



# STTH802CT/CB/CFP

## HIGH EFFICIENCY ULTRAFAST DIODE

### MAIN PRODUCT CHARACTERISTICS

|                |        |
|----------------|--------|
| $I_{F(AV)}$    | 2 x 4A |
| $V_{RRM}$      | 200 V  |
| $T_j$ (max)    | 175 °C |
| $V_F$ (max)    | 0.95 V |
| $t_{rr}$ (max) | 20 ns  |

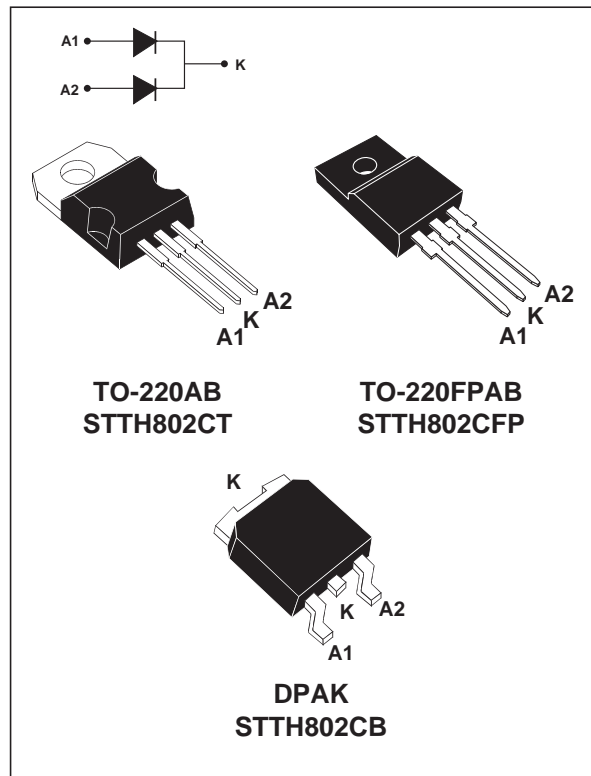
### FEATURES AND BENEFITS

- Suited for SMPS
- Low losses
- Low forward and reverse recovery times
- High surge current capability
- High junction temperature
- Insulated package: TO-220FPAB

### DESCRIPTION

Dual center tap rectifier suited for Switch Mode Power Supplies and High frequency DC to DC converters.

Packaged in DPAK, TO-220AB or TO-220FPAB. This device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.



### ABSOLUTE RATINGS (limiting values)

| Symbol       | Parameter                              |                              |                           | Value      | Unit |   |
|--------------|--|------------------------------|---------------------------|------------|------|---|
| $V_{RRM}$    | Repetitive peak reverse voltage        |                              |                           | 200        | V    |   |
| $I_{F(RMS)}$ | RMS forward current                    | TO-220AB / TO-220FPAB / DPAK |                           | 10         | A    |   |
| $I_{F(AV)}$  | Average forward current $\delta = 0.5$ | TO-220AB / DPAK              | $T_c = 155^\circ\text{C}$ | Per diode  | 4    | A |
|              |  | TO-220FPAB                   | $T_c = 145^\circ\text{C}$ |            |      |   |
|              |  | TO-220AB / DPAK              | $T_c = 150^\circ\text{C}$ | Per device | 8    | A |
|              |  | TO-220FPAB                   | $T_c = 130^\circ\text{C}$ |            |      |   |
| $I_{FSM}$    | Surge non repetitive forward current   |                              | $t_p = 10$ ms Sinusoidal  | 50         | A    |   |
| $T_{stg}$    | Storage temperature range              |                              |                           | - 65 + 175 | °C   |   |
| $T_j$        | Maximum operating junction temperature |                              |                           | 175        | °C   |   |

