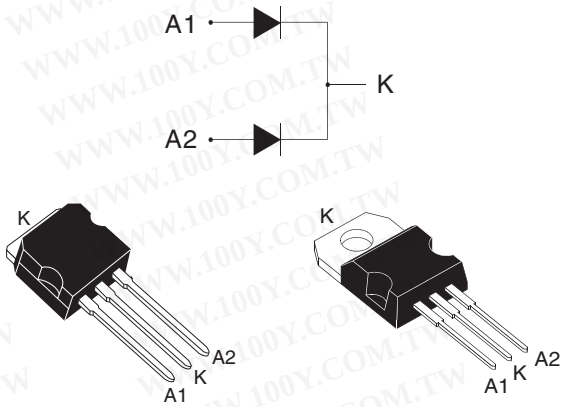
STPS41L60C

Power Schottky rectifier

Main product characteristics

$I_{F(AV)}$	2 x 20 A
V_{RRM}	60 V
$T_{j\ (max)}$	150° C
$V_{F\ (max)}$	0.58 V



I^2PAK

STPS41L60CR

TO-220AB

STPS41L60CT

D^2PAK

STPS41L60CG

Features and benefits

- Low forward voltage drop
- Negligible switching losses
- Low thermal resistance
- Avalanche capability specified

Description

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

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

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			60	V
$I_{F(RMS)}$	RMS forward current			30	A
$I_{F(AV)}$	Average forward current	T_C = 125° C δ = 0.5	Per diode Per device	20 40	A
I_{FSM}	Surge non repetitive forward current	tp = 10 ms Sinusoidal		220	A
P_{ARM}	Repetitive peak avalanche power	tp = 1 µs T_j = 25° C		9500	W
T_{stg}	Storage temperature range			-65 to + 175	° C
T_j	Maximum operating junction temperature(1)			150	° C

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

1 Characteristics

Table 2. Thermal resistances

Symbol	Parameter		Value	Unit
$R_{th\ (j-c)}$	Junction to case	Per diode Total	1.5 0.8	° C/W
$R_{th\ (c)}$	Coupling		0.1	

When the diodes 1 and 2 are used simultaneously :
$\Delta Tj(diode\ 1) = P(diode1) \times R_{th(j-c)}(Per\ diode) + P(diode\ 2) \times R_{th(c)}$

Table 3. Static electrical characteristics (per diode)

Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25° C	$V_R = V_{RRM}$			600	µA
		T_j = 125° C			100	175	mA
V_F (1)	Forward voltage drop	T_j = 25° C	I_F = 20 A			0.60	V
		T_j = 125° C	I_F = 20 A		0.50	0.58	
		T_j = 25° C	I_F = 40A			0.77	
		T_j = 125° C	I_F = 40A		0.67	0.71	

1. Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.42 \times I_{F(AV)} + 0.007 \times I_F{}^2{}_{(RMS)}$

