STPS2L60

Power Schottky rectifier

Features

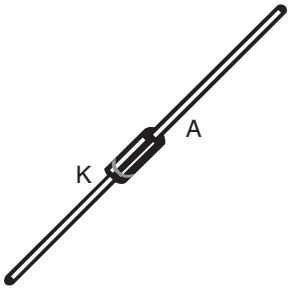
- Negligible switching losses
- Low forward voltage drop
- Surface mount miniature package
- Avalanche capability specified
- ECOPACK2® halogen-free component (SMBflat)

Description

Axial and surface mount power Schottky rectifiers suited to switched mode power supplies and high frequency DC to DC converters.

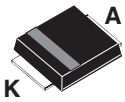
Packaged in SMA, DO-41 and SMBflat this device is especially intended for use in low voltage, high frequency inverters and small battery chargers.

SMA
(JEDEC DO-214AC)
STPS2L60A



DO-41

STPS2L60



SMBflat
(JEDEC DO221-AA)
STPS2L60UF

Table 1. Device summary

$I_{F(AV)}$	2 A
V_{RRM}	60 V
T_j (max)	150 °C
V_F(max)	0.55 V

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			60	V
$I_{F(RMS)}$	RMS forward voltage			10	A
$I_{F(AV)}$	Average forward current	SMBflat	T_L = 130 °C δ = 0.5	2	A
		SMA	T_L = 115 °C δ = 0.5		
		DO-41	T_L = 110 °C δ = 0.5		
I_{FSM}	Surge non repetitive forward current		t_p =10 ms sinusoidal	75	A
P_{ARM}	Repetitive peak avalanche power		t_p = 1 µs T_j = 25 °C	1600	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			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 3. Thermal resistance

Symbol	Test conditions			Value	Unit
$R_{th(j-l)}$	Junction-lead		SMBflat	15	°C/W
			SMA	25	
		Lead length = 10 mm	DO-41	30	

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			100	µA
		T_j = 100 °C			2	10	mA
V_F (1)	Forward voltage drop	T_j = 25 °C	I_F = 2 A			0.60	V
		T_j = 125 °C			0.51	0.55	
		T_j = 25 °C	I_F = 4 A			0.77	
		T_j = 125 °C			0.62	0.67	

1. Pulse test: tp = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.43 \times I_{F(AV)} + 0.06\ I_F{}^2{}_{(RMS)}$

Figure 1. Average forward power dissipation versus average forward current

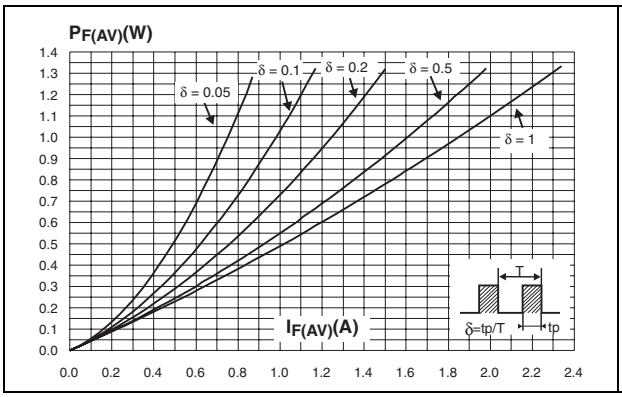


Figure 2. Average forward current versus ambient temperature (δ = 0.5) DO-41, SMA

