

## HIGH EFFICIENCY ULTRAFAST DIODE

**Table 1: Main Product Characteristics**

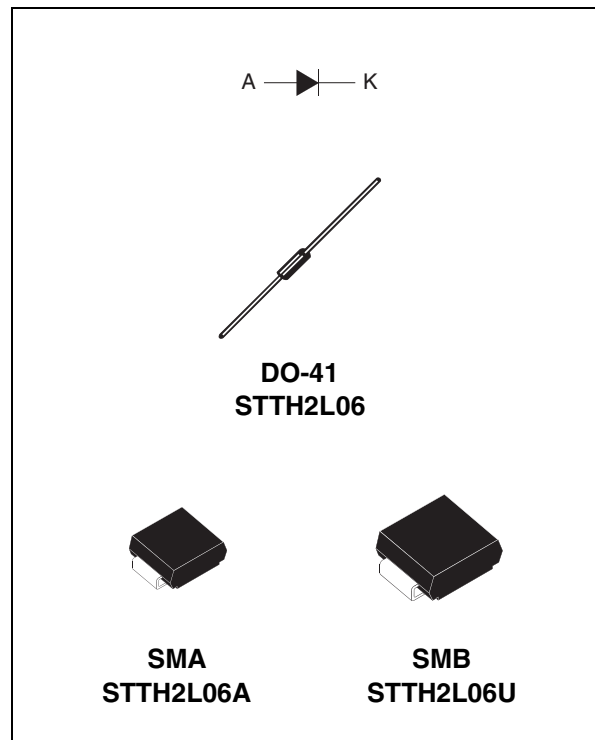
$I_{F(AV)}$	2 A
$V_{RRM}$	600 V
$T_j$	175°C
$V_F$ (typ)	0.85 V
$t_{rr}$ (typ)	60 ns

**FEATURES AND BENEFITS**

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

**DESCRIPTION**

The STTH2L06 is using ST Turbo 2 600V planar Pt doping technology. It is specially suited for SMPS and base drive transistor circuits. Packaged in axial, SMA and SMB, this device is intended for use in high frequency inverters, free wheeling and polarity protection.



**Table 2: Order Codes**

Part Number	Marking
STTH2L06	STTH2L06
STTH2L06RL	STTH2L06

Part Number	Marking
STTH2L06A	L6A
STTH2L06U	L6U

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

Symbol	Parameter		Value	Unit	
$V_{RRM}$	Repetitive peak reverse voltage		600	V	
$I_{F(RMS)}$	RMS forward current		7	A	
$I_{F(AV)}$	Average forward current $\delta = 0.5$	DO-41	$T_I = 90^\circ\text{C}$	2	A
		SMA	$T_I = 100^\circ\text{C}$	2	
		SMB	$T_I = 115^\circ\text{C}$	2	
$I_{FSM}$	Surge non repetitive forward current	DO-41	$t_p = 10\text{ms}$ sinusoidal	45	A
		SMA / SMB		35	
$T_{stg}$	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	DO-41 L = 5 mm	35	°C/W
		SMA	30	
		SMB	25	

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	$T_j = 25^\circ\text{C}$	$I_F = 2\text{A}$			1.3	V
		$T_j = 150^\circ\text{C}$		0.85	1.05		

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

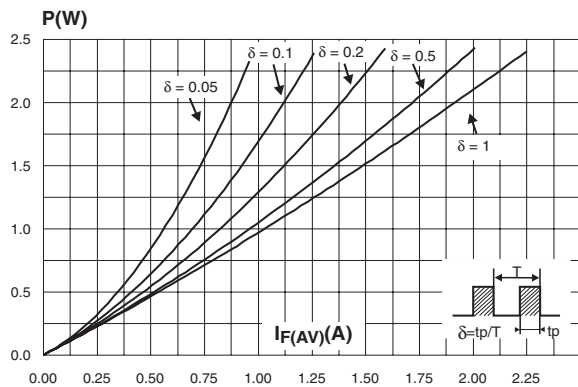
\*\*  $t_p = 380\ \mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:  $P = 0.89 \times I_{F(AV)} + 0.08 I_F^2(\text{RMS})$

