

High efficiency ultrafast diode

Features

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

Description

The STTH2L06 is using ST Turbo 2 600 V 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.

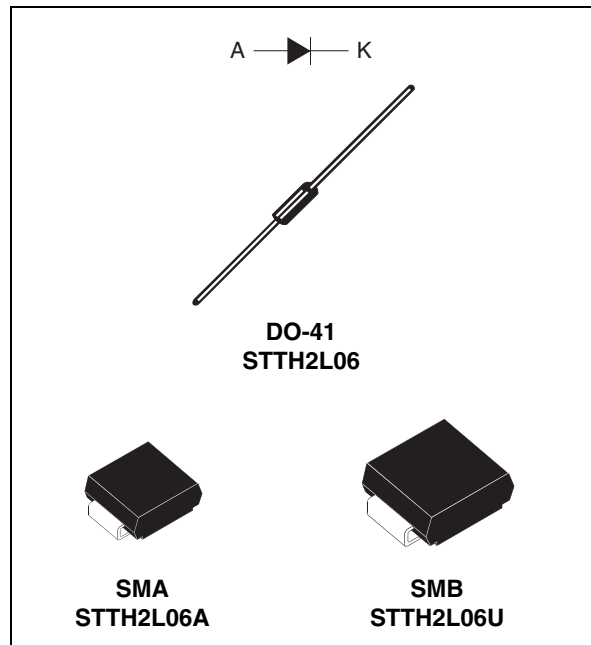


Table 1. Device summary

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

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter		Value	Unit	
V_{RRM}	Repetitive peak reverse voltage		600	V	
$I_{F(RMS)}$	Forward rms current		7	A	
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	DO-41	$T_I = 90\text{ }^\circ\text{C}$	2	A
		SMA	$T_I = 100\text{ }^\circ\text{C}$	2	
		SMB	$T_I = 115\text{ }^\circ\text{C}$	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	$^\circ\text{C}$	
T_j	Maximum operating junction temperature		175	$^\circ\text{C}$	

Table 3. Thermal resistance

Symbol	Parameter		Maximum	Unit
$R_{th(j-l)}$	Junction to lead	DO-41 L = 5 mm	35	$^\circ\text{C/W}$
		SMA	30	
		SMB	25	

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ }^\circ\text{C}$	$V_R = V_{RRM}$			2	μA
		$T_j = 150\text{ }^\circ\text{C}$			12	85	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 2\text{ A}$			1.3	V
		$T_j = 150\text{ }^\circ\text{C}$			0.85	1.05	

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

2. Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the maximum conduction losses use the following equation:

$$P = 0.89 \times I_{F(AV)} + 0.08 I_{F(RMS)}^2$$

Table 5. Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 1\text{ A}$, $di_F/dt = 50\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$		60	85	ns
t_{fr}	Forward recovery time	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 2\text{ A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$			100	ns
V_{FP}	Forward recovery voltage					9	V

