

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 and SMB, this device is intended for use in high frequency inverters, free wheeling and polarity protection.

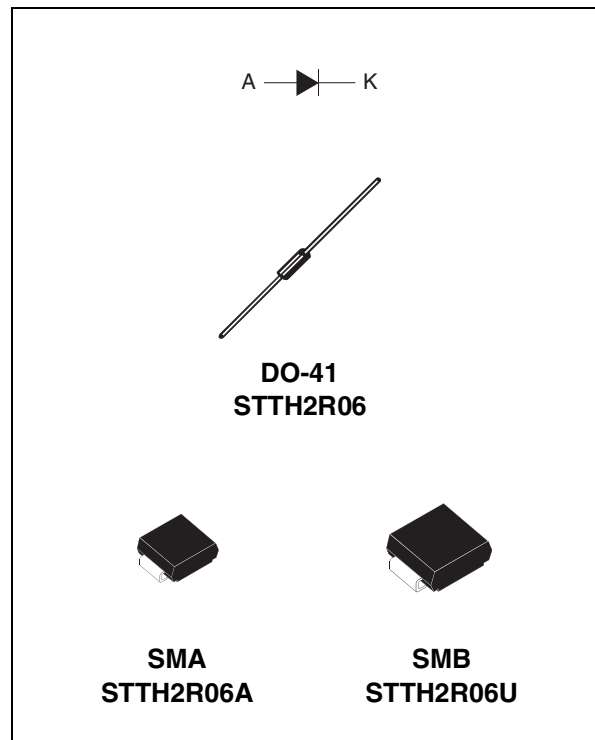


Table 2: Order Codes

Part Number	Marking
STTH2R06	STTH2R06
STTH2R06RL	STTH2R06

Part Number	Marking
STTH2R06A	R6A
STTH2R06U	R6U

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	$T_I = 70^\circ\text{C}$	2	A
		SMA	$T_I = 85^\circ\text{C}$	2	
		SMB	$T_I = 100^\circ\text{C}$	2	
I_{FSM}	Surge non repetitive forward current	DO-41	$t_p = 10\text{ms}$ sinusoidal	40	A
		SMA / SMB		30	
T_{stg}	Storage temperature range		-65 to + 175	°C	
T_j	Maximum operating junction temperature		175	°C	

STTH2R06

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	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: $P = 1 \times I_{F(AV)} + 0.125 I_F^2(\text{RMS})$

Table 6: Dynamic Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25^\circ\text{C}$	$I_F = 0.5\text{A}$ $I_{rr} = 0.25\text{A}$ $I_R = 1\text{A}$			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

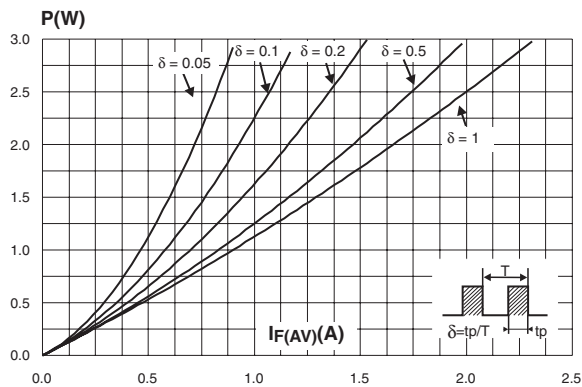


Figure 2: Forward voltage drop versus forward current

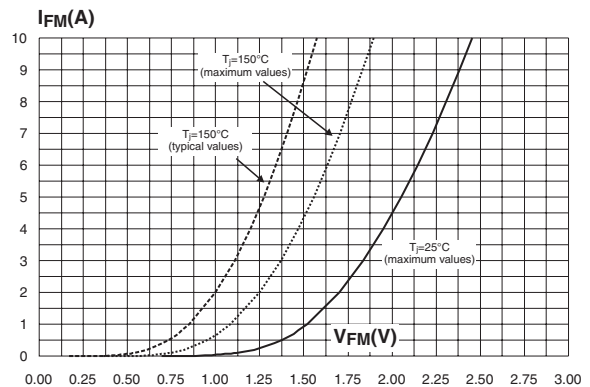


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration (SMA - $S_{CU} = 1\text{cm}^2$)

