

## TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

**Table 1: Main Product Characteristics**

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

### FEATURES AND BENEFITS

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

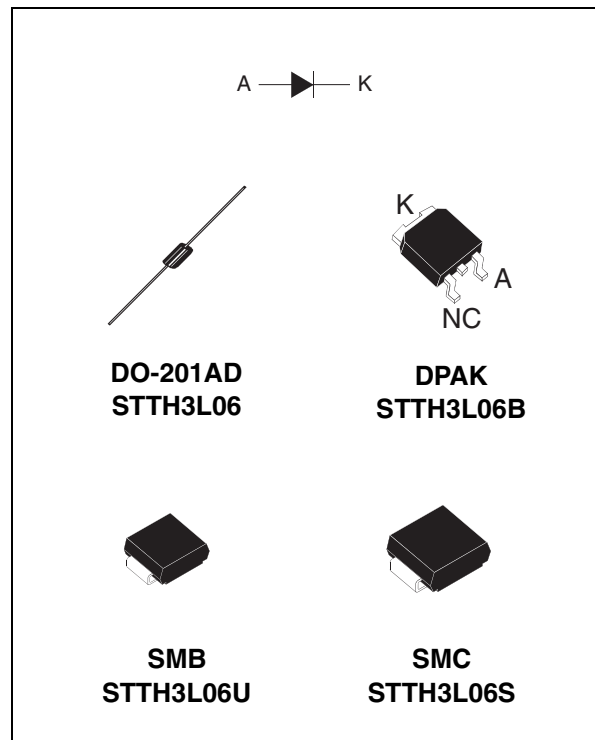
### DESCRIPTION

The STTH3L06, which is using ST Turbo 2 600V technology, is specially suited as boost diode in discontinuous or critical mode power factor corrections.

This device is intended for use as a free wheeling diode in power supplies and other power switching applications.

**Table 2: Order Codes**

Part Number	Marking
STTH3L06	STTH3L06
STTH3L06RL	STTH3L06
STTH3L06B	STTH3L06B
STTH3L06B-TR	STTH3L06B
STTH3L06U	3L06U
STTH3L06S	S06



**Table 3: Absolute Ratings** (limiting values)

Symbol	Parameter		Value	Unit	
$V_{RRM}$	Repetitive peak reverse voltage		600	V	
$I_{F(RMS)}$	RMS forward voltage	DO-201AD / SMB / SMC	10	A	
		DPAK	6		
$I_{F(AV)}$	Average forward current $\delta = 0.5$	DO-201AD	$T_I = 100^\circ\text{C}$	3	A
		DPAK	$T_I = 155^\circ\text{C}$		
		SMB	$T_I = 80^\circ\text{C}$		
		SMC	$T_I = 100^\circ\text{C}$		
$I_{FSM}$	Surge non repetitive forward current	DO-201AD	$t_p = 10\text{ms}$ sinusoidal	70	A
		SMB / SMC		60	
		DPAK		40	
$T_{stg}$	Storage temperature range		-65 to + 175	$^\circ\text{C}$	
$T_j$	Maximum operating junction temperature		175	$^\circ\text{C}$	

**Table 4: Thermal Parameters**

Symbol	Parameter		Maximum	Unit
$R_{th(j-l)}$	Junction to lead	DO-201AD L = 10 mm	20	$^\circ\text{C/W}$
		DPAK	5.5	
		SMB	25	
		SMC	20	
$R_{th(j-a)}$	Junction to ambient (see fig. 13)	DO-201AD L = 10 mm	75	$^\circ\text{C/W}$

**Table 5: Static Electrical Characteristics**

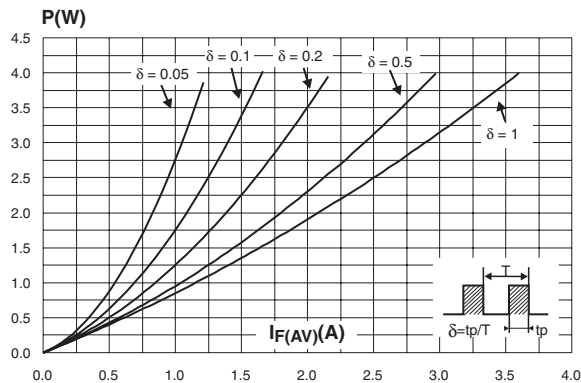
Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
$I_R$	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			3	$\mu\text{A}$
		$T_j = 150^\circ\text{C}$			15	100	
$V_F$	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 3\text{A}$			1.3	V
		$T_j = 150^\circ\text{C}$			0.85	1.05	

