STPS1150

Power Schottky rectifier

Features

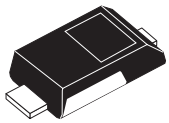
- Negligible switching losses
- Low forward voltage drop for higher efficiency and extented battery life
- Low thermal resistance
- Surface mount miniature package
- Avalanche capability specified

Description

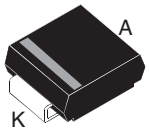
These 150 V power Schottky rectifiers are suited for switch mode power supplies on up to 24 V rails and high frequency converters.

Packaged in STmite/STmite flat, SMA and axial, this device is intended for use in consumer and computer applications like TV, STB, PC and DVD where low drop forward voltage is required to reduce power dissipation.

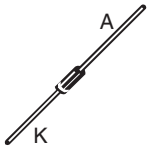
STmite
(JEDEC DO-216AA)
STPS1150M



STmite flat
STPS1150MF



SMA
(JEDEC DO-214AC)
STPS1150A



DO-41
STPS1150

Table 1. Device summary

$I_{F(AV)}$	1 A
V_{RRM}	150 V
T_j (max)	175 °C
V_F(max)	0.67 V

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			150	V
$I_{F(RMS)}$	Forward rms current			15	A
$I_{F(AV)}$	Average forward current	STmite/flat	T_c = 160 °C δ = 0.5	1	A
		SMA	T_L = 160 °C δ = 0.5		
		DO-41	T_L = 150 °C δ = 0.5		
I_{FSM}	Surge non repetitive forward current	STmite/flat	t_p = 10 ms sinusoidal	50	A
		SMA		50	
		DO-41		75	
P_{ARM}	Repetitive peak avalanche power		tp = 1µs Tj = 25 °C	1500	W
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum operating junction temperature(1)			175	°C

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

Table 3. Thermal resistance

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

Table 4. Static electrical characteristics

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$		0.2	1.0	µA
		T_j = 125 °C			0.2	1.0	mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 1 A		0.78	0.82	V
		T_j = 125 °C			0.62	0.67	
		T_j = 25 °C	I_F = 2 A		0.85	0.89	
		T_j = 125 °C			0.69	0.75	

1. t_p = 5 ms, δ < 2%
2. t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.59 \times I_{F(AV)} + 0.08\ I_{F^2(RMS)}$

