



STTH1302CT/CG/CFP

HIGH EFFICIENCY ULTRAFAST DIODE

MAIN PRODUCT CHARACTERISTICS

| | |
|----------------|-----------|
| $I_{F(AV)}$ | 2 x 6.5 A |
| V_{RRM} | 200 V |
| T_j (max) | 175 °C |
| V_F (max) | 0.95 V |
| t_{rr} (max) | 25 ns |

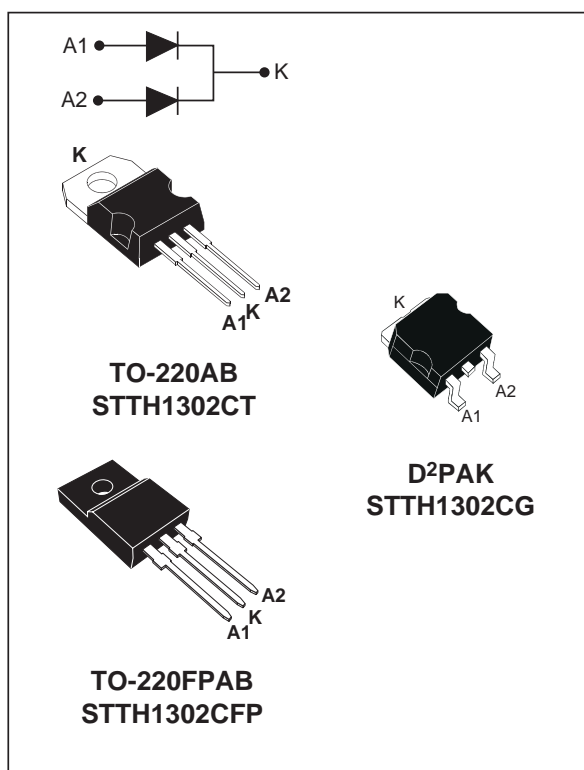
FEATURES AND BENEFITS

- Suited for SMPS
- Low losses
- Low forward and reverse recovery times
- High surge current capability
- High junction temperature
- Insulated package: TO-220FPAB:
Insulation voltage = 2000 V_{DC}
Capacitance = 12 pF

DESCRIPTION

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

This device is especially intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.



ABSOLUTE RATINGS (limiting values, per diode)

| Symbol | Parameter | | | Value | Unit | |
|--------------|--|-------------------------------|---------------------------|-------------|------|---|
| V_{RRM} | Repetitive peak reverse voltage | | | 200 | V | |
| $I_{F(RMS)}$ | RMS forward current | | | 20 | A | |
| $I_{F(AV)}$ | Average forward current $\delta = 0.5$ | TO-220AB / D ² PAK | $T_c = 155^\circ\text{C}$ | Per diode | 6.5 | A |
| | | | $T_c = 145^\circ\text{C}$ | Per device | 13 | |
| | | TO-220FPAB | $T_c = 135^\circ\text{C}$ | Per diode | 6.5 | A |
| | | | $T_c = 110^\circ\text{C}$ | Per device | 13 | |
| I_{FSM} | Surge non repetitive forward current | | tp = 10 ms sinusoidal | | 70 | A |
| T_{stg} | Storage temperature range | | | -65 to +175 | °C | |
| T_j | Maximum operating junction temperature | | | 175 | °C | |

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THERMAL RESISTANCES

| Symbol | Parameter | | Value | Unit | | |
|----------------------|------------------|-------------------------------|-----------|------|------|------|
| R _{th(j-c)} | Junction to case | TO-220AB / D ² PAK | Per diode | 3 | °C/W | |
| | | TO-220FPAB | | 5.5 | | |
| | | TO-220AB / D ² PAK | Total | | 1.9 | °C/W |
| | | TO-220FPAB | | | 4.5 | |
| R _{th(c)} | Coupling | TO-220AB / D ² PAK | | 0.8 | °C/W | |
| | | TO-220FPAB | | 3.5 | | |

When the diodes 1 and 2 are used simultaneously :
 $\Delta T_j(\text{diode } 1) = P(\text{diode } 1) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode } 2) \times R_{th(c)}$

