

## Power Schottky rectifier

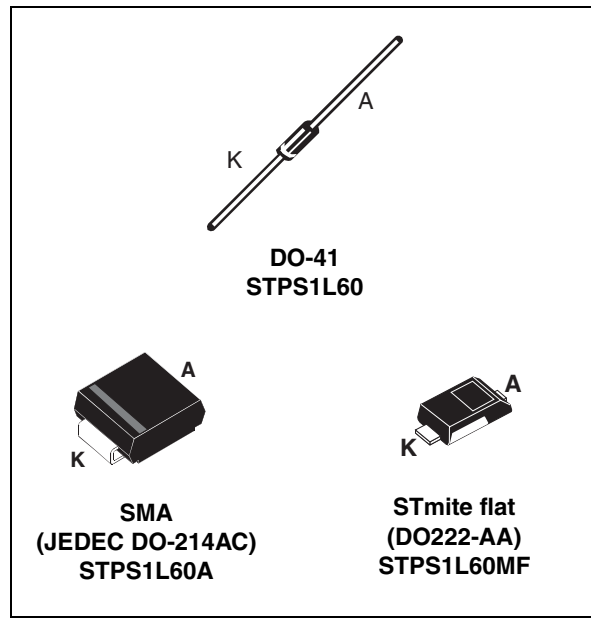
### Features

- 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 and DO-41, 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
$T_j$ (max)	150 °C
$V_F$ (max)	0.56 V

# 1 Characteristics

**Table 2. Absolute ratings (limiting values)**

Symbol	Parameter		Value	Unit	
$V_{RRM}$	Repetitive peak reverse voltage		60	V	
$I_{F(RMS)}$	Forward rms current	STmite flat	2	A	
		SMA, DO-41	10	A	
$I_{F(AV)}$	Average forward current	SMA	1	A	
		DO-41			$T_L = 120\text{ °C } \delta = 0.5$
		STmite flat			$T_C = 135\text{ °C } \delta = 0.5$
$I_{FSM}$	Surge non repetitive forward current		$t_p = 10\text{ ms}$ sinusoidal	40	A
$P_{ARM}$	Repetitive peak avalanche power		$t_p = 1\text{ }\mu\text{s } T_j = 25\text{ °C}$	1200	W
$T_{stg}$	Storage temperature range		- 65 to + 150	°C	
$T_j$	Maximum operating junction temperature <sup>(1)</sup>		150	°C	
dV/dt	Critical rate of rise of reverse voltage		10000	V/ $\mu\text{s}$	

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

**Table 3. Thermal resistance**

Symbol	Parameter		Value	Unit
$R_{th(j-a)}$	Junction to ambient	SMA	120	°C/W
		Lead length = 10 mm	DO-41	
$R_{th(j-l)}$	Junction to lead	SMA	30	°C/W
		Lead length = 10 mm	DO-41	
$R_{th(j-c)}$	Junction to case	STmite flat	20	°C/W

**Table 4. Static electrical characteristics**

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$			50	$\mu\text{A}$
		$T_j = 100\text{ °C}$			1.5	5	mA
$V_F^{(1)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 1\text{ A}$			0.57	V
		$T_j = 100\text{ °C}$				0.56	
		$T_j = 125\text{ °C}$			0.5	0.54	
		$T_j = 25\text{ °C}$	$I_F = 2\text{ A}$			0.75	
		$T_j = 100\text{ °C}$				0.68	
		$T_j = 125\text{ °C}$			0.6	0.66	

1. Pulse test:  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.44 \times I_{F(AV)} + 0.12 I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current

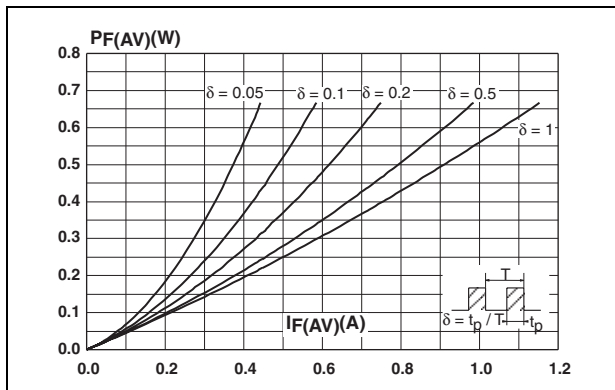


Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ ) (SMA)

