

TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER
Table 1: Main Product Characteristics

$I_{F(AV)}$	1 A
V_{RRM}	600 V
$I_R (max)$	75 μA
T_j	175°C
$V_F (typ)$	1.0 V
$t_{rr} (max)$	25 ns

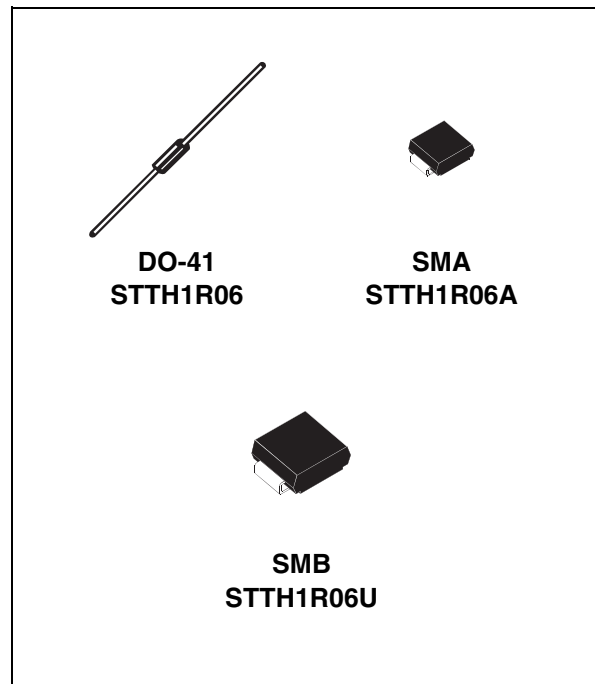
FEATURES AND BENEFITS

- Ultrafast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching & conduction losses

DESCRIPTION

The STTH1R06, which is using ST Turbo 2 600V technology, is specially suited as boost diode in power factor correction circuitry.

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


Table 2: Order Codes

Part Number	Marking
STTH1R06	STTH1R06
STTH1R06RL	STTH1R06

Part Number	Marking
STTH1R06A	HR6
STTH1R06U	BR6

Table 3: Absolute Ratings (limiting values)

Symbol	Parameter		Value	Unit	
V_{RRM}	Repetitive peak reverse voltage		600	V	
$I_{F(RMS)}$	RMS forward current	DO-41	10	A	
		SMA / SMB	7		
$I_{F(AV)}$	Average forward current	DO-41	1	A	
		SMA			$T_c = 100^\circ\text{C} \quad \delta = 0.5$
		SMB			$T_c = 125^\circ\text{C} \quad \delta = 0.5$
I_{FSM}	Surge non repetitive forward current	DO-41	25	A	
		SMA / SMB			$t_p = 10\text{ms sinusoidal}$
T_{stg}	Storage temperature range		-65 to + 175	°C	
T_j	Maximum operating junction temperature		175	°C	

Table 4: Thermal Resistance

Symbol	Parameter			Value (max).	Unit
$R_{th(j-l)}$	Junction to lead	L = 10mm	DO-41	45	°C/W
			SMA	30	
			SMB	25	
$R_{th(j-a)}$	Junction to ambient (1)	L = 10mm	DO-41	70	°C/W

Note 1: $R_{th(j-a)}$ is measured with a copper area $S = Scm^2$ (see figure12).

Table 5: Static Electrical Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R	Reverse leakage current	$T_j = 25^\circ C$	$V_R = V_{RRM}$			1	μA
		$T_j = 150^\circ C$			10	75	
V_F	Forward voltage drop	$T_j = 25^\circ C$	$I_F = 1A$			1.7	V
		$T_j = 150^\circ C$			1.0	1.25	

To evaluate the conduction losses use the following equation: $P = 1.03 \times I_{F(AV)} + 0.27 I_F^2(RMS)$

