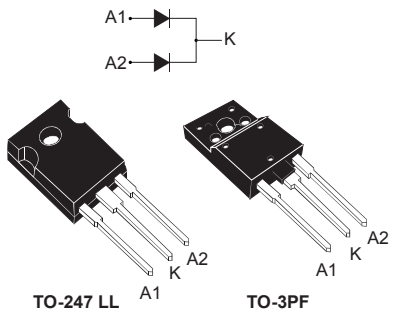
STTH30AC06C

Datasheet

600 V, 2 x 15 A ultrafast high voltage diode



TO-247 LL TO-3PF

Product status link
STTH30AC06C

Product summary	
$I_{F(AV)}$	2 x 15 A
V_{RRM}	600 V
t_{rr} (typ)	40 ns
V_F (typ)	1.15 V
T_j	175 °C

Features

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching and conduction losses
- Insulated package TO-3PF:
  - Insulated voltage: 2500 V_{DC}

Applications

- Air conditioning equipment
- Power supplies and converters
- Boost PFC
- Rectification diode
- Freewheeling diode

Description

The STTH30AC06C uses ST Turbo 2 600 V technology. It is suited as boost diode specially for use in air conditioning equipment as continuous mode interleaved power factor correction.

1 Characteristics

Table 1. 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		30	A
$I_{F(AV)}$	Average forward current	Per diode	15	A
		Per device	30	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	140	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature		175	°C

Table 2. Thermal parameters

Symbol	Parameter			Max. value	Unit
$R_{th(j-c)}$	Junction to case	TO247 LL	Per diode	1.5	°C/W
			Total	0.85	
		TO-3PF	Per diode	3.5	
			Total	2.7	
$R_{th(c)}$	Coupling	TO247 LL		0.2	
		TO-3PF		1.9	

For more information, refer to the following application note :

- AN5088: Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		10	µA
		T_j = 150 °C		-	40	400	
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 15 A	-		1.95	V
		T_j = 150 °C		-	1.15	1.45	
		T_j = 25 °C	I_F = 30 A	-		2.25	
		T_j = 150 °C		-	1.42	1.8	

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:

$P = 1.1 \times I_{F(AV)} + 0.023 \times I_F{}^2{}_{(RMS)}$

For more information, refer to the following application notes related to the power losses :

- AN604: Calculation of conduction losses in a power rectifier
- AN5028: Calculation of turn-off power losses generated by an ultrafast diode

Table 4. **Dynamic characteristics (per diode)**

Symbol	Parameters	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	-		30	ns
			I_F = 1 A dI_F/dt = 50 A/µs V_R = 30 V	-	40	55	
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 15 A dI_F/dt = 100 A/µs V_R = 400 V	-	4	5.5	A
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 15 A dI_F/dt = 100 A/µs V_{FR} = 1.9 V	-		100	ns
V_{FP}	Forward recovery voltage			-	2.5		V

1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current (per diode)

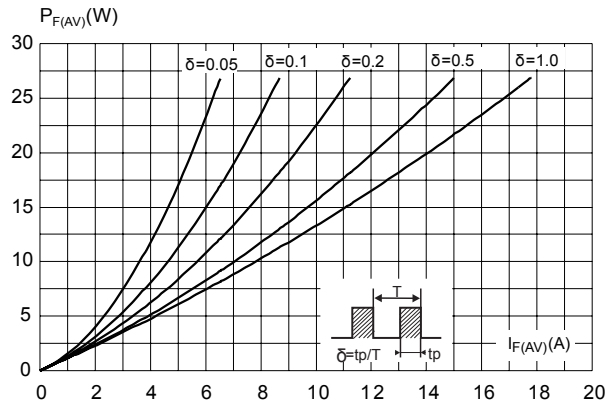


Figure 2. Forward voltage drop versus forward current (typical values, per diode)

