STTH8L06

Turbo 2 ultrafast high voltage rectifier

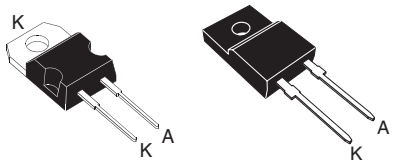
Features

- Ultrafast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching and conduction losses
- Package insulation voltage:
  - TO-220AC Ins: 2500 V rms
  - TO-220FPAC: 2000 V DC

Description

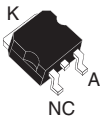
The STTH8L06, which is using ST Turbo2 600 V technology, is specially suited as boost diode in discontinuous or critical mode power factor corrections.

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

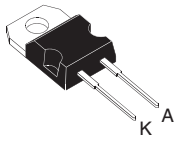


TO-220AC
STTH8L06D

TO-220FPAC
STTH8L06FP



D²PAK
STTH8L06G



TO-220AC Insulated
STTH8L06DIRG

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	8 A
V_{RRM}	600 V
I_R (max)	200 µA
T_j	175 °C
V_F (typ)	0.85 V
t_{rr} (typ)	75 ns

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			600	V
$I_{F(RMS)}$	Forward rms current	TO-220AC / TO-220FPAC / D^2PAK		30	A
		TO-220AC Ins.		24	
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO-220AC / D^2PAK	T_c = 150 °C	8	A
		TO-220FPAC	T_c = 125 °C		
		TO-220AC Ins.	T_c = 135 °C		
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal	120	A
T_{stg}	Storage temperature range			-65 to 175	°C
T_j	Operating junction temperature range			-40 to 175	°C

Table 3. Thermal resistance

Symbol	Parameter		Value (max)	Unit
$R_{th(j-c)}$	Junction to case	TO-220AC / D^2PAK	2.5	°C/W
		TO-220FPAC	5	
		TO-220AC Ins.	4	

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			8	µA
		T_j = 150 °C			16	200	
V_F	Forward voltage drop	T_j = 25 °C	I_F = 8 A			1.3	V
		T_j = 150 °C			0.85	1.05	

To evaluate the conduction losses use the following equation: $P = 0.89 \times I_{F(AV)} + 0.022\ I_{F^2(RMS)}$

Table 5. Dynamic characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 1 A, dI_F/dt = -50 A/µs V_R = 30 V		75	105	ns
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 8 A, dI_F/dt = 100 A/µs, V_R = 400 V		7.2	10	A
t_{fr}	Forward recovery time	T_j = 25°C	I_F = 8 A, dI_F/dt = 100 A/µs V_{FR} = 1.1 x V_{Fmax}			150	ns
V_{FP}	Forward recovery voltage		I_F = 8 A, dI_F/dt = 100 A/µs			6	V

Figure 1. Conduction losses versus average current

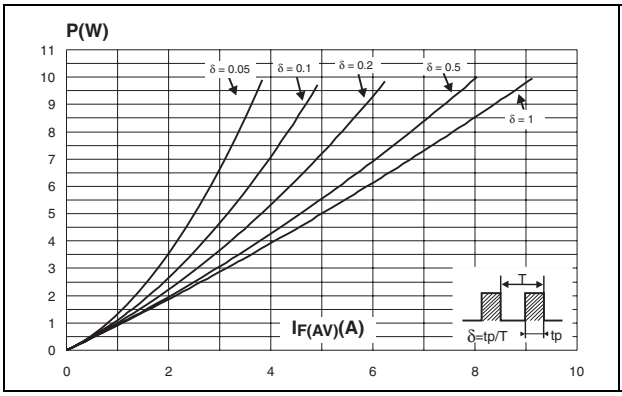


Figure 2. Forward voltage drop versus forward current

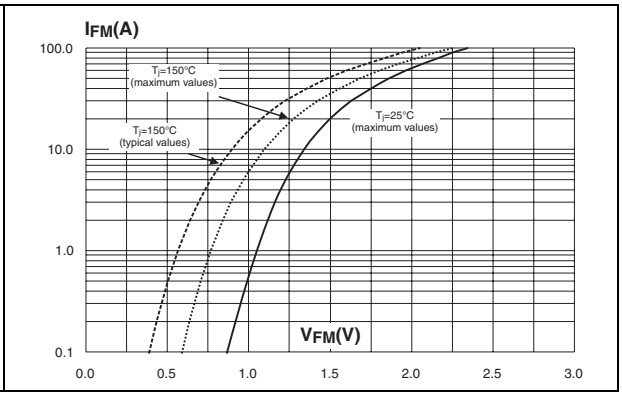


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAC)

