

TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	1 A
V_{RRM}	600 V
$I_R (max)$	75 μ A
$T_j (max)$	175 °C
$V_F (max)$	1.05 V
$t_{rr} (max)$	80 ns

FEATURES AND BENEFITS

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

DESCRIPTION

The STTH1L06/U/A, which is using ST Turbo 2 600V technology, is specially suited as boost diode in discontinuous or critical mode power factor corrections.

The device is also intended for use as a free wheeling diode in power supplies and other power switching applications.



ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	RMS forward current	DO-41 SMA / SMB	10 7	A
$I_{F(AV)}$	Average forward current	$T_I = 120^{\circ}\text{C}$ $\delta = 0.5$ DO-41 $T_I = 135^{\circ}\text{C}$ $\delta = 0.5$ SMA $T_I = 145^{\circ}\text{C}$ $\delta = 0.5$ SMB	1 1 1	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10$ ms Sinusoidal DO-41 $t_p = 10$ ms Sinusoidal SMA / SMB	30 20	A
T_{stg}	Storage temperature range		- 65 + 175	°C
T_j	Maximum operating junction temperature		+ 175	°C

THERMAL PARAMETERS

Symbol	Parameter			Maximum	Unit
$R_{th(j-l)}$	Junction to lead	L = 10 mm	DO-41	45	°C/W
			SMA	30	
			SMB	25	
$R_{th(j-a)}$	Junction to ambient (note 1)	L = 10 mm	DO-41	70	

Note 1: $R_{th(j-a)}$ is measured with a copper area $S = 5\text{cm}^2$ (see Fig 12)

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I_R	Reverse leakage current	$V_R = 600\text{V}$	$T_j = 25^\circ\text{C}$			1	μA
			$T_j = 150^\circ\text{C}$		10	75	
V_F	Forward voltage drop	$I_F = 1\text{A}$	$T_j = 25^\circ\text{C}$			1.3	V
			$T_j = 150^\circ\text{C}$		0.85	1.05	

To evaluate the maximum conduction losses use the following equation :

$$P = 0.89 \times I_{F(AV)} + 0.165 I_F^2(RMS)$$

DYNAMIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
trr	Reverse recovery time	$I_F = 1\text{A}$ $di_F/dt = -50\text{A}/\mu\text{s}$ $V_R = 30\text{V}$	$T_j = 25^\circ\text{C}$		55	80	ns
tfr	Forward recovery time	$I_F = 1\text{A}$ $di_F/dt = 100\text{A}/\mu\text{s}$ $V_{FR} = 3.5\text{V}$	$T_j = 25^\circ\text{C}$			50	ns
V_{FP}	Forward recovery voltage	$I_F = 1\text{A}$ $di_F/dt = 100\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$			10	V