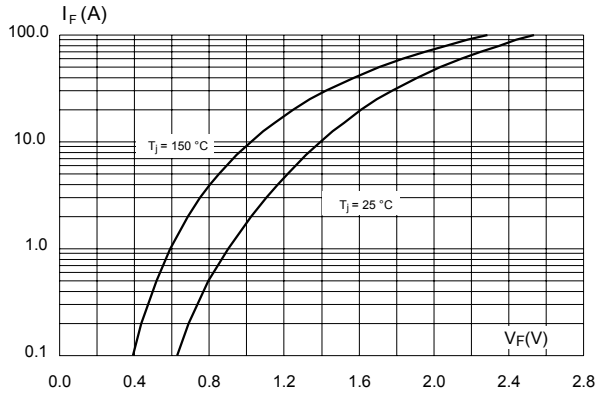


Figure 3. Forward voltage drop versus forward current (maximum values, per diode)

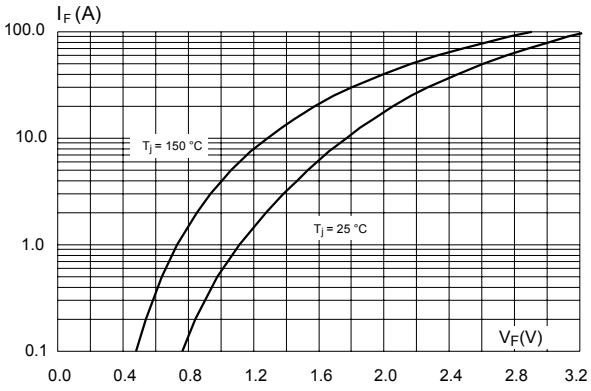


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration

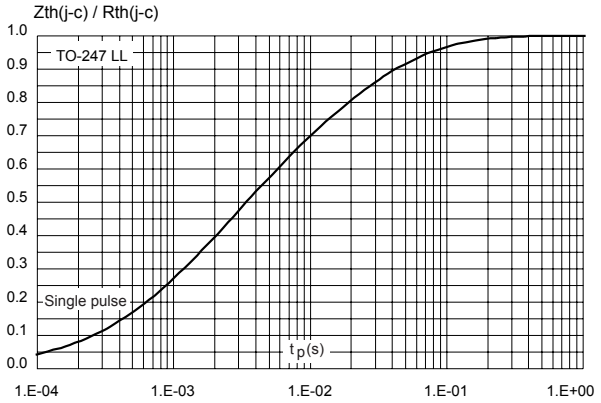


Figure 5. Relative variation of thermal impedance, junction to case, versus pulse duration

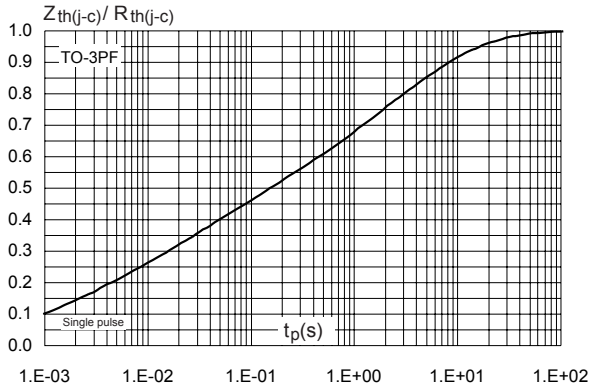


Figure 6. Peak reverse recovery current versus dI_F/dt (typical values, per diode)

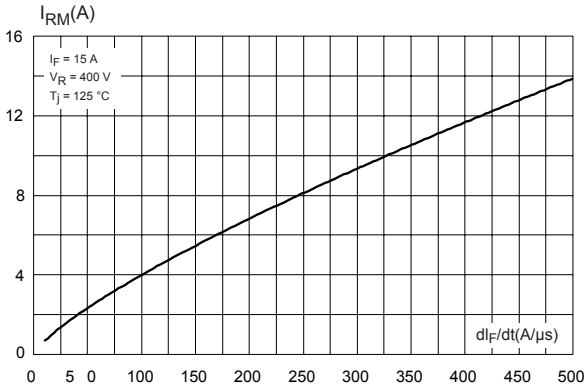


Figure 7. Reverse recovery time versus dI_F/dt (typical values, per diode)

