

Power Schottky rectifier

Features

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

Description

Dual center tap Schottky rectifier 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.

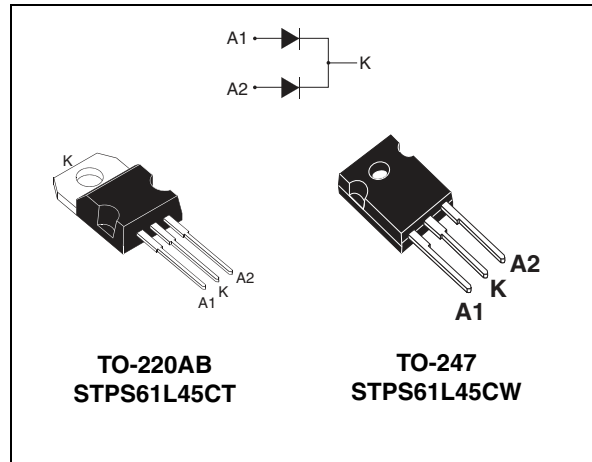


Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 30 A
V_{RRM}	45 V
T_j (max)	150 °C
V_F (typ)	0.45 V

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		45	V	
I _{F(RMS)}	Forward rms current		60	A	
I _{F(AV)}	Average forward current $\delta = 0.5$	T _c = 120 °C T _c = 115 °C	Per diode Per device	30 60	A
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms sinusoidal	500	A	
P _{ARM}	Repetitive peak avalanche power	t _p = 1 μ s T _j = 25 °C	10000	W	
T _{stg}	Storage temperature range		-65 to + 175	°C	
T _j	Maximum operating junction temperature ⁽¹⁾		150	°C	

1. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ condition to avoid runaway for a diode on its own heatsink

Table 3. Thermal resistances

Symbol	Parameter		Value	Unit
R _{th(j-c)}	Junction to case	Per diode Total	1.3 0.75	°C/W
R _{th(c)}	Coupling		0.2	°C/W

When the diodes 1 and 2 are used simultaneously :

$$\Delta T_j(\text{diode 1}) = P(\text{diode1}) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode 2}) \times R_{th(c)}$$

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}			1.5	mA
		T _j = 125 °C			190	400	
V _F ⁽²⁾	Forward voltage drop	T _j = 25 °C	I _F = 5 A		0.35		V
		T _j = 125 °C			0.23		
		T _j = 25 °C	I _F = 15 A		0.43	0.50	
		T _j = 125 °C			0.34	0.40	
		T _j = 25 °C	I _F = 30 A		0.50	0.56	
		T _j = 125 °C			0.45	0.51	

1. Pulse test: t_p = 5 ms, $\delta < 2\%$

2. Pulse test: t_p = 380 μ s, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.3 \times I_{F(AV)} + 0.007 \times I_{F(RMS)}^2$$

Figure 1. Conduction losses versus average forward current (per diode)

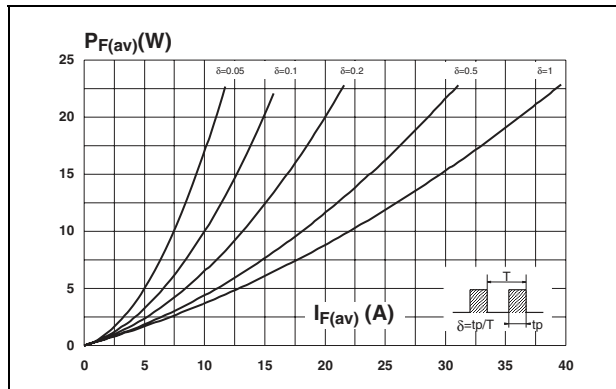


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$), (per diode)

