STPS61L60C

Power Schottky rectifier

Features

- High current capability
- Avalanche rated
- Low forward voltage drop current
- High frequency operation

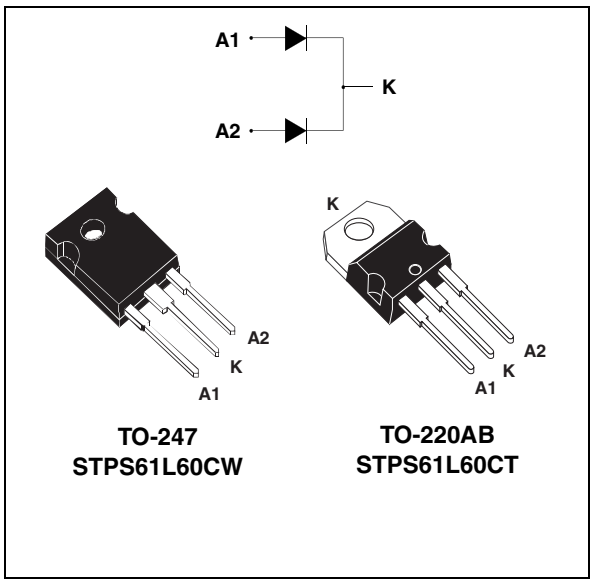
Description

This dual center tap schottky rectifier is suited for high frequency switch mode power supplies.

Packaged in TO-247 and TO-220AB, this device provides desktop SMPS designers with a low forward voltage drop device, and reduced leakage current, with the objective of making the application compliant with environmental care standards, or suitable for 80+ requirements.

Table 1. Device summary

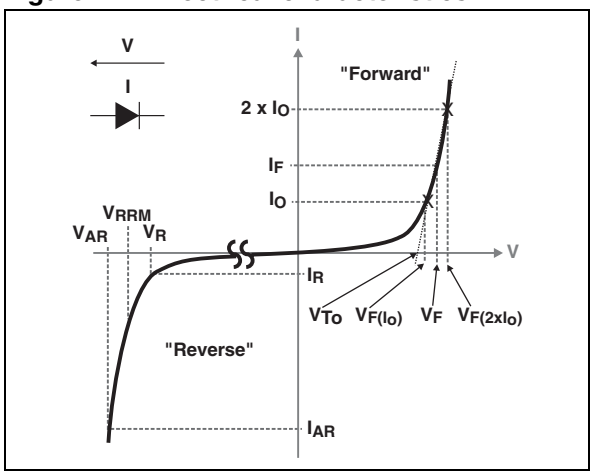
$I_{F(AV)}$	2 x 30 A
V_{RRM}	60 V
T_j (max)	150 °C
V_F(typ)	0.560 V



TO-247
STPS61L60CW

TO-220AB
STPS61L60CT

Figure 1. Electrical characteristics (a)



a. V_{ARM} and I_{ARM} must respect the reverse safe operating area defined in *Figure 12* V_{AR} and I_{AR} are pulse measurements (t_p < 1 µs). V_R, I_R, V_{RRM} and V_F, are static characteristics

1 Characteristics

Table 2. Absolute ratings (limiting values per diode at 25 °C unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			60	V
$I_{F(RMS)}$	Forward rms voltage			50	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	T_c = 125 °C T_c = 120 °C	Per diode Per device	30 60	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	T0-247 T0-220AB	530 400	A
P_{ARM}	Repetitive peak avalanche power	t_p = 1 µs Tj = 25 °C		11500	W
V_{ARM} (1)	Maximum repetitive peak avalanche voltage	t_p < 1 µs T_j < 150 °C, I_{AR} < 43 A		80	V
V_{ASM} (1)	Maximum single pulse peak avalanche voltage	t_p < 1 µs T_j < 150 °C, I_{AR} < 43 A		80	V
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum operating junction temperature (2)			150	°C

1. Refer to *Figure 12*
2. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistances

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-247	Per diode Total	0.95 0.6	°C/W
		TO-220AB	Per diode Total	1.1 0.7	
$R_{th(c)}$	Coupling		TO-247	0.25	
			TO-220AB	0.3	

When the diodes 1 and 2 are used simultaneously :
ΔTj(diode 1) = P(diode1) x $R_{th(j-c)}$(Per diode) + P(diode 2) x $R_{th(c)}$.