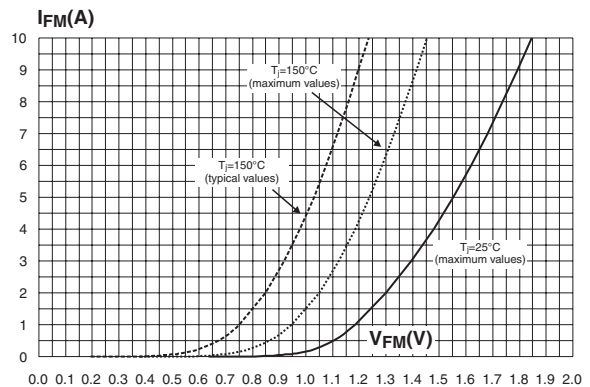
Table 6: Dynamic Characteristics

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	$T_j = 25^\circ\text{C}$	$I_F = 2\text{A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$				100	ns
$V_{FP}$	Forward recovery voltage						9	V

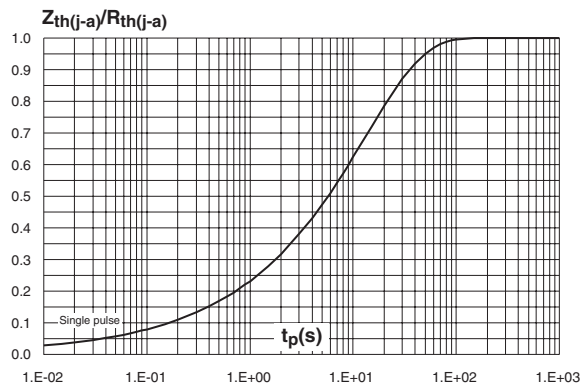
**Figure 1: Conduction losses versus average forward current**



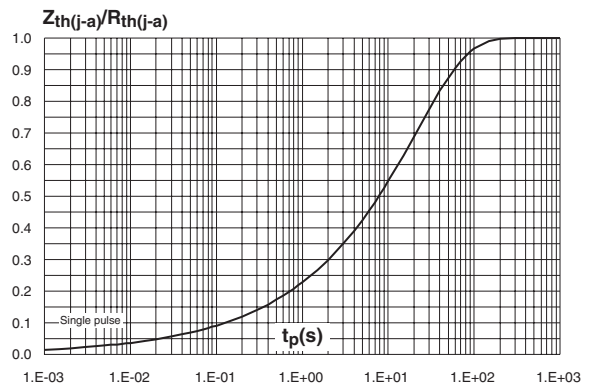
**Figure 2: Forward voltage drop versus forward current**



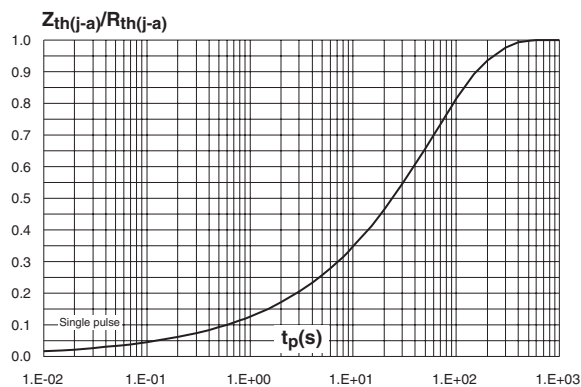
**Figure 3: Relative variation of thermal impedance junction to case versus pulse duration (SMA - S<sub>CU</sub> = 1cm<sup>2</sup>)**



**Figure 4: Relative variation of thermal impedance junction to case versus pulse duration (SMB - S<sub>CU</sub> = 1cm<sup>2</sup>)**



