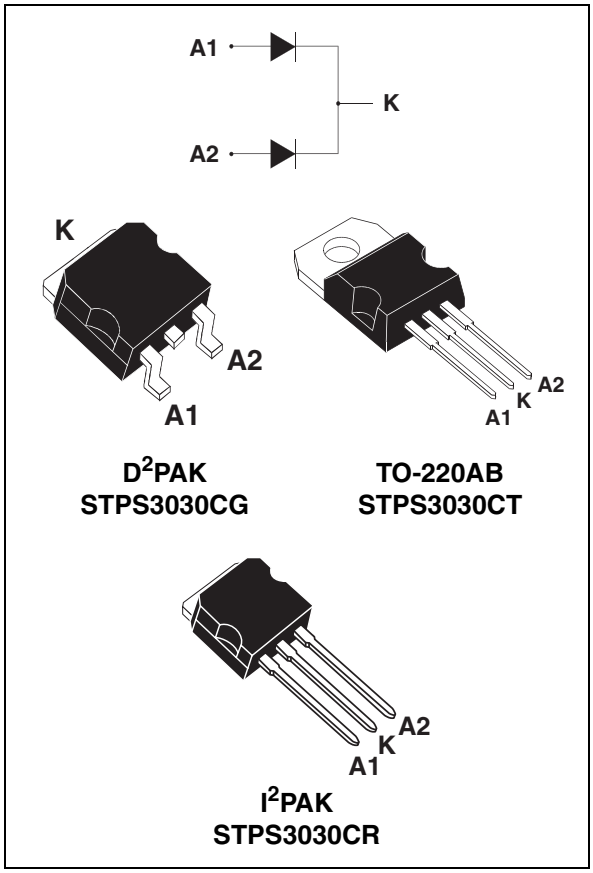
STPS3030/CT/CG/CR

Low drop power Schottky rectifier

Main product characteristics

$I_{F(AV)}$	2 x 15 A
V_{RRM}	30 V
T_j (max)	150° C
V_F(max)	0.42 V



D²PAK
STPS3030CG

TO-220AB
STPS3030CT

I²PAK
STPS3030CR

Features and benefits

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop for higher efficiency
- Low thermal resistance
- Avalanche capability specified

Description

Dual Schottky rectifier suited for switch mode power supply and high frequency DC to DC converters.

Packaged in TO-220AB, D^2PAK and I^2PAK, this device is intended for use in low voltage high frequency inverters, free-wheeling and polarity protection applications.

1 Characteristics

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			30	V
$I_{F(RMS)}$	RMS forward current			30	A
$I_{F(AV)}$	Average forward current	T_c = 135° C	Per diode	15	A
		δ = 0.5	Per device	30	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		250	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		3	A
P_{ARM}	Repetitive peak avalanche power	t_p = 1 µs T_j = 25° C		4100	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 (rated V_R, T_j = 25° C)			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 resistance

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case TO-220AB - D^2PAK - I^2PAK	Per diode	1.2	°C/W
		Total	0.8	
$R_{th(c)}$		Coupling	0.4	

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	$V_R = V_{RRM}$		0.23	1.0	mA
		T_j = 125° C			125	180	
V_F (1)	Forward voltage drop	T_j = 25° C	I_F = 15 A		0.44	0.49	V
		T_j = 125° C	I_F = 15 A		0.36	0.40	
		T_j = 25° C	I_F = 30 A		0.53	0.58	
		T_j = 125° C	I_F = 30 A		0.49	0.53	

1. Pulse test: tp = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.26 \times I_{F(AV)} + 0.0107\ I_F{}^2{}_{(RMS)}$

