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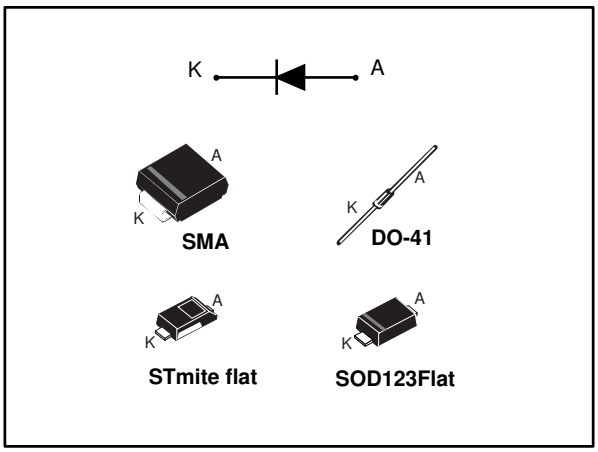
STPS1L60

Power Schottky rectifier

Datasheet - production data



Features

- Negligible switching losses
- Low forward voltage drop
- Surface mount miniature packages
- Avalanche capability specified

Description

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

Packaged in SMA, STmite flat, DO-41 and SOD123Flat, this device is especially intended for use in low voltage, high frequency inverters and small battery chargers.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	1 A
V_{RRM}	60 V
V_F(typ.)	0.50 V
T_j(max.)	175 °C

1 Characteristics

Table 2: Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			60	V
$I_{F(RMS)}$	Forward rms current		SMA/DO-41	10	A
			STmite flat	2	
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	SMA	T_L = 155 °C	1	A
		DO-41	T_L = 145 °C		
		SOD123Flat	T_L = 160 °C		
		STmite flat	T_C = 160 °C		
I_{FSM}	Surge non repetitive forward current	SMA DO-41 STmite flat	t_p = 10 ms sinusoidal	40	A
		SOD123Flat		50	
P_{ARM}	Repetitive peak avalanche power		t_p = 10 µs, T_j = 125 °C	85	W
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Operating junction temperature range(1)			-40 to +175	°C

Notes:

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

Table 3: Thermal parameters

Symbol	Parameter		Max. value	Unit
$R_{th(j-l)}$	Junction to lead	SMA	30	°C/W
		DO-41/lead length = 10 mm	45	
		SOD123Flat	20	
$R_{th(j-c)}$	Junction to case	STmite flat	20	

Table 4: Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		50	µA
		T_j = 100 °C		-	1.5	5	mA
		T_j = 125 °C		-	5.6	21	
V_F (1)	Forward voltage drop	T_j = 25 °C	I_F = 1 A	-		0.57	V
		T_j = 125 °C		-	0.50	0.54	
		T_j = 25 °C	I_F = 2 A	-		0.75	
		T_j = 125 °C		-	0.60	0.66	

Notes:

(1)Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses, use the following equation:

$P = 0.42 \times I_{F(AV)} + 0.12 \times I_{F^2(RMS)}$

1.1 Characteristics (curves)

Figure 1: Average forward power dissipation versus average forward current

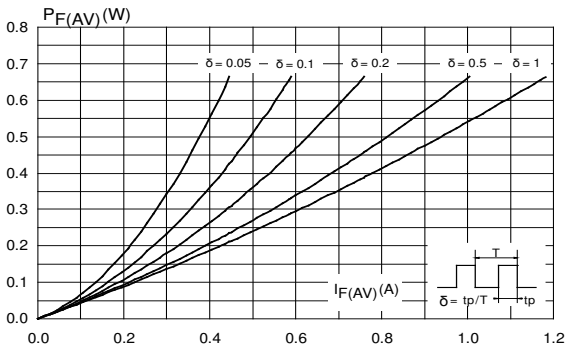


Figure 2: Average forward current versus ambient temperature (δ = 0.5)

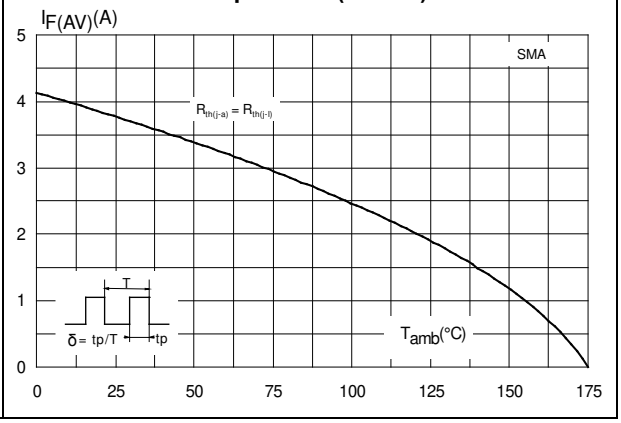


Figure 3: Average forward current versus ambient temperature (δ = 0.5)

