



BU941Z/BU941ZP BU941ZPFI

HIGH VOLTAGE IGNITION COIL DRIVER NPN POWER DARLINGTON TRANSISTOR

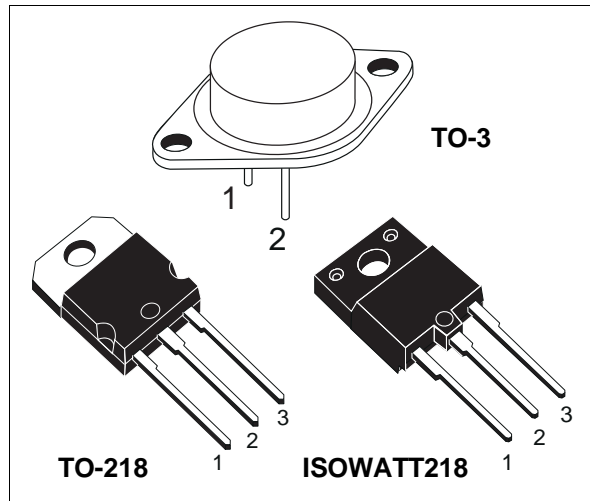
- VERY RUGGED BIPOLAR TECHNOLOGY
- BUILT IN CLAMPING ZENER
- HIGH OPERATING JUNCTION TEMPERATURE
- WIDE RANGE OF PACKAGES
- FULLY INSULATED PACKAGE (U.L. COMPLIANT) FOR EASY MOUNTING

APPLICATIONS

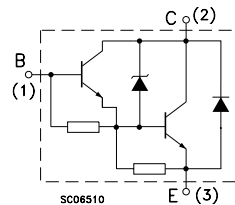
- HIGH RUGGEDNESS ELECTRONIC IGNITIONS

DESCRIPTION

The devices are bipolar Darlington transistors manufactured using Multiepitaxial Planar technology. They have been properly designed to be used in Automotive environment as electronic ignition power actuators.



INTERNAL SCHEMATIC DIAGRAM



for TO-3
Emitter: pin 2
Base: pin 1
Collector: tab

ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | | | Unit |
|------------|--|------------|------------|------------|------------------|
| | | BU941Z | BU941ZP | BU941ZPFI | |
| V_{CEO} | Collector-Emitter Voltage ($I_B = 0$) | 350 | | | 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 $T_c = 25^\circ\text{C}$ | 180 | 155 | 65 | W |
| V_{isol} | Insulation Withstand Voltage (RMS) from All Three Leads to External Heatsink | 2500 | | | V |
| T_{stg} | Storage Temperature | -65 to 200 | -65 to 175 | -65 to 175 | $^\circ\text{C}$ |
| T_j | Max. Operating Junction Temperature | 200 | 175 | 175 | $^\circ\text{C}$ |

BU941Z/BU941ZP/BU941ZPFI

THERMAL DATA

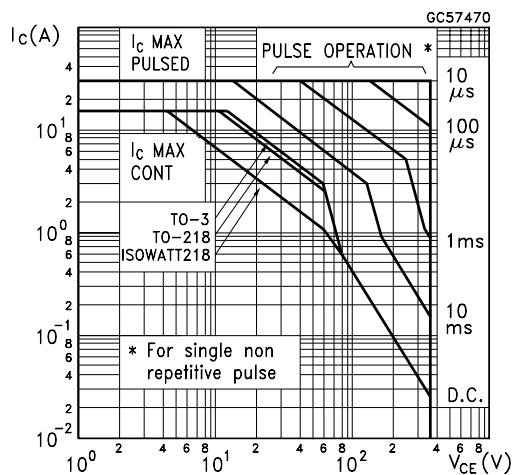
| | | TO-3 | TO-218 | ISOWATT218 | |
|----------------|--------------------------------------|------|--------|------------|------|
| $R_{thj-case}$ | Thermal Resistance Junction-case Max | 0.97 | 0.97 | 2.3 | °C/W |