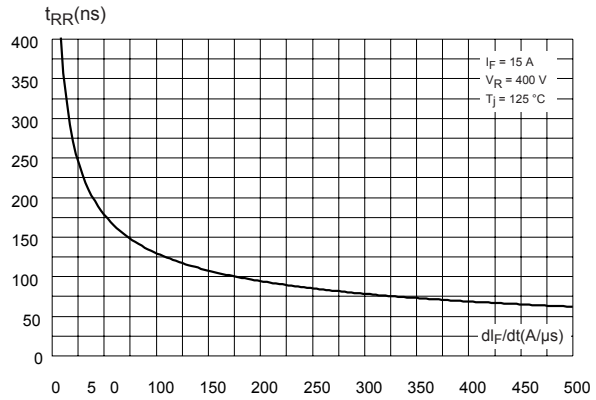


Figure 8. Reverse recovery charges versus dI_F/dt (typical values, per diode)

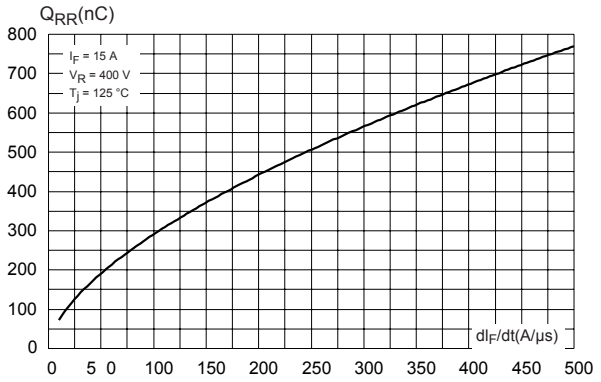


Figure 9. Reverse recovery softness factor versus dI_F/dt (typical values, per diode)

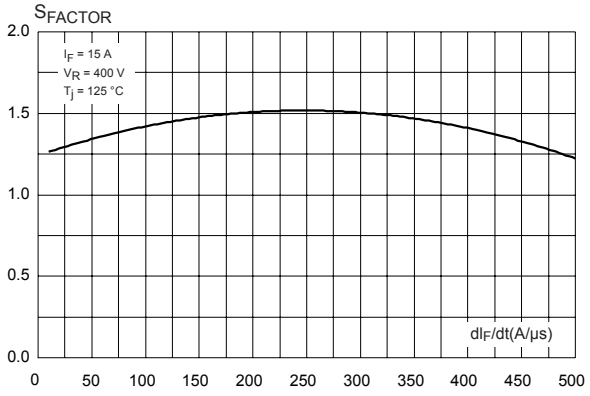


Figure 10. Relative variations of dynamic parameters versus junction temperature

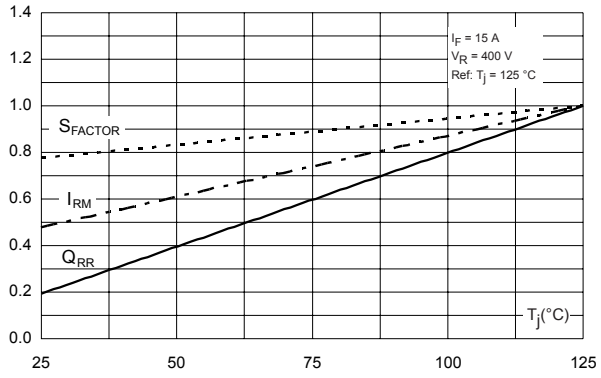


Figure 11. Transient peak forward voltage versus dI_F/dt (typical values, per diode)

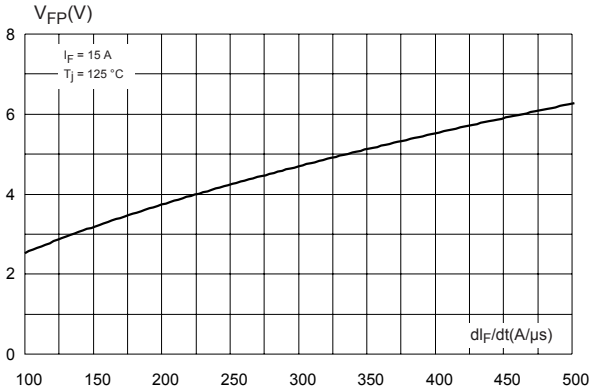


Figure 12. Forward recovery time versus dI_F/dt (typical values, per diode)