Figure 1. Conduction losses versus average current

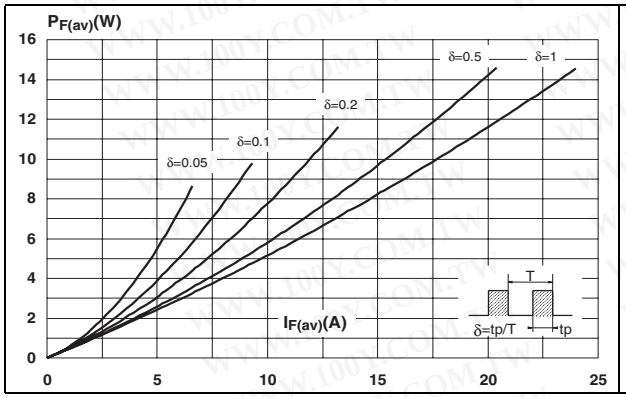


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

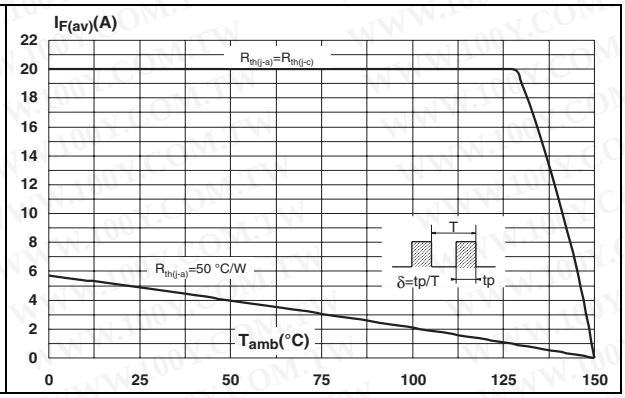


Figure 3. Normalized avalanche power derating versus pulse duration

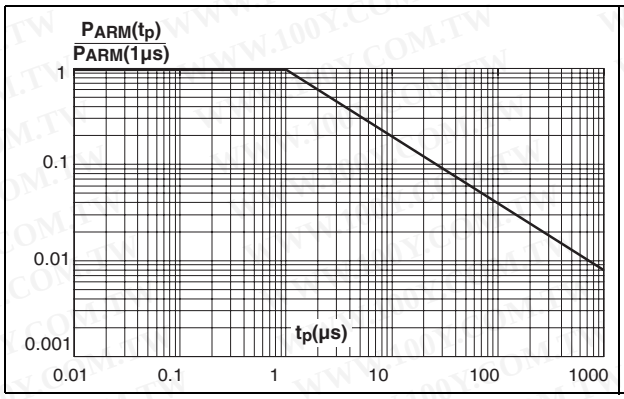


Figure 4. Normalized avalanche power derating versus junction temperature

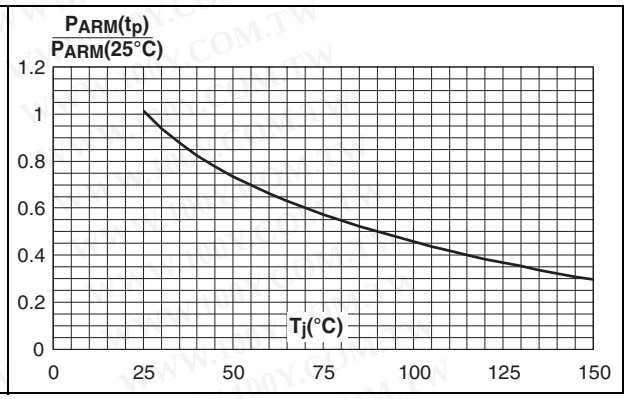


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)

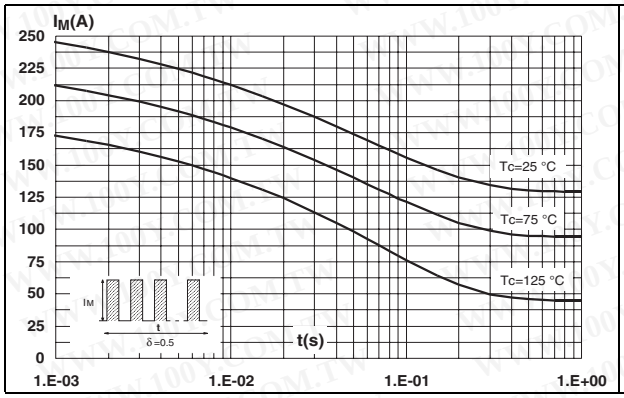


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

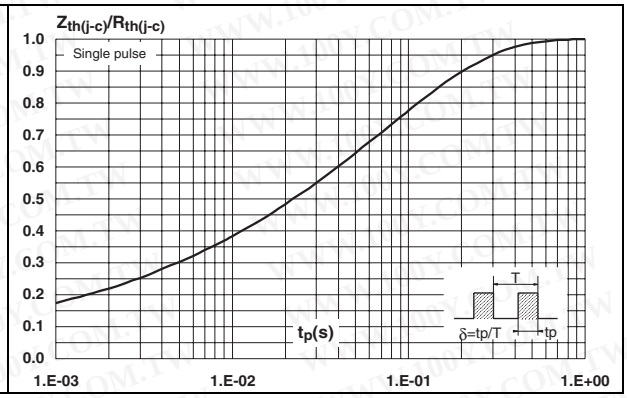


Figure 7. Reverse leakage current versus reverse voltage applied (typical values)

