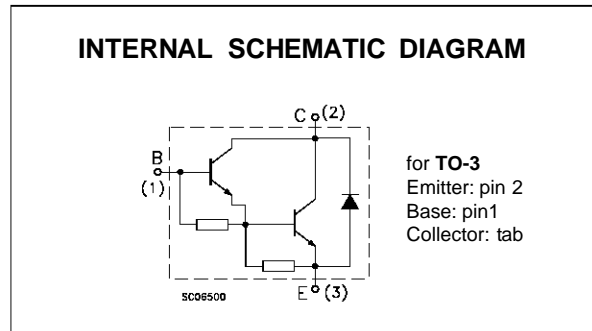
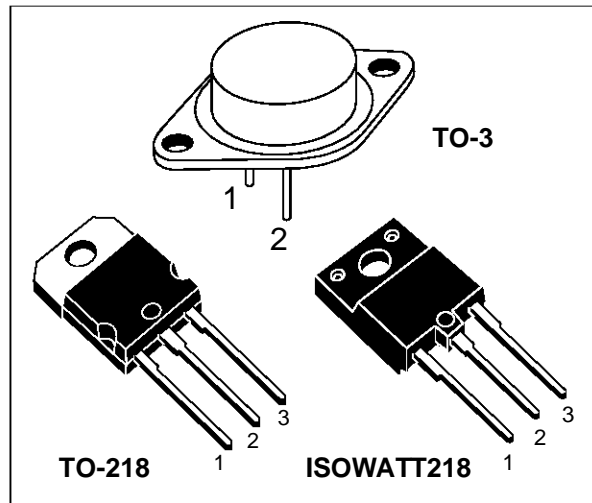


**HIGH VOLTAGE IGNITION COIL DRIVER
NPN POWER DARLINGTON**

- VERY RUGGED BIPOLAR TECHNOLOGY
- HIGH OPERATING JUNCTION TEMPERATURE
- WIDE RANGE OF PACKAGES

APPLICATIONS

- HIGH RUGGEDNESS ELECTRONIC IGNITIONS



ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | | | Unit |
|-----------|--|------------|------------|------------|------------|
| | | BU931 | BU931P | BU931PFI | |
| V_{CES} | Collector-Emitter Voltage ($V_{BE} = 0$) | 500 | | | V |
| V_{CEO} | Collector-Emitter Voltage ($I_B = 0$) | 400 | | | V |
| V_{EBO} | Emitter-Base Voltage ($I_C = 0$) | 5 | | | V |
| I_C | Collector Current | 15 | | | A |
| I_{CM} | Collector Peak Current | 30 | | | A |
| I_B | Base Current | 1 | | | A |
| I_{BM} | Base Peak Current | 5 | | | A |
| P_{tot} | Total Dissipation at $T_c = 25^\circ C$ | 175 | 135 | 60 | W |
| T_{stg} | Storage Temperature | -65 to 200 | -65 to 175 | -65 to 175 | $^\circ C$ |
| T_j | Max. Operating Junction Temperature | 200 | 175 | 175 | $^\circ C$ |

BU931/BU931P/BU931PFI

THERMAL DATA

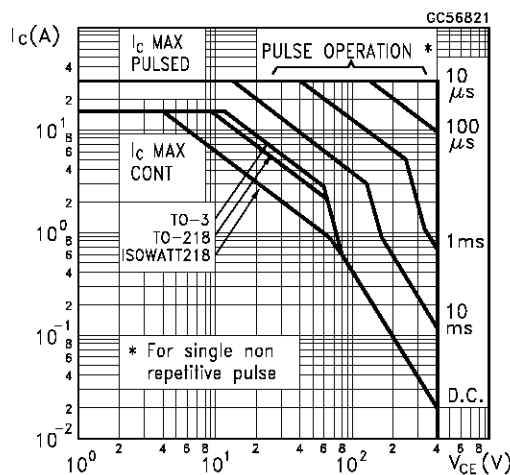
| | | TO-3 | TO-218 | ISOWATT218 | |
|----------------|--------------------------------------|------|--------|------------|---------------|
| $R_{thj-case}$ | Thermal Resistance Junction-case Max | 1 | 1.1 | 2.5 | $^{\circ}C/W$ |