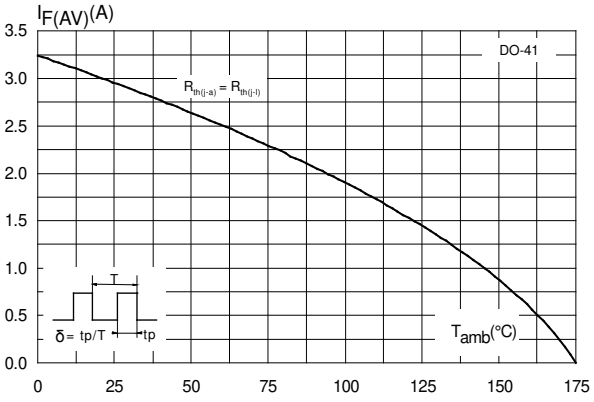


Figure 4: Average forward current versus ambient temperature (δ = 0.5)

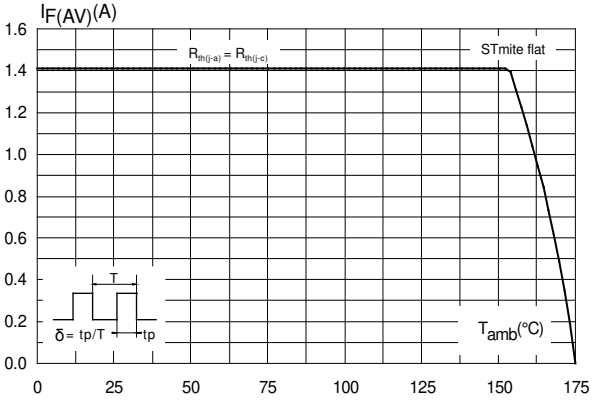


Figure 5: Average forward current versus ambient temperature (δ = 0.5)

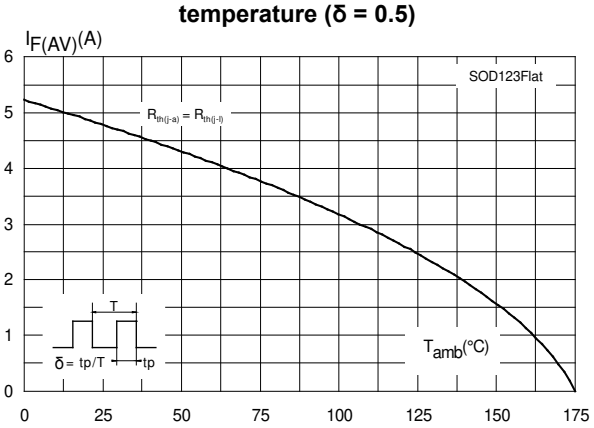


Figure 6: Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

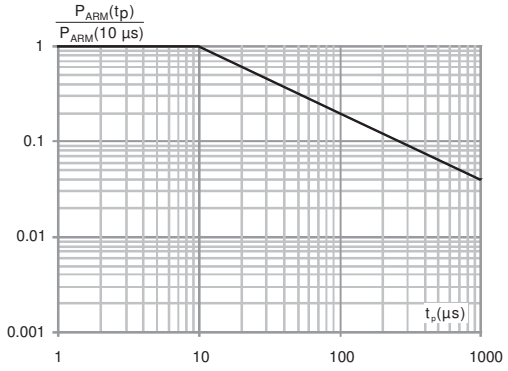


Figure 7: Relative variation of thermal impedance junction to ambient versus pulse duration

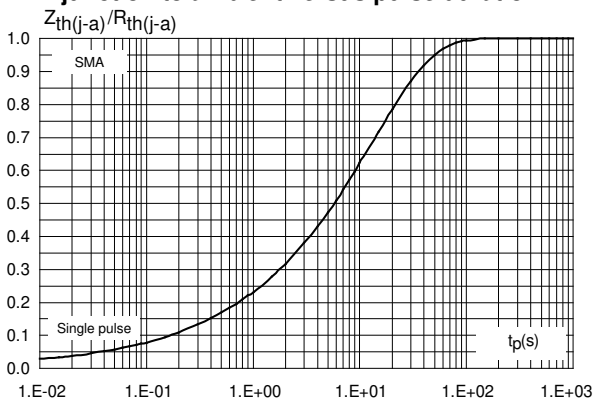


Figure 8: Relative variation of thermal impedance junction to ambient versus pulse duration