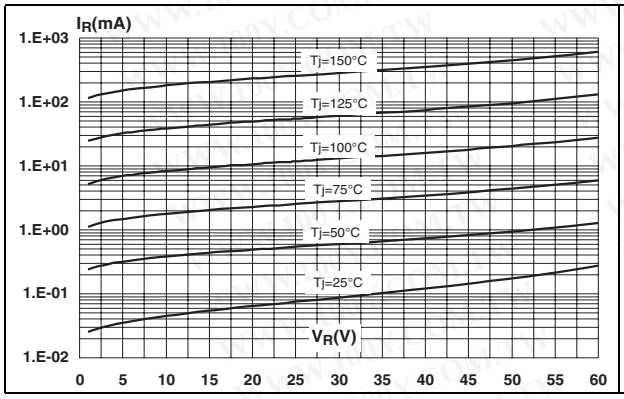


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

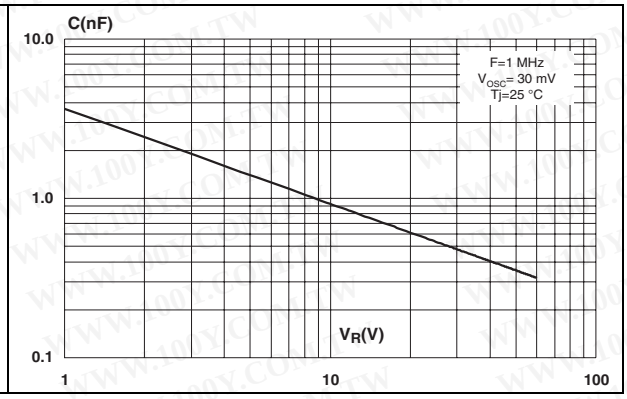


Figure 9. Forward voltage drop versus forward current

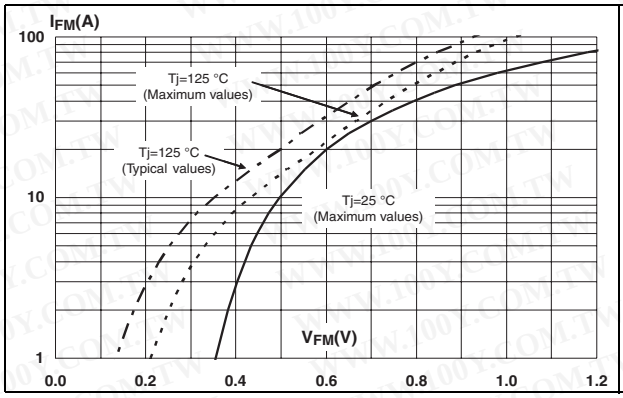
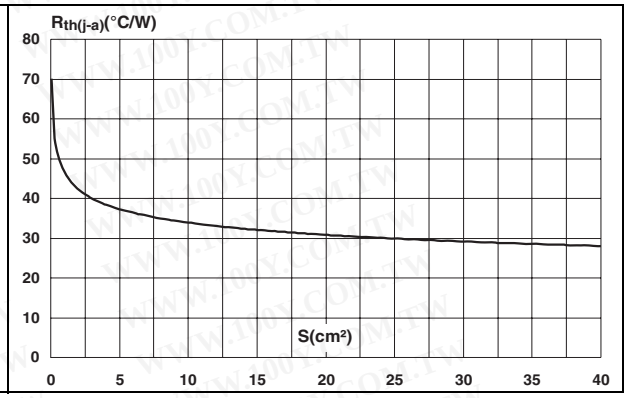


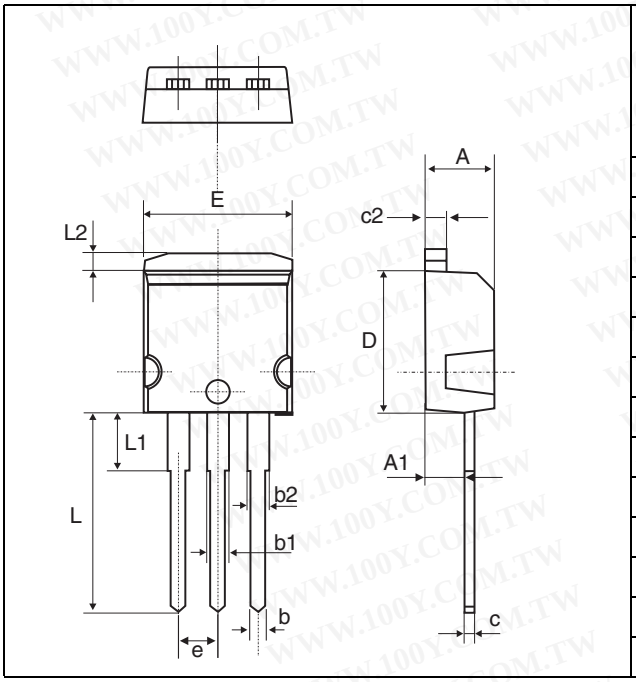
Figure 10. Thermal resistance junction to ambient versus copper surface under tab (epoxy printed board FR4, Cu = 35 µm) (STPS41L60CG only)