## STTH802/CT/CB/CFP

### THERMAL PARAMETERS

| Symbol               | Parameter        |                 | Maximum   | Unit |      |
|----------------------|------------------|-----------------|-----------|------|------|
| R <sub>th(j-c)</sub> | Junction to case | TO-220AB / DPAK | Per diode | 4.0  | °C/W |
|                      |                  | TO-220FPAB      |           | 6.5  |      |
|                      |                  | TO-220AB / DPAK | Total     | 2.5  |      |
|                      |                  | TO-220FPAB      |           | 5    |      |
| R <sub>th(j-c)</sub> | Coupling         | TO-220AB / DPAK | 1         | °C/W |      |
|                      |                  | TO-220FPAB      | 3.5       |      |      |

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j (\text{diode1}) = P(\text{diode1}) \times R_{th(j-c)} (\text{per diode}) + P(\text{diode2}) \times R_{th(c)}$$

### STATIC ELECTRICAL CHARACTERISTICS

| Symbol            | Parameter               | Tests conditions       |                                   | Min. | Typ. | Max. | Unit |
|-------------------|-------------------------|------------------------|-----------------------------------|------|------|------|------|
| I <sub>R</sub> *  | Reverse leakage current | T <sub>j</sub> = 25°C  | V <sub>R</sub> = V <sub>RRM</sub> |      |      | 4    | μA   |
|                   |                         | T <sub>j</sub> = 125°C |                                   |      | 2    | 40   |      |
| V <sub>F</sub> ** | Forward voltage drop    | T <sub>j</sub> = 25°C  | I <sub>F</sub> = 4 A              |      |      | 1.1  | V    |
|                   |                         | T <sub>j</sub> = 125°C | I <sub>F</sub> = 4 A              |      | 0.81 | 0.95 |      |
|                   |                         | T <sub>j</sub> = 25°C  | I <sub>F</sub> = 8 A              |      |      | 1.25 |      |
|                   |                         | T <sub>j</sub> = 125°C | I <sub>F</sub> = 8 A              |      | 0.95 | 1.1  |      |

Pulse test: \* t<sub>p</sub> = 5ms, δ < 2%

\*\* t<sub>p</sub> = 380μs, δ < 2%

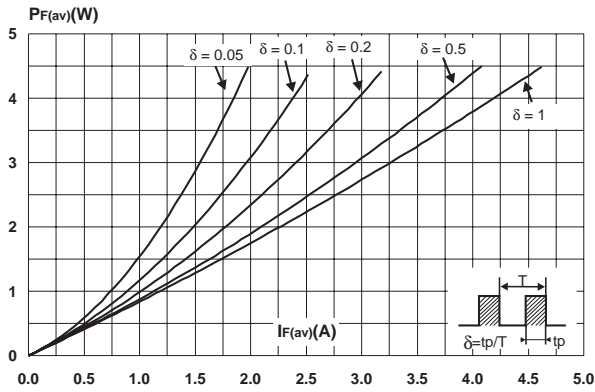
To evaluate the maximum conduction losses use the following equation :