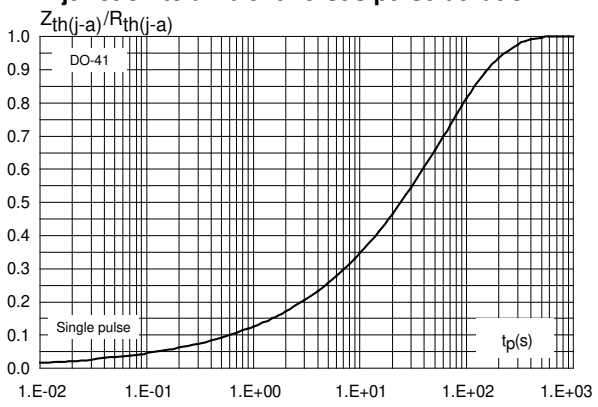


Figure 9: Relative variation of thermal impedance junction to ambient versus pulse duration

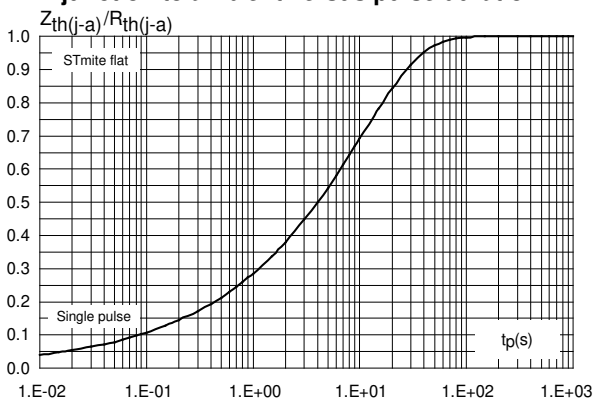


Figure 10: Relative variation of thermal impedance junction to lead versus pulse duration

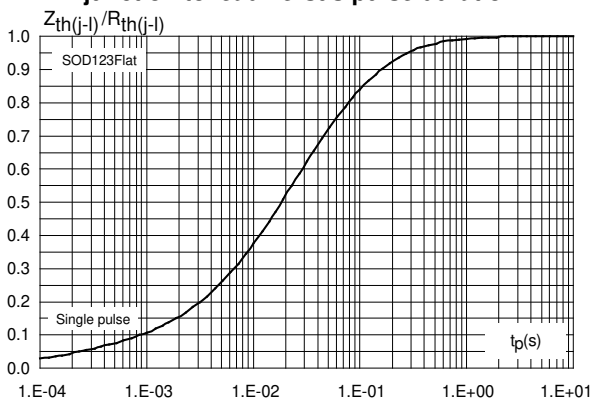


Figure 11: Reverse leakage current versus reverse voltage applied (typical values)

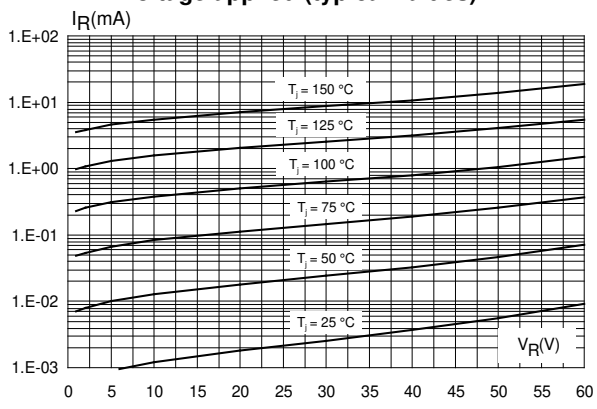


Figure 12: Junction capacitance versus reverse voltage applied (typical values)

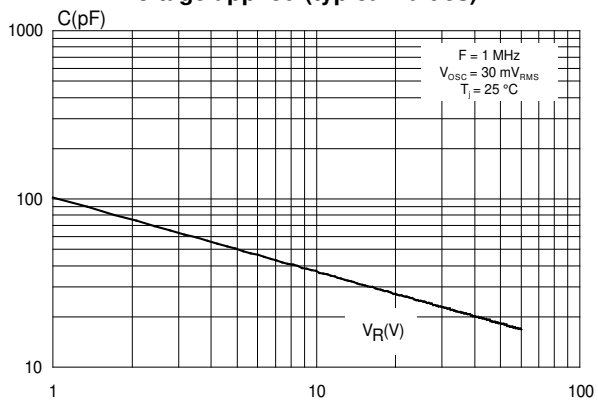


Figure 13: Forward voltage drop versus forward current (typical values)

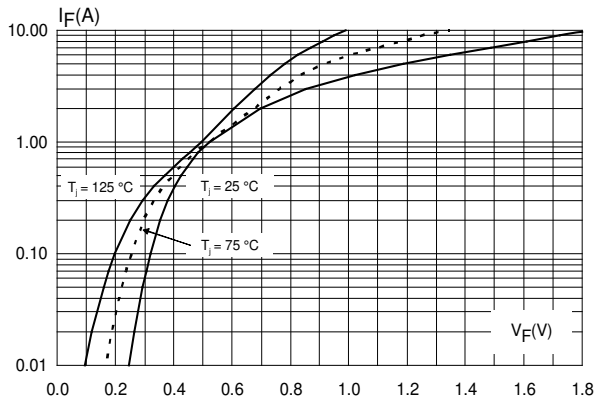


Figure 14: Thermal resistance junction to ambient versus copper surface under each lead (typical values)

