

## 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)

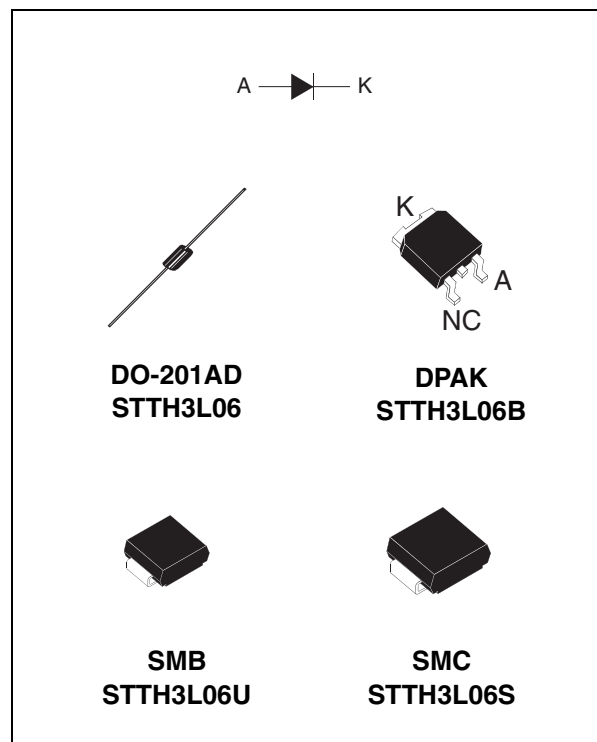
### DESCRIPTION

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

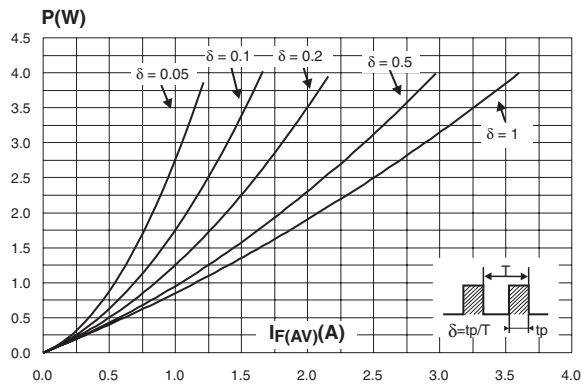


Figure 2: Forward voltage drop versus forward current

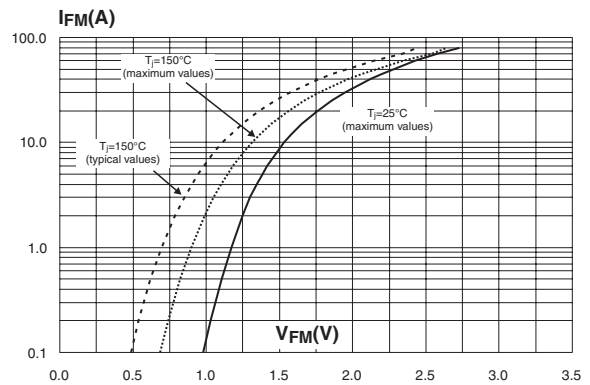


Figure 3: Relative variation of thermal impedance junction ambient versus pulse duration (epoxy printed circuit FR4, L\_leads = 10mm, S\_CU=1cm²)

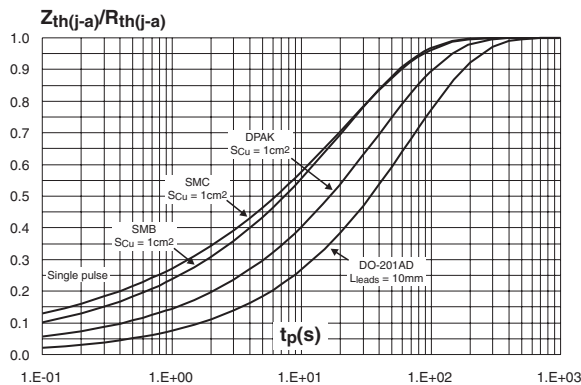


Figure 4: Peak reverse recovery current versus di\_F/dt (typical values)

