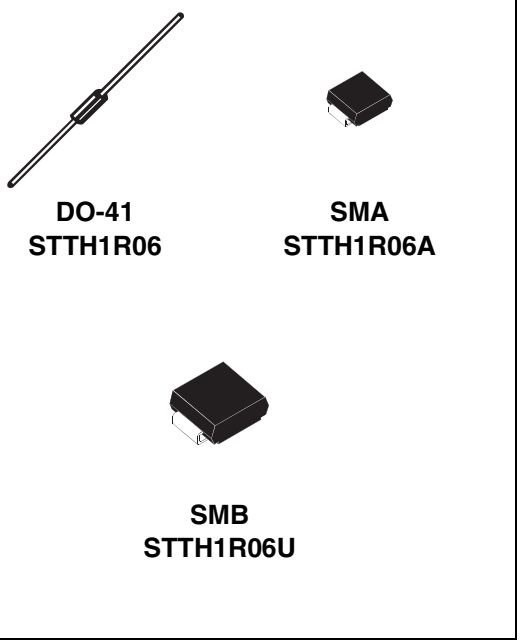
STTH1R06

TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

Table 1: Main Product Characteristics

$I_{F(AV)}$	1 A
V_{RRM}	600 V
I_R (max)	75 µA
T_j	175°C
V_F (typ)	1.0 V
t_{rr} (max)	25 ns



FEATURES AND BENEFITS

- Ultrafast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching & conduction losses

DESCRIPTION

The STTH1R06, which is using ST Turbo 2 600V technology, is specially suited as boost diode in power factor correction circuitry.
The device is also intended for use as a free wheeling diode in power supplies and other power switching applications.

Table 2: Order Codes

Part Number	Marking
STTH1R06	STTH1R06
STTH1R06RL	STTH1R06

Part Number	Marking
STTH1R06A	HR6
STTH1R06U	BR6

Table 3: Absolute Ratings (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			600	V
$I_{F(RMS)}$	RMS forward voltage	DO-41		10	A
		SMA / SMB		7	
$I_{F(AV)}$	Average forward current	DO-41	Tc = 100°C δ = 0.5	1	A
		SMA	Tc = 125°C δ = 0.5		
		SMB	Tc = 135°C δ = 0.5		
I_{FSM}	Surge non repetitive forward current	DO-41	tp = 10ms sinusoidal	25	A
		SMA / SMB		20	
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	L = 10mm	DO-41	45	°C/W
			SMA	30	
			SMB	25	
$R_{th(j-a)}$	Junction to ambient (1)	L = 10mm	DO-41	70	°C/W

Note 1: $R_{th(j-a)}$ is measured with a copper area S = Scm^2 (see figure12).

Table 5: Static Electrical Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R	Reverse leakage current	T_j = 25°C	$V_R = V_{RRM}$			1	µA
		T_j = 150°C			10	75	
V_F	Forward voltage drop	T_j = 25°C	I_F = 1A			1.7	V
		T_j = 150°C			1.0	1.25	

To evaluate the conduction losses use the following equation: $P = 1.03 \times I_{F(AV)} + 0.27\ I_F{}^2{}_{(RMS)}$

Table 6: Dynamic Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25°C	I_F = 0.5A Irr = 0.25A I_R =1A			25	ns
			I_F = 1A dI_F/dt = -50 A/µs V_R =30V		30	45	
t_{fr}	Forward recovery time	T_j = 25°C	I_F = 1A dI_F/dt = 100 A/µs $V_{FR} = 1.1 \times V_{Fmax}$			100	ns
V_{FP}	Forward recovery voltage	T_j = 25°C	I_F = 1A dI_F/dt = 100 A/µs $V_{FR} = 1.1 \times V_{Fmax}$			10	V