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

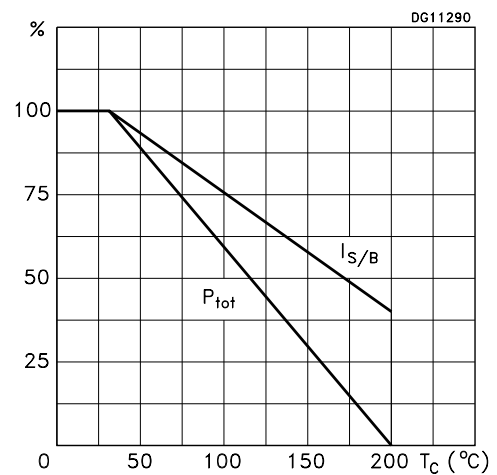
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-----------------|---|--|------|-----------|-------------------|--------------------------------|
| I_{CEO} | Collector Cut-off Current ($I_B = 0$) | $V_{CE} = 300\text{ V}$ $V_{CE} = 300\text{ V}$ $T_C = 125\text{ °C}$ | | | 100 0.5 | μA mA |
| I_{EBO} | Emitter Cut-off Current ($I_C = 0$) | $V_{EB} = 5\text{ V}$ | | | 20 | mA |
| V_{CL}^* | Clamping Voltage | $I_C = 100\text{ mA}$ | 350 | | 500 | V |
| $V_{CE(sat)}^*$ | Collector-Emitter Saturation Voltage | $I_C = 8\text{ A}$ $I_B = 100\text{ mA}$ $I_C = 10\text{ A}$ $I_B = 250\text{ mA}$ $I_C = 12\text{ A}$ $I_B = 300\text{ mA}$ | | | 1.8 1.8 2 | V V V |
| $V_{BE(sat)}^*$ | Base-Emitter Saturation Voltage | $I_C = 8\text{ A}$ $I_B = 100\text{ mA}$ $I_C = 10\text{ A}$ $I_B = 250\text{ mA}$ $I_C = 12\text{ A}$ $I_B = 300\text{ mA}$ | | | 2.2 2.5 2.7 | V V V |
| h_{FE}^* | DC Current Gain | $I_C = 5\text{ A}$ $V_{CE} = 10\text{ V}$ | 300 | | | |
| V_F | Diode Forward Voltage | $I_F = 10\text{ A}$ | | | 2.5 | V |
| | Functional Test | $V_{CC} = 24\text{ V}$ $L = 7\text{ mH}$ (see fig. 1) | 10 | | | A |
| t_s t_f | INDUCTIVE LOAD Storage Time Fall Time | $V_{CC} = 12\text{ V}$ $L = 7\text{ mH}$ $V_{BE} = 0$ $R_{BE} = 47\ \Omega$ $V_{clamp} = 300\text{ V}$ $I_C = 7\text{ A}$ $I_B = 70\text{ mA}$ (see fig. 3) | | 15 0.5 | | μs μs |

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

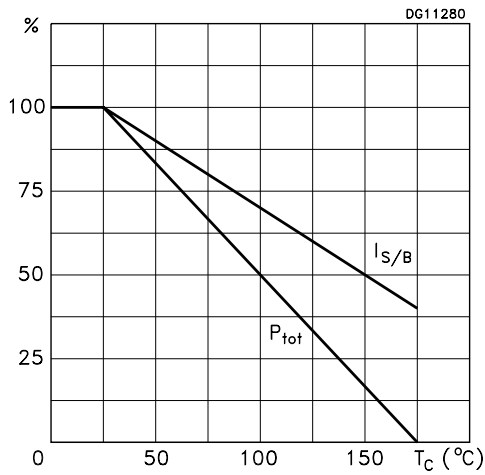
Safe Operating Areas



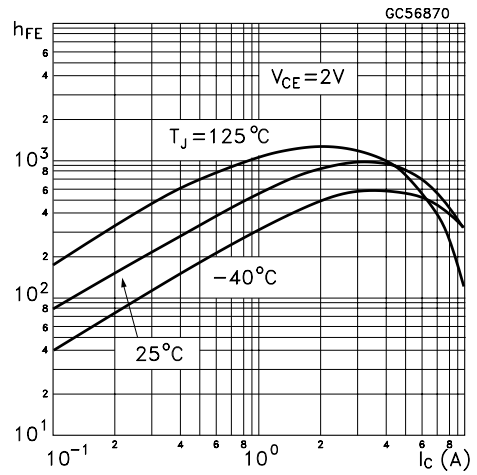
Derating Curves (TO-3)



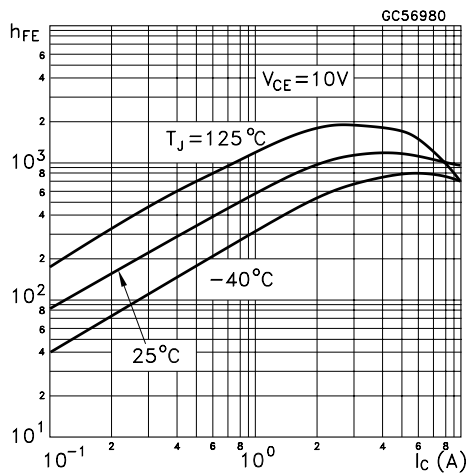
Derating Curves (TO-218/ISOWATT218)



