

## TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

**Table 1: Main Product Characteristics**

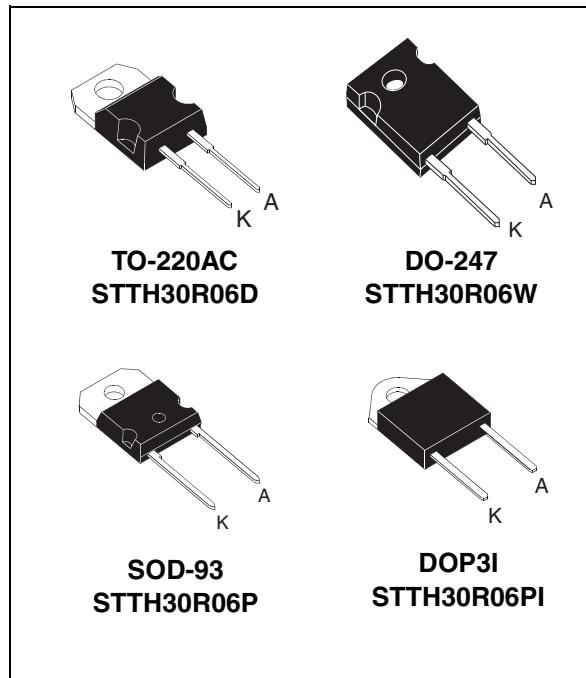
$I_{F(AV)}$	30 A
$V_{RRM}$	600 V
$T_j$	175°C
$V_F$ (typ)	1.10 V
$t_{rr}$ (max)	50 ns

### FEATURES AND BENEFITS

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

### DESCRIPTION

The STTH30R06, which is using ST Turbo 2 600V technology, is specially suited for use in switching power supplies, and industrial applications, as rectification and discontinuous mode PFC boost diode.



**Table 2: Order Codes**

Part Number	Marking
STTH30R06D	STTH30R06D
STTH30R06W	STTH30R06W
STTH30R06P	STTH30R06P
STTH30R06PI	STTH30R06PI

**Table 3: Absolute Ratings (limiting values)**

Symbol	Parameter			Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage			600	V
$I_{F(RMS)}$	RMS forward voltage			50	A
$I_{F(AV)}$	Average forward current	TO-220AC / DO-247 / SOD-93	$T_c = 115^\circ\text{C}$ $\delta = 0.5$	30	A
		DOP3I	$T_c = 85^\circ\text{C}$ $\delta = 0.5$		
$I_{FSM}$	Surge non repetitive forward current			160	A
$T_{stg}$	Storage temperature range			-65 to + 175	°C
$T_j$	Maximum operating junction temperature			175	°C

## STTH30R06

**Table 4: Thermal Resistance**

Symbol	Parameter		Value (max.)	Unit
$R_{th(j-c)}$	Junction to case	TO-220AC / DO-247/ SOD-93	1.1	°C/W
		DOP3I	1.7	

**Table 5: Static Electrical Characteristics**

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
$I_R$ *	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			25	μA
		$T_j = 150^\circ\text{C}$			80	800	
$V_F$ **	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 30\text{A}$			1.85	V
		$T_j = 150^\circ\text{C}$				1.10	

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

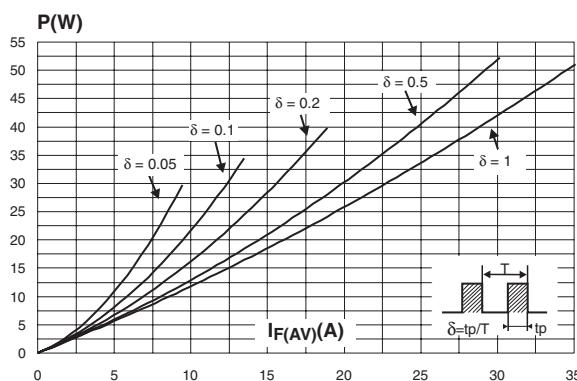
\*\*  $tp = 380 \mu\text{s}, \delta < 2\%$

To evaluate the conduction losses use the following equation:  $P = 1.07 \times I_F(\text{AV}) + 0.011 I_F^2 (\text{RMS})$