STATIC ELECTRICAL CHARACTERISTICS (per diode)

| Symbol | Parameter | Tests Conditions | | Min. | Typ. | Max. | Unit |
|------------------|-------------------------|------------------------|-----------------------------------|------|------|------|------|
| I _R * | Reverse leakage Current | T _j = 25°C | V _R = V _{RRM} | | | 6 | μA |
| | | T _j = 125°C | | | 3 | 60 | |
| V _F * | Forward Voltage drop | T _j = 25°C | I _F = 6.5 A | | | 1.1 | V |
| | | T _j = 125°C | I _F = 6.5 A | | 0.81 | 0.95 | |
| | | T _j = 25°C | I _F = 13 A | | | 1.25 | |
| | | T _j = 125°C | I _F = 13 A | | 0.95 | 1.1 | |

Pulse test : * t_p = 380 μs, δ < 2%

To evaluate the conduction losses use the following equation :
 $P = 0.80 \times I_{F(AV)} + 0.023 \times I_{F(RMS)}^2$

DYNAMIC CHARACTERISTICS (per diode)

| 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 | | 16 | 25 | ns |
| t _{fr} | Forward recovery time | T _j = 25°C | I _F = 6.5 A dI _F /dt = 100 A/μs V _{FR} = 1.1 x V _F max | | 70 | | ns |
| V _{FP} | Forward recovery voltage | T _j = 25°C | I _F = 6.5 A dI _F /dt = 100 A/μs | | 2.2 | | V |

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

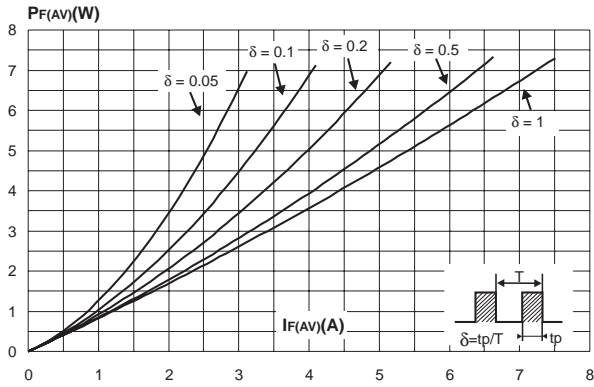


Fig. 2: Peak current versus factor (per diode).

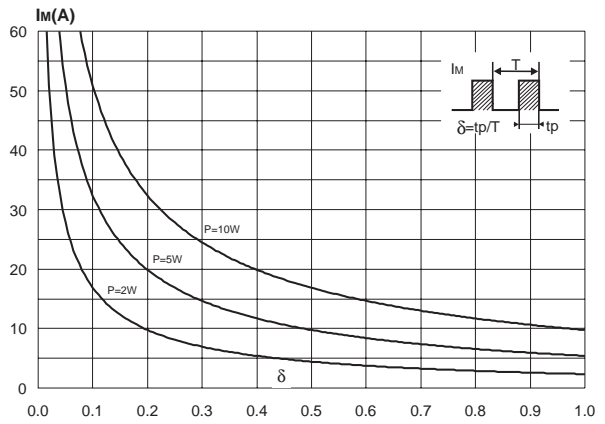


Fig. 3: Forward voltage drop versus forward current (per diode).

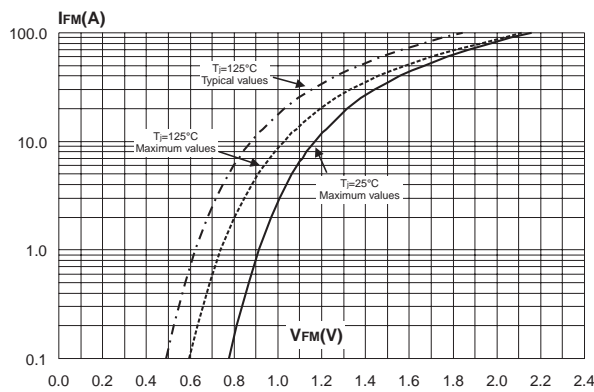


Fig. 4-1: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB / D²PAK).