Table 6: Dynamic Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25^\circ C$	$I_F = 0.5A$ $I_{rr} = 0.25A$ $I_R = 1A$			25	ns
			$I_F = 1A$ $di_F/dt = -50 A/\mu s$ $V_R = 30V$		30	45	
t_{fr}	Forward recovery time	$T_j = 25^\circ C$	$I_F = 1A$ $di_F/dt = 100 A/\mu s$ $V_{FR} = 1.1 \times V_{Fmax}$			100	ns
V_{FP}	Forward recovery voltage	$T_j = 25^\circ C$	$I_F = 1A$ $di_F/dt = 100 A/\mu s$ $V_{FR} = 1.1 \times V_{Fmax}$			10	V

Figure 1: Conduction losses versus average forward current

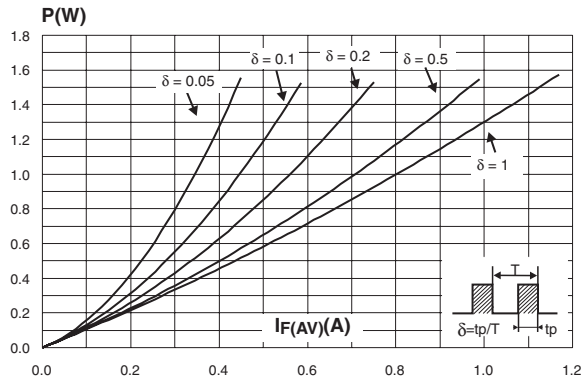


Figure 2: Forward voltage drop versus forward current

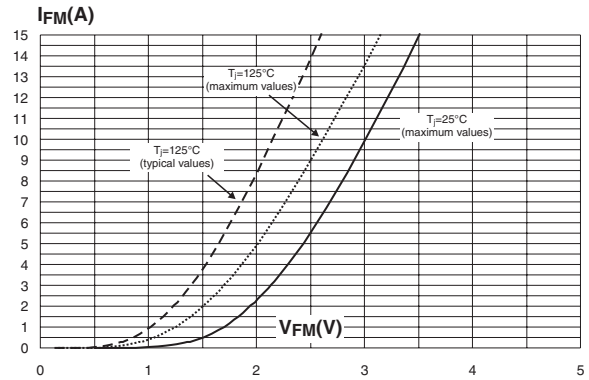


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration (DO-41)

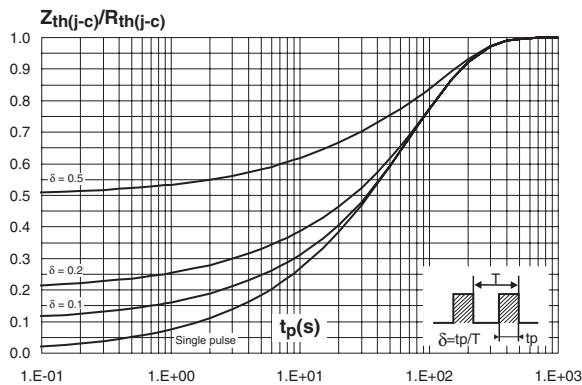


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration (SMA)

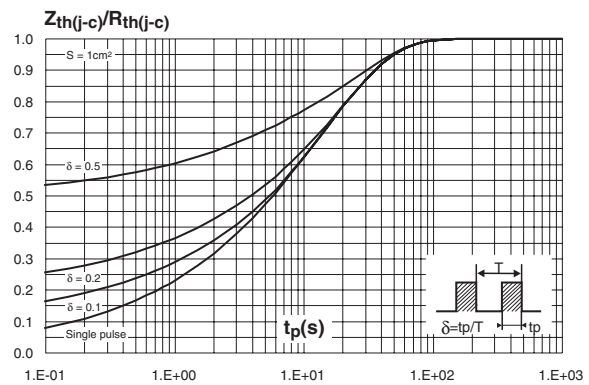


Figure 5: Relative variation of thermal impedance junction to case versus pulse duration (SMB)