To evaluate the conduction losses use the following equation:  $P = 0.89 \times I_{F(AV)} + 0.055 I_{F(RMS)}^2$

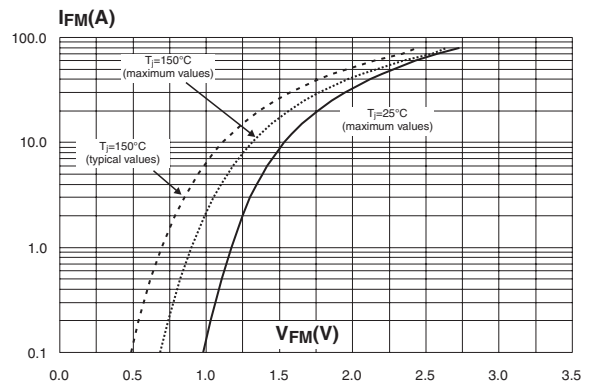
**Table 6: Dynamic Characteristics**

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

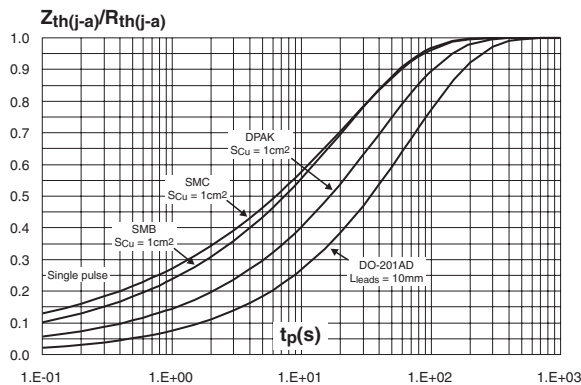
**Figure 1: Conduction losses versus average current**



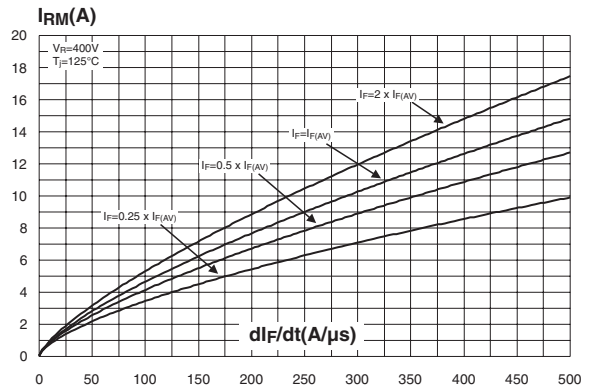
**Figure 2: Forward voltage drop versus forward current**



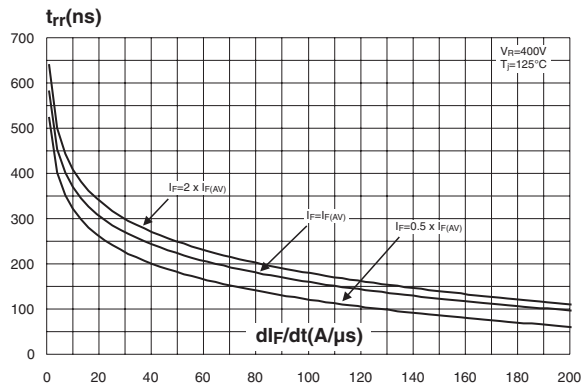
**Figure 3: Relative variation of thermal impedance junction ambient versus pulse duration (epoxy printed circuit FR4, L\_leads = 10mm, S\_CU=1cm²)**



**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)**

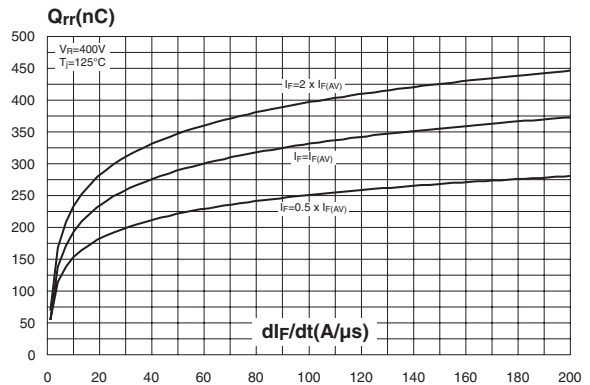


Figure 7: Softness factor versus  $di_F/dt$  (typical values)

