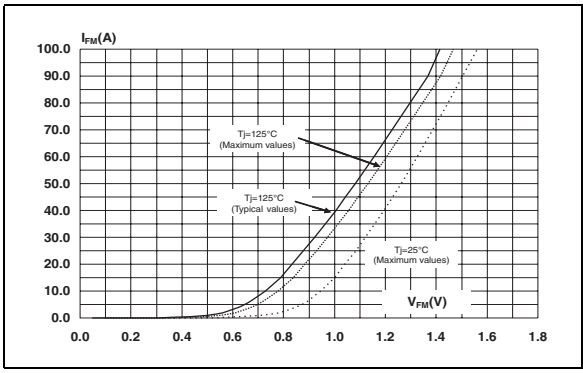


Figure 10. Thermal resistance junction to ambient versus copper surface under tab (epoxy printed board FR4, Cu = 35 µm - DPAK)

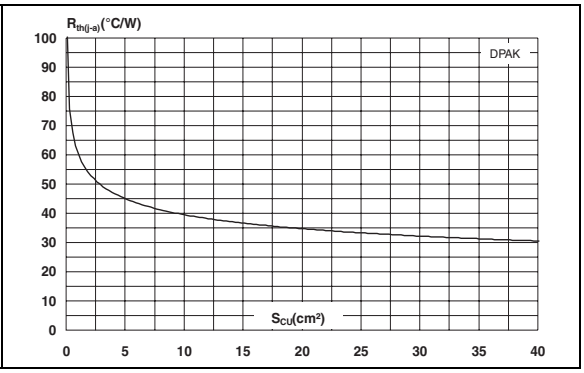
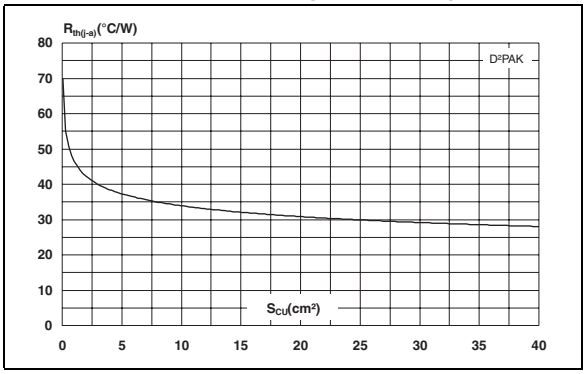


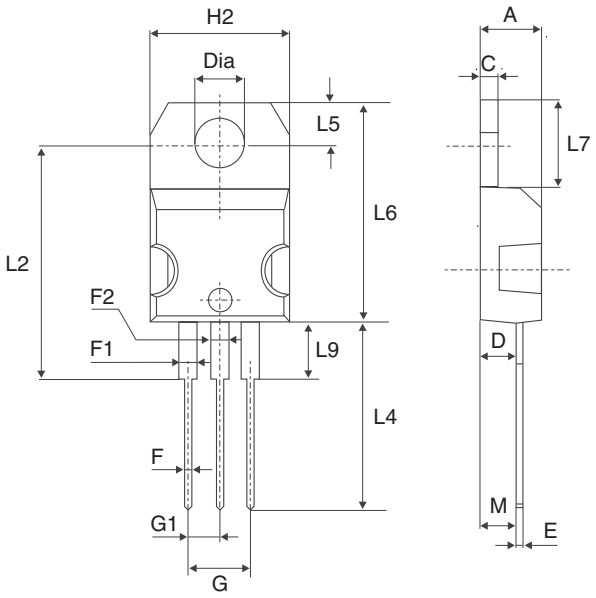
Figure 11. Thermal resistance junction to ambient versus copper surface under tab (epoxy printed board FR4, Cu = 35 µm - D^2PAK)



