



STPR1020CB/CG/CT/CF/CFP/CR

ULTRA-FAST RECOVERY RECTIFIER DIODES

MAIN PRODUCTS CHARACTERISTICS

| | |
|-------------|---------|
| $I_{F(AV)}$ | 2 x 5 A |
| V_{RRM} | 200 V |
| T_j (max) | 150°C |
| V_F (max) | 0.99 V |
| trr (max) | 30 ns |

FEATURES

- SUITED FOR SMPS
- LOW LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- INSULATED PACKAGES: ISOWATT220AB / TO-220FPAB
Insulation Voltage = 2000V DC
Capacitance = 12 pF

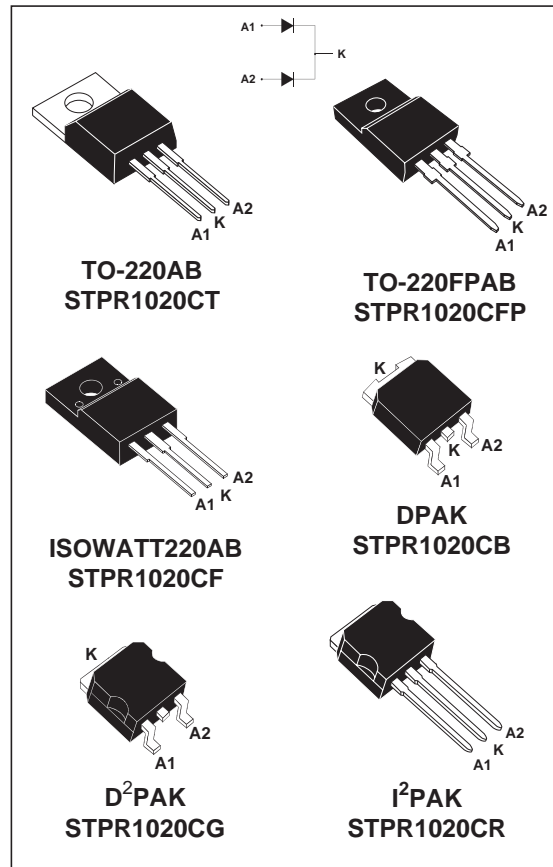
DESCRIPTION

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

Packaged in DPAK, D²PAK, I²PAK, TO-220AB, TO-220FPAB or ISOWATT220AB, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM (limiting values, per diode)

| Symbol | Parameter | | | Value | Unit | |
|--------------|---|--|--------------------------------|---------------|------|---|
| V_{RRM} | Repetitive peak reverse voltage | | | 200 | V | |
| $I_{F(RMS)}$ | RMS forward current | D ² PAK / TO-220AB / ISOWATT220AB / TO-220FPAB / I ² PAK | | 10 | A | |
| | | DPAK | | 7 | A | |
| $I_{F(AV)}$ | Average forward current $\delta = 0.5$ | D ² PAK / DPAK | $T_c = 125^\circ\text{C}$ | Per diode | 5 | A |
| | | TO-220AB / I ² PAK | | | | |
| | | ISOWATT220AB | $T_c = 115^\circ\text{C}$ | Per device | | |
| | | TO-220FPAB | $T_c = 110^\circ\text{C}$ | Per device | 10 | |
| I_{FSM} | Surge non repetitive forward current | | $t_p = 10\text{ms}$ sinusoidal | 50 | A | |
| T_{stg} | Storage temperature range | | | - 65 to + 150 | °C | |



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THERMAL RESISTANCES

| Symbol | Parameter | | Value | Unit | |
|----------------------|------------------|---|-----------|------|------|
| R _{th(j-c)} | Junction to case | TO-220AB / D ² PAK / DPAK / I ² PAK | Per diode | 4.0 | °C/W |
| | | | Total | 2.4 | |
| | | ISOWATT220AB | Per diode | 6.0 | |
| | | | Total | 4.0 | |
| | | TO-220FPAB | Per diode | 6.5 | |
| | | | Total | 5 | |
| R _{th(c)} | Coupling | TO-220AB / D ² PAK / DPAK / I ² PAK | 0.7 | | |
| | | ISOWATT220AB | 2.0 | | |
| | | TO-220FPAB | 3.5 | | |

When 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 | Parameters | Test conditions | | Min. | Typ. | Max. | Unit |
|-------------------|-------------------------|------------------------|-----------------------------------|------|------|------|------|
| I _R * | Reverse leakage current | T _j = 25°C | V _R = V _{RRM} | | | 50 | μA |
| | | T _j = 100°C | | | | 0.6 | mA |
| V _F ** | Forward voltage drop | T _j = 125°C | I _F = 5 A | | 0.8 | 0.99 | V |
| | | T _j = 125°C | I _F = 10 A | | 0.95 | 1.20 | |
| | | T _j = 25°C | I _F = 10 A | | | 1.25 | |