Table 4. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-	-	0.8	mA
		T_j = 125 °C		-	150	350	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 5 A	-	0.360	-	V
		T_j = 125 °C	I_F = 5 A	-	0.255	-	
		T_j = 25 °C	I_F = 15 A	-	0.460	0.540	
		T_j = 125 °C	I_F = 15 A	-	0.415	0.480	
		T_j = 25 °C	I_F = 30 A	-	0.580	0.660	
		T_j = 125 °C	I_F = 30 A	-	0.560	0.620	

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: $P = 0.44 \times I_{F(AV)} + 0.006 \times I_F{}^2{}_{(RMS)}$

Figure 2. Average forward power dissipation vs. average forward current (per diode)

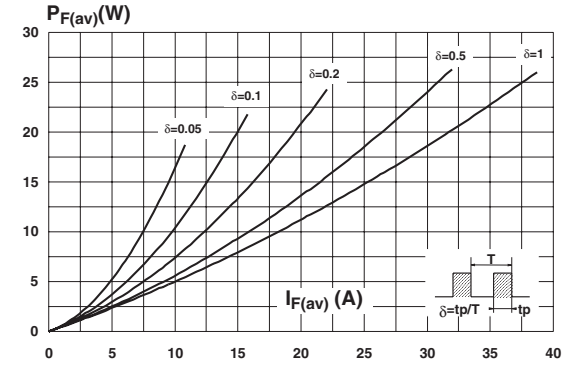


Figure 3. Average forward current vs. ambient temperature (δ = 0.5, per diode)

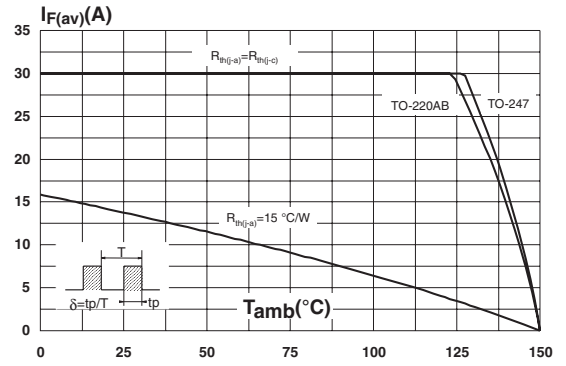


Figure 4. Normalized avalanche power derating vs. pulse duration

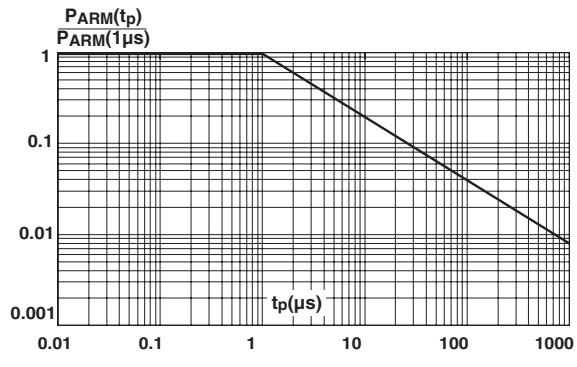


Figure 5. Normalized avalanche power derating vs. junction temperature

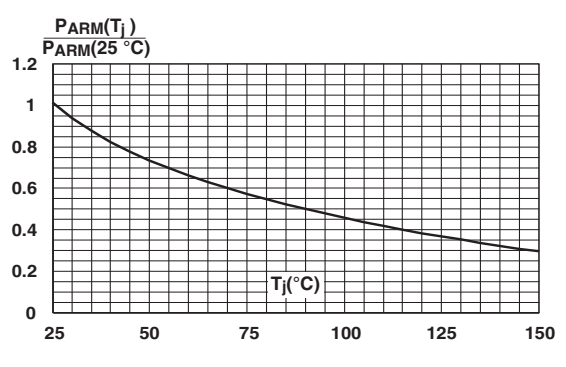


Figure 6. Non repetitive surge peak forward current vs. overload duration (max. values, per diode, TO-247)

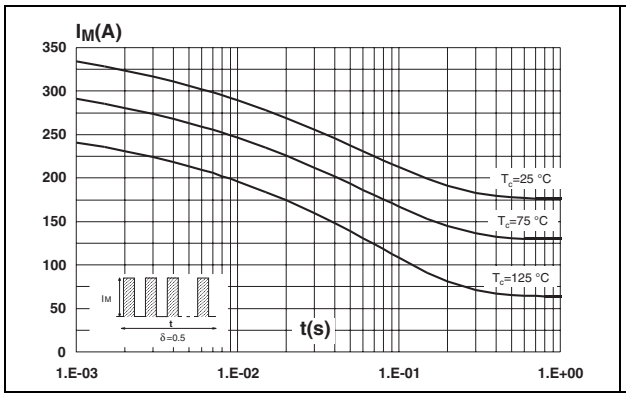


Figure 7. Non repetitive surge peak forward current vs. overload duration (max. values, per diode, TO-220AB)

