

## HIGH EFFICIENCY ULTRAFAST DIODE

**Table 1: Main Product Characteristics**

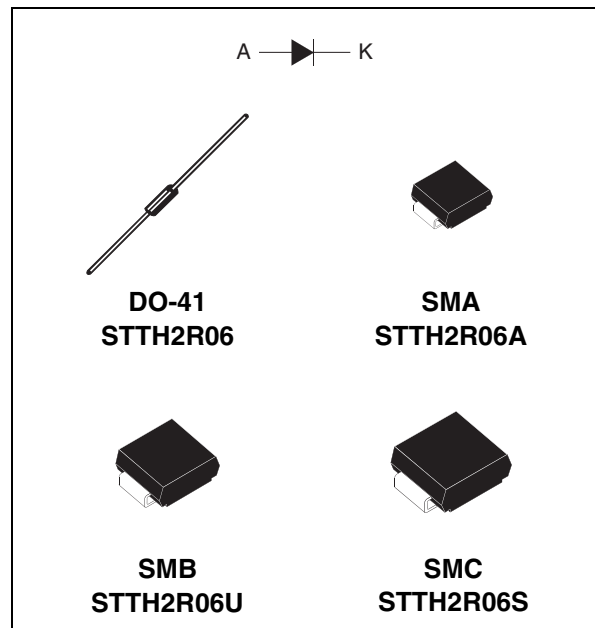
$I_{F(AV)}$	2 A
$V_{RRM}$	600 V
$T_j$	175°C
$V_F$ (typ)	1 V
$t_{rr}$ (typ)	35 ns

**FEATURES AND BENEFITS**

- Very low conduction losses
- Negligible switching losses
- Low forward and reverse recovery times
- High junction temperature

**DESCRIPTION**

The STTH2R06 is using ST Turbo 2 600V planar Pt doping technology. It is specially suited for switching mode base drive & transistor circuits. Packaged in axial, SMA, SMB and SMC, this device is intended for use in high frequency inverters, free wheeling and polarity protection.



**Table 2: Order Codes**

Part Number	Marking
STTH2R06	STTH2R06
STTH2R06RL	STTH2R06
STTH2R06A	R6A
STTH2R06U	R6U
STTH2R06S	R62

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

Symbol	Parameter		Value	Unit	
$V_{RRM}$	Repetitive peak reverse voltage		600	V	
$I_{F(RMS)}$	RMS forward voltage		7	A	
$I_{F(AV)}$	Average forward current $\delta = 0.5$	DO-41	$T_L = 70^\circ\text{C}$	2	A
		SMA	$T_L = 85^\circ\text{C}$		
		SMB	$T_L = 100^\circ\text{C}$		
		SMC	$T_L = 115^\circ\text{C}$		
$I_{FSM}$	Surge non repetitive forward current	DO-41	$t_p = 10\text{ms}$	40	A
		SMA / SMB / SMC	sinusoidal	30	
$T_{stg}$	Storage temperature range		-65 to + 175	°C	
$T_j$	Operating junction temperature range		-40 to + 175	°C	

Table 4: Thermal Resistance

Symbol	Parameter		Value (max).	Unit
$R_{th(j-l)}$	Junction to lead	DO-41 L = 5 mm	35	°C/W
		SMA	30	
		SMB	25	
		SMC	20	

Table 5: Static Electrical Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
$I_R^*$	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			2	$\mu\text{A}$
		$T_j = 150^\circ\text{C}$			12	85	
$V_F^{**}$	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 2\text{A}$			1.7	V
		$T_j = 150^\circ\text{C}$			1.0	1.25	

Pulse test: \*  $t_p = 5 \text{ ms}$ ,  $\delta < 2\%$

\*\*  $t_p = 380 \mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:  $P = 1 \times I_{F(AV)} + 0.125 I_{F(RMS)}^2$

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	50	
$t_{fr}$	Forward recovery time	$T_j = 25^\circ\text{C}$	$I_F = 2\text{A}$ $di_F/dt = 100 \text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$			100	ns
$V_{FP}$	Forward recovery voltage					10	V