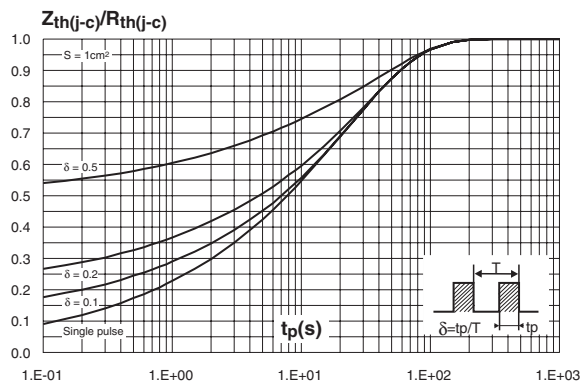


Figure 6: Peak reverse recovery current versus di_F/dt (typical values)

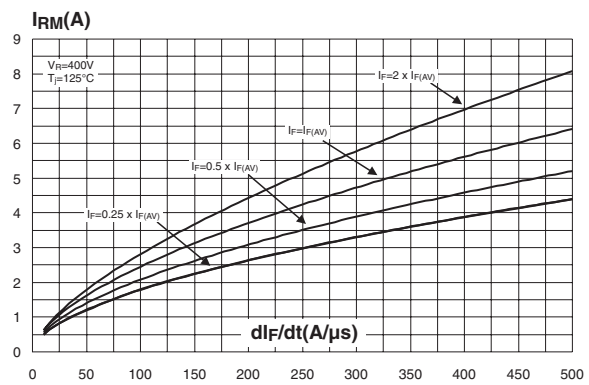


Figure 7: Reverse recovery time versus di_F/dt (typical values)

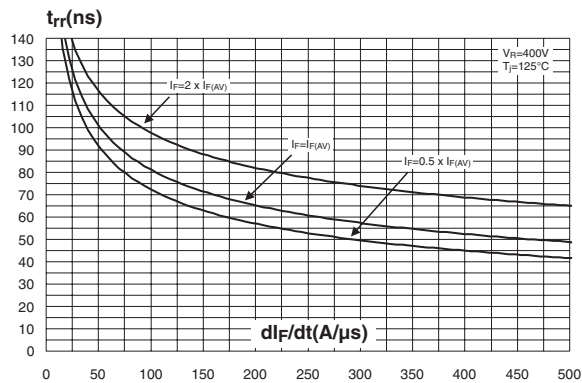


Figure 8: Reverse recovery charges versus di_F/dt (typical values)

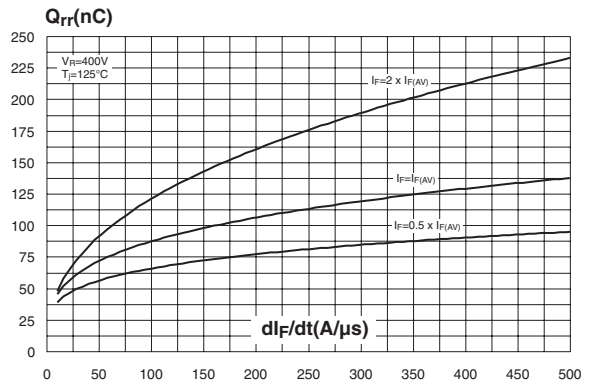


Figure 9: Reverse recovery softness factor versus di_F/dt (typical values)