**Figure 5: Relative variation of thermal impedance junction to case versus pulse duration (DO-41)**



**Figure 6: Peak reverse recovery current versus di\_F/dt (typical values)**

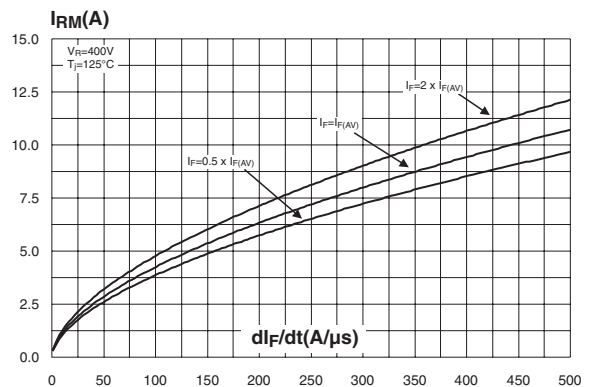


Figure 7: Reverse recovery time versus  $di_F/dt$  (typical values)

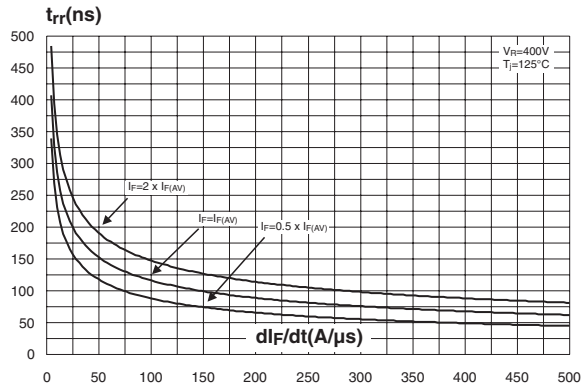


Figure 8: Reverse recovery charges versus  $di_F/dt$  (typical values)

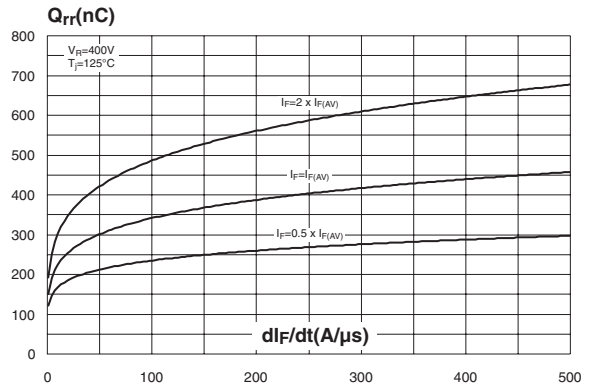


Figure 9: Relative variations of dynamic parameters versus junction temperature

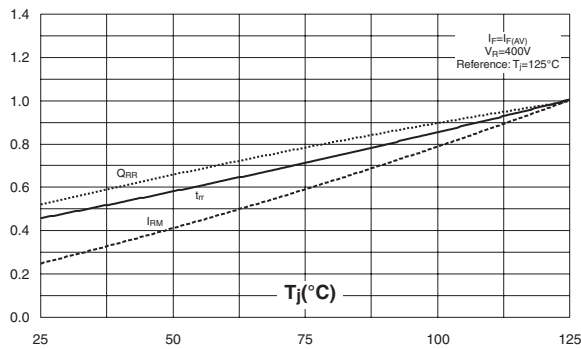


Figure 10: Transient peak forward voltage versus  $di_F/dt$  (typical values)

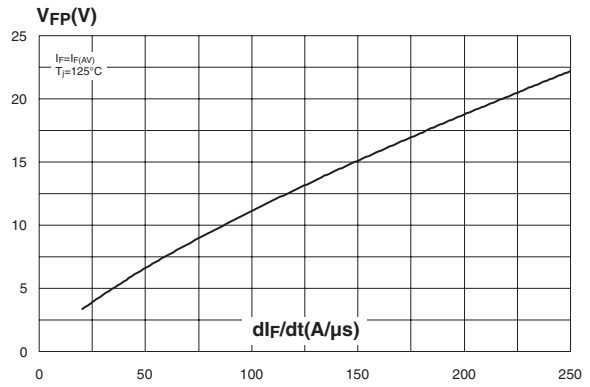


Figure 11: Forward recovery time versus  $di_F/dt$  (typical values)