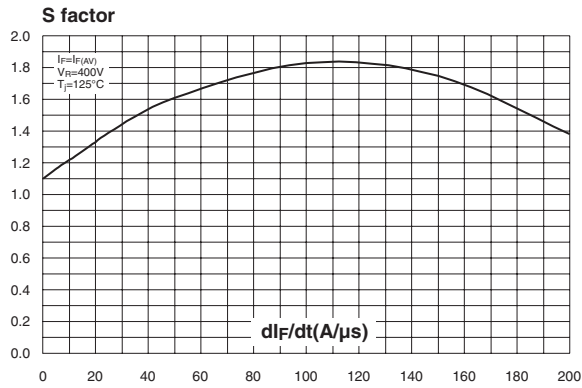


Figure 8: Relative variations of dynamic parameters versus junction temperature

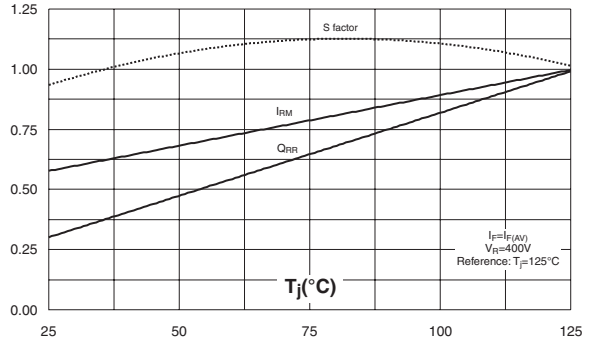


Figure 9: Transient peak forward voltage versus  $di_F/dt$  (typical values)

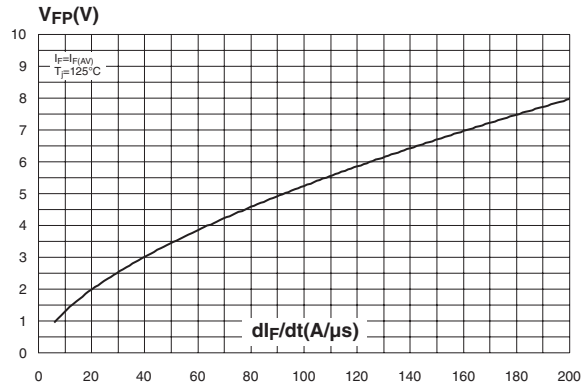


Figure 10: Forward recovery time versus  $di_F/dt$  (typical values)

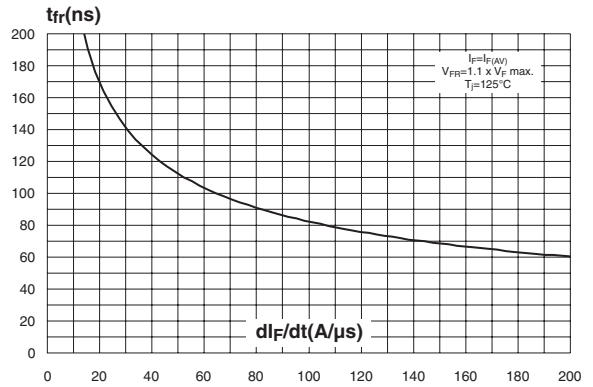


Figure 11: Junction capacitance versus reverse voltage applied (typical values)