Figure 1. Average forward power dissipation versus average forward current

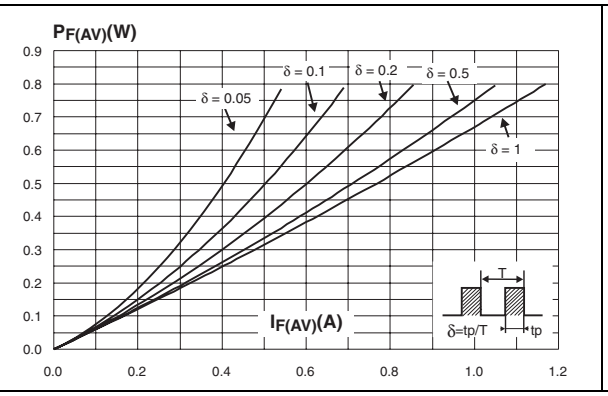


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

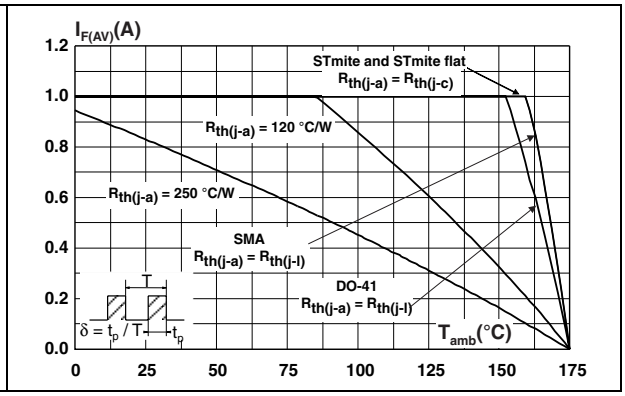


Figure 3. Normalized avalanche power derating versus pulse duration

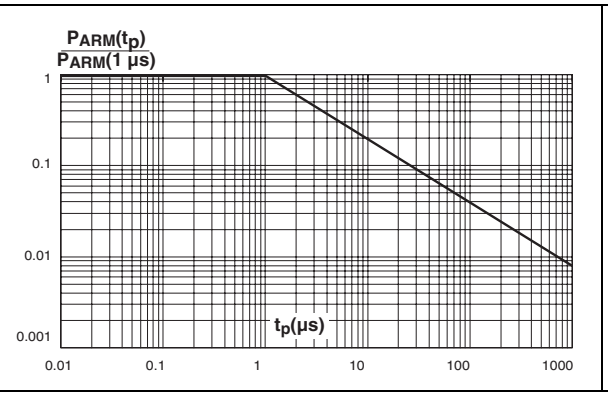


Figure 4. Normalized avalanche power derating versus junction temperature

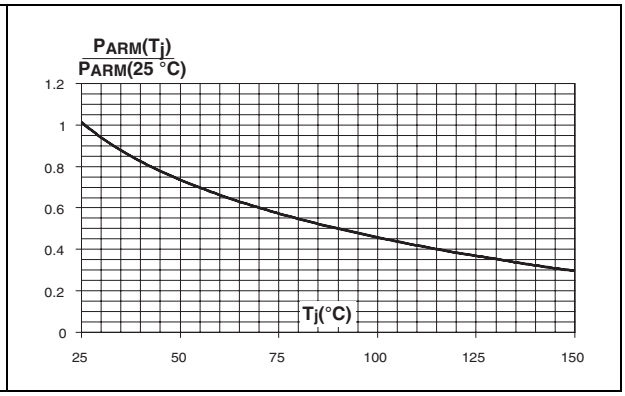


Figure 5. Non repetitive surge peak forward current versus overload duration - maximum values

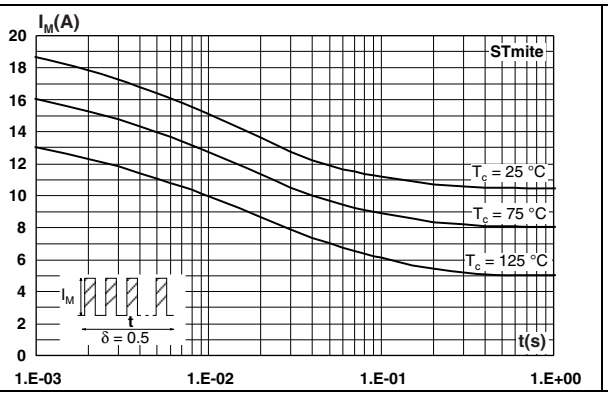


Figure 6. Non repetitive surge peak forward current versus overload duration - maximum values

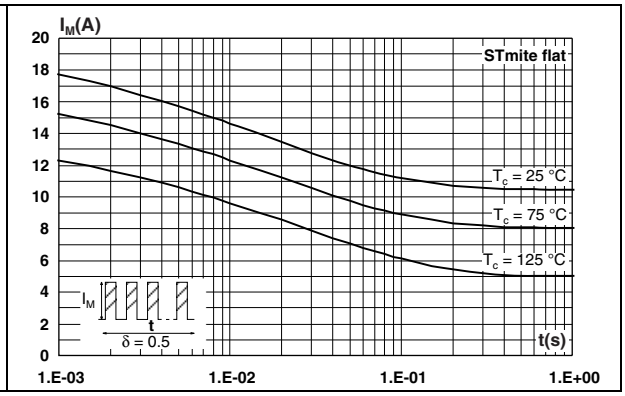


Figure 7. Non repetitive surge peak forward current versus overload duration - maximum values

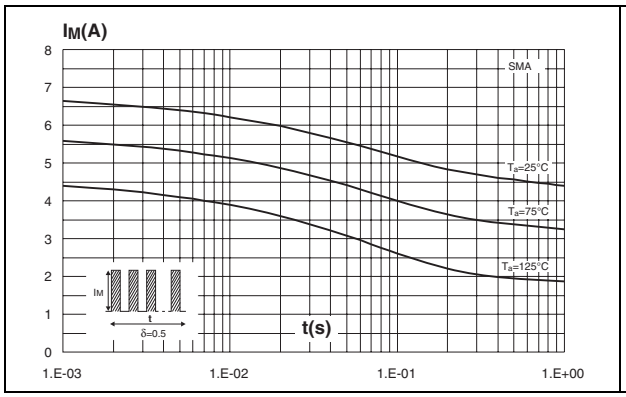


Figure 8. Non repetitive surge peak forward current versus overload duration - maximum values