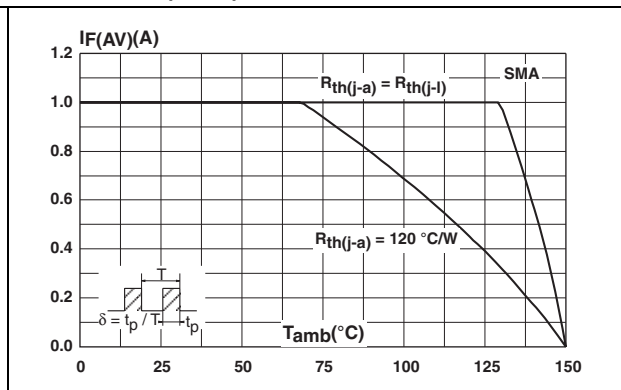


Figure 3. Average forward current versus ambient temperature ( $\delta = 0.5$ ) (DO-41)

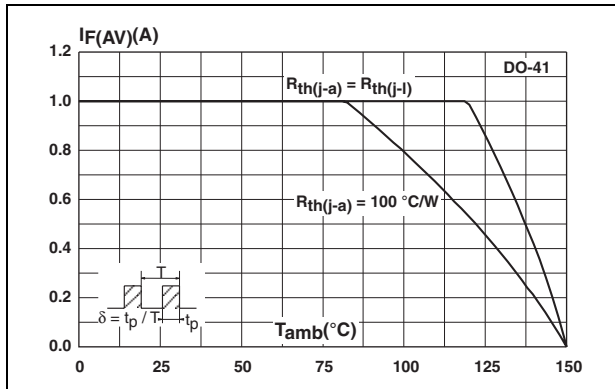


Figure 4. Average forward current versus ambient temperature ( $\delta = 0.5$ ) (STmite flat)

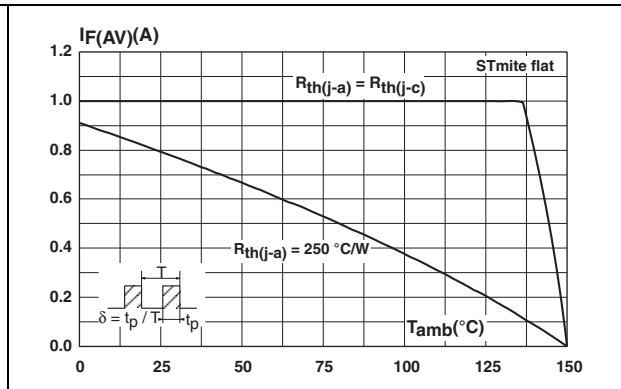


Figure 5. Normalized avalanche power derating versus pulse duration

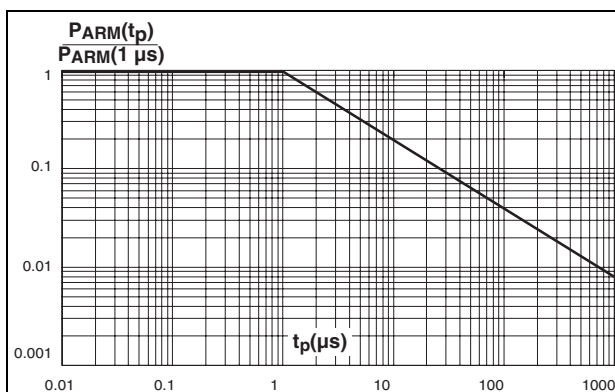
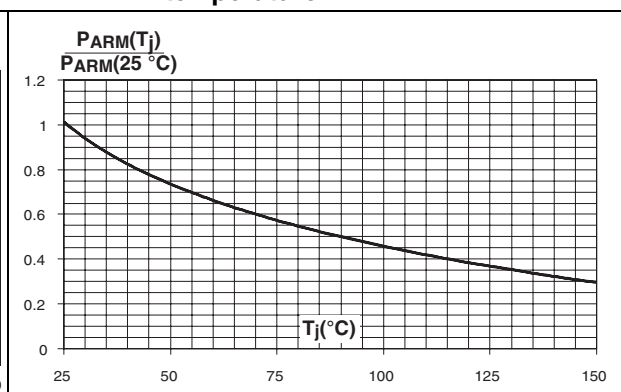
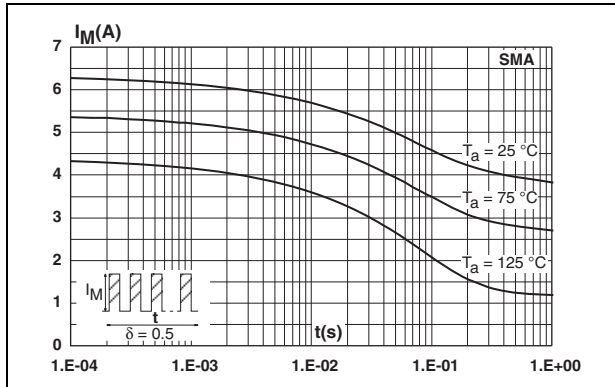