2 Package information

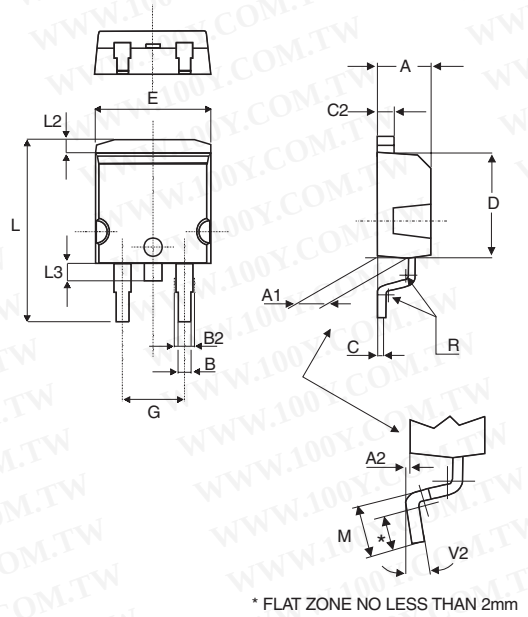
- Epoxy meets UL94,V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 Nm
- Maximum torque value: 1.0 Nm

Figure 11. Package dimensions I^2PAK



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
b	0.70	0.93	0.028	0.037
b1	1.14	1.17	0.044	0.046
b2	1.14	1.17	0.044	0.046
c	0.45	0.60	0.018	0.024
c2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
e	2.40	2.70	0.094	0.106
E	10.0	10.4	0.394	0.409
L	13.1	13.6	0.516	0.535
L1	3.48	3.78	0.137	0.149
L2	1.27	1.40	0.050	0.055

Figure 12. Package dimensions D^2PAK



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

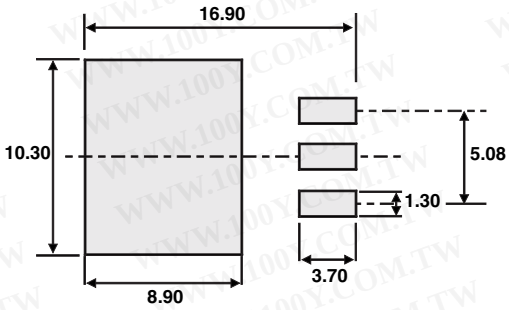
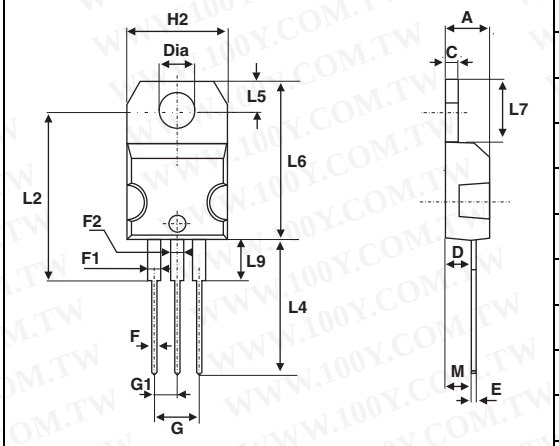


Figure 14. Package dimensions TO-220AB



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

Type	Marking	Package	Weight	Base qty	Delivery mode
STPS41L60CG	STPS41L60CG	D^2PAK	1.48 g	50	Tube
STPS41L60CG-TR	STPS41L60CG	D^2PAK	1.48 g	1000	Tape and reel
STPS41L60CT	STPS41L60CT	TO-220AB	2.20 g	50	Tube
STPS41L60CR	STPS41L60CR	I^2PAK	1.49 g	50	Tube

4 Revision history

Date	Revision	Description of Changes
July 2003	3A	Previous issue
10-Jan-2007	4	Reformated to current standards. Added ECOPACK statement Removed I_{RRM} and dV/dT from the Absolute ratings table on page 1. Updated reverse leakage current values in Table 3 and Figure 7.
28-May-2007	5	Updated figures 1, 2, and 5 to 10.

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