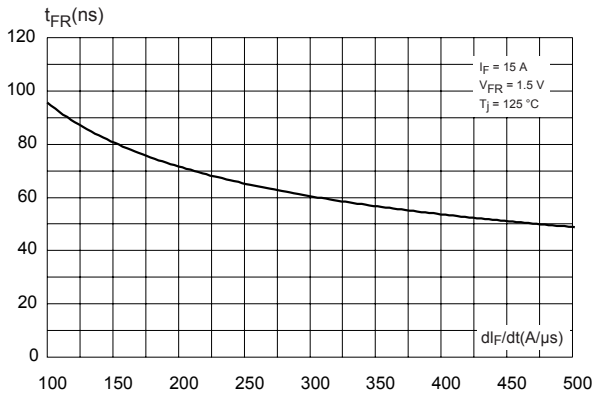
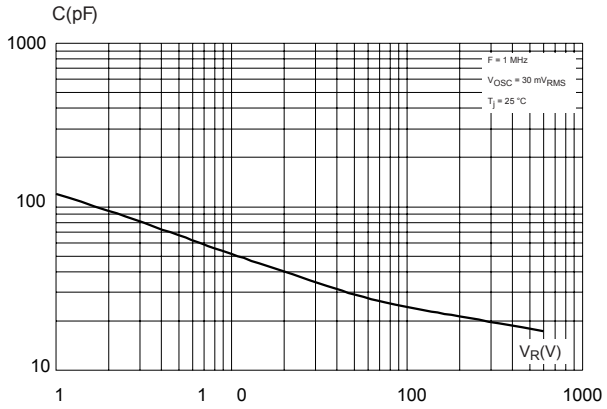


Figure 13. Junction capacitance versus reverse voltage applied (typical values, per diode)