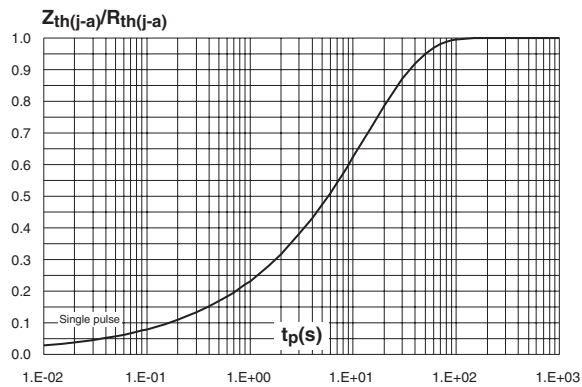


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration (SMB - $S_{CU} = 1\text{cm}^2$)

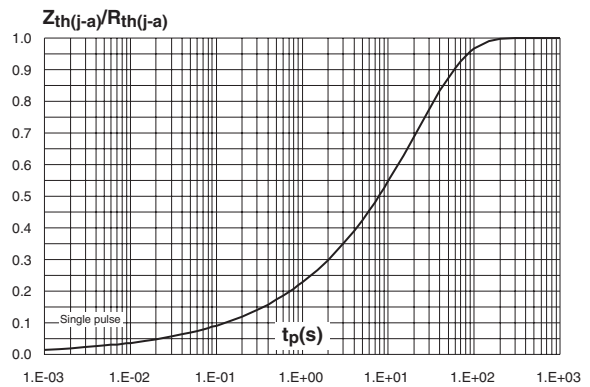


Figure 5: Relative variation of thermal impedance junction to case versus pulse duration (DO-41)

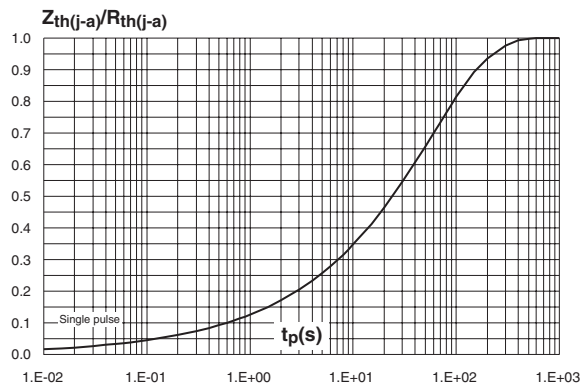


Figure 6: Peak reverse recovery current versus dI_F/dt (typical values)

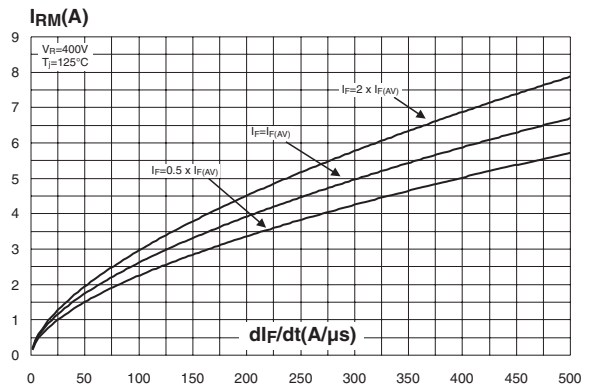


Figure 7: Reverse recovery time versus di_F/dt (typical values)

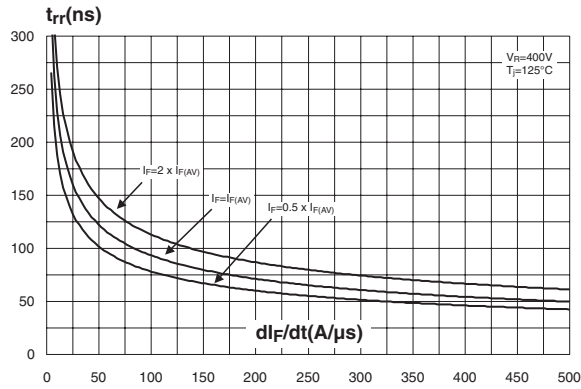


Figure 8: Reverse recovery charges versus di_F/dt (typical values)