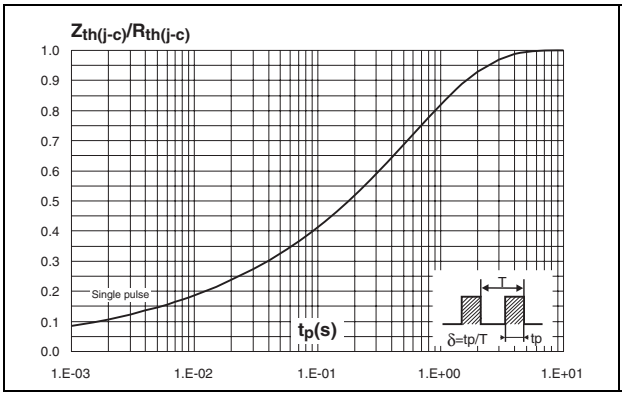


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

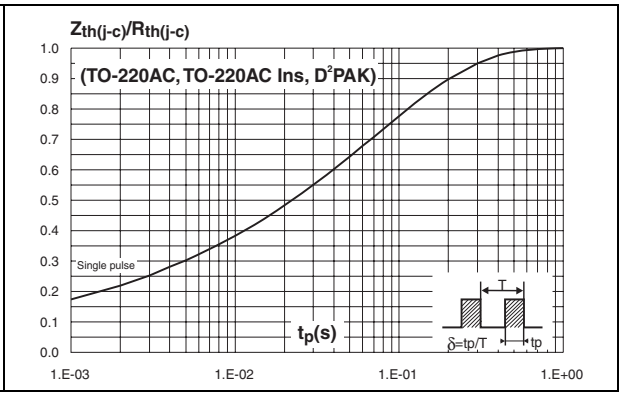


Figure 5. Peak reverse recovery current versus dI_F/dt (typical values)

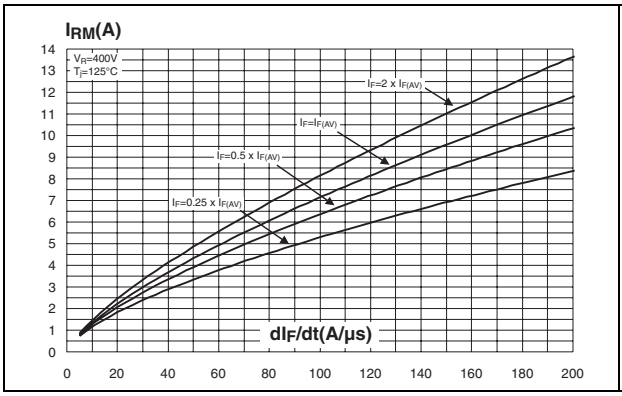


Figure 6. Reverse recovery time versus dI_F/dt (typical values)

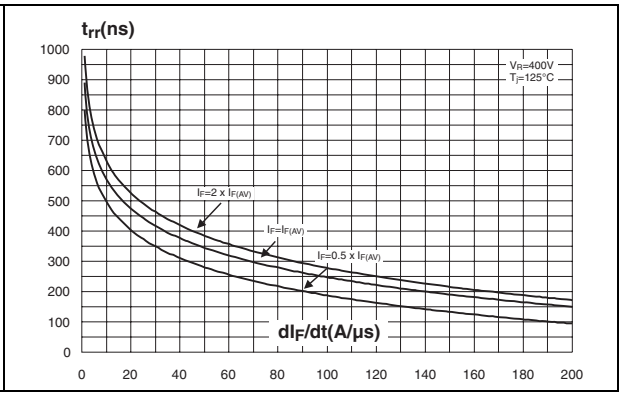


Figure 7. Reverse recovery charges versus dI_F/dt (typical values)