Figure 1: Conduction losses versus average forward current

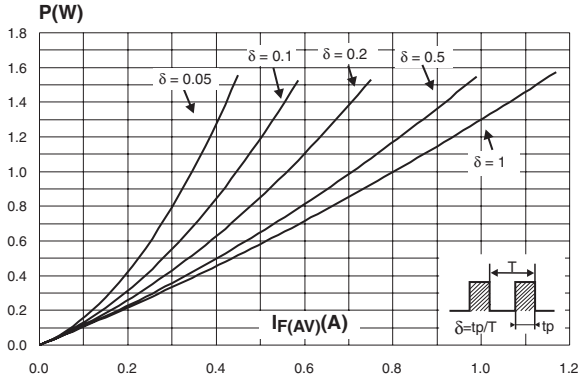


Figure 2: Forward voltage drop versus forward current

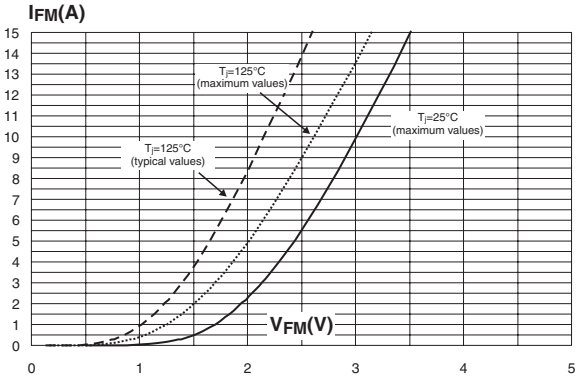


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration (DO-41)

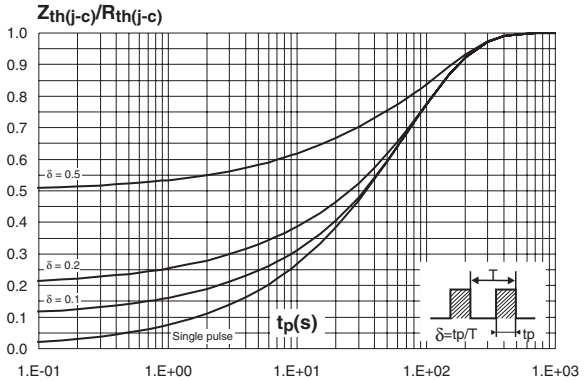


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration (SMA)

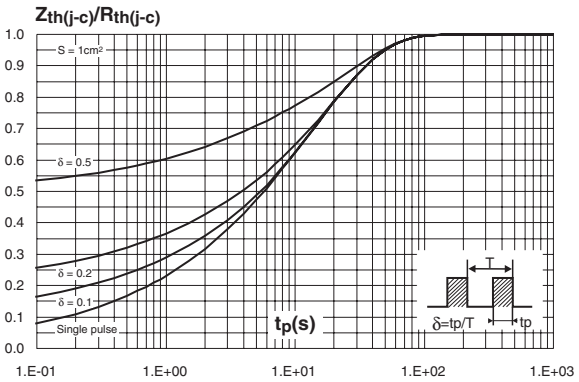


Figure 5: Relative variation of thermal impedance junction to case versus pulse duration (SMB)

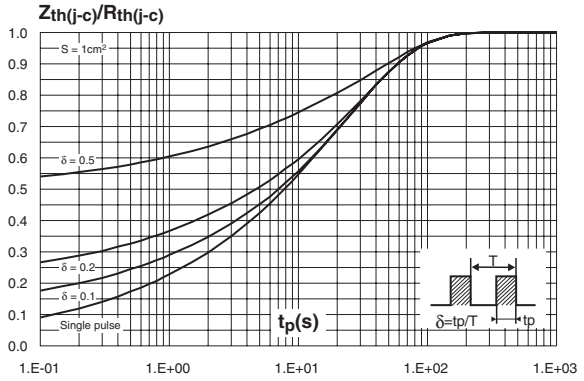


Figure 6: Peak reverse recovery current versus dI_F/dt (typical values)