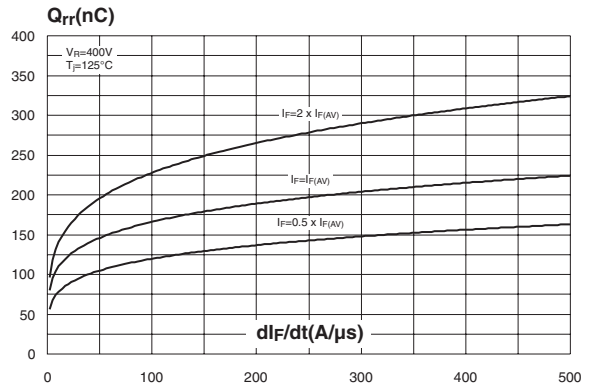


Figure 9: Relative variations of dynamic parameters versus junction temperature

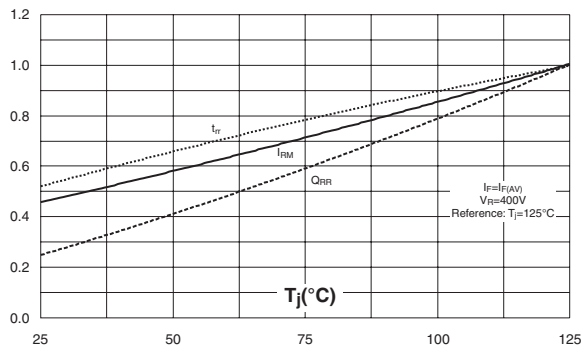


Figure 10: Transient peak forward voltage versus di_F/dt (typical values)

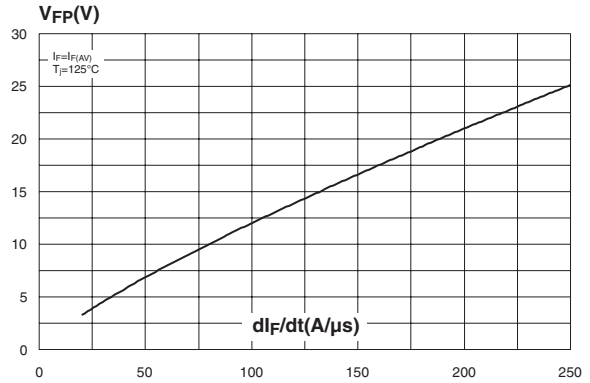


Figure 11: Forward recovery time versus di_F/dt (typical values)

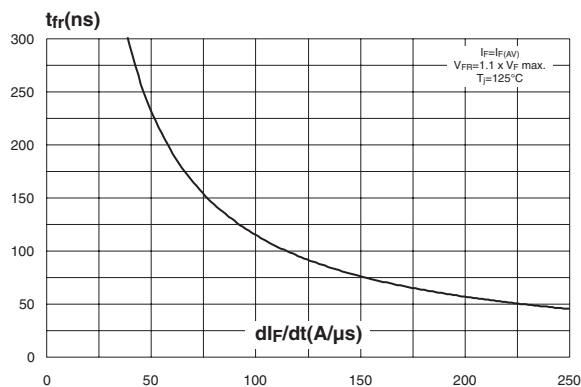


Figure 12: Junction capacitance versus reverse voltage applied (typical values)

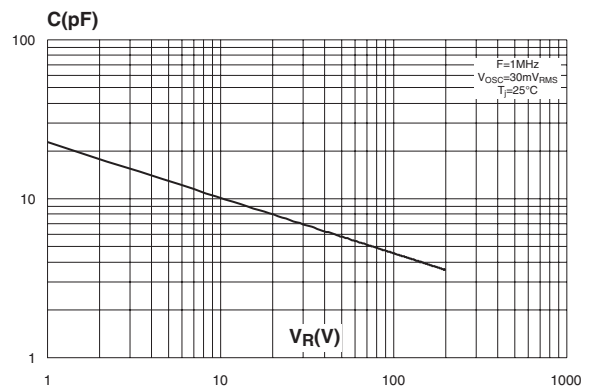


Figure 13: Thermal resistance junction to ambient versus copper surface under each lead (epoxy FR4, $e_{Cu}=35\mu m$) (SMA / SMB)

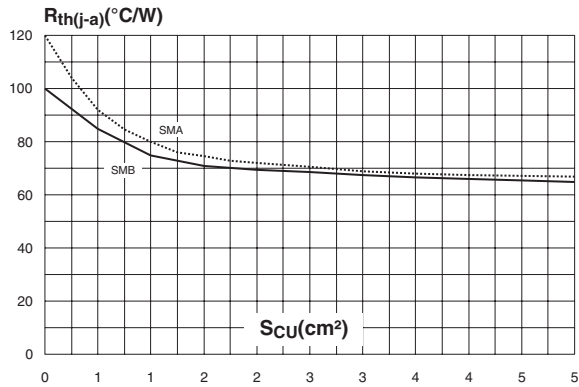


Figure 14: Thermal resistance versus lead length (DO-41)