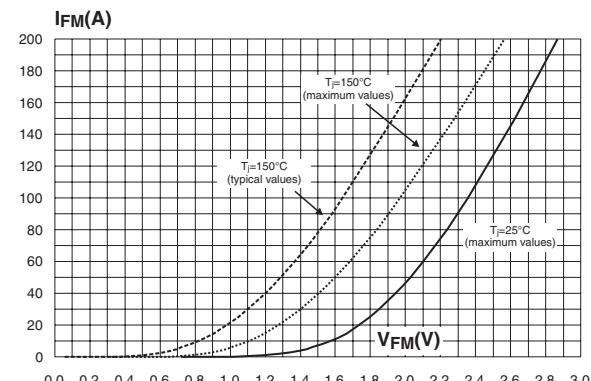
**Table 6: Dynamic Characteristics**

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit	
$t_{rr}$	Reverse recovery time	$T_j = 25^\circ\text{C}$	$I_F = 0.5\text{A}$	$I_{rr} = 0.25\text{A}$	$I_R = 1\text{A}$		ns	
			$I_F = 1\text{A}$	$dI_F/dt = 50 \text{ A}/\mu\text{s}$	$V_R = 30\text{V}$	50		
$I_{RM}$	Reverse recovery current	$T_j = 125^\circ\text{C}$	$I_F = 30\text{A}$	$V_R = 400\text{V}$	$dI_F/dt = 100 \text{ A}/\mu\text{s}$	8	11	A
$t_{fr}$	Forward recovery time	$T_j = 25^\circ\text{C}$	$I_F = 30\text{A}$	$dI_F/dt = 100 \text{ A}/\mu\text{s}$	$V_{FR} = 1.1 \times V_{Fmax}$		500	ns
$V_{FP}$	Forward recovery voltage	$T_j = 25^\circ\text{C}$	$I_F = 30\text{A}$	$dI_F/dt = 100 \text{ A}/\mu\text{s}$	$V_{FR} = 1.1 \times V_{Fmax}$	2.5		V

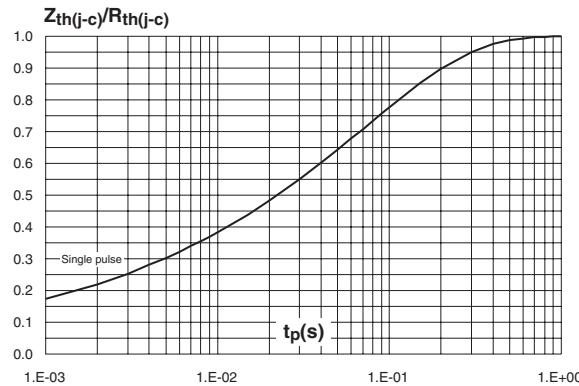
**Figure 1: Conduction losses versus average forward current**



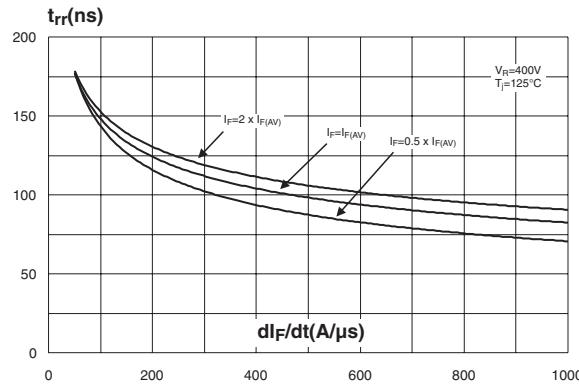
**Figure 2: Forward voltage drop versus forward current**



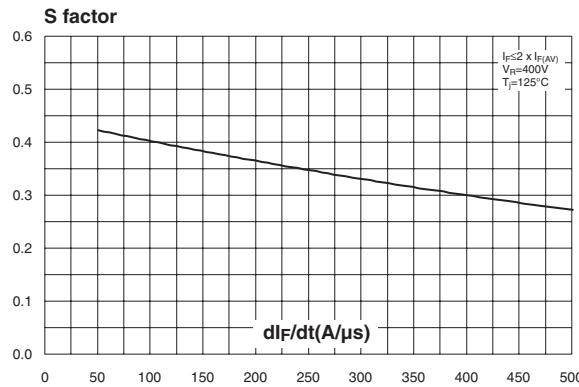
**Figure 3: Relative variation of thermal impedance junction to case versus pulse duration**