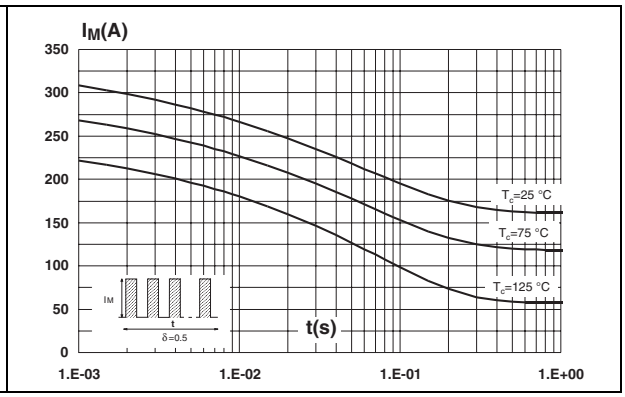


Figure 8. Relative variation of thermal impedance junction to case vs. pulse duration

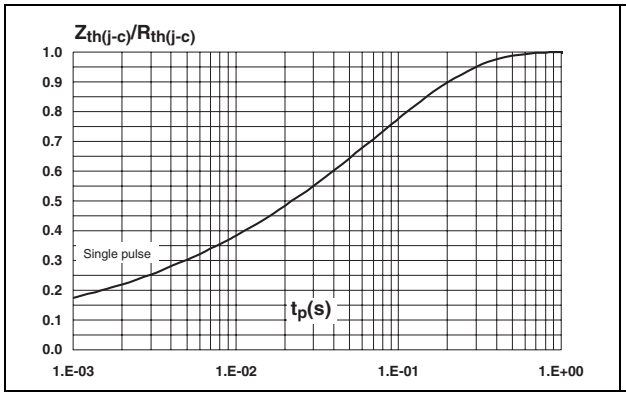


Figure 9. Reverse leakage current vs. reverse voltage applied (typical values, per diode)

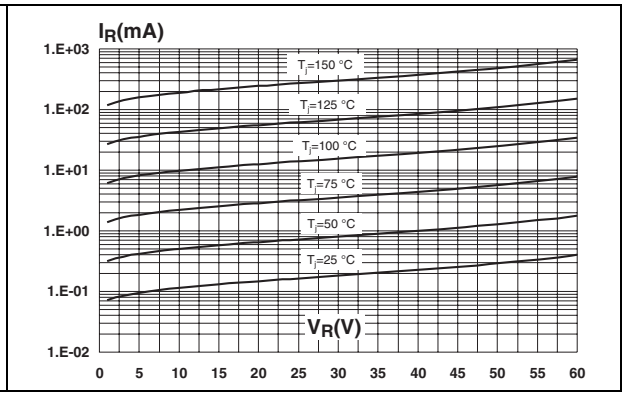


Figure 10. Junction capacitance vs. reverse voltage applied (typical values, per diode)

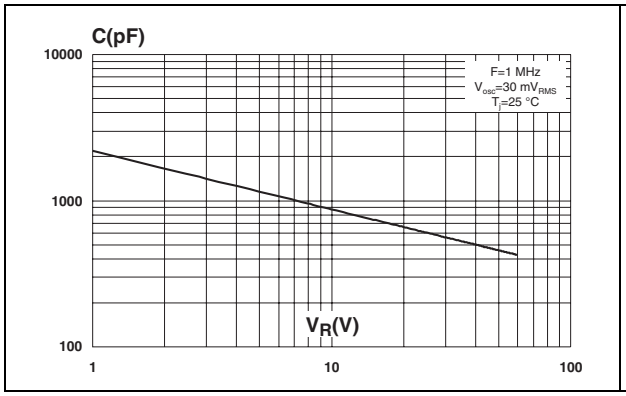


Figure 11. Forward voltage drop vs. forward current (per diode)