Figure 1: Conduction losses versus average forward current

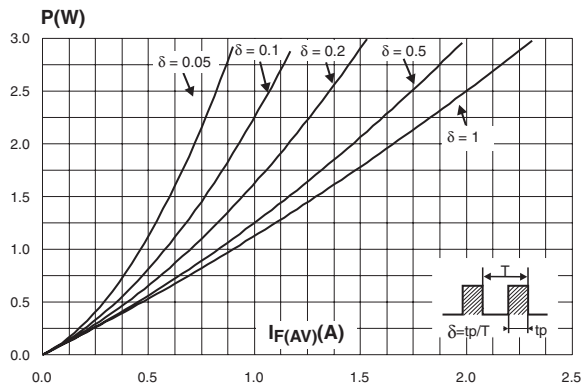


Figure 2: Forward voltage drop versus forward current

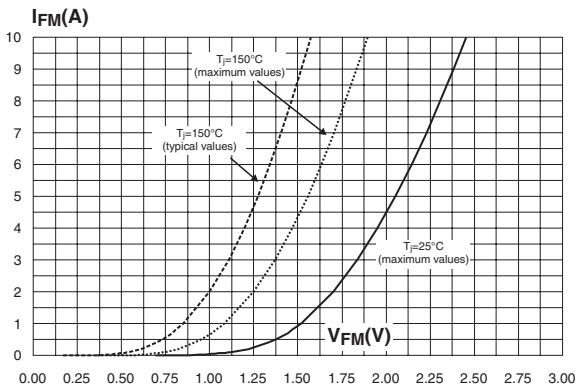


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration (SMA/SMB/SMC: S<sub>CU</sub> = 1cm<sup>2</sup>)

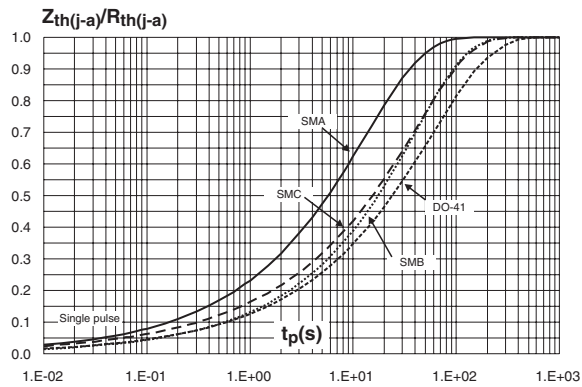


Figure 4: Peak reverse recovery current versus di<sub>F</sub>/dt (typical values)

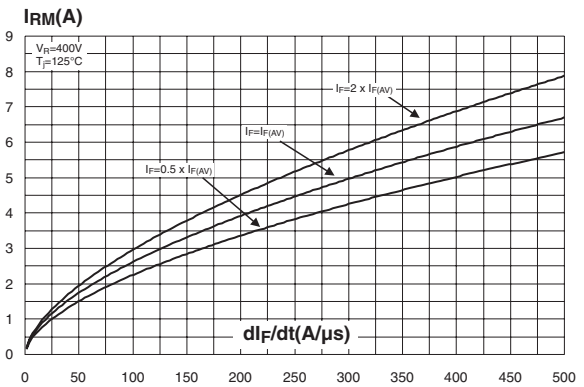


Figure 5: Reverse recovery time versus di<sub>F</sub>/dt (typical values)

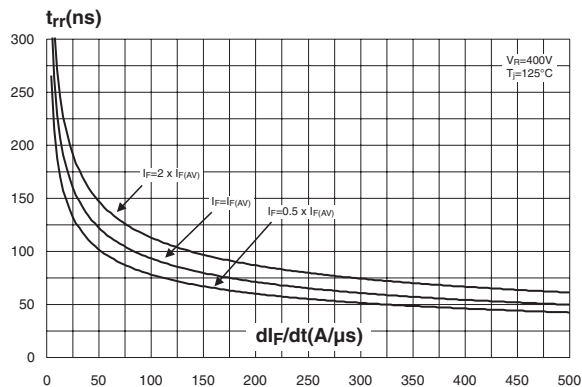


Figure 6: Reverse recovery charges versus di<sub>F</sub>/dt (typical values)