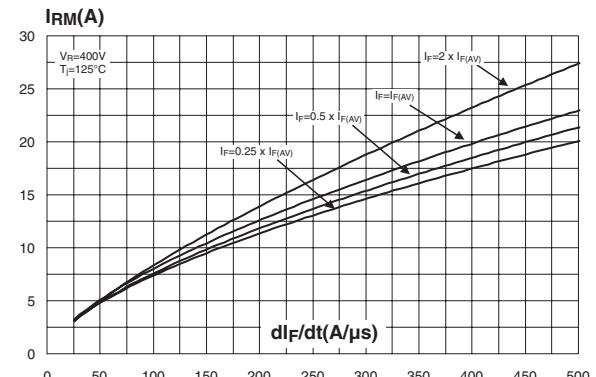
**Figure 5: Reverse recovery time versus  $dI_F/dt$  (typical values)**



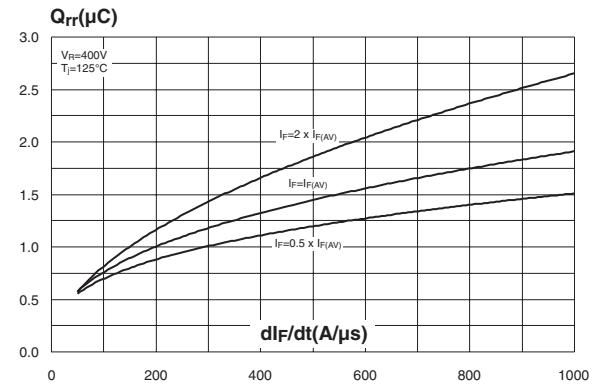
**Figure 7: Softness factor versus  $dI_F/dt$  (typical values)**



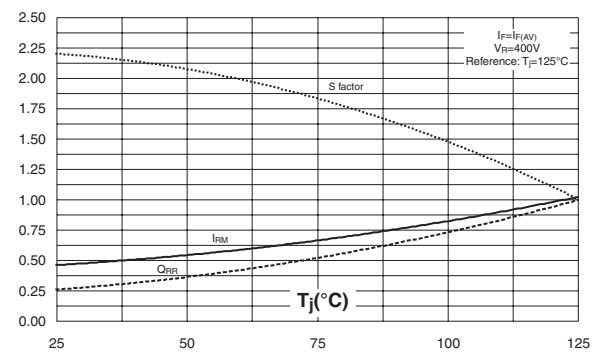
**Figure 4: Peak reverse recovery current versus  $dI_F/dt$  (typical values)**



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



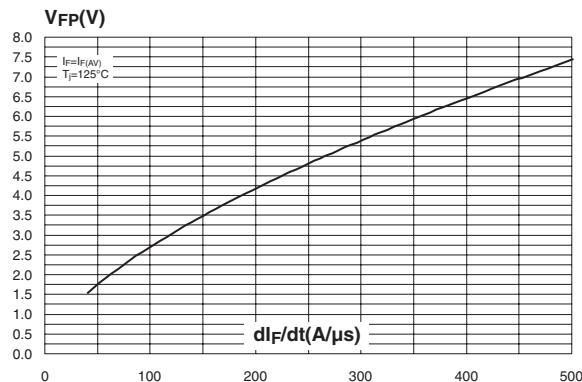
**Figure 8: Relative variations of dynamic parameters versus junction temperature**



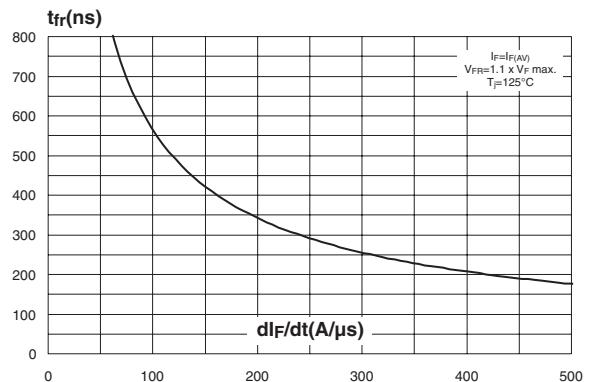
## STTH30R06

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**Figure 9: Transient peak forward voltage versus  $dI_F/dt$  (typical values)**