$$P = 0.80 \times I_{F(AV)} + 0.037 I_{F(RMS)}^2$$

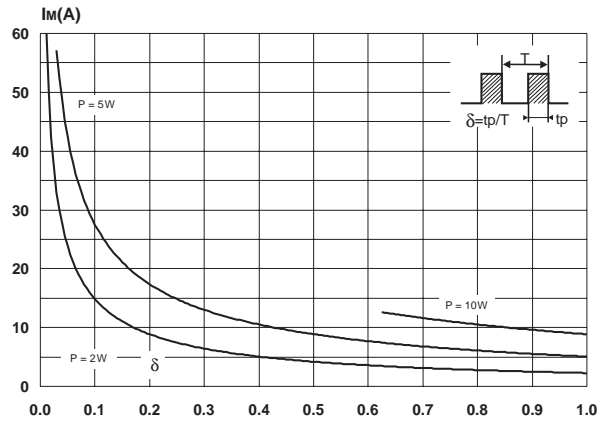
### DYNAMIC ELECTRICAL CHARACTERISTICS

| Symbol          | Parameter                | Tests conditions      |  | Min. | Typ. | Max. | Unit |
|-----------------|--------------------------|-----------------------|--|------|------|------|------|
| trr             | Reverse recovery time    | T <sub>j</sub> = 25°C | I <sub>F</sub> = 0.5 A I <sub>rr</sub> = 0.25 A<br>I <sub>R</sub> = 1A                           |      | 13   | 20   | ns   |
| tfr             | Forward recovery time    | T <sub>j</sub> = 25°C | I <sub>F</sub> = 4 A dI <sub>F</sub> /dt = 100 A/μs<br>V <sub>FR</sub> = 1.1 x V <sub>Fmax</sub> |      | 50   |      | ns   |
| V <sub>FP</sub> | Forward recovery voltage | T <sub>j</sub> = 25°C | I <sub>F</sub> = 4 A dI <sub>F</sub> /dt = 100 A/μs  |      | 2.4  |      | V    |

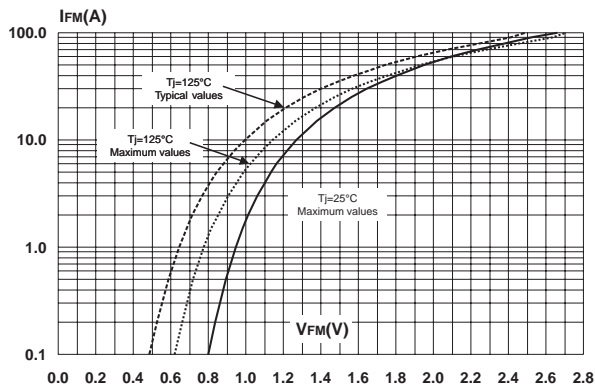
**Fig. 1:** Average forward power dissipation versus average forward current (per diode).



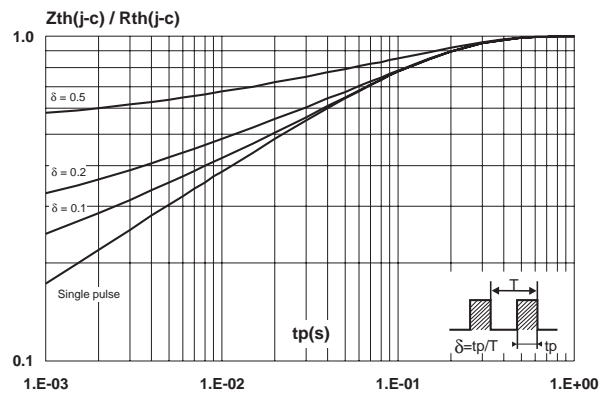
**Fig. 2:** Peak current versus form factor (per diode).



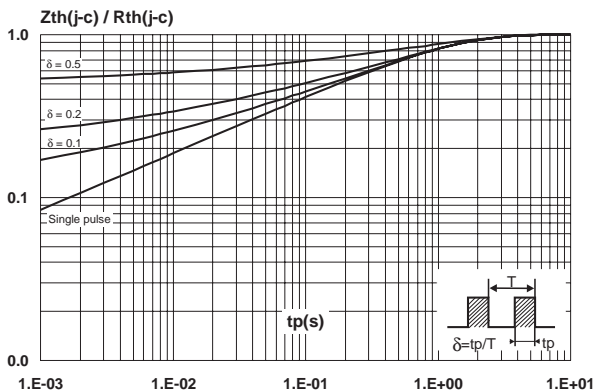
**Fig. 3:** Forward voltage drop versus forward current (per diode).



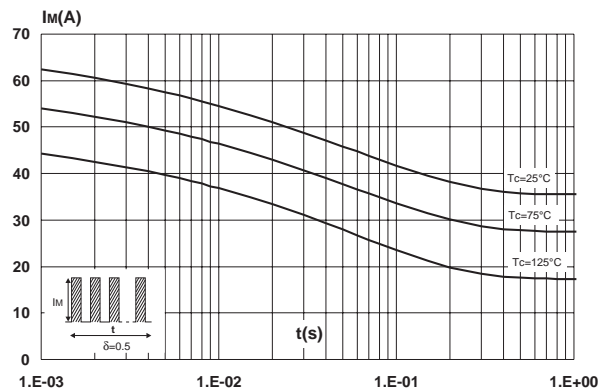
**Fig. 4-1:** Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, DPAK).