Figure 1. Conduction losses versus average current

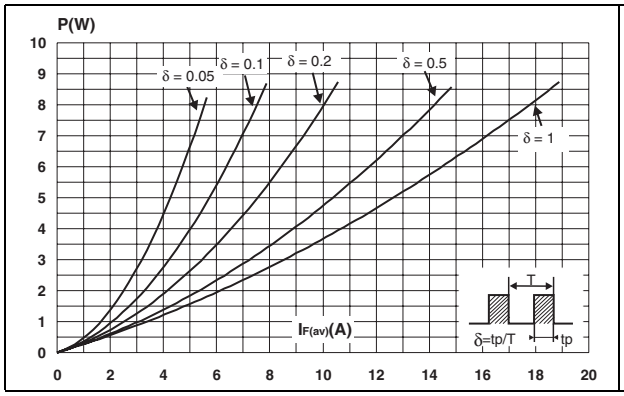


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

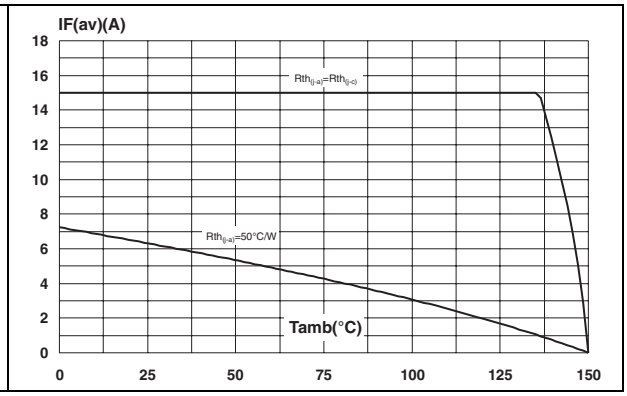


Figure 3. Normalized avalanche power derating versus pulse duration

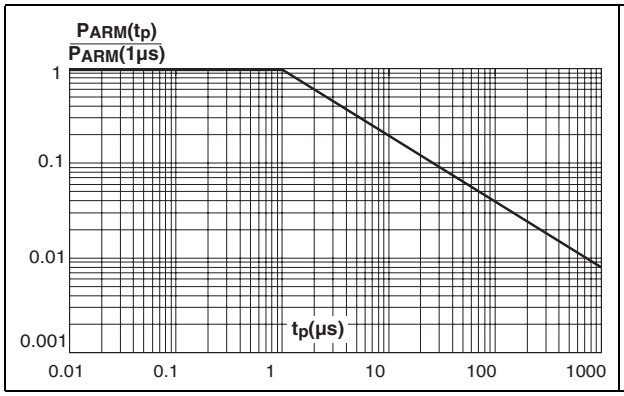


Figure 4. Normalized avalanche power derating versus junction temperature

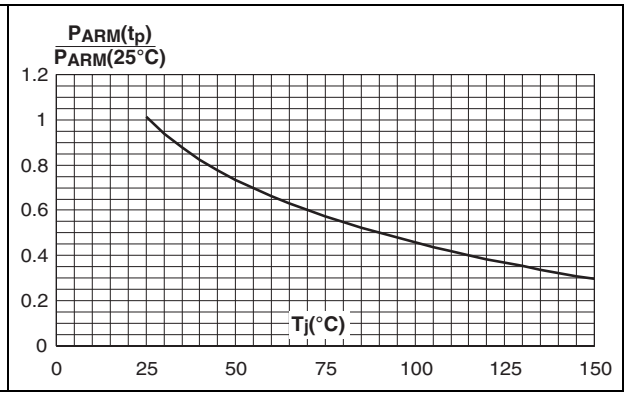


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)

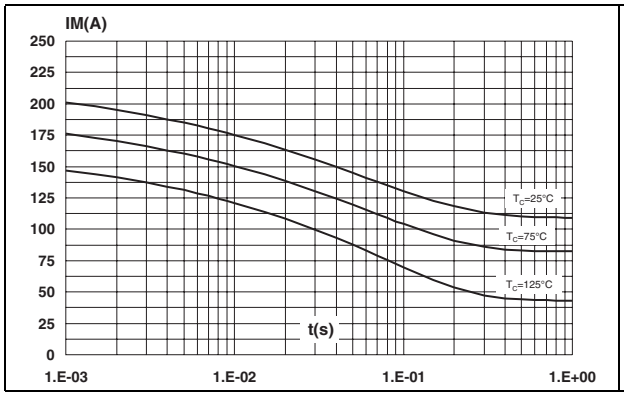


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

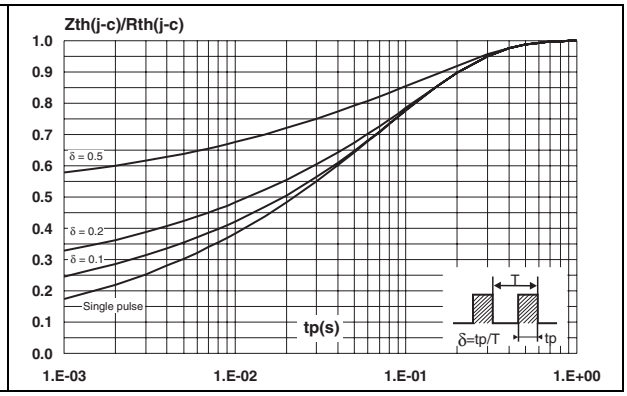


Figure 7. Reverse leakage current versus reverse voltage applied (typical values)

