THE DATASHEET OF

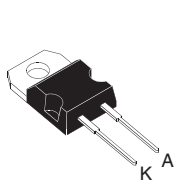
STTH30L06D

STTH30L06

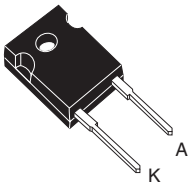
Turbo 2 ultrafast high voltage rectifier

Main product characteristics

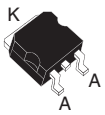
$I_{F(AV)}$	30 A
V_{RRM}	600 V
T_j	175°C
V_F (typ)	1.0 V
t_{rr} (max)	65 ns



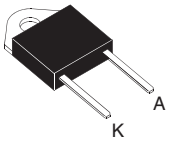
TO-220AC
STTH30L06D



DO-247
STTH30L06W



D²PAK
STTH30L06G



DOP3I
STTH30L06PI

Features and benefits

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching & conduction losses
- Package insulation voltage
  DOP3I: 2500 V_{RMS}

Description

The STTH30L06, 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.

Order codes

Part Number	Marking
STTH30L06D	STTH30L06D
STTH30L06G	STTH30L06G
STTH30L06G-TR	STTH30L06G
STTH30L06W	STTH30L06W
STTH30L06PI	STTH30L06PI

1 Characteristics

Table 1. 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 / TO-247 / D^2PAK	T_c = 125° C δ = 0.5	30	A
		DOP3I	T_c = 95° C δ = 0.5		
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal	160	A
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum operating junction temperature			175	°C

Table 2. Thermal resistance

Symbol	Parameter		Value (max).	Unit
$R_{th(j-c)}$	Junction to case	TO-220AC / TO-247 / D^2PAK	1.1	°C/W
		DOP3I	1.7	

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25° C	$V_R = V_{RRM}$			25	μA
		T_j = 150° C			80	800	
V_F (2)	Forward voltage drop	T_j = 25° C	I_F = 30 A			1.55	V
		T_j = 150° C			1.0	1.25	

1. Pulse test: t_p = 5 ms, δ < 2%
2. Pulse test: t_p = 380 μs, δ < 2%

To evaluate the conduction losses use the following equation: $P = 0.95 \times I_{F(AV)} + 0.010\ I_{F^2(RMS)}$

Table 4. Dynamic Characteristics

Symbol	Parameter	Test conditions		Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	T_j = 25° C	I_F = 0.5 A I_{rr} = 0.25 A I_R =1 A			65	ns
			I_F = 1 A dI_F/dt = 50 A/μs V_R =30 V		65	90	
I_{RM}	Reverse recovery current	T_j = 125° C	I_F = 30 A V_R = 400 V dI_F/dt = 100 A/μs		11.5	16	A
t_{fr}	Forward recovery time	T_j = 25° C	I_F = 30 A 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 = 30 A dI_F/dt = 100 A/μs $V_{FR} = 1.1 \times V_{Fmax}$		2.5		V