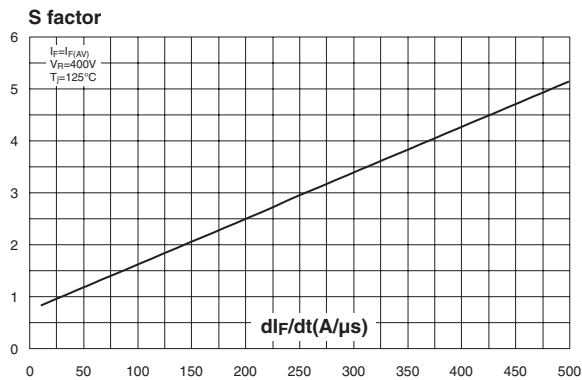


Figure 10: Relative variations of dynamic parameters versus junction temperature

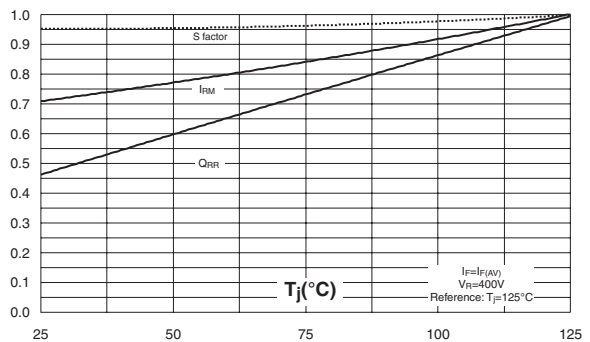


Figure 11: Transient peak forward voltage versus di_F/dt (typical values)

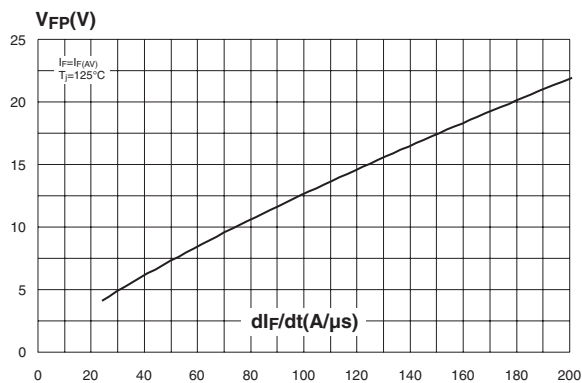


Figure 12: Forward recovery time versus di_F/dt (typical values)

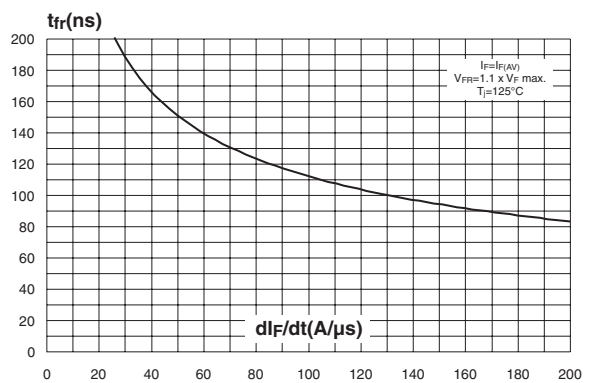


Figure 13: Junction capacitance versus reverse voltage applied (typical values)

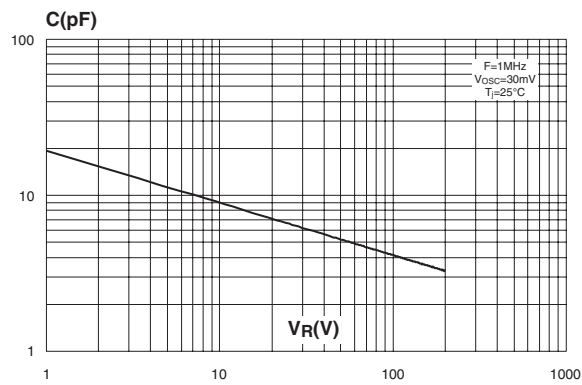


Figure 14: Thermal resistance junction to ambient versus copper surface under each lead (epoxy FR4, $e_{Cu}=35\mu\text{m}$) (DO-41, SMB)

