

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.

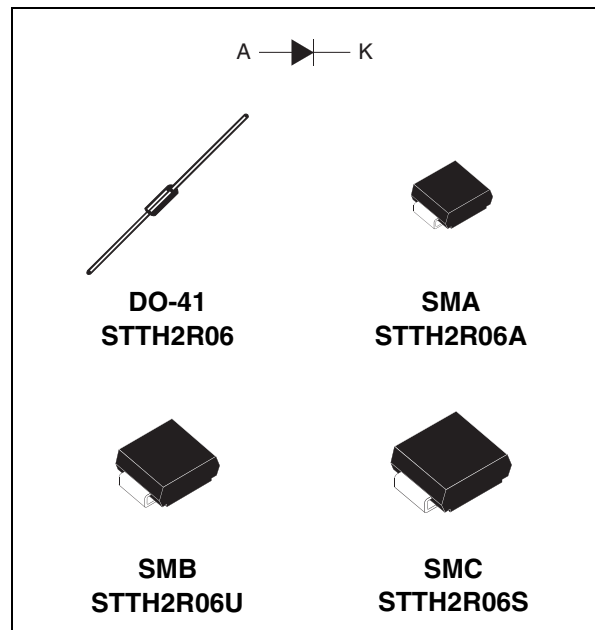


Table 2: Order Codes

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	μA
		$T_j = 150^\circ\text{C}$			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

Figure 1: Conduction losses versus average forward current

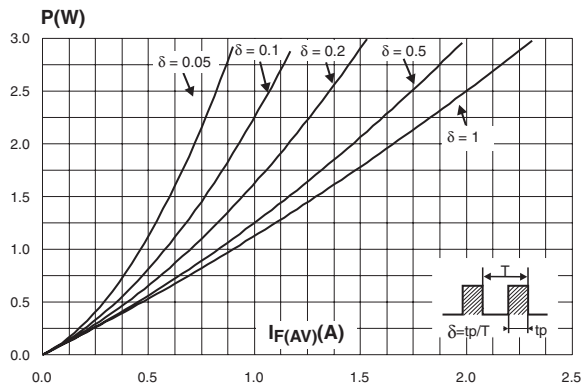


Figure 2: Forward voltage drop versus forward current

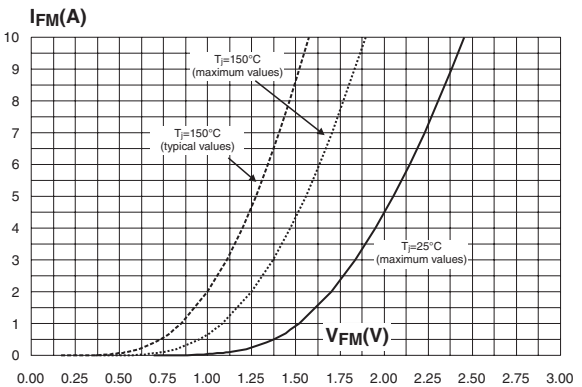


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration (SMA/SMB/SMC: S_{CU} = 1cm²)

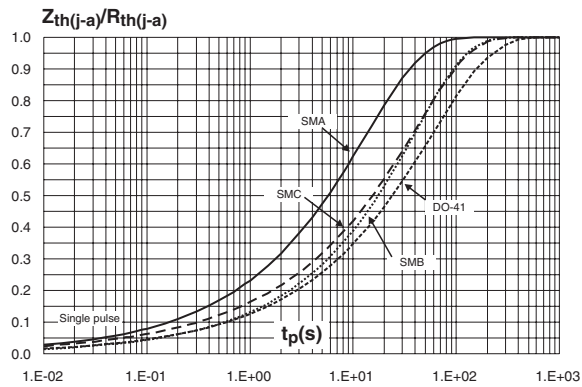


Figure 4: Peak reverse recovery current versus di_F/dt (typical values)

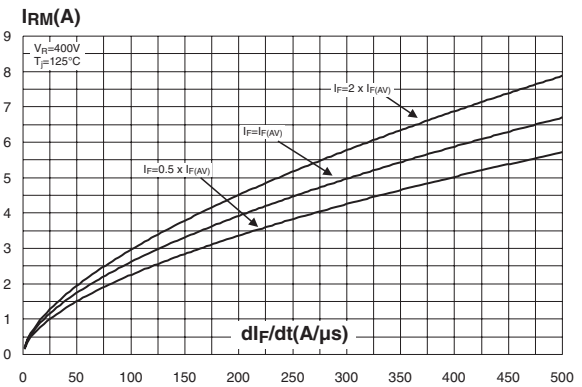


Figure 5: Reverse recovery time versus di_F/dt (typical values)