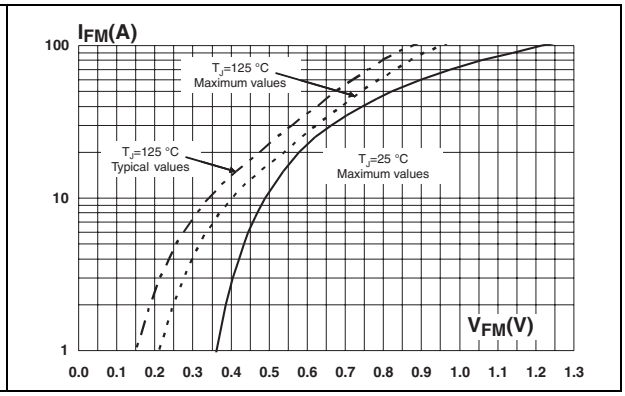
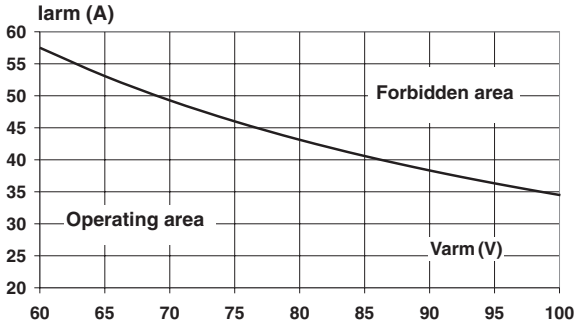


Figure 12. Reverse safe operating area (t_p < 1 µs and T_j < 150 °C)

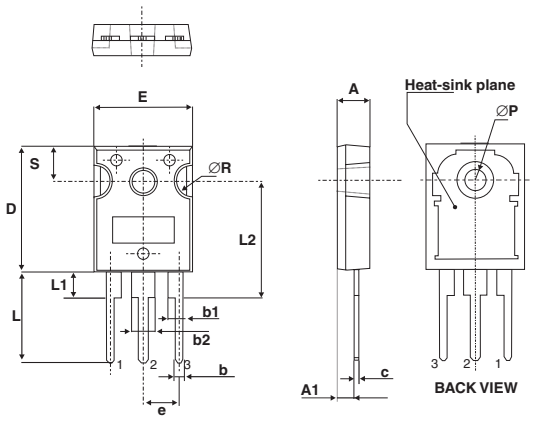


2 Package information

- Epoxy meets UL94, V0
- Cooling method: conduction
- Torque value:
  - TO-247 - 0.55 N·m recommended, 1.0 N·m maximum
  - TO-220AB - 0.4 to 0.6 N·m

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

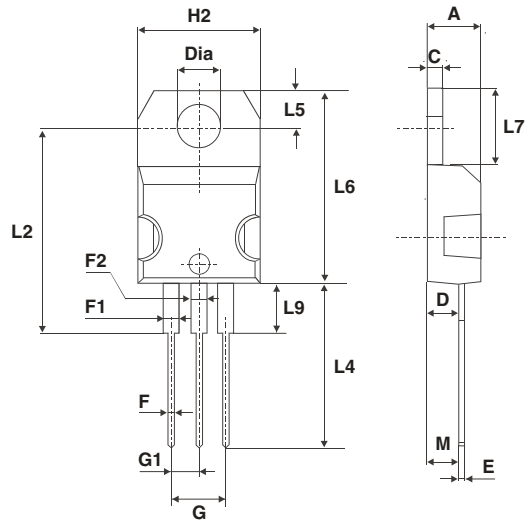
Table 5. TO-247 dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.85	5.15	0.191	0.203
A1	2.20	2.60	0.086	0.102
b	1.00	1.40	0.039	0.055
b1	2.00	2.40	0.078	0.094
b2	3.00	3.40	0.118	0.133
c	0.40	0.80	0.015	0.031
D(1)	19.85	20.15	0.781	0.793
E	15.45	15.75	0.608	0.620
e	5.45 typ.		0.215 typ.	
L	14.20	14.80	0.559	0.582
L1	3.70	4.30	0.145	0.169
L2	18.50 typ.		0.728 typ.	
ØP(2)	3.55	3.65	0.139	0.143
ØR	4.50	5.50	0.177	0.217
S	5.50 typ.		0.216 typ.	

1. Dimension D plus gate protrusion does not exceed 20.5 mm
2. Resin thickness around the mounting hole is not less than 0.9 mm

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

3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS61L60CW	STPS61L60CW	TO-247	4.4 g	30	Tube
STPS61L60CT	STPS61L60CT	TO-220AB	2.23 g	30	Tube

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
18-May-2009	1	Initial release.
29-Jun-2010	2	Added *Figure 1* and *Figure 12*. Added parameters V_{ARM} and V_{ASM} to *Table 2*. Updated *Table 5*.

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