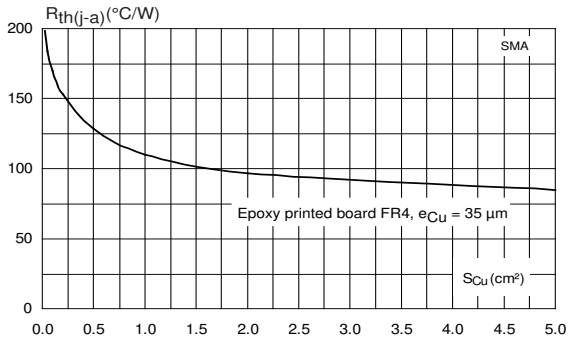


Figure 15: Thermal resistance junction to ambient versus copper surface under tab (typical values)

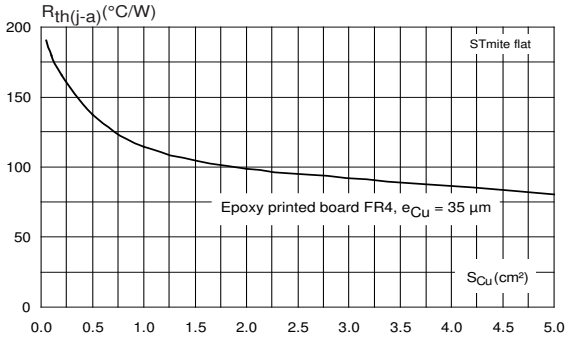


Figure 16: Thermal resistance junction to ambient versus copper surface under each lead (typical values)

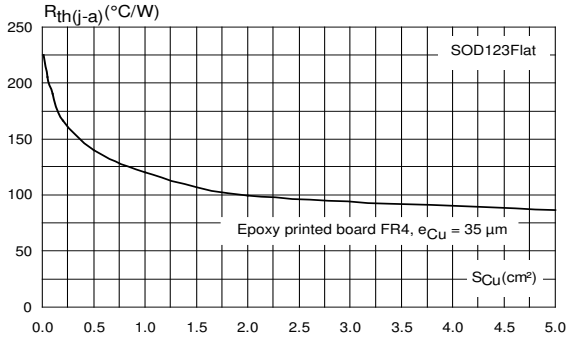
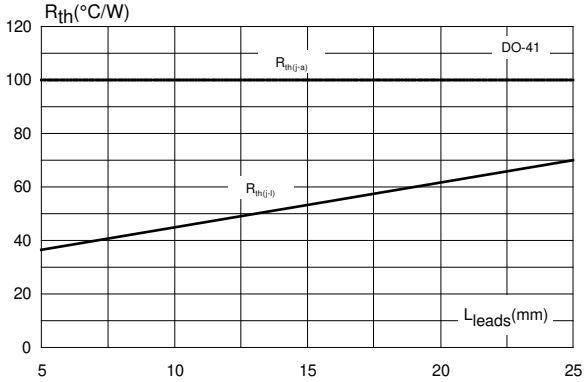


Figure 17: Thermal resistance versus lead length



2 Package information

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.

