

### STTH2R06

### High efficiency ultrafast diode

### **Features**

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

### **Description**

The STTH2R06 uses ST Turbo 2 600 V planar Pt doping technology. It is specially suited for switching mode base drive and transistor circuits. Packaged in axial, SMA, SMB and SMC, this device is intended for use in high frequency inverters, free wheeling and polarity protection.

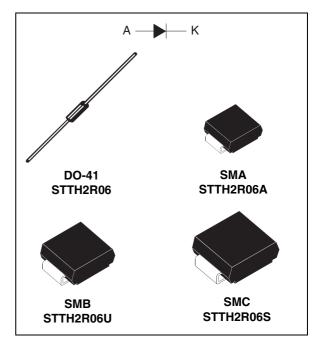


Table 1. Device summary

Symbol	Value
I <sub>F(AV)</sub>	2 A
V <sub>RRM</sub>	600 V
Tj	175 °C
V <sub>F</sub> (typ)	1.0 V
t <sub>rr</sub> (typ)	35 ns

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Table 2. Absolute ratings (limiting values)

Symbol	Paramete	Parameter				
$V_{RRM}$	Repetitive peak reverse voltage	Repetitive peak reverse voltage			V	
I <sub>F(RMS)</sub>	Forward rms current			7	Α	
		DO-41	T <sub>L</sub> = 70 °C		А	
	Average forward ourrent S = 0.5	SMA	T <sub>L</sub> = 85 °C	2		
I <sub>F(AV)</sub>	Average forward current $\delta = 0.5$	SMB	T <sub>L</sub> = 100 °C	2		
		SMC	T <sub>L</sub> = 115 °C			
		DO-41	t = 10ma	40		
I <sub>FSM</sub>	Surge non repetitive forward current		t <sub>p</sub> = 10ms sinusoidal	30	Α	
T <sub>stg</sub>	Storage temperature range			-65 to + 175	°C	
T <sub>j</sub>	Operating junction temperature range			-40 to + 175	°C	

Table 3. Thermal resistance

Symbol	F	arameter	Maximum	Unit
		DO-41 L = 5 mm	35	
Ь	Junction to lead	SMA	30	°C/W
$R_{th(j-l)}$	Junction to lead	SMB	25	C/VV
		SMC	20	

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage	T <sub>j</sub> = 25 °C	V <sub>R</sub> = V <sub>RRM</sub>	-	-	2	μA
'R`	current	$T_j = 150 ^{\circ}\text{C}$ $V_R = V_{RR}$	VR - VRRM	-	12	85	μΛ
V <sub>E</sub> <sup>(2)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 2 A	-	-	1.7	V
VF`	Forward voltage drop	T <sub>j</sub> = 150 °C	1F = 2 A	•	1.0	1.25	V

<sup>1.</sup> Pulse test:  $t_p$  = 5 ms,  $\delta$  < 2 %

To evaluate the maximum conduction losses use the following equation: P = 1 x  $I_{F(AV)}$  + 0.125  $I_{F}^{2}$ <sub>(RMS)</sub>

<sup>2.</sup> Pulse test:  $t_p$  = 380  $\mu$ s,  $\delta$  < 2 %

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Table 5. Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit	
			$I_F = 0.5 \text{ A}, I_{rr} = 0.25 \text{ A},$ $I_R = 1 \text{ A}$	-	-	30		
t <sub>rr</sub>	Reverse recovery time	T <sub>j</sub> = 25 °C	$T_j = 25 \text{ °C}$ $I_F = 1$ $dI_F/dt$ $V_R = 3$	$I_F = 1 \text{ A},$ $dI_F/dt = -50 \text{ A/}\mu\text{s}$ $V_R = 30 \text{ V}$	-	35	50	ns
t <sub>fr</sub>	Forward recovery time		I <sub>F</sub> = 2 A,	-	-	100	ns	
V <sub>FP</sub>	Forward recovery voltage	I <sub>j</sub> = 25 °C	$T_j = 25  ^{\circ}\text{C}$ $dI_F/dt = 100  \text{A/}\mu\text{s}$ $V_{FR} = 1.1  \text{x}  V_{Fmax}$	-	-	10	V	

