STTH30R06

TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

Table 1: Main Product Characteristics

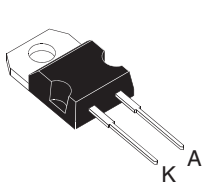
$I_{F(AV)}$	30 A
V_{RRM}	600 V
T_j	175°C
V_F (typ)	1.10 V
t_{rr} (max)	50 ns

FEATURES AND BENEFITS

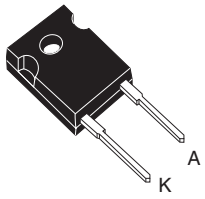
- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching & conduction losses

DESCRIPTION

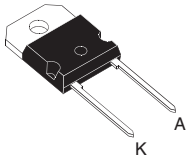
The STTH30R06, which is using ST Turbo 2 600V technology, is specially suited for use in switching power supplies, and industrial applications, as rectification and discontinuous mode PFC boost diode.



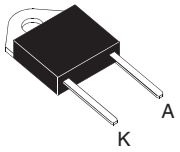
TO-220AC
STTH30R06D



DO-247
STTH30R06W



SOD-93
STTH30R06P



DOP3I
STTH30R06PI

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	Tc = 115°C δ = 0.5	30	A
		DOP3I	Tc = 85°C δ = 0.5		
I_{FSM}	Surge non repetitive forward current		tp = 10ms sinusoidal	160	A
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
$R_{th(j-c)}$	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°C	$V_R = V_{RRM}$			25	µA
		T_j = 150°C			80	800	
V_F **	Forward voltage drop	T_j = 25°C	I_F = 30A			1.85	V
		T_j = 150°C			1.10	1.40	

Pulse test: * tp = 5 ms, δ < 2%

** tp = 380 µs, δ < 2%

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

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			50	ns
			I_F = 1A dI_F/dt = 50 A/µs V_R =30V		50	70	
I_{RM}	Reverse recovery current	T_j = 125°C	I_F = 30A V_R = 400V dI_F/dt = 100 A/µs		8	11	A
t_{fr}	Forward recovery time	T_j = 25°C	I_F = 30A dI_F/dt = 100 A/µs $V_{FR} = 1.1 \times V_{Fmax}$			500	ns
V_{FP}	Forward recovery voltage	T_j = 25°C	I_F = 30A dI_F/dt = 100 A/µs $V_{FR} = 1.1 \times V_{Fmax}$		2.5		V

Figure 1: Conduction losses versus average forward current

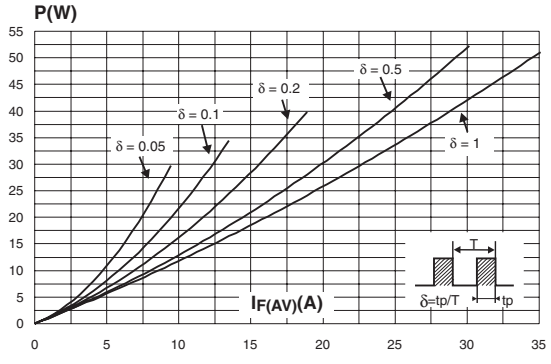


Figure 2: Forward voltage drop versus forward current

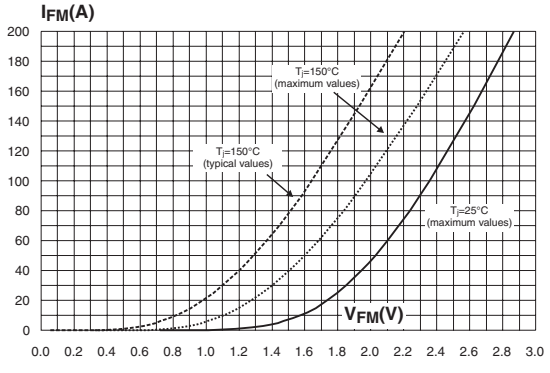


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration

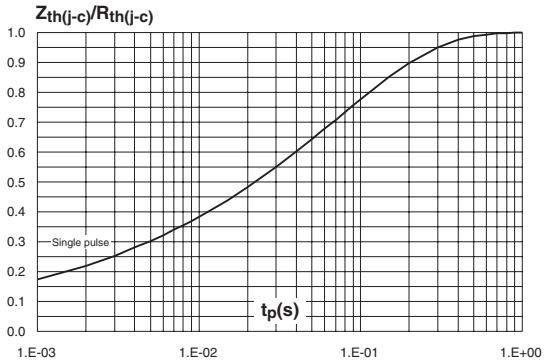


Figure 4: Peak reverse recovery current versus dI_F/dt (typical values)