2 Package information

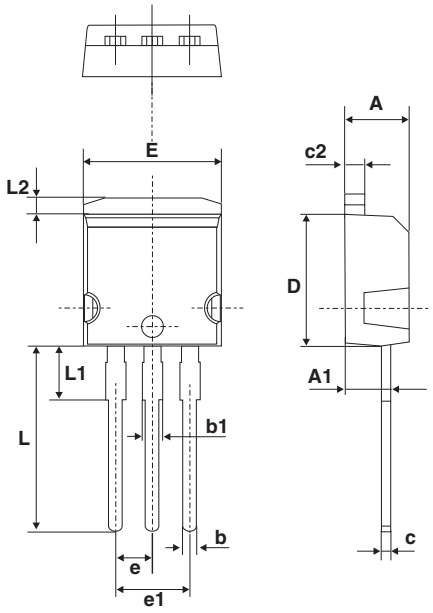
Epoxy meets UL94, V0

Table 4. T0-220AB dimensions



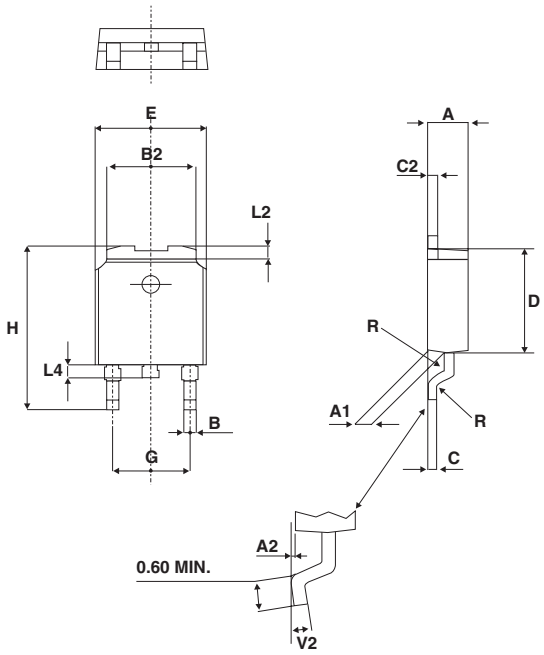
Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
F2	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
G1	2.40	2.70	0.094	0.106
H2	10	10.40	0.393	0.409
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 5. 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

Table 6. DPAK dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max	Min.	Max.
A	2.20	2.40	0.086	0.094
A1	0.90	1.10	0.035	0.043
A2	0.03	0.23	0.001	0.009
B	0.64	0.90	0.025	0.035
B2	5.20	5.40	0.204	0.212
C	0.45	0.60	0.017	0.023
C2	0.48	0.60	0.018	0.023
D	6.00	6.20	0.236	0.244
E	6.40	6.60	0.251	0.259
G	4.40	4.60	0.173	0.181
H	9.35	10.10	0.368	0.397
L2	0.80 typ.		0.031 typ.	
L4	0.60	1.00	0.023	0.039
V2	0°	8°	0°	8°

Figure 12. DPAK footprint (dimensions in mm)

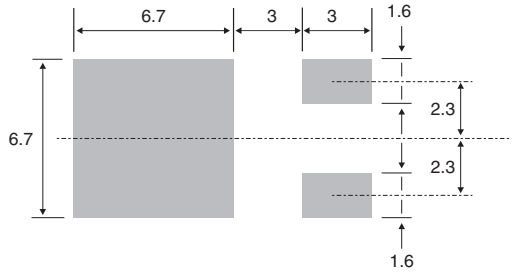
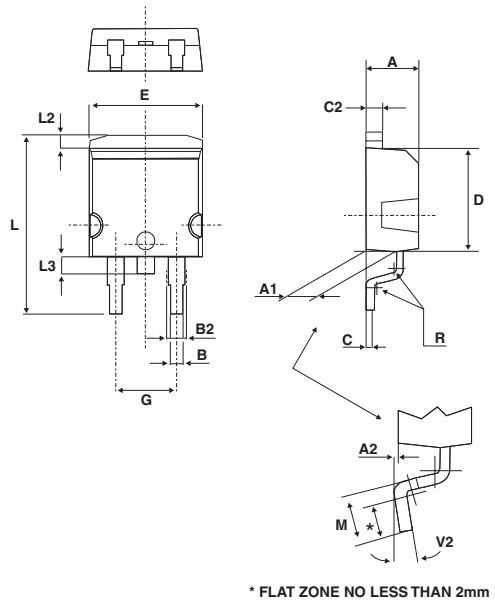
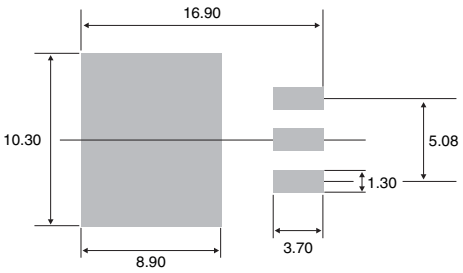


Table 7. D²PAK dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	0.208
L	15.00	15.85	0.590	0.624
L2	1.27	1.40	0.050	0.055
L3	1.40	1.75	0.055	0.069
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

Figure 13. D²PAK footprint (dimensions in mm)



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

Part Number	Marking	Package	Weight	Base qty	Delivery mode
STPS16170CT	STPS16170CT	TO-220ABB	2.23 g	50	Tube
STPS16170CG	STPS16170CG	D^2PAK	1.48 g	50	Tube
STPS16170CG-TR	STPS16170CG	D^2PAK	1.48 g	1000	Tape and reel
STPS16170CR	STPS16170CR	I^2PAK	1.49 g	50	Tube
STPS16170CB-TR	PS16170CB	DPAK	0.3 g	2500	Tape and reel
STPS16170CB	PS16170CB	DPAK	0.3 g	75	Tube

4 Revision history

Date	Revision	Description of Changes
13-Jul-2006	1	First issue

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