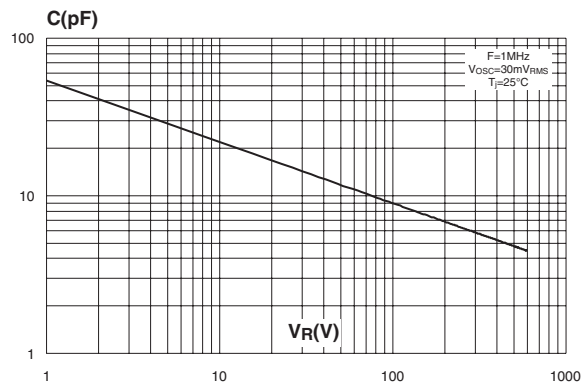
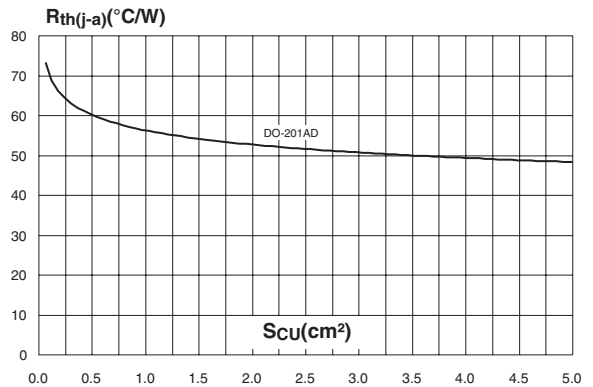
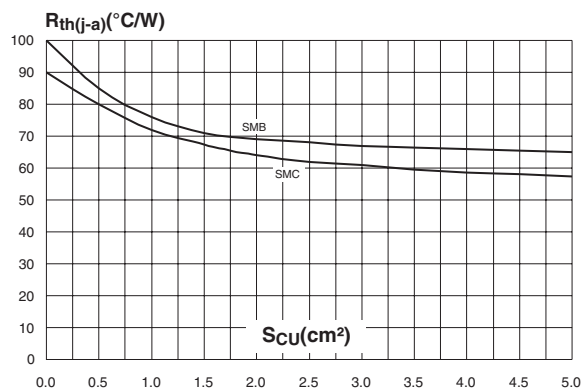


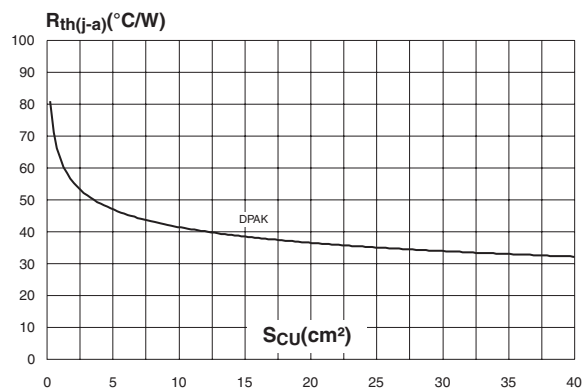
Figure 12: Thermal resistance junction to ambient versus copper surface under lead (epoxy FR4,  $e_{CU}=35\mu m$ ) (DO-201AD)



**Figure 13: Thermal resistance junction to ambient versus copper surface under lead (epoxy FR4,  $e_{CU}=35\mu m$ ) (SMB / SMC)**



**Figure 14: Thermal resistance junction to ambient versus copper surface under tab (epoxy FR4,  $e_{CU}=35\mu m$ ) (DPAK)**