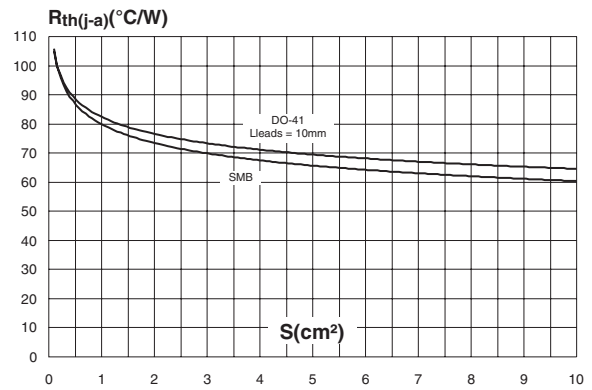


Figure 15: Thermal resistance junction to ambient versus copper surface under each lead (epoxy FR4, $e_{Cu}=35\mu\text{m}$) (SMA)

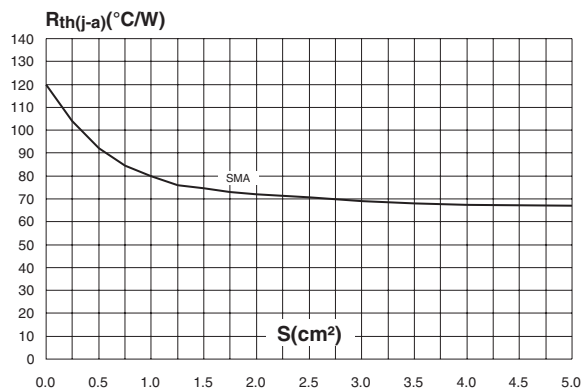


Figure 16: SMA Package Mechanical Data

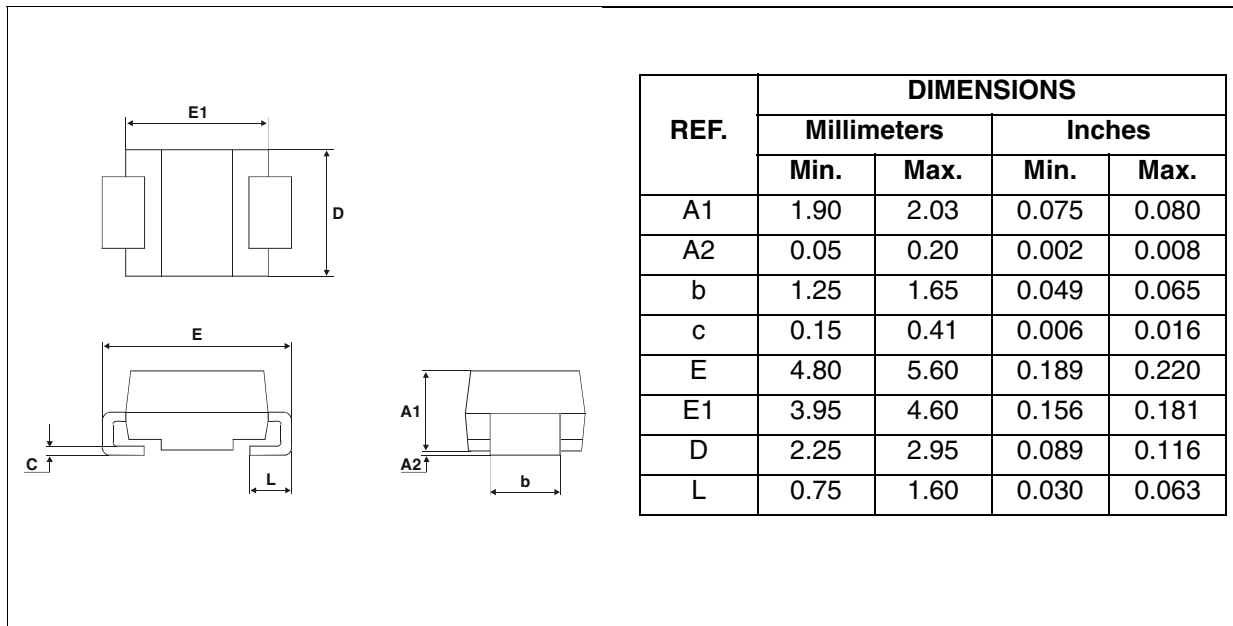


Figure 17: SMA Foot Print Dimensions
(in millimeters)