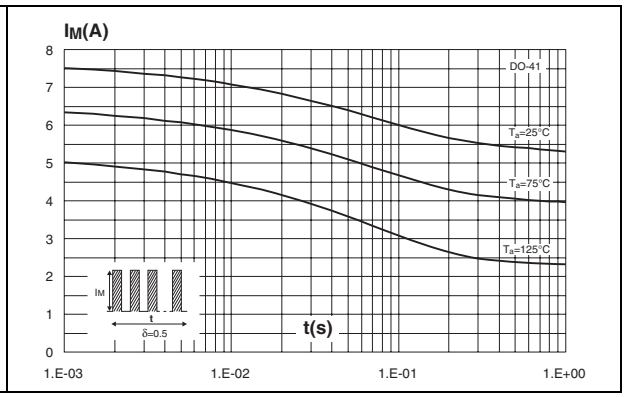


Figure 9. Relative variation of thermal impedance junction to case versus pulse duration

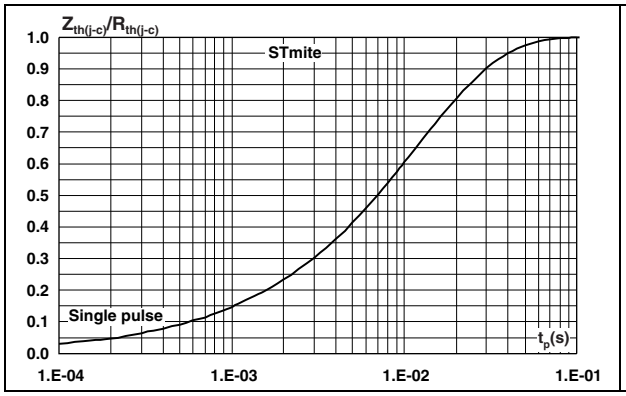


Figure 10. Relative variation of thermal impedance junction to case versus pulse duration

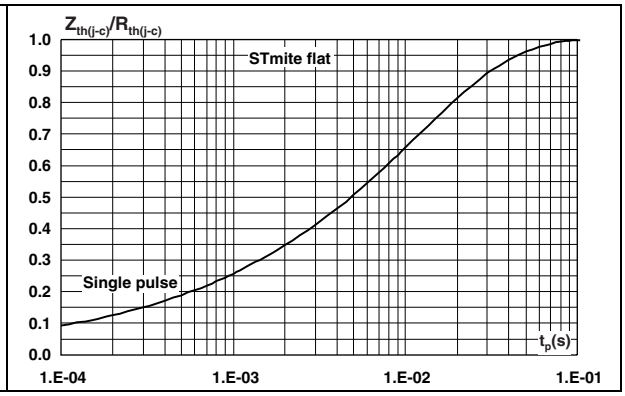


Figure 11. Relative variation of thermal impedance junction to ambient versus pulse duration

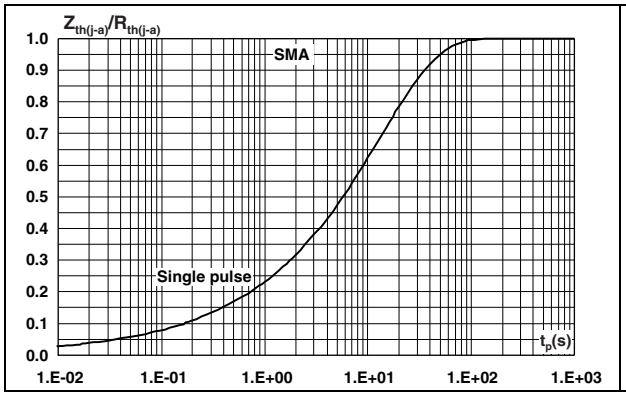


Figure 12. Relative variation of thermal impedance junction to ambient versus pulse duration

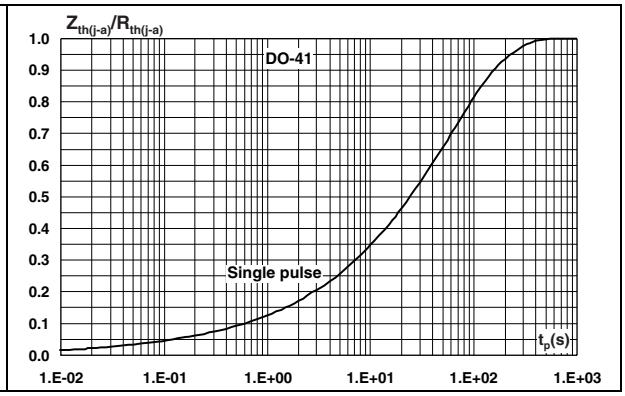


Figure 13. Reverse leakage current versus reverse voltage applied (typical values)