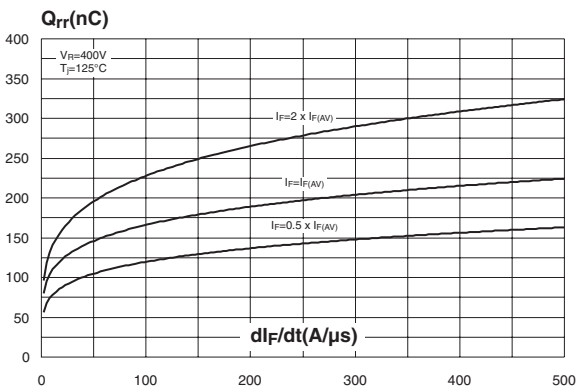


Figure 7: Relative variations of dynamic parameters versus junction temperature

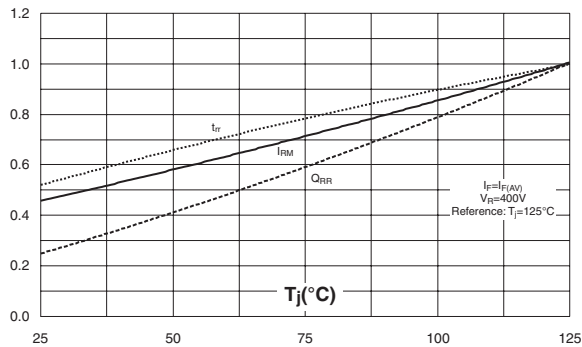


Figure 8: Transient peak forward voltage versus  $di_F/dt$  (typical values)

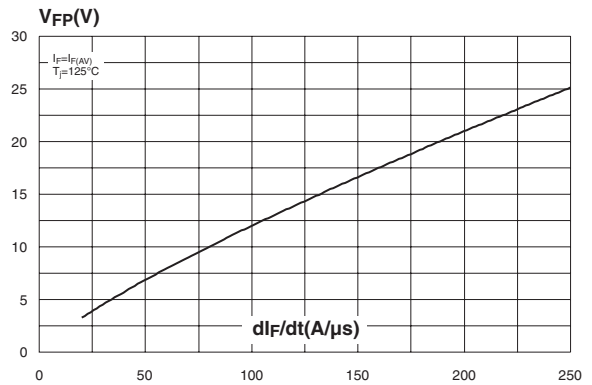


Figure 9: Forward recovery time versus  $di_F/dt$  (typical values)

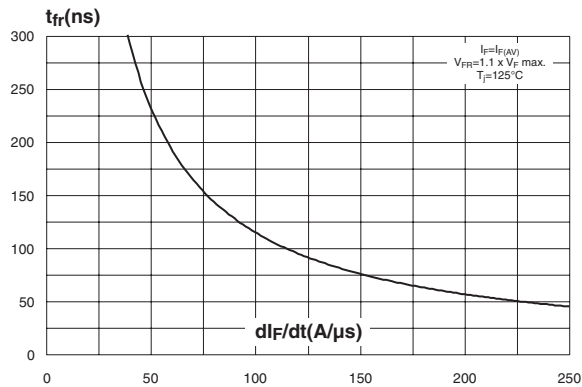


Figure 10: Junction capacitance versus reverse voltage applied (typical values)

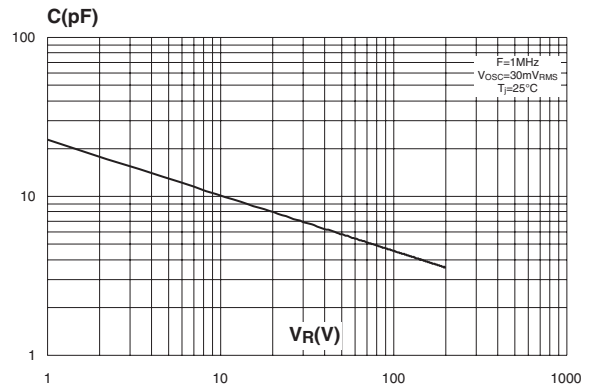


Figure 11: Thermal resistance junction to ambient versus copper surface under each lead (epoxy FR4,  $e_{Cu}=35\mu m$ ) (SMA/SMB/SMC)

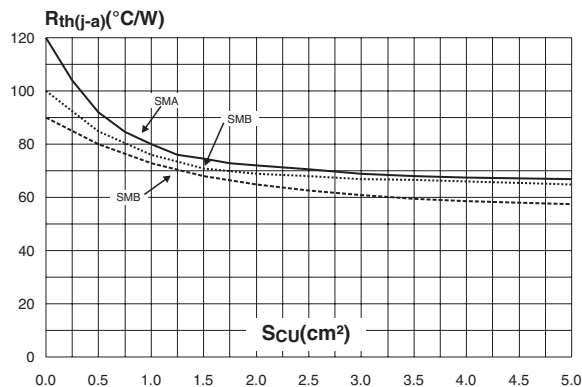


Figure 12: Thermal resistance versus lead length (DO-41)

