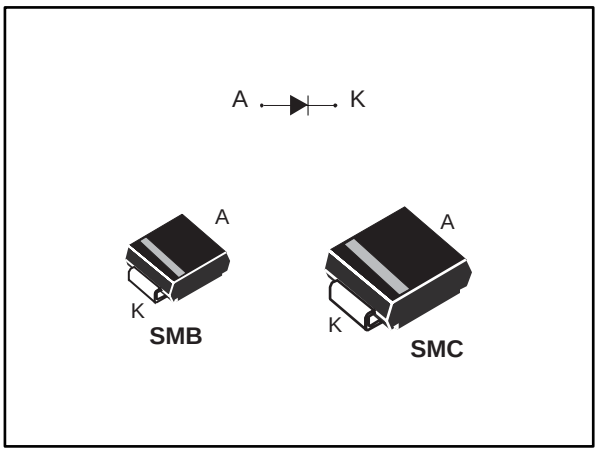
STTH212

High voltage ultrafast diode

Datasheet - production data



Features

- Low forward voltage drop
- High reliability
- High surge current capability
- Soft switching for reduced EMI disturbances
- Planar technology

Description

This device is an ultrafast diode based on a high voltage planar technology, it is perfectly suited for freewheeling, clamping, snubbering, demagnetization in power supplies and other power switching applications.

Housed in SMB and SMC packages, this diode reduces the losses in high switching frequency operations.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	2 A
V_{RRM}	1200 V
T_j	175 °C
V_F (typ.)	1.0 V
t_{rr} (max.)	75 ns

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			1200	V
$V_{(RMS)}$	RMS voltage			850	V
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	SMB	T_{lead} = 90 °C	2	A
		SMC	T_{lead} = 105 °C		
$I_{F(RMS)}$	RMS forward current			10	A
I_{FSM}	Forward surge current t_p = 8.3 ms			40	
T_{stg}	Storage temperature range			-50 to +175	°C
T_j	Maximum operating junction temperature			175	°C

Table 3: Thermal parameters

Symbol	Parameter		Maximum	Unit
$R_{th(j-l)}$	Junction to lead	SMB	25	°C/W
		SMC	20	

Table 4: Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		10	µA
		T_j = 125 °C		-		100	
V_F	Forward voltage drop	T_j = 25 °C	I_F = 2 A	-		1.75	V
		T_j = 125 °C		-	1.07	1.50	
		T_j = 150 °C		-	1.0	-	

To evaluate the conduction losses, use the following equation:

$P = 1.26 \times I_{F(AV)} + 0.12 \times I_{F^2(RMS)}$

Table 5: Dynamic characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 1 A; dI_F/dt = -100 A/µs; V_R = 30 V	-	-	75	ns
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 2 A; dI_F/dt = 50 A/µs; $V_{FR} = 1.1 \times V_{Fmax}$	-	-	500	
V_{FP}	Forward recovery voltage			-	-	30	V

1.1 Characteristics (curves)

Figure 1: Conduction losses versus average forward current

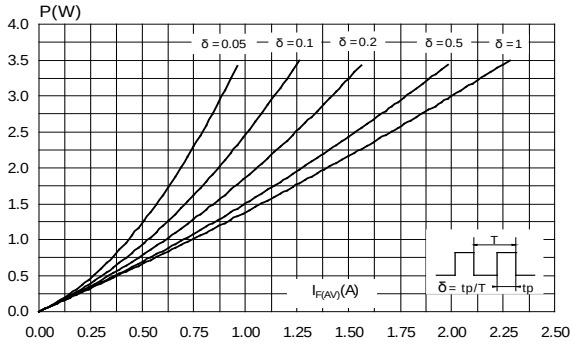


Figure 2: Forward voltage drop versus forward current

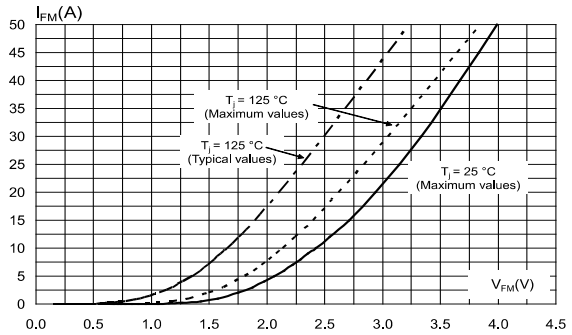


Figure 3: Relative variation of thermal impedance junction to ambient versus pulse duration (Epoxy printed circuit board FR4, S_{CU} = 1 cm2)