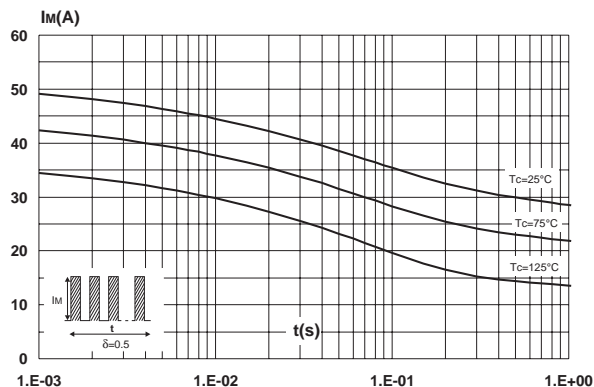
**Fig. 4-2:** Relative variation of thermal impedance junction to case versus duration (TO-220FPAB).



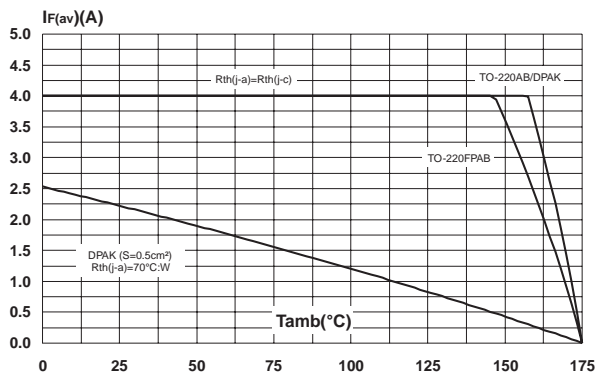
**Fig. 5-1:** Non repetitive surge peak forward current versus overload duration per diode (TO-220AB, DPAK).



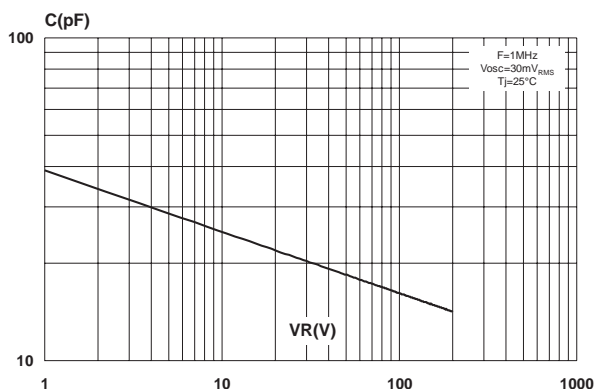
**Fig. 5-2:** Non repetitive surge peak forward current versus overload duration per diode (TO-220FPAB).



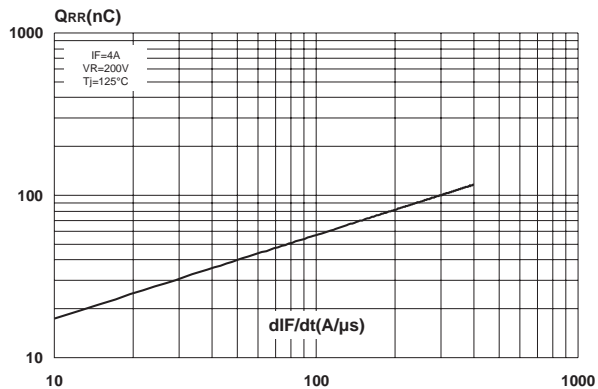
**Fig. 6:** Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode).



