STPS30170C

HIGH VOLTAGE POWER SCHOTTKY RECTIFIER

Table 1: Main Product Characteristics

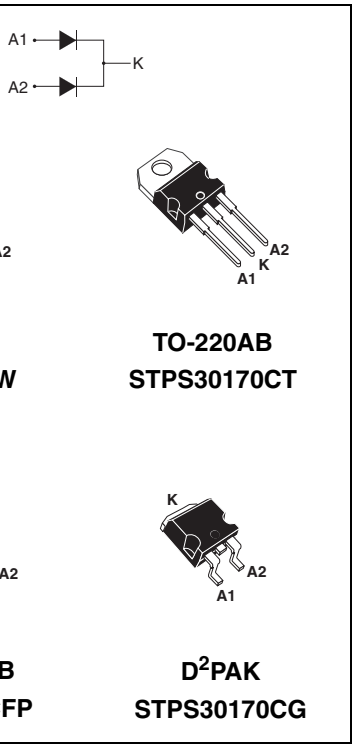
$I_{F(AV)}$	2 x 15 A
V_{RRM}	170 V
T_j	175 °C
V_F(max)	0.75 V

FEATURES AND BENEFITS

- High junction temperature capability
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Insulated package: TO-220FPAB
  Insulating voltage: 2000 V DC
  Capacitance: 45 pF
- Avalanche specification

DESCRIPTION

Dual center tab Schottky rectifier suited for High Frequency Switch Mode Power Supply.



TO-247
STPS30170CW

TO-220AB
STPS30170CT

TO-220FPAB
STPS30170CFP

D^2PAK
STPS30170CG

Table 2: Order Codes

Part Numbers	Marking
STPS30170CW	STPS30170CW
STPS30170CT	STPS30170CT
STPS30170CFP	STPS30170CFP
STPS30170CG	STPS30170CG
STPS30170CG-TR	STPS30170CG

Table 3: Absolute Ratings (limiting values, per diode)

Symbol	Parameter				Value	Unit
V_{RRM}	Repetitive peak reverse voltage				170	V
$I_{F(RMS)}$	RMS forward current				30	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO-220FPAB	Tc = 120 °C	Per diode	15	A
		TO-220AB / D^2PAK	Tc = 155 °C			
		TO-247		Per device	30	
I_{FSM}	Surge non repetitive forward current		tp = 10ms sinusoidal		220	A
P_{ARM}	Repetitive peak avalanche power		tp = 1µs Tj = 25 °C		10500	W
T_{stg}	Storage temperature range				-65 to + 175	°C
T_j	Maximum operating junction temperature *				175	°C
dV/dt	Critical rate of rise of reverse voltage				10000	V/µs

* : $\frac{dPtot}{dTj} > \frac{1}{Rth(j-a)}$ thermal runaway condition for a diode on its own heatsink

Table 4: Thermal Parameters

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220FPAB	Per diode Total	4 3.3	°C/W
		TO-220AB / D^2PAK	Per diode Total	1.6 0.85	
		TO-247	Per diode Total	1.5 0.8	
$R_{th(c)}$		TO-220FPAB	Coupling	2.6	°C/W
		TO-220AB / D^2PAK	Coupling	0.3	
		TO-247	Coupling	0.3	

When the diodes 1 and 2 are used simultaneously:

Δ Tj(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	Parameter	Tests conditions		Min.	Typ	Max.	Unit
I_R *	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			20	µA
		T_j = 125 °C			5	20	mA
V_F **	Forward voltage drop	T_j = 25 °C	I_F = 15 A			0.92	V
		T_j = 125 °C			0.69	0.75	
		T_j = 25 °C	I_F = 30 A			1	
		T_j = 125 °C			0.80	0.86	

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

To evaluate the conduction losses use the following equation: P = 0.64 x $I_{F(AV)}$ + 0.0073 $I_F{}^2{}_{(RMS)}$

