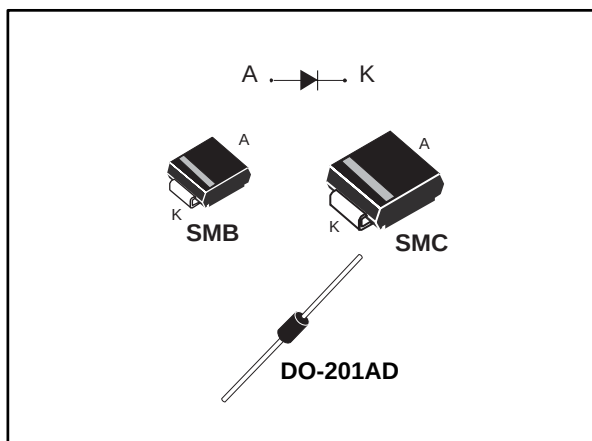


Turbo 2 ultrafast high voltage rectifier

Datasheet - production data



Features

- Ultrafast switching
- Low forward voltage drop
- Low thermal resistance
- Low leakage current (platinum doping)

Description

This device uses ST Turbo 2 600 V technology, and is particularly suited as boost diode in discontinuous or critical mode power factor corrections.

It is also intended for use as a freewheeling diode in power supplies and other power switching applications.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	3 A
V_{RRM}	600 V
I_R (max.)	100 μ A
T_j (max.)	175 °C
V_F (typ.)	0.85 V
t_{rr} (typ.)	60 ns

Table 2: Order codes

Part number	Marking
STTH3L06	STTH3L06
STTH3L06U	3L6U
STTH3L06S	S06

1 Characteristics

Table 3: Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V _{RRM}	Repetitive peak reverse voltage			600	V
I _{F(RMS)}	Forward rms current			10	A
I _{F(AV)}	Average forward current δ = 0.5, square wave	DO-201AD/SMC	TI = 100 °C	3	A
		SMB	TI = 80 °C		
I _{FSM}	Surge non repetitive forward current, t _p = 10 ms sinusoidal		DO-201AD	70	A
			SMB/SMC	60	A
T _{stg}	Storage temperature range			-65 to +175	°C
T _j	Maximum operating junction temperature			+175	°C

Table 4: Thermal parameters

Symbol	Parameter		Maximum	Unit
$R_{th(j-l)}$	Junction to lead	DO-201AD L = 10 mm	20	°C/W
		SMB	25	
		SMC	20	
$R_{th(j-a)}$	Junction to ambient	DO-201AD L = 10 mm	75	

Table 5: Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-		3	μA
		$T_j = 150\text{ °C}$		-	15	100	
V_F	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 3\text{ A}$	-		1.3	V
		$T_j = 150\text{ °C}$		-	0.85	1.05	

To evaluate the conduction losses use the following equation:

$$P = 0.89 \times I_{F(AV)} + 0.055 I_{F(RMS)}^2$$

Table 6: Dynamic characteristics

Symbol	Parameters	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25\text{ °C}$	$I_F = 1\text{ A}$; $di_F/dt = -50\text{ A}/\mu\text{s}$; $V_R = 30\text{ V}$	-	60	85	ns
t_{fr}	Forward recovery time	$T_j = 25\text{ °C}$	$I_F = 3\text{ A}$; $di_F/dt = 100\text{ A}/\mu\text{s}$; $V_{FR} = 1.1 \times V_{Fmax}$	-		100	
V_{FP}	Forward recovery voltage		$I_F = 3\text{ A}$; $di_F/dt = 100\text{ A}/\mu\text{s}$	-		7.5	V