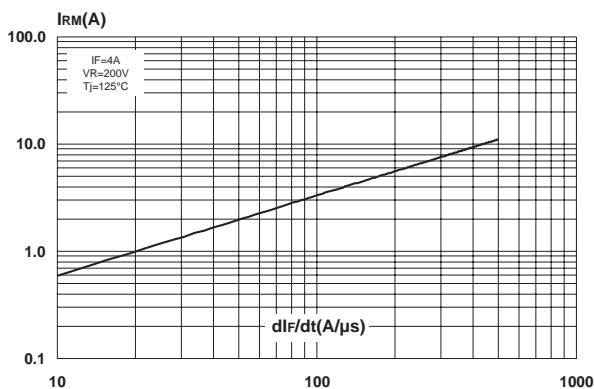
**Fig. 7:** Junction capacitance versus reverse voltage applied (typical values, per diode).



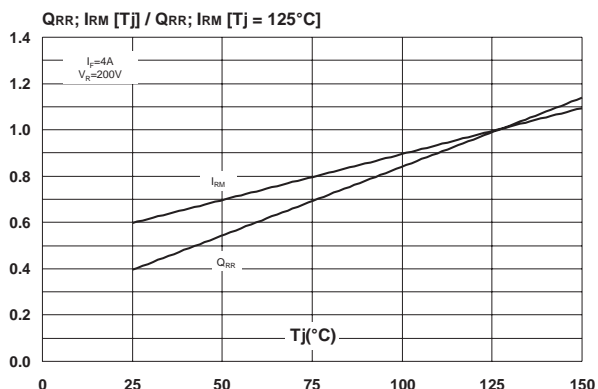
**Fig. 8:** Reverse recovery charges versus  $dI_F/dt$  (90% confidence, per diode).



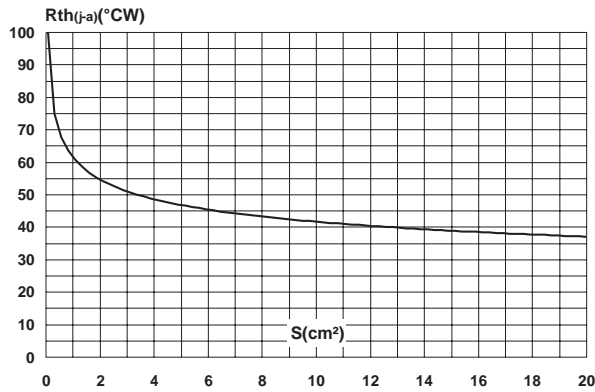
**Fig. 9:** Peak reverse recovery current versus  $dI_F/dt$  (90% confidence, per diode).



**Fig. 10:** Dynamic parameters versus junction temperature.



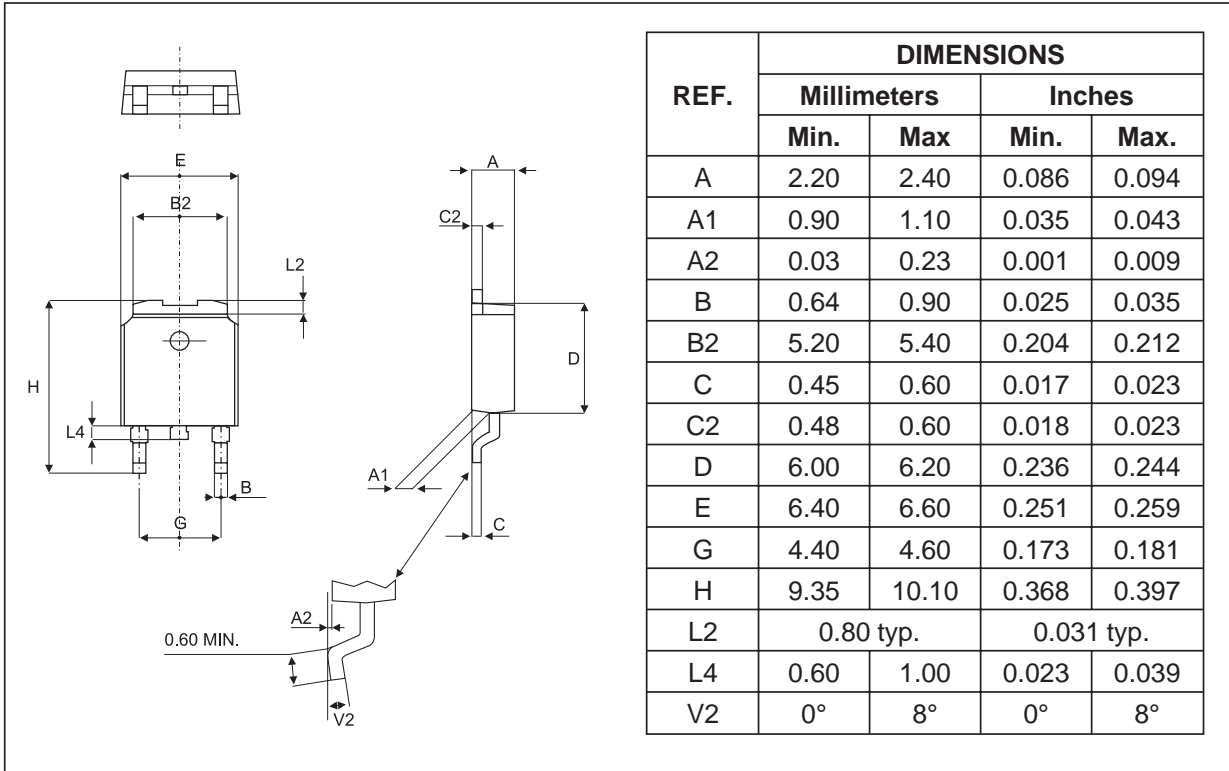
**Fig. 11:** Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35µm) for DPAK.