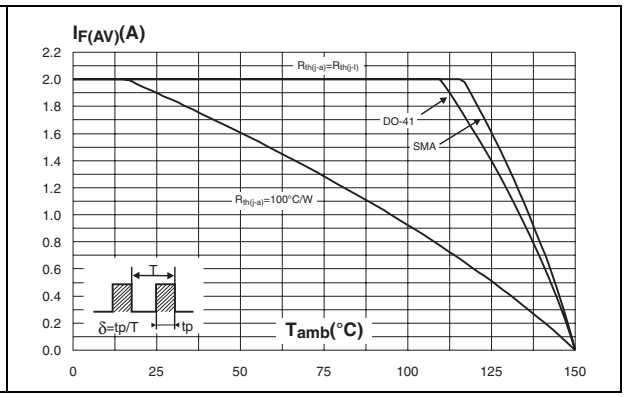


Figure 3. Average forward current versus ambient temperature (δ = 0.5) SMBflat

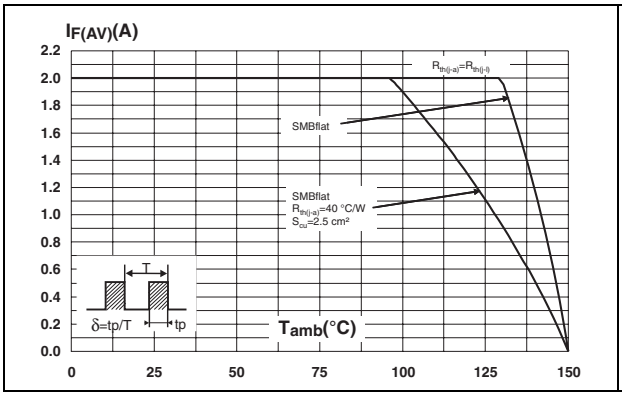


Figure 4. Normalized avalanche power derating versus pulse duration

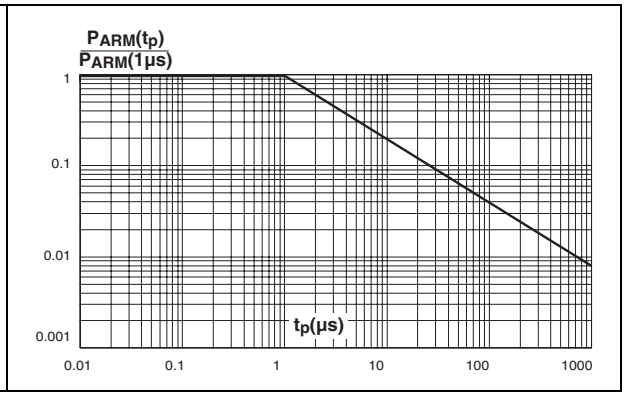


Figure 5. Normalized avalanche power derating versus junction temperature

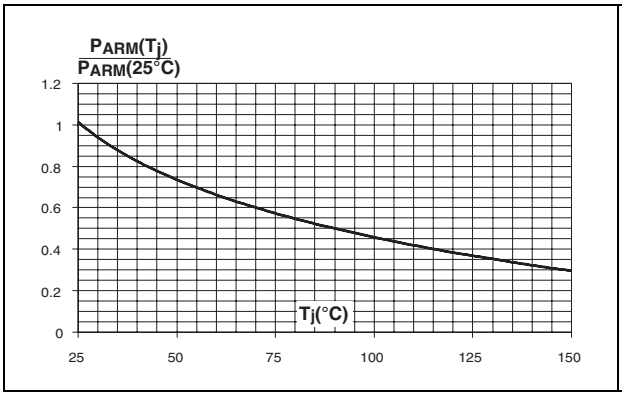


Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values) (SMA)

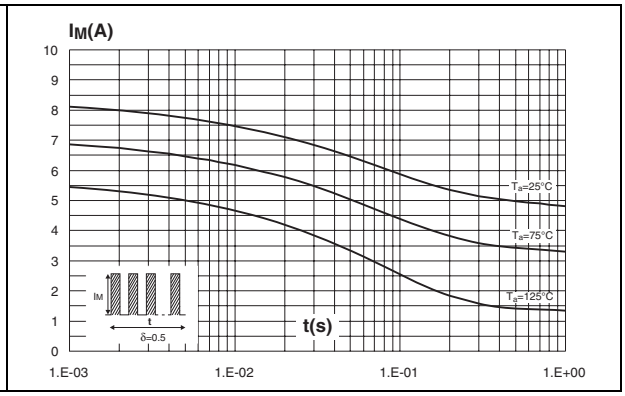


Figure 7. Non repetitive surge peak forward current versus overload duration (maximum values) (DO-41)