Pulse test : * tp = 5 ms, δ < 2 %

** tp = 380 μs, δ < 2 %

To evaluate the conduction losses use the following equation :

$$P = 0.78 \times I_{F(AV)} + 0.042 \times I_{F(RMS)}^2$$

RECOVERY CHARACTERISTICS

| Symbol | Test conditions | | Min. | Typ. | Max. | Unit |
|-----------------|-----------------------|---|-------------------------------|------|------|------|
| t _{rr} | T _j = 25°C | I _F = 0.5A I _R = 1A | I _{rr} = 0.25A | | 30 | ns |
| t _{fr} | T _j = 25°C | I _F = 1A V _{FR} = 1.1 x V _F max | di _F /dt = 50 A/μs | 20 | | ns |
| V _{FP} | T _j = 25°C | I _F = 1A | di _F /dt = 50 A/μs | 3 | | V |

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

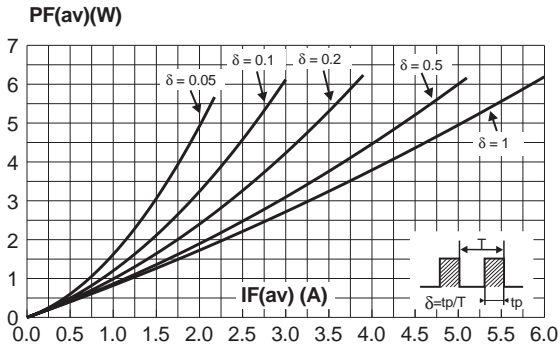


Fig. 2: Peak current versus form factor (per diode).

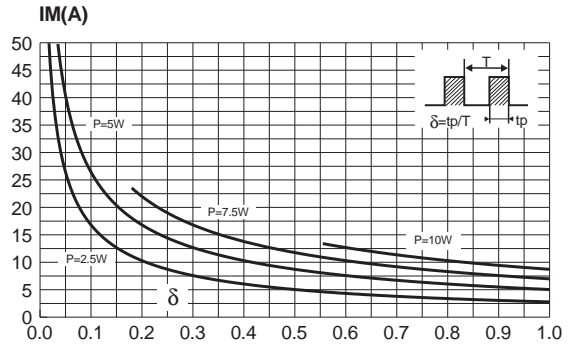


Fig. 3-1: Average forward current versus ambient temperature ($\delta = 0.5$, TO-220AB, DPAK, D²PAK).

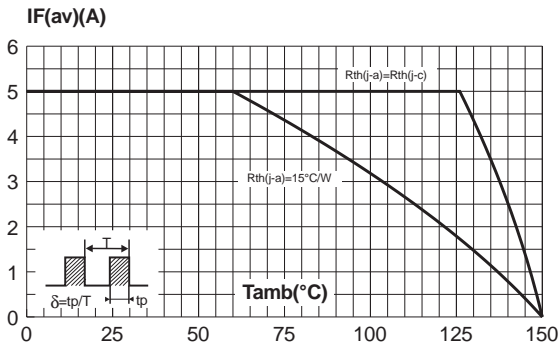


Fig. 3-2: Average forward current versus ambient temperature ($\delta = 0.5$, ISOWATT220AB, TO-220FPAB).

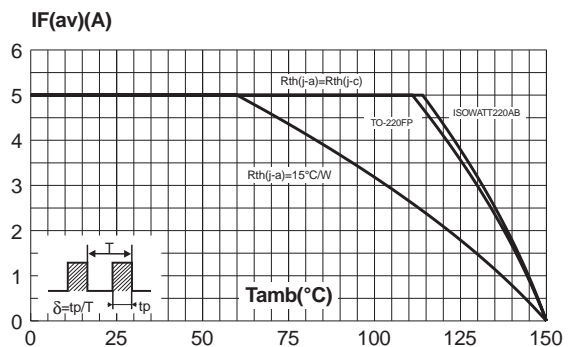


Fig. 4-1: Non repetitive surge peak forward current versus overload duration (TO-220AB, DPAK, D²PAK).