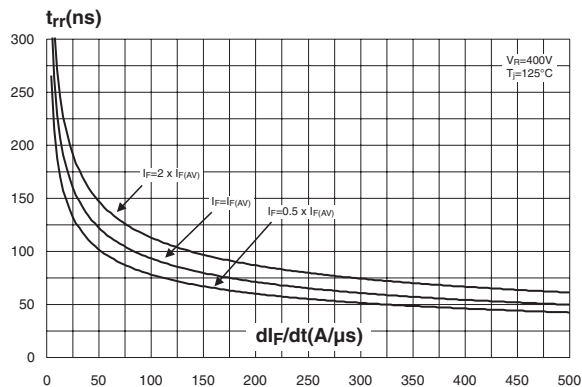


Figure 6: Reverse recovery charges versus di_F/dt (typical values)

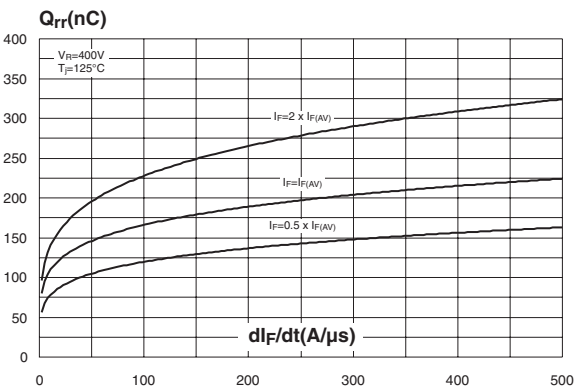


Figure 7: Relative variations of dynamic parameters versus junction temperature

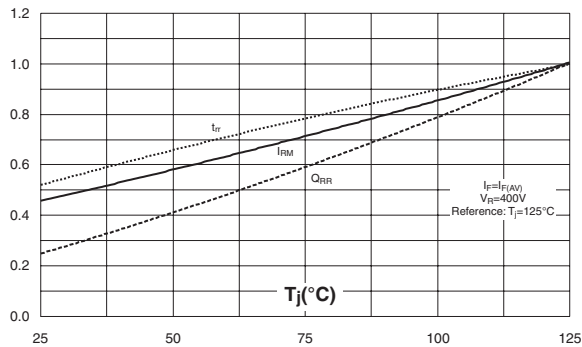


Figure 8: Transient peak forward voltage versus dI_F/dt (typical values)

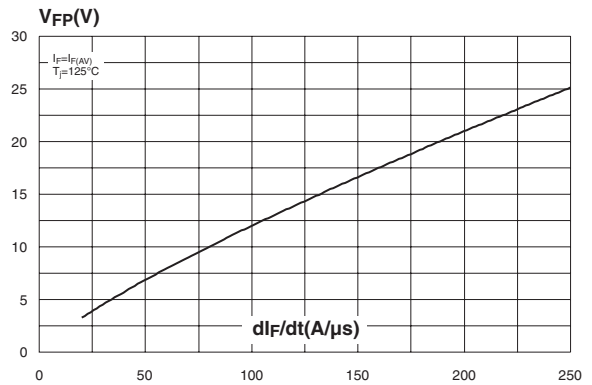


Figure 9: Forward recovery time versus dI_F/dt (typical values)

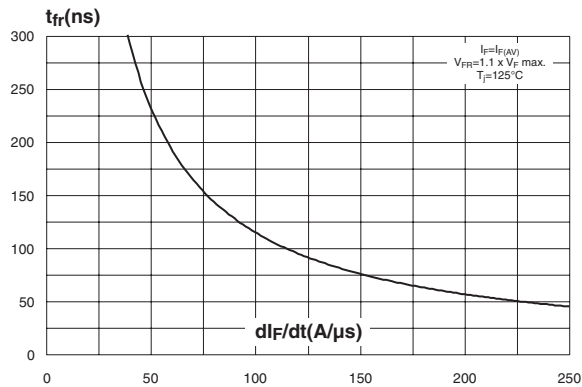


Figure 10: Junction capacitance versus reverse voltage applied (typical values)