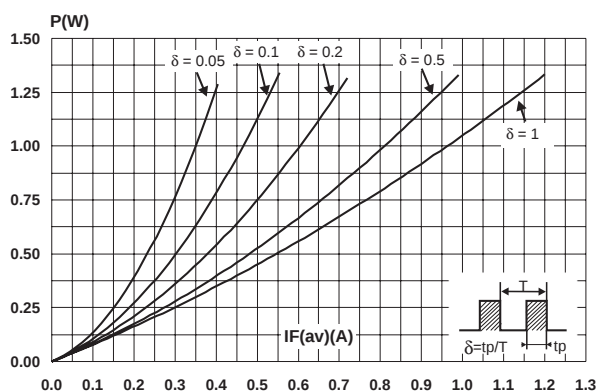
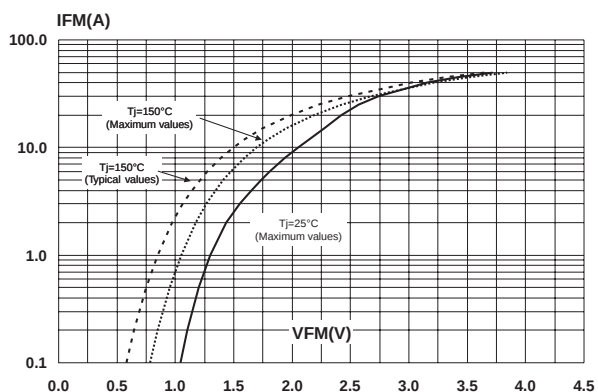
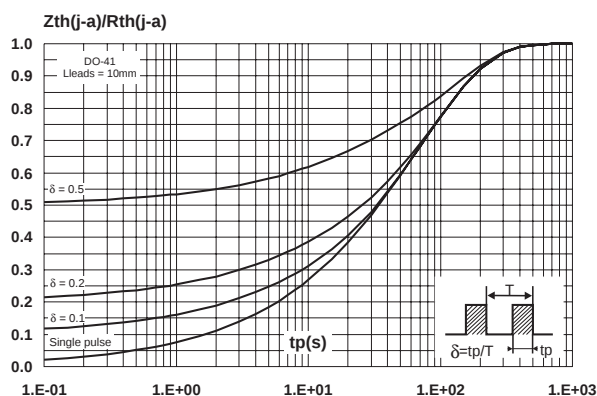
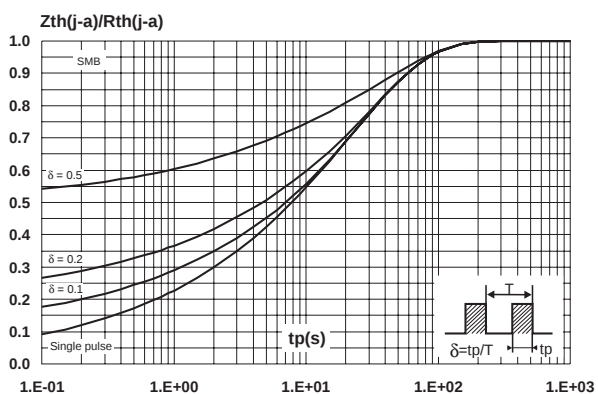
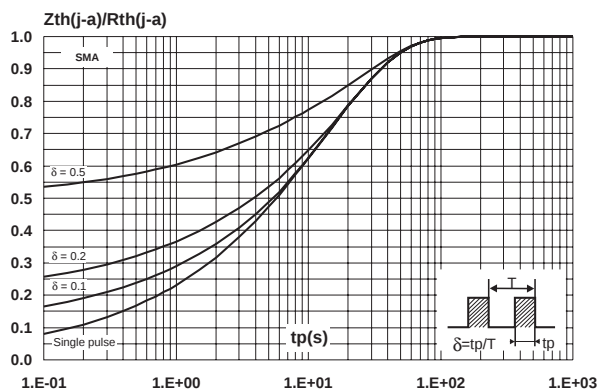
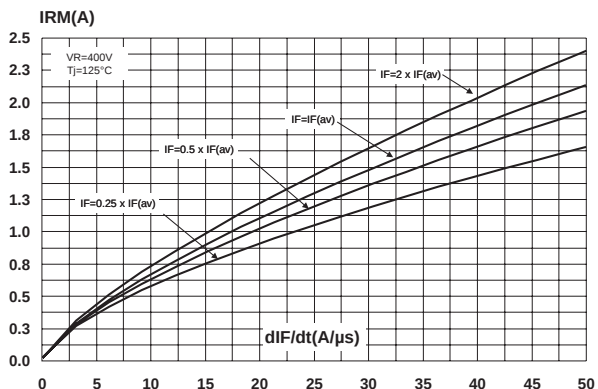
Fig. 1: Conduction losses versus average current.**Fig. 2:** Forward voltage drop versus forward current.**Fig. 3-1:** Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4, Leads = 10mm)**Fig. 3-2:** Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4, S = 1cm²)**Fig. 3-3:** Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4)**Fig. 4:** Peak reverse recovery current versus dI_F/dt (90% confidence).

Fig. 5: Reverse recovery time versus di_F/dt (90% confidence).

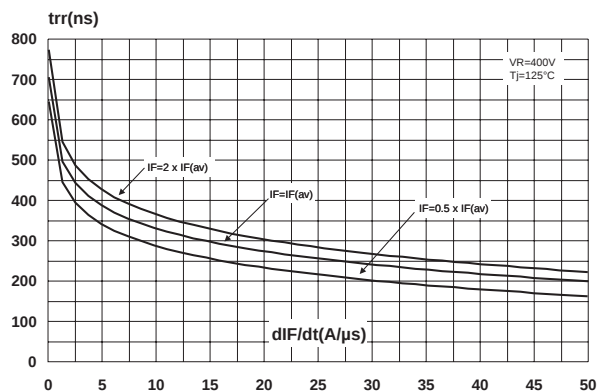


Fig. 6: Reverse recovery charges versus di_F/dt (90% confidence).