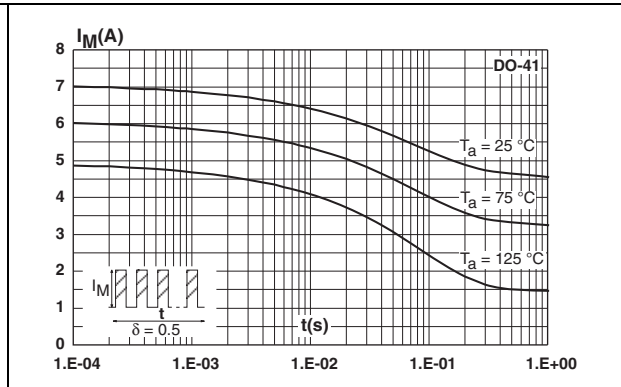
Figure 6. Normalized avalanche power derating versus junction temperature



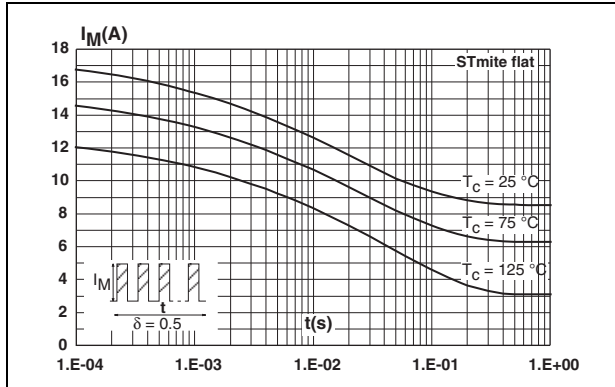
**Figure 7. Non repetitive surge peak forward current versus overload duration (maximum values) (SMA)**



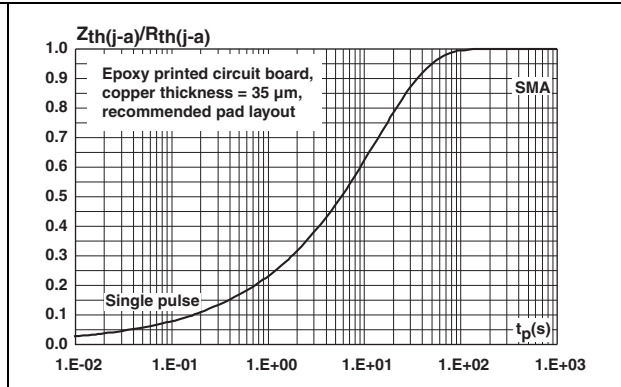
**Figure 8. Non repetitive surge peak forward current versus overload duration (maximum values) (DO-41)**