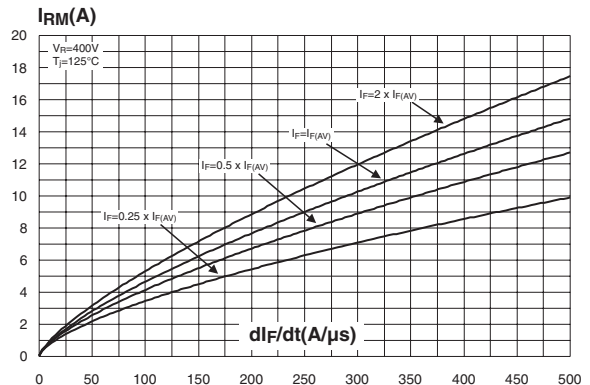


Figure 5: Reverse recovery time versus di\_F/dt (typical values)

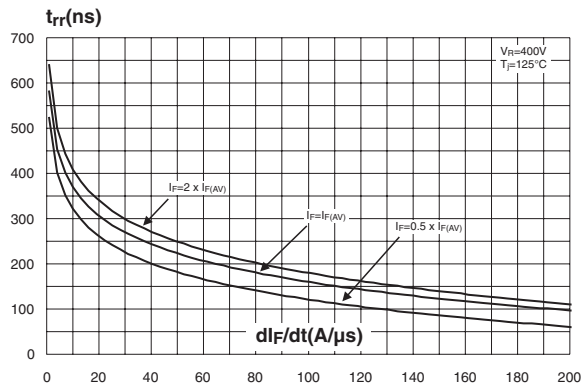


Figure 6: Reverse recovery charges versus di\_F/dt (typical values)

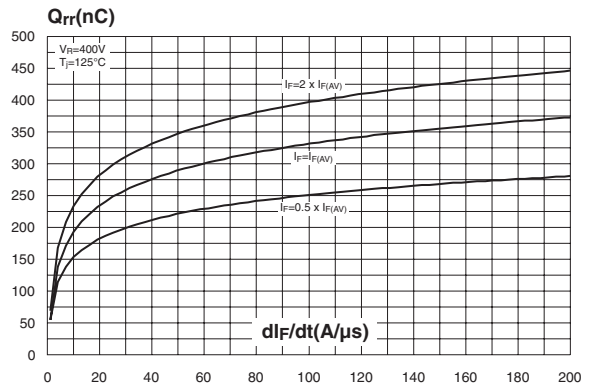


Figure 7: Softness factor versus  $di_F/dt$  (typical values)

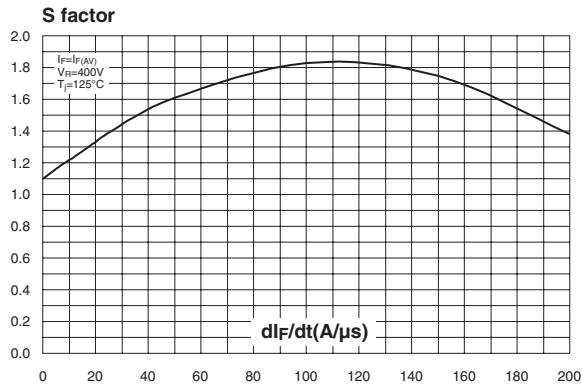


Figure 8: Relative variations of dynamic parameters versus junction temperature

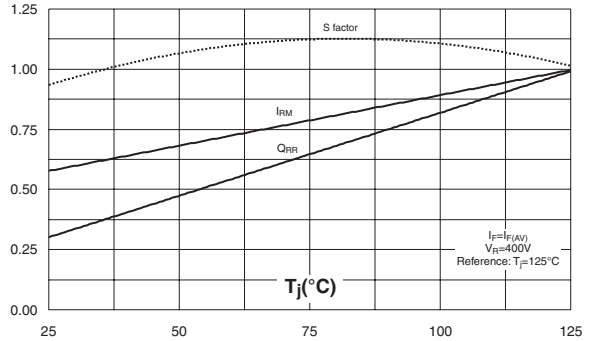


Figure 9: Transient peak forward voltage versus  $di_F/dt$  (typical values)

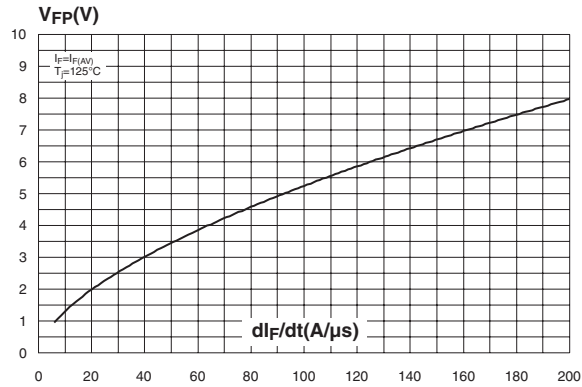


Figure 10: Forward recovery time versus  $di_F/dt$  (typical values)