Figure 1. Conduction losses vs average forward current

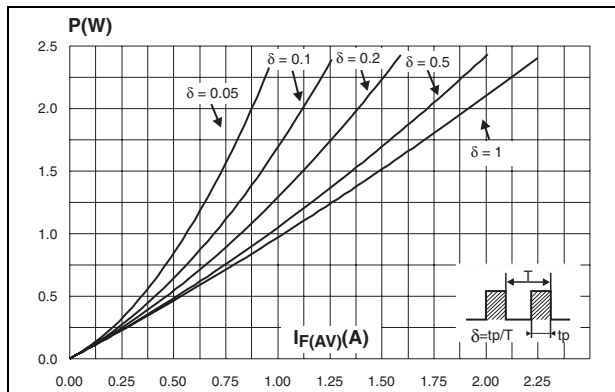


Figure 2. Forward voltage drop vs forward current

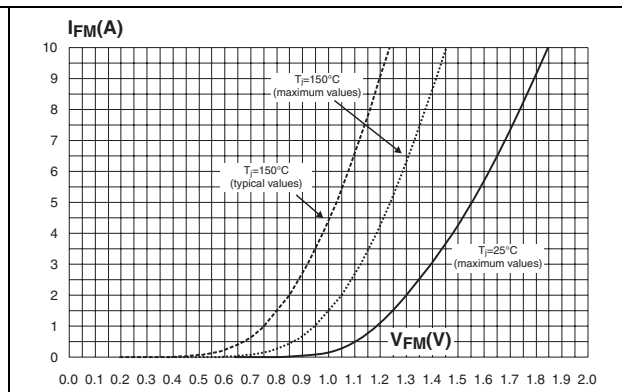


Figure 3. Relative variation of thermal impedance junction to case vs pulse duration (SMA - $S_{CU} = 1\text{ cm}^2$)

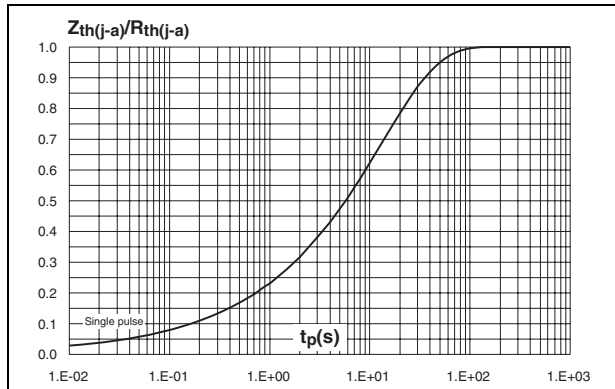


Figure 4. Relative variation of thermal impedance junction to case vs pulse duration (SMB - $S_{CU} = 1\text{ cm}^2$)

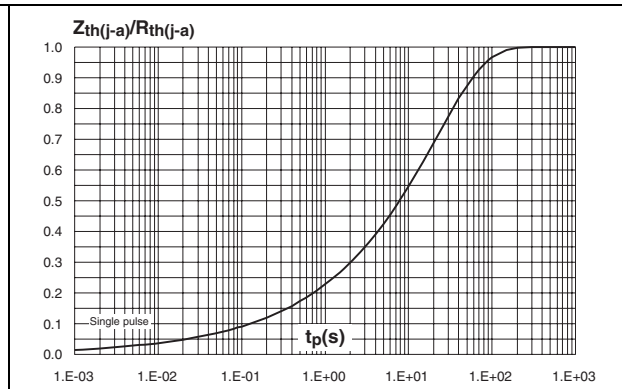


Figure 5. Relative variation of thermal impedance junction to case vs pulse duration (DO-41)

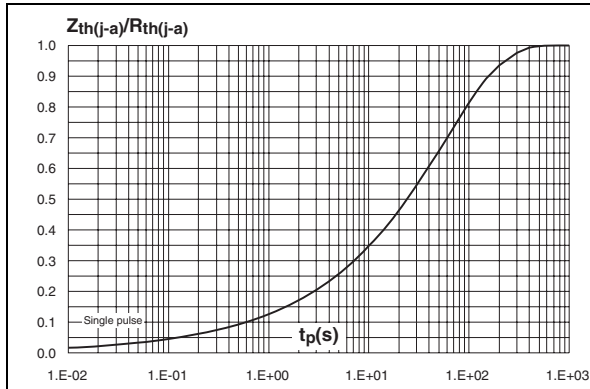


Figure 6. Peak reverse recovery current vs di_F/dt (typical values)

