



# STTH2R06

## HIGH EFFICIENCY ULTRAFAST DIODE

**Table 1: Main Product Characteristics**

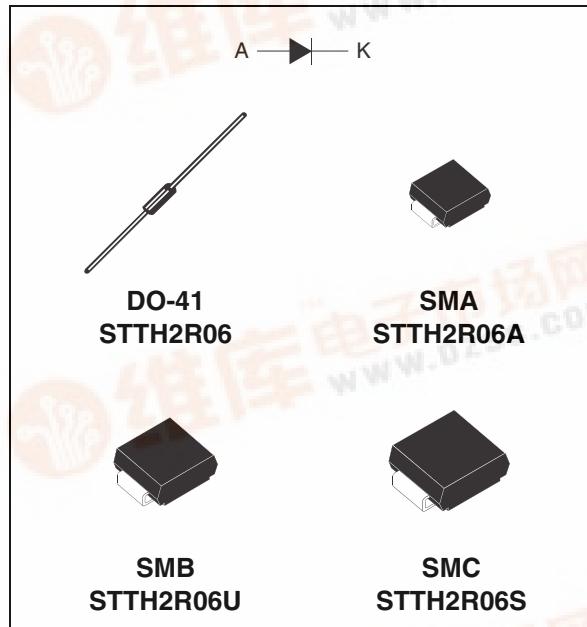
$I_{F(AV)}$	2 A
$V_{RRM}$	600 V
$T_j$	175°C
$V_F$ (typ)	1 V
$t_{rr}$ (typ)	35 ns

### 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

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**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	$\text{V}$
		$T_j = 150^\circ\text{C}$			1.0	1.25	

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

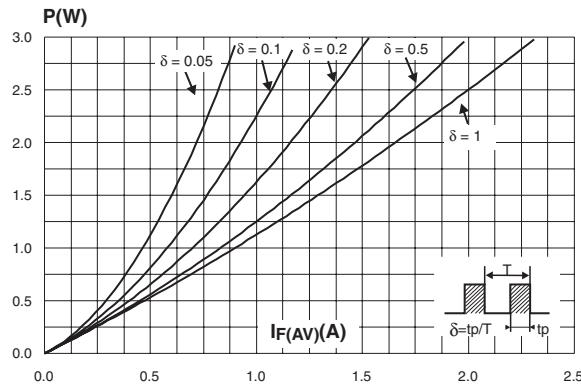
\*\*  $t_p = 380 \mu\text{s}$ ,  $\delta < 2\%$

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

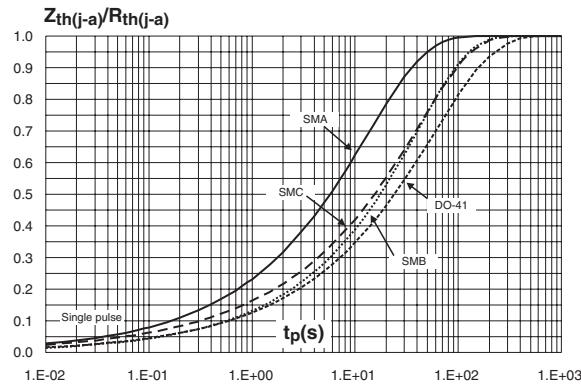
**Table 6: Dynamic Characteristics**

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

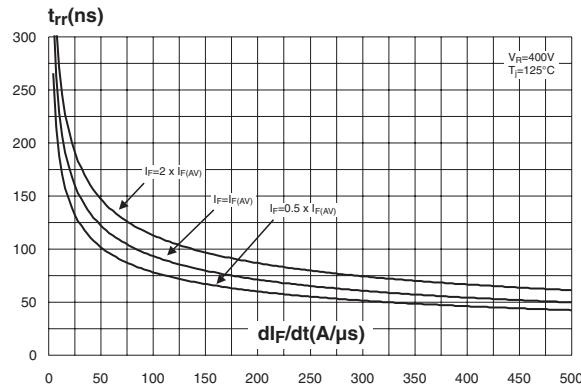
**Figure 1: Conduction losses versus average forward current**