Figure 1. Conduction losses versus average forward current

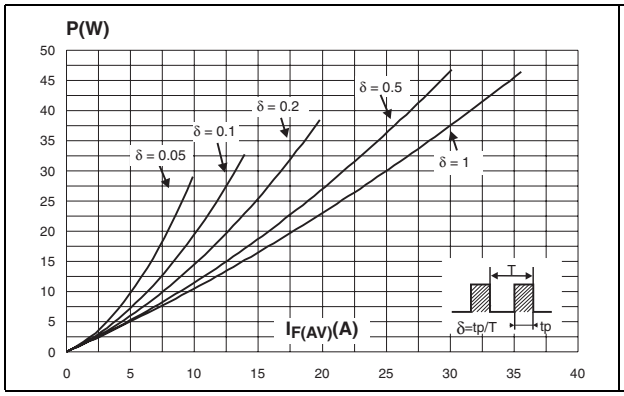


Figure 2. Forward voltage drop versus forward current

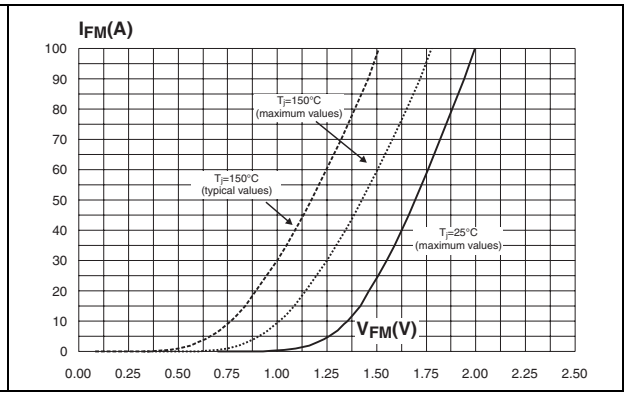


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

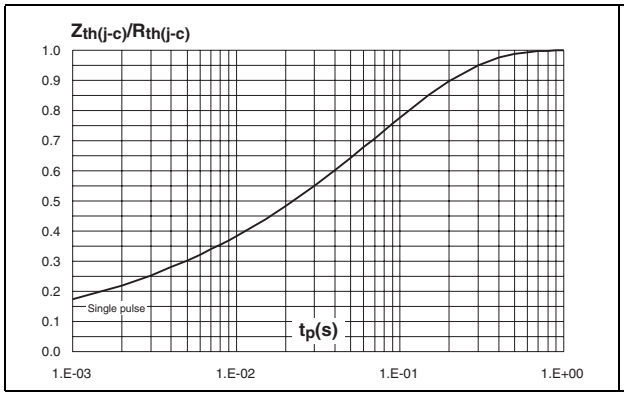


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values)

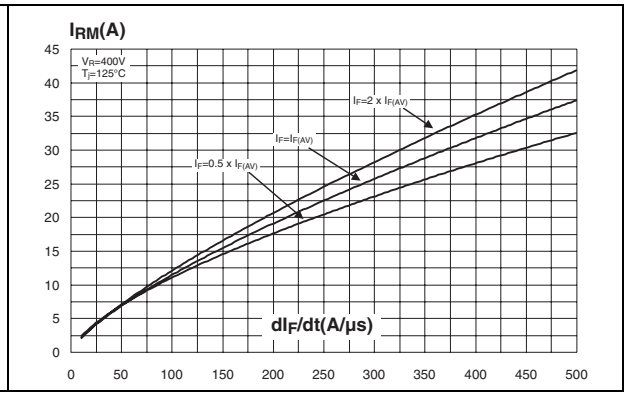


Figure 5. Reverse recovery time versus dI_F/dt (typical values)

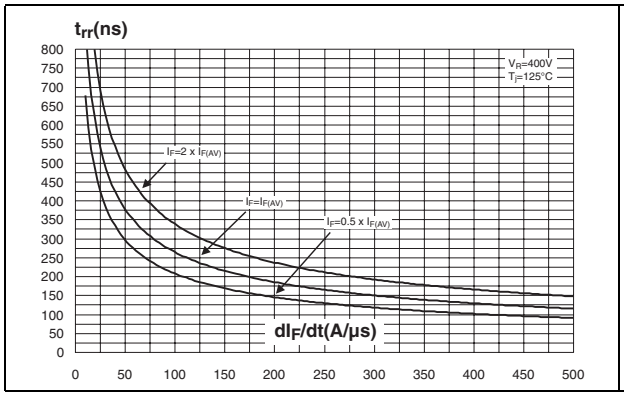


Figure 6. Reverse recovery charges versus dI_F/dt (typical values)

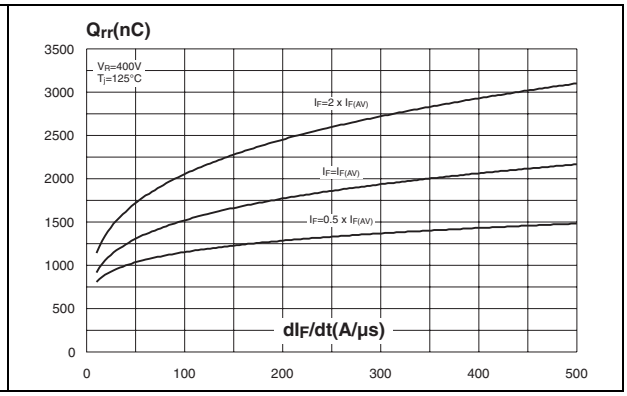


Figure 7. Reverse recovery softness factor versus dI_F/dt (typical values)