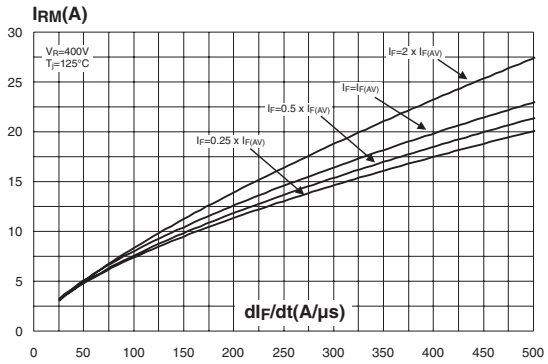


Figure 5: Reverse recovery time versus dI_F/dt (typical values)

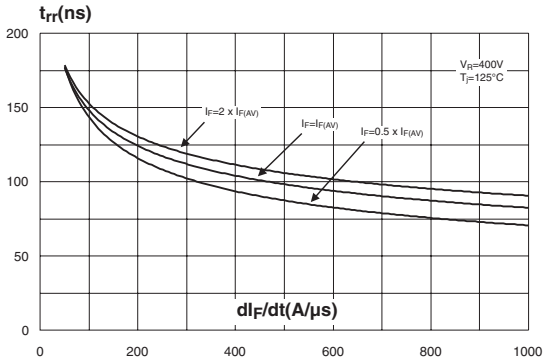


Figure 6: Reverse recovery charges versus dI_F/dt (typical values)

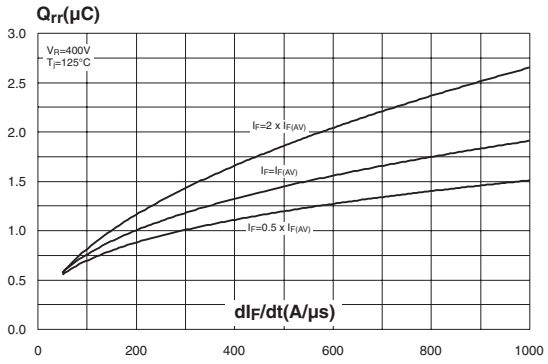


Figure 7: Softness factor versus dI_F/dt (typical values)

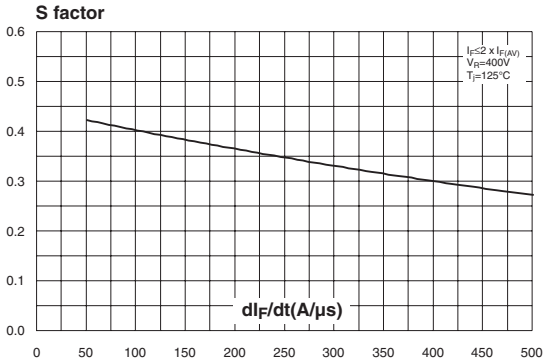


Figure 8: Relative variations of dynamic parameters versus junction temperature

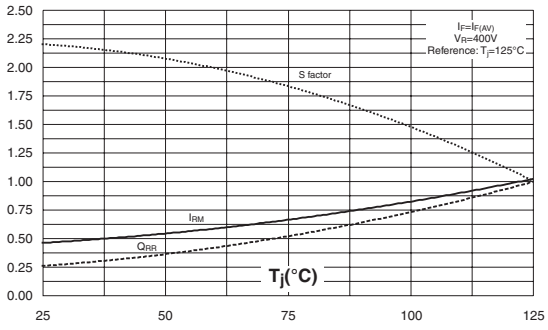


Figure 9: Transient peak forward voltage versus dI_F/dt (typical values)

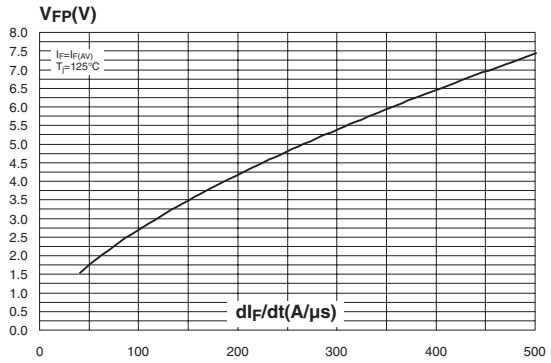


Figure 10: Forward recovery time versus dI_F/dt (typical values)

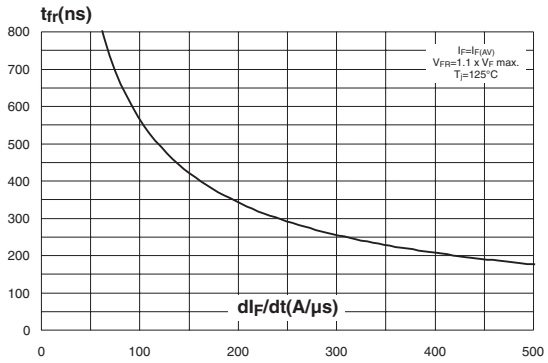


Figure 11: Junction capacitance versus reverse voltage applied (typical values)

