

TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

Table 1: Main Product Characteristics

$I_{F(AV)}$	3 A
V_{RRM}	600 V
$I_R (max)$	100 μ A
T_j	175°C
$V_F (typ)$	1.0 V
$t_{rr} (typ)$	35 ns

FEATURES AND BENEFITS

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

DESCRIPTION

The STTH3R06, which is using ST Turbo 2 600V technology, is specially suited for use in switching power supplies, inverters and as a free wheeling diode.

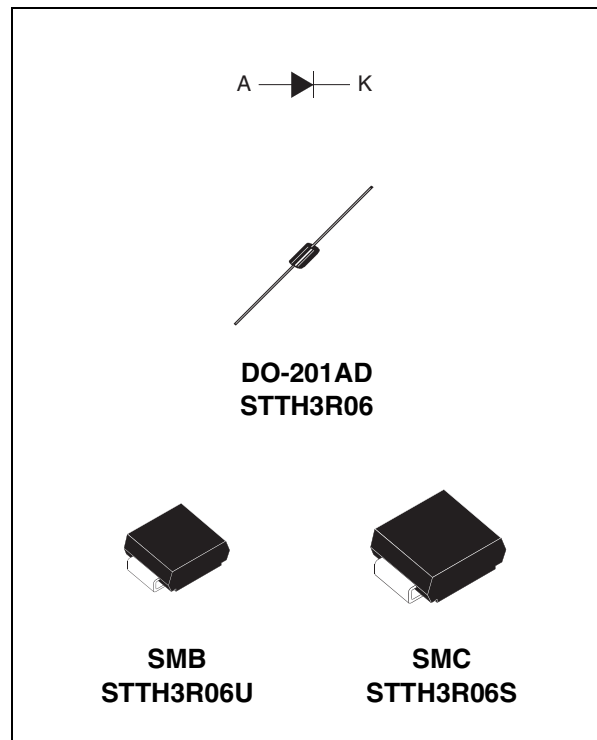


Table 2: Order Codes

Part Number	Marking
STTH3R06	STTH3R06
STTH3R06RL	STTH3R06
STTH3R06U	R06U
STTH3R06S	R6S

Table 3: Absolute Ratings (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			600	V
$I_{F(RMS)}$	RMS forward current			10	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	DO-201AD	$T_I = 80^\circ\text{C}$	3	A
		SMB	$T_I = 55^\circ\text{C}$		
		SMC	$T_I = 80^\circ\text{C}$		
I_{FSM}	Surge non repetitive forward current	DO-201AD	$t_p = 10\text{ms}$ sinusoidal	55	A
		SMB / SMC		45	
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	$^\circ\text{C/W}$
		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	μA
		$T_j = 150^\circ\text{C}$			15	100	
V_F	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 3\text{A}$			1.7	V
		$T_j = 150^\circ\text{C}$			1.0	1.25	

To evaluate the conduction losses use the following equation: $P = 1.03 \times I_{F(AV)} + 0.09 I_{F(RMS)}^2$

Table 6: Dynamic Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25^\circ\text{C}$	$I_F = 0.5\text{A}$ $I_{RR} = 0.25\text{A}$ $I_R = 1\text{A}$			30	ns
			$I_F = 1\text{A}$ $di_F/dt = -50\text{ A}/\mu\text{s}$ $V_R = 30\text{V}$		35		
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		$I_F = 3\text{A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$			10	V