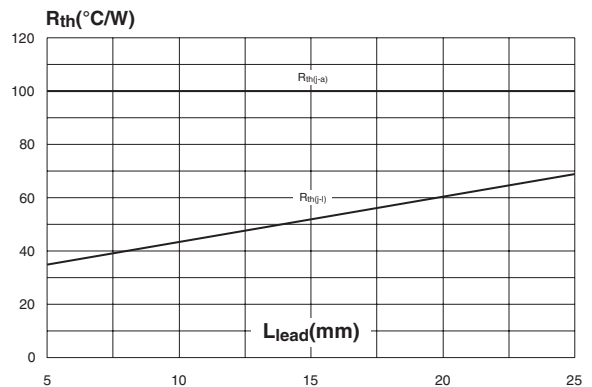


Figure 13: SMA Package Mechanical Data

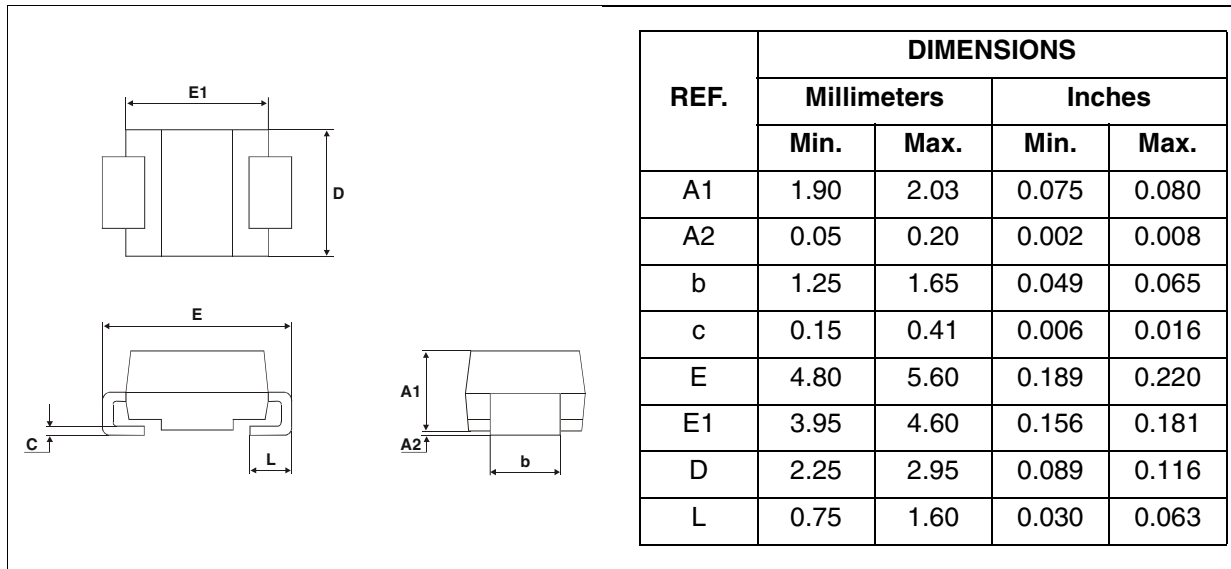
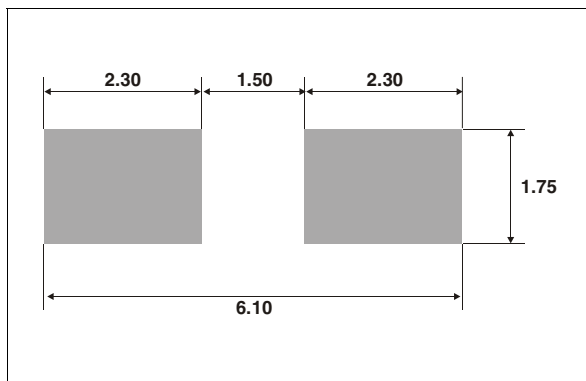
Figure 14: SMA Foot Print Dimensions  
(in millimeters)