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

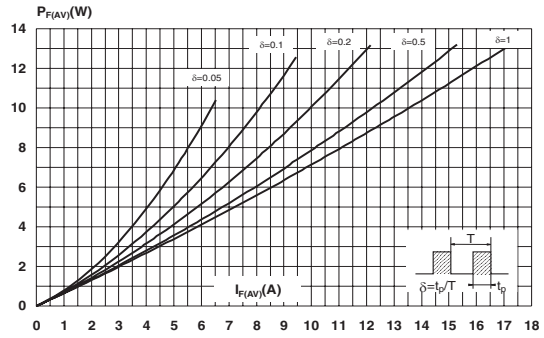


Figure 2: Average forward current versus ambient temperature (δ = 0.5, per diode)

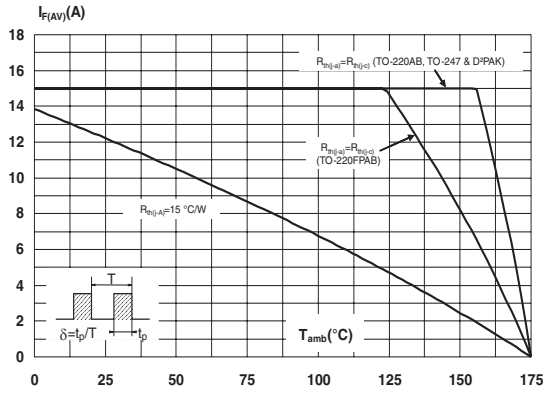


Figure 3: Normalized avalanche power derating versus pulse duration

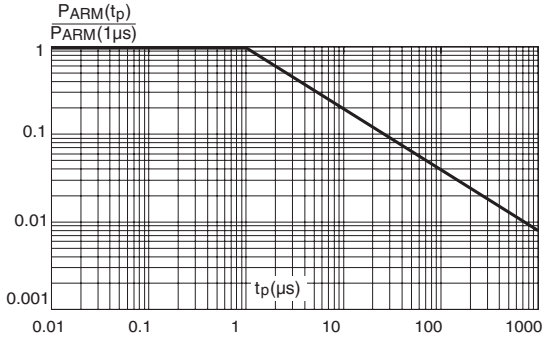


Figure 4: Normalized avalanche power derating versus junction temperature

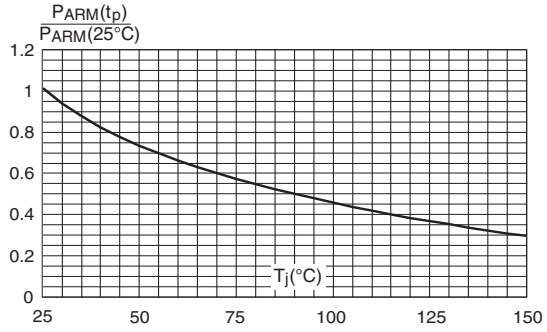


Figure 5: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TO-220AB, TO-247, D²PAK)

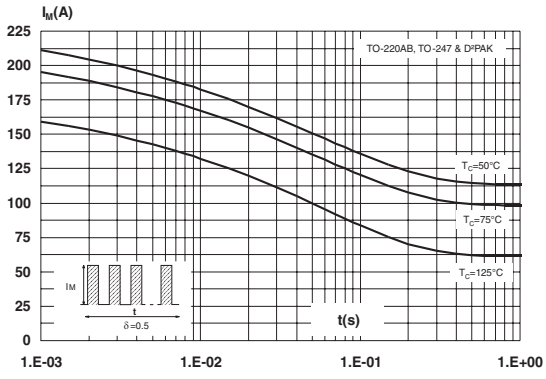


Figure 6: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TO-220FPAB)

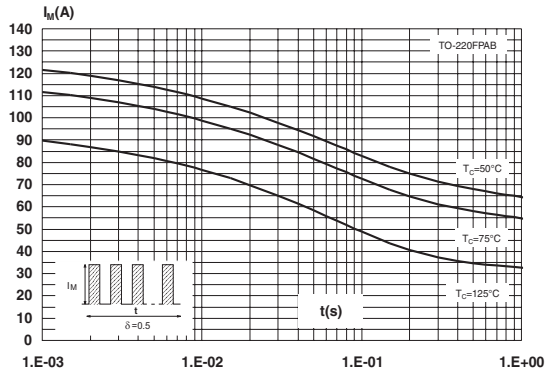


Figure 7: Relative variation of thermal impedance junction to case versus pulse duration (per diode) (TO-220AB, TO-247, D²PAK)