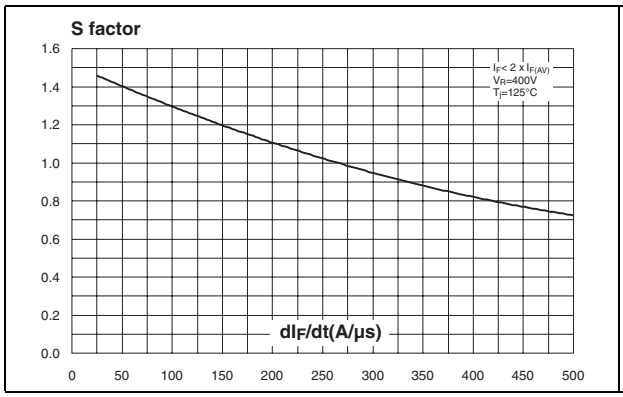


Figure 8. Relative variations of dynamic parameters versus junction temperature

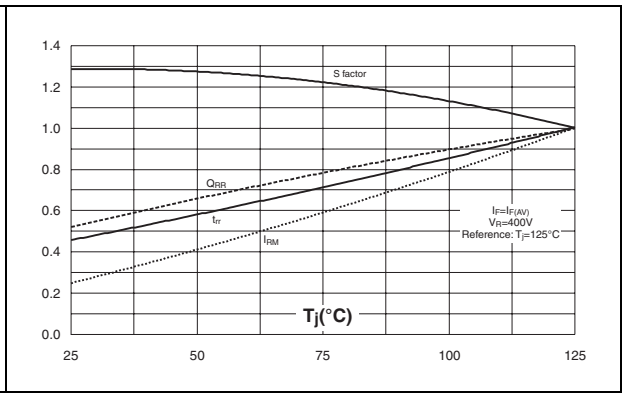


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values)

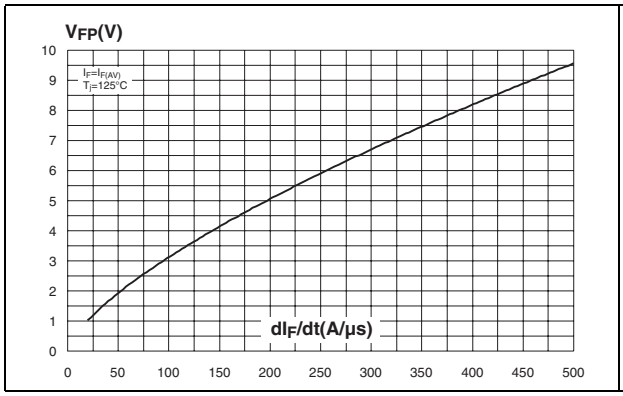


Figure 10. Forward recovery time versus dI_F/dt (typical values)