- Epoxy meets UL94, V0
- Band indicates cathode

2.1 SMA package information

Figure 18: SMA package outline

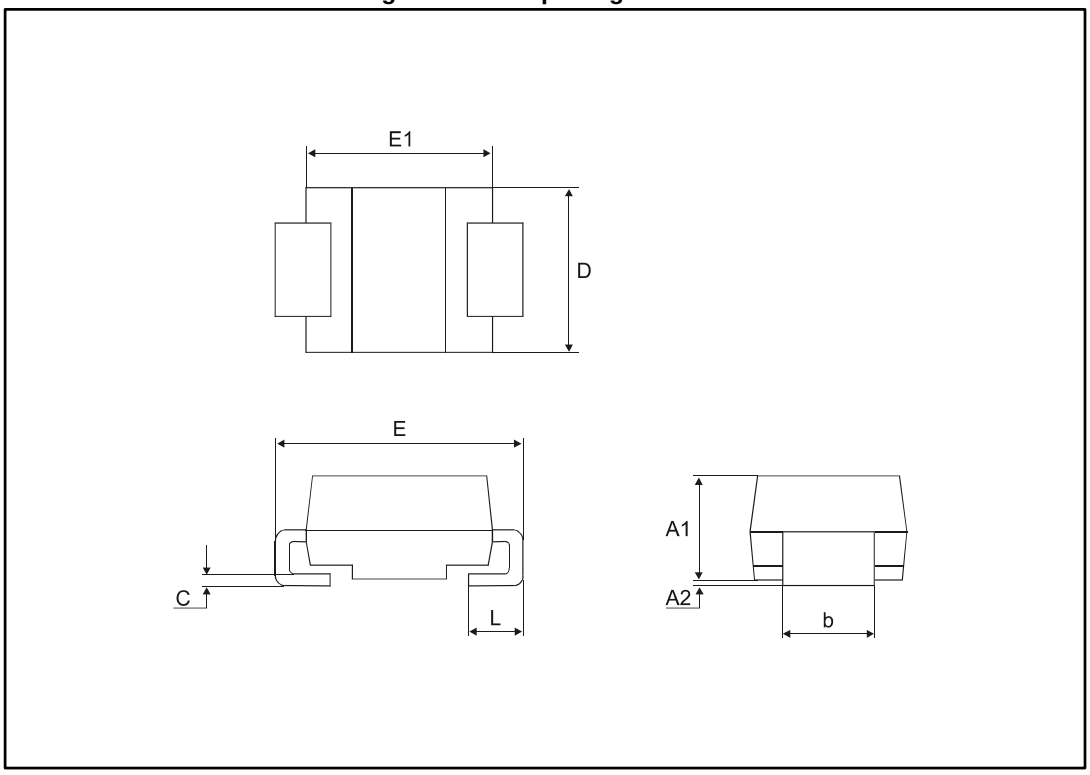
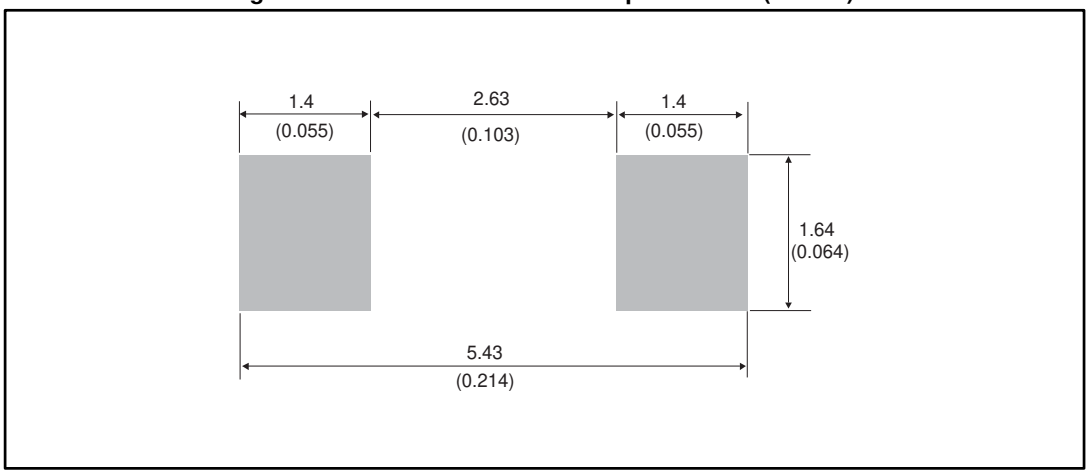


Table 5: SMA package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.097
A2	0.05	0.20	0.002	0.008
b	1.25	1.65	0.049	0.065
c	0.15	0.40	0.006	0.016
D	2.25	2.90	0.089	0.114
E	4.80	5.35	0.189	0.211
E1	3.95	4.60	0.156	0.181
L	0.75	1.50	0.030	0.059

Figure 19: SMA recommended footprint in mm (inches)