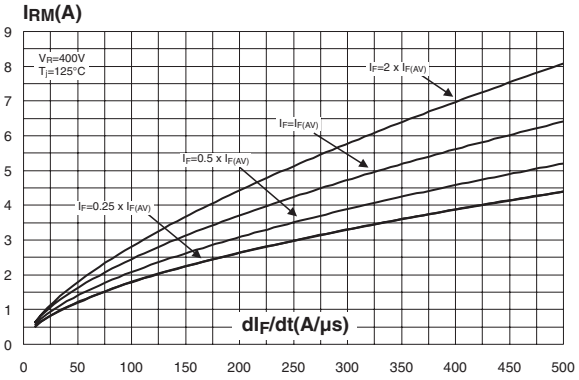


Figure 7: Reverse recovery time versus dI_F/dt (typical values)

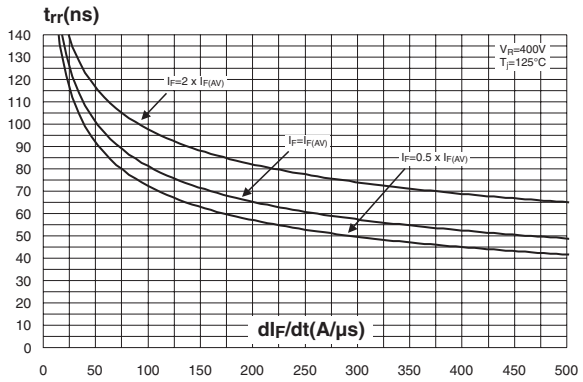


Figure 8: Reverse recovery charges versus dI_F/dt (typical values)

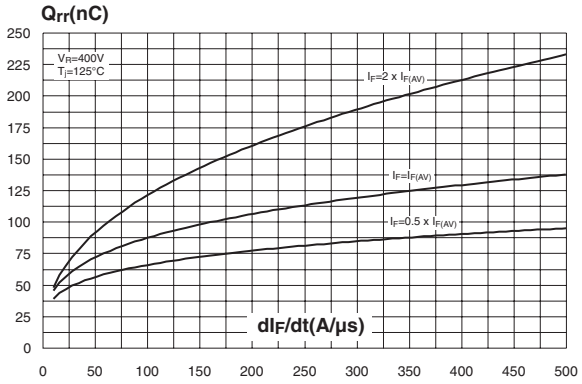


Figure 9: Reverse recovery softness factor versus dI_F/dt (typical values)

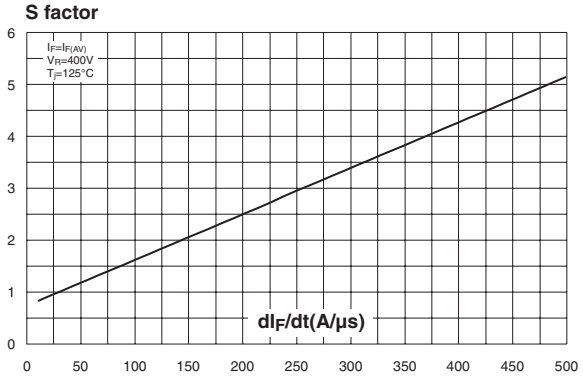


Figure 10: Relative variations of dynamic parameters versus junction temperature

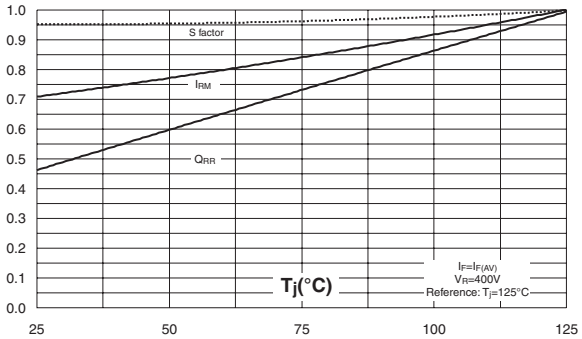


Figure 11: Transient peak forward voltage versus dI_F/dt (typical values)