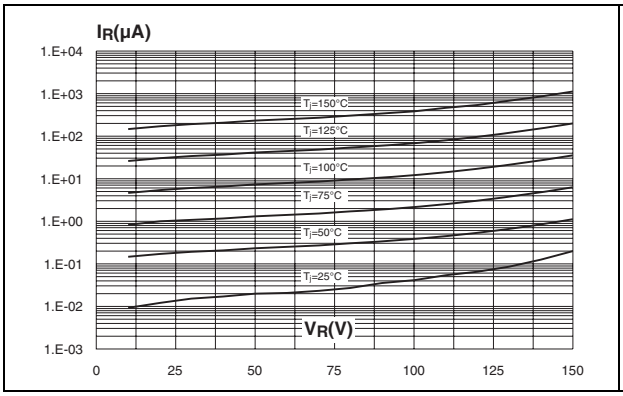


Figure 14. Junction capacitance versus reverse voltage applied (typical values)

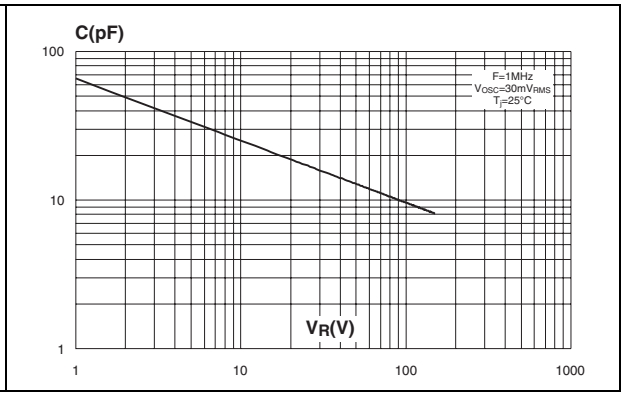


Figure 15. Forward voltage drop versus forward current (all packages)

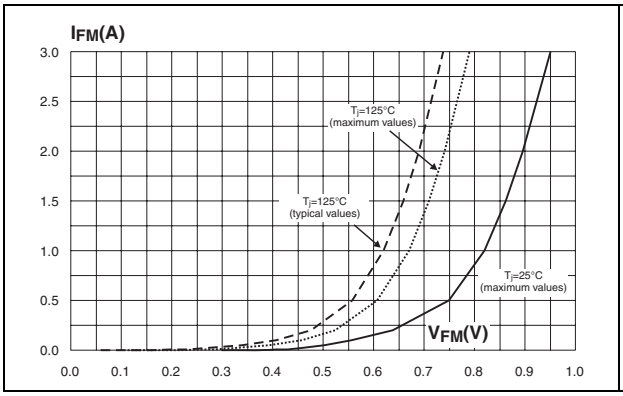


Figure 16. Thermal resistance junction to ambient versus copper surface under tab (STmite)

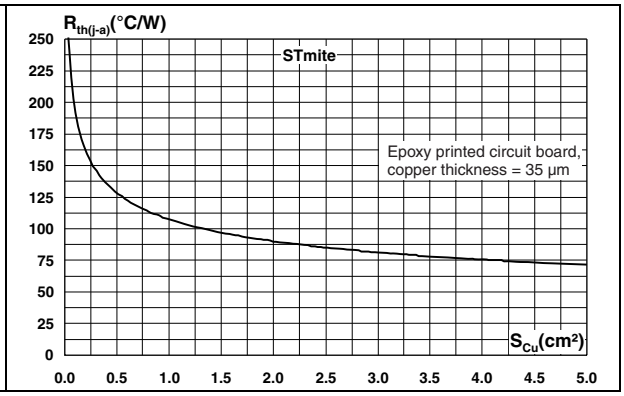


Figure 17. Thermal resistance junction to ambient versus copper surface under tab (STmite flat)

