STPS30H60C

Power Schottky rectifier

Features

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

Description

Dual centre tab Schottky rectifier suited for high frequency switch mode power supply.

Packaged in TO-220FPAB, TO-220AB, TO-247, I^2PAK, and D^2PAK, this device is intended to be used in notebook and LCD adaptors and desktop SMPS. In these applications the STPS30H60C provides a good margin between the remaining voltages applied on the diode and the voltage capability of the diode.

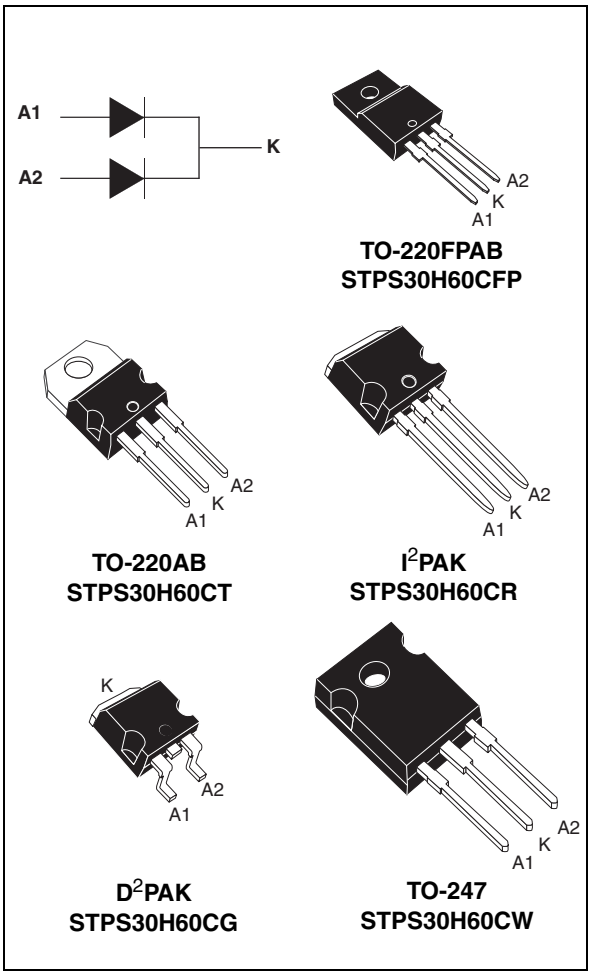


Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 X 15 A
V_{RRM}	60 V
T_j	175 °C
$V_{F\ (typ)}$	0.535 V

1 Characteristics

Table 2. Absolute ratings (limiting values per diode)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			60	V
$I_{F(RMS)}$	Forward rms current			30	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	TO-220AB T_c = 155 °C	Per diode	15	A
			Total package	30	
		TO-220FPAB T_c = 125 °C	Per diode	15	A
		TO-220FPAB T_c = 90 °C	Total package	30	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		230	A
P_{ARM}	Releative peak avalanche power	T_j = 25 °C	t_p = 1 µs	10 200	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 thermal runaway for a diode on its own heatsink

Table 3. Thermal parameters

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB, I^2PAK, D^2PAK, TO-247	Per diode	1.5	°C/W
			Total	0.8	
		TO-220FPAB	Per diode	4.7	
			Total	3.95	
$R_{th(c)}$	Coupling	TO-220AB, I^2PAK, D^2PAK, TO-247		0.1	
		TO-220FPAB		3.2	

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			60	µA
		T_j = 125 °C			8	25	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 7.5 A			550	mV
		T_j = 125 °C			435	470	
		T_j = 25 °C	I_F = 15 A			660	
		T_j = 125 °C			535	570	
		T_j = 25 °C	I_F = 30 A			820	
		T_j = 125 °C			635	690	

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: $P = 0.45 \times I_{F(AV)} + 0.008 \times I_F{}^2{}_{(RMS)}$