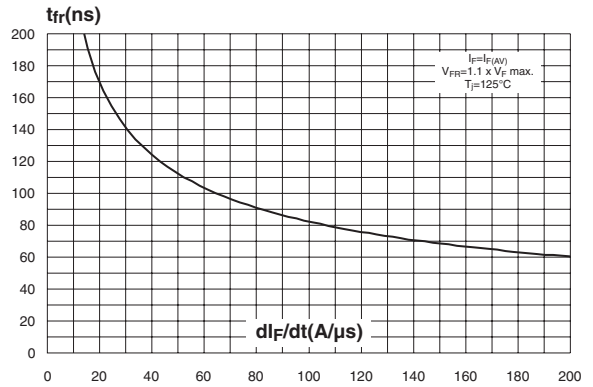


Figure 11: Junction capacitance versus reverse voltage applied (typical values)

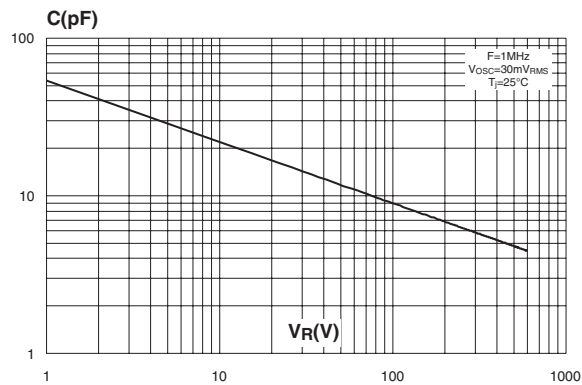
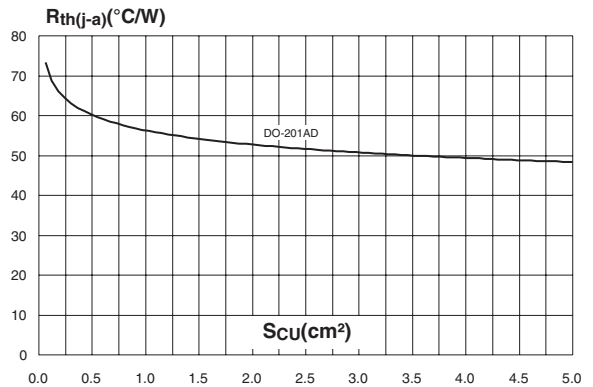
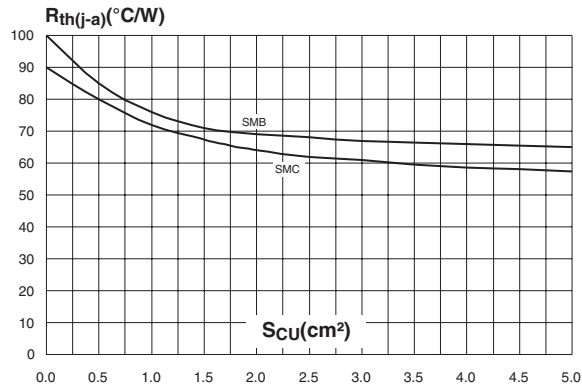


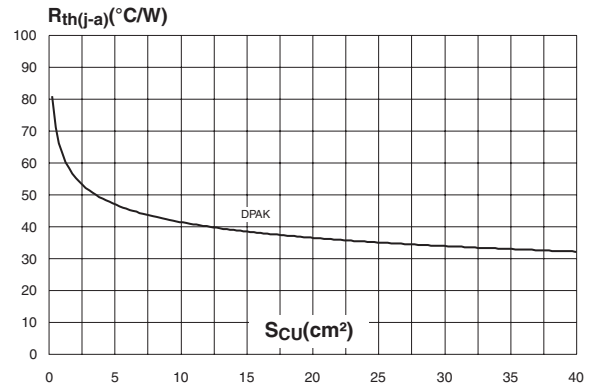
Figure 12: Thermal resistance junction to ambient versus copper surface under lead (epoxy FR4,  $e_{CU}=35\mu m$ ) (DO-201AD)



