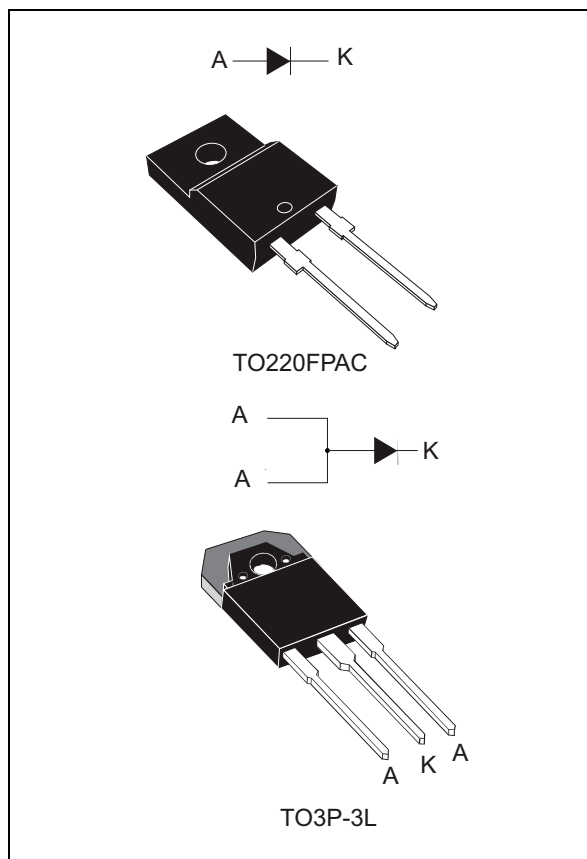


Turbo 2 ultrafast high voltage rectifier

Datasheet - production data



Description

The STTH30AC06, implementing the ST Turbo 2 600 V technology, is suitable as a boost diode, especially in air conditioning equipment for continuous mode interleaved power factor correction.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	30 A
V_{RRM}	600 V
t_{rr} (typ)	45 ns
V_F (typ)	1.15 V
T_j (max)	175 °C

Features

- Ultrafast switching
- Low reverse current
- Reduces switching and conduction losses
- Low thermal resistance
- Insulated package: TO-220FPAC
 - Insulated voltage: 2000 V_{RMS} sine

1 Characteristics

Table 2. Absolute ratings (limiting values per diode at 25 °C, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	Forward rms current		50	A
$I_{F(AV)}$	Average forward current		30	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10$ ms sinusoidal	270	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature		175	°C

Table 3. Thermal parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220FPAC	3.5	°C/W
		TO3P-3L	0.7	

Table 4. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25$ °C	$V_R = V_{RRM}$			20	μA
		$T_j = 150$ °C			80	800	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25$ °C	$I_F = 30$ A			1.95	V
		$T_j = 150$ °C			1.15	1.45	

1. Pulse test: $t_p = 5$ ms, $\delta < 2\%$

2. Pulse test: $t_p = 380$ μs, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 1.1 \times I_{F(AV)} + 0.012 I_{F(RMS)}^2$$

Table 5. 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			35	ns
			$I_F = 1$ A, $V_R = 30$ V, $dI_F/dt = 50$ A/μs		45	60	
I_{RM}	Reverse recovery current	$T_j = 125$ °C	$I_F = 30$ A, $V_R = 400$ V, $dI_F/dt = 100$ A/μs		6	8	A

Figure 1. Average forward power dissipation versus average forward current

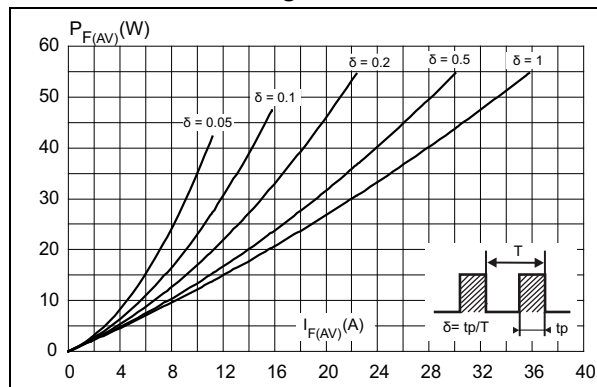


Figure 2. Forward voltage drop versus forward current (typical values)