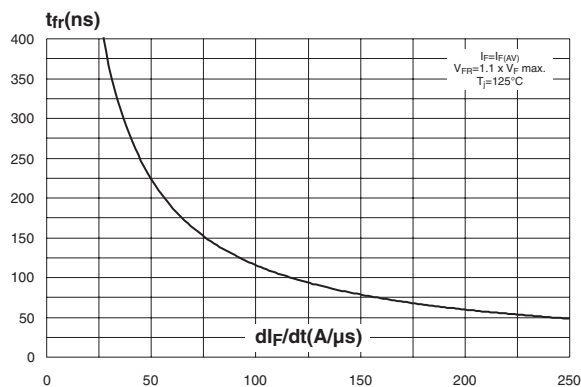


Figure 12: Junction capacitance versus reverse voltage applied (typical values)

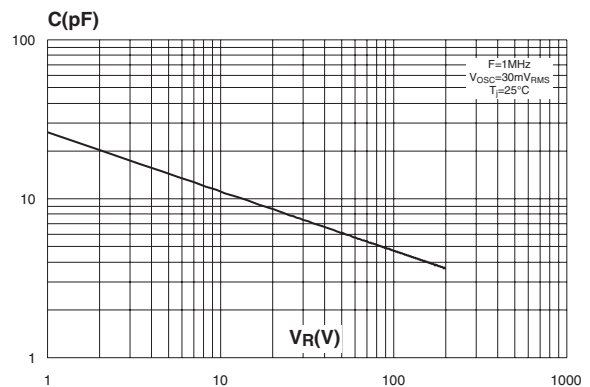


Figure 13: Thermal resistance junction to ambient versus copper surface under tab (epoxy FR4,  $e_{Cu}=35\mu m$ ) (SMA / SMB)

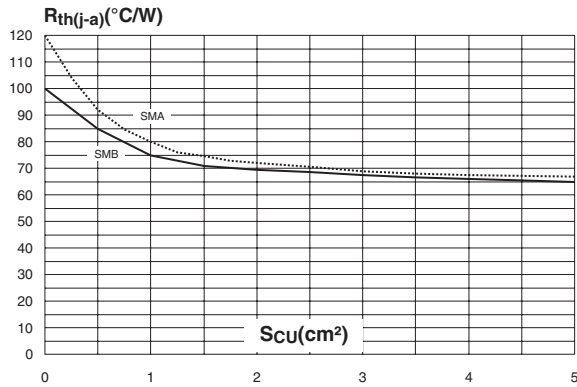


Figure 14: Thermal resistance versus lead length (DO-41)

