

