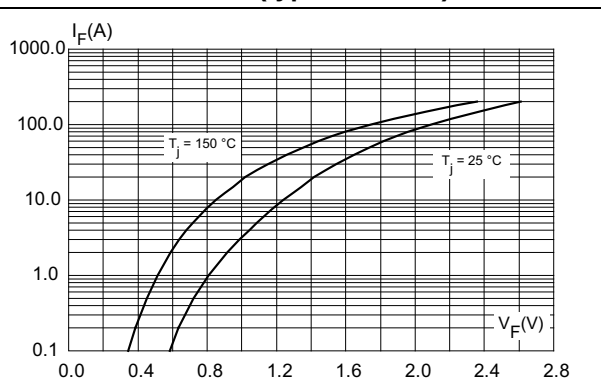


Figure 3. Forward voltage drop versus forward current (maximum values)

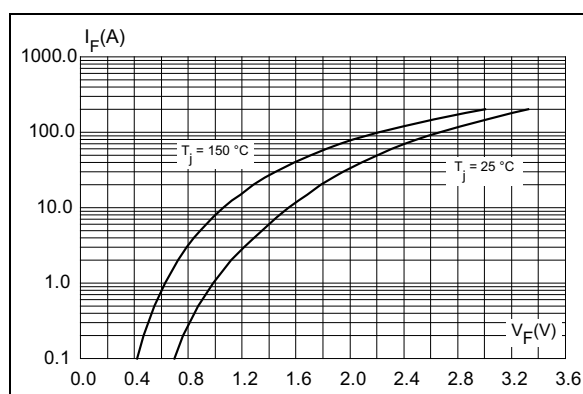


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration (TO-220FPAC)

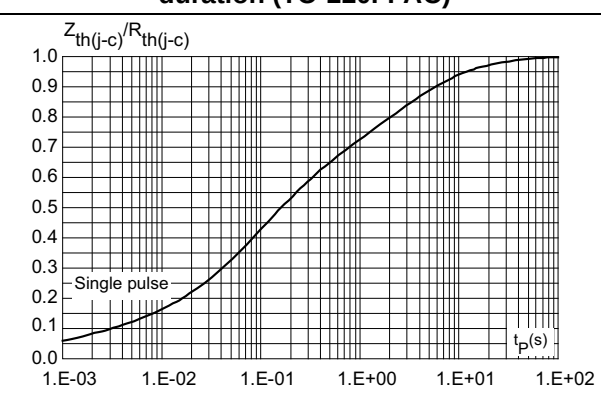


Figure 5. Relative variation of thermal impedance, junction to case, versus pulse duration (TO3P-3L)

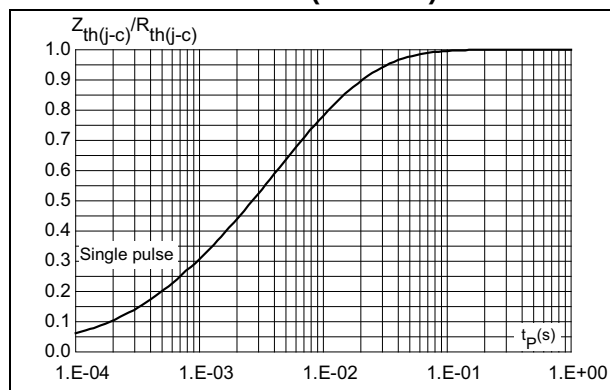


Figure 6. Peak reverse recovery current versus di_F/dt (typical values)

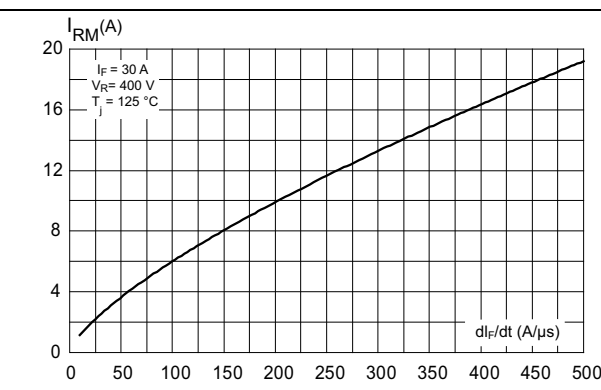


Figure 7. Reverse recovery time versus di_F/dt (typical values)

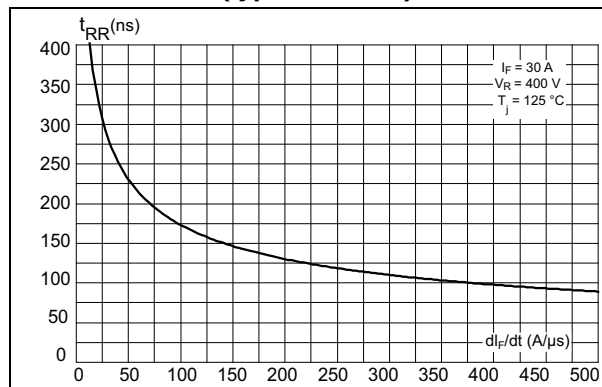


Figure 8. Reverse recovery charges versus di_F/dt (typical values)