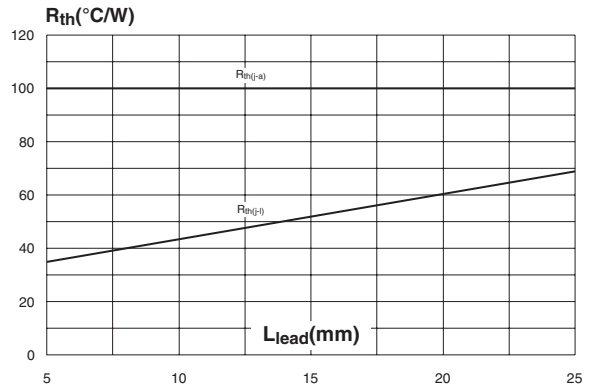


Figure 15: SMA Package Mechanical Data

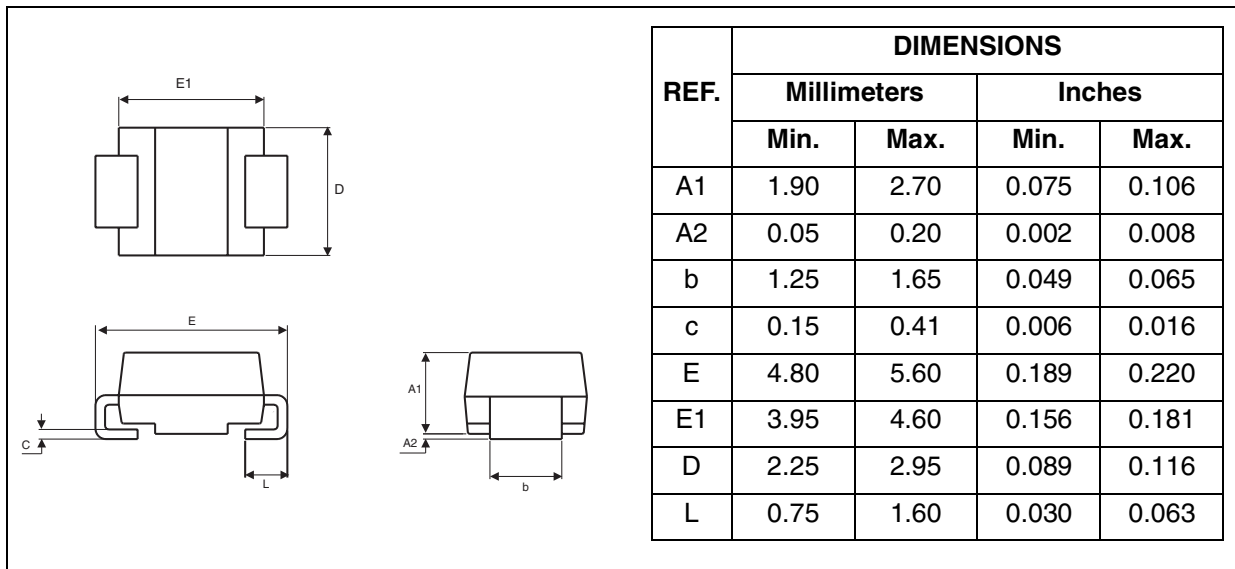


Figure 16: SMA Foot Print Dimensions (in millimeters)