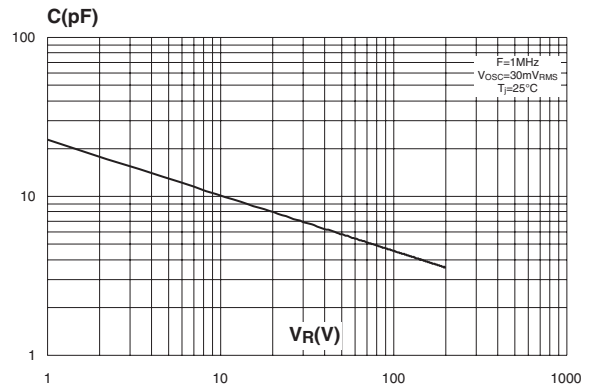


Figure 11: Thermal resistance junction to ambient versus copper surface under each lead (epoxy FR4, $e_{CU}=35\mu m$) (SMA/SMB/SMC)

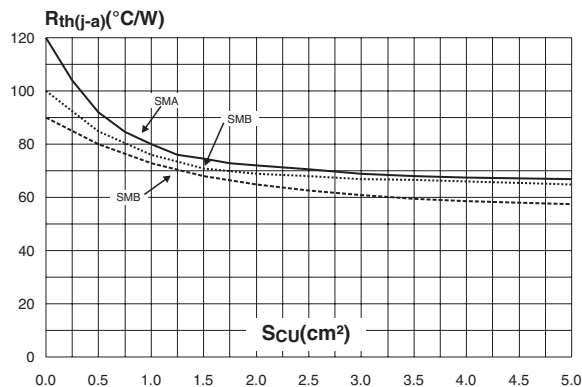


Figure 12: Thermal resistance versus lead length (DO-41)

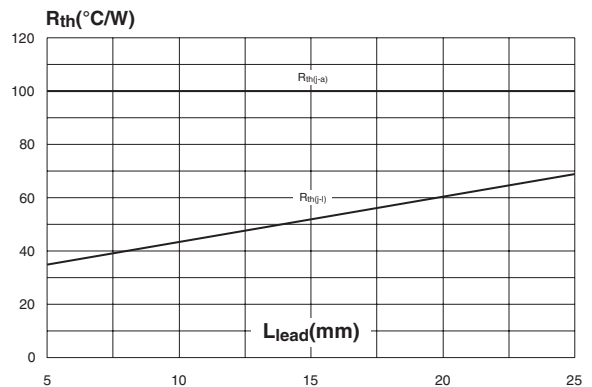


Figure 13: SMA Package Mechanical Data

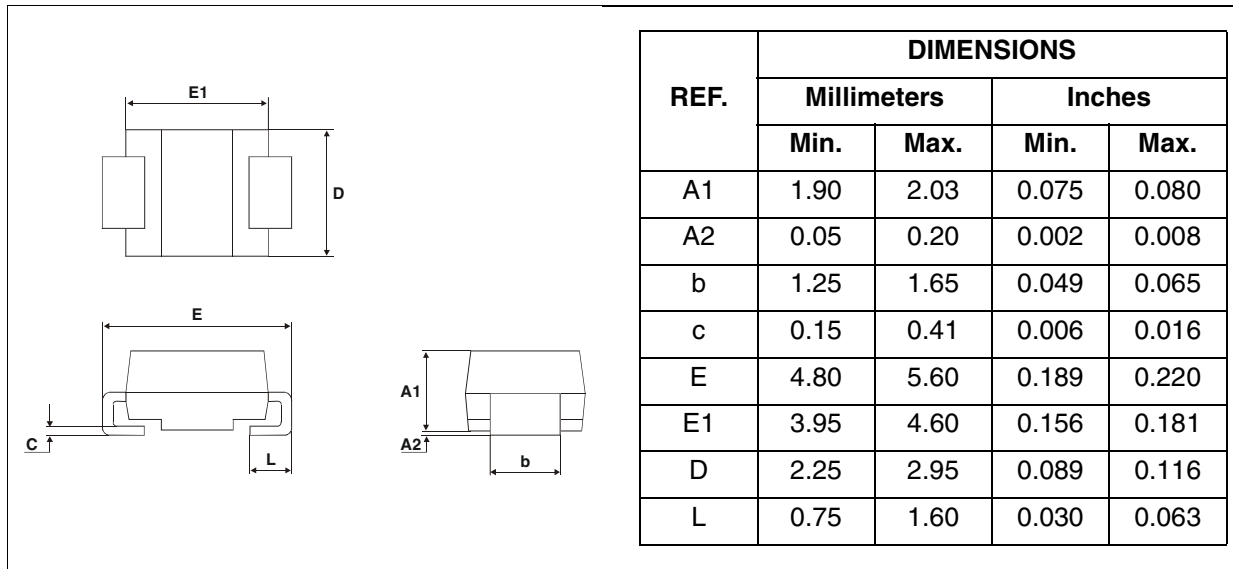
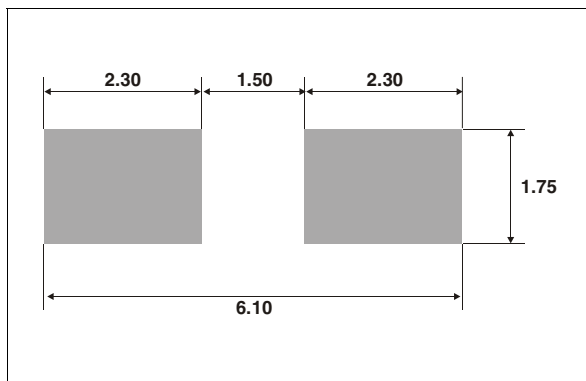
Figure 14: SMA Foot Print Dimensions
(in millimeters)