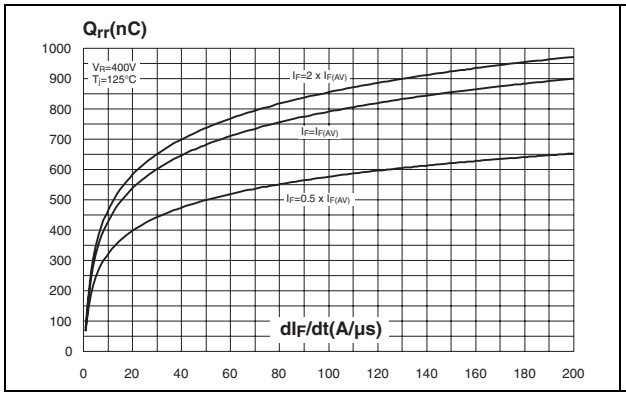


Figure 8. Softness factor versus dI_F/dt (typical values)

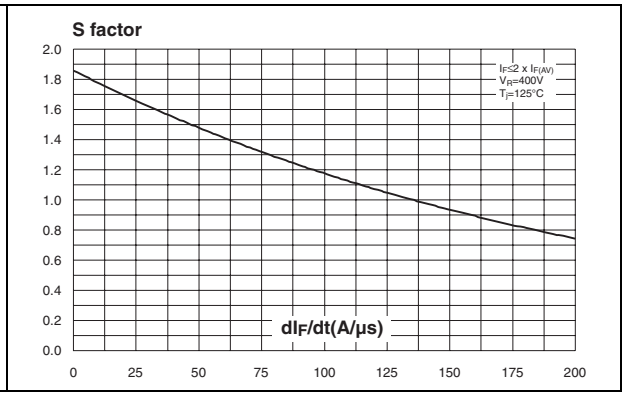


Figure 9. Relative variations of dynamic parameters versus junction temperature

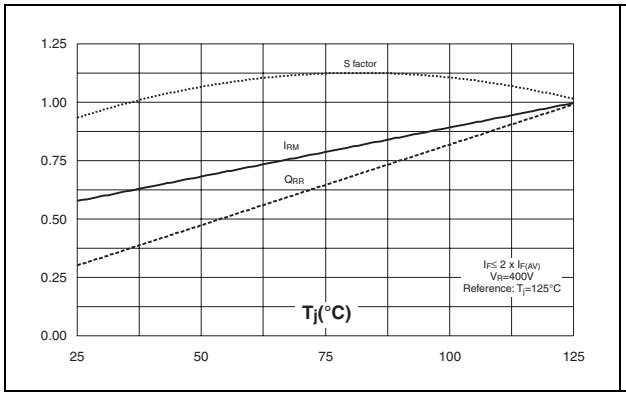


Figure 10. Transient peak forward voltage versus dI_F/dt (typical values)

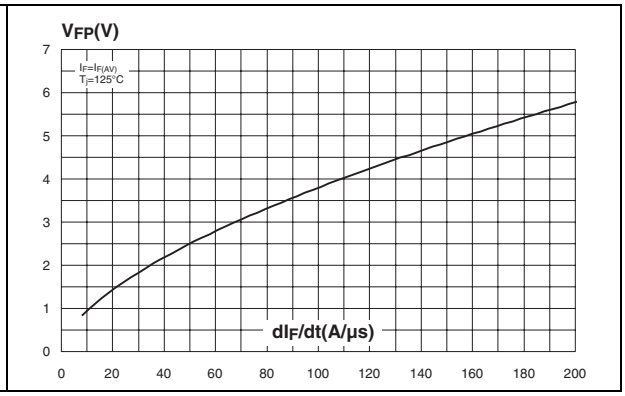


Figure 11. Forward recovery time versus dI_F/dt (typical values)

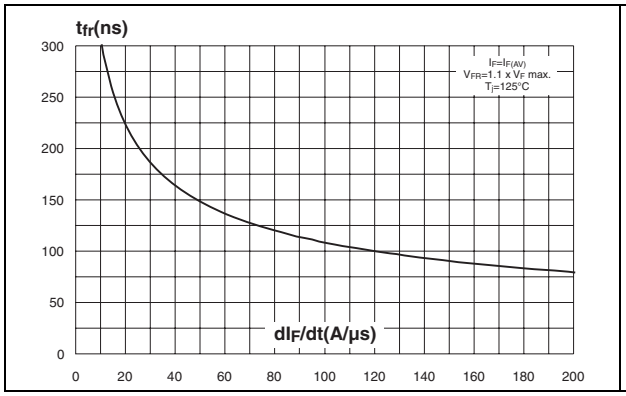


Figure 12. Junction capacitance versus reverse voltage applied (typical values)