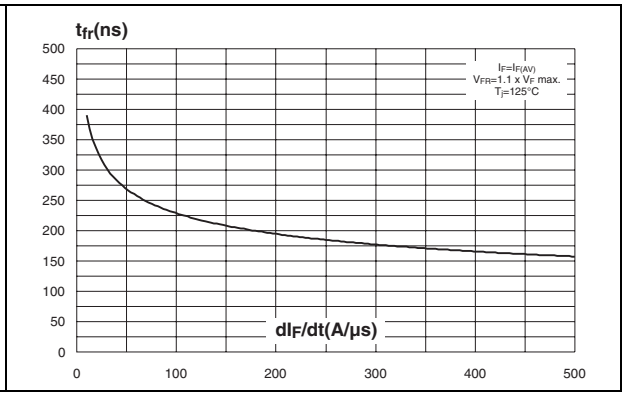


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

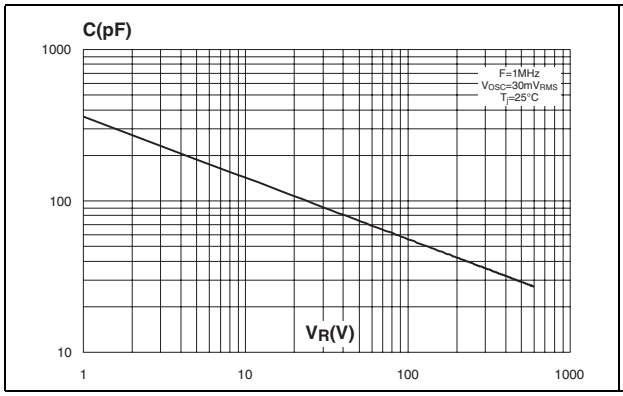
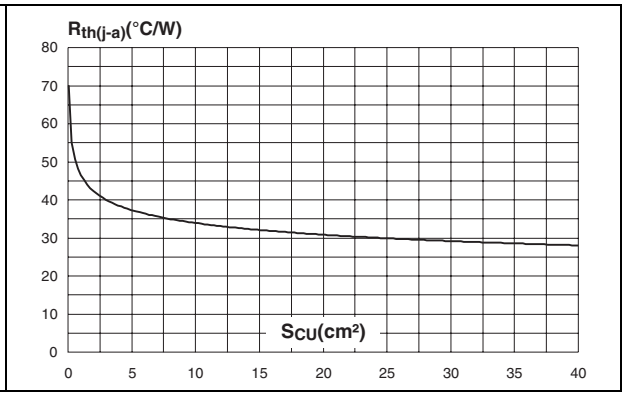


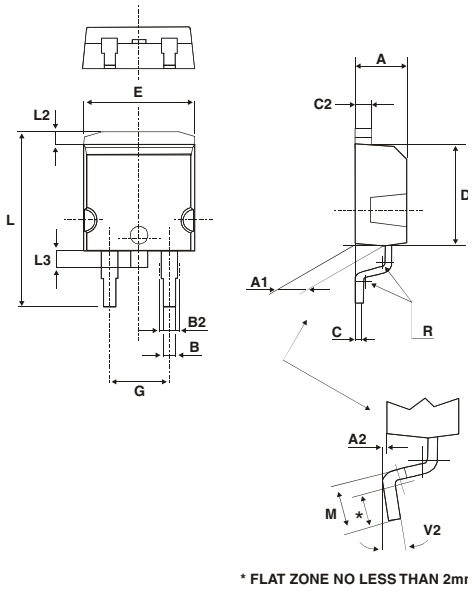
Figure 12. Thermal resistance junction to ambient versus copper surface under tab (epoxy FR4, e_{CU}=35µm) (D^2PAK)



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 Nm (TO-220FPAC) / 0.55 Nm (TO-220AC)
- Maximum torque value: 1.0 Nm (TO-220FPAC) / 0.70 Nm (TO-220AC)

Table 5. D²PAK dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	0.208
L	15.00	15.85	0.590	0.624
L2	1.27	1.40	0.050	0.055
L3	1.40	1.75	0.055	0.069
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

Figure 13. D²PAK footprint (dimensions in mm)

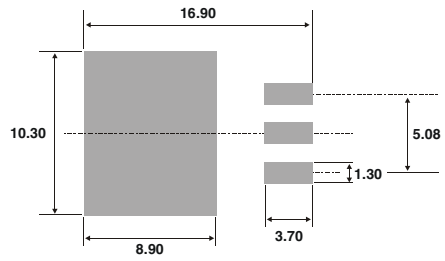
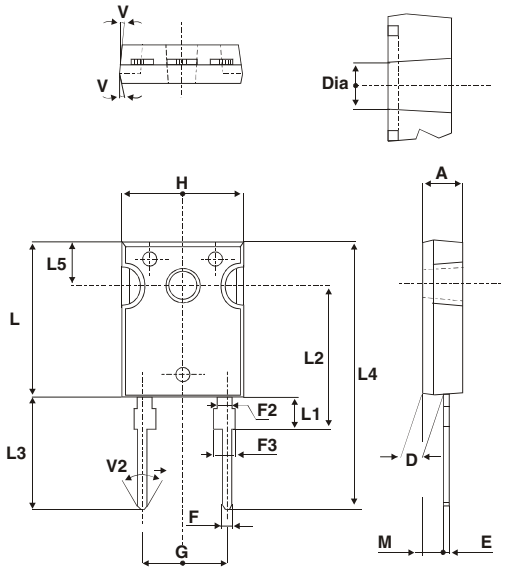
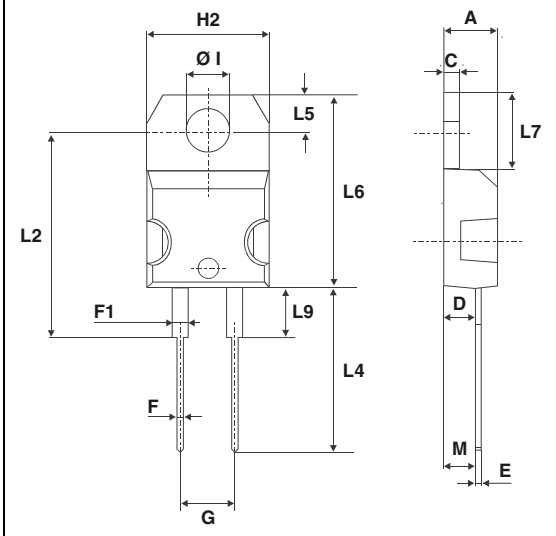