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ unless otherwise specified)

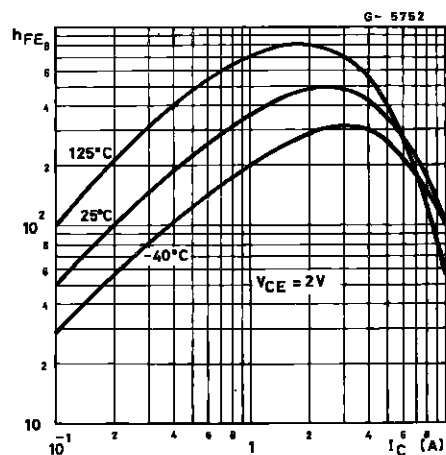
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|------------------|--|--|------|------|-------------------|---------------|
| I_{CES} | Collector Cut-off Current ($V_{BE} = 0$) | $V_{CE} = 500 V$ $V_{CE} = 500 V \quad T_j = 125^{\circ}C$ | | | 100 0.5 | μA mA |
| I_{CEO} | Collector Cut-off Current ($I_B = 0$) | $V_{CE} = 450 V$ $V_{CE} = 450 V \quad T_j = 125^{\circ}C$ | | | 100 0.5 | μA mA |
| I_{EBO} | Emitter Cut-off Current ($I_C = 0$) | $V_{EB} = 5 V$ | | | 20 | mA |
| $V_{CEO(sus)}^*$ | Collector-Emitter Sustaining Voltage | $I_C = 100 mA \quad L = 10 mH \quad I_B = 0$ $V_{CLAMP} = RATED V_{CEO}$ (See FIG.4) | 400 | | | V |
| $V_{CE(sat)}^*$ | Collector-Emitter Saturation Voltage | $I_C = 7 A \quad I_B = 70 mA$ $I_C = 8 A \quad I_B = 100 mA$ $I_C = 10 A \quad I_B = 250 mA$ | | | 1.6 1.8 1.8 | V V V |
| $V_{BE(sat)}^*$ | Base-Emitter Saturation Voltage | $I_C = 7 A \quad I_B = 70 mA$ $I_C = 8 A \quad I_B = 100 mA$ $I_C = 10 A \quad I_B = 250 mA$ | | | 2.2 2.4 2.5 | V V V |
| h_{FE}^* | DC Current Gain | $I_C = 5 A \quad V_{CE} = 10 V$ | 300 | | | |
| V_F | Diode Forward Voltage | $I_F = 10 A$ | | | 2.5 | V |
| | Functional Test (see fig. 1) | $V_{CC} = 24 V \quad V_{clamp} = 400 V \quad L = 7 mH$ | 8 | | | A |
| t_s | INDUCTIVE LOAD Storage Time | $V_{CC} = 12 V \quad V_{clamp} = 300 V \quad L = 7 mH$ $I_C = 7 A \quad I_B = 70 mA$ | | 15 | | μs |
| t_f | Fall Time (see fig. 3) | $V_{BE} = 0 \quad R_{BE} = 47 \Omega$ | | 0.5 | | μs |

* Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %

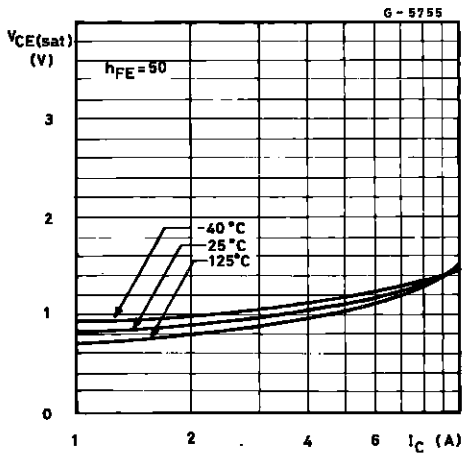
Safe Operating Area



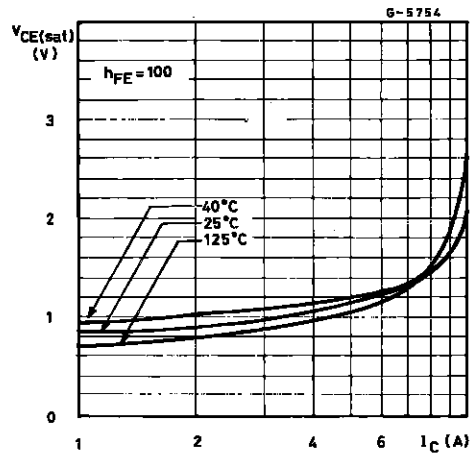
DC Current Gain



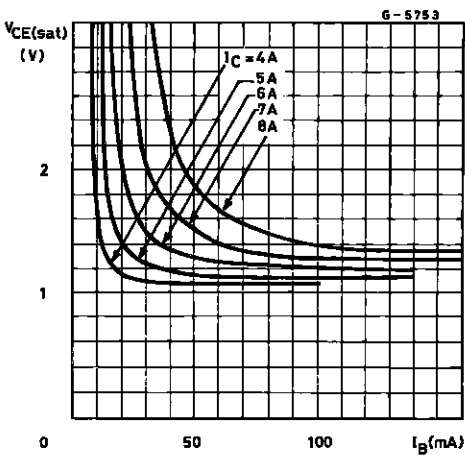
Collector Emitter Saturation Voltage



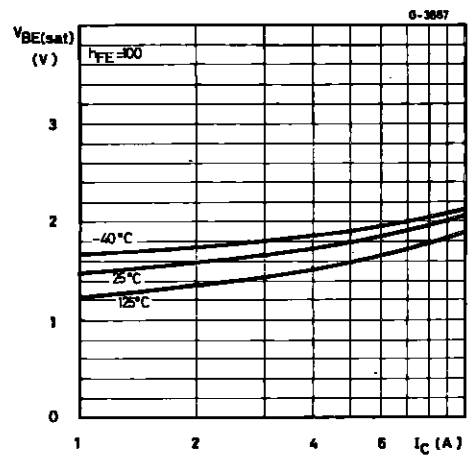