**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**

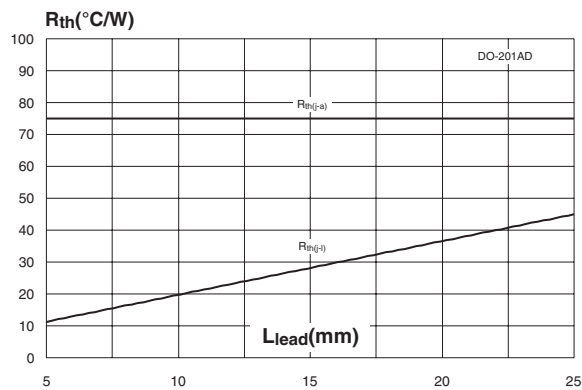


Figure 16: DPAK Package Mechanical Data

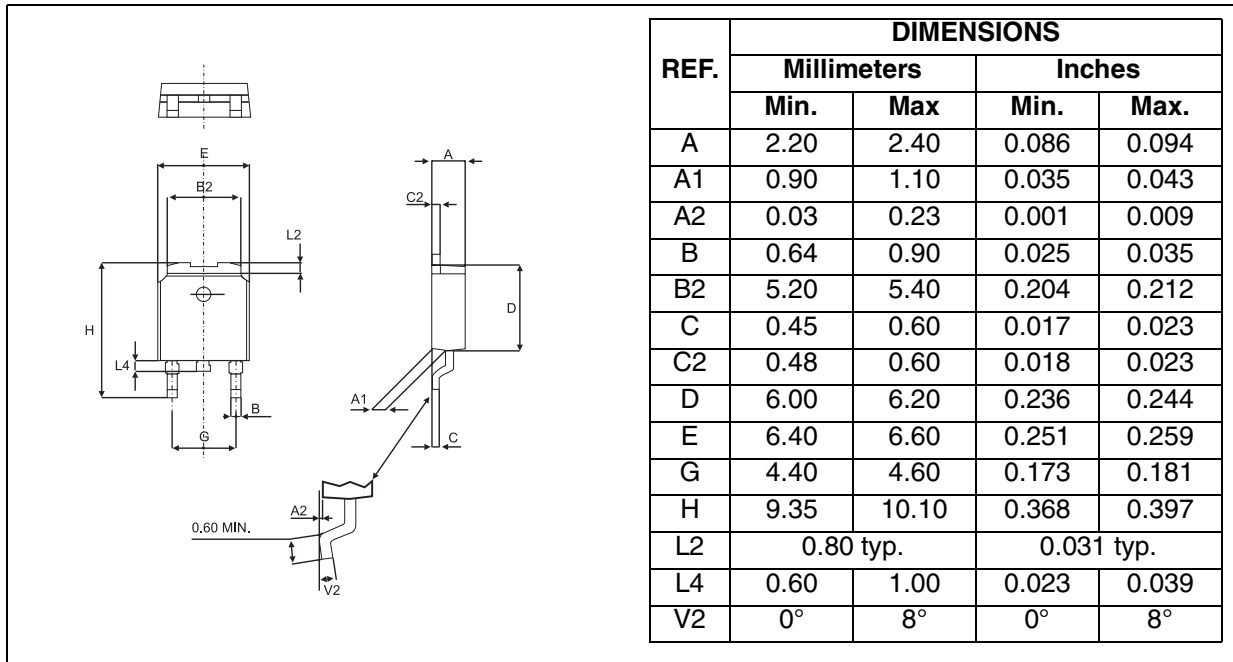


Figure 17: DPAK Foot Print Dimensions (in millimeters)