Figure 15: SMB Package Mechanical Data

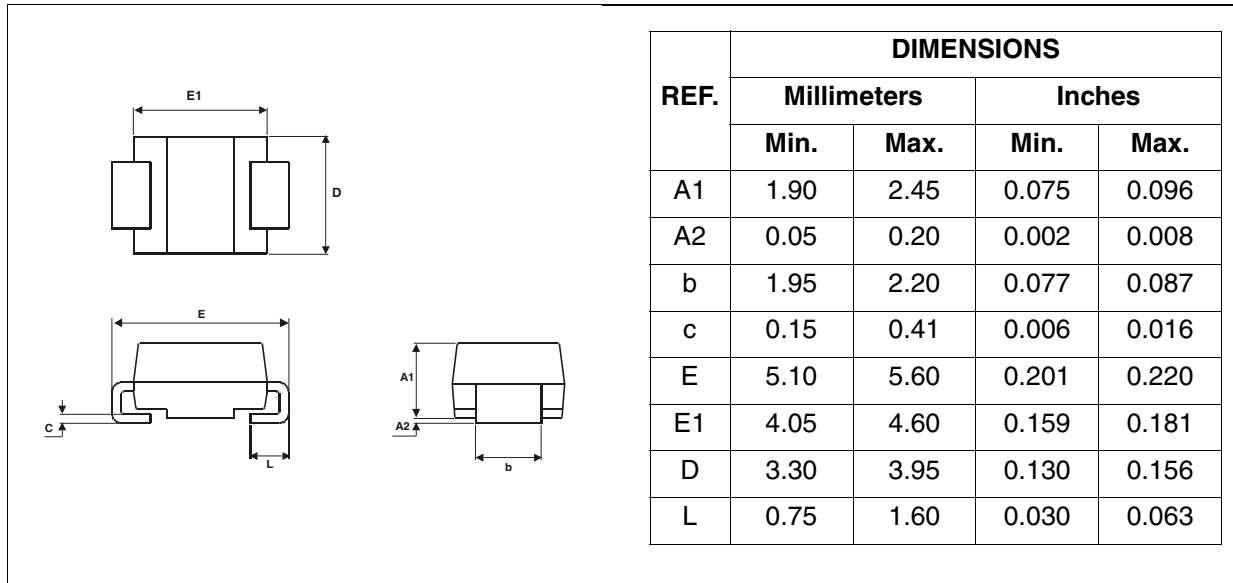


Figure 16: SMB Foot Print Dimensions  
(in millimeters)