Collector Emitter Saturation Voltage



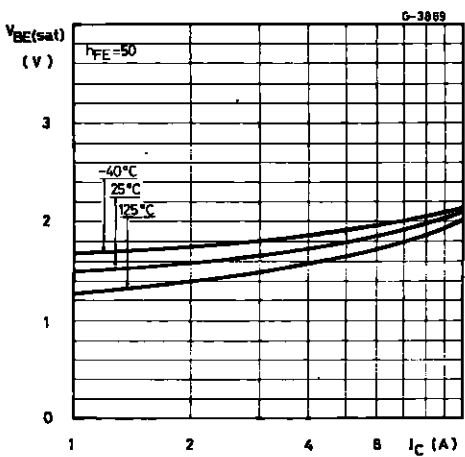
Collector Emitter Saturation Voltage



Base Emitter Saturation Voltage



Base Emitter Saturation Voltage



Switching Time Inductive Load

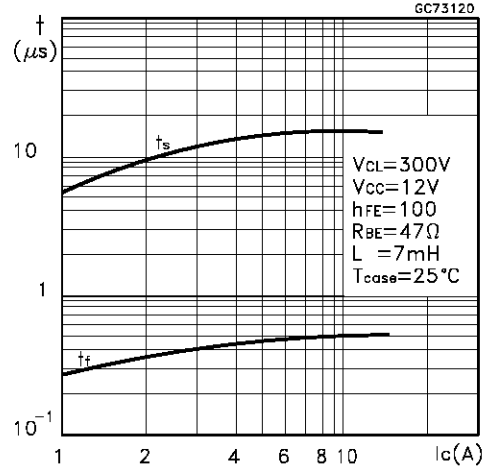


FIGURE 1: Functional Test Circuit