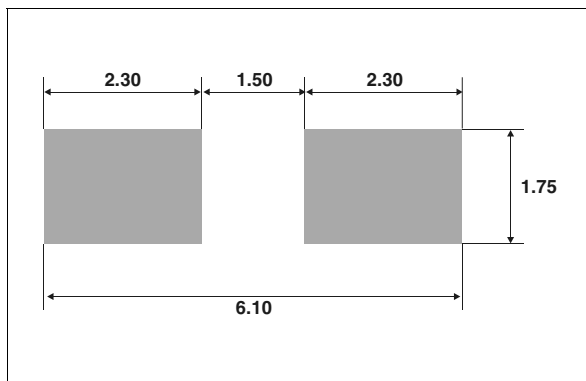


Figure 18: SMB Package Mechanical Data

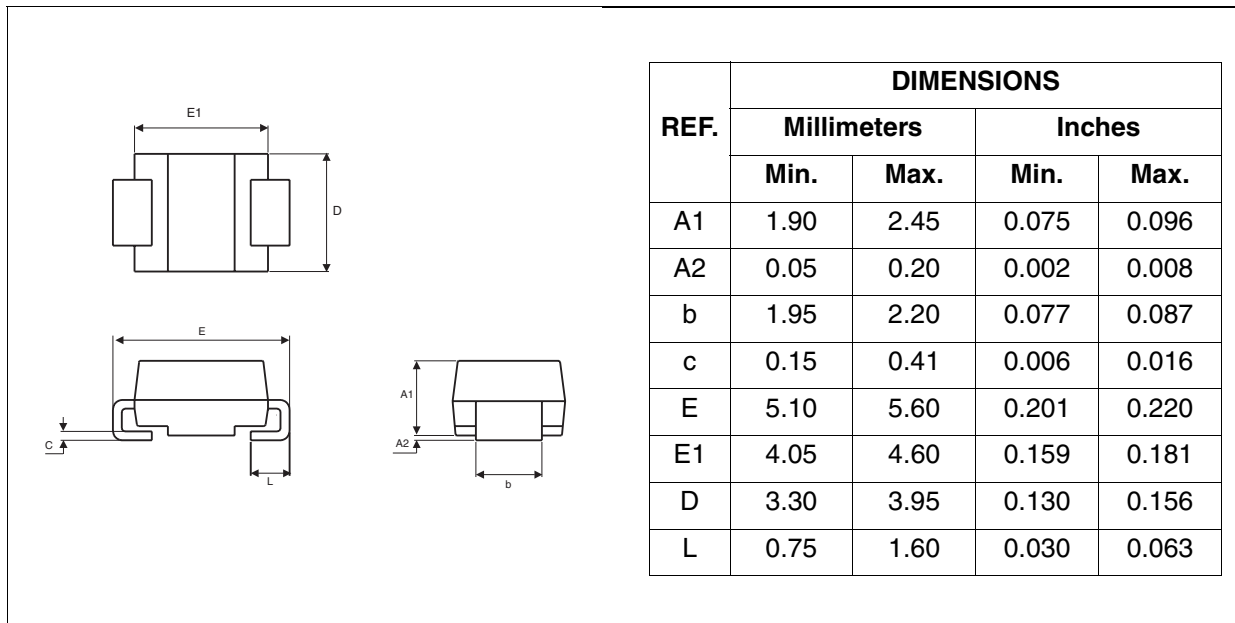
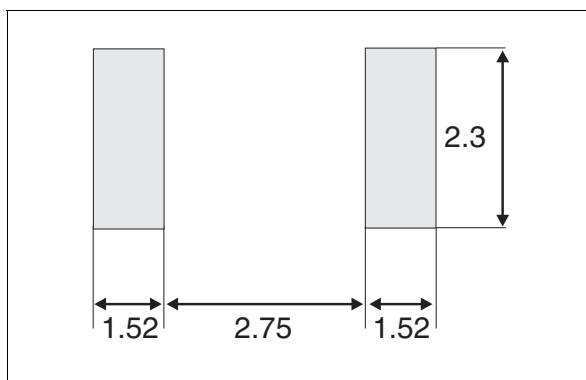
Figure 19: SMB Foot Print Dimensions
(in millimeters)