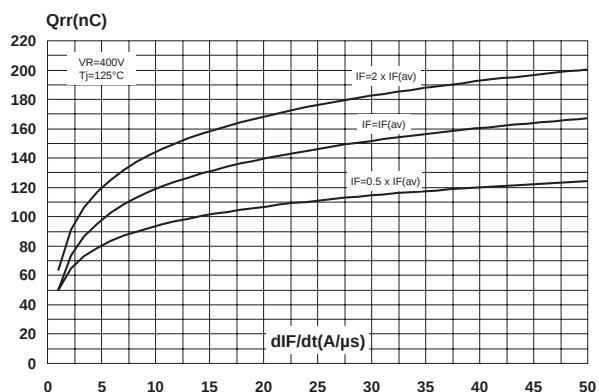


Fig. 7: Softness factor versus di_F/dt (typical values).

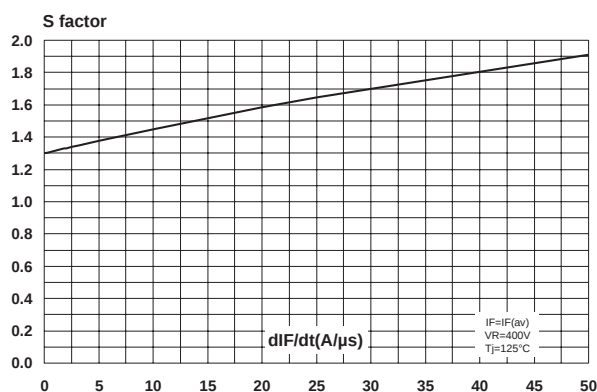


Fig. 8: Relative variations of dynamic parameters versus junction temperature.

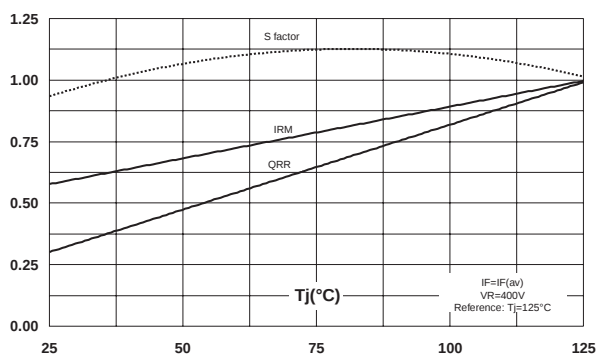


Fig. 9: Transient peak forward voltage versus di_F/dt (90% confidence).

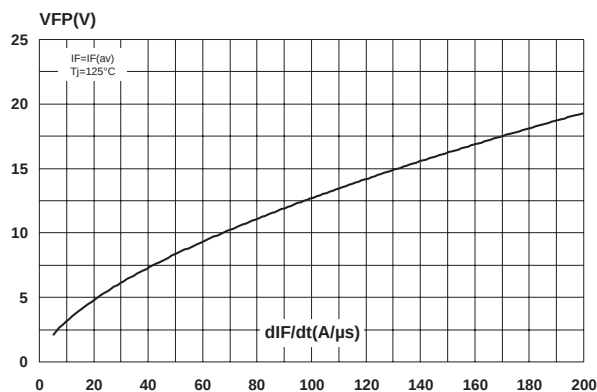


Fig. 10: Forward recovery time versus di_F/dt (90% confidence).

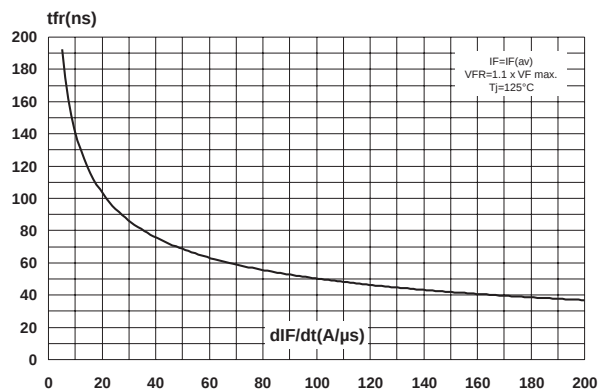


Fig. 11: Junction capacitance versus reverse voltage applied (typical values).