Figure 1. Conduction losses versus average Figure 2. Forward voltage drop versus forward current

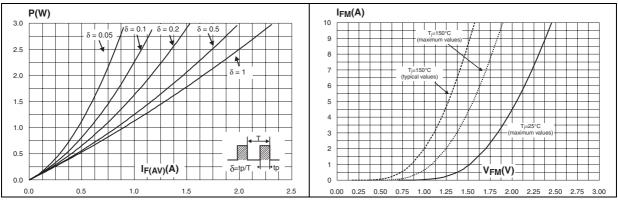
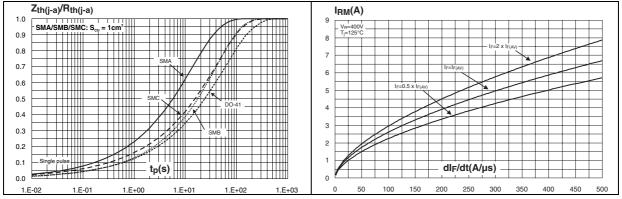


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

Figure 4. Peak reverse recovery current versus dl<sub>F</sub>/dt (typical values)



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Figure 5. Reverse recovery time versus dl<sub>F</sub>/dt Figure 6. Reverse recovery charges versus (typical values)

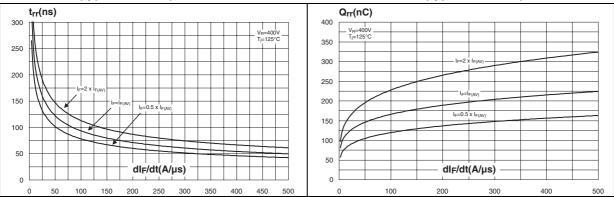


Figure 7. Relative variations of dynamic parameters versus junction temperature

Figure 8. Transient peak forward voltage versus dl<sub>F</sub>/dt (typical values)

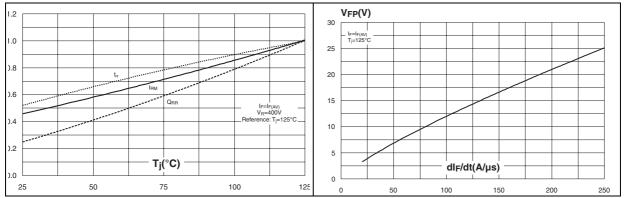
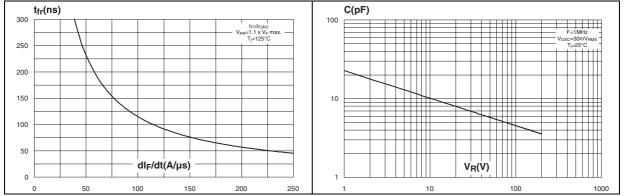


Figure 9. Forward recovery time versus dl<sub>F</sub>/dt Figure 10. Junction (typical values)

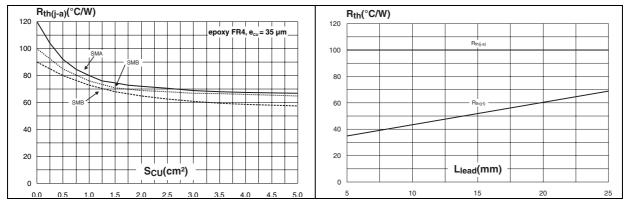
Junction capacitance versus reverse voltage applied (typical values)



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Figure 11. Thermal resistance junction to ambient versus copper surface under each lead

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



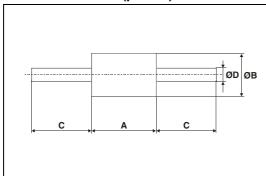
Package information STTH2R06

### 2 Package information

- Epoxy meets UL 94, V0
- Band indicates cathode
- Bending method (DO-41): see Application note AN1471

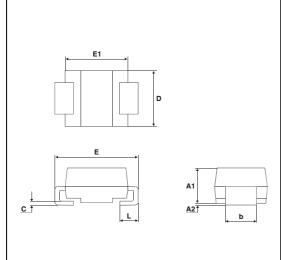
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: <a href="www.st.com">www.st.com</a>. ECOPACK<sup>®</sup> is an ST trademark.