1.1 Characteristics (curves)

Figure 1: Conduction losses versus average current

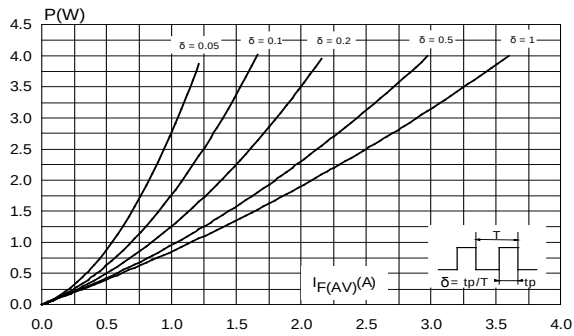


Figure 2: Forward voltage drop versus forward current

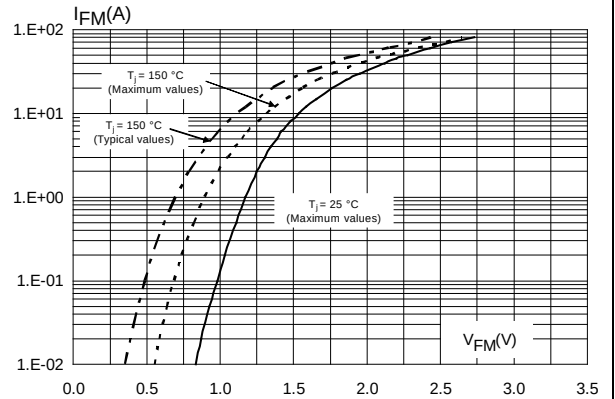


Figure 3: Relative variation of thermal impedance junction ambient versus pulse duration (epoxy printed circuit FR4, $e_{cu} = 35 \mu m$)

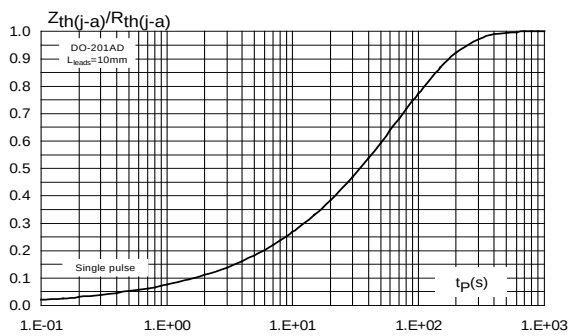


Figure 4: Peak reverse recovery current versus di_F/dt (typical values)

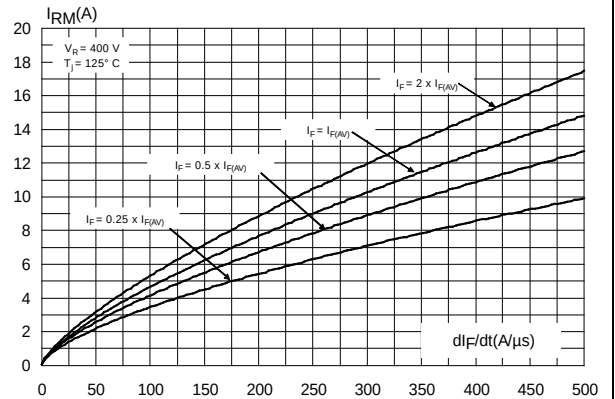


Figure 5: Reverse recovery time versus di_F/dt (typical values)

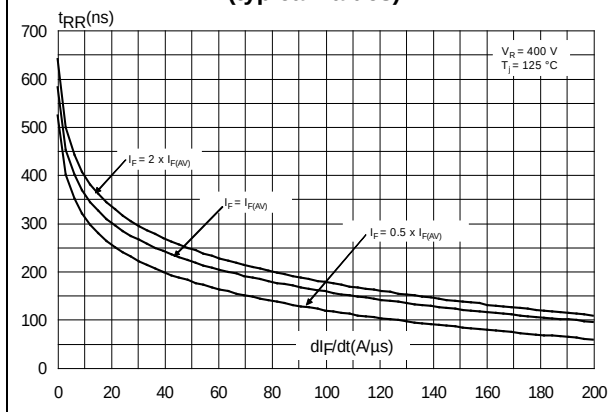


Figure 6: Reverse recovery charges versus di_F/dt (typical values)