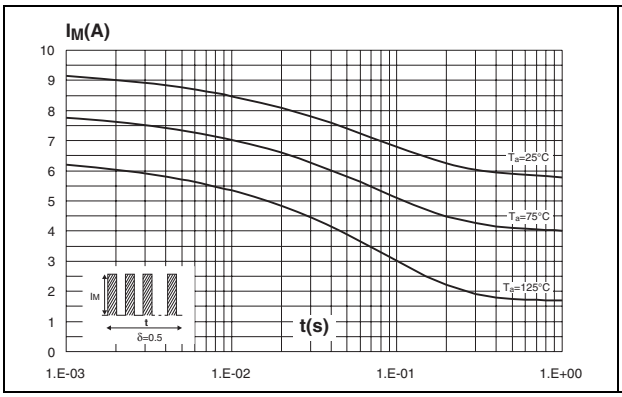


Figure 8. Non repetitive surge peak forward current versus overload duration (maximum values) (SMBflat)

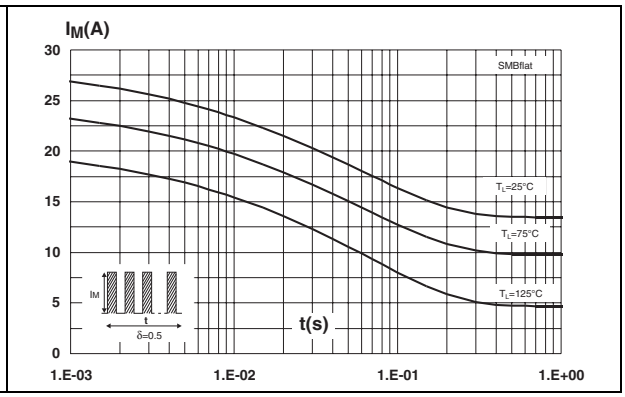


Figure 9. Relative variation of thermal impedance junction to ambient versus pulse duration (epoxy printed circuit board FR4, copper thickness: 35 µm) (SMA)

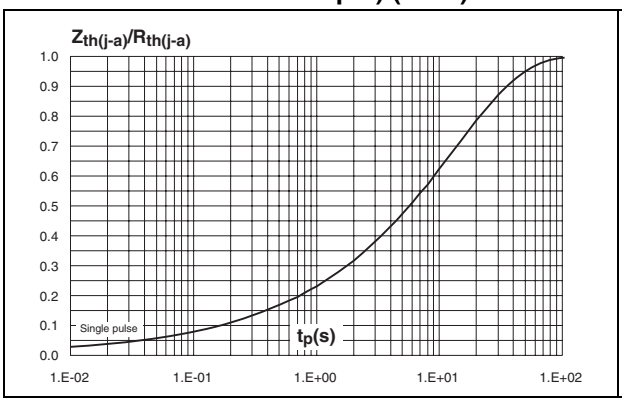


Figure 10. Relative variation of thermal impedance junction to ambient versus pulse duration (DO-41)

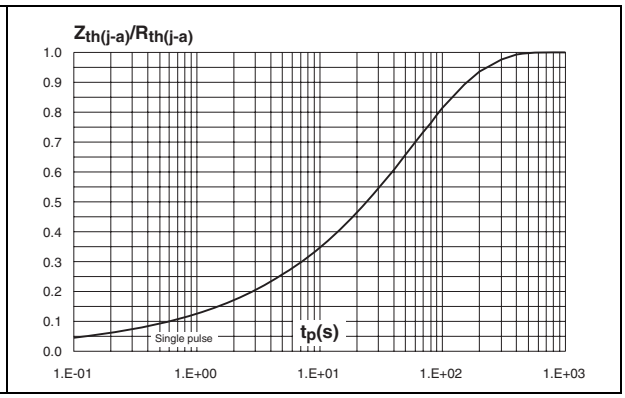


Figure 11. Relative variation of thermal impedance junction to lead versus pulse duration (epoxy printed circuit board FR4, copper thickness: 35 µm) (SMBflat)

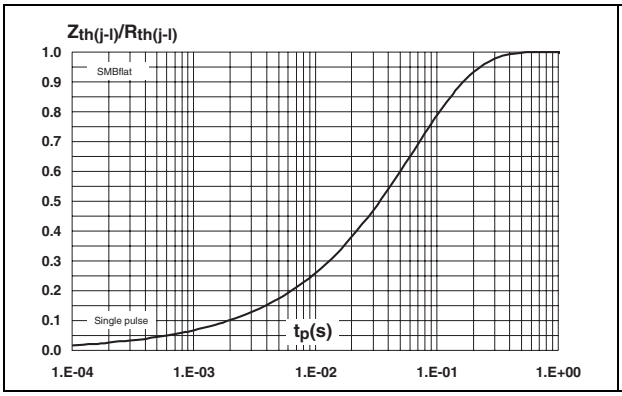


Figure 12. Reverse leakage current versus reverse voltage applied (typical values)