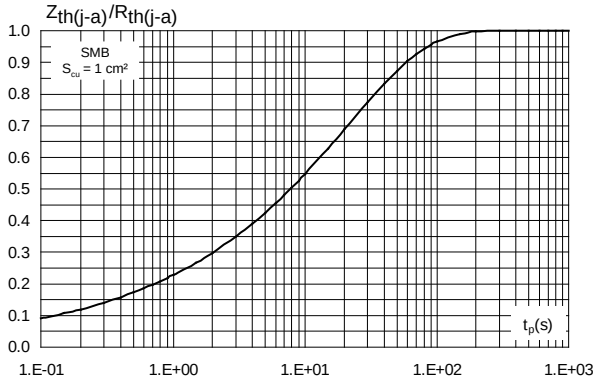


Figure 4: Relative variation of thermal impedance junction to ambient versus pulse duration (Epoxy printed circuit board FR4, S_{CU} = 1 cm2)

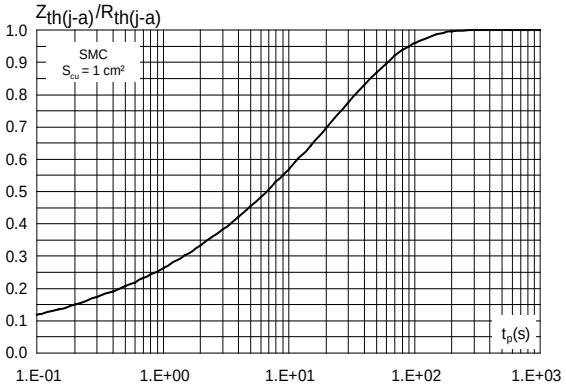


Figure 5: Reverse recovery current versus dI_F/dt (typical values)

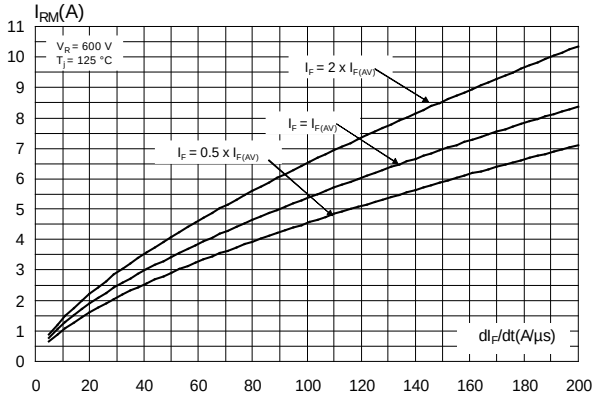


Figure 6: Reverse recovery time versus dI_F/dt (typical values)

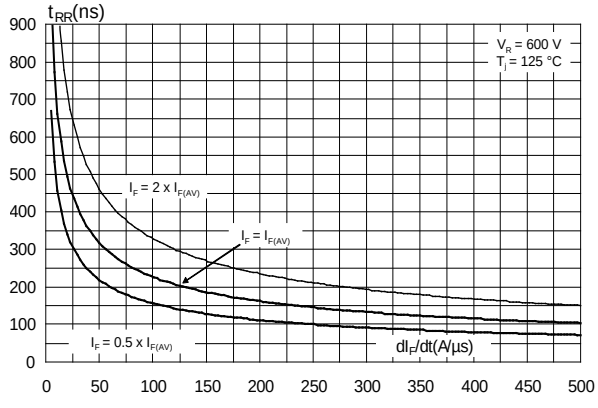


Figure 7: Reverse recovery charges versus dI_F/dt (typical values)

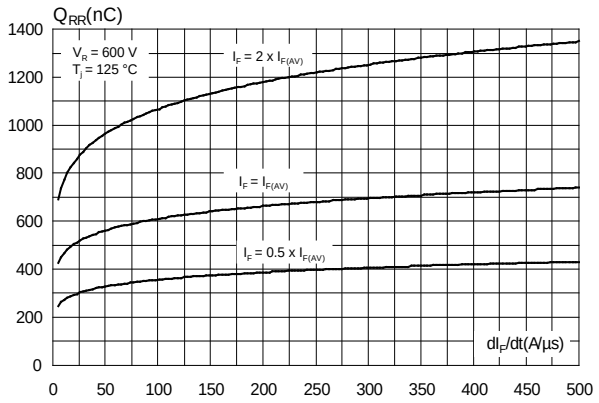


Figure 8: Softness factor versus dI_F/dt (typical values)