Figure 1: Conduction losses versus average current

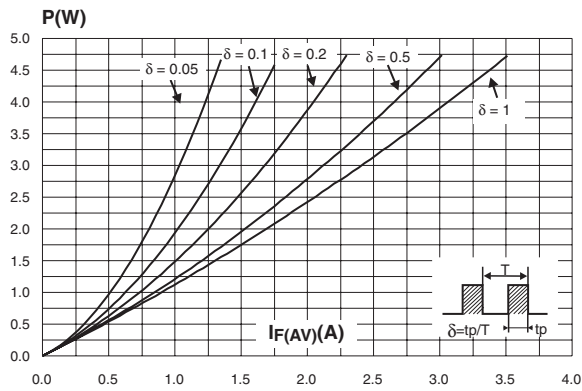


Figure 2: Forward voltage drop versus forward current

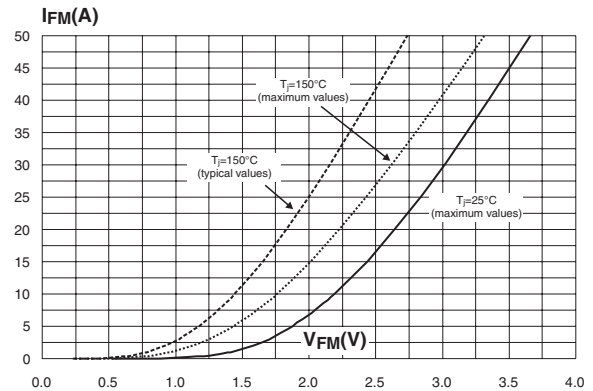


Figure 3: Relative variation of thermal impedance junction ambient versus pulse duration (epoxy printed circuit FR4, L_leads = 10mm, S_CU=1cm²)

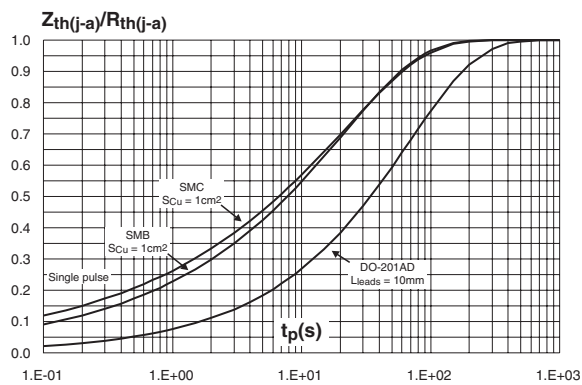


Figure 4: Peak reverse recovery current versus di_F/dt (typical values)

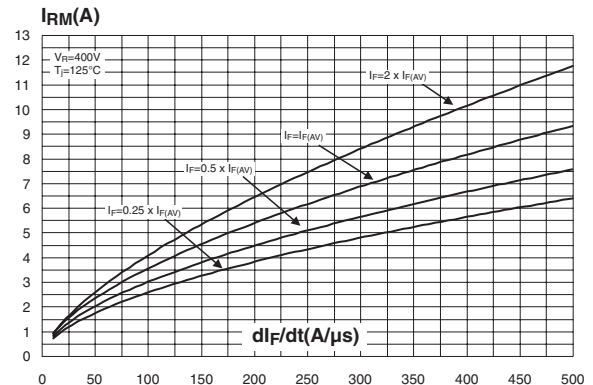


Figure 5: Reverse recovery time versus di_F/dt (typical values)

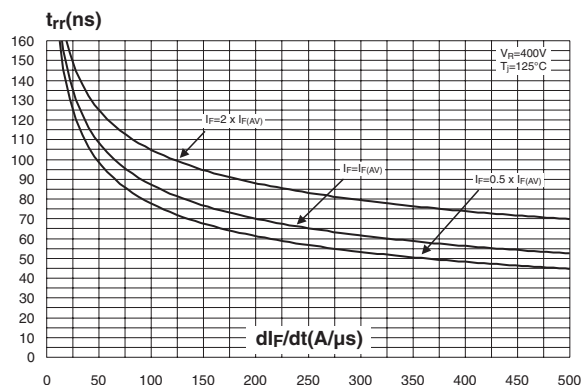


Figure 6: Reverse recovery charges versus di_F/dt (typical values)

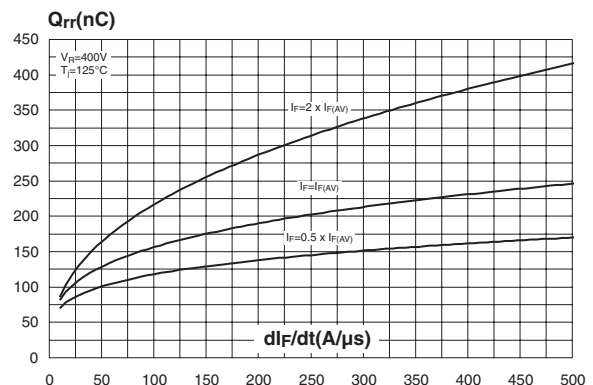


Figure 7: Softness factor versus di_F/dt (typical values)