**Figure 15: Thermal resistance versus lead length**

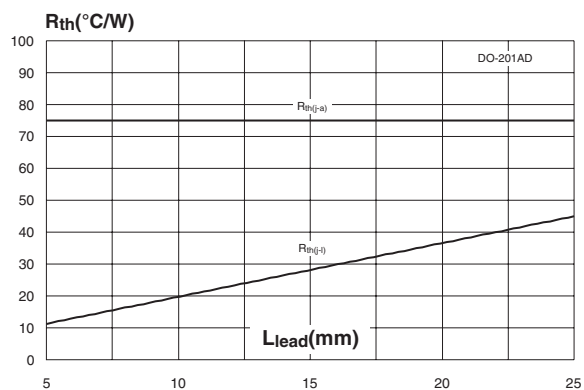


Figure 16: DPAK Package Mechanical Data

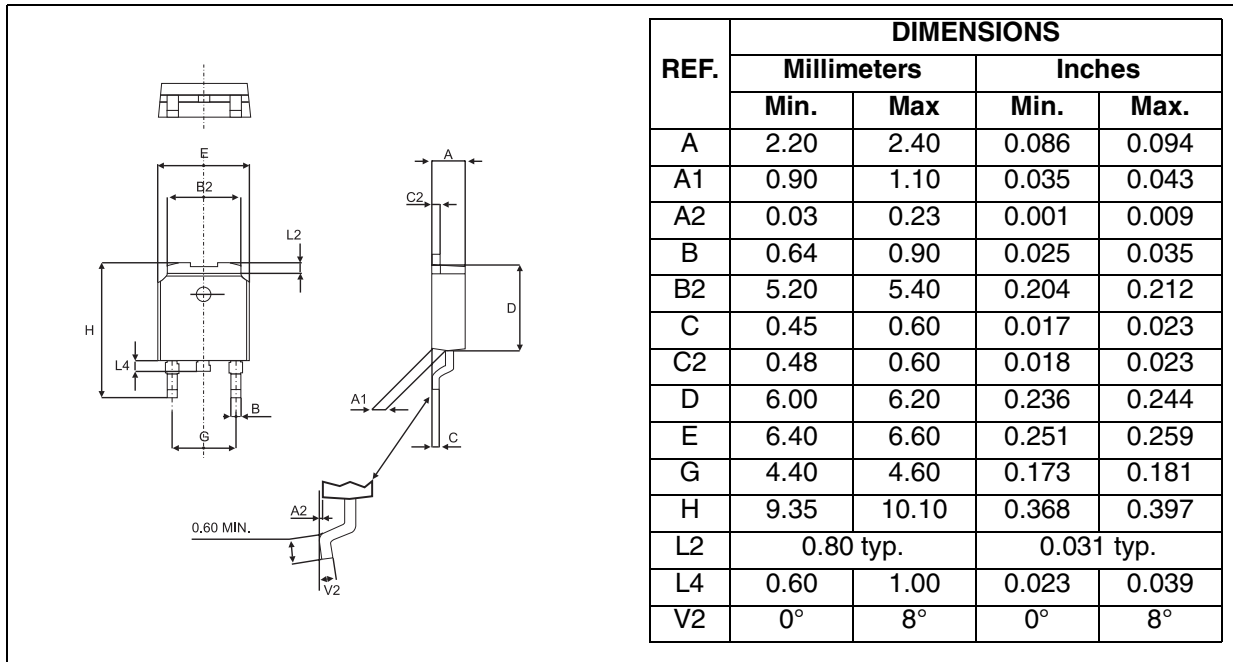


Figure 17: DPAK Foot Print Dimensions (in millimeters)