2.2 DO-41 package information

Figure 20: DO-41 package outline

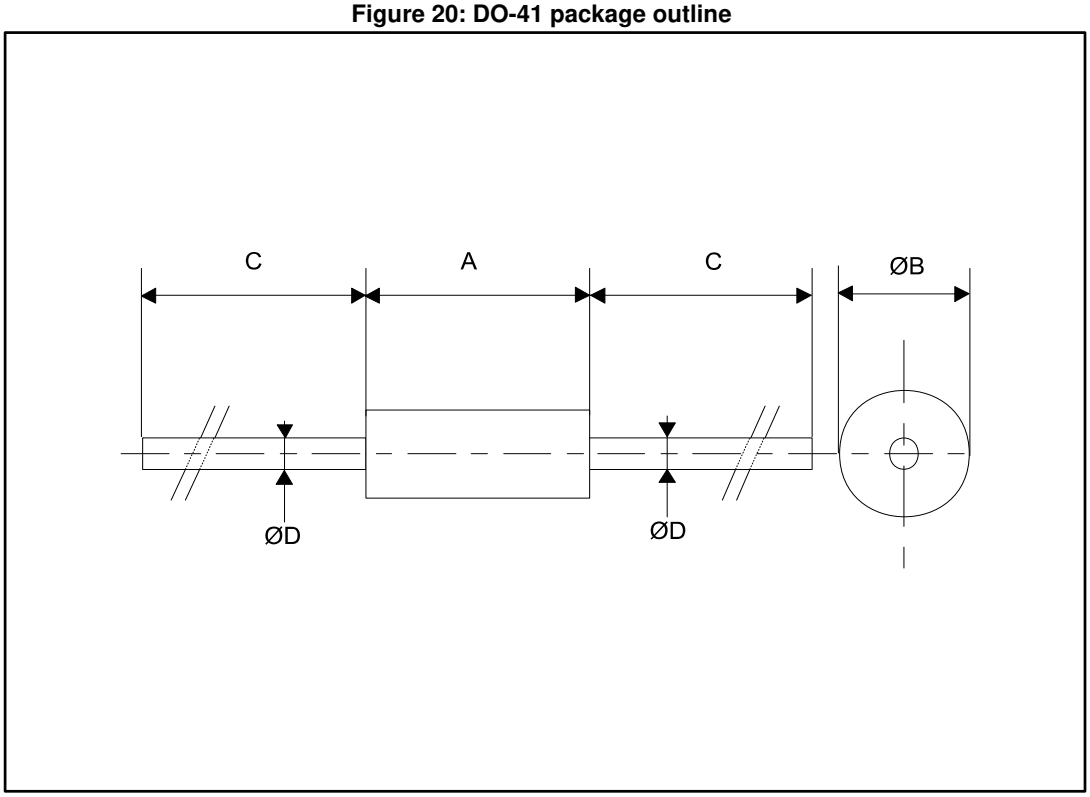


Table 6: DO-41 package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.07	5.20	0.160	0.205
ØB	2.04	2.71	0.080	0.107
C	25.40		1	
ØD	0.71	0.86	0.028	0.034

2.3 STmite flat package information

Figure 21: STmite flat package outline

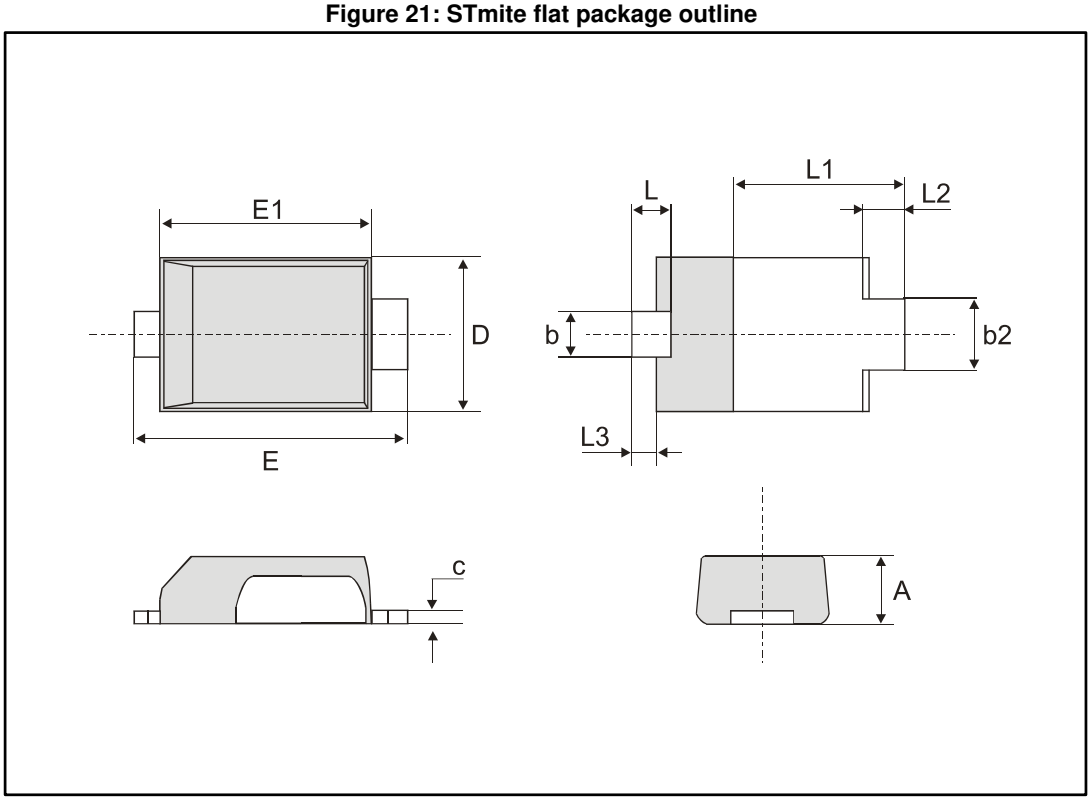
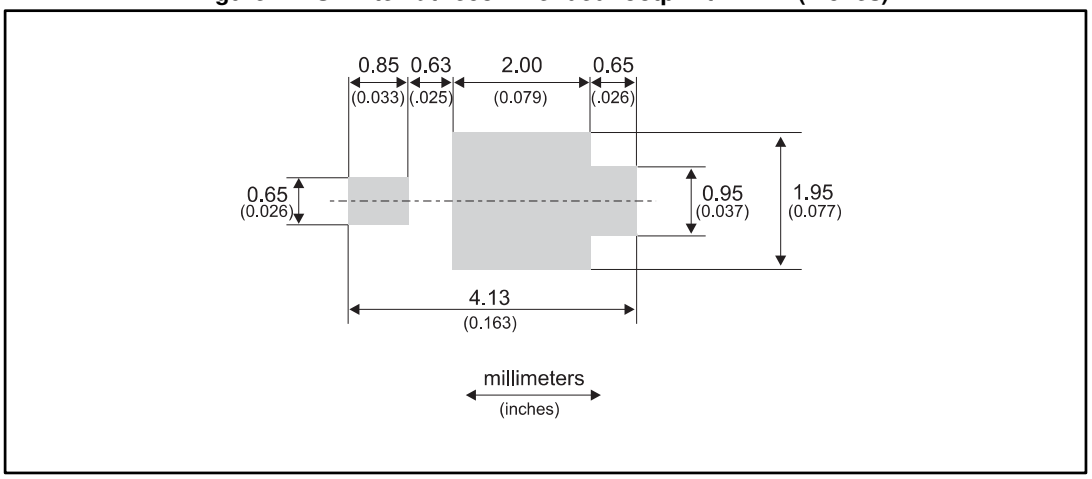