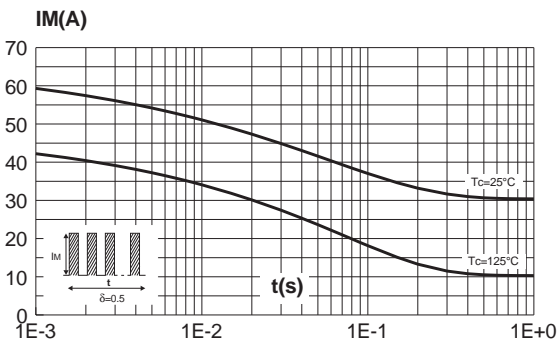
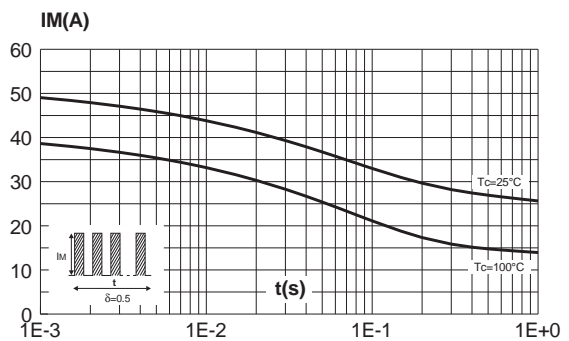


Fig. 4-2: Non repetitive surge peak forward current versus overload duration (ISOWATT220AB).



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Fig. 4-3: Non repetitive surge peak forward current versus overload duration (TO-220FPAB).

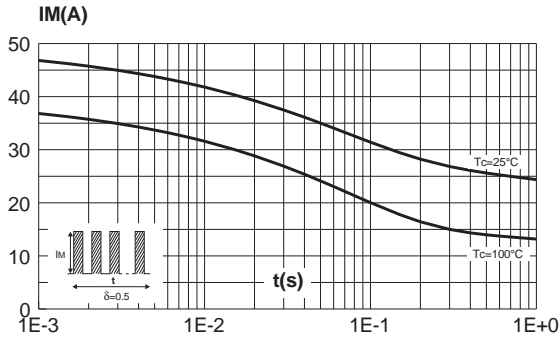


Fig. 5-1: Relative variation of thermal impedance junction to case versus pulse duration (D²PAK, DPAK, TO-220AB).

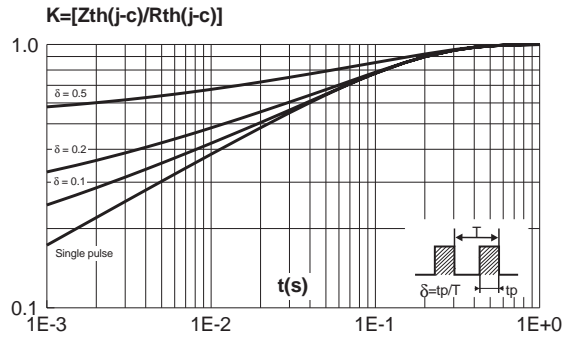


Fig. 5-2: Relative variation of thermal impedance junction to case versus pulse duration (ISOWATT220AB, TO-220FPAB).

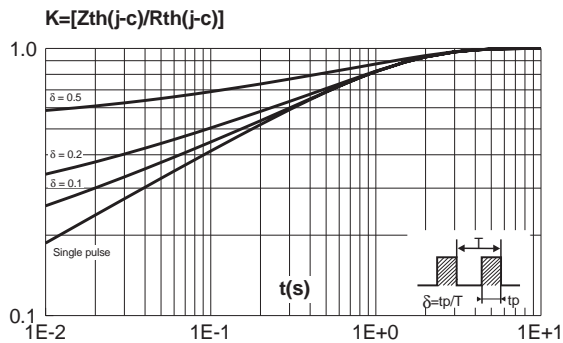


Fig. 6: Forward voltage drop versus forward current (maximum values, per diode).

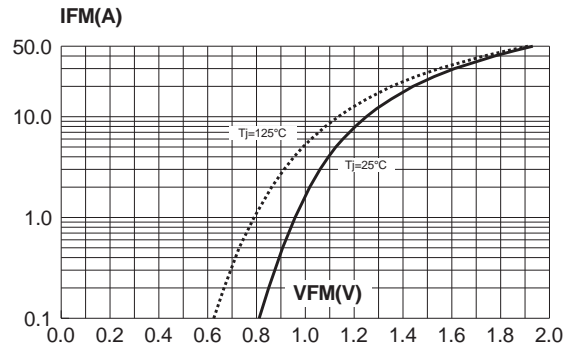


Fig. 7: Junction capacitance versus reverse voltage applied (typical values, per diode).

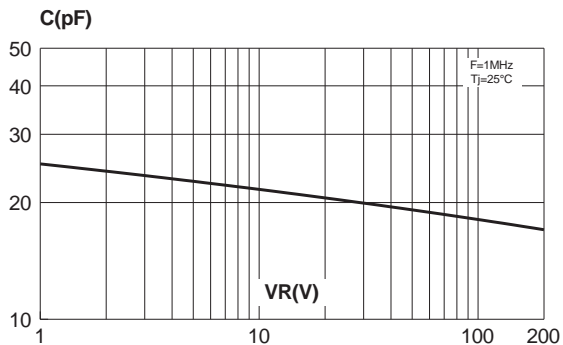


Fig. 8: Reverse recovery charges versus dIF/dt (per diode).