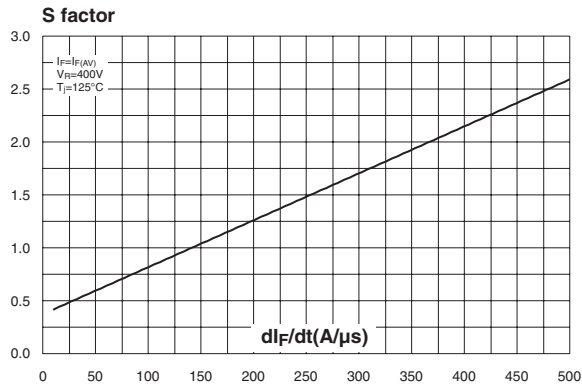


Figure 8: Relative variations of dynamic parameters versus junction temperature

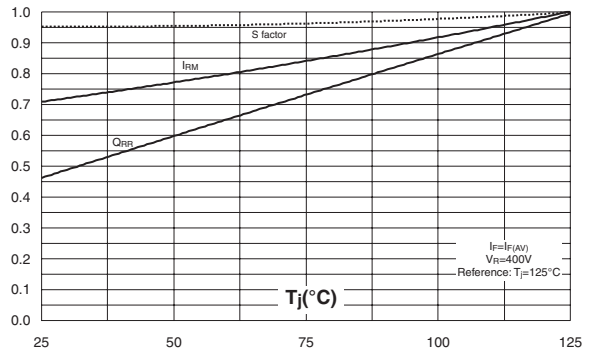


Figure 9: Transient peak forward voltage versus di_F/dt (typical values)

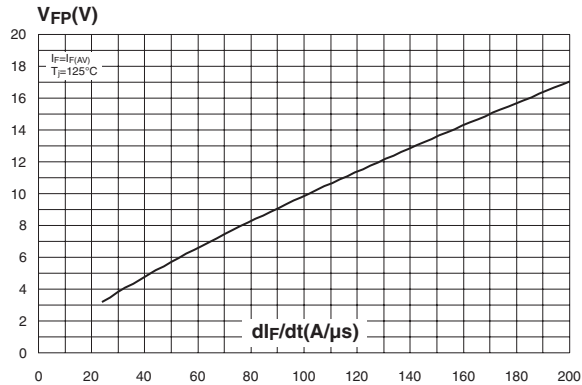


Figure 10: Forward recovery time versus di_F/dt (typical values)

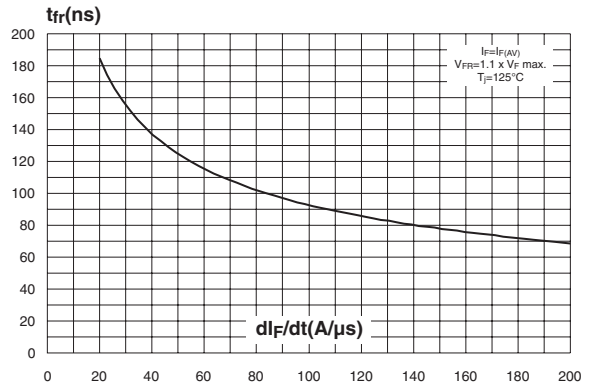


Figure 11: Junction capacitance versus reverse voltage applied (typical values)

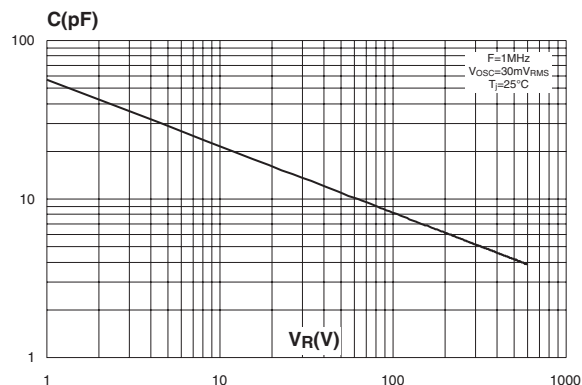


Figure 12: Thermal resistance junction to ambient versus copper surface under lead (epoxy FR4, $e_{Cu} = 35\mu m$) (DO-201AD)