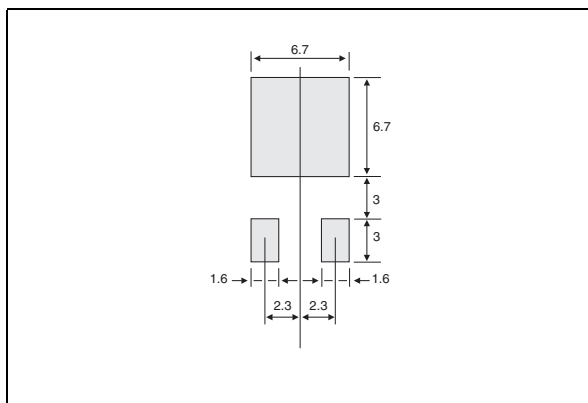


Figure 18: SMB Package Mechanical Data

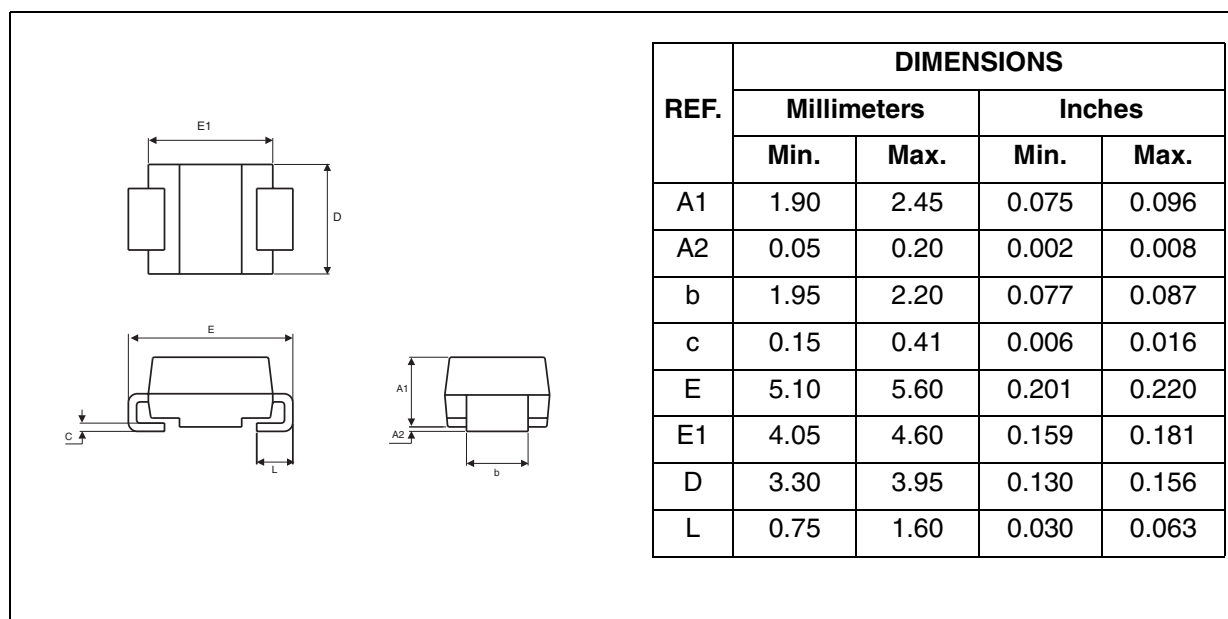
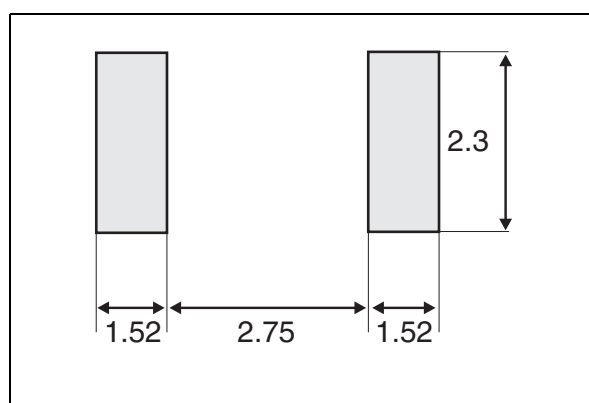
Figure 19: SMB Foot Print Dimensions  
(in millimeters)