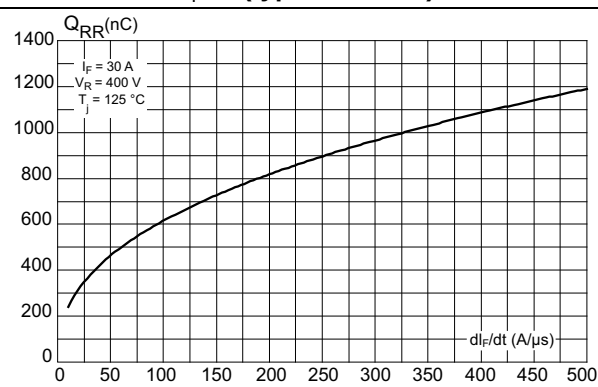


Figure 9. Reverse recovery softness factor versus di_F/dt (typical values)

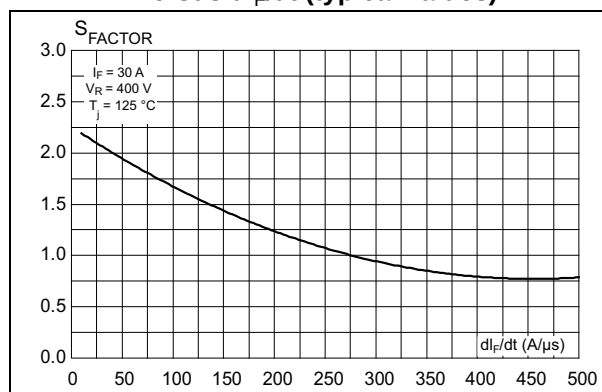


Figure 10. Relative variations of dynamic parameters versus junction temperature

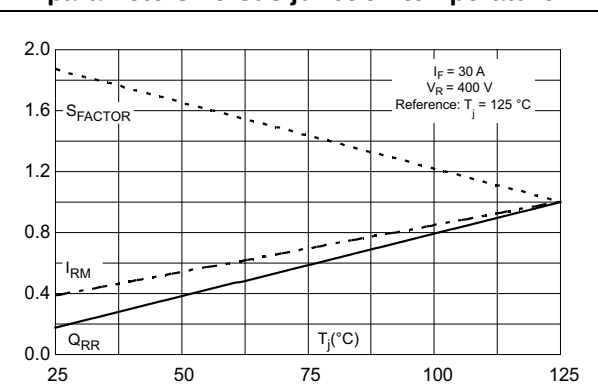
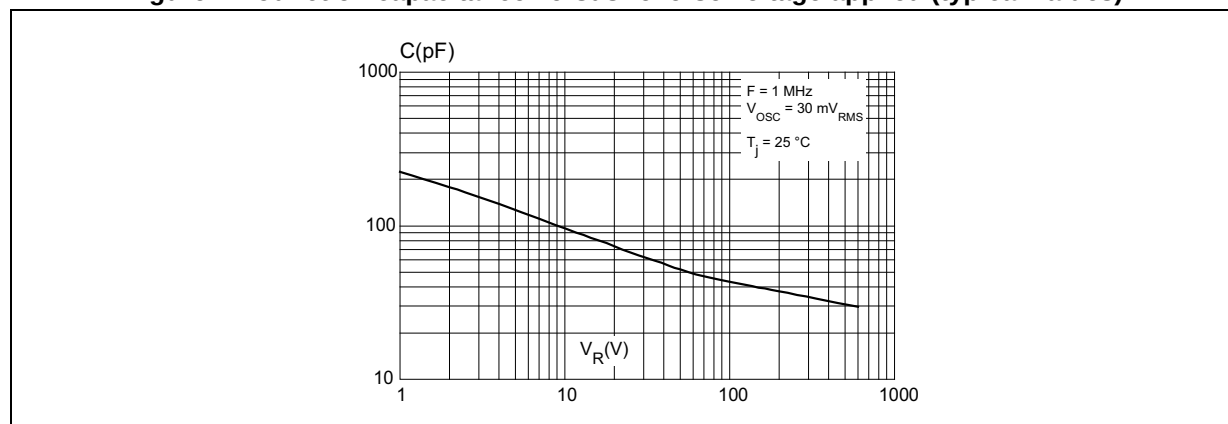


Figure 11. Junction capacitance versus reverse voltage applied (typical values)



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: (TO-220FPAC) 0.55 N·m
- Recommended torque: (TO3P-3L) 0.4 to 0.6 N·m
- Maximum torque value: (TO-220FPAC) 0.7 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.