**Figure 10: Forward recovery time versus  $dI_F/dt$  (typical values)**



**Figure 11: Junction capacitance versus reverse voltage applied (typical values)**

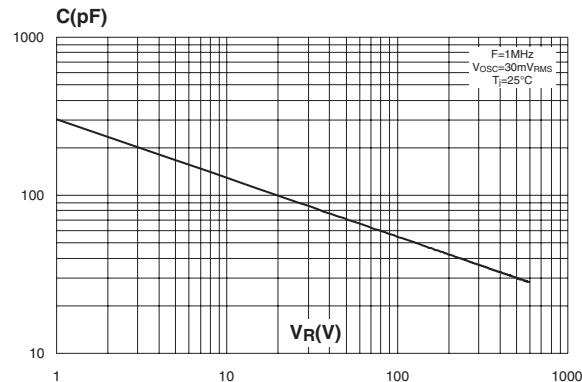
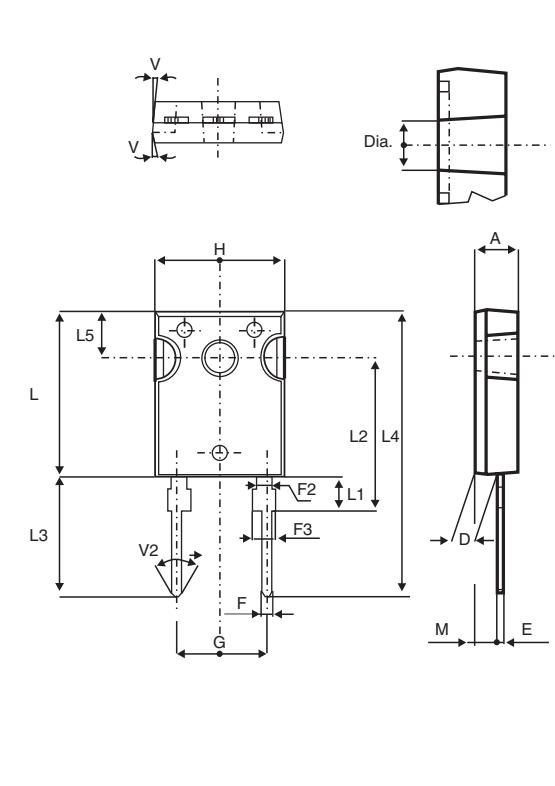
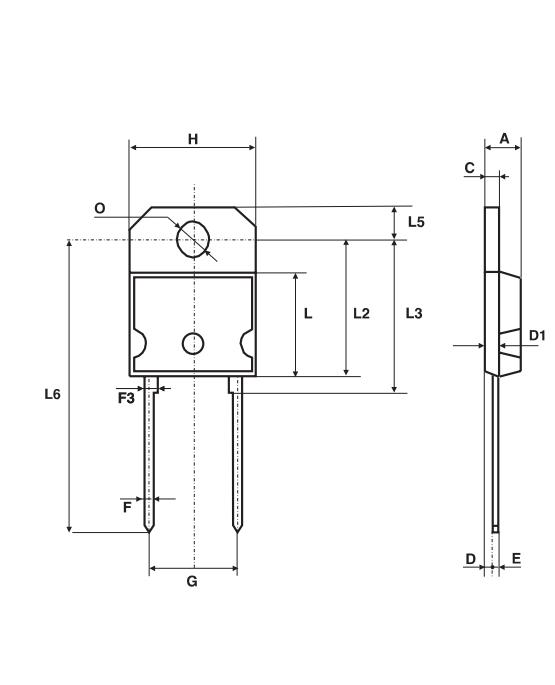


Figure 12: DO-247 Package Mechanical Data



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
D	2.20		2.60	0.086		0.102
E	0.40		0.80	0.015		0.031
F	1.00		1.40	0.039		0.055
F2		2.00			0.078	
F3	2.00		2.40	0.078		0.094
G		10.90			0.429	
H	15.45		15.75	0.608		0.620
L	19.85		20.15	0.781		0.793
L1	3.70		4.30	0.145		0.169
L2		18.50			0.728	
L3	14.20		14.80	0.559		0.582
L4		34.60			1.362	
L5		5.50			0.216	
M	2.00		3.00	0.078		0.118
V		5°			5°	
V2		60°			60°	
Dia.	3.55		3.65	0.139		0.143