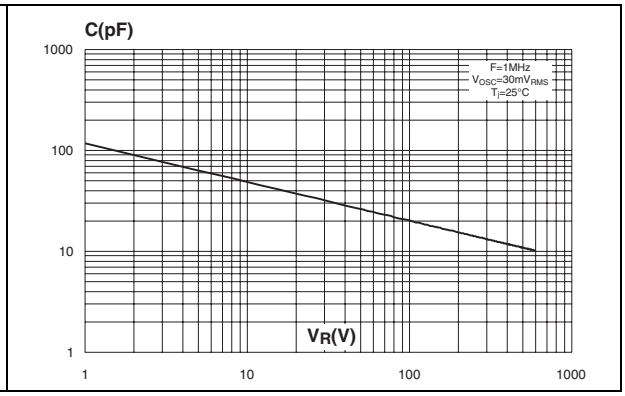
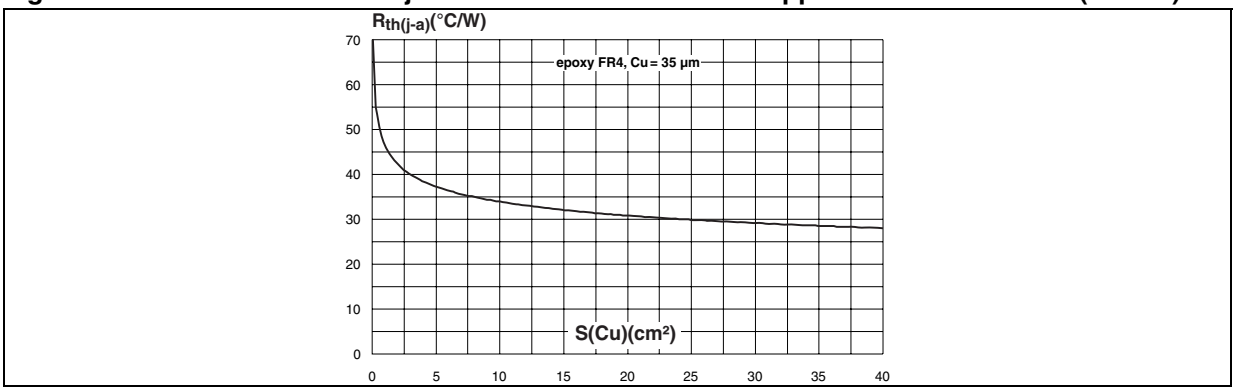


Figure 13. Thermal resistance junction to ambient versus copper surface under tab (D^2PAK)

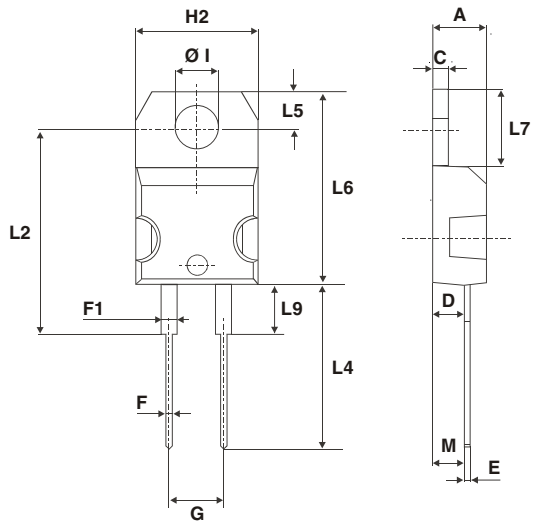


2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.4 N·m to 0.6 N·m

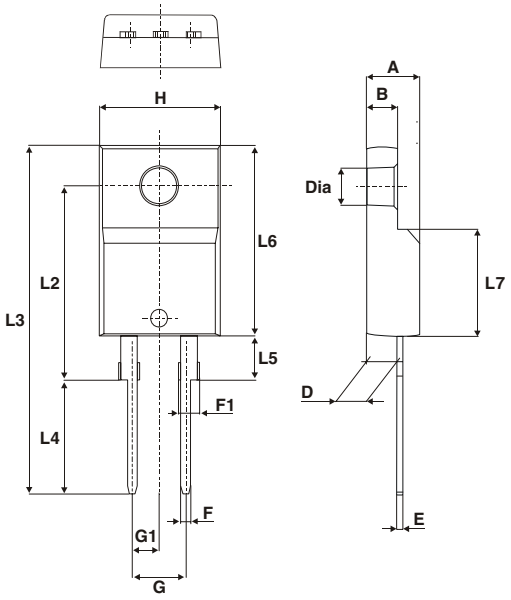
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 6. TO-220AC dimensions