Figure 15: SMB Package Mechanical Data

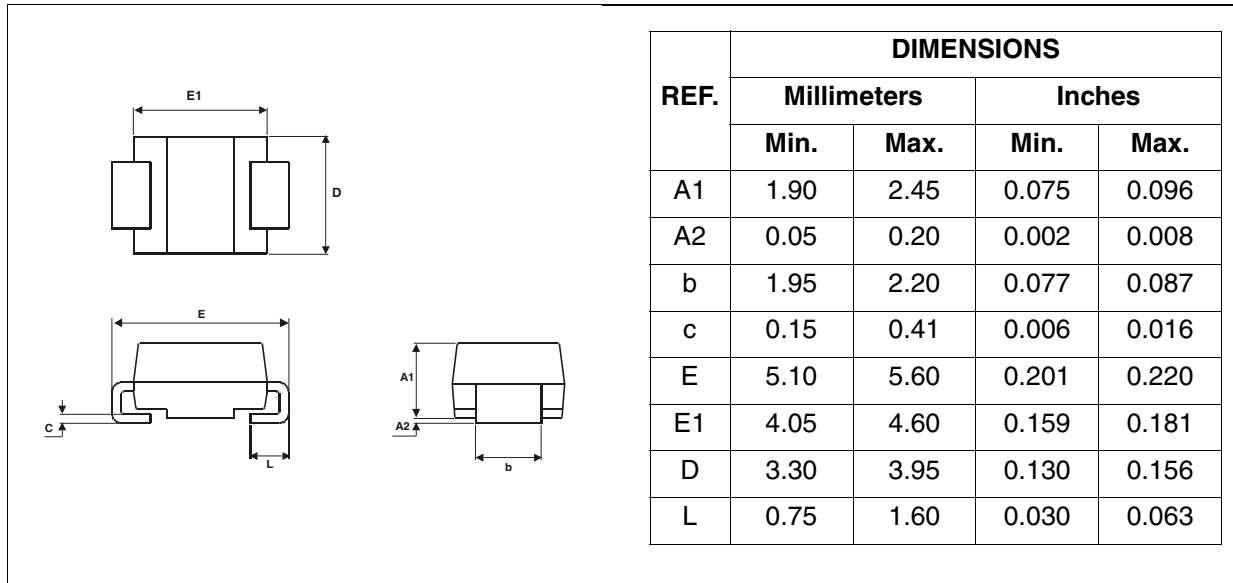


Figure 16: SMB Foot Print Dimensions
(in millimeters)