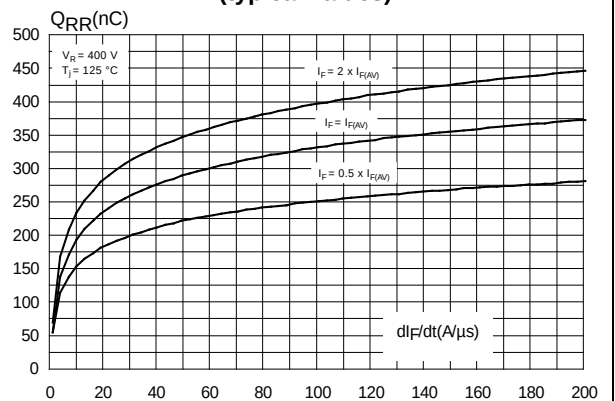
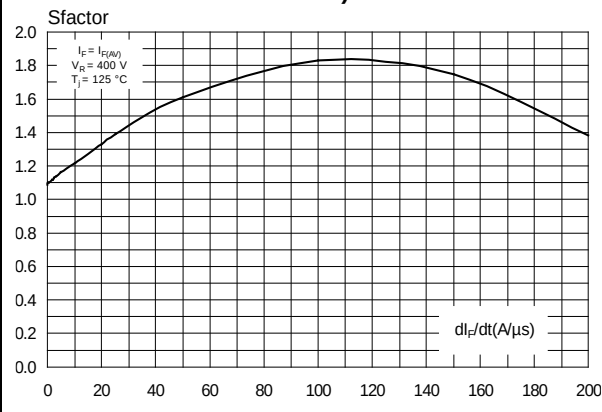
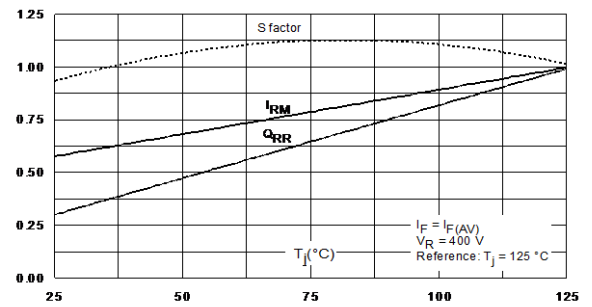
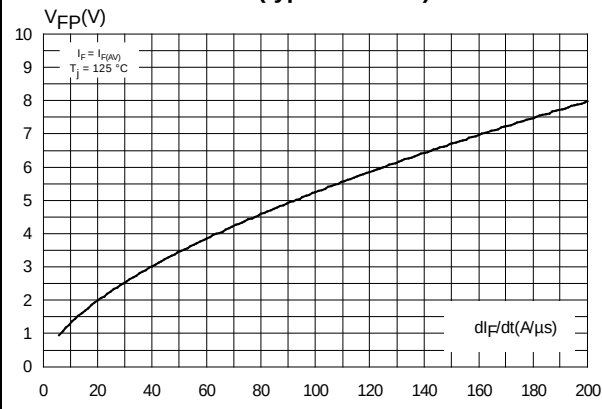
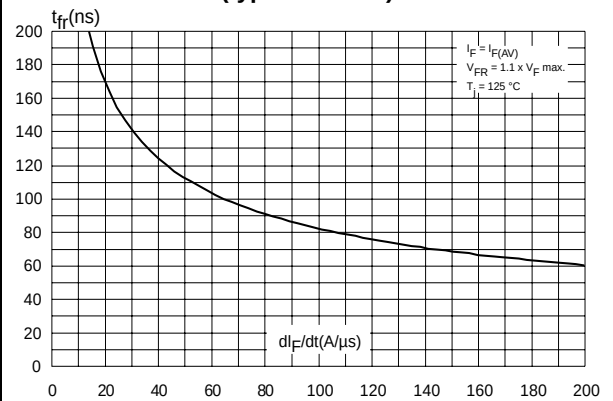
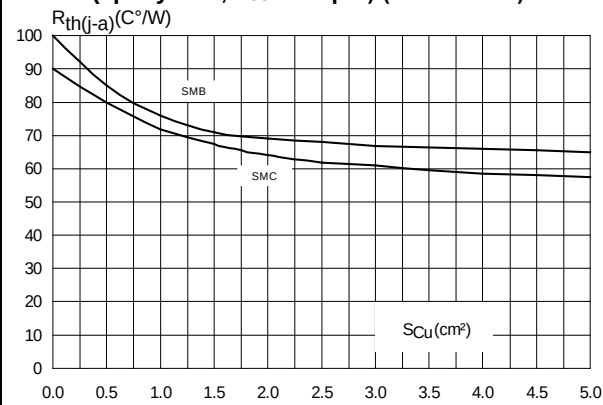
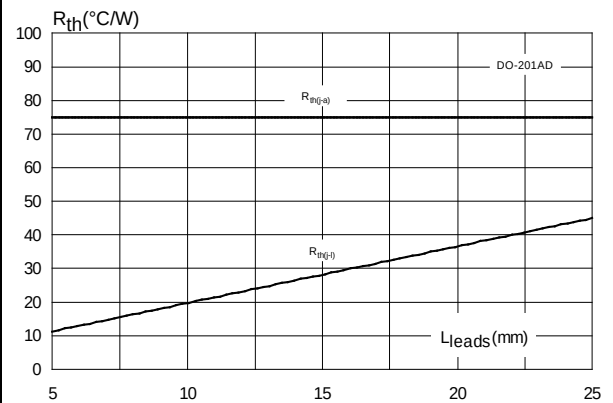