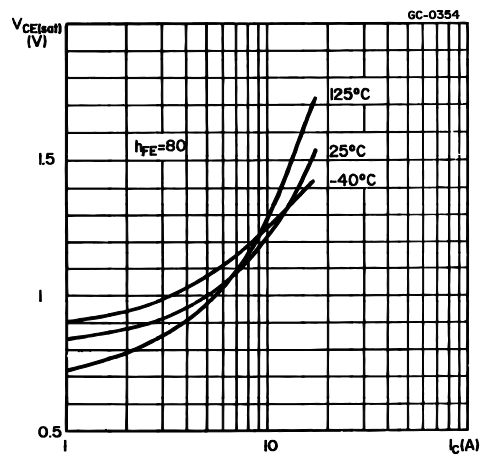
DC Current Gain



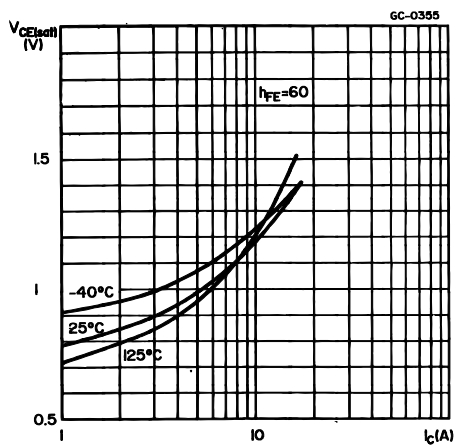
DC Current Gain



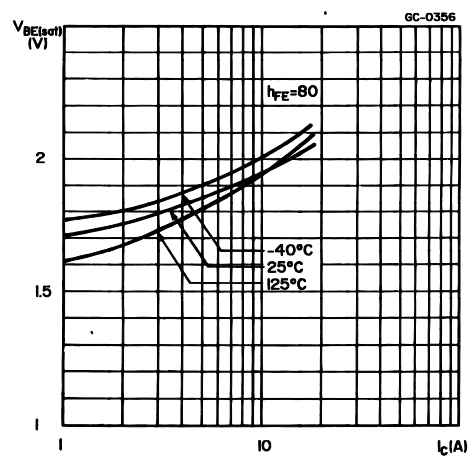
Collector-emitter Saturation Voltage



Collector-emitter Saturation Voltage



Base-emitter Saturation Voltage



Base-emitter Saturation Voltage

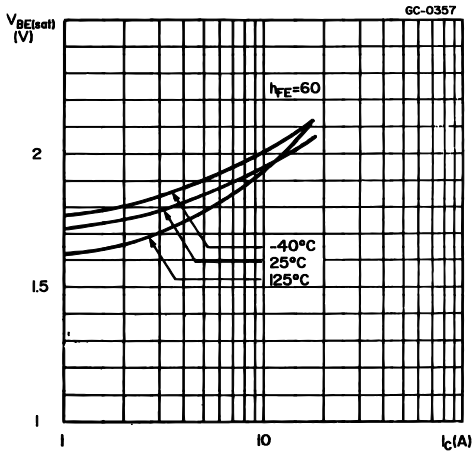


FIGURE 1: Functional Test Circuit

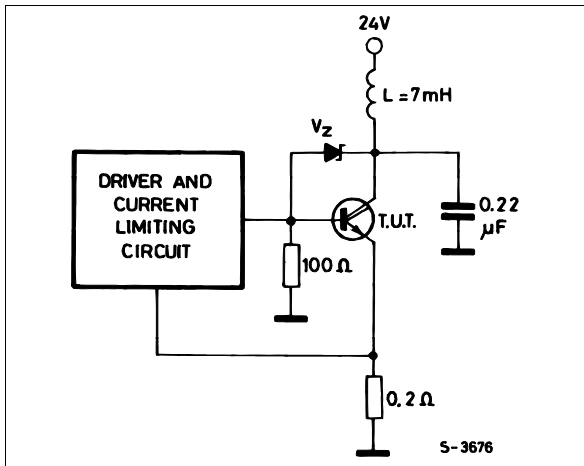
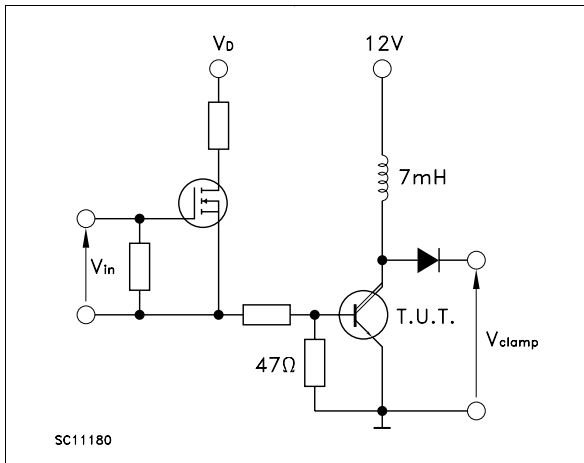