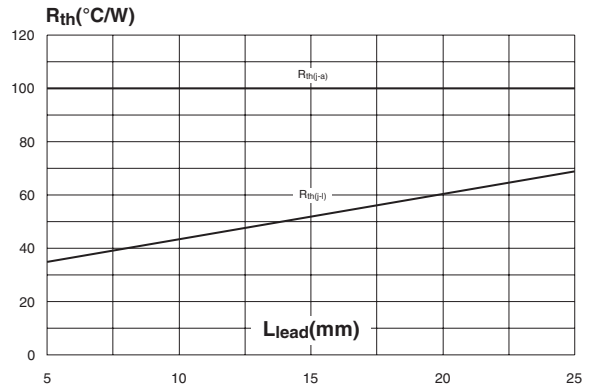


Figure 15: SMA Package Mechanical Data

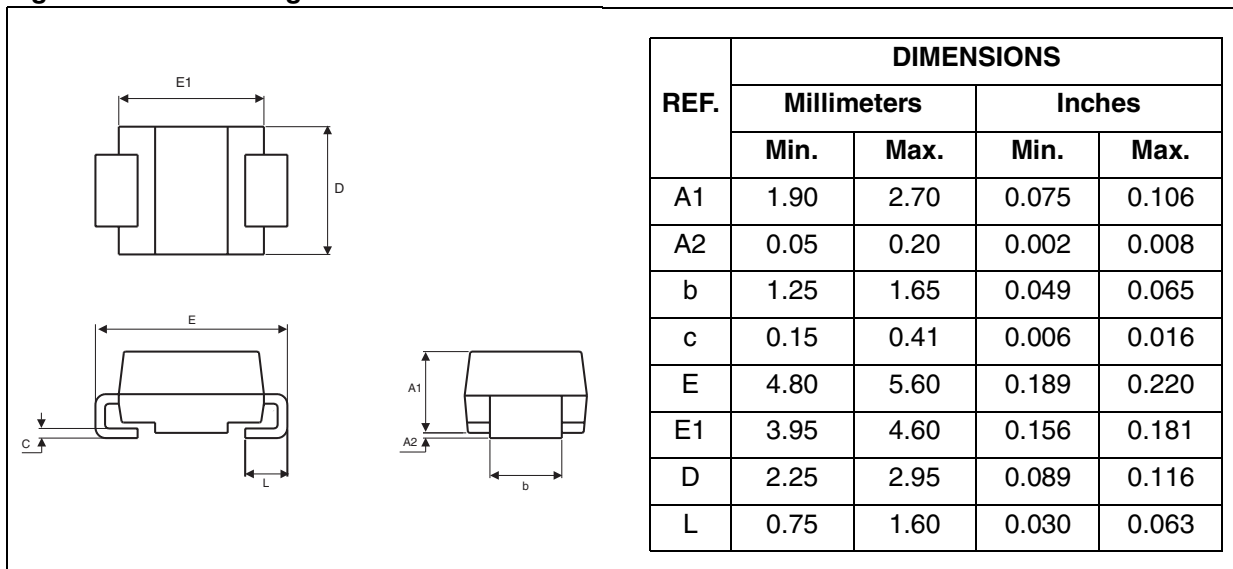


Figure 16: SMA Foot Print Dimensions (in millimeters)