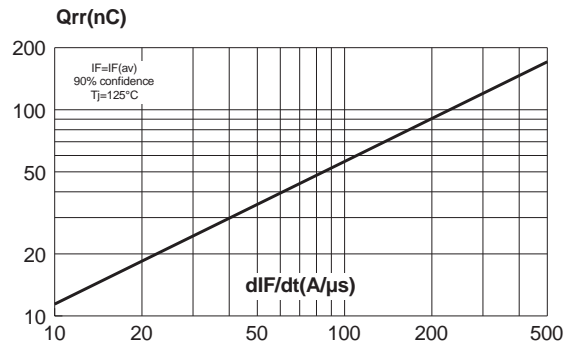


Fig. 9: Peak reverse recovery current versus dIF/dt (per diode).

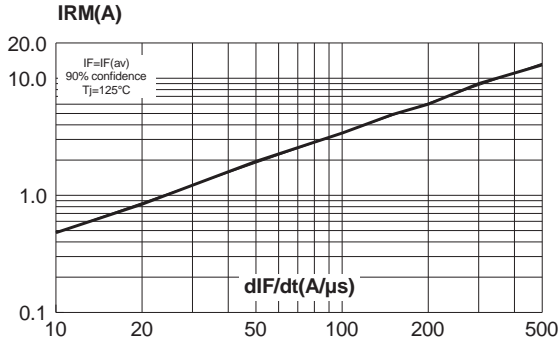


Fig. 10: Dynamic parameters versus junction temperature (per diode).

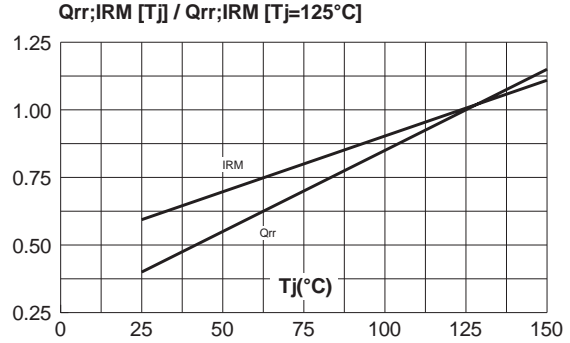
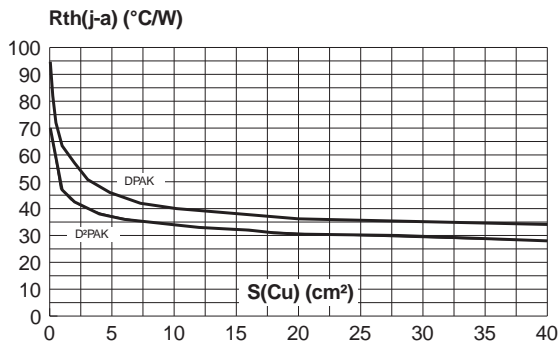
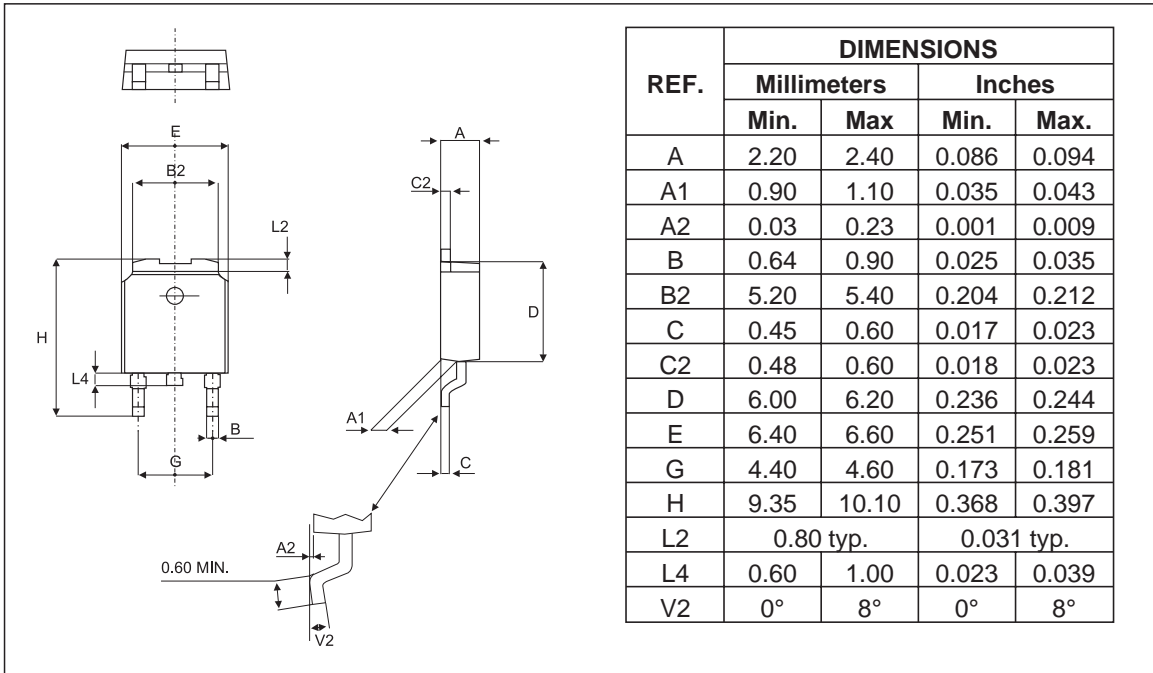