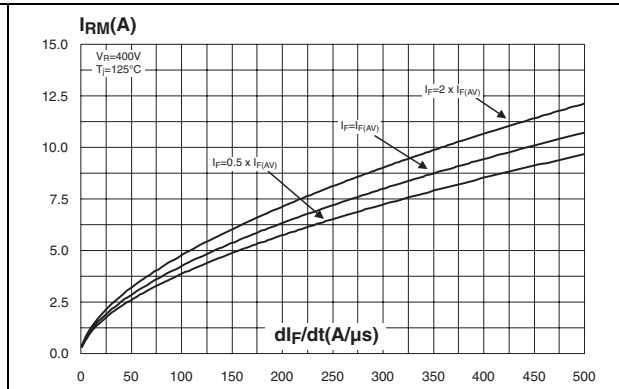


Figure 7. Reverse recovery time vs di_F/dt (typical values)

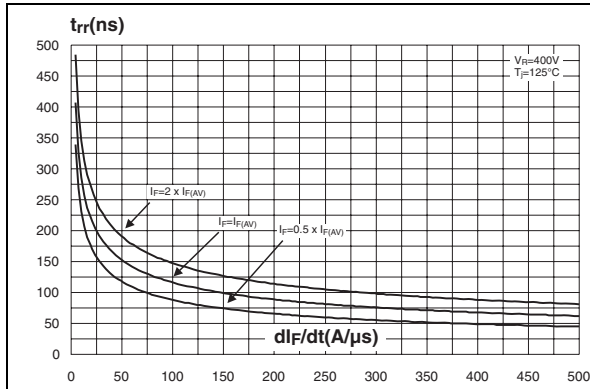


Figure 8. Reverse recovery charges vs di_F/dt (typical values)

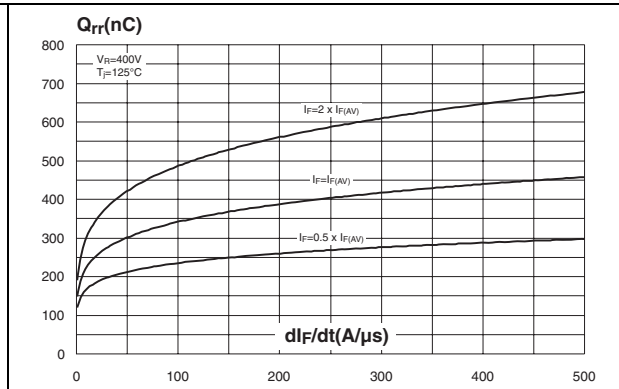


Figure 9. Relative variations of dynamic parameters vs junction temperature

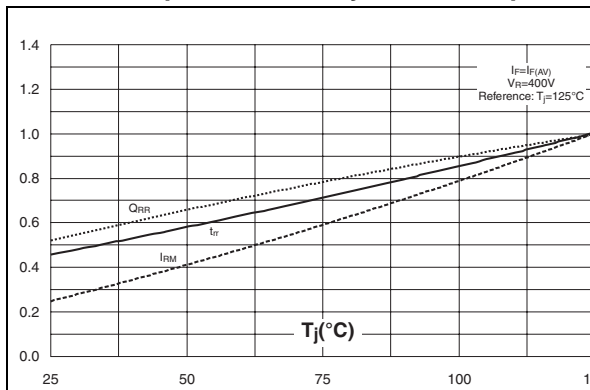


Figure 10. Transient peak forward voltage vs di_F/dt (typical values)

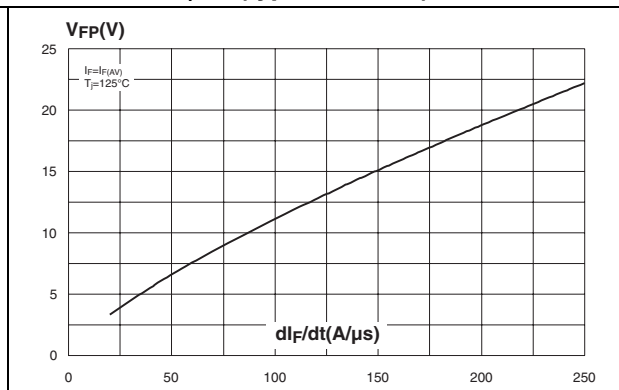


Figure 11. Forward recovery time vs di_F/dt (typical values)