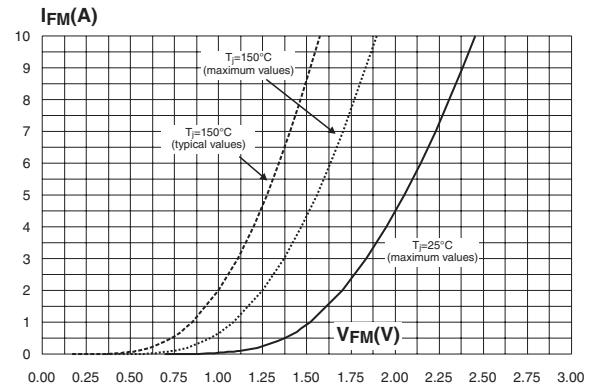
**Figure 3: Relative variation of thermal impedance junction to case versus pulse duration (SMA/SMB/SMC:  $S_{CU} = 1\text{cm}^2$ )**



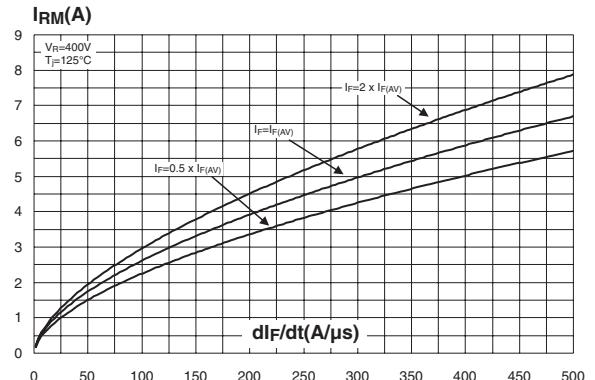
**Figure 5: Reverse recovery time versus  $dl_F/dt$  (typical values)**



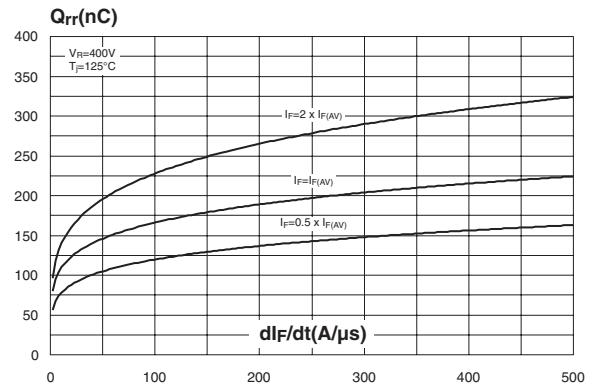
**Figure 2: Forward voltage drop versus forward current**