Fig. 11: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35μm).

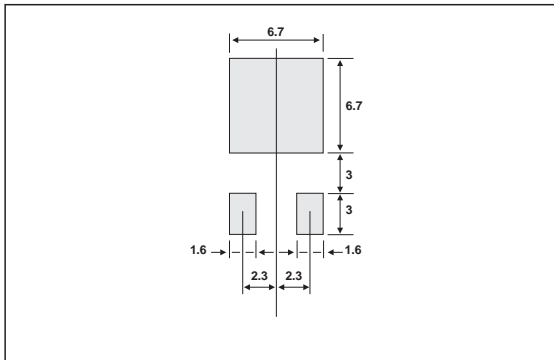


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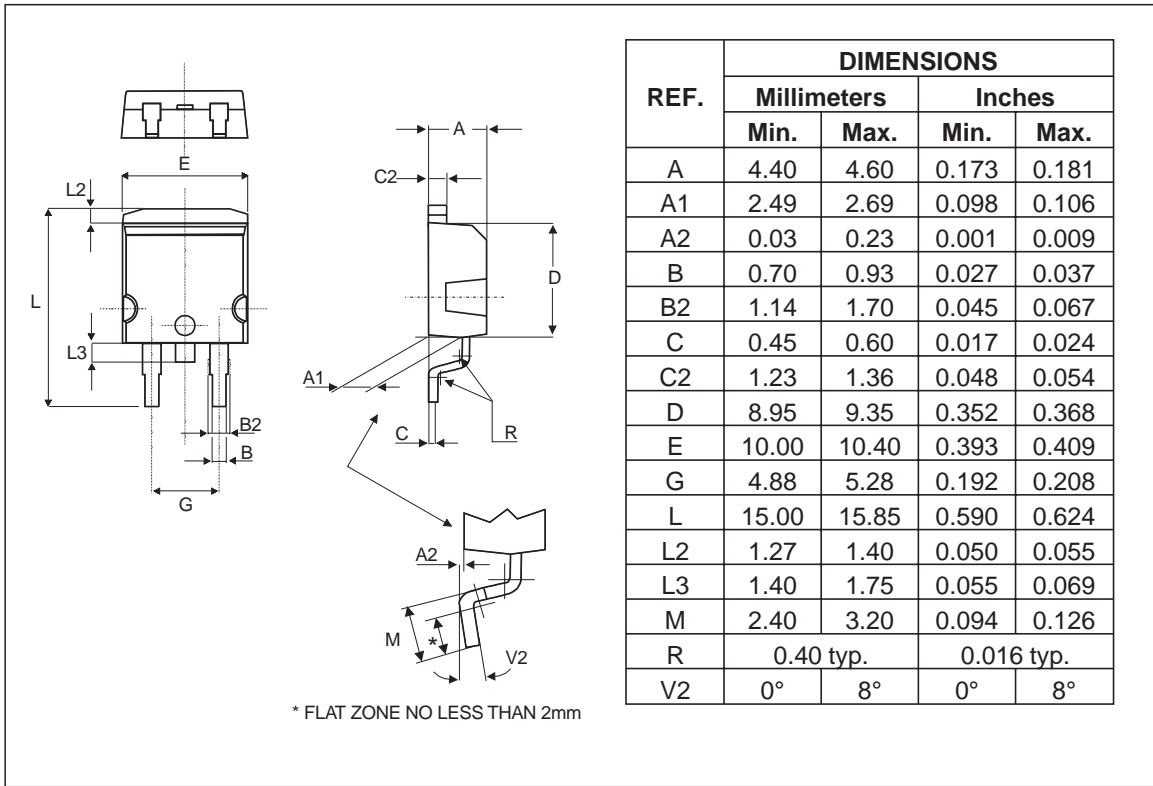
PACKAGE MECHANICAL DATA DPAK