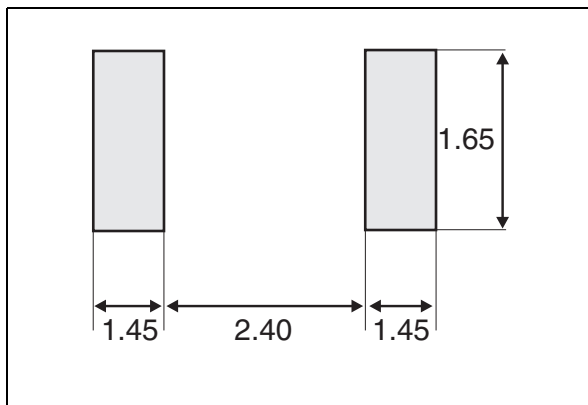


Figure 17: SMB Package Mechanical Data

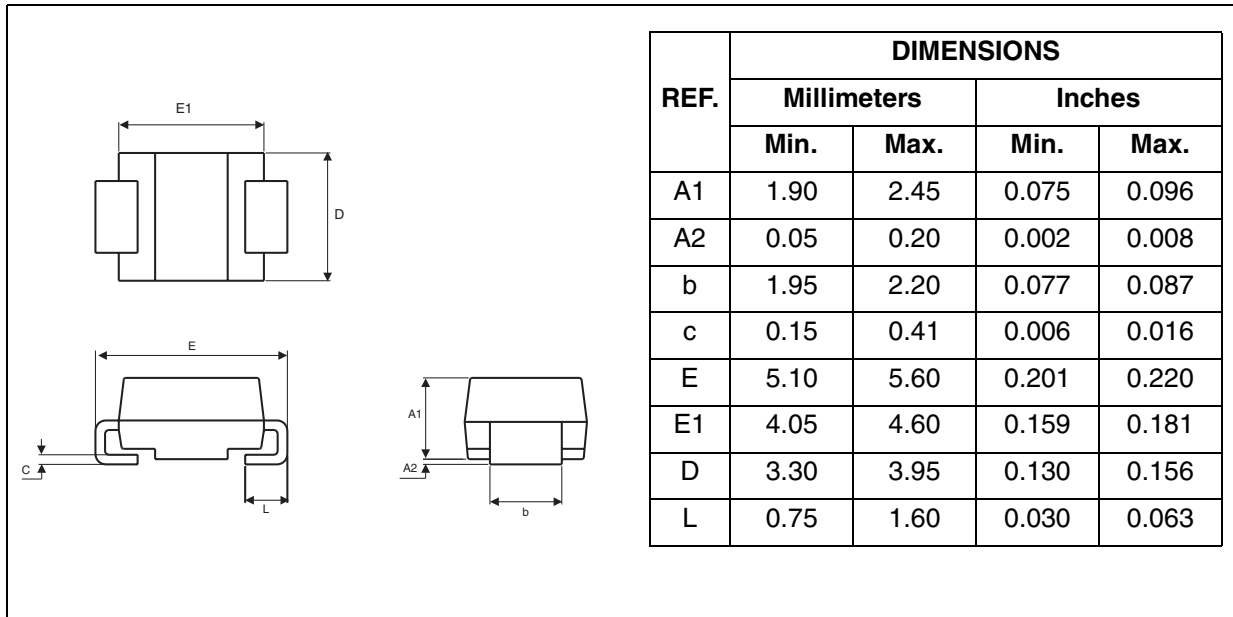


Figure 18: SMB Foot Print Dimensions  
(in millimeters)

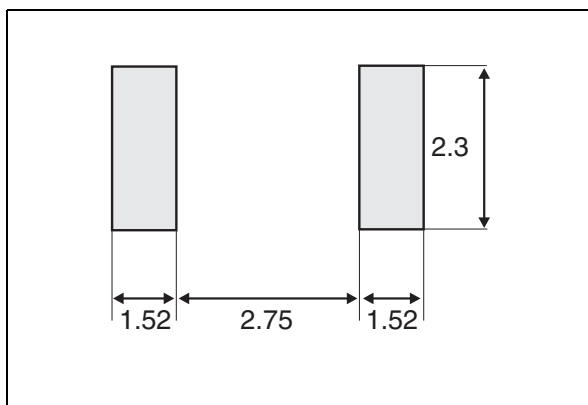


Figure 19: DO-41 Package Mechanical Data

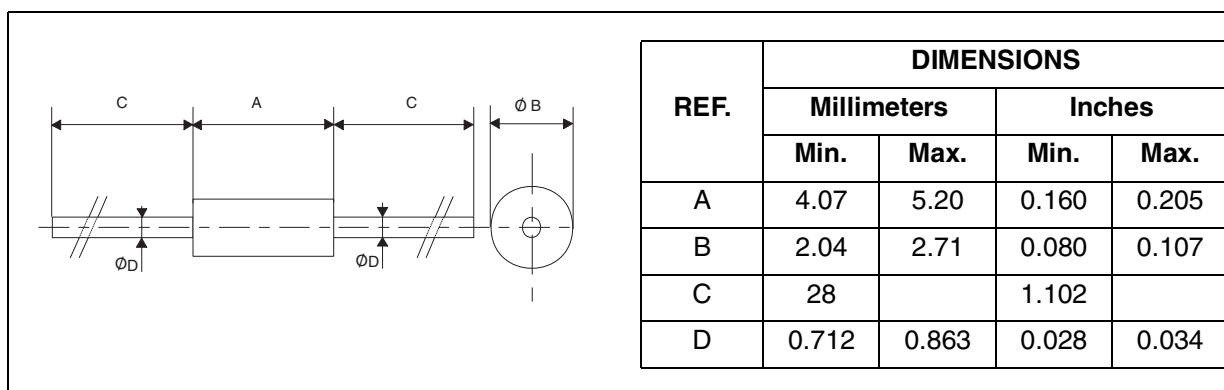


Table 7: Ordering Information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
STTH2L06	STTH2L06	DO-41	0.34 g	2000	Ammopack
STTH2L06RL	STTH2L06	DO-41	0.34 g	5000	Tape & reel
STTH2L06A	L6A	SMA	0.068 g	5000	Tape & reel
STTH2L06U	L6U	SMB	0.11 g	2500	Tape & reel

Table 8: Revision History

Date	Revision	Description of Changes
07-Sep-2004	1	First issue

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