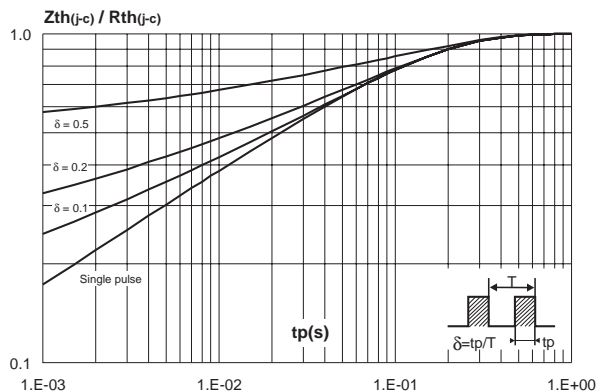


Fig. 4-2: Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB).

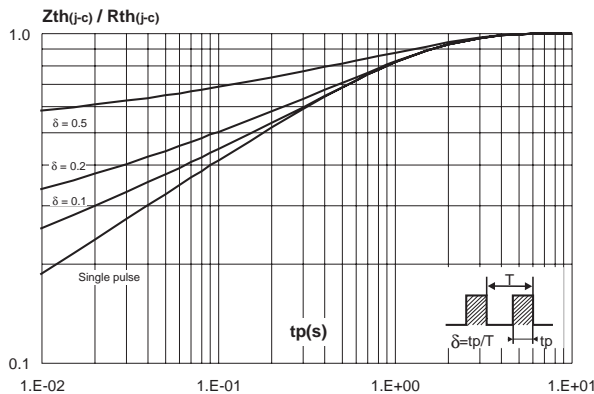


Fig. 5-1: Non repetitive surge peak forward current versus overload duration per diode (TO-220AB / D²PAK).

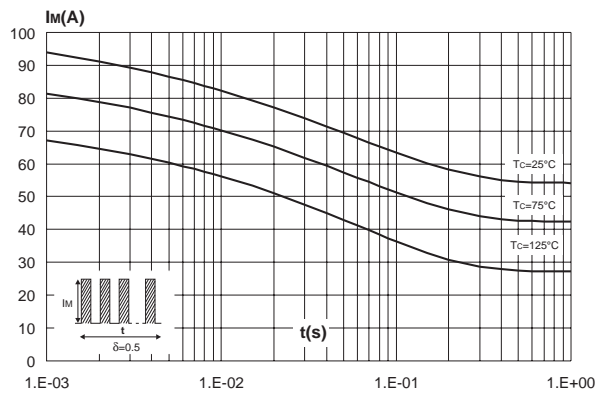


Fig. 5-2: Non repetitive surge peak forward current versus overload duration per diode (TO-220FPAB).

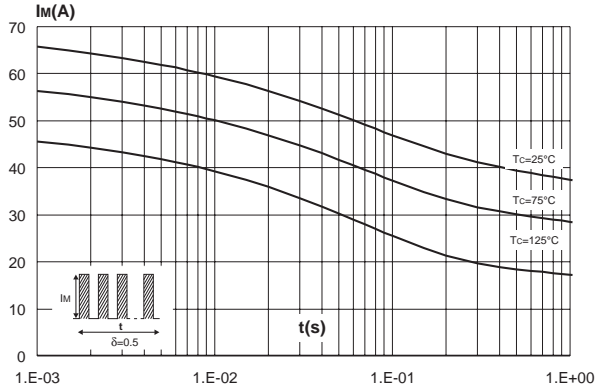


Fig. 6: Average forward current versus ambient temperature ($\delta=0.5$, per diode).

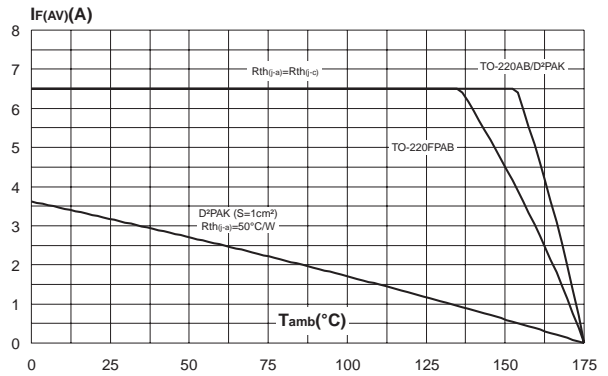


Fig. 7: Junction capacitance versus reverse voltage applied (typical values, per diode).