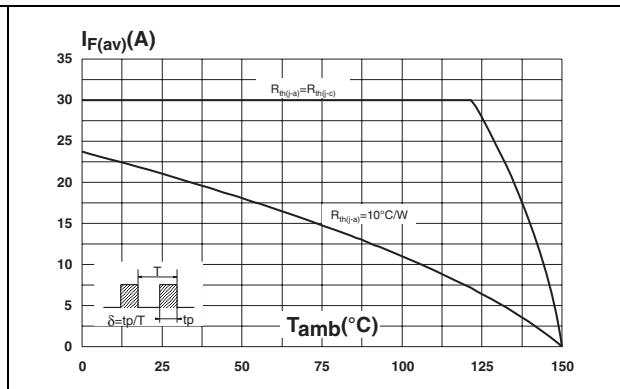


Figure 3. Normalized avalanche power derating versus pulse duration

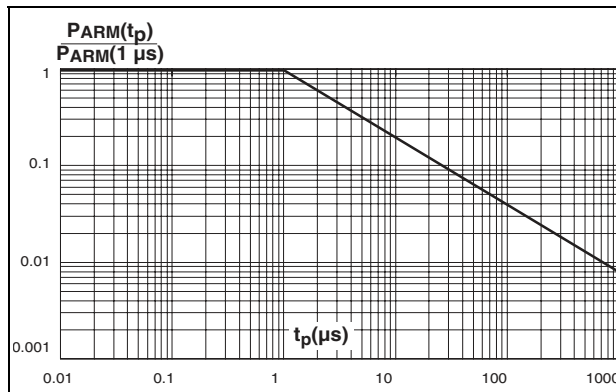


Figure 4. Normalized avalanche power derating versus junction temperature

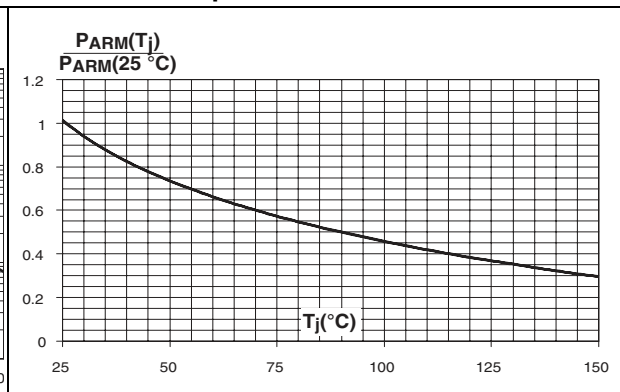


Figure 5. Non repetitive surge peak forward current versus overload duration (per diode)

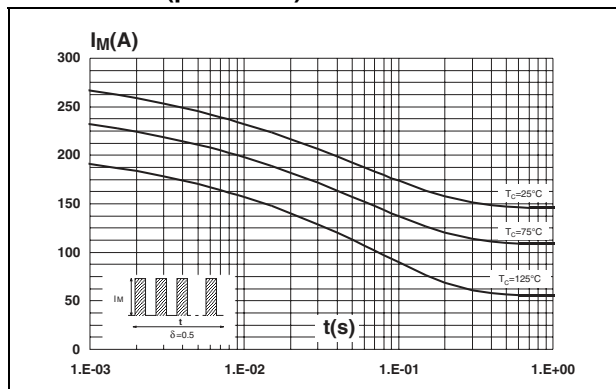


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

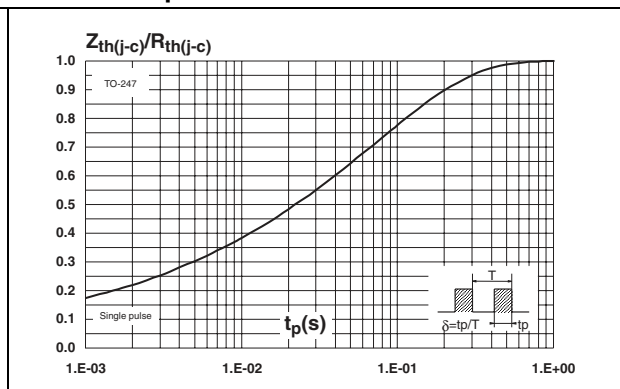


Figure 7. Reverse leakage current versus reverse voltage applied (typical values, per diode)

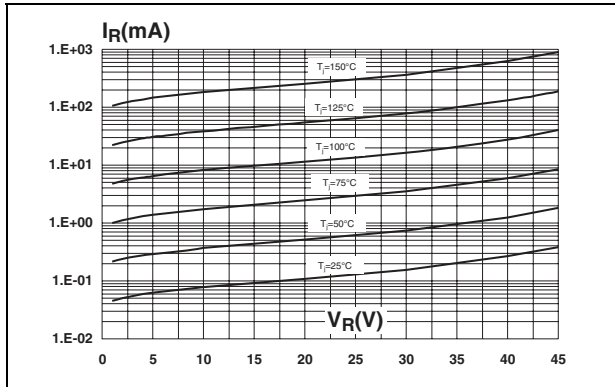


Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)