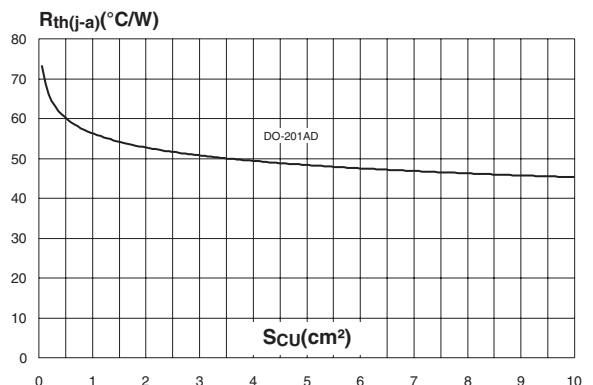


Figure 13: Thermal resistance junction to ambient versus copper surface under lead (epoxy FR4, $e_{CU}=35\mu m$) (SMB / SMC)

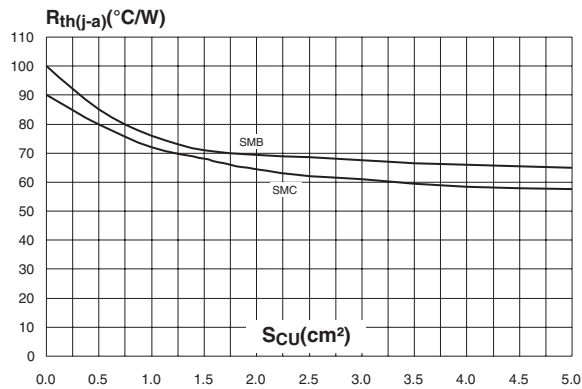


Figure 14: Thermal resistance versus lead length

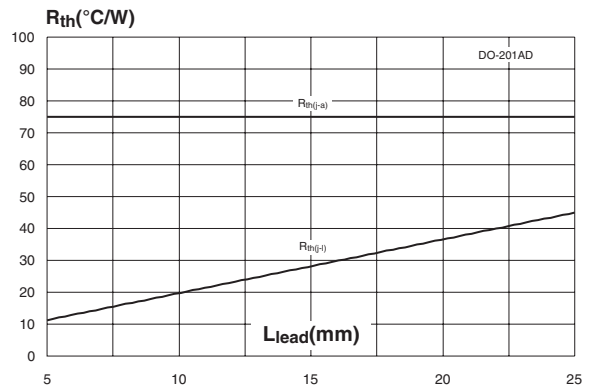