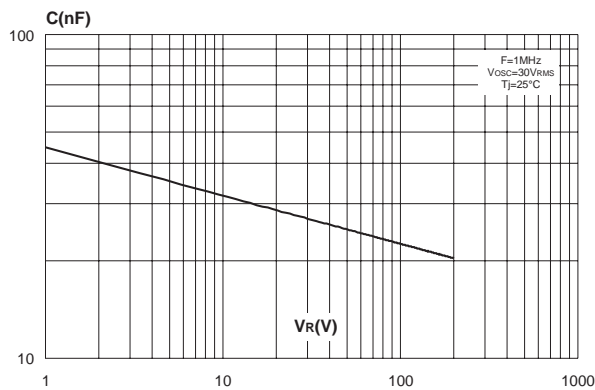


Fig. 8: Reverse recovery charges versus di_F/dt (90% confidence, per diode).

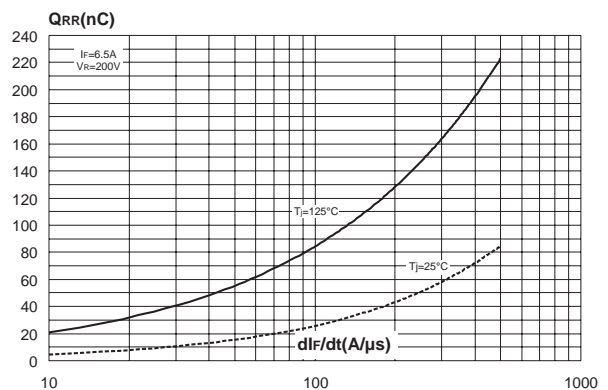


Fig. 9: Reverse recovery time versus di_F/dt (90% confidence, per diode).

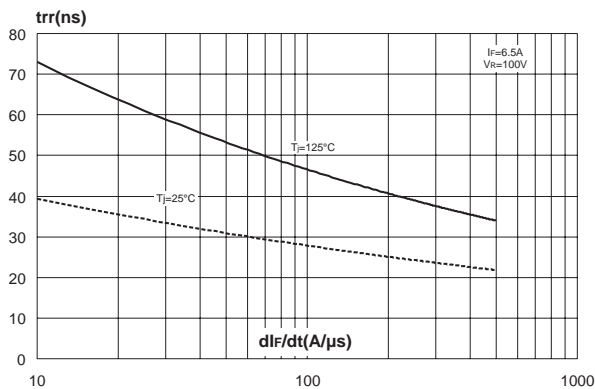


Fig. 10: Reverse recovery current versus di_F/dt (90% confidence, per diode).

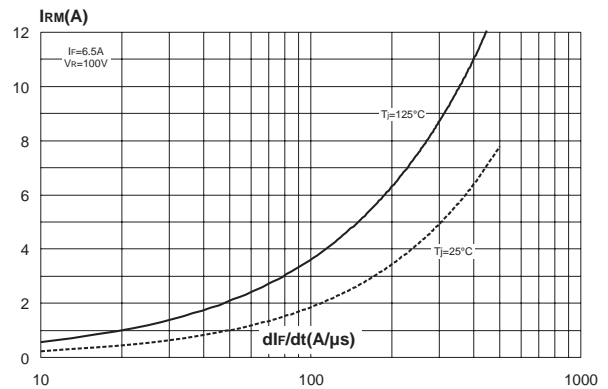


Fig. 11: Dynamic parameters versus junction temperature.