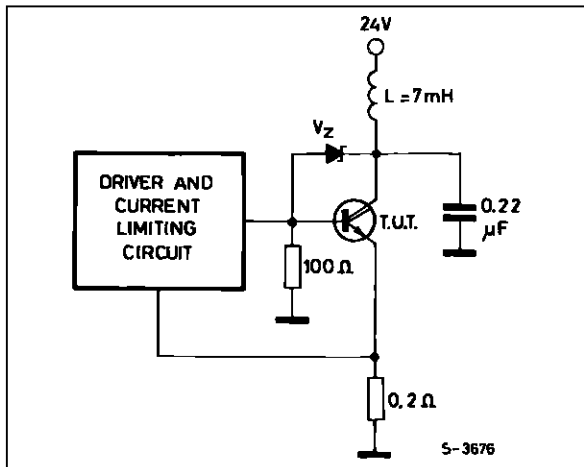


FIGURE 2: Functional Test Waveforms

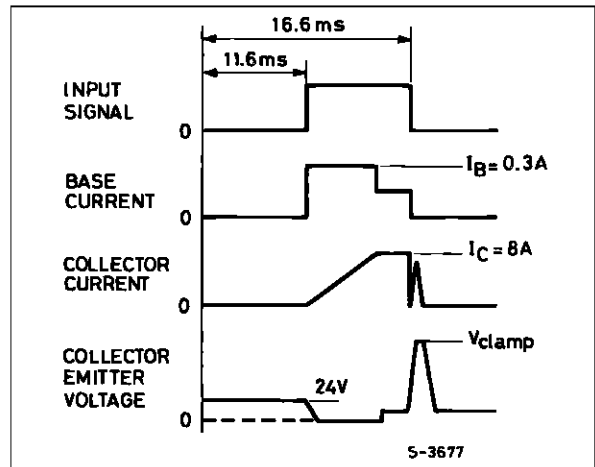


FIGURE 3: Switching Time Test Circuit

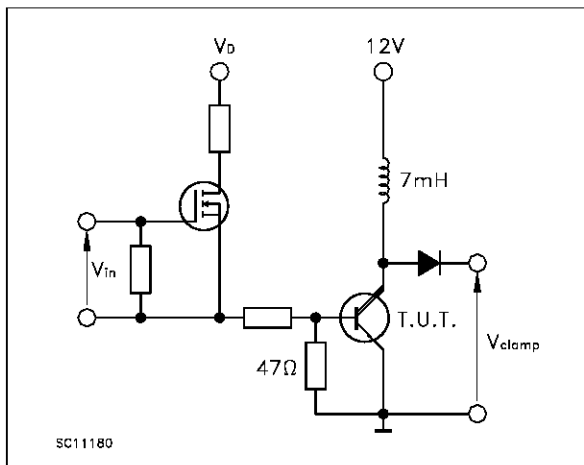
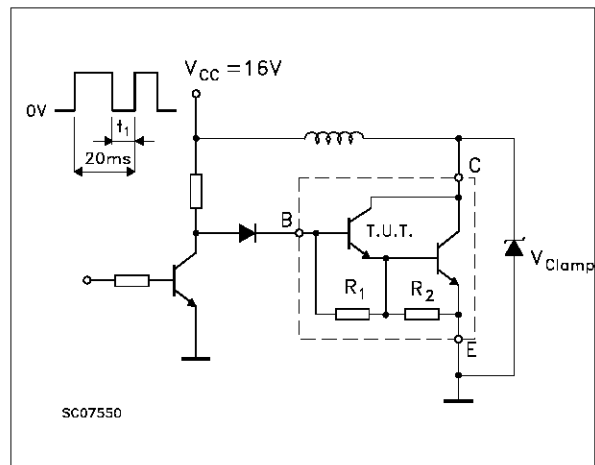
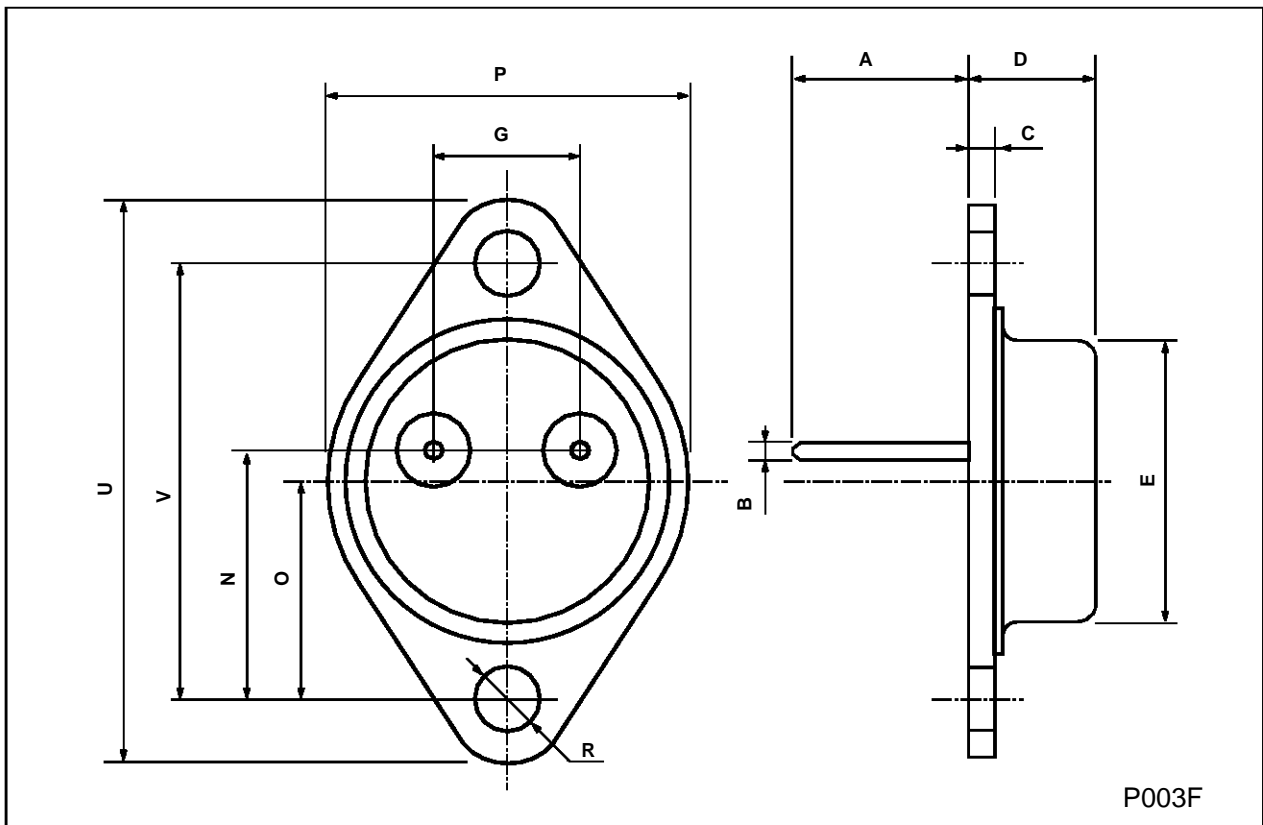