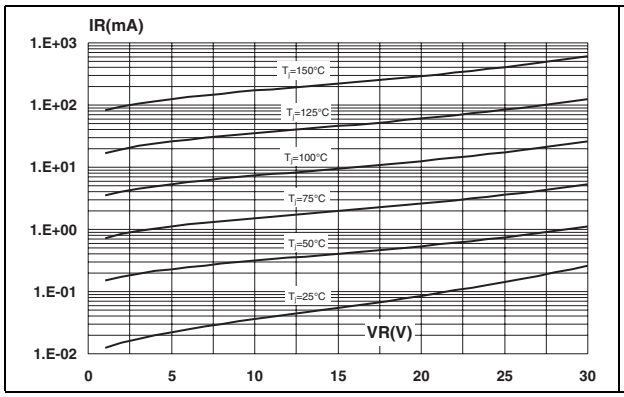


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

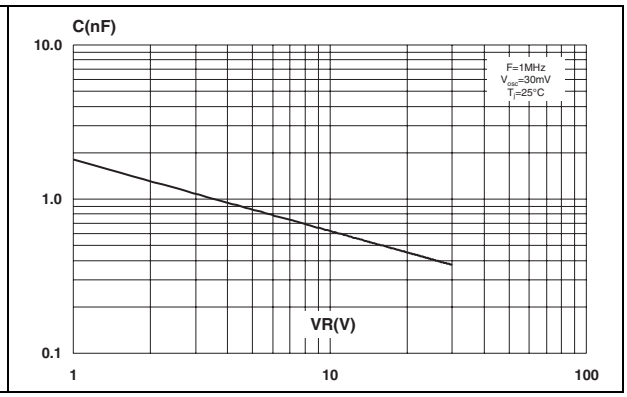


Figure 9. Forward voltage drop versus forward current

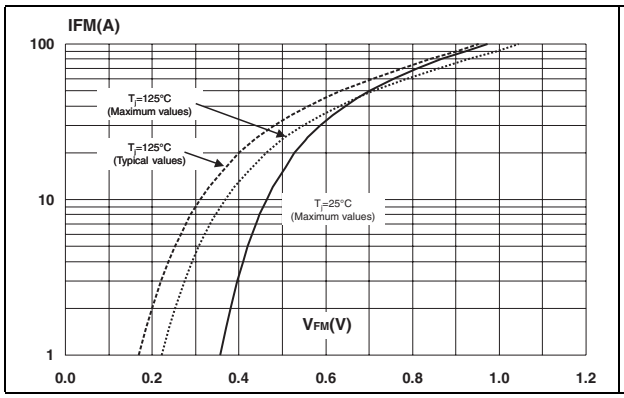
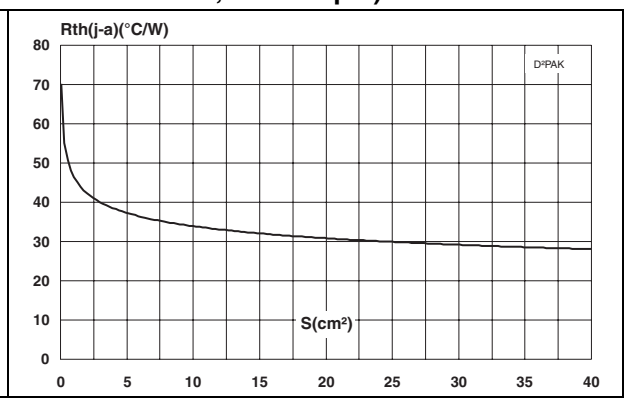