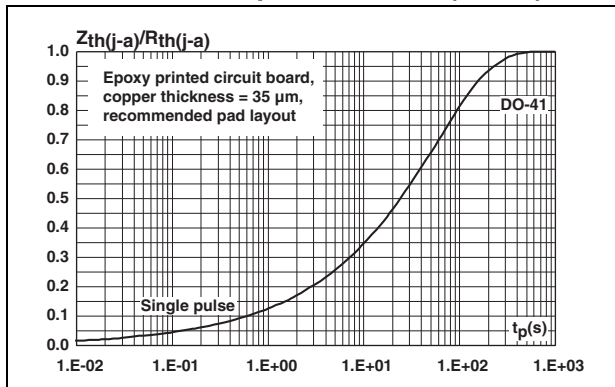
**Figure 9. Non repetitive surge peak forward current versus overload duration (maximum values) (STmite flat)**



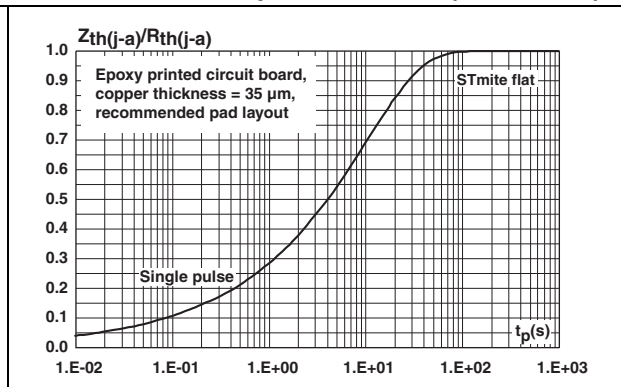
**Figure 10. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)**



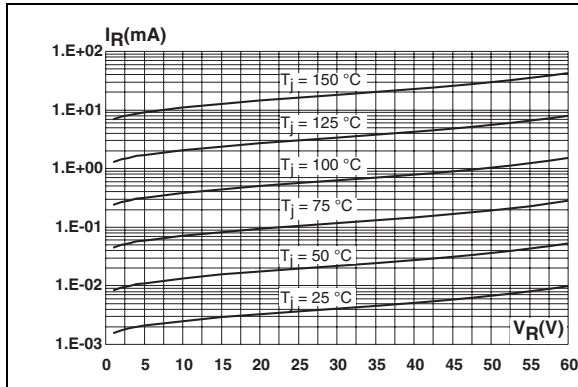
**Figure 11. Relative variation of thermal impedance junction to ambient versus pulse duration (DO-41)**



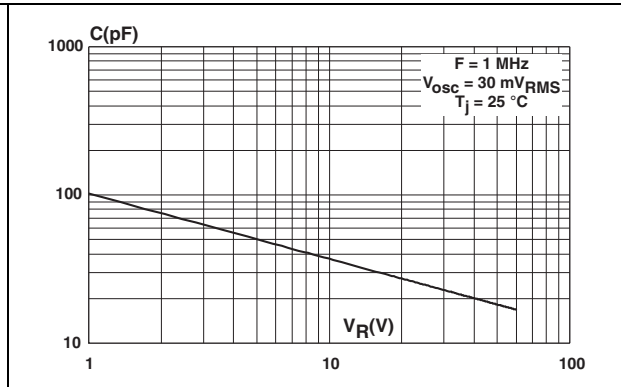
**Figure 12. Relative variation of thermal impedance junction to ambient versus pulse duration (STmite flat)**



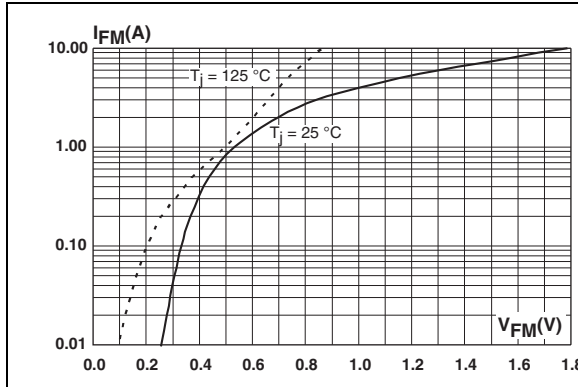
**Figure 13. Reverse leakage current versus reverse voltage applied (typical values)**