Figure 7: Softness factor versus dI_F/dt (typical values)**Figure 8: Relative variations of dynamic parameters versus junction temperature****Figure 9: Transient peak forward voltage versus dI_F/dt (typical values)****Figure 10: Forward recovery time versus dI_F/dt (typical values)****Figure 11: Thermal resistance junction to ambient versus copper surface under lead (epoxy FR4, $e_{Cu} = 35 \mu m$) (SMB / SMC)****Figure 12: 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 indicated cathode (DO-201AD)
- Bending method: see application note AN1471 (DO-201AD)

2.1 DO-201AD package information

Figure 13: DO-201AD package outline

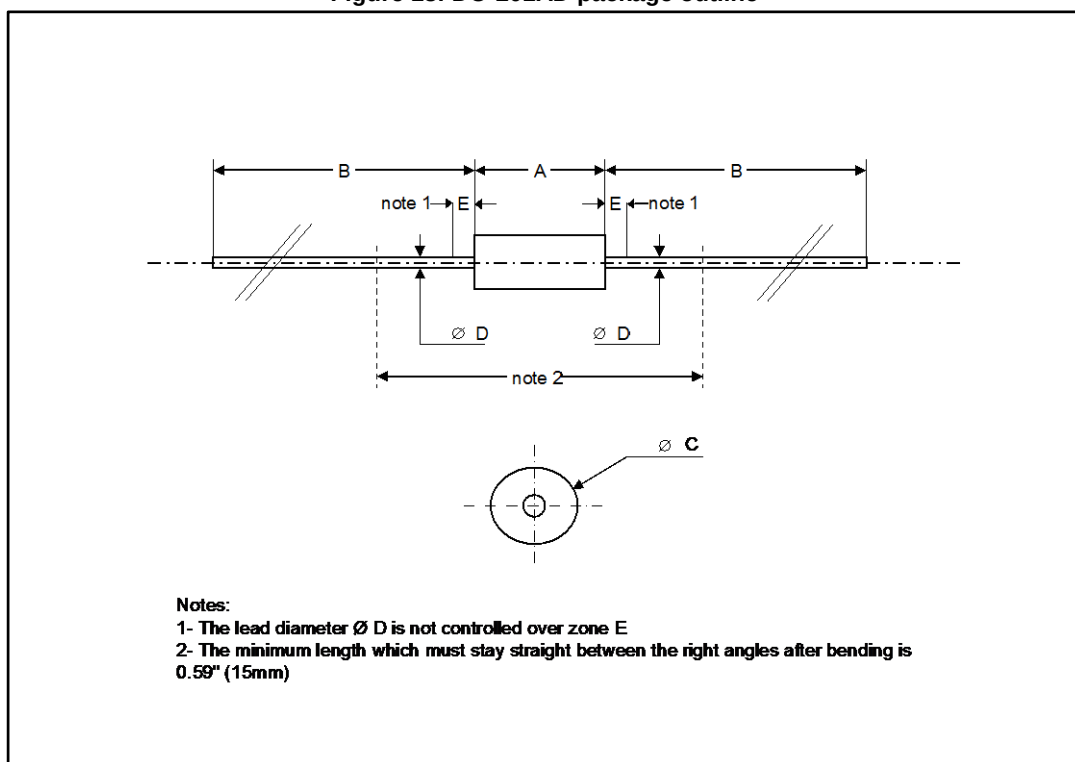


Table 7: DO-201AD package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A		9.5		0.3740
B	25.4		1.000	
C		5.3		0.2087
D		1.3		0.0512
E		1.25		0.0492