FIGURE 3: Switching Time Test Circuit



Collector-emitter Saturation Voltage

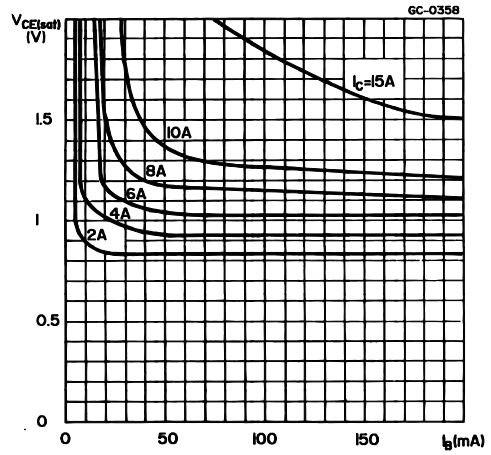
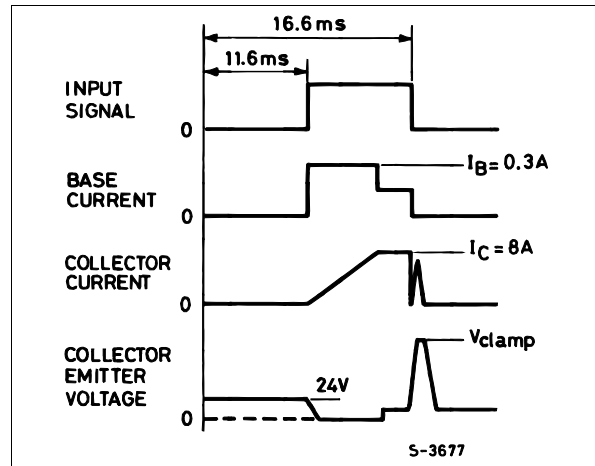
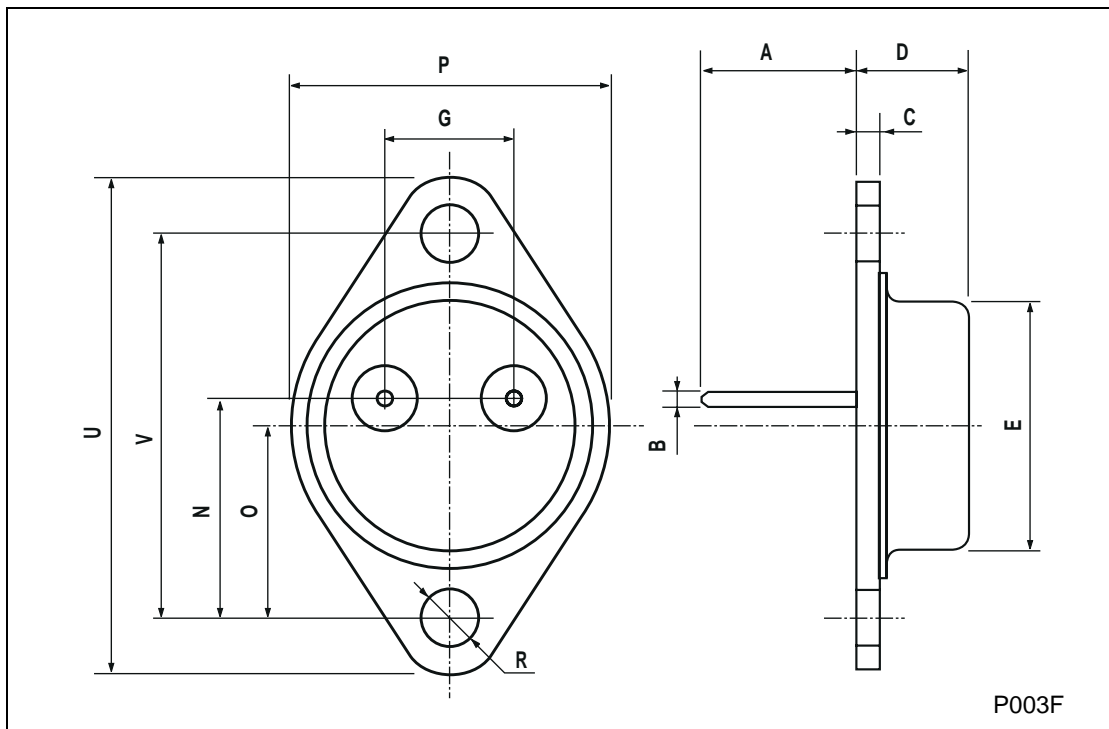