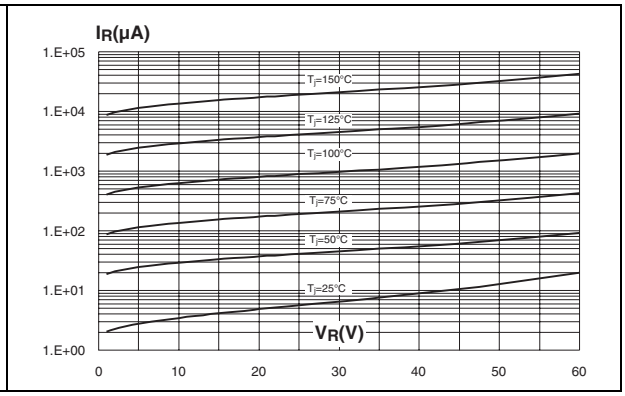


Figure 13. Junction capacitance versus reverse voltage applied (typical values)

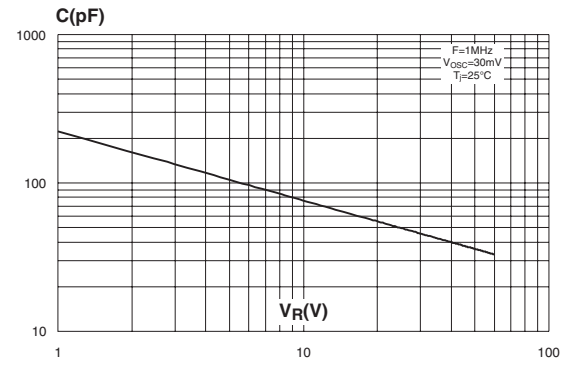


Figure 14. Forward voltage drop versus forward current (maximum values, low level)

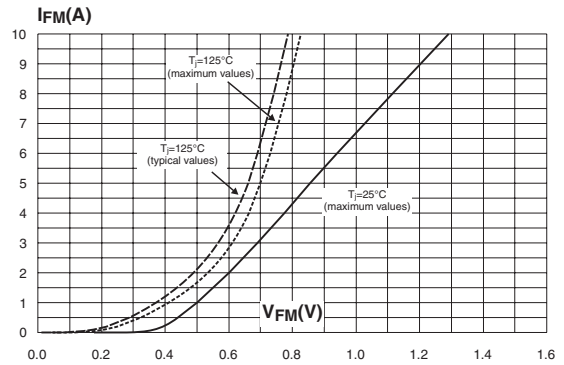


Figure 15. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed circuit board FR4, copper thickness: 35 µm) (SMA and SMBflat)

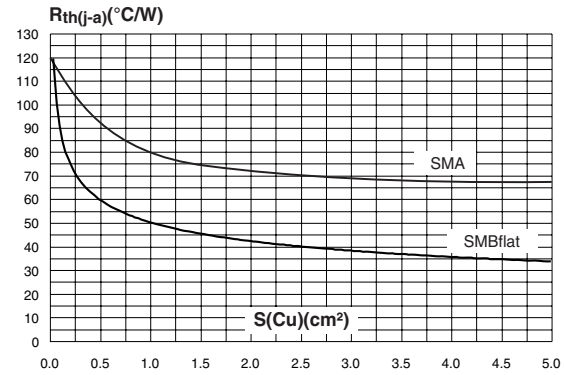
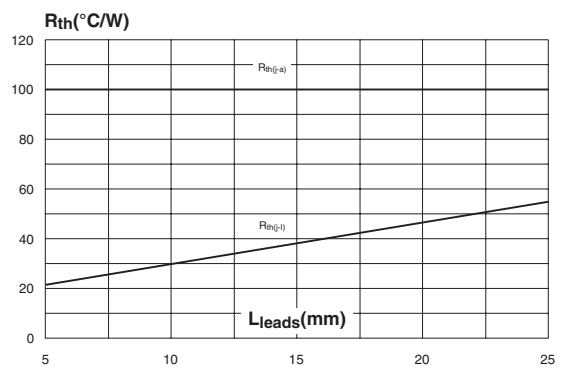