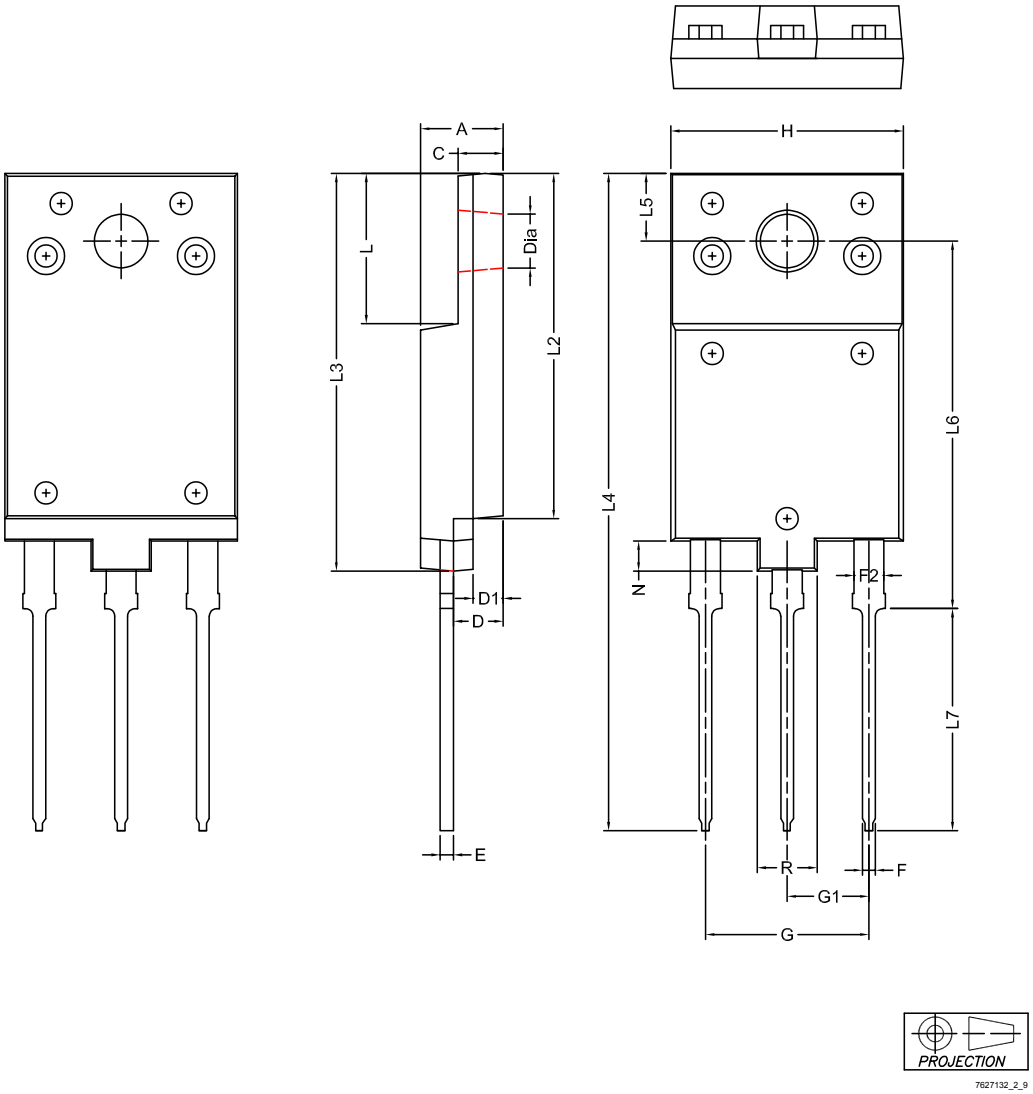
2 Package information

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 TO-3PF package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque: 0.8 to 1.0 N·m

Figure 14. TO-3PF package outline



Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5. **TO-3PF mechanical data**

Dim.	mm		
	Min.	Typ.	Max.
A	5.30	5.50	5.70
C	2.80	3.00	3.20
D	3.10	3.30	3.50
D1	1.80	2.00	2.20
E	0.80	0.95	1.10
F	0.65	0.80	0.95
F2	1.80	2.00	2.20
G	10.30	10.90	11.50
G1		5.45	
H	15.30	15.50	15.70
L	9.80	10.00	10.20
L2	22.80	23.00	23.20
L3	26.30	26.50	26.70
L4	43.20	43.80	44.40
L5	4.30	4.50	4.70
L6	24.30	24.50	24.70
L7	14.60	14.80	15.00
N	1.80	2.00	2.20
R	3.80	4.00	4.20
Dia	3.40	3.60	3.80