FIGURE 2: Functional Test Waveforms



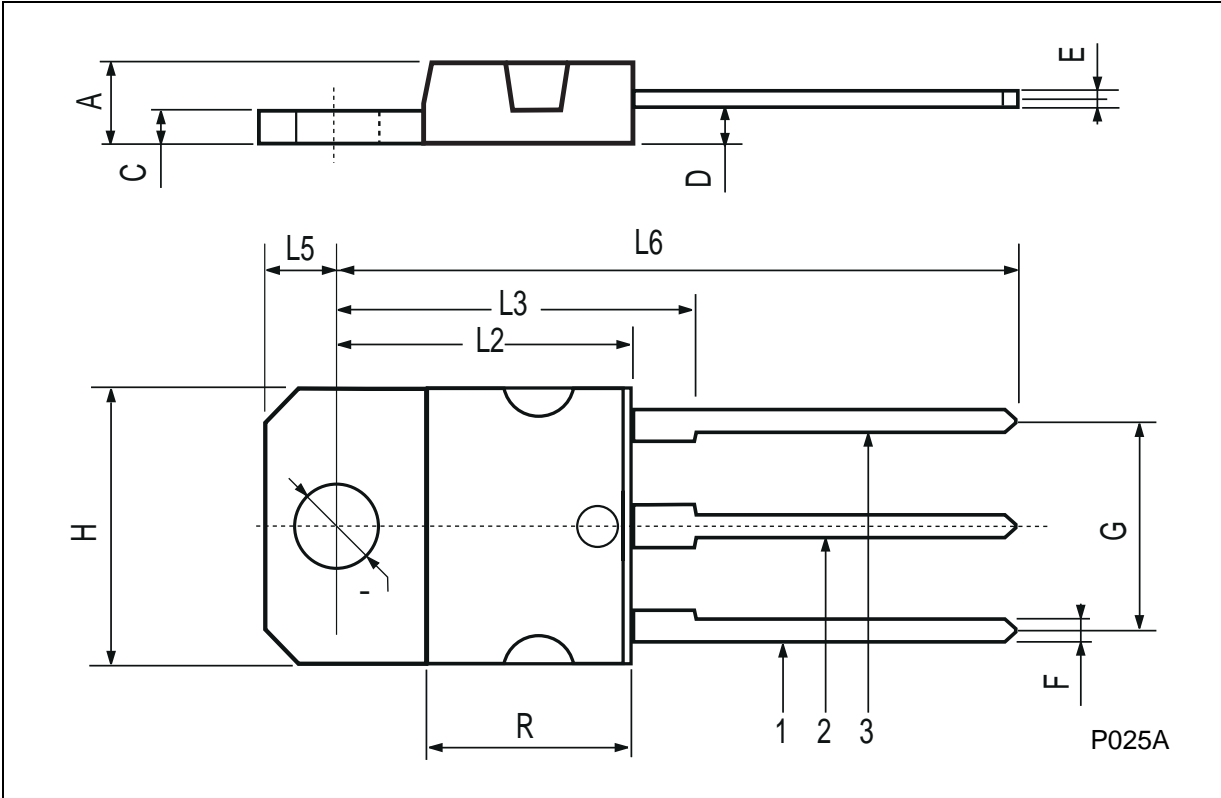
TO-3 MECHANICAL DATA

| 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 |



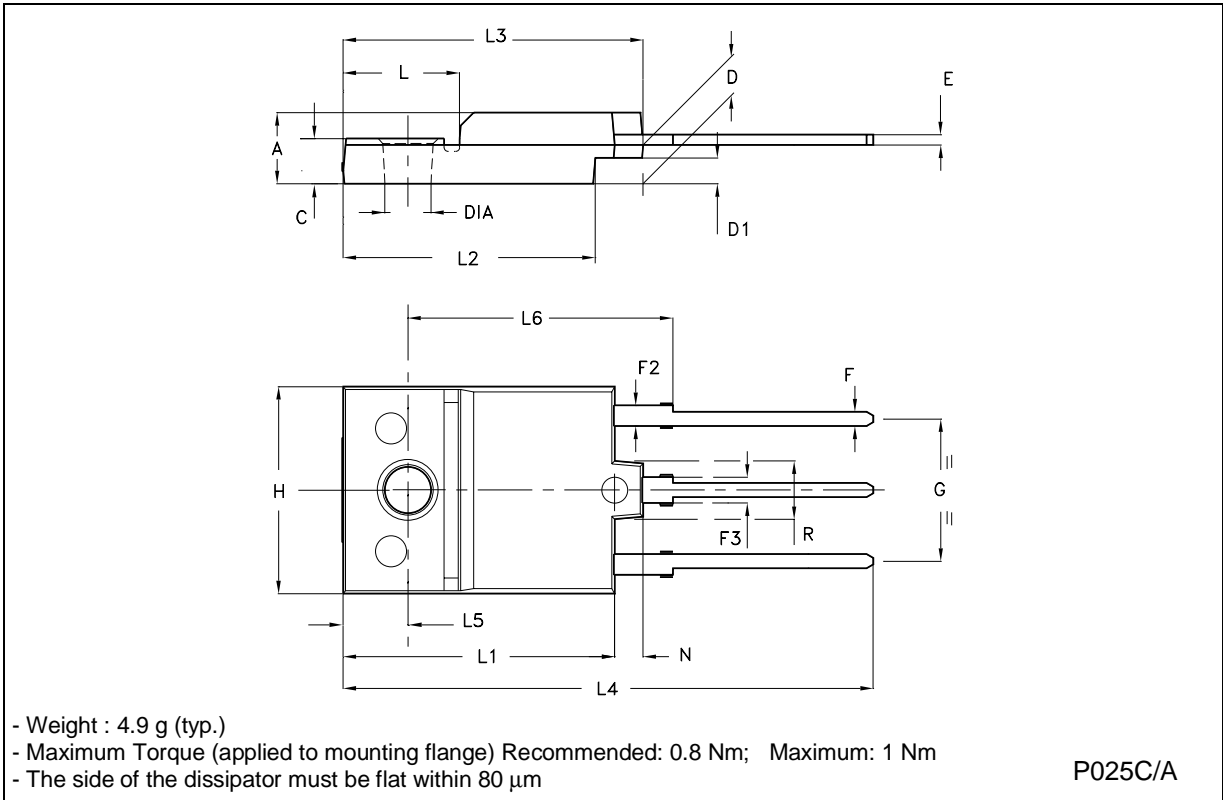
TO-218 (SOT-93) MECHANICAL DATA

| 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 | 0.211 | | 0.222 |
| C | 3.30 | | 3.80 | 0.130 | | 0.150 |
| D | 2.90 | | 3.10 | 0.114 | | 0.122 |
| D1 | 1.88 | | 2.08 | 0.074 | | 0.082 |
| E | 0.75 | | 0.95 | 0.030 | | 0.037 |
| F | 1.05 | | 1.25 | 0.041 | | 0.049 |
| F2 | 1.50 | | 1.70 | 0.059 | | 0.067 |
| F3 | 1.90 | | 2.10 | 0.075 | | 0.083 |
| G | 10.80 | | 11.20 | 0.425 | | 0.441 |
| H | 15.80 | | 16.20 | 0.622 | | 0.638 |
| L | | 9 | | | 0.354 | |
| L1 | 20.80 | | 21.20 | 0.819 | | 0.835 |
| L2 | 19.10 | | 19.90 | 0.752 | | 0.783 |
| L3 | 22.80 | | 23.60 | 0.898 | | 0.929 |
| L4 | 40.50 | | 42.50 | 1.594 | | 1.673 |
| L5 | 4.85 | | 5.25 | 0.191 | | 0.207 |
| L6 | 20.25 | | 20.75 | 0.797 | | 0.817 |
| N | 2.1 | | 2.3 | 0.083 | | 0.091 |
| R | | 4.6 | | | 0.181 | |
| DIA | 3.5 | | 3.7 | 0.138 | | 0.146 |



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