**Figure 14. Junction capacitance versus reverse voltage applied (typical values)**



**Figure 15. Forward voltage drop versus forward current (typical values, high level)**



**Figure 16. Forward voltage drop versus forward current (typical values, low level)**

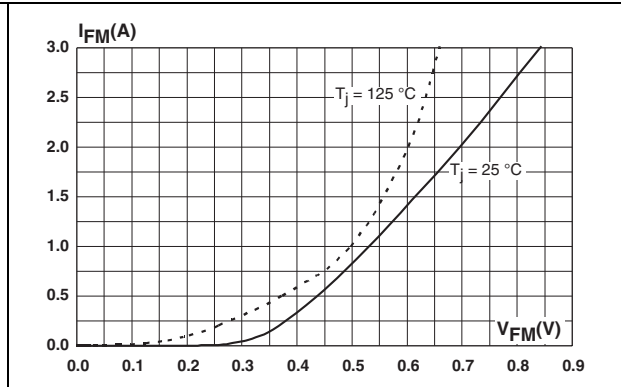


Figure 17. Thermal resistance junction to ambient versus copper surface under each lead (SMA)

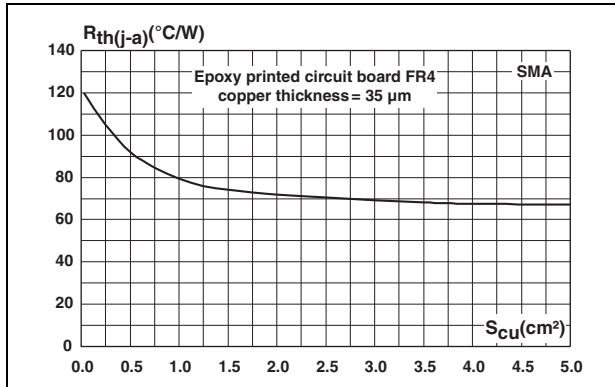


Figure 18. Thermal resistance versus lead length (DO-41)

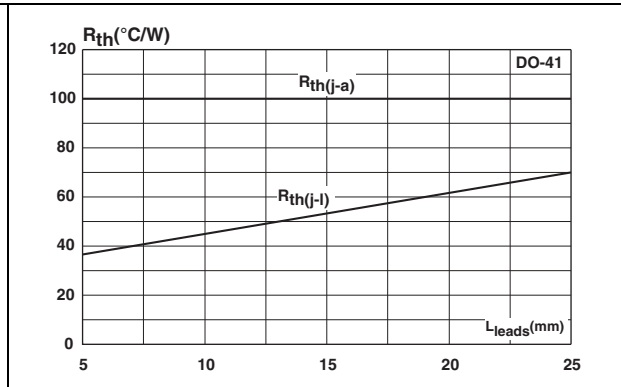
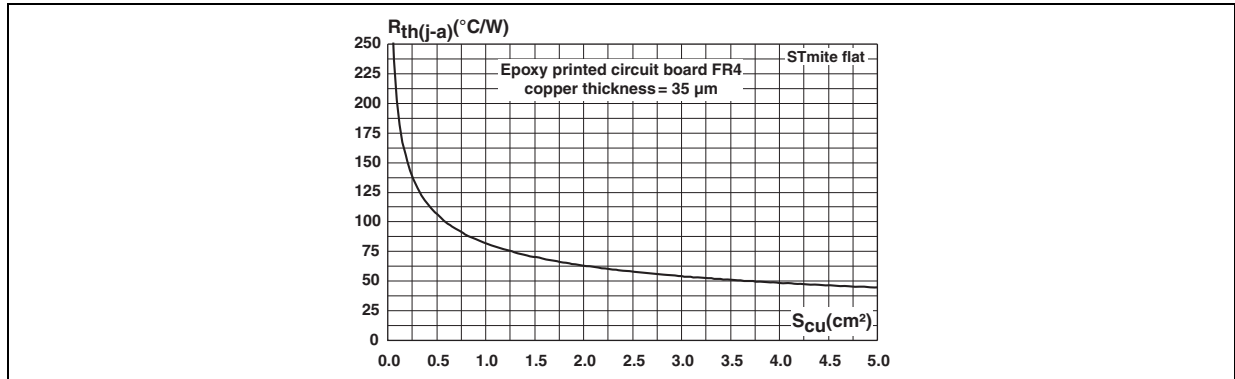