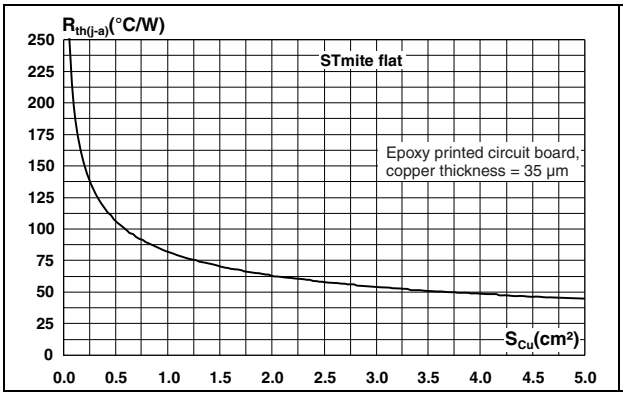


Figure 18. Thermal resistance junction to ambient versus copper surface under each lead (SMA)

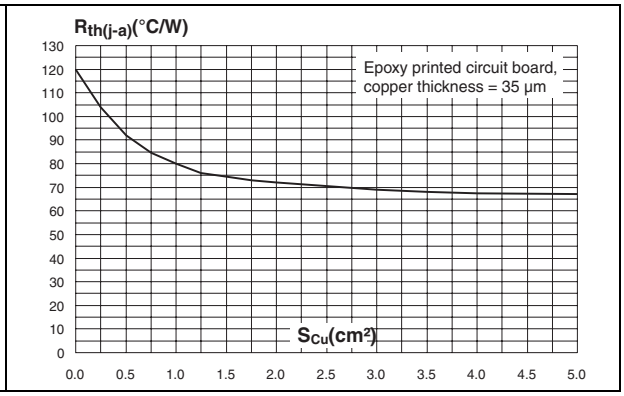
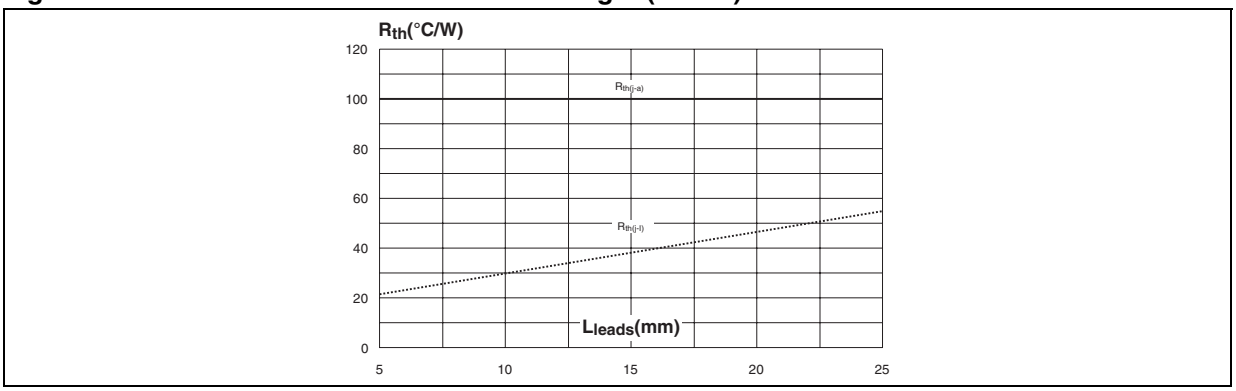


Figure 19. Thermal resistance versus lead length (DO-41)

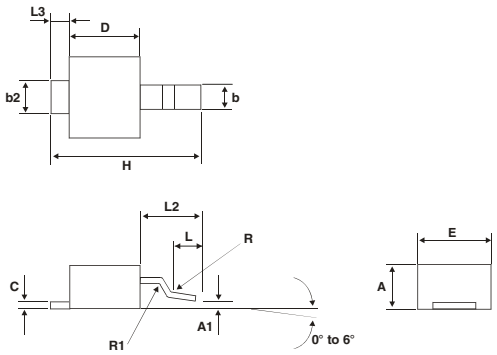


2 Package information

- Band shows cathode.
- Epoxy meets UL94, V0

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. STmite dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.85	1.00	1.15	0.033	0.039	0.045
A1	-0.05		0.105	-0.002		0.004
b	0.40		0.65	0.016		0.025
b2	0.70		1.00	0.027		0.039
c	0.10		0.25	0.004		0.010
D	1.75	1.90	2.05	0.069	0.007	0.081
E	1.75	1.90	2.05	0.069	0.007	0.081
H	3.60	3.75	3.90	0.142	0.148	0.154
L	0.50	0.63	0.80	0.047	0.025	0.031
L2	1.20	1.35	1.50	0.047	0.053	0.059
L3		0.50 ref			0.019 ref	
R	0.07			0.003		
R1	0.07			0.003		

Figure 20. Footprint (dimensions in mm)