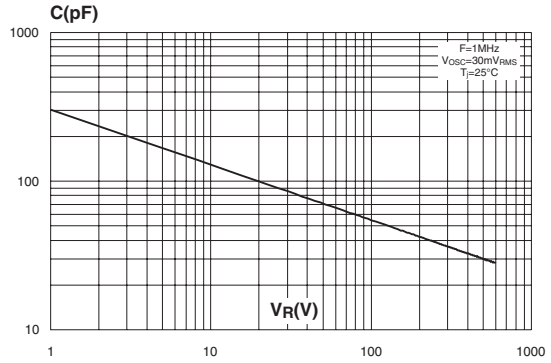
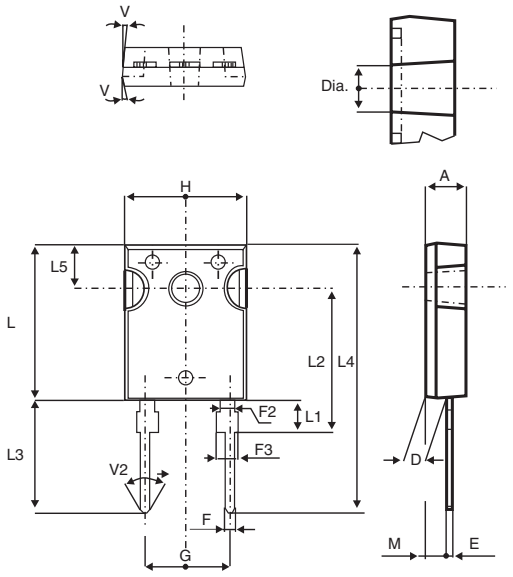
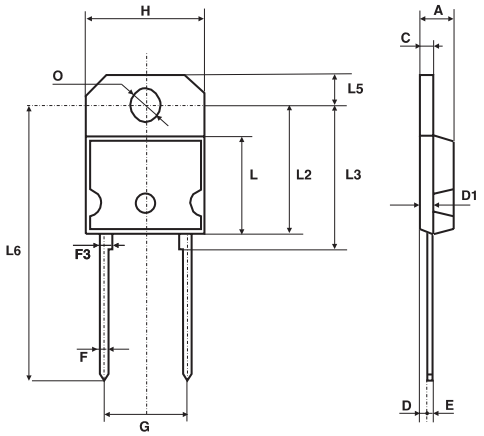


Figure 12: DO-247 Package Mechanical Data



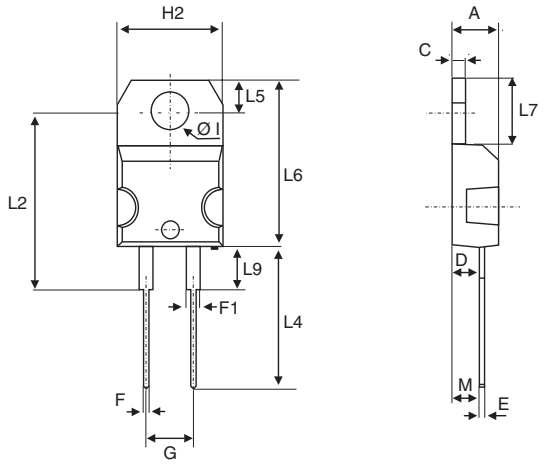
REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
D	2.20		2.60	0.086		0.102
E	0.40		0.80	0.015		0.031
F	1.00		1.40	0.039		0.055
F2		2.00			0.078	
F3	2.00		2.40	0.078		0.094
G		10.90			0.429	
H	15.45		15.75	0.608		0.620
L	19.85		20.15	0.781		0.793
L1	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



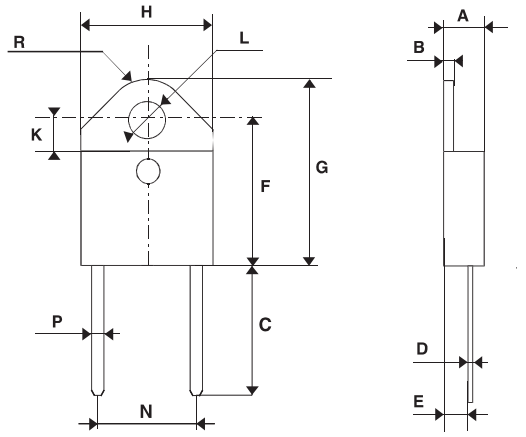
REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.70	4.90	0.185	0.193
C	1.17	1.37	0.046	0.054
D	2.50 Typ.		0.098 Typ.	
D1	1.27 Typ.		0.050 Typ.	
E	0.50	0.78	0.020	0.031
F	1.10	1.30	0.043	0.051
F3	1.75 Typ.		0.069 Typ	
G	10.80	11.10	0.425	0.437
H	14.70	15.20	0.578	0.598
L		12.20		0.480
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

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