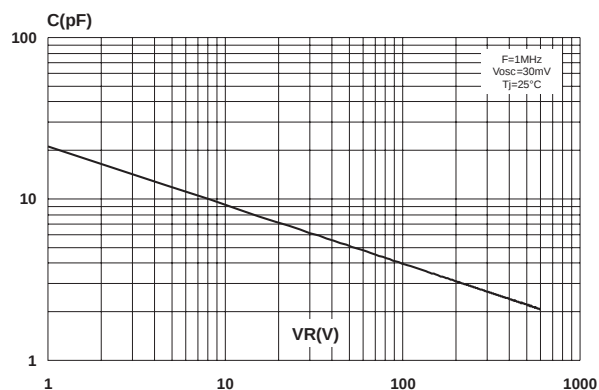


Fig. 12-1: Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35 μm).

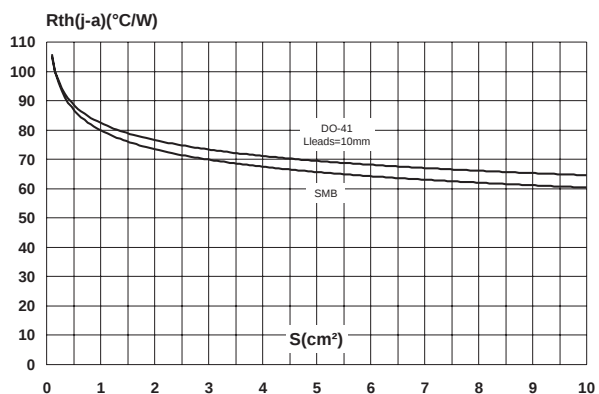
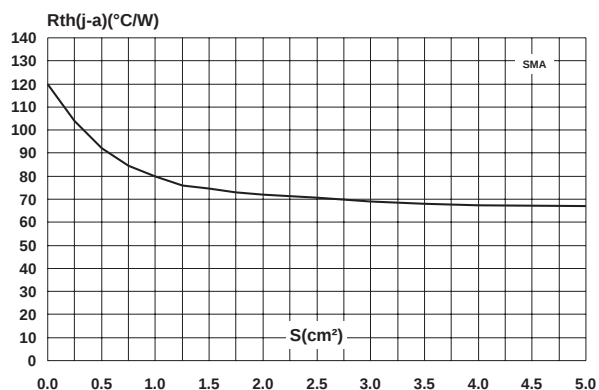


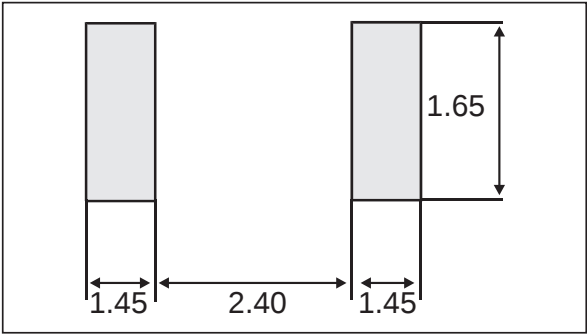
Fig. 12-2: Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35 μm).



PACKAGE MECHANICAL DATA
SMA

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

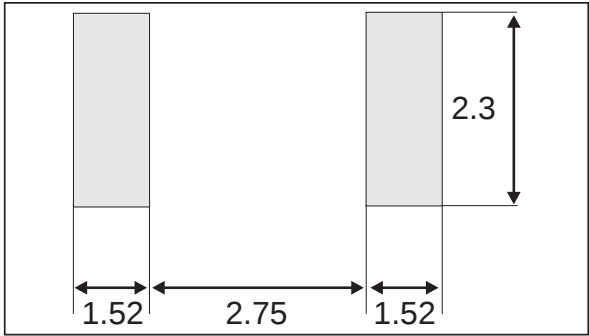
FOOTPRINT



PACKAGE MECHANICAL DATA
SMB

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

FOOTPRINT



PACKAGE MECHANICAL DATA

DO-41

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

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH1L06	STTH1L06	DO-41	0.34 g	2000	Ammopack
STTH1L06RL	STTH1L06	DO-41	0.34 g	5000	Tape & reel
STTH1L06U	BL6	SMB	0.11 g	2500	Tape & reel
STTH1L06A	HL6	SMA	0.068 g	5000	Tape & reel

- Epoxy meets UL 94,V0
- Band indicated cathode
- Bending method: Application note AN1471

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