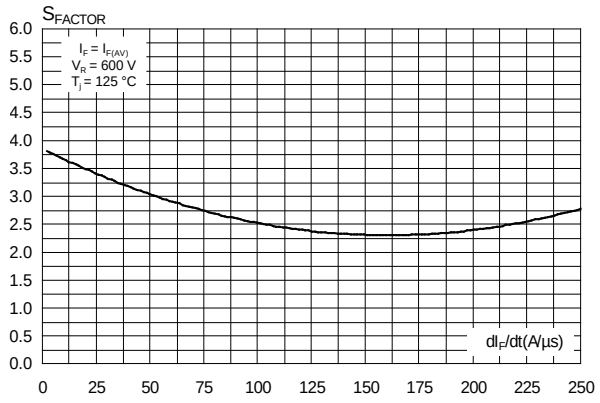


Figure 9: Relative variations of dynamic parameters versus junction temperature

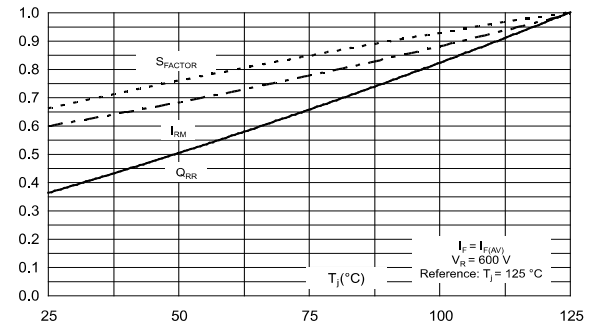


Figure 10: Transient peak forward voltage versus dI_F/dt (typical values)

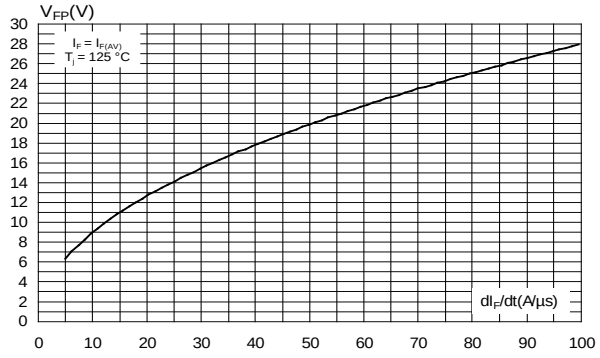


Figure 11: Forward recovery time versus dI_F/dt (typical values)

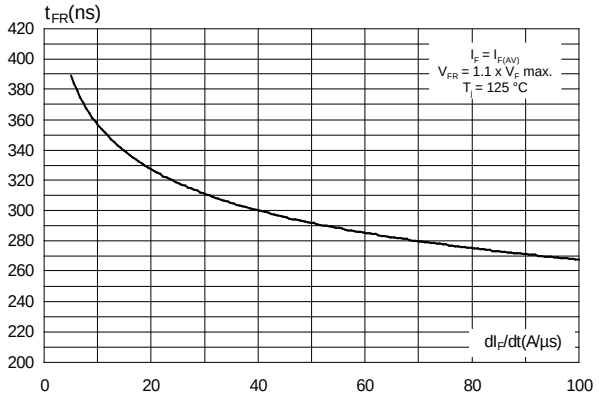


Figure 12: Junction capacitance versus reverse voltage applied (typical values)

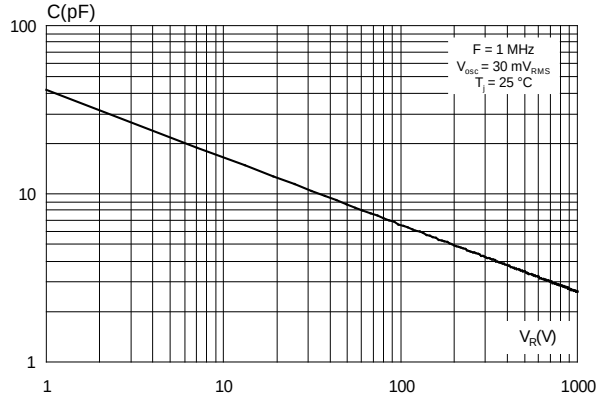
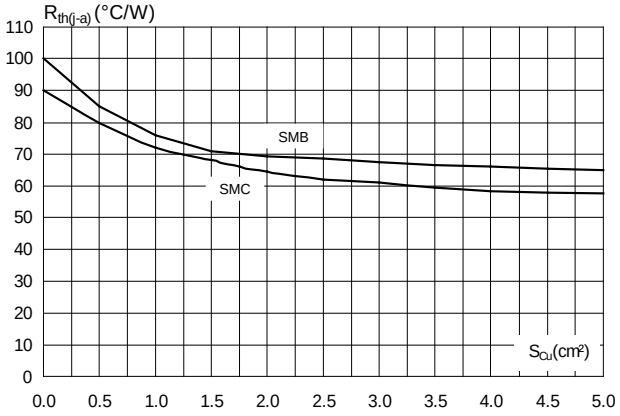