Figure 19. Thermal resistance junction to ambient versus copper surface under tab (STmite flat)



## 2 Package information

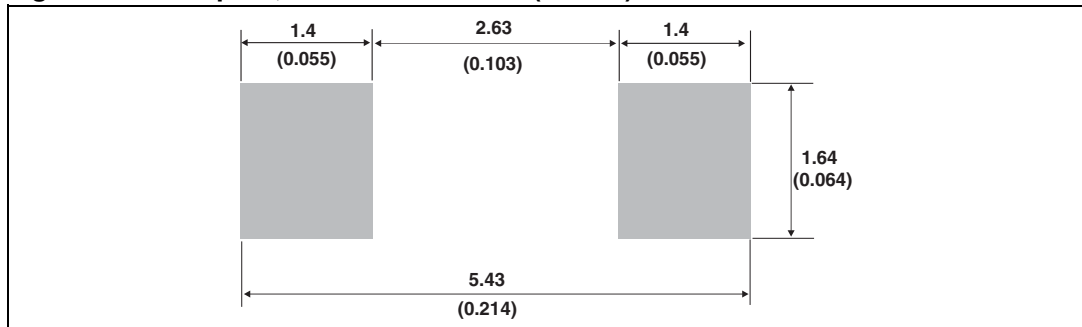
- Epoxy meets UL94, V0
- Band indicates cathode

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**Table 5. SMA dimensions**

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.094
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

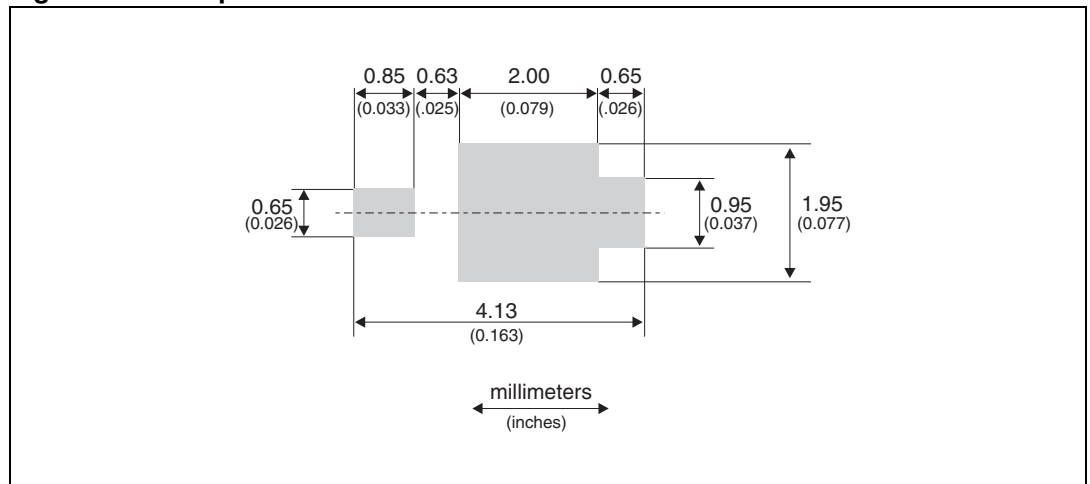
**Figure 20. Footprint, dimensions in mm (inches)**



**Table 6. STmite flat dimensions**

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	0.024	0.030
L3	0.20	0.35	0.50	0.008	0.014	0.020

**Figure 21. Footprint dimensions**



**Table 7. DO-41 (plastic) 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	25.4		1	
D	0.71	0.86	0.028	0.034

### 3 Ordering information

**Table 8. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS1L60A	GB6	SMA	0.068 g	5000	Tape and reel
STPS1L60	STPS1L60	DO-41	0.34 g	2000	Ammopack
STPS1L60RL	STPS1L60	DO-41	0.34 g	5000	Tape and reel
STPS1L60MF	F1L6	STmite flat	0.016 g	12000	Tape and reel

### 4 Revision history

**Table 9. 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 inc.) to 2.03 mm (0.080 inc).
25-Jun-2009	7	Added package STmite flat. Updated ECOPACK statement.
30-Sep-2009	8	Updated table 7 ref. " C ".

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