Table 6. DO-41 (plastic) dimensions



	Dimensions				
Ref.	Millin	Millimeters		hes	
	Min.	Max.	Min.	Max.	
Α	4.07	5.20	0.160	0.205	
В	2.04	2.71	0.080	0.107	
С	25.4		1		
D	0.71	0.86	0.028	0.034	

Table 7. SMA dimensions



	Dimensions					
Ref.	Millim	Millimeters		hes		
	Min.	Max.	Min.	Max.		
A1	1.90	2.45	0.075	0.094		
A2	0.05	0.20	0.002	0.008		
b	1.25	1.65	0.049	0.065		
С	0.15	0.40	0.006	0.016		
D	2.25	2.90	0.089	0.114		
E	4.80	5.35	0.189	0.211		
E1	3.95	4.60	0.156	0.181		
L	0.75	1.50	0.030	0.059		

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Figure 13. Footprint (dimensions in mm)

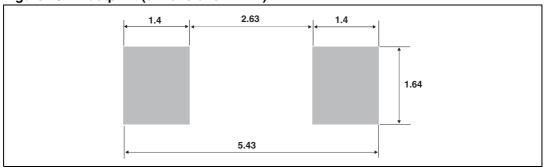
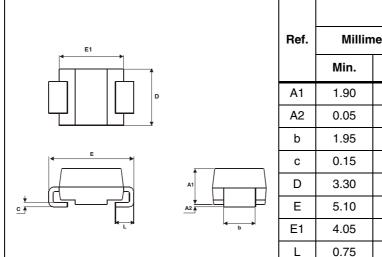
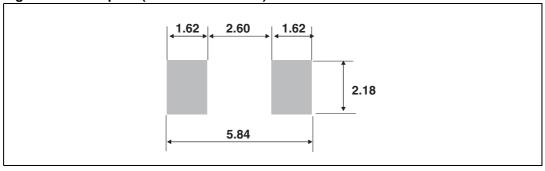


Table 8. SMB dimensions



	Dimensions				
Ref.	Millim	limeters Inc		hes	
	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	
С	0.15	0.40	0.006	0.016	
D	3.30	3.95	0.130	0.156	
Е	5.10	5.60	0.201	0.220	
E1	4.05	4.60	0.159	0.181	
L	0.75	1.50	0.030	0.059	

Figure 14. Footprint (dimensions in mm)



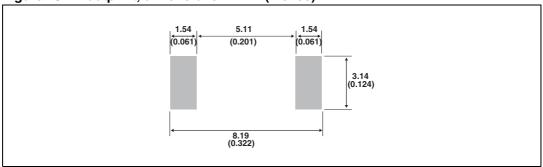
Package information STTH2R06

Table 9. SMC dimensions

			Dimensions			
		Ref.	Millim	neters	Inc	hes
<del>← E1</del>			Min.	Max.	Min.	Max.
		A1	1.90	2.45	0.075	0.096
D		A2	0.05	0.20	0.002	0.008
		b <sup>(1)</sup>	2.90	3.20	0.114	0.126
E		c <sup>(1)</sup>	0.15	0.40	0.006	0.016
	<u>† /                                   </u>	D	5.55	6.25	0.218	0.246
	A1	Е	7.75	8.15	0.305	0.321
C E2 L	A2 b	E1	6.60	7.15	0.260	0.281
		E2	4.40	4.70	0.173	0.185
		L	0.75	1.50	0.030	0.059

<sup>1.</sup> Dimensions b and c apply to plated leads

Figure 15. Footprint, dimensions in mm (inches)



## **3** Ordering information

Table 10. Ordering information

Order code	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 and reel
STTH2R06A	R6A	SMA	0.068 g	5000	Tape and reel
STTH2R06U	R6U	SMB	0.11 g	2500	Tape and reel
STTH2R06S	R62	SMC	0.243 g	2500	Tape and reel

# 4 Revision history

Table 11. Document revision history

Date	Revision	Changes
07-Sep-2004	1	First issue
1-Jun-2005	2	SMC package addition.
30-Sep-2009	3	Updated <i>Table 6</i> package dimensions.
04-Dec-2009	4	Updated <i>Table 9</i> package dimensions.

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