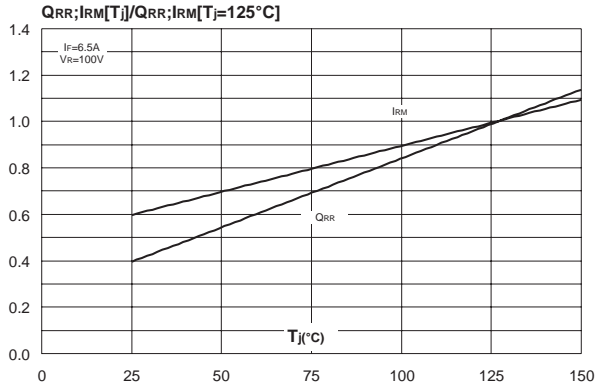
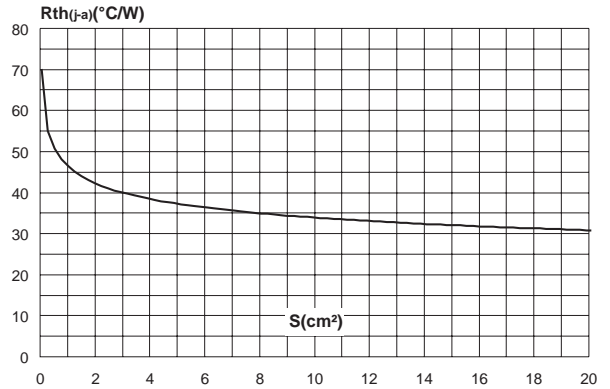
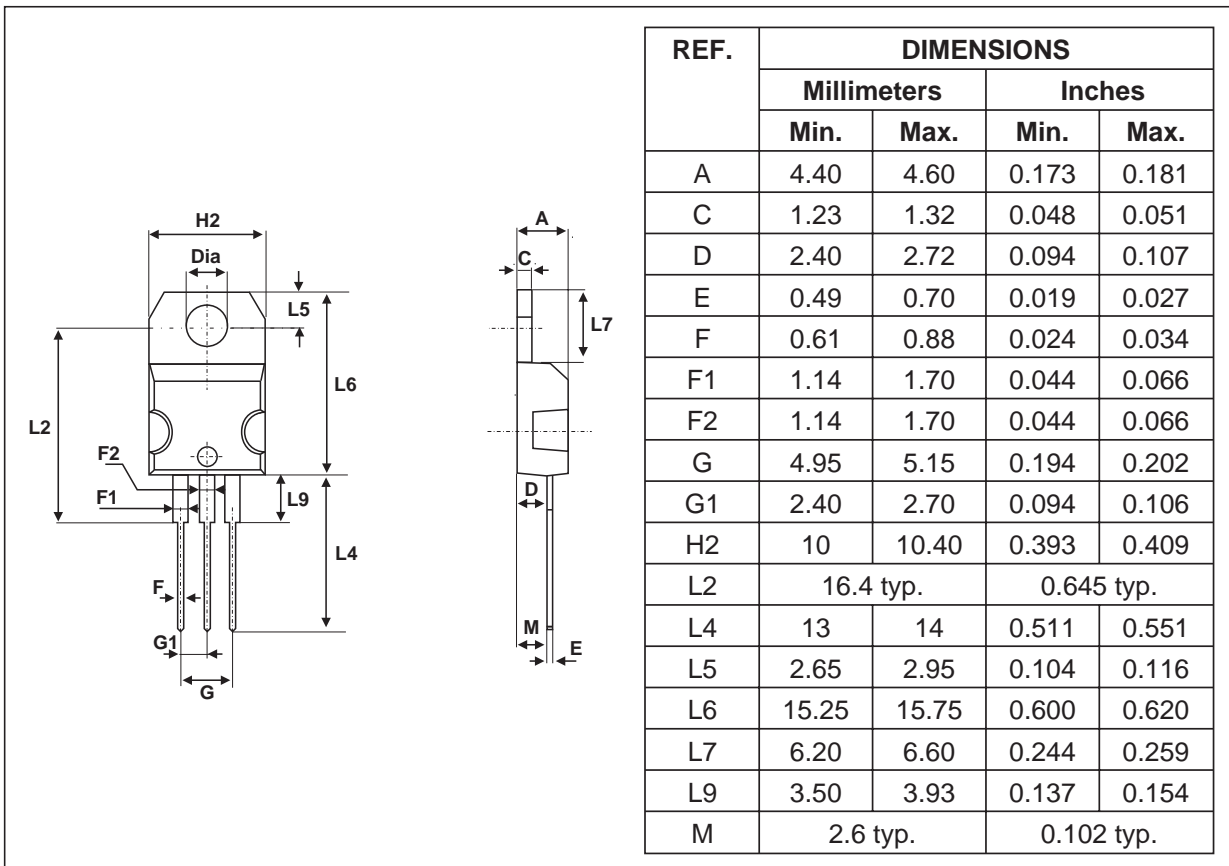