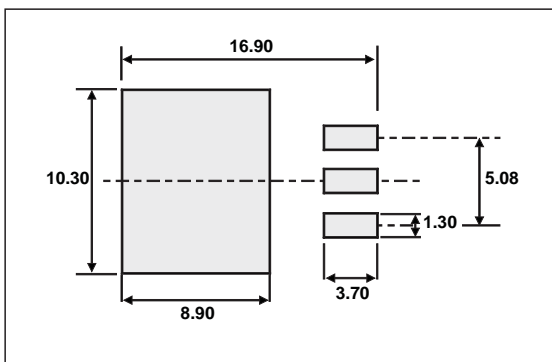
FOOT PRINT (in milliteters) DPAK



PACKAGE MECHANICAL DATA
D²PAK

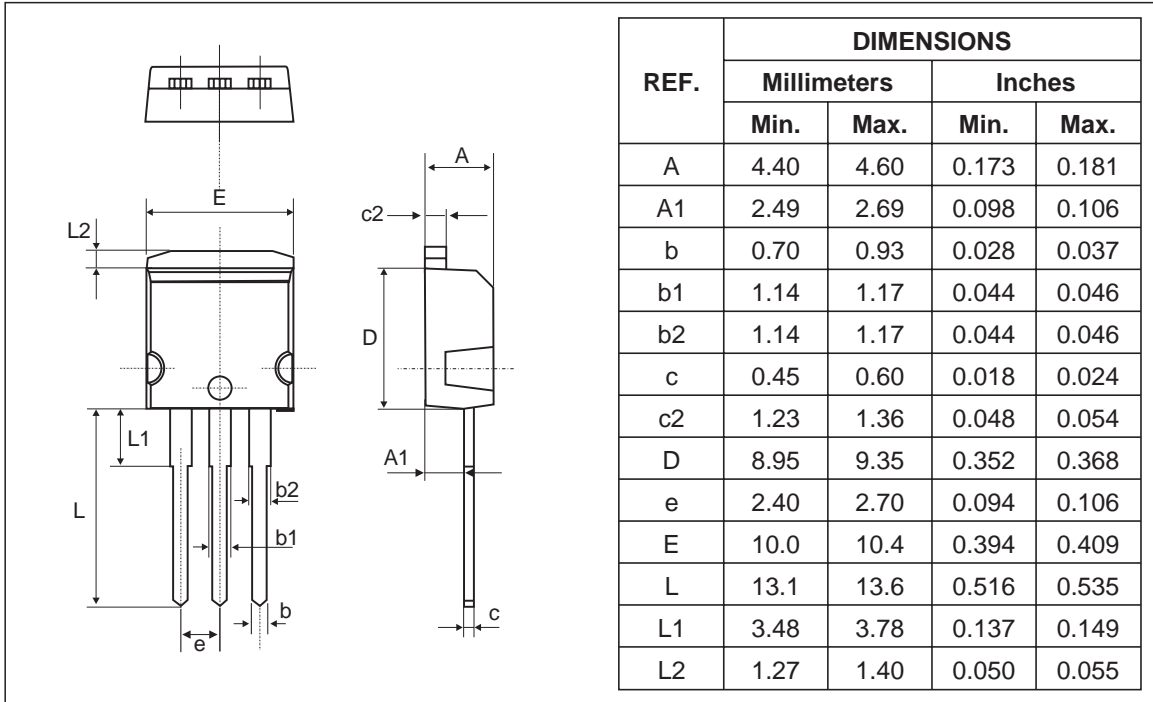


FOOT PRINT (in millimeters)
D²PAK