Figure 20: SMC Package Mechanical Data

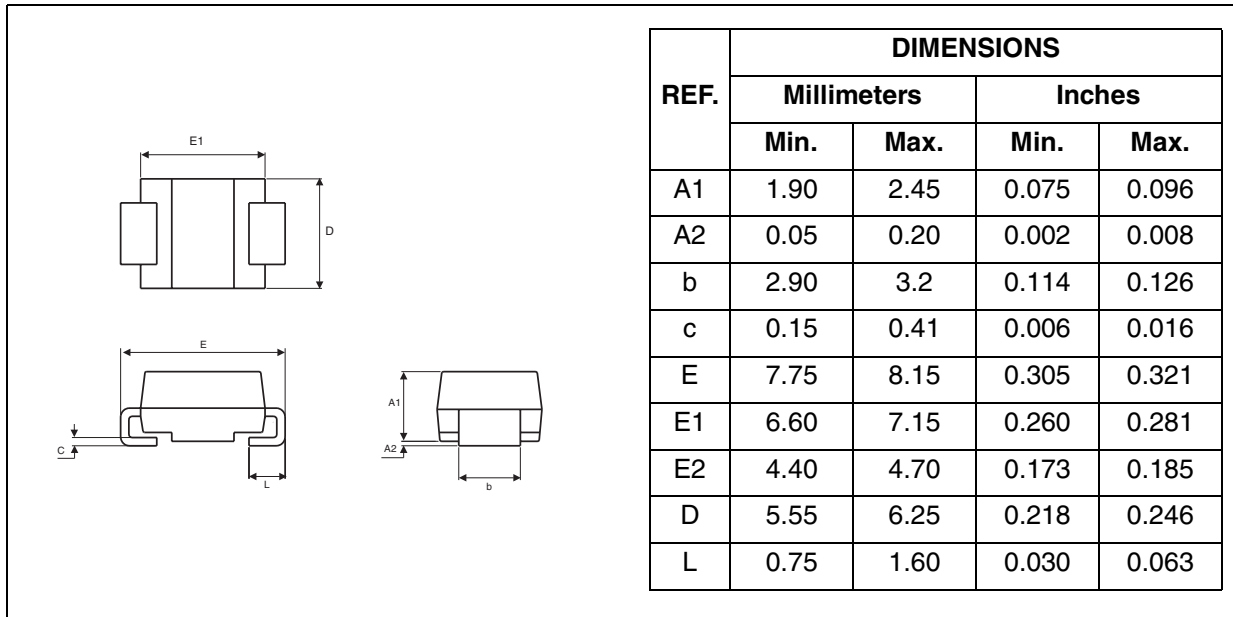


Figure 21: SMC Foot Print Dimensions (in millimeters)

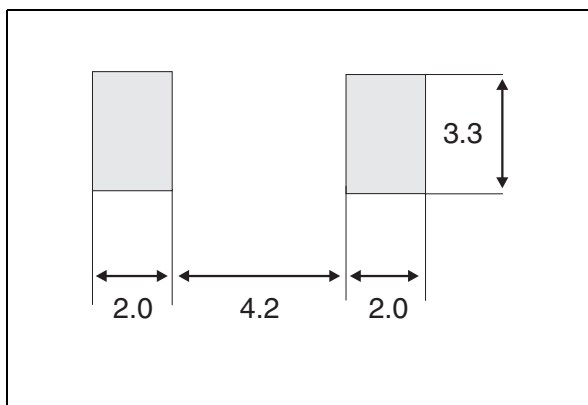


Figure 22: DO-201AD Package Mechanical Data

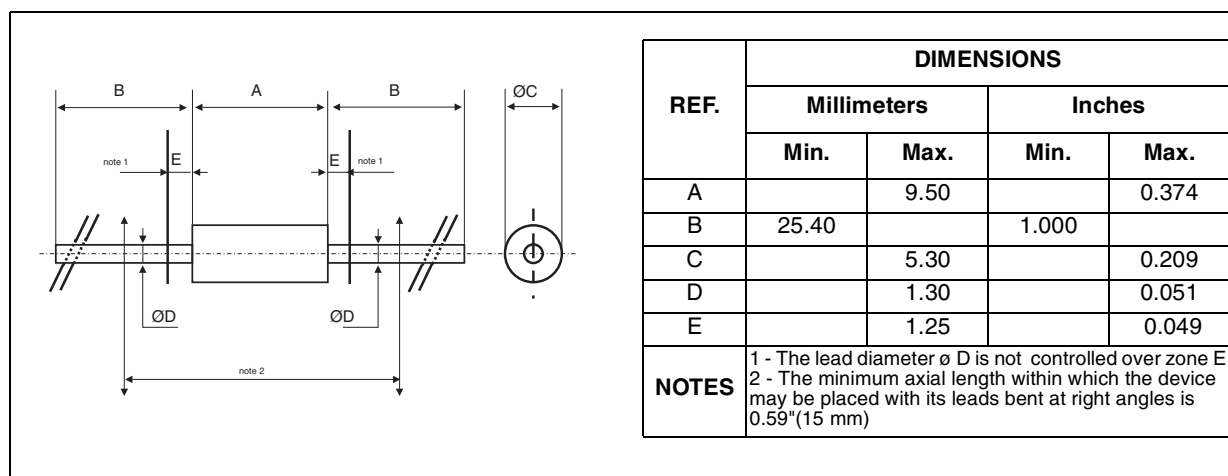


Table 7: Ordering Information

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

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