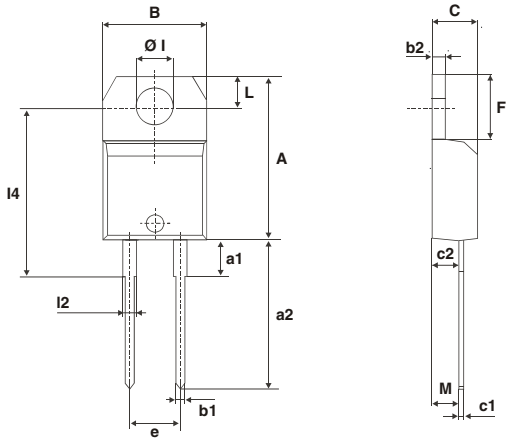
Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
H2	10.00	10.40	0.393	0.409
L2	16.40 typ.		0.645 typ.	
L4	13.00	14.00	0.511	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 7. TO-220FPAC dimensions



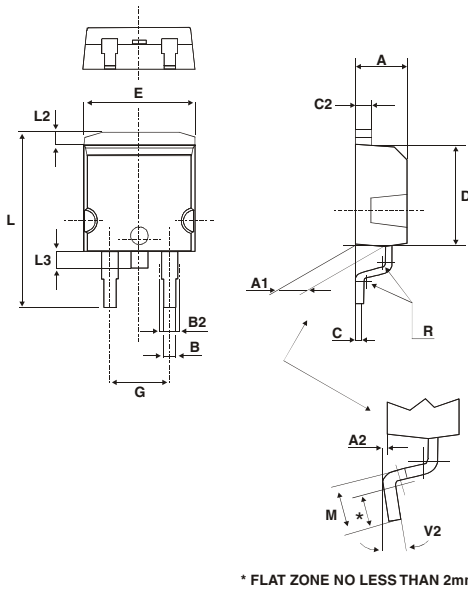
Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		0.63 Typ.	
L3	28.6	30.6	1.126	1.205
L4	9.8	10.6	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.9	16.4	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia.	3.00	3.20	0.118	0.126

Table 8. TO-220AC (Nins. & Ins. 20-up) dimensions



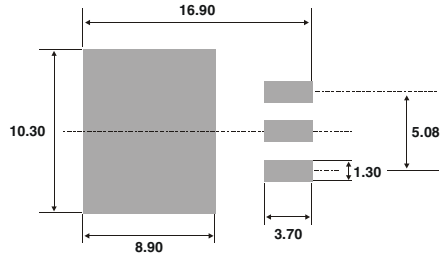
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
B	10.00		10.40	0.393		0.409
b1	0.61		0.88	0.024		0.034
b2	1.23		1.32	0.048		0.051
C	4.40		4.60	0.173		0.181
c1	0.49		0.70	0.019		0.027
c2	2.40		2.72	0.094		0.107
e	4.80		5.40	0.189		0.212
F	6.20		6.60	0.244		0.259
ØI	3.75		3.85	0.147		0.151
I4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
I2	1.14		1.70	0.044		0.066
M		2.60			0.102	

Table 9. 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 14. Footprint (dimensions in mm)



3 Ordering information

Table 10. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH8L06D	STTH8L06D	TO-220AC	1.90 g	50	Tube
STTH8L06G	STTH8L06G	D^2PAK	1.48 g	50	Tube
STTH8L066G-TR	STTH8L06G	D^2PAK	1.48 g	1000	Tape and reel
STTH8L06FP	STTH8L06FP	TO-220FPAC	1.70 g	50	Tube
STTH8L06DIRG	STTH8L06DI	TO-220AC Ins.	1.86 g	50	Tube

4 Revision history

Table 11. Document revision history

Date	Revision	Changes
Nov-2002	2A	Last issue
18-Oct-2004	3	TO-220AC Insulated and D^2PAK packages added
13-Jun-2005	4	T_j changed from value 175 to range -40 to 175 °C - Page1
10-Aug-2006	5	Reformatted to current standard. Added package insulation voltage data on page 1. Changed order code STTH8L06DI to STTH8L06DIRG.
07-Feb-2012	6	Added I_{RM} to *Table 4*.

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