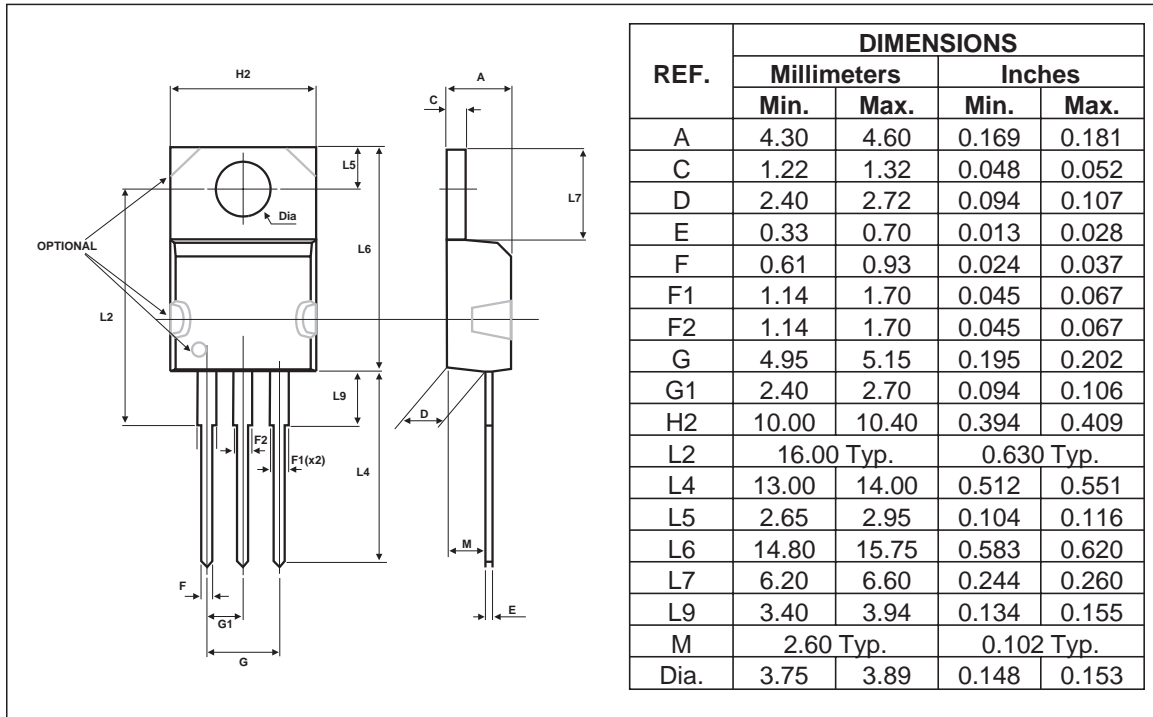


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PACKAGE MECHANICAL DATA
I²PAK

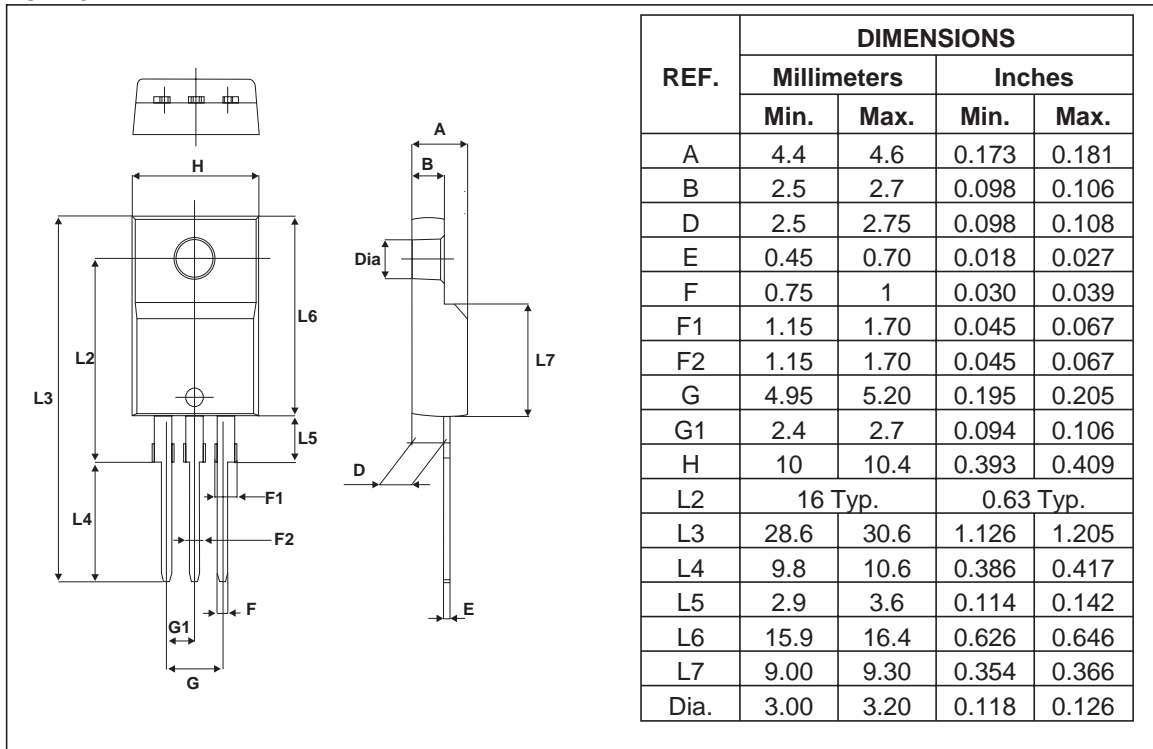


PACKAGE MECHANICAL DATA
TO-220AB (JEDEC compatible)