Figure 1. Conduction losses versus average forward current

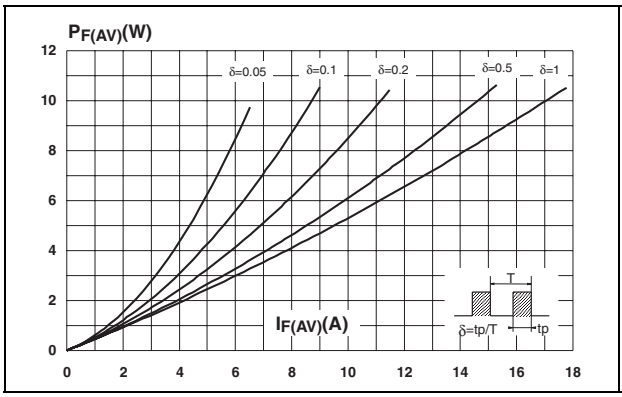


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

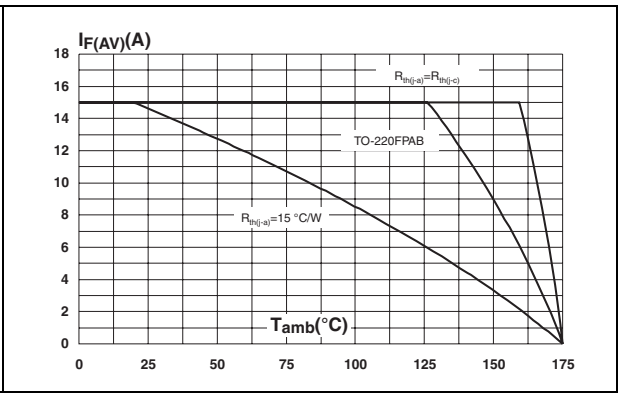


Figure 3. Normalized avalanche power derating versus pulse duration

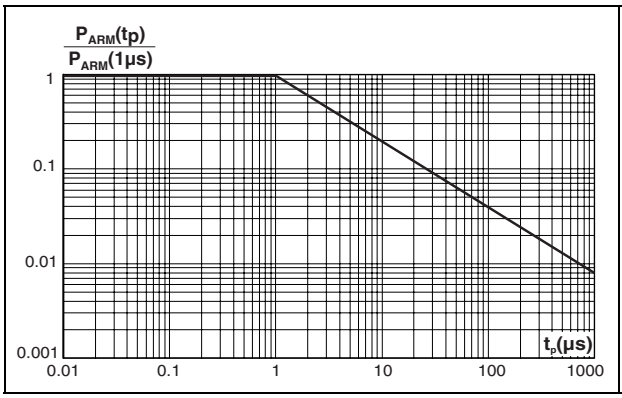


Figure 4. Normalized avalanche power derating versus junction temperature

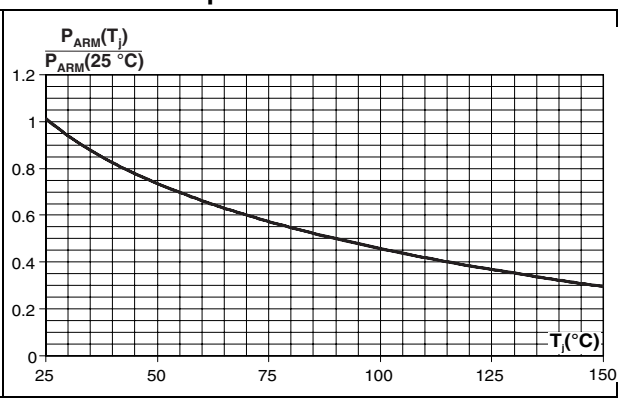


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

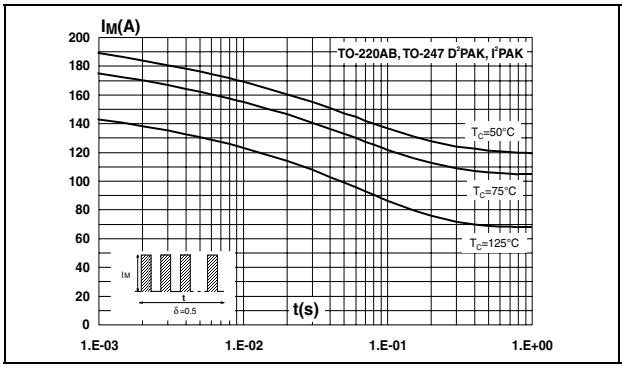


Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

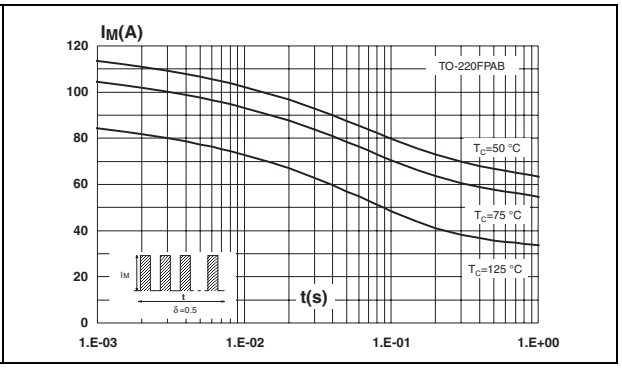


Figure 7. Relative variation of thermal impedance junction to case versus pulse duration