**Figure 4: Peak reverse recovery current versus  $dl_F/dt$  (typical values)**

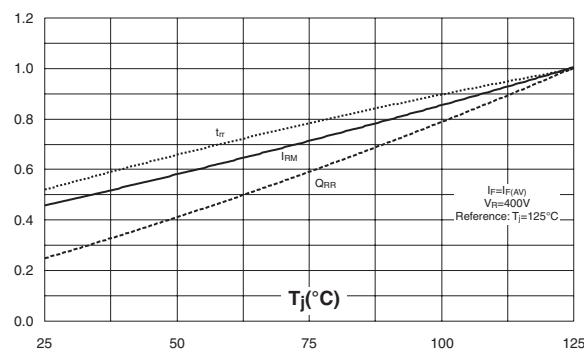


**Figure 6: Reverse recovery charges versus  $dl_F/dt$  (typical values)**

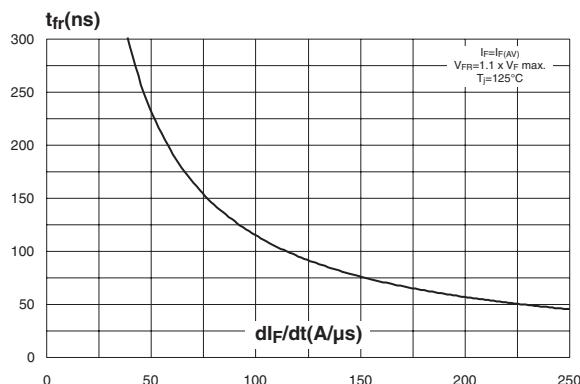


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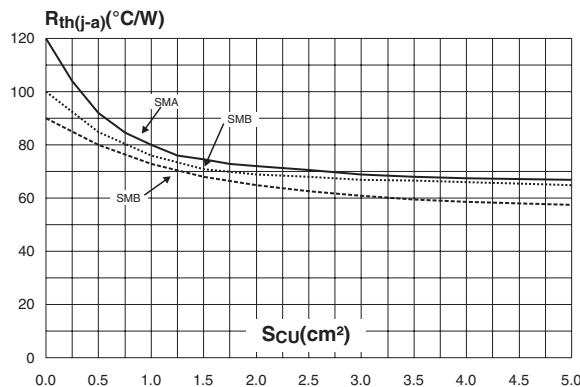
**Figure 7: Relative variations of dynamic parameters versus junction temperature**



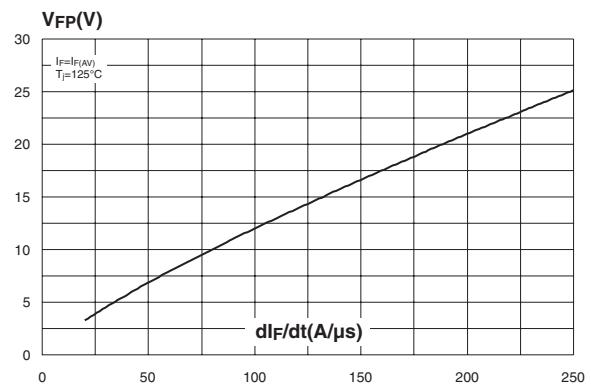
**Figure 9: Forward recovery time versus  $dI_F/dt$  (typical values)**



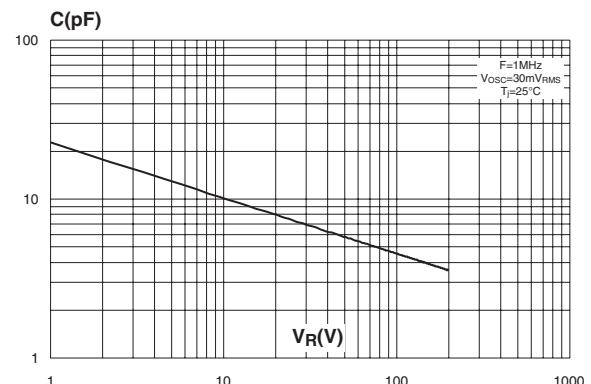
**Figure 11: Thermal resistance junction to ambient versus copper surface under each lead (epoxy FR4,  $e_{\text{CU}}=35\mu\text{m}$ ) (SMA/SMB/SMC)**



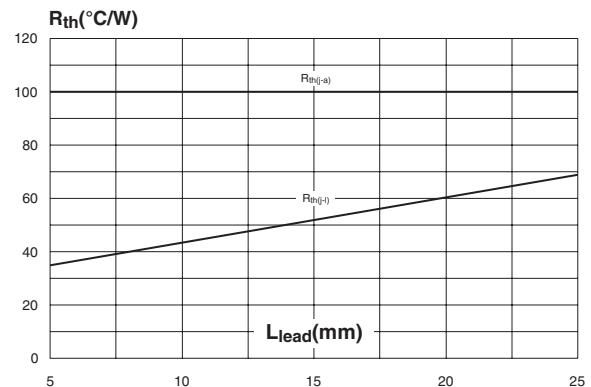
**Figure 8: Transient peak forward voltage versus  $dI_F/dt$  (typical values)**



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



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

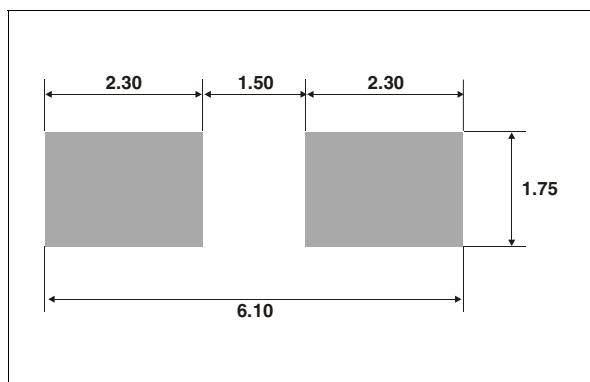


**Figure 13: SMA Package Mechanical Data**

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.03	0.075	0.080
A2	0.05	0.20	0.002	0.008
b	1.25	1.65	0.049	0.065
c	0.15	0.41	0.006	0.016
E	4.80	5.60	0.189	0.220
E1	3.95	4.60	0.156	0.181
D	2.25	2.95	0.089	0.116
L	0.75	1.60	0.030	0.063