Figure 20: DO-41 Package Mechanical Data

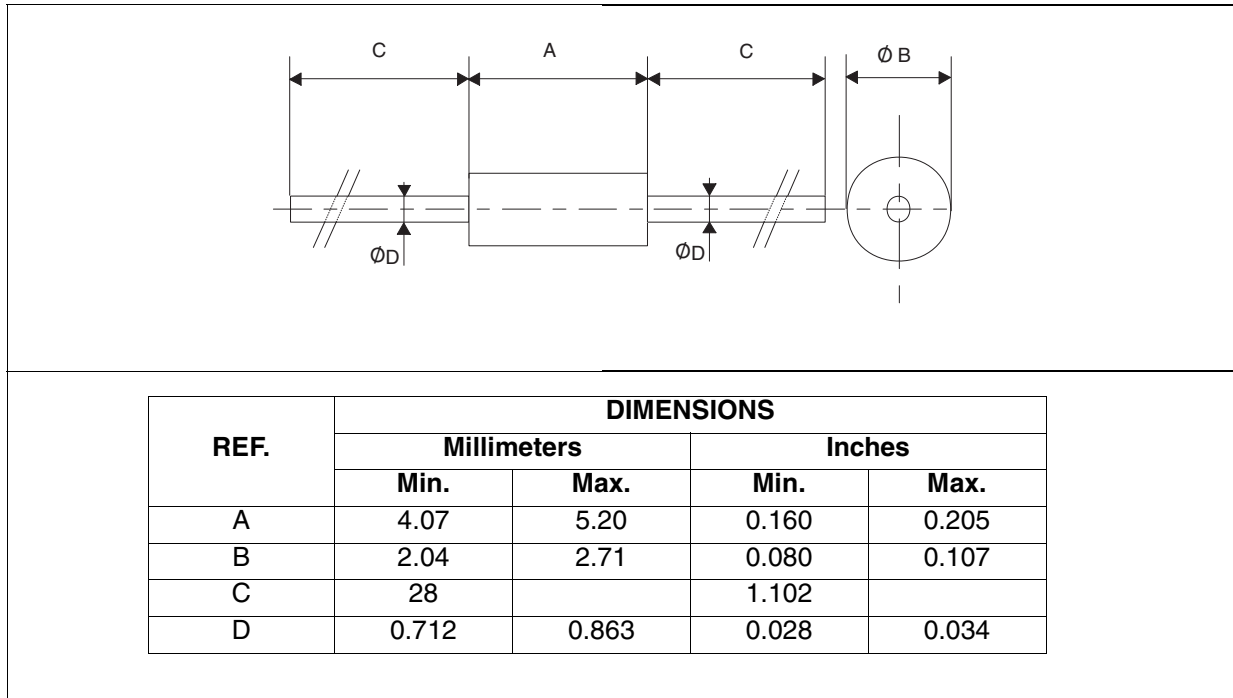


Table 7: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH1R06	STTH1R06	DO-41	0.34 g	2000	Ammopack
STTH1R06RL	STTH1R06	DO-41	0.34 g	5000	Tape & reel
STTH1R06A	AR6	SMA	0.068 g	5000	Tape & reel
STTH1R06B	BR6	SMB	0.11 g	2500	Tape & reel

- Epoxy meets UL94, V0

Table 8: Revision History

Date	Revision	Description of Changes
Apr-2003	1	First issue
07-Sep-2004	2	DO-41 and SMA packages added
24-Feb-2005	3	SMA package dimensions update. Reference A1 max. changed from 2.70mm (0.106inc.) to 2.03mm (0.080).

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