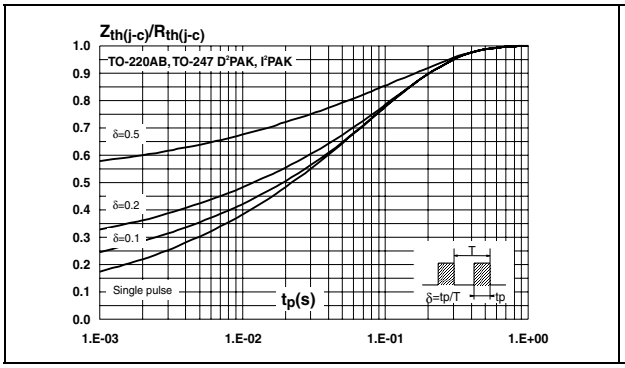


Figure 8. Relative variation of thermal impedance junction to case versus pulse duration

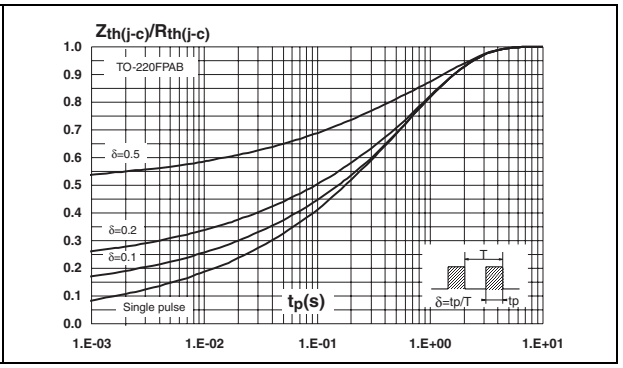


Figure 9. Reverse leakage current versus reverse voltage applied (typical values, per diode)

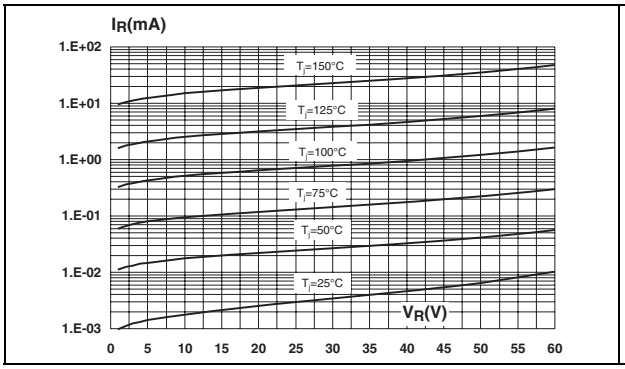


Figure 10. Junction capacitance versus reverse voltage applied (typical values, per diode)

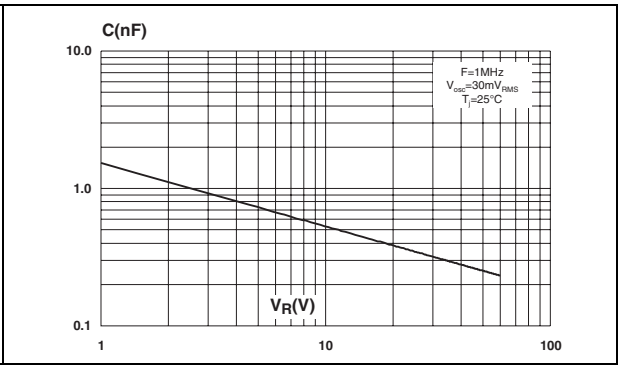


Figure 11. Forward voltage drop versus forward current (per diode)