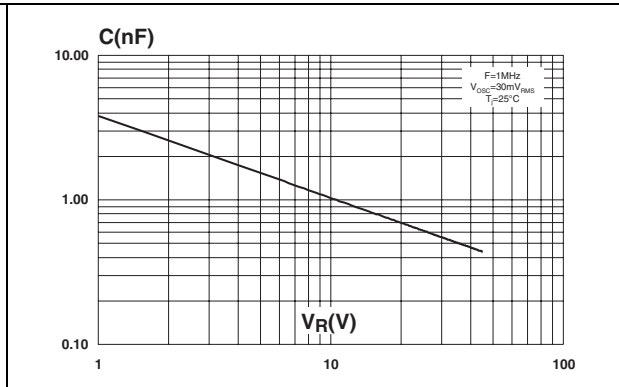
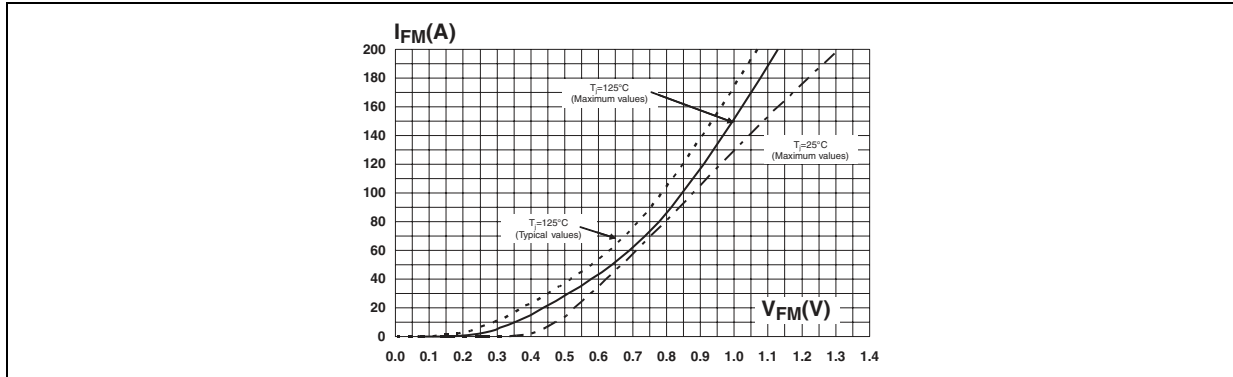


Figure 9. Forward voltage drop versus forward current (per diode)



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque values for: TO-220AB 0.4 to 0.6 N·m
- Recommended torque value for: TO-247 0.55 to 1.0 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-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

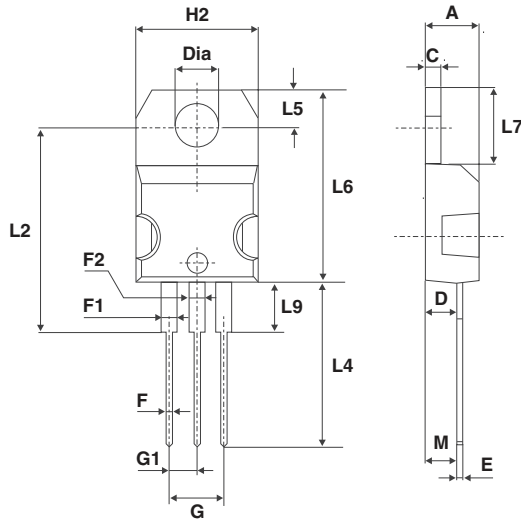
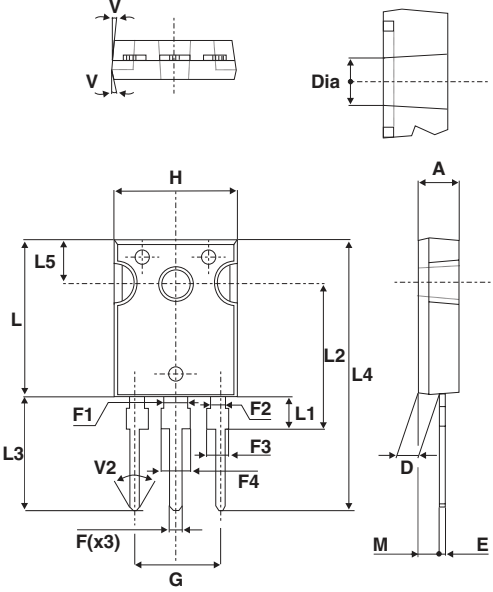


Table 6. TO-247 dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.85	5.16	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 typ.		0.118 typ.	
F2	2.00 typ.		0.079 typ.	
F3	1.90	2.40	0.075	0.094
F4	3.00	3.40	0.118	0.134
G	10.90 typ.		0.429 typ.	
H	15.45	16.03	0.608	0.631
L	19.85	21.09	0.781	0.830
L1	3.70	4.30	0.146	0.169
L2	18.30	19.13	0.720	0.753
L3	14.20	20.30	0.559	0.799
L4	34.05	41.38	1.341	1.629
L5	5.35	6.30	0.211	0.248
M	2.00	3.00	0.079	0.118
V	5° typ.		5° typ.	
V2	60° typ.		60° typ.	
Dia.	3.55	3.65	0.140	0.144

3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS61L45CW	STPS61L45CW	TO-247	4.4 g	30	Tube
STPS61L45CT	STPS61L45CT	TO-220AB	2.2 g	50	Tube

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
14-Nov-2007	1	Initial release.
15-Jul-2011	2	Reformatted to current standards. Updated package illustration for TO-247.

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