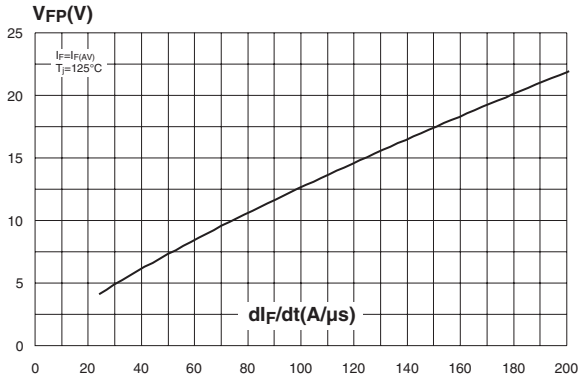


Figure 12: Forward recovery time versus dI_F/dt (typical values)

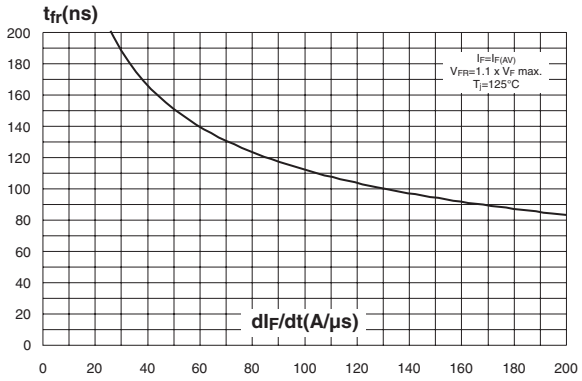


Figure 13: Junction capacitance versus reverse voltage applied (typical values)

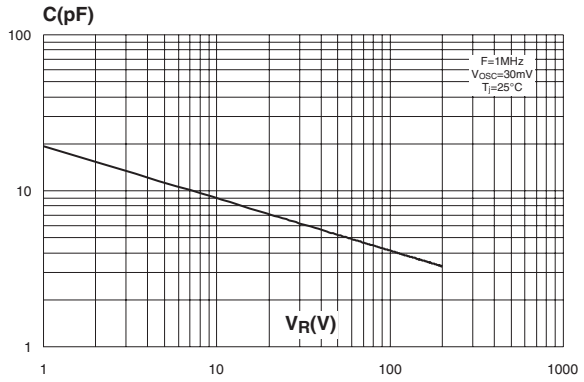


Figure 14: Thermal resistance junction to ambient versus copper surface under each lead (epoxy FR4, e_{CU}=35µm) (DO-41, SMB)

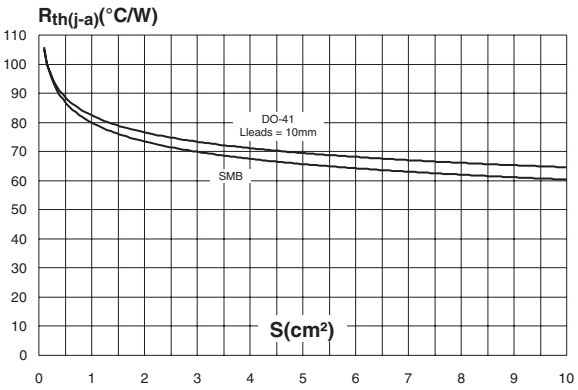


Figure 15: Thermal resistance junction to ambient versus copper surface under each lead (epoxy FR4, e_{CU}=35µm) (SMA)

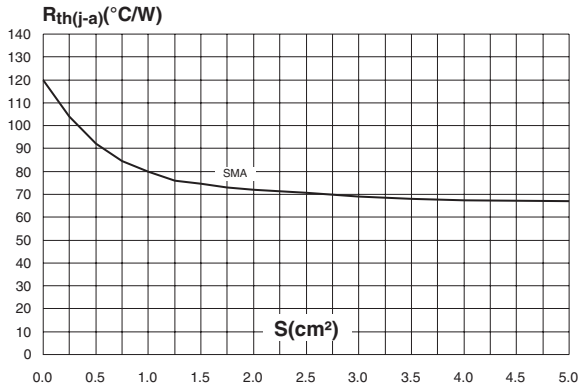
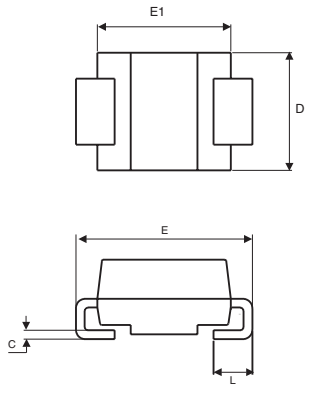