Table 7: STmite flat package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.80	0.85	0.95	0.031	0.033	0.037
b	0.40	0.55	0.65	0.016	0.022	0.026
b2	0.70	0.85	1.00	0.027	0.033	0.039
c	0.10	0.15	0.25	0.004	0.006	0.009
D	1.75	1.90	2.05	0.069	0.075	0.081
E	3.60	3.80	3.90	0.142	0.150	0.154
E1	2.80	2.95	3.10	0.110	0.116	0.122
L	0.50	0.55	0.80	0.020	0.022	0.031
L1	2.10	2.40	2.60	0.083	0.094	0.102
L2	0.45	0.60	0.75	0.018	0.021	0.030
L3	0.20	0.35	0.50	0.008	0.014	0.020

Figure 22: STmite flat recommended footprint in mm (inches)



2.4 SOD123Flat package information

Figure 23: SOD123Flat package outline

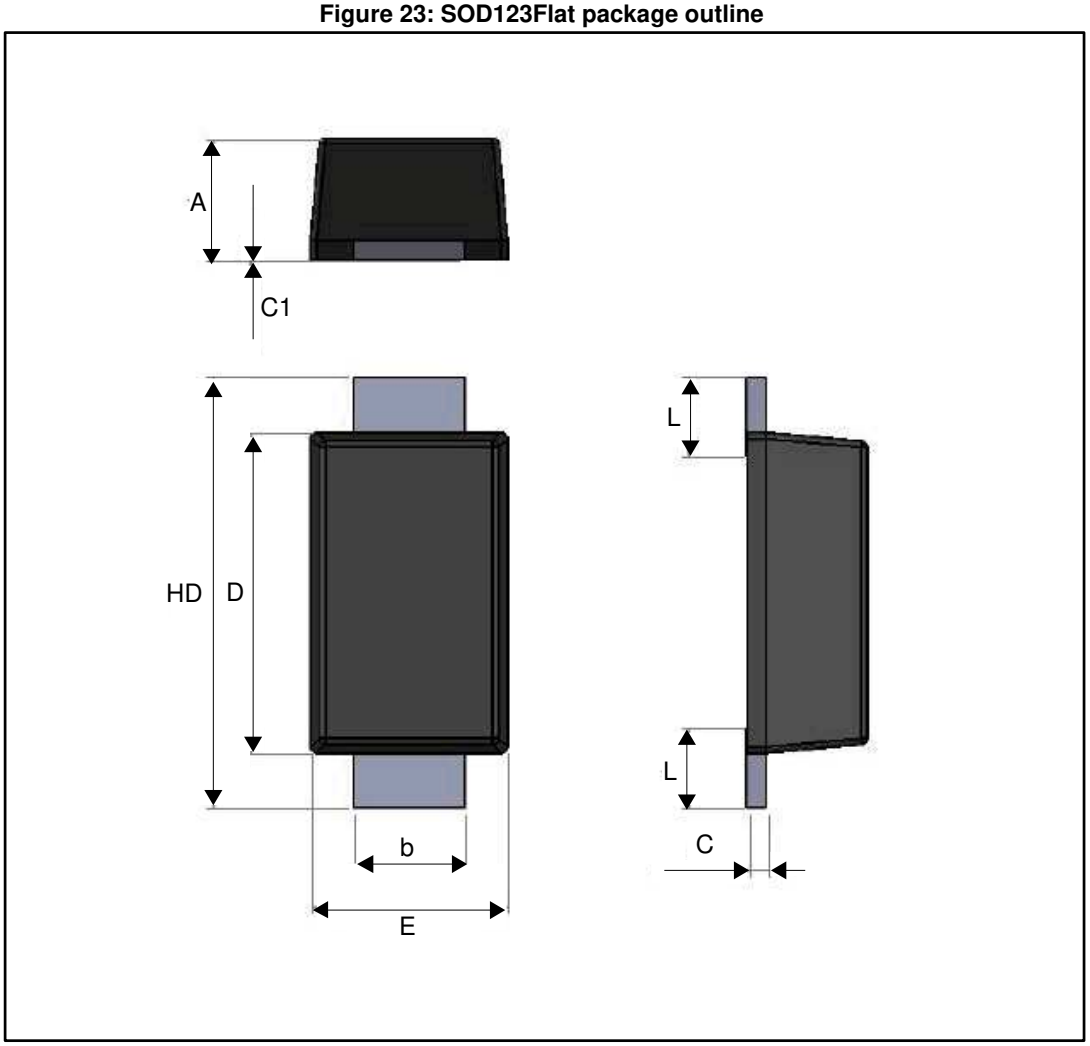
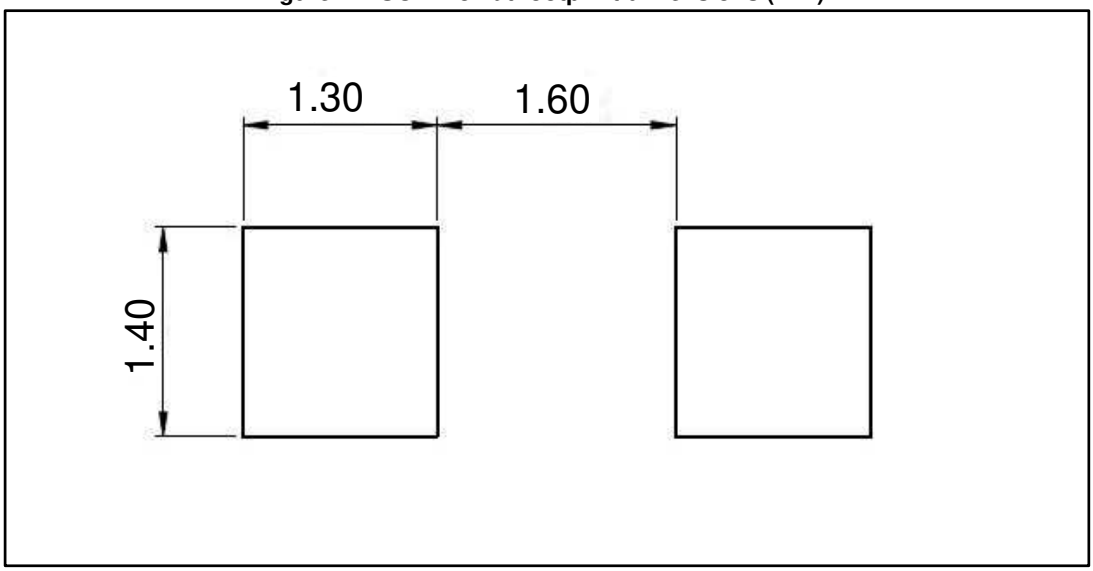


Table 8: SOD123Flat package mechanical data

Ref.	Dimensions		
	Millimeters		
	Min.	Typ.	Max.
A	0.86	0.98	1.10
b	0.80	0.90	1.00
c	0.08	0.15	0.25
c1	0.00		0.10
D	2.50	2.60	2.70
E	1.50	1.60	1.80
HD	3.30	3.50	3.70
L	0.45	0.65	0.85

Figure 24: SOD123Flat footprint dimensions (mm)



3 Ordering information

Table 9: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS1L60A	GB6	SMA	68 mg	5000	Tape and reel
STPS1L60RL	STPS1L60	DO-41	340 mg	5000	Tape and reel
STPS1L60MF	F1L6	STmite flat	16 mg	12000	Tape and reel
STPS1L60ZF	1L6	SOD123Flat	12.5 mg	3000	Tape and reel

4 Revision history

Table 10: Document revision history

Date	Revision	Changes
Jul-2003	5A	Last update.
Aug-2004	6	SMA package dimensions update. Reference A1 max. changed from 2.70 mm (0.106 inch.) to 2.03 mm (0.080 inc.).
25-Jun-2009	7	Added STmite flat package. Updated ECOPACK statement
30-Sep-2009	8	Updated table 7 ref. "C"
19-Aug-2016	9	Added SOD123Flat package.
26-Aug-2016	10	Updated *table 4*.

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