Table 6. DO247 dimensions



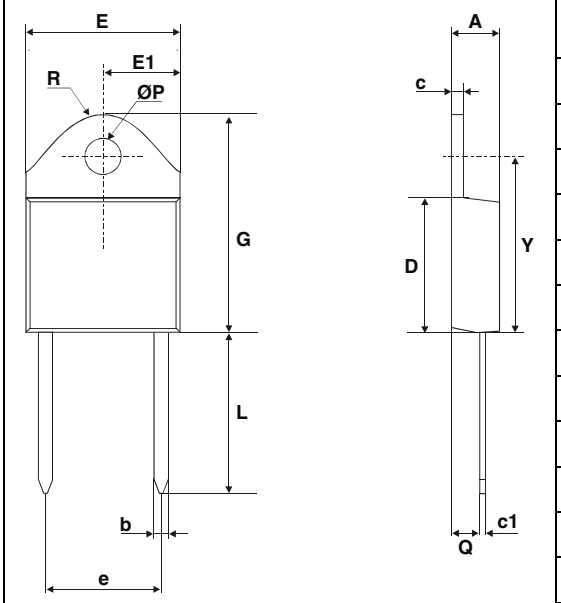
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
D	2.20		2.60	0.086		0.102
E	0.40		0.80	0.015		0.031
F	1.00		1.40	0.039		0.055
F2		2.00			0.078	
F3	2.00		2.40	0.078		0.094
G		10.90			0.429	
H	15.45		15.75	0.608		0.620
L	19.85		20.15	0.781		0.793
L1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

Table 7. TO-220AC dimensions



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

Table 8. DOP3I dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
b	1.20	1.40	0.047	0.055
c	1.45	1.55	0.057	0.061
c1	0.50	0.70	0.020	0.028
D	12.15	13.10	0.474	0.516
E	15.10	15.50	0.594	0.610
E1	7.55	7.75	0.297	0.305
e	10.80	11.30	0.425	0.445
G	20.4	21.10	0.815	0.831
L	14.35	15.60	0.565	0.614
P	4.08	4.17	0.161	0.164
Q	2.70	2.90	0.106	0.114
R	4.60 typ.		0.181 typ.	
Y	15.80	16.50	0.622	0.650

3 Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH30L06D	STTH30L06D	TO-220AC	1.90 g	50	Tube
STTH30L06G	STTH30L06G	D^2PAK	1.48 g	50	Tube
STTH30L06G-TR	STTH30L06G	D^2PAK	1.48 g	1000	Tape & reel
STTH30L06W	STTH30L06W	DO-247	4.40 g	30	Tube
STTH30L06PI	STTH30L06PI	DOP3I	4.46 g	30	Tube

4 Revision history

Date	Revision	Changes
07-Sep-2004	1	First issue.
21-Oct-2004	2	DOP3I package added.
11-Jan-06	3	On page 2: – $I_{F(RMS)}$ corrected from 30 A to 50 A – $I_{F(AV)}$ corrected from 50 A to 30 A
10-Aug-2006	4	Reformatted to current standards. SOD-93 packaage removed.

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