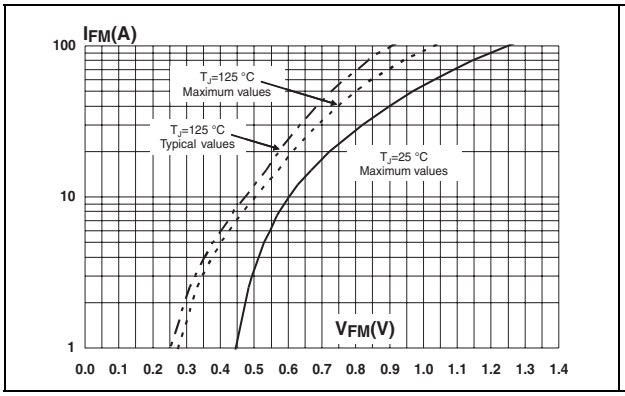
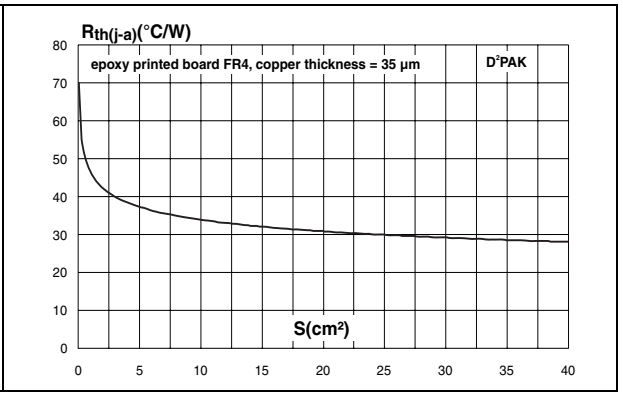


Figure 12. Thermal resistance junction to ambient versus copper surface under tab

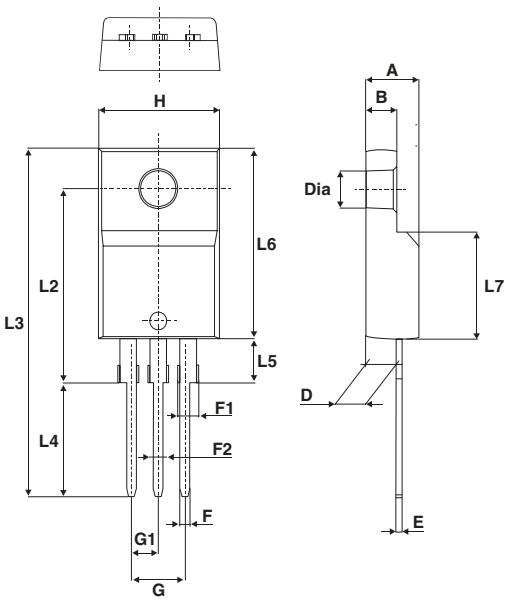


2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque values:
  - TO-220FPAB and TO-220AB 0.4 to 0.6 N·m
  - TO-247 0.9 to 1.2 N·m

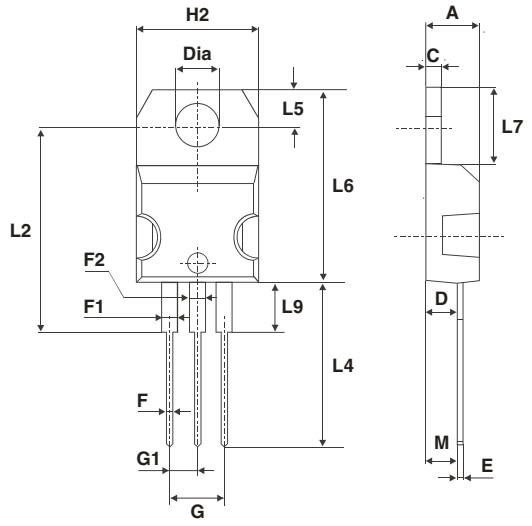
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Table 5. TO-220FPAB dimensions



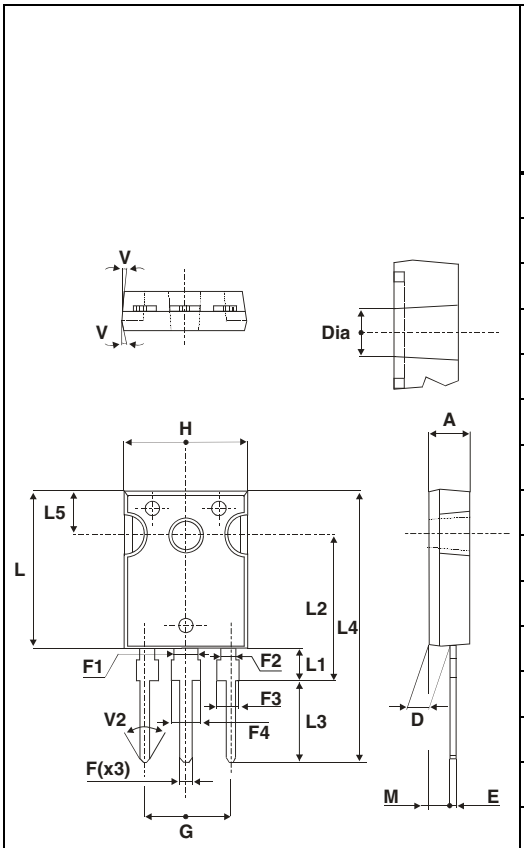
Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		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