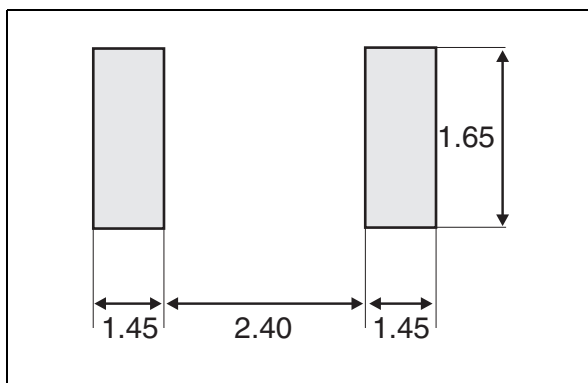


Figure 17: SMB Package Mechanical Data

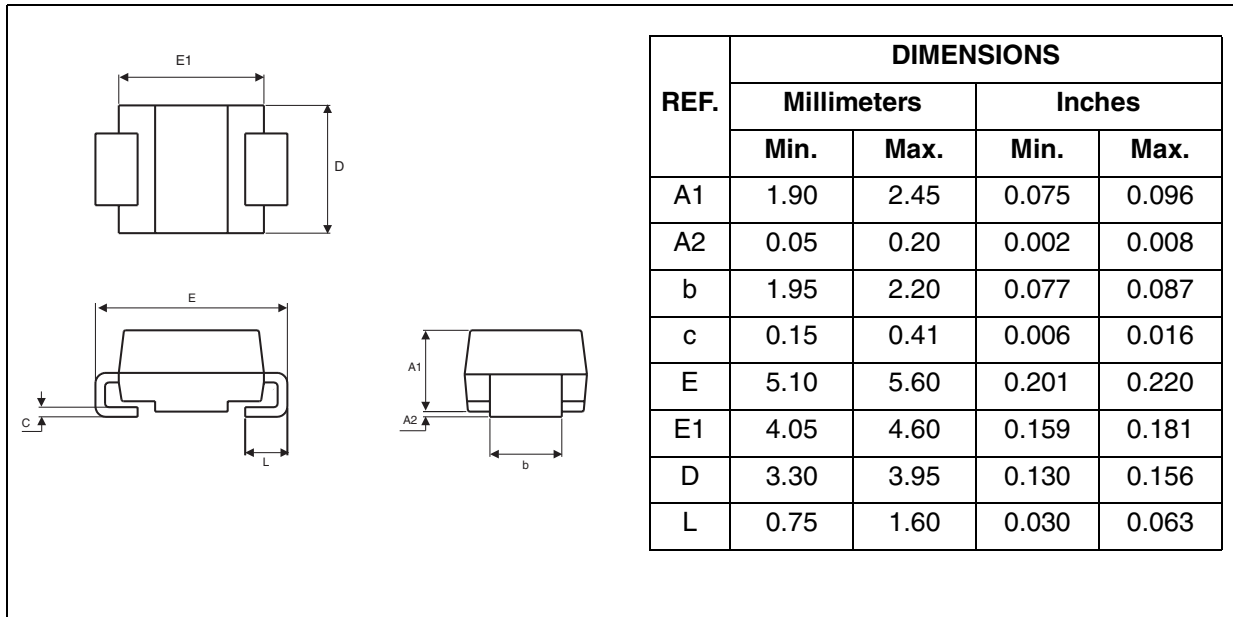


Figure 18: SMB Foot Print Dimensions
(in millimeters)

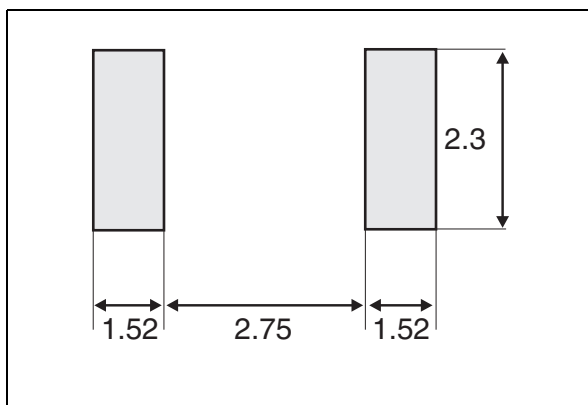


Figure 19: DO-41 Package Mechanical Data

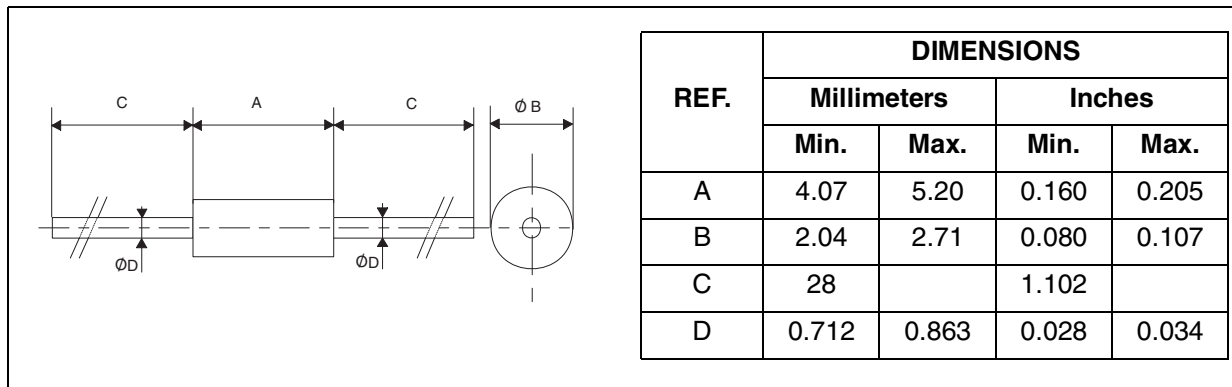


Table 7: Ordering Information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
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

Table 8: Revision History

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

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