Figure 15: SMB Package Mechanical Data

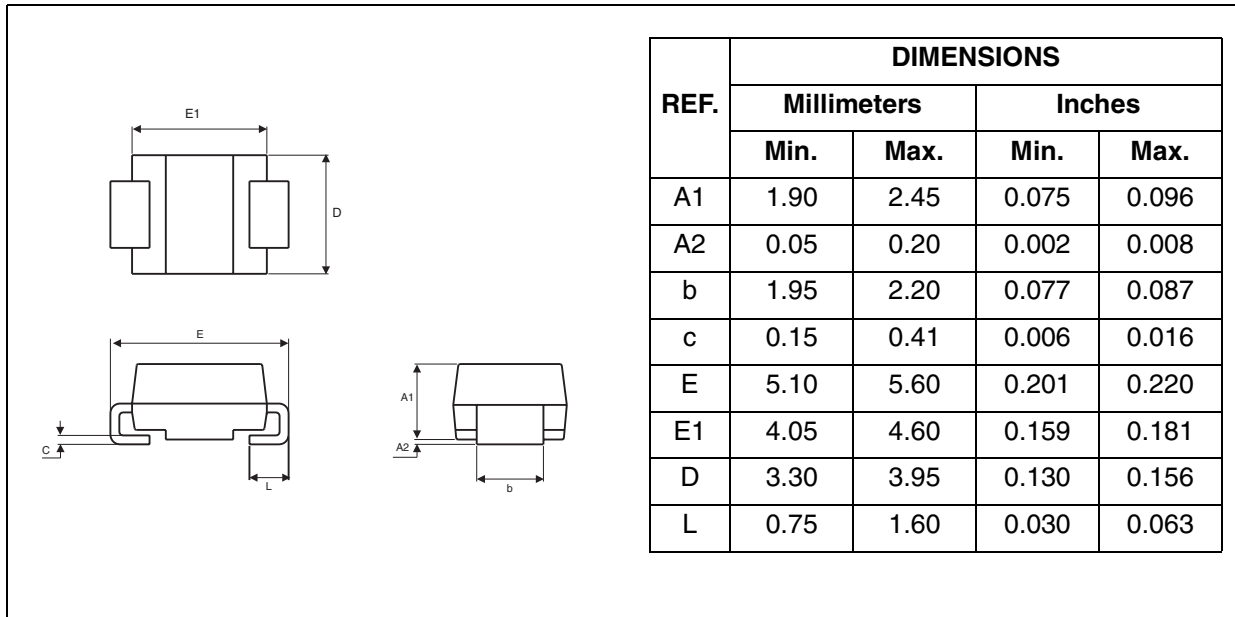


Figure 16: SMB Foot Print Dimensions
(in millimeters)

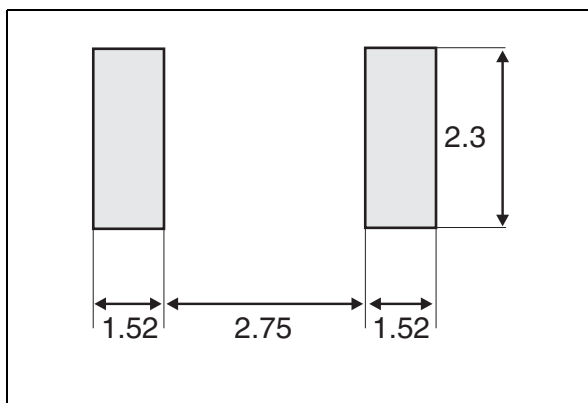


Figure 17: SMC Package Mechanical Data

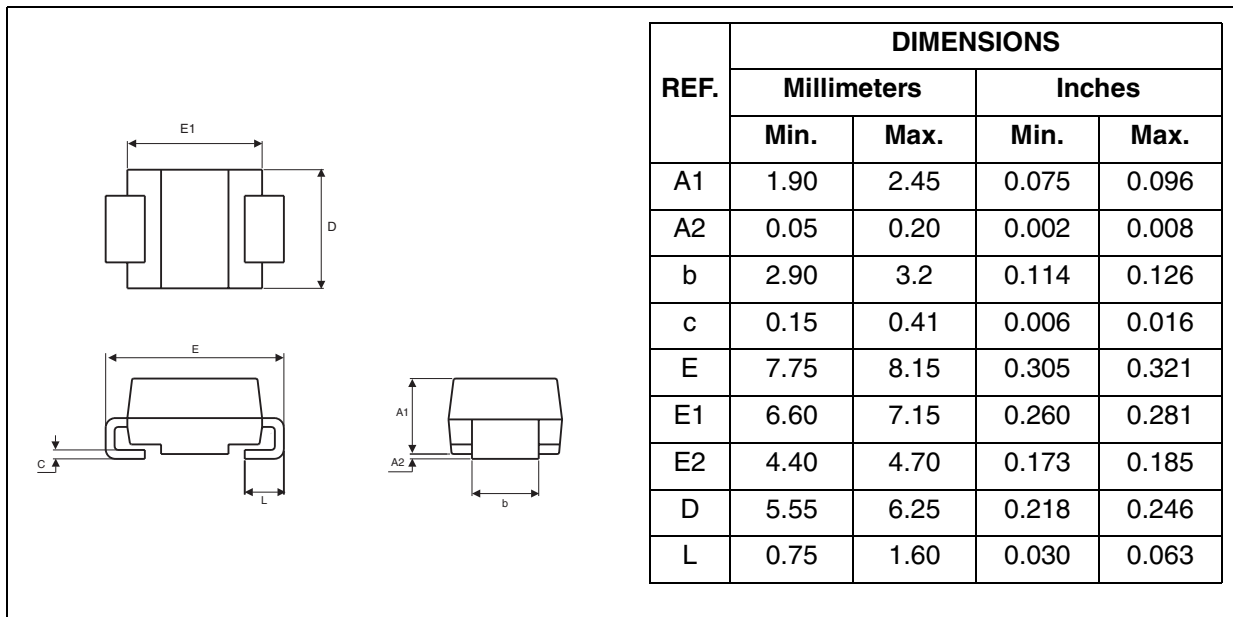
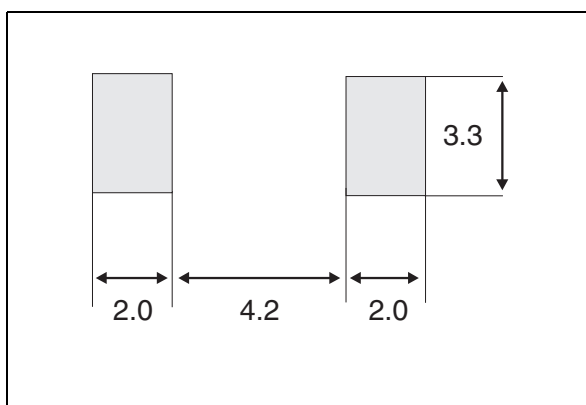