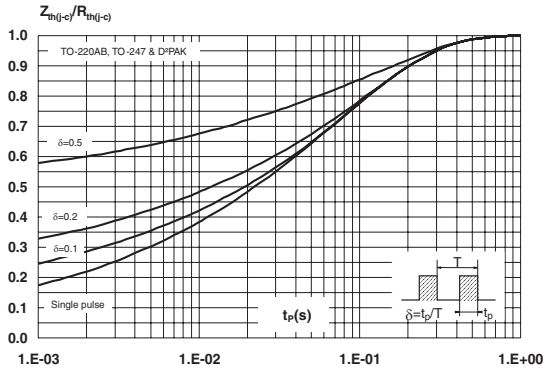


Figure 8: Relative variation of thermal impedance junction to case versus pulse duration (per diode) (TO-220FPAB)

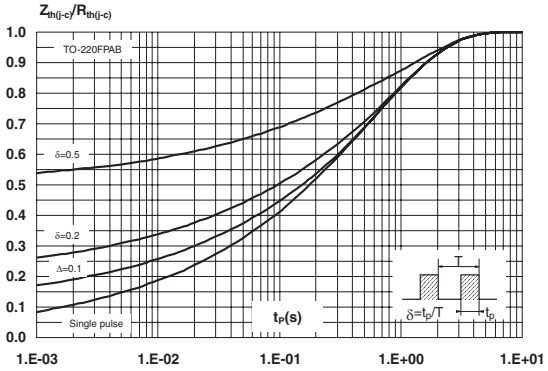


Figure 9: Reverse leakage current versus reverse voltage applied (typical values, per diode)

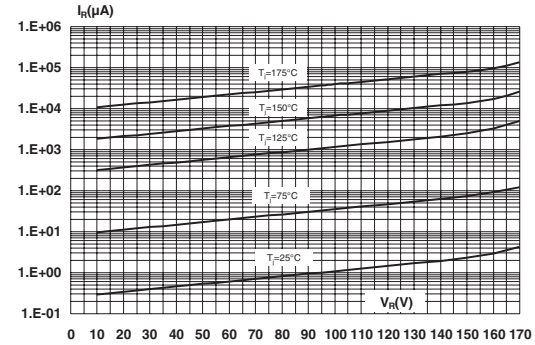


Figure 10: Junction capacitance versus reverse voltage applied (typical values, per diode)

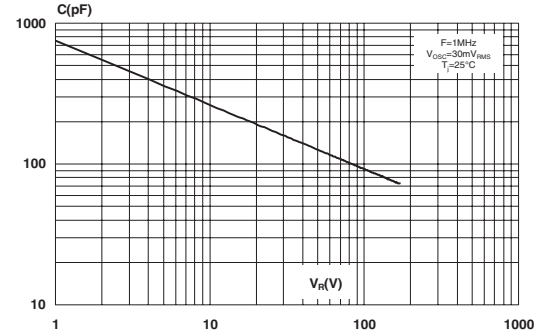


Figure 11: Forward voltage drop versus forward current (maximum values, per diode, low level)

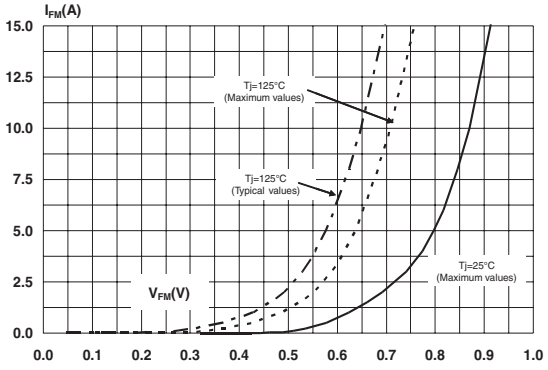


Figure 12: Forward voltage drop versus forward current (maximum values, per diode, high level)