Figure 16: SMA Package Mechanical Data



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.70	0.075	0.106
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 17: SMA Foot Print Dimensions
(in millimeters)

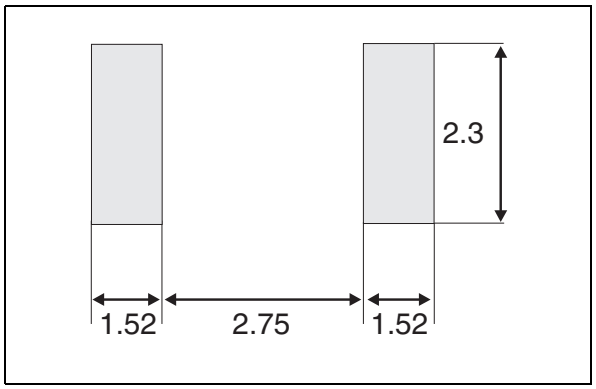
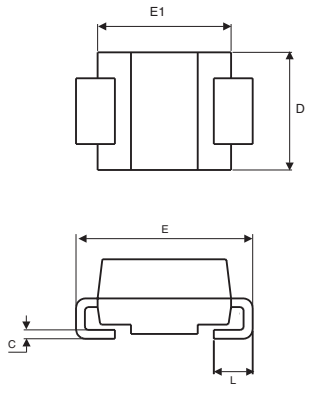


Figure 18: SMB Package Mechanical Data



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 19: SMB Foot Print Dimensions
(in millimeters)

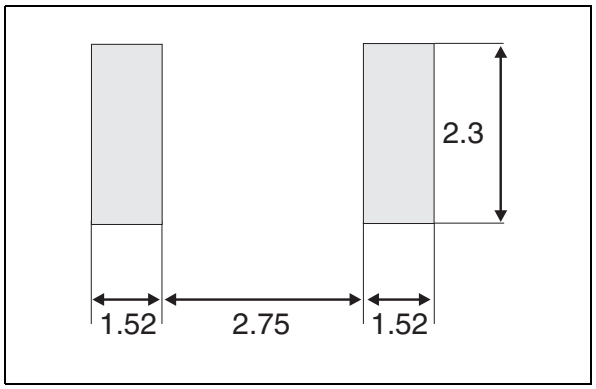
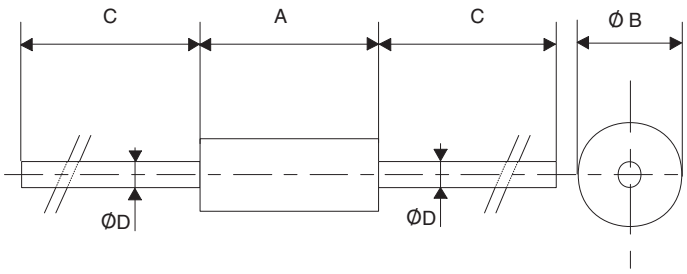


Figure 20: DO-41 Package Mechanical Data



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

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH1R06	STTH1R06	DO-41	0.34 g	2000	Ammopack
STTH1R06RL	STTH1R06	DO-41	0.34 g	5000	Tape & reel
STTH1R06A	AR6	SMA	0.068 g	5000	Tape & reel
STTH1R06B	BR6	SMB	0.11 g	2500	Tape & reel

- Epoxy meets UL94, V0

Table 8: Revision History

Date	Revision	Description of Changes
Apr-2003	1	First issue
07-Sep-2004	2	DO-41 and SMA packages added