Table 6. TO-220AB dimensions



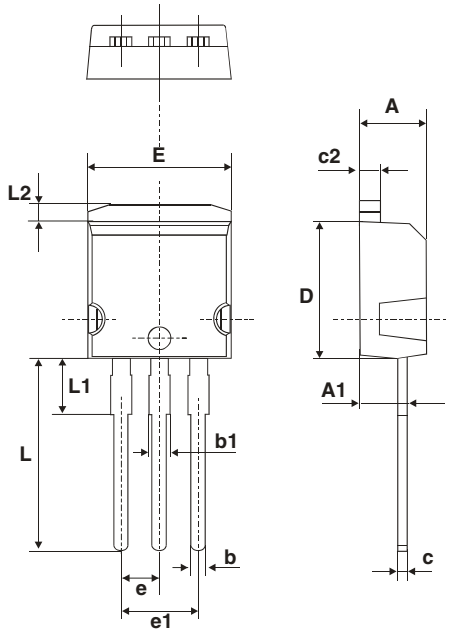
Ref	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
F2	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
G1	2.40	2.70	0.094	0.106
H2	10	10.40	0.393	0.409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

Table 7. TO-247 dimensions



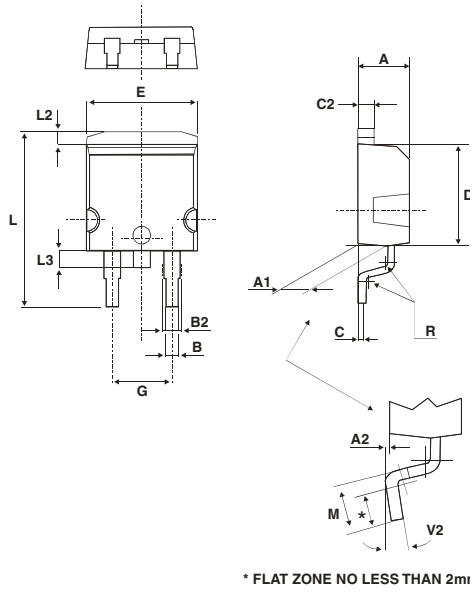
Ref	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
D	2.20		2.60	0.086		0.102
E	0.40		0.80	0.015		0.031
F	1.00		1.40	0.039		0.055
F1		3.00			0.118	
F2		2.00			0.078	
F3	2.00		2.40	0.078		0.094
F4	3.00		3.40	0.118		0.133
G		10.90			0.429	
H	15.45		15.75	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

Table 8. I^2PAK dimensions



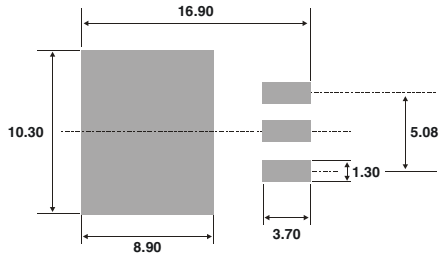
Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.40	2.72	0.094	0.107
b	0.61	0.88	0.024	0.035
b1	1.14	1.70	0.044	0.067
c	0.49	0.70	0.019	0.028
c2	1.23	1.32	0.048	0.052
D	8.95	9.35	0.352	0.368
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.195	0.203
E	10	10.40	0.394	0.409
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 9. 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. Footprint (dimensions in millimeters)



3 Ordering information

Table 10. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS30H60CT	STPS30H60CT	TO-220AB	2.23 g	50	Tube
STPS30H60CR	STPS30H60CR	I^2PAK	1.49 g	50	Tube
STPS30H60CG	STPS30H60CG	D^2PAK	1.48 g	50	Tube
STPS30H60CG-TR	STPS30H60CG-TR	D^2PAK	1.48 g	1000	Tape and reel
STPS30H60CW	STPS30H60W	TO-247	4.46 g	30	Tube
STPS30H60CFP	STPS30H60CFP	TO-220FPAB	2.00 g	50	Tube

4 Revision history

Table 11. Document revision history

Date	Revision	Changes
27-Feb-2006	1	First issue.
31-Mar-2007	2	Added TO-220FPAB package. Updated thermal parameters in Table 2.
08-Jul-2011	3	Updated *Table 2*.

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