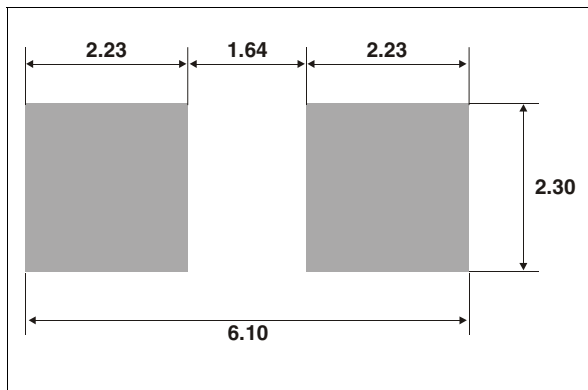
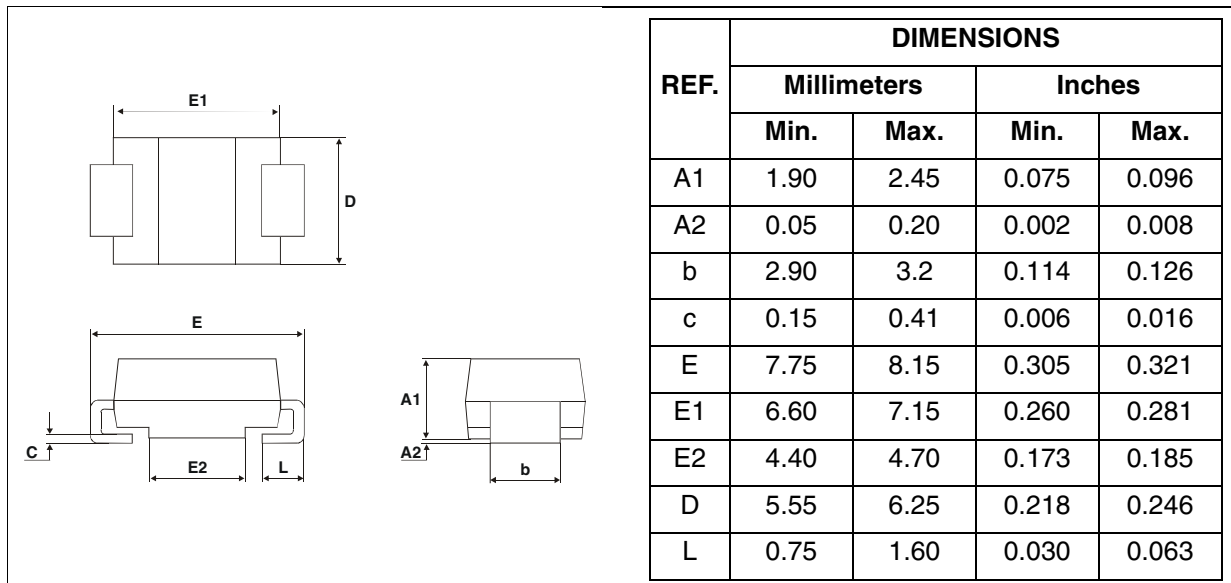
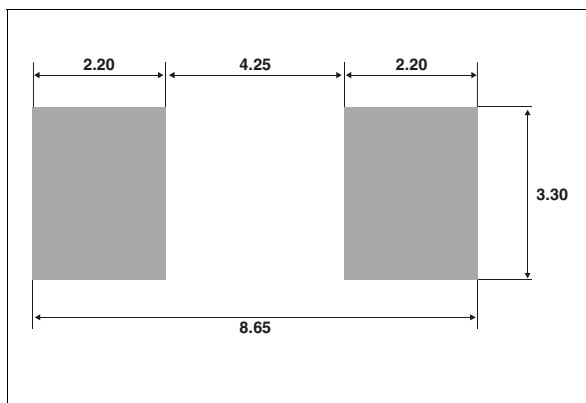


Figure 17: SMC Package Mechanical Data

Figure 18: SMC Foot Print Dimensions  
(in millimeters)

## STTH2R06

Figure 19: DO-41 Package Mechanical Data

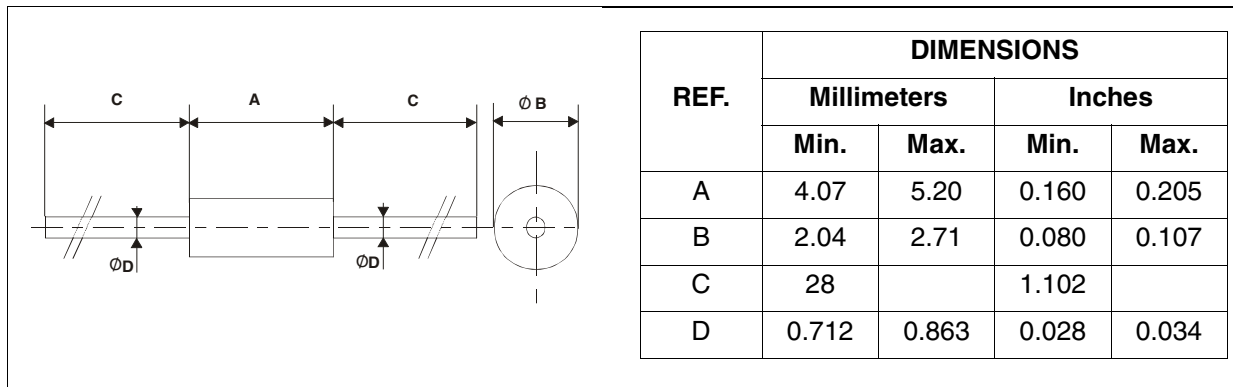


Table 7: Ordering Information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
STTH2R06	STTH2R06	DO-41	0.34 g	2000	Ammopack
STTH2R06RL	STTH2R06	DO-41	0.34 g	5000	Tape & reel
STTH2R06A	R6A	SMA	0.068 g	5000	Tape & reel
STTH2R06U	R6U	SMB	0.11 g	2500	Tape & reel
STTH2R06S	R62	SMC	0.243 g	2500	Tape & reel

Table 8: Revision History

Date	Revision	Description of Changes
07-Sep-2004	1	First issue.
1-Jun-2005	2	SMC package addition.



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