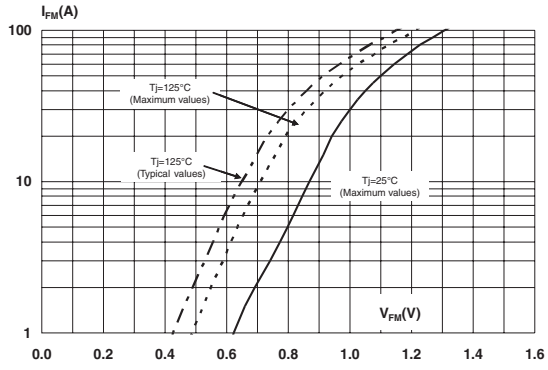


Figure 13: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board, copper thickness: 35 µm) (D^2PAK)

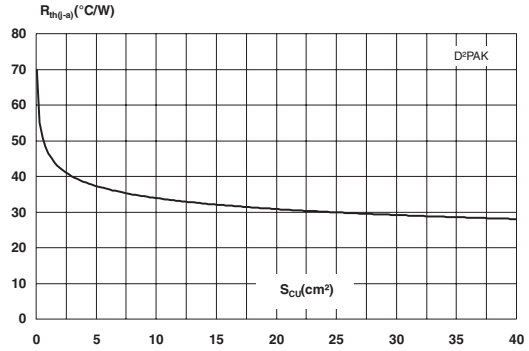
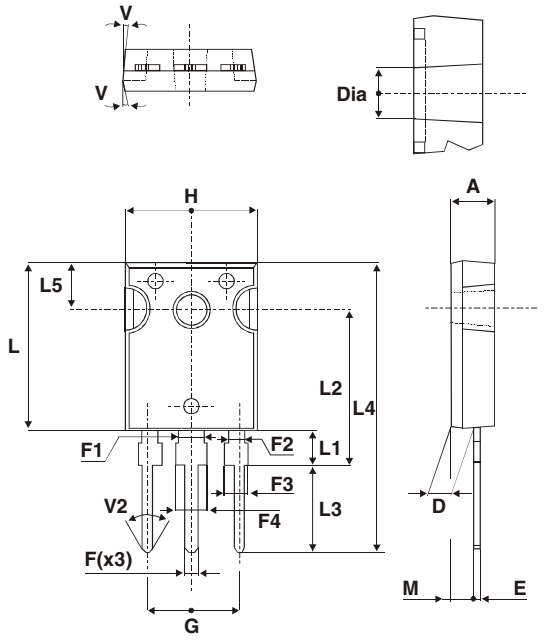
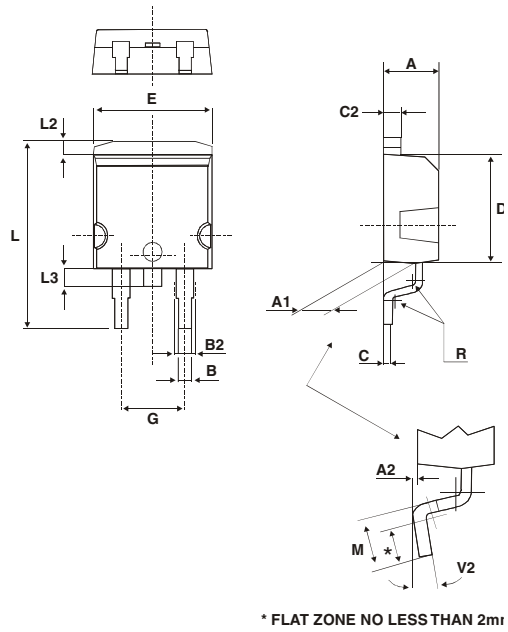