2.1 TO3P-3L package information

Figure 12. TO3P-3L package outline

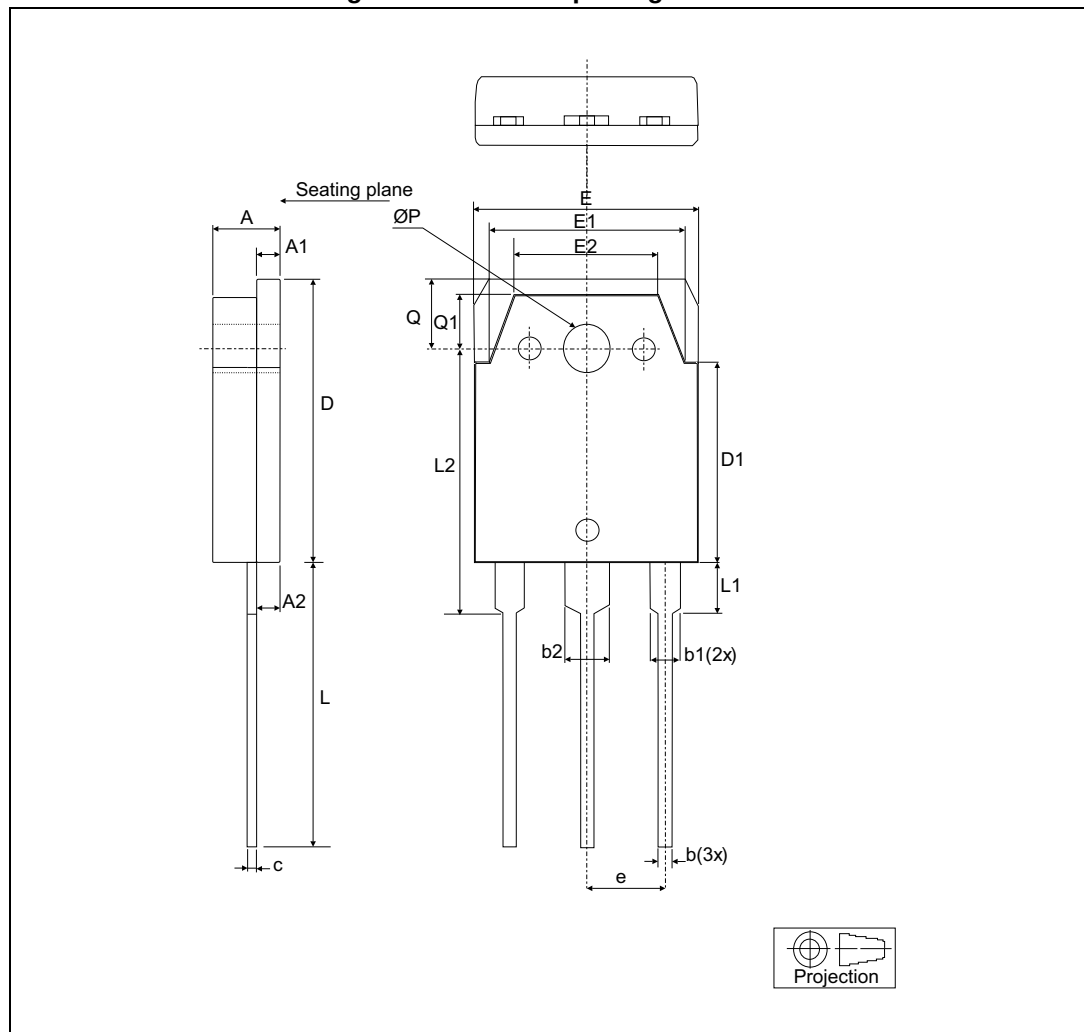


Table 6. TO3P-3L dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.6		5	0.18		0.19
A1	1.45	1.5	1.65	0.05	0.06	0.06
A2	1.20	1.40	1.60	0.04	0.05	0.06
b	0.80	1	1.20	0.03	0.04	0.05
b1	1.80		2.20	0.07		0.08
b2	2.80		3.20	0.11		0.12
c	0.55	0.60	0.75	0.02	0.02	0.03
D	19.70	19.90	20.10	0.77	0.78	0.79
D1		13.90			0.54	
E	15.40		15.80	0.60		0.62
E1		13.60			0.53	
E2		9.60			0.38	
e	5.15	5.45	5.75	0.20	0.21	0.22
L	19.50	20	20.50	0.76	0.78	0.80
L1		3.50			0.14	
L2	18.20	18.40	18.60	0.71	0.72	0.73
ØP	3.10		3.30	0.12		0.13
Q		5			0.19	
Q1		3.80			0.15	