2.2 SMC package information

Figure 14: SMC package outline

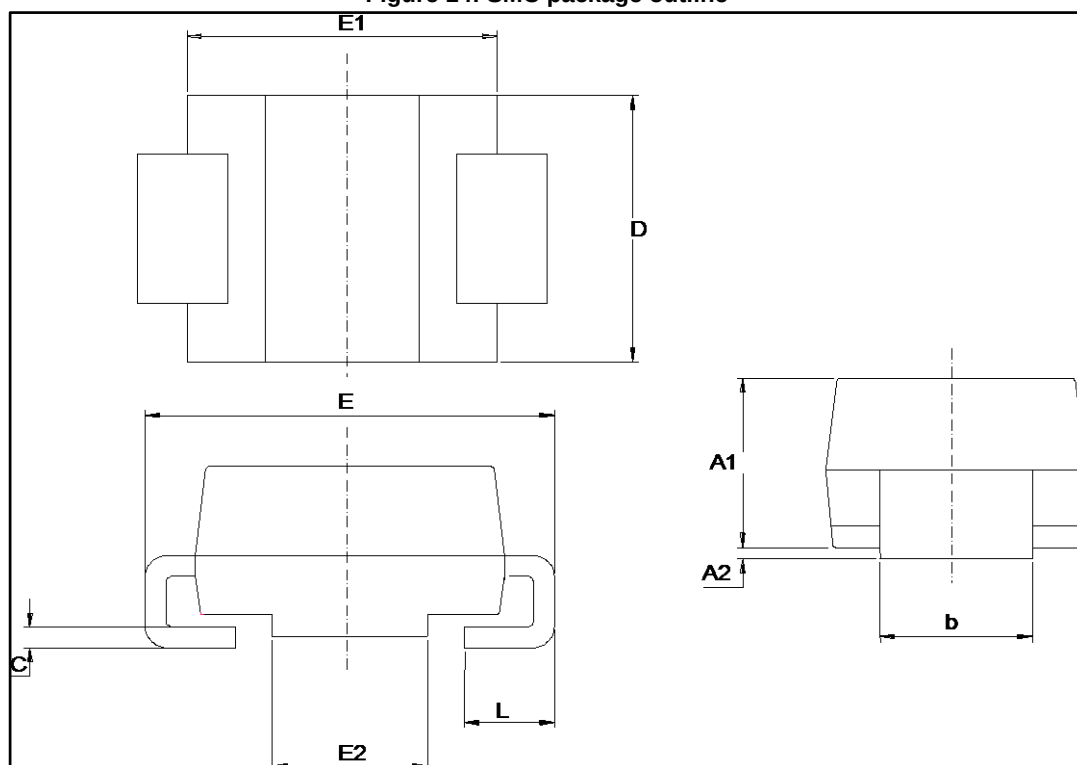
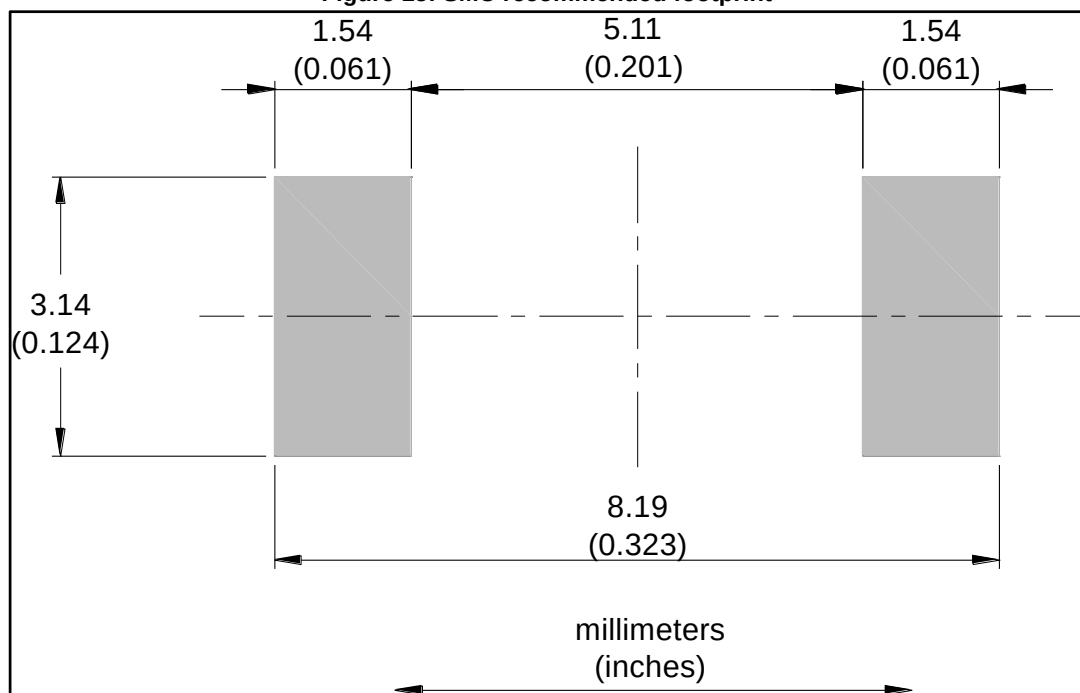