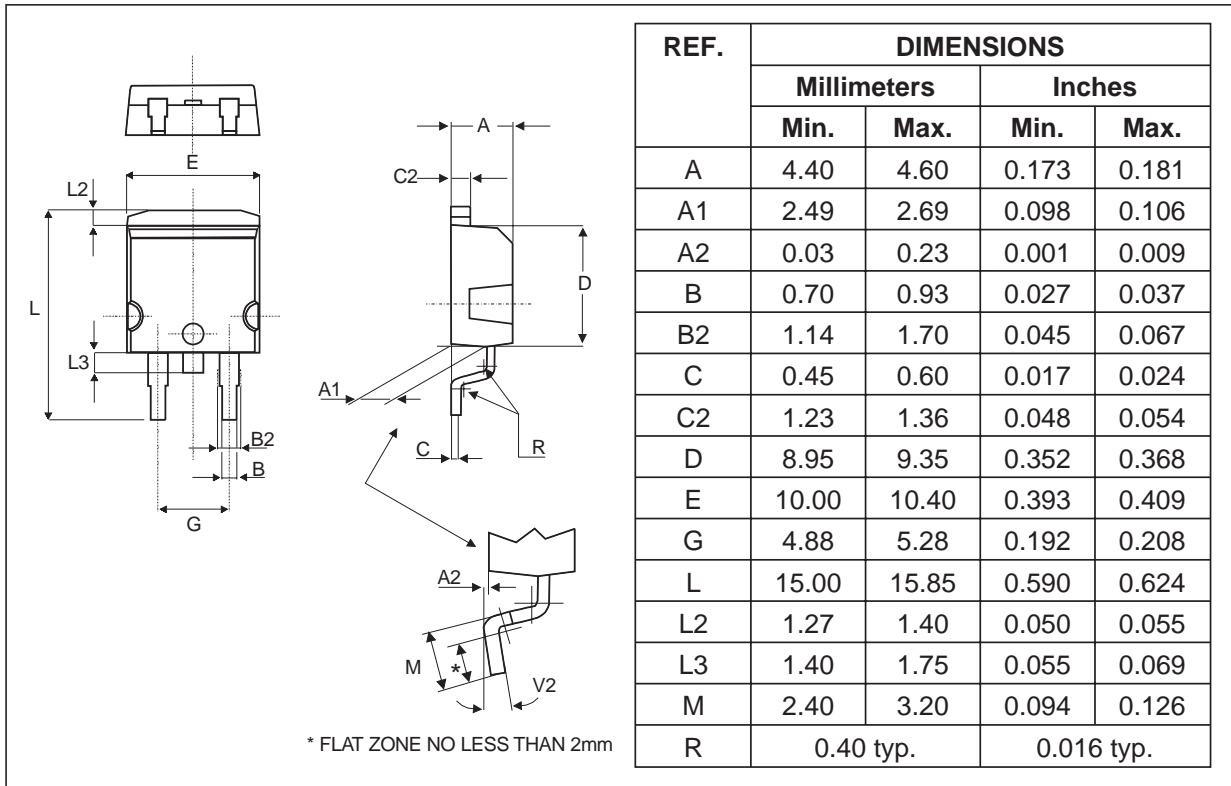
Fig. 12: Thermal resistance junction to ambient versus copper surface under tab (epoxy printed board FR4, Cu = 35µm)(D²PAK).



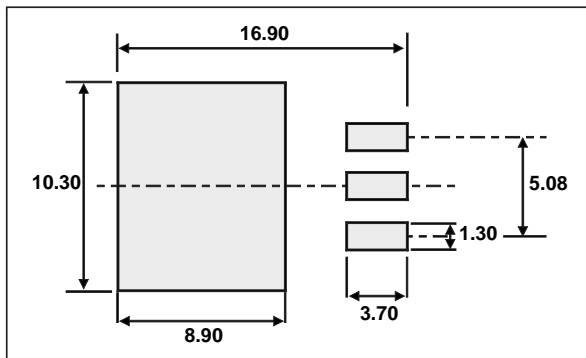
PACKAGE MECHANICAL DATA
TO-220AB



PACKAGE MECHANICAL DATA
D²PAK



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 type | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|-------------|--------------------|--------|----------|---------------|
| STTH1302CT | STTH1302CT | TO-220AB | 2.20 g | 50 | Tube |
| STTH1302CFP | STTH1302CFP | TO-220FPAB | 2.0 g | 50 | Tube |
| STTH1302CG | STTH1302CG | D ² PAK | 1.48 g | 50 | Tube |
| STTH1302CG-TR | STTH1302CG | D ² PAK | 1.48 g | 1000 | Tape & reel |

- Epoxy meets UL94,V0

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