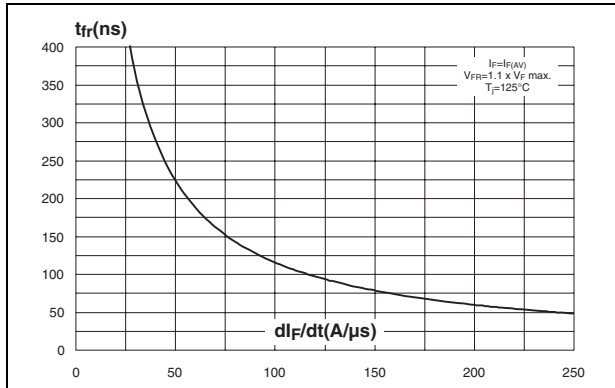


Figure 12. Junction capacitance vs reverse voltage applied (typical values)

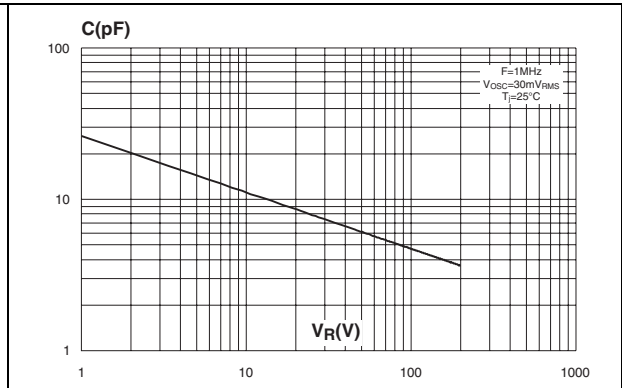


Figure 13. Thermal resistance junction to ambient vs copper surface under tab (epoxy FR4, Cu = 35 μ m)

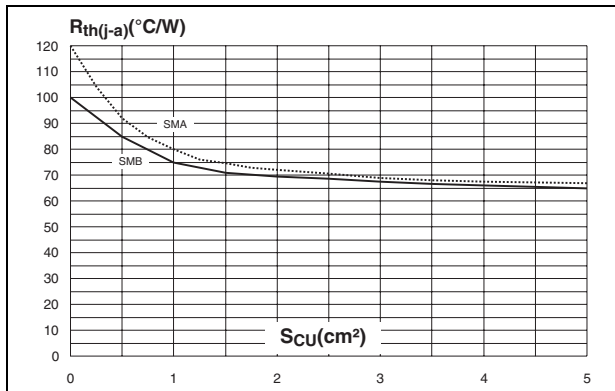
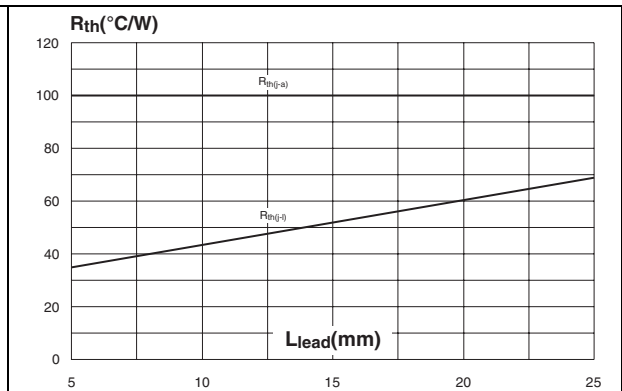


Figure 14. Thermal resistance vs lead length (DO-41)



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® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 6. DO-41 (plastic) dimensions

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	25.4		1	
D	0.71	0.86	0.028	0.034