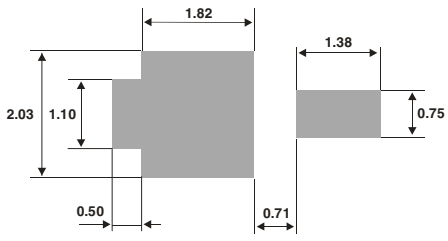
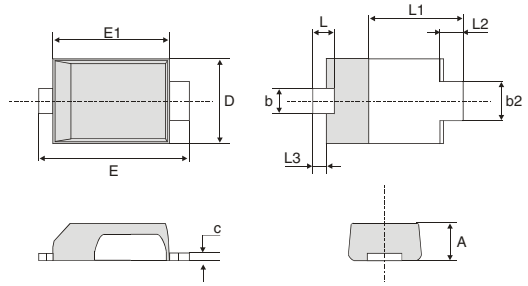


Table 6. STmite flat dimensions



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

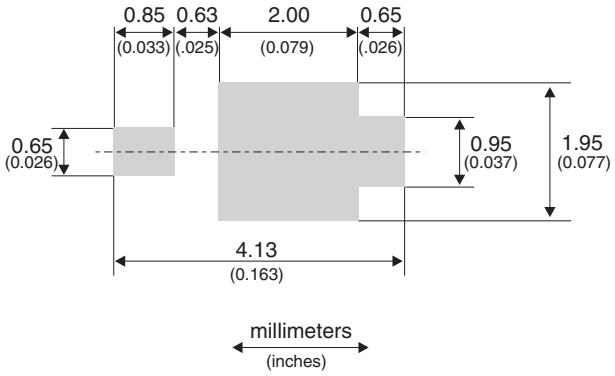
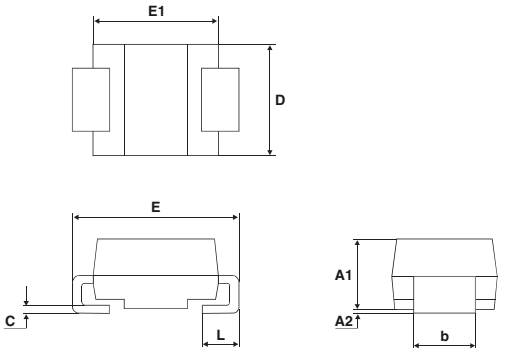


Table 7. SMA dimensions



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 22. Footprint (dimensions in mm)

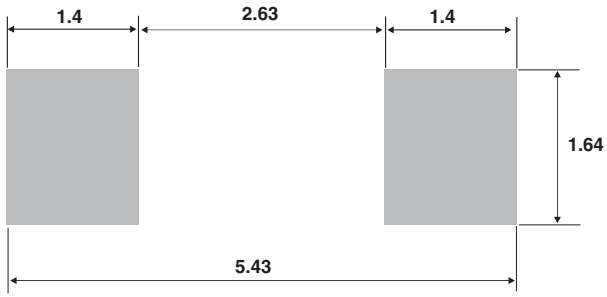
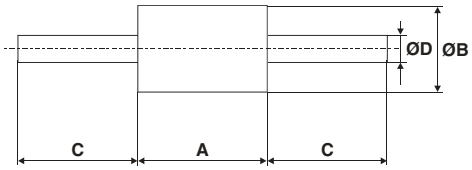


Table 8. DO-41 (plastic) dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.1	5.20	0.160	0.205
B	2	2.71	0.080	0.107
C	25.4		1	
D	0.712	0.863	0.028	0.034

3 Ordering information

Table 9. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS1150M	115	STmite	0.0155 g	12000	Tape and reel
STPS1150MF	F115	STmite flat	0.016 g	12000	Tape and reel
STPS1150A	1150	SMA	0.068 g	5000	Tape and reel
STPS1150	STPS1150	DO-41	0.34 g	2000	Ammopack
STPS1150RL	STPS1150	DO-41	0.34 g	5000	Tape and reel

4 Revision history

Table 10. Document revision history

Date	Revision	Changes
Jul-2003	2A	Last update.
Aug-2004	3	SMA package dimensions update. Reference A1 max. changed from 2.70mm (0.106) to 2.03mm (0.080).
31-May-2006	4	Reformatted to current standard. Added ECOPACK statement. Updated SMA footprint in Figure 15. Changed nF to pF in Figure 10.
09-Feb-2011	5	Added STmite and STmite flat package.

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