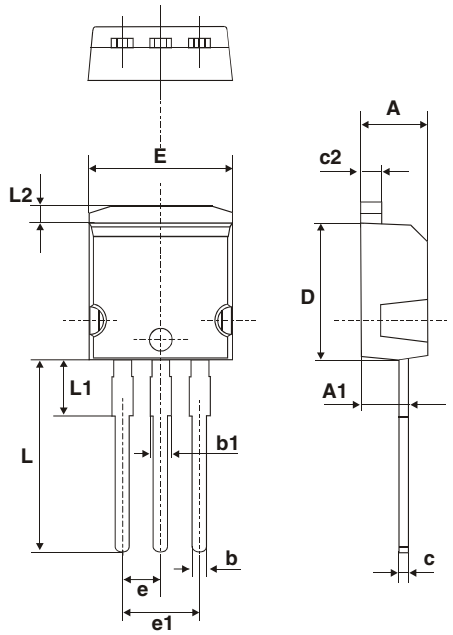
Figure 10. Thermal resistance junction to ambient versus copper surface under tab (epoxy printed board FR4, Cu = 35 µm)



2 Package information

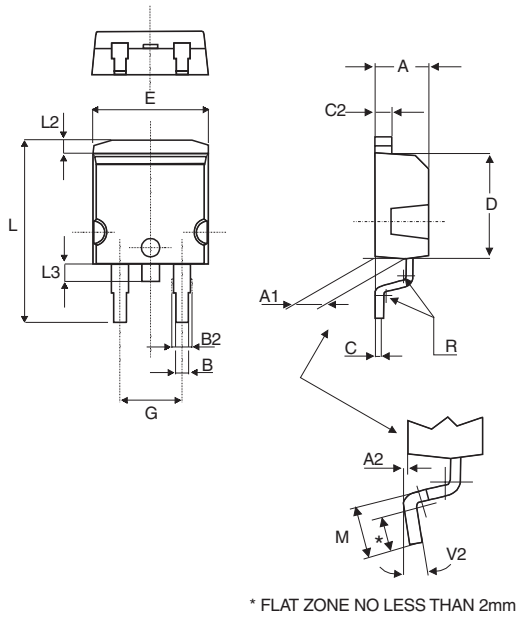
- Epoxy meets UL94,V0
- Cooling method: C
- Recommended torque value: 0.55 Nm
- Maximum torque value: 0.70 Nm

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

Table 5. 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 11. Footprint (dimensions in millimeters)

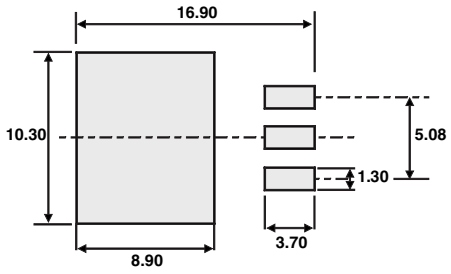
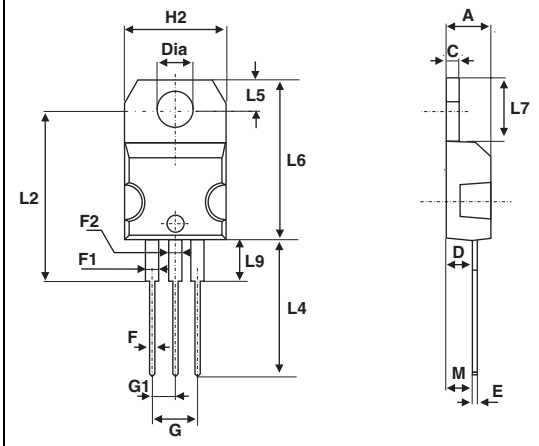


Table 6. TO-220AB dimensions



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

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
STPS3030CT	STPS3030CT	TO-220AB	2.2 g	50	Tube
STPS3030CG	STPS3030CG	D^2PAK	1.48 g	50	Tube
STPS3030CG-TR	STPS3030CG	D^2PAK	1.48 g	1000	Tape and reel
STPS3030CR	STPS3030CR	I^2PAK	1.49 g	50	Tube

4 Revision history

Date	Revision	Changes
Jul-2006	3A	Initial release.
16-Oct-2006	4	Reformatted to current standards. Corrected dimensions for I^2PAK in Table 4

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