Figure 14: TO-247 Package Mechanical Data



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
D	2.20		2.60	0.086		0.102
E	0.40		0.80	0.015		0.031
F	1.00		1.40	0.039		0.055
F1		3.00			0.118	
F2		2.00			0.078	
F3	2.00		2.40	0.078		0.094
F4	3.00		3.40	0.118		0.133
G		10.90			0.429	
H	15.45		15.75	0.608		0.620
L	19.85		20.15	0.781		0.793
L1	3.70		4.30	0.145		0.169
L2		18.50			0.728	
L3	14.20		14.80	0.559		0.582
L4		34.60			1.362	
L5		5.50			0.216	
M	2.00		3.00	0.078		0.118
V		5°			5°	
V2		60°			60°	
Dia.	3.55		3.65	0.139		0.143

Figure 15: D²PAK Package Mechanical Data



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 16: Foot Print Dimensions (in millimeters)

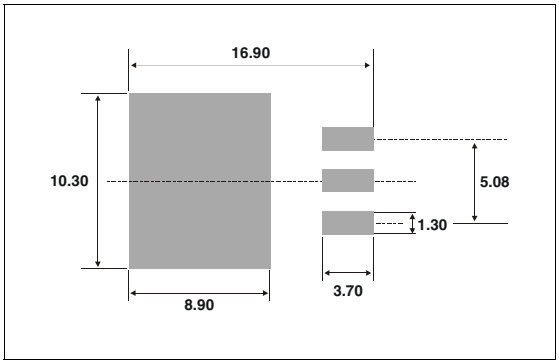
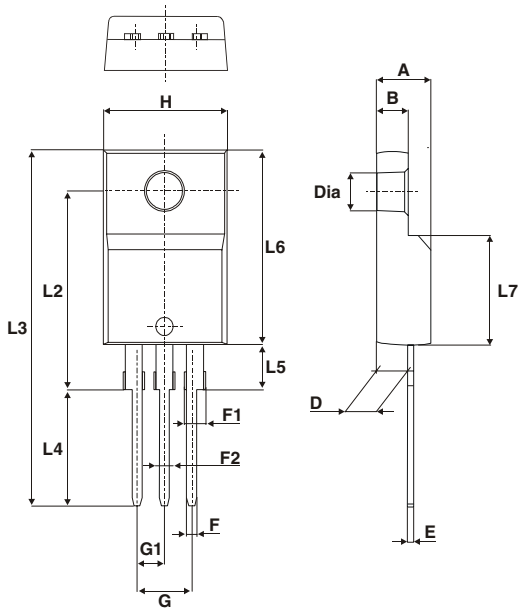
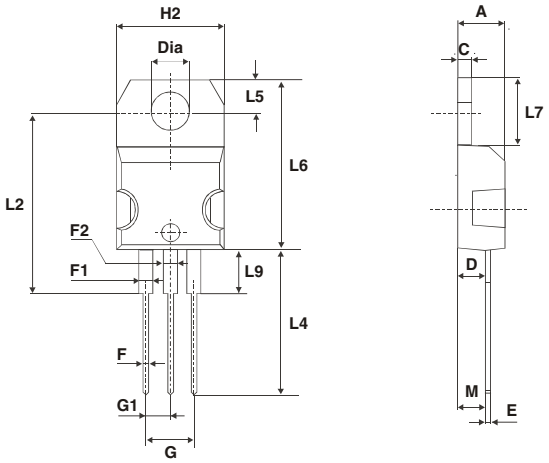


Figure 17: TO-220FPAB Package Mechanical Data



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

Figure 18: TO-220AB Package Mechanical Data



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

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.

Table 6: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS30170CW	STPS30170CW	TO-247	4.40 g	30	Tube
STPS30170CT	STPS30170CT	TO-220AB	2 g	50	Tube
STPS30170CFP	STPS30170CFP	TO-220FPAB	1.9 g	50	Tube
STPS30170CG	STPS30170CG	D^2PAK	1.48 g	50	Tube
STPS30170CG-TR	STPS30170CG			1000	Tape & reel

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- TO-220 - Recommended torque value: 0.55 Nm, Maximum torque value: 0.7 Nm.
- TO-247 - Recommended torque value: 0.8 Nm, Maximum torque value: 1.0 Nm.

Table 7: Revision History

Date	Revision	Description of Changes
16-Sep-2005	1	First issue.