Table 8: SMC package mechanical data

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 15: SMC recommended footprint



2.3 SMB package information

Figure 16: SMB package outline

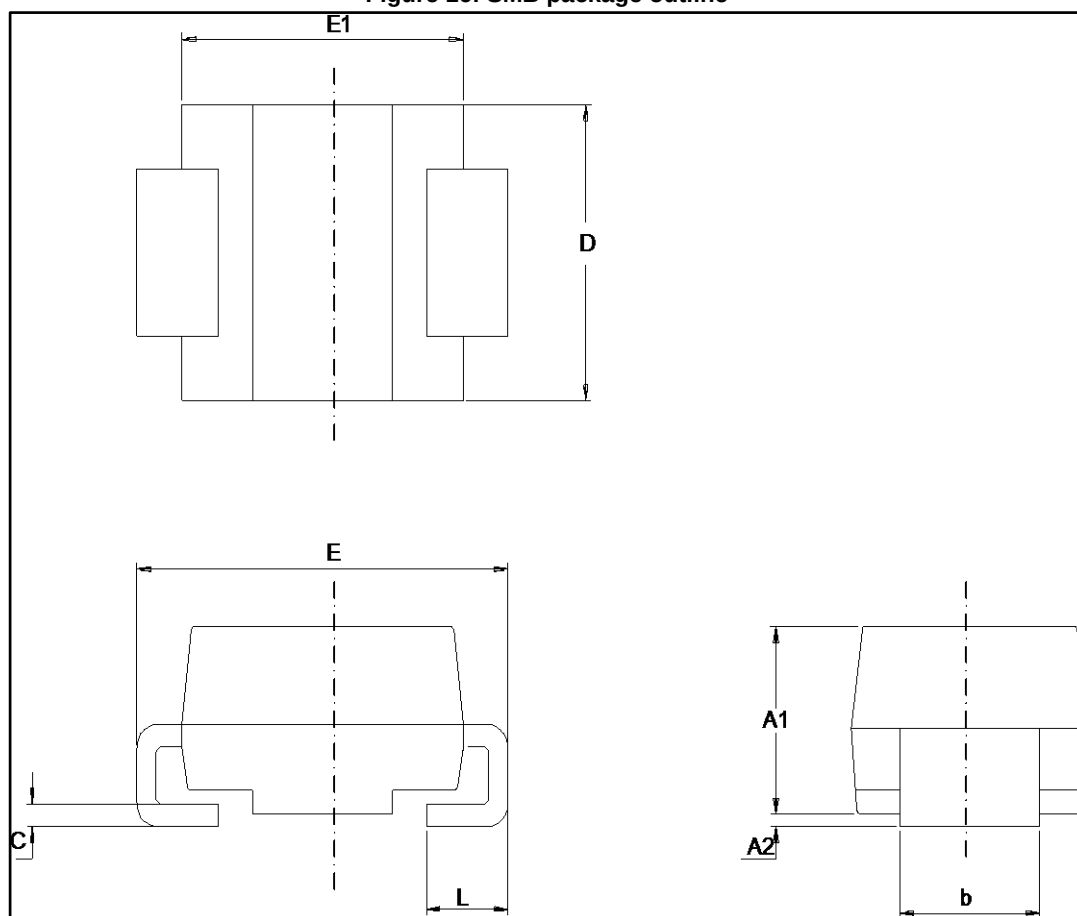
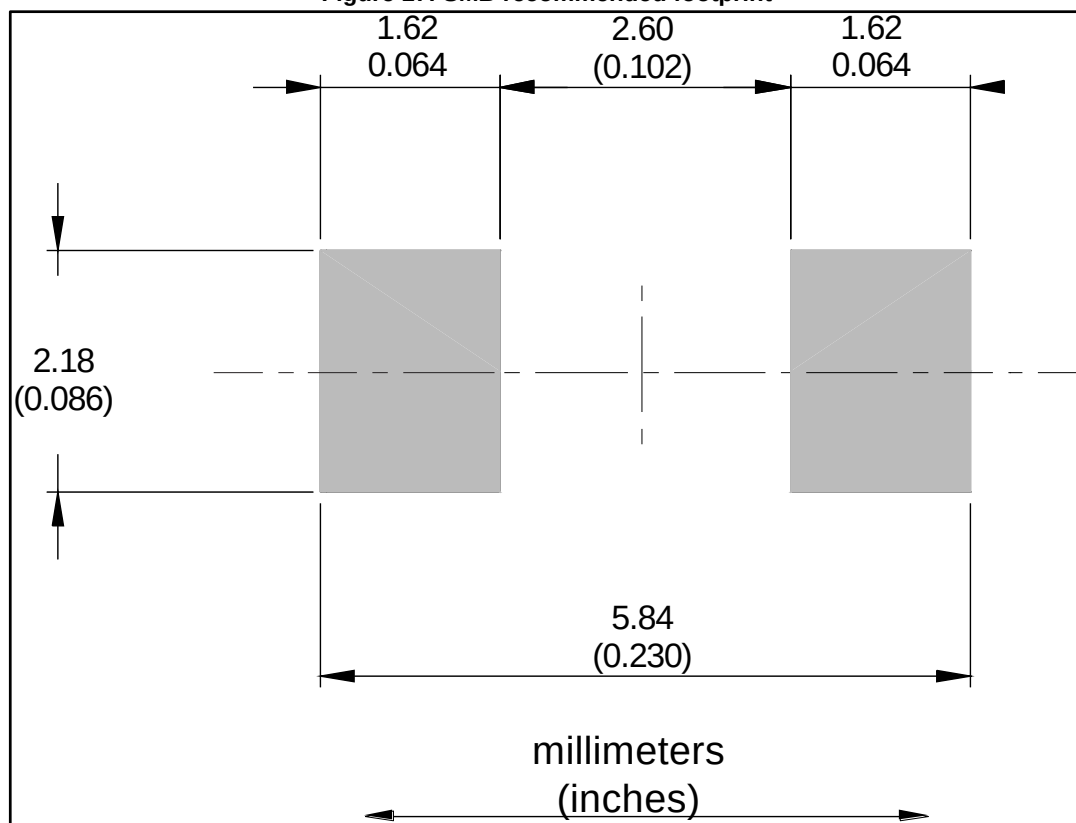


Table 9: SMB package mechanical data

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 17: SMB recommended footprint



3 Ordering information

Table 10: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH3L06	STTH3L06	DO-201AD	1.12 g	600	Ammopack
STTH3L06-RL	STTH3L06			1900	Tape and reel
STTH3L06U	3L6U	SMB	0.11 g	2500	Tape and reel
STTH3L06S	S06	SMC	0.243 g	2500	Tape and reel

4 Revision history

Table 11: Document revision history

Date	Revision	Changes
October-2001	1	First issue
07-Sep-2004	2	SMB, SMC and DPAK packages added.
14-Oct-2005	3	Changed marking of STTH3L06U from 3L06U to 3L6U. Added ECOPACK statement.
29-Apr-2016	4	Removed DPAK package information. Minor text changes

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