2.2 TO-220AC package information

Figure 13. TO-220FPAC package outline

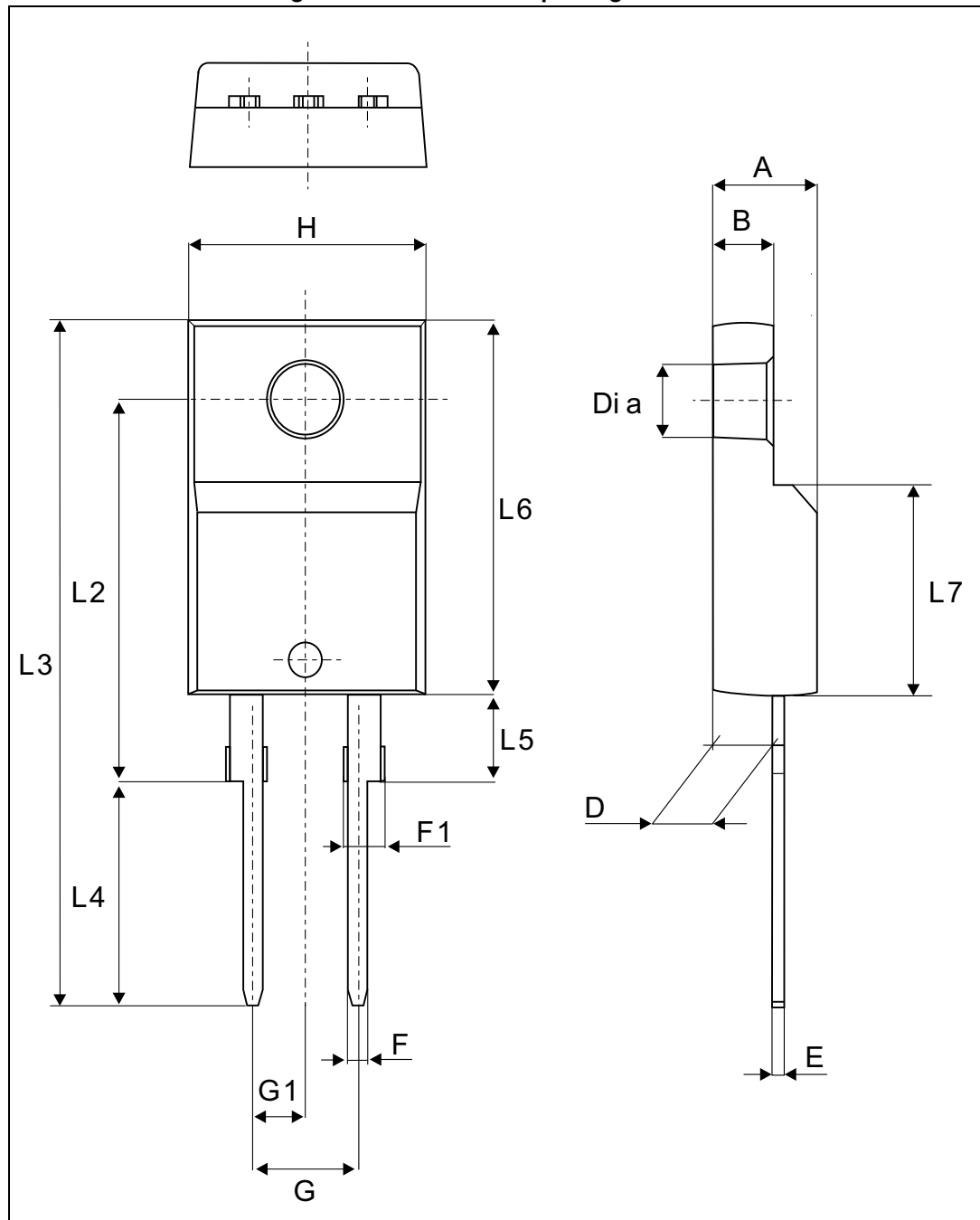


Table 7. TO-220FPAC package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	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
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

3 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH30AC06FP	STTH30AC06FP	TO-220FPAC	1.8 g	50	Tube
STTH30AC06SP	STTH30AC06SP	TO3P-3L	5.26	30	Tube

4 Revision history

Table 9. Document revision history

Date	Revision	Changes
09-Mar-2016	1	First release.

IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2016 STMicroelectronics – All rights reserved