**Figure 14: SMA Foot Print Dimensions**

(in millimeters)



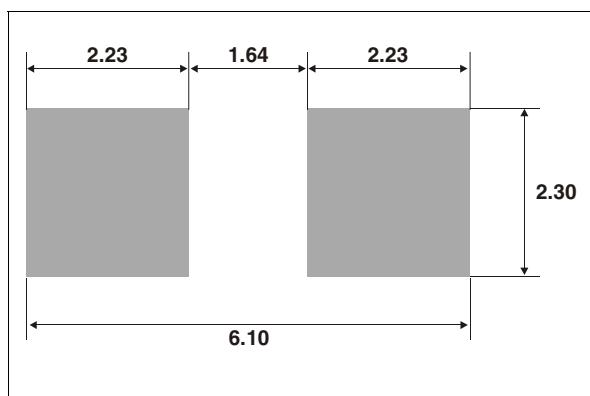
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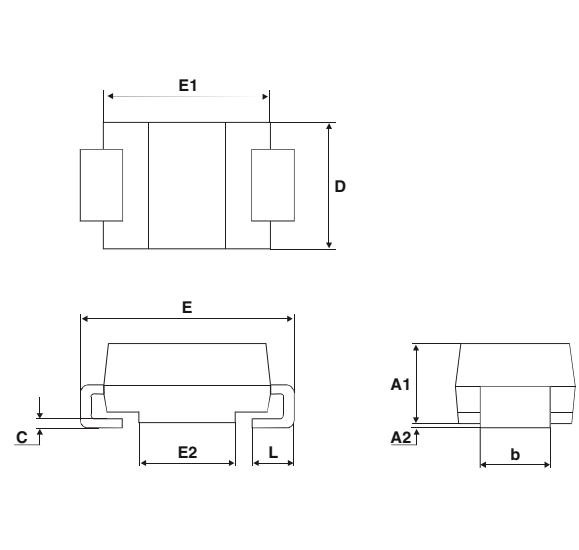
Figure 15: SMB Package Mechanical Data

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	1.95	2.20	0.077	0.087
c	0.15	0.41	0.006	0.016
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
D	3.30	3.95	0.130	0.156
L	0.75	1.60	0.030	0.063

Figure 16: SMB Foot Print Dimensions

(in millimeters)

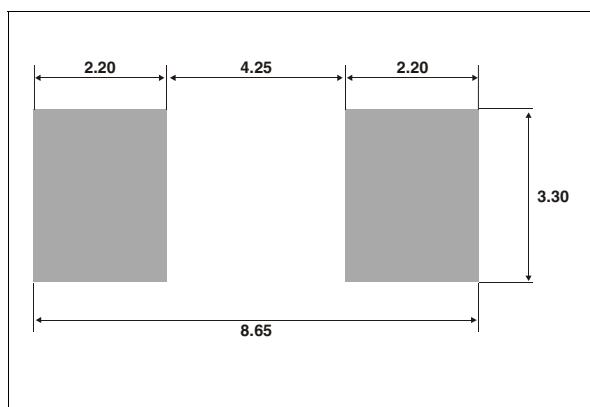


**Figure 17: SMC Package Mechanical Data**


REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	2.90	3.2	0.114	0.126
c	0.15	0.41	0.006	0.016
E	7.75	8.15	0.305	0.321
E1	6.60	7.15	0.260	0.281
E2	4.40	4.70	0.173	0.185
D	5.55	6.25	0.218	0.246
L	0.75	1.60	0.030	0.063

**Figure 18: SMC Foot Print Dimensions**

(in millimeters)



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**Figure 19: DO-41 Package Mechanical Data**

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.07	5.20	0.160	0.205
B	2.04	2.71	0.080	0.107
C	28		1.102	
D	0.712	0.863	0.028	0.034

**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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