FIGURE 4: Sustaining Voltage Test Circuit



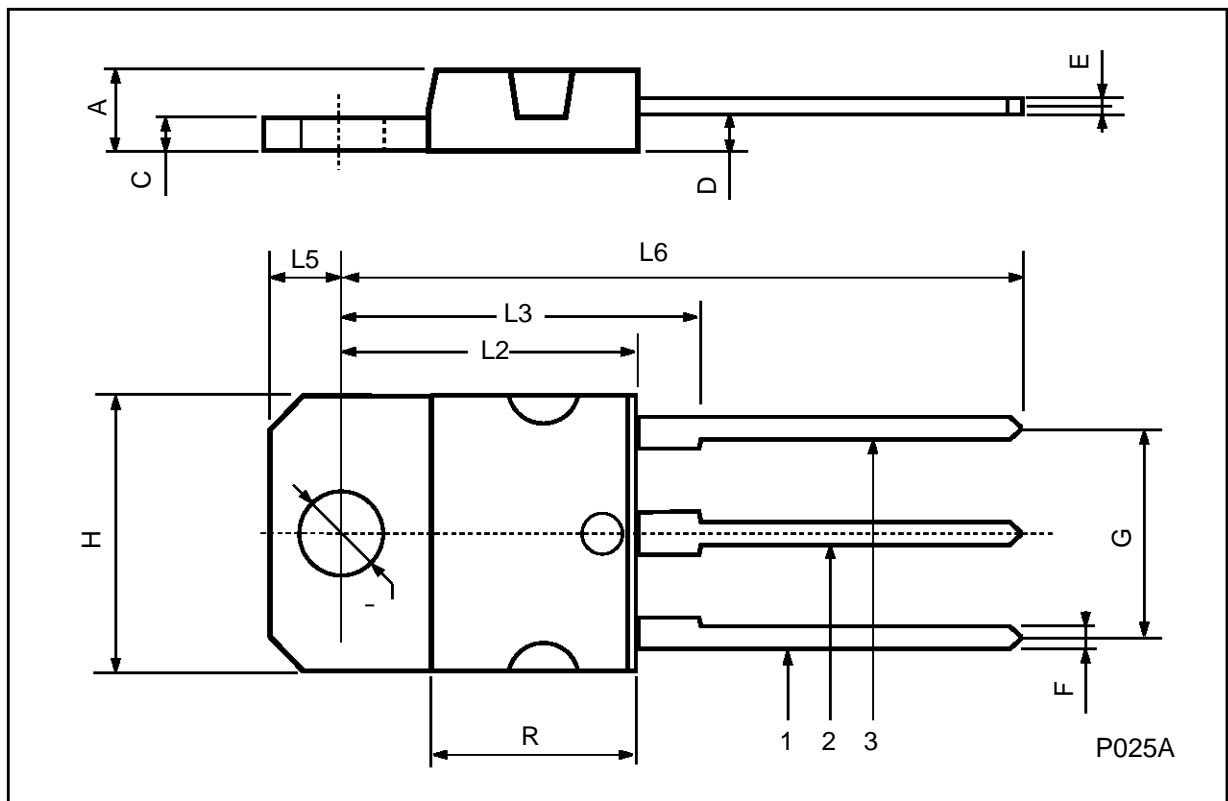
TO-3 MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|-------|------|-------|-------|------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 11.00 | | 13.10 | 0.433 | | 0.516 |
| B | 0.97 | | 1.15 | 0.038 | | 0.045 |
| C | 1.50 | | 1.65 | 0.059 | | 0.065 |
| D | 8.32 | | 8.92 | 0.327 | | 0.351 |
| E | 19.00 | | 20.00 | 0.748 | | 0.787 |
| G | 10.70 | | 11.10 | 0.421 | | 0.437 |
| N | 16.50 | | 17.20 | 0.649 | | 0.677 |
| P | 25.00 | | 26.00 | 0.984 | | 1.023 |
| R | 4.00 | | 4.09 | 0.157 | | 0.161 |
| U | 38.50 | | 39.30 | 1.515 | | 1.547 |
| V | 30.00 | | 30.30 | 1.187 | | 1.193 |