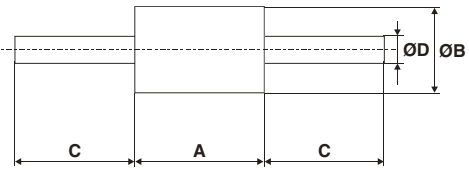


Table 7. SMA dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	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
c	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

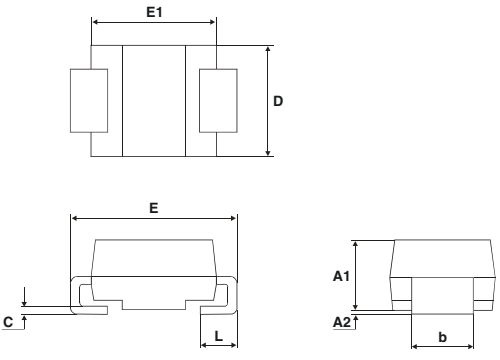


Figure 15. Footprint (dimensions in mm)

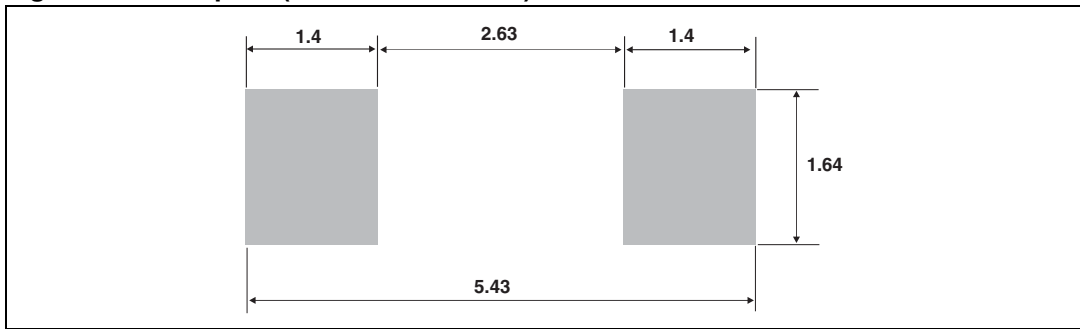
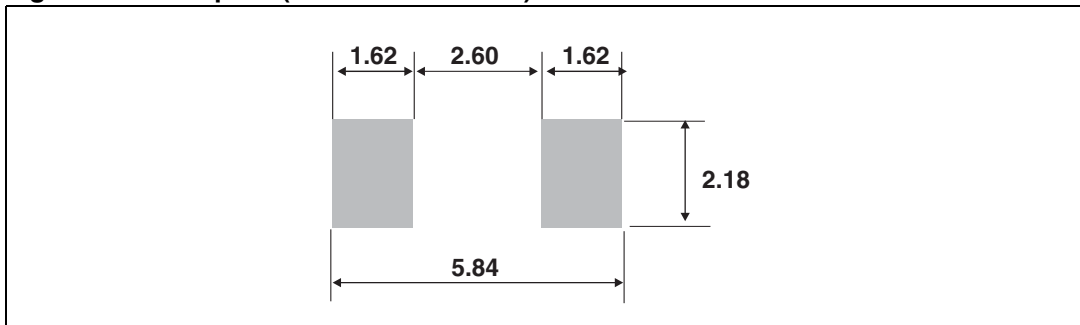


Table 8. SMB dimensions

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	0.40	0.006	0.016
D	3.30	3.95	0.130	0.156
E	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 16. Footprint (dimensions in mm)



3 Ordering information

Table 9. Ordering information

Order code	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 and reel
STTH2L06A	L6A	SMA	0.068 g	5000	Tape and reel
STTH2L06U	L6U	SMB	0.11 g	2500	Tape and reel

4 Revision history

Table 10. Document revision history

Date	Revision	Changes
07-Sep-2004	1	First issue.
30-Sep-2009	2	Updated table 6 package dimensions.

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