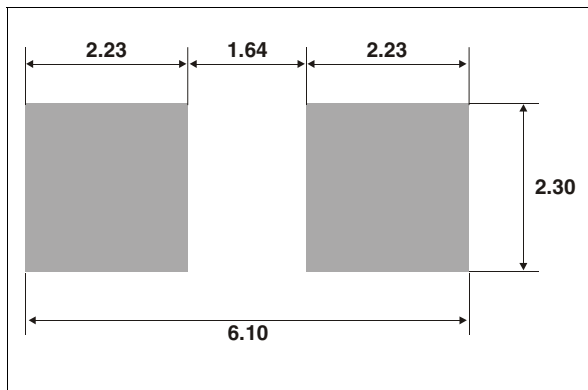
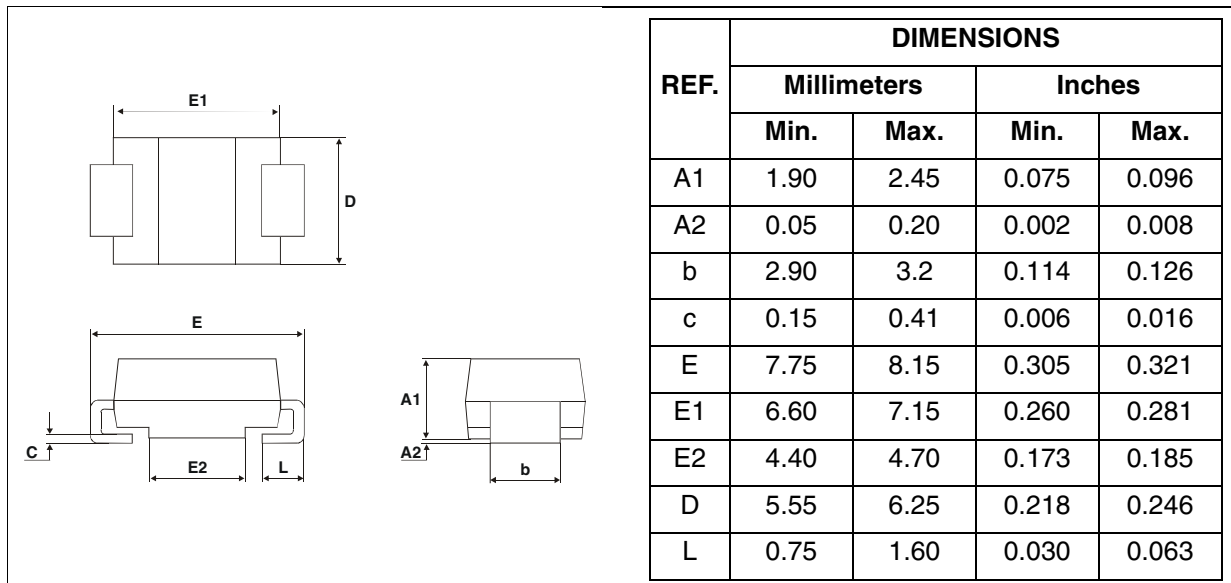
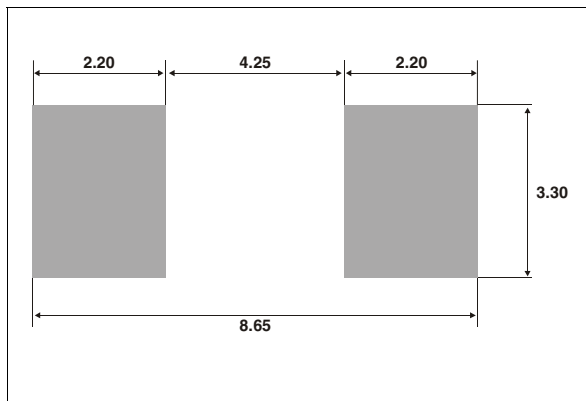


Figure 17: SMC Package Mechanical Data

Figure 18: SMC Foot Print Dimensions
(in millimeters)

STTH2R06

Figure 19: DO-41 Package Mechanical Data

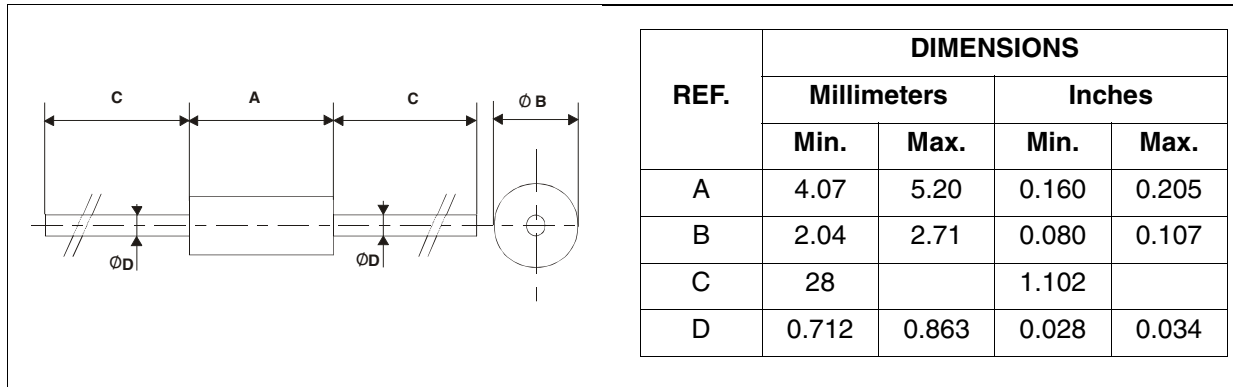


Table 7: Ordering Information

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.

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

© 2005 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