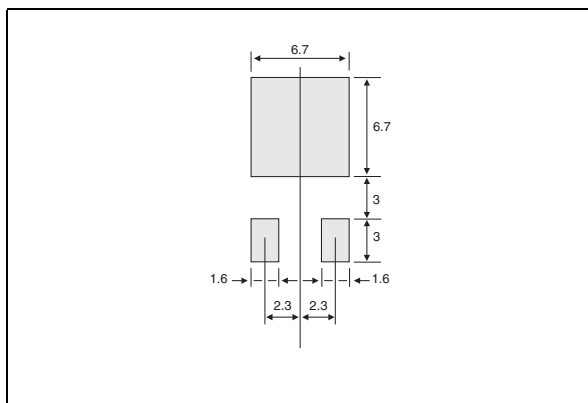


Figure 18: SMB Package Mechanical Data

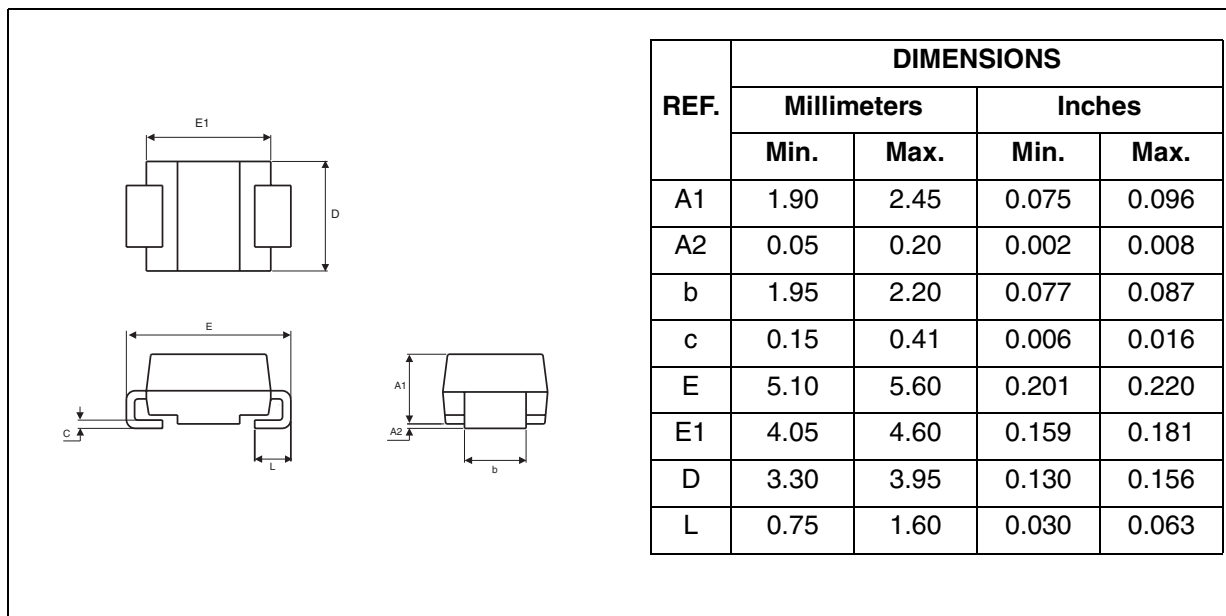
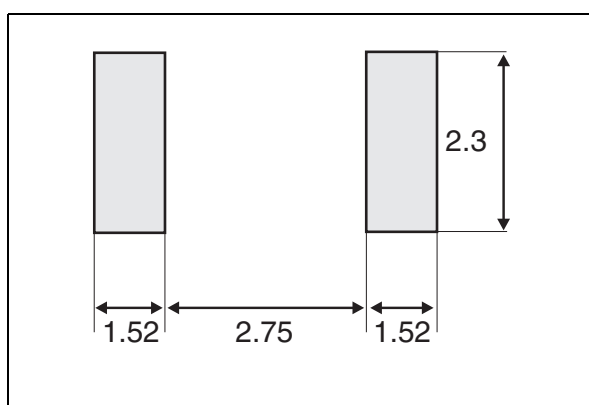
Figure 19: SMB Foot Print Dimensions  
(in millimeters)

Figure 20: SMC Package Mechanical Data

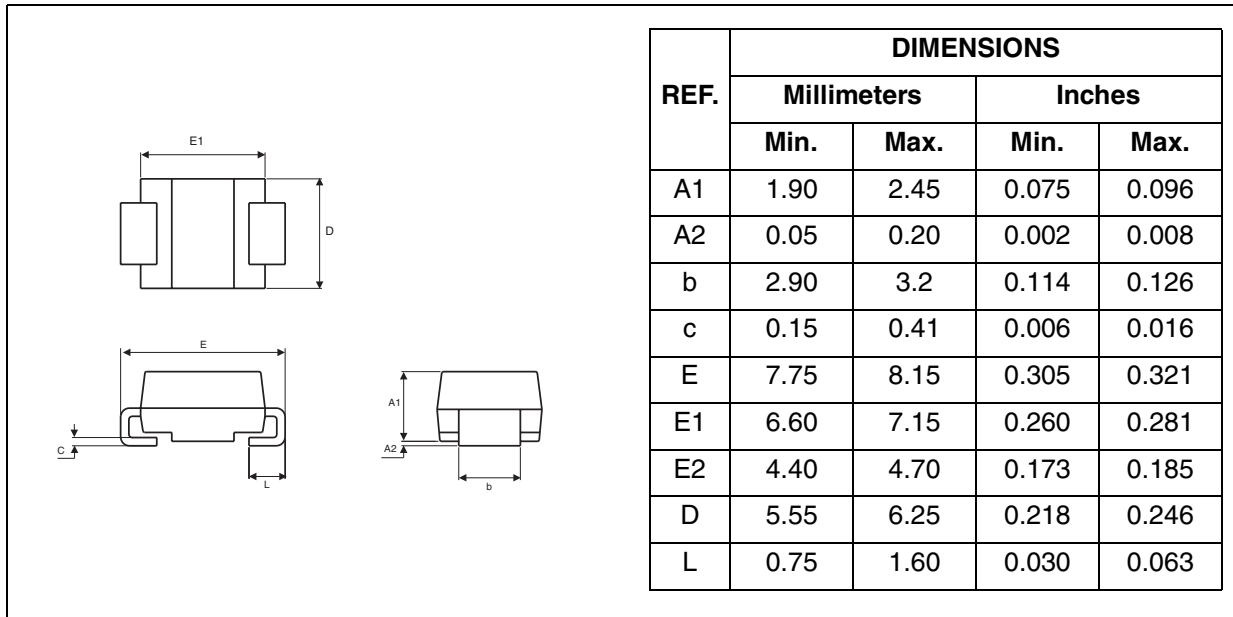


Figure 21: SMC Foot Print Dimensions (in millimeters)