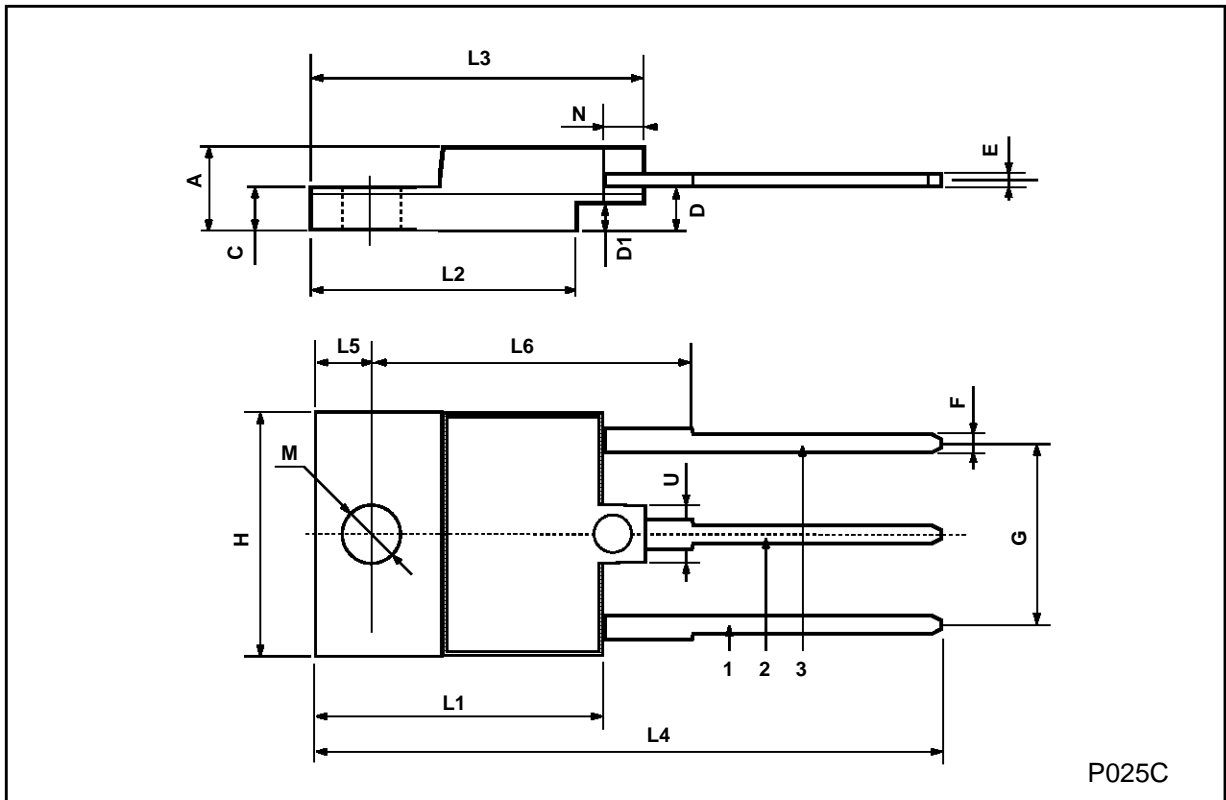
TO-218 (SOT-93) MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|------|------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 4.7 | | 4.9 | 0.185 | | 0.193 |
| C | 1.17 | | 1.37 | 0.046 | | 0.054 |
| D | | 2.5 | | | 0.098 | |
| E | 0.5 | | 0.78 | 0.019 | | 0.030 |
| F | 1.1 | | 1.3 | 0.043 | | 0.051 |
| G | 10.8 | | 11.1 | 0.425 | | 0.437 |
| H | 14.7 | | 15.2 | 0.578 | | 0.598 |
| L2 | - | | 16.2 | - | | 0.637 |
| L3 | | 18 | | | 0.708 | |
| L5 | 3.95 | | 4.15 | 0.155 | | 0.163 |
| L6 | | 31 | | | 1.220 | |
| R | - | | 12.2 | - | | 0.480 |
| Ø | 4 | | 4.1 | 0.157 | | 0.161 |



ISOWATT218 MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|-------|------|-------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 5.35 | | 5.65 | 0.210 | | 0.222 |
| C | 3.3 | | 3.8 | 0.130 | | 0.149 |
| D | 2.9 | | 3.1 | 0.114 | | 0.122 |
| D1 | 1.88 | | 2.08 | 0.074 | | 0.081 |
| E | 0.75 | | 1 | 0.029 | | 0.039 |
| F | 1.05 | | 1.25 | 0.041 | | 0.049 |
| G | 10.8 | | 11.2 | 0.425 | | 0.441 |
| H | 15.8 | | 16.2 | 0.622 | | 0.637 |
| L1 | 20.8 | | 21.2 | 0.818 | | 0.834 |
| L2 | 19.1 | | 19.9 | 0.752 | | 0.783 |
| L3 | 22.8 | | 23.6 | 0.897 | | 0.929 |
| L4 | 40.5 | | 42.5 | 1.594 | | 1.673 |
| L5 | 4.85 | | 5.25 | 0.190 | | 0.206 |
| L6 | 20.25 | | 20.75 | 0.797 | | 0.817 |
| M | 3.5 | | 3.7 | 0.137 | | 0.145 |
| N | 2.1 | | 2.3 | 0.082 | | 0.090 |
| U | | 4.6 | | | 0.181 | |



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