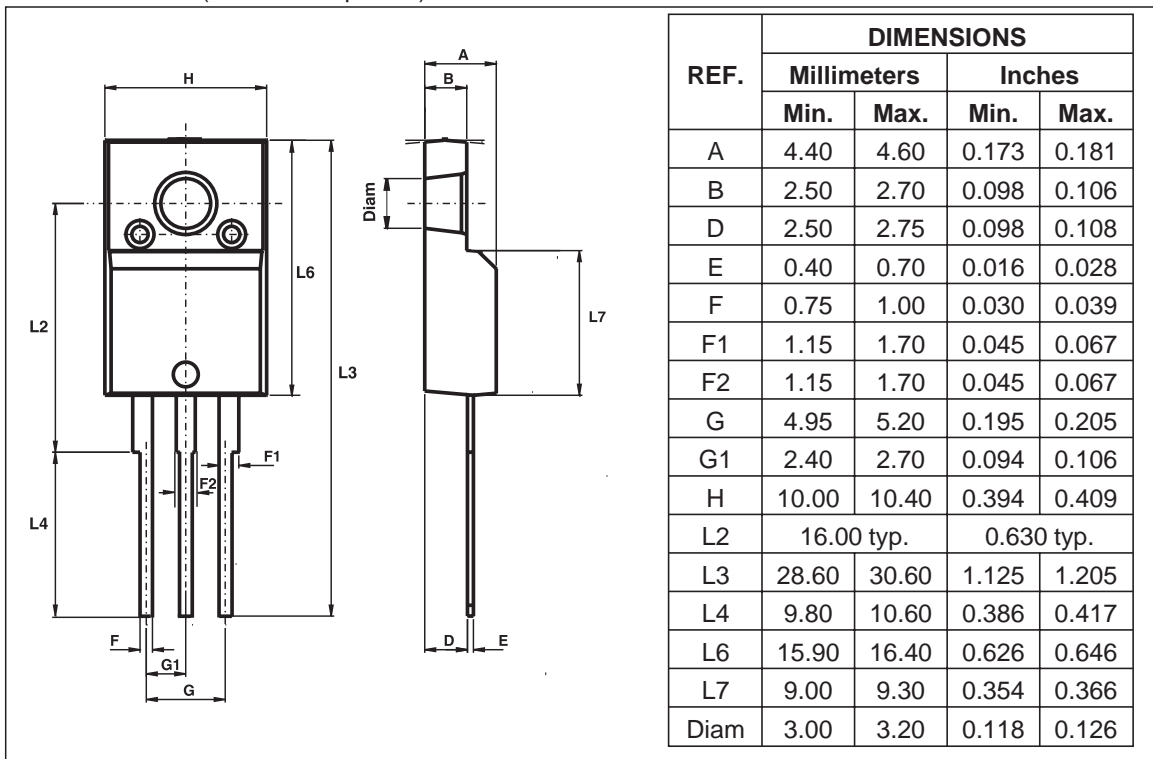


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PACKAGE MECHANICAL DATA
TO-220FPAB



PACKAGE MECHANICAL DATA
ISOWATT220AB (JEDEC compatible)



STPR1020CB/CG/CT/CF/CFP/CR

| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|-------------|--------------------|--------|----------|---------------|
| STPR1020CB | STPR1020CB | DPAK | 0.3g | 75 | Tube |
| STPR1020CB-TR | STPR1020CB | DPAK | 0.3g | 2500 | Tape & reel |
| STPR1020CT | STPR1020CT | TO-220AB | 2.23g | 50 | Tube |
| STPR1020CF | STPR1020CF | ISOWATT220AB | 2.2g | 50 | Tube |
| STPR1020CG | STPR1020CG | D ² PAK | 1.48g | 50 | Tube |
| STPR1020CFP | STPR1020CFP | TO-220FP | 2.0g | 50 | Tube |
| STPR1020CR | STPR1020CR | I ² PAK | 1.49 g | 50 | Tube |

- Cooling method : by conduction (C)
- Recommended torque value (ISOWATT220AB, TO-220FPAB): 0.55 N.m.
- Maximum torque value (ISOWATT220AB, TO-220FPAB): 0.70 N.m.
- Recommended torque value (TO-220AB): 0.8 N.m
- Maximum torque value (TO-220AB): 1.0 N.m.
- Epoxy meets UL94,V0

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