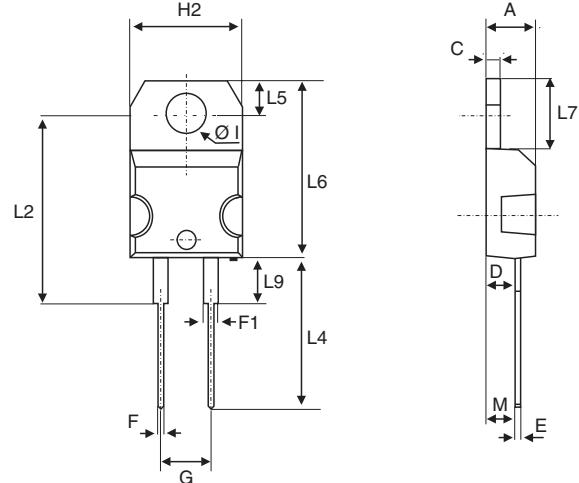
Figure 13: SOD-93 Package Mechanical Data



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.70	4.90	0.185	0.193
C	1.17	1.37	0.046	0.054
D		2.50 Typ.		0.098 Typ.
D1		1.27 Typ.		0.050 Typ.
E	0.50	0.78	0.020	0.031
F	1.10	1.30	0.043	0.051
F3		1.75 Typ.		0.069 Typ
G	10.80	11.10	0.425	0.437
H	14.70	15.20	0.578	0.598
L		12.20		0.480
L2		16.20		0.638
L3		18.0 Typ		0.709 Typ.
L5	3.95	4.15	0.156	0.163
L6		31.00 Typ.		1.220 Typ.
O	4.00	4.10	0.157	0.161

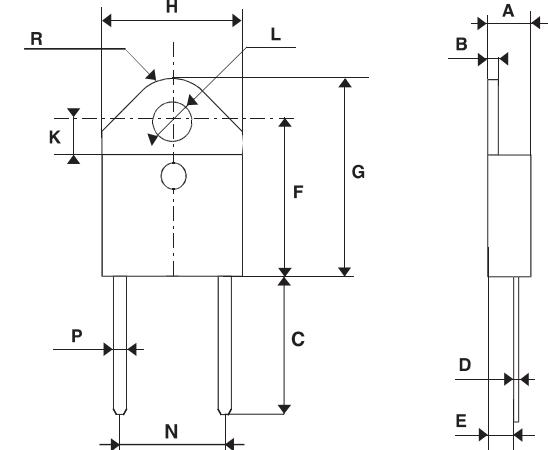
## STTH30R06

Figure 14: TO-220AC Package Mechanical Data



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
H2	10.00	10.40	0.393	0.409
L2	16.40 typ.		0.645 typ.	
L4	13.00	14.00	0.511	0.551
L5	2.65	2.95	0.104	0.116
L6	15.25	15.75	0.600	0.620
L7	6.20	6.60	0.244	0.259
L9	3.50	3.93	0.137	0.154
M	2.6 typ.		0.102 typ.	
Diam. I	3.75	3.85	0.147	0.151

Figure 15: DOP3I Package Mechanical Data



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	1.45	1.55	0.057	0.061
C	14.35	15.60	0.565	0.614
D	0.5	0.7	0.020	0.028
E	2.7	2.9	0.106	0.114
F	15.8	16.5	0.622	0.650
G	20.4	21.1	0.815	0.831
H	15.1	15.5	0.594	0.610
K	3.4	3.65	0.134	0.144
L	4.08	4.17	0.161	0.164
N	10.8	11.3	0.425	0.444
P	1.20	1.40	0.047	0.055
R	4.60 typ.		0.181 typ.	

**Table 7: Ordering Information**

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH30R06D	STTH30R06D	TO-220AC	1.90 g	50	Tube
STTH30R06W	STTH30R06W	DO-247	4.40 g	30	Tube
STTH30R06P	STTH30R06P	SOD-93	3.79 g	30	Tube
STTH30R06PI	STTH30R06PI	DOP3I	4.46 g	30	Tube

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 m.N. (TO-220AC)
- Maximum torque value: 0.70 m.N. (TO-220AC)

**Table 8: Revision History**

Date	Revision	Description of Changes
18-Oct-2004	1	First issue

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