Figure 13: Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, e_{CU} = 35 µm)



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

2.1 SMB package information

Figure 14: SMB package outline

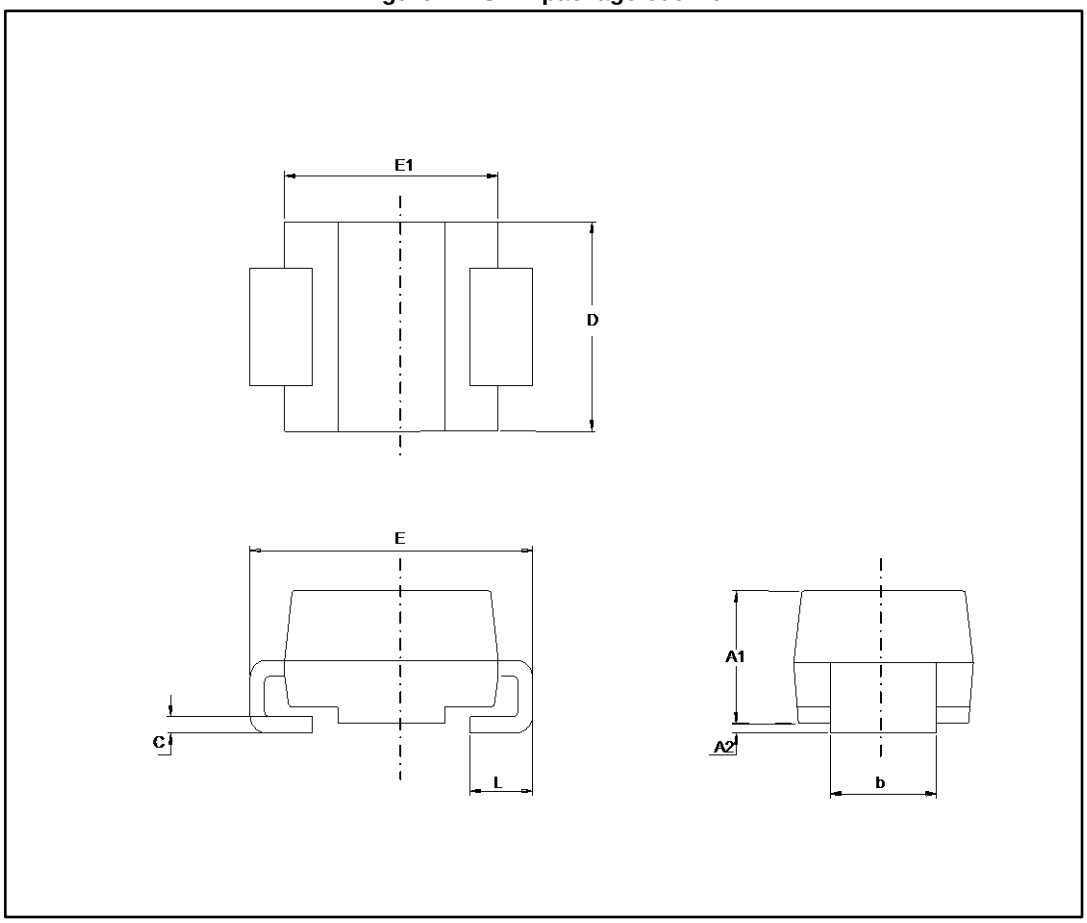
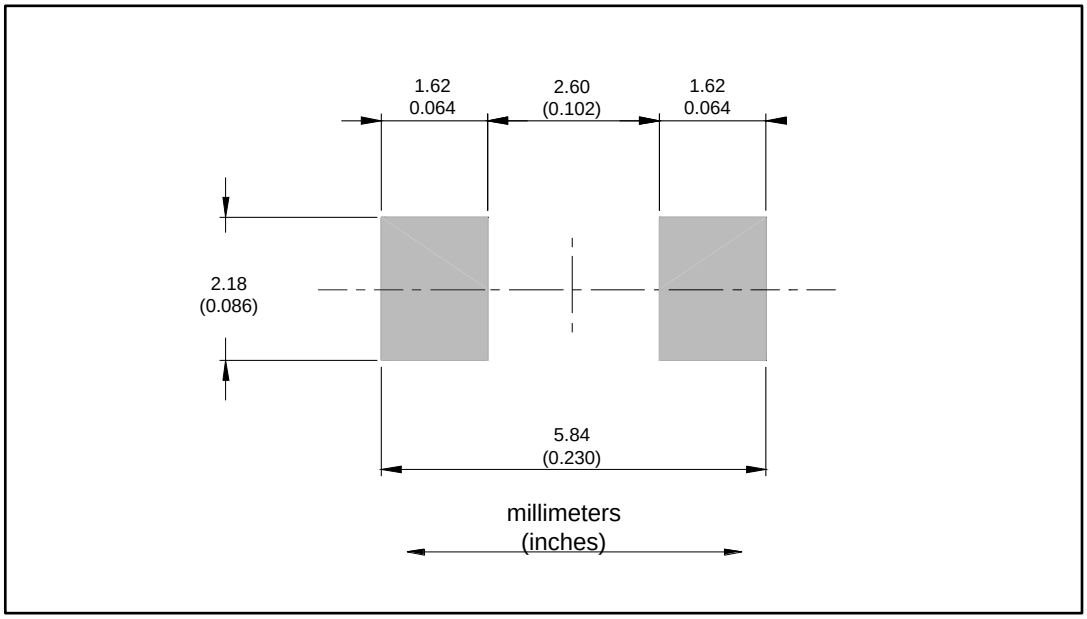