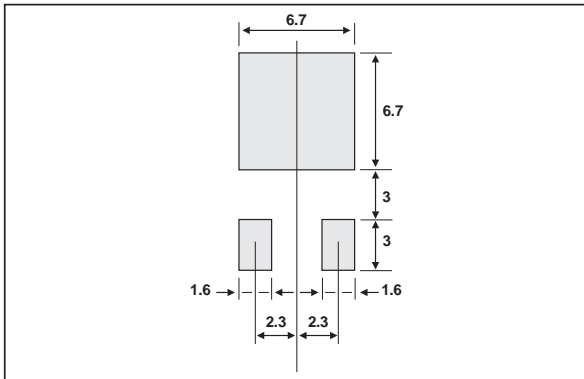
**PACKAGE MECHANICAL DATA**  
TO-220AB

| 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 |
| F2    | 1.14        | 1.70  | 0.044      | 0.066 |
| G     | 4.95        | 5.15  | 0.194      | 0.202 |
| G1    | 2.40        | 2.70  | 0.094      | 0.106 |
| H2    | 10          | 10.40 | 0.393      | 0.409 |
| L2    | 16.4 typ.   |       | 0.645 typ. |       |
| L4    | 13          | 14    | 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. | 3.75        | 3.85  | 0.147      | 0.151 |

**PACKAGE MECHANICAL DATA**  
DPAK



**FOOTPRINT**



**PACKAGE MECHANICAL DATA**  
 TO-220FPAB

| 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 |
| F2   | 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 |

| Ordering code | Marking    | Package    | Weight | Base qty | Delivery mode |
|---------------|------------|------------|--------|----------|---------------|
| STTH802CT     | STTH802CT  | TO-220AB   | 2.23 g | 50       | Tube          |
| STTH802CB     | STTH802CB  | DPAK       | 0.3 g  | 75       | Tube          |
| STTH802CB-TR  | STTH802CB  | DPAK       | 0.3 g  | 2500     | Tape & reel   |
| STTH802CFP    | STTH802CFP | TO-220FPAB | 2.0 g  | 50       | Tube          |

- Cooling method: by conduction (method C)
- Recommended torque value (TO-220AB): 0.8 N.m
- Maximum torque value (TO-220AB): 1.0 N.m
- Recommended torque value (TO-220FPAB): 0.55 N.m
- Maximum torque value (TO-220FPAB): 0.7 N.m
- Epoxy meets UL 94,V0

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