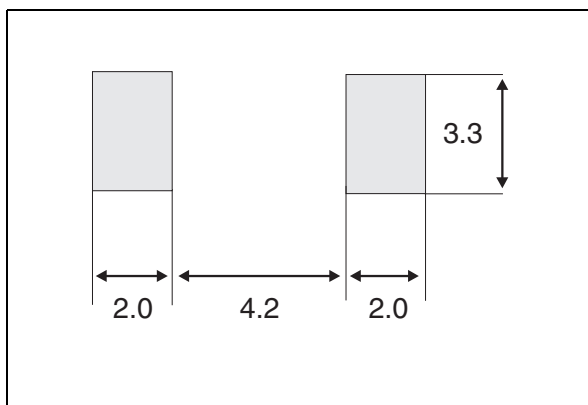




Figure 22: DO-201AD Package Mechanical Data

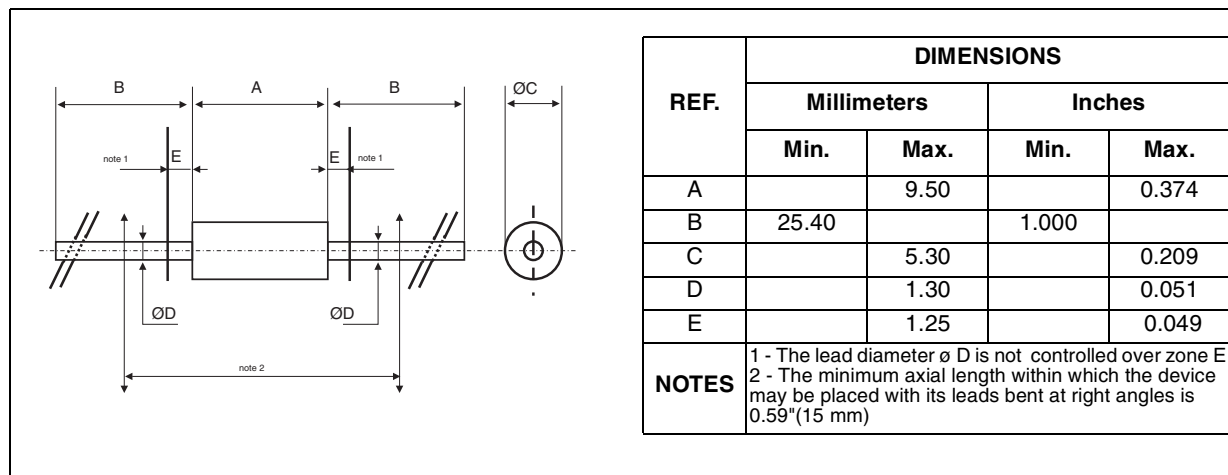


Table 7: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH3L06	STTH3L06	DO-201AD	1.12 g	600	Ammopack
STTH3L06-RL	STTH3L06	DO-201AD	1.12 g	1900	Tape & reel
STTH3L06B	STTH3L06B	DPAK	0.3 g	75	Tubel
STTH3L06B-TR	STTH3L06B	DPAK	0.3 g	2500	Tape & reel
STTH3L06U	3L06U	SMB	0.11 g	2500	Tape & reel
STTH3L06S	S06	SMC	0.243 g	2500	Tape & reel

- Epoxy meets UL94, V0
- Band indicated cathode (DO-201AD)
- Bending method: see application note **AN1471** (DO-201AD)

Table 8: Revision History

Date	Revision	Description of Changes
October-2001	1	First issue
07-Sep-2004	2	SMB, SMC and DPAK packages added

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics.  
All other names are the property of their respective owners

© 2004 STMicroelectronics - All rights reserved

**STMicroelectronics group of companies**

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America  
**[www.st.com](http://www.st.com)**