Table 6: SMB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.0748	0.0965
A2	0.05	0.20	0.0020	0.0079
b	1.95	2.20	0.0768	0.0867
c	0.15	0.40	0.0059	0.0157
D	3.30	3.95	0.1299	0.1556
E	5.10	5.60	0.2008	0.2205
E1	4.05	4.60	0.1594	0.1811
L	0.75	1.50	0.0295	0.0591

Figure 15: SMB recommended footprint



2.2 SMC package information

Figure 16: SMC package outline

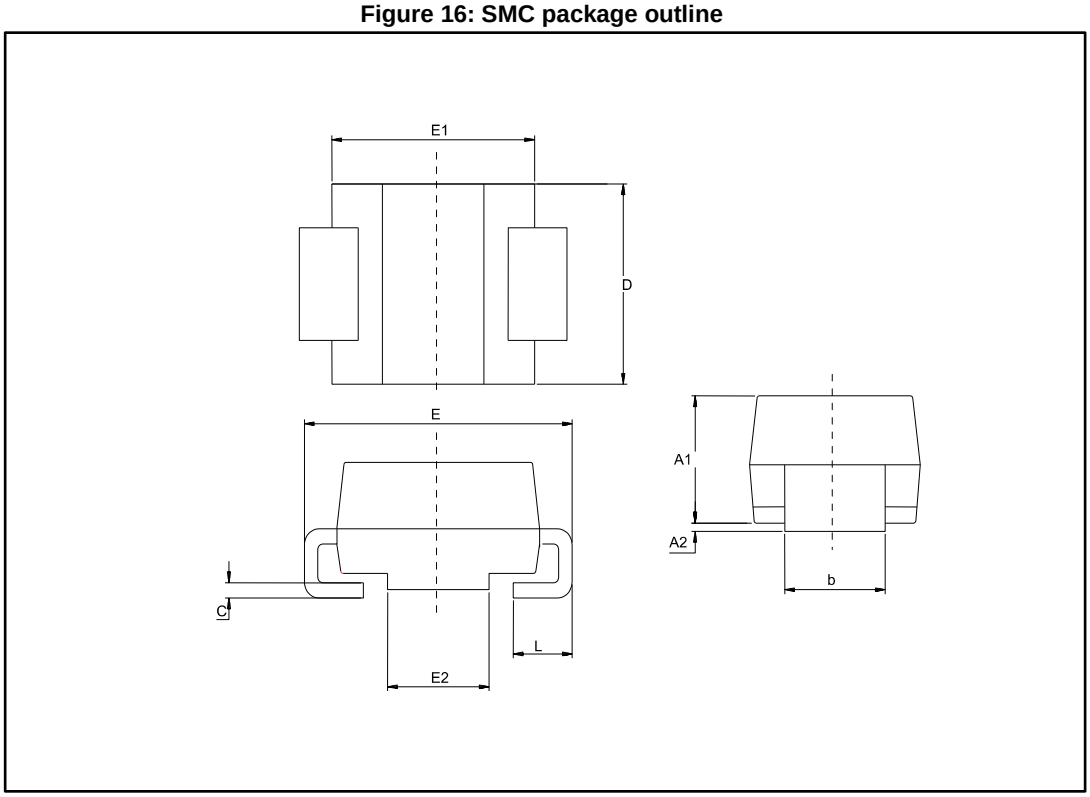
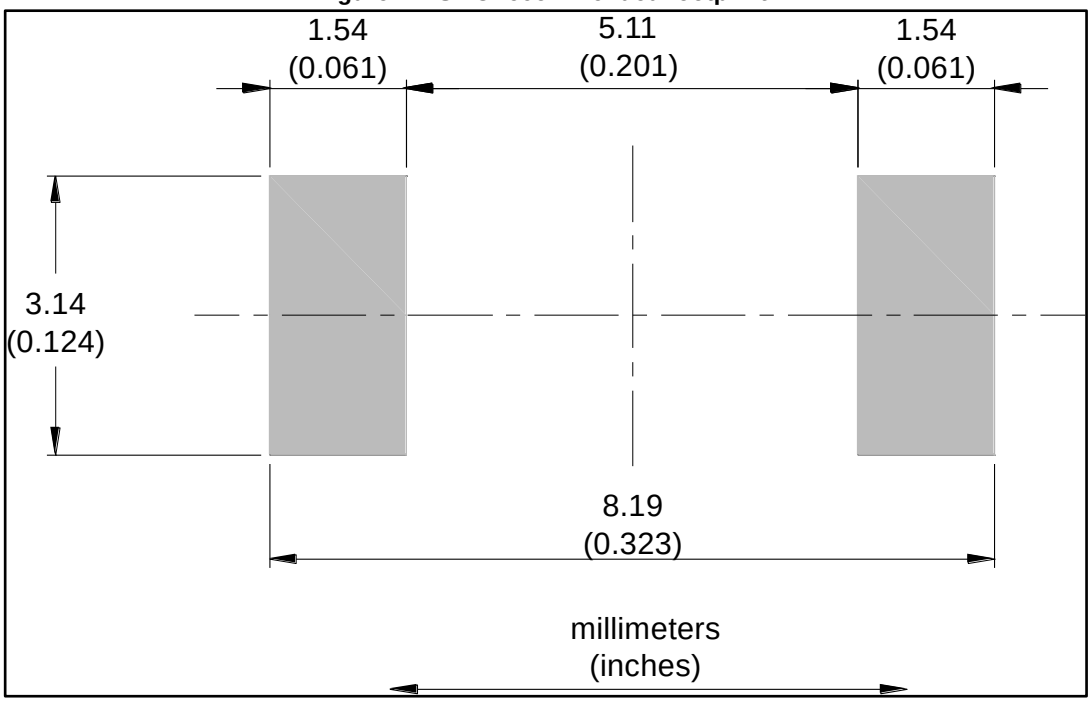


Table 7: SMC package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.0748	0.0965
A2	0.05	0.20	0.0020	0.0079
b	2.90	3.20	0.1142	0.1260
c	0.15	0.40	0.0059	0.0157
D	5.55	6.25	0.2185	0.2461
E	7.75	8.15	0.3051	0.3209
E1	6.60	7.15	0.2598	0.2815
E2	4.40	4.70	0.1732	0.1850
L	0.75	1.50	0.0295	0.0591

Figure 17: SMC recommended footprint



3 Ordering information

Table 8: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH212U	U22	SMB	0.110 g	2500	Tape and reel
STTH212S	S12	SMC	0.243 g	2500	Tape and reel

4 Revision history

Table 9: Document revision history

Date	Revision	Changes
28-Jun-2005	1	First issue
12-Jun-2017	2	Updated cover image. Removed DO-201AD package.

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