Figure 18: SMC Foot Print Dimensions
(in millimeters)



STTH3R06

Figure 19: DO-201AD Package Mechanical Data

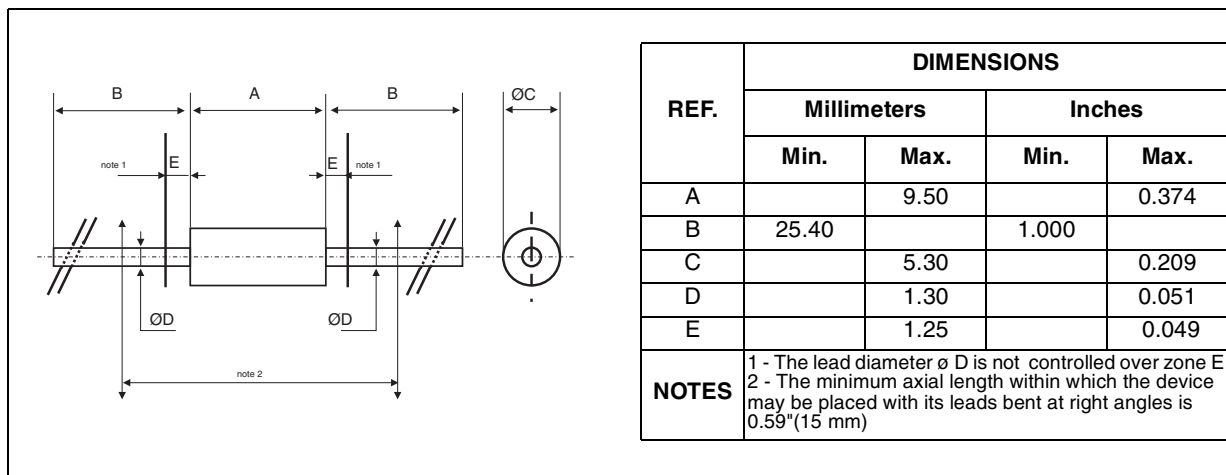


Table 7: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH3R06	STTH3R06	DO-201AD	1.12 g	600	Ammopack
STTH3R06-RL	STTH3R06	DO-201AD	1.12 g	1900	Tape & reel
STTH3R06U	3R6U	SMB	0.11 g	2500	Tape & reel
STTH3R06S	R6S	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
March-2003	1	First issue
07-Sep-2004	2	SMB and SMC packages added

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