2.2 TO-247 LL package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 N·m
- Maximum torque value: 1.0 N·m

Figure 15. TO-247 LL package outline

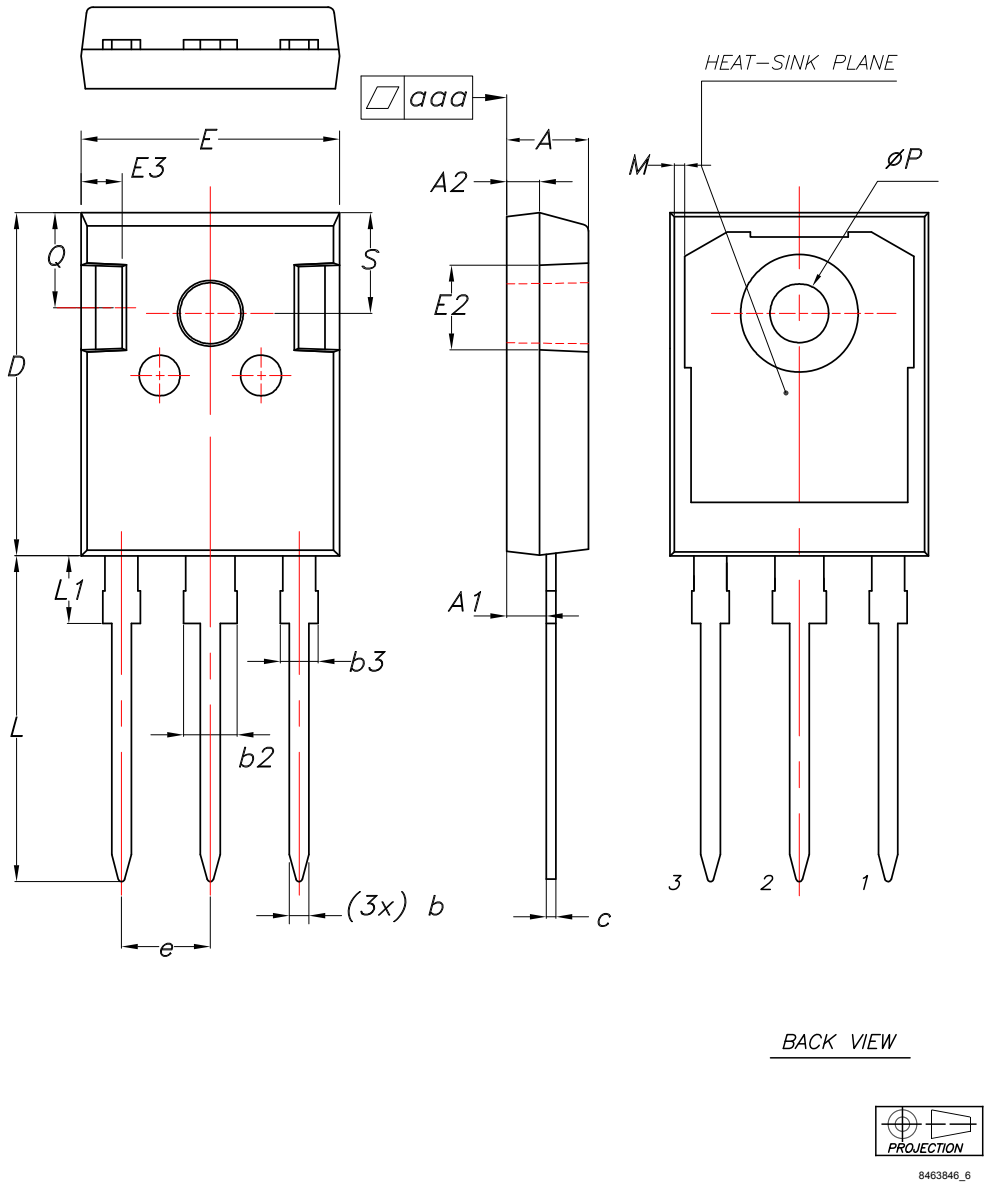


Table 6. **TO-247 LL package mechanical data**

Dim.	mm.			Inches (only for reference)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.90	5.00	5.10	0.192	0.196	0.200
A1	2.31	2.41	2.51	0.090	0.094	0.098
A2	1.90	2.00	2.10	0.074	0.078	0.082
b	1.16		1.26	0.045		0.049
b2			3.25			0.128
b3			2.25			0.089
c	0.59		0.66	0.0232		0.0260
D	20.90	21.00	21.10	0.8228	0.826	0.830
E	15.70	15.80	15.90	0.6181	0.622	0.626
E2	4.90	5.00	5.10	0.192	0.196	0.200
E3	2.40	2.50	2.60	0.094	0.098	0.102
e	5.34	5.44	5.54	0.2102	0.2142	0.2181
L	19.80	19.92	20.10	0.779	0.784	0.792
L1			4.30			0.170
M	0.35		0.95	0.013		0.038
P	3.50	3.60	3.70	0.137	0.141	0.145
Q	5.60		6.00	0.220		0.236
S	6.05	6.15	6.25	0.238	0.242	0.246
aaa		0.04	0.10		0.001	0.004

3 Ordering information

Table 7. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH30AC06CPF	TH30AC06C	TO-3PF	5.6 g	30	Tube
STTH30AC06CWL	STTH30AC06CWL	TO-247 LL	4.36 g	30	

Revision history

Table 8. **Document revision history**

Date	Version	Changes
13-Nov-2013	1	Initial release.
25-Jun-2015	2	Update of cover page and *Table 7*. Format updated to current standard.
01-Jul-2015	3	Updated *Features*.
05-Sep-2016	4	Updated *Figure 16*.
18-Apr-2018	5	Updated TO247LL POA drawing.
30-Oct-2025	6	Added Section Applications, and updated Section 2: Package information. Removed TO3P-3L package information.

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