Figure 16. Thermal resistance versus lead length (DO-41)

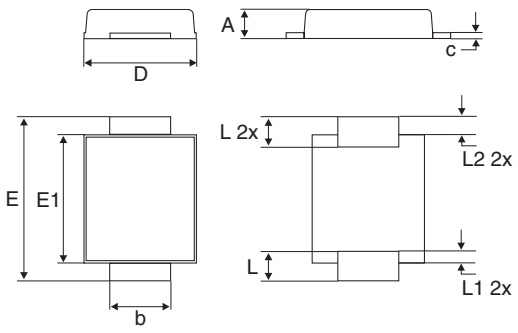


2 Package information

- Epoxy meets UL94, V0

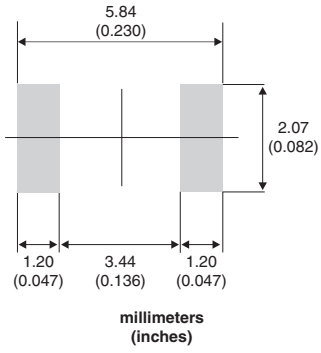
In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings 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*.

Table 5. SMBflat dimensions



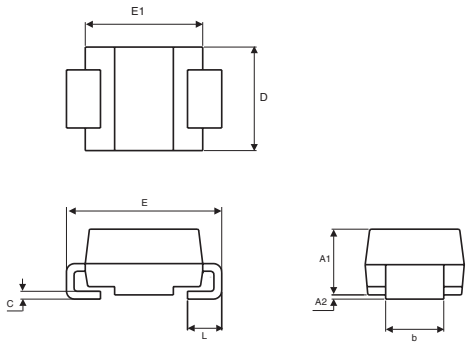
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
b	1.95		2.20	0.077		0.087
c	0.15		0.40	0.006		0.016
D	3.30		3.95	0.130		0.156
E	5.10		5.60	0.200		0.220
E1	4.05		4.60	0.189		0.181
L	0.75		1.50	0.029		0.059
L1		0.40			0.016	
L2		0.60			0.024	

Figure 17. SMBflat footprint dimensions



The footprint in *Figure 17* has been optimized for the SMBflat package. The footprint of the SMB package can be used instead.

Figure 18. SMA package dimensions



Ref	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.03	0.075	0.080
A2	0.05	0.20	0.002	0.008
b	1.25	1.65	0.049	0.065
c	0.15	0.41	0.006	0.016
E	4.80	5.60	0.189	0.220
E1	3.95	4.60	0.156	0.181
D	2.25	2.95	0.089	0.116
L	0.75	1.60	0.030	0.063

Figure 19. SMA footprint dimensions (in millimeters)

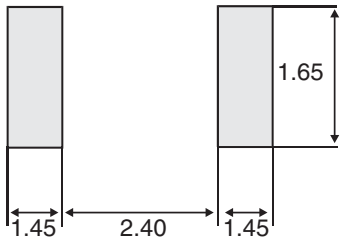
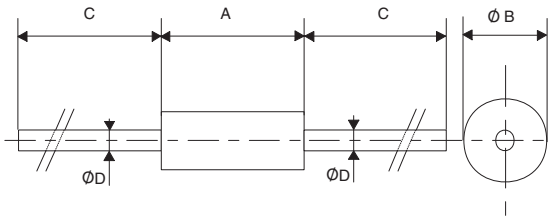


Figure 20. DO-41 package dimensions



Ref	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.07	5.20	0.160	0.205
B	2.04	2.71	0.080	0.107
C	28.00		1.102	
D	0.712	0.863	0.028	0.034

3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS2L60A	S26	SMA	0.068 g	5000	Tape and reel
STPS2L60	STPS2L60	DO-41	0.34 g	2000	Ammopack
STPS2L60RL	STPS2L60	DO-41	0.34 g	5000	Tape and reel
STPS2L60UF	FG26	SMBflat	0.050 g	5000	Tape and reel

4 Revision history

Table 7. Document revision history

Date	Revision	Description of changes
Jul-2003	2A	Last update.
Aug-2004	3	SMA package dimensions update. Reference A1 max changed from 2.70 mm (0.106 inch) to 2.03 mm (0.080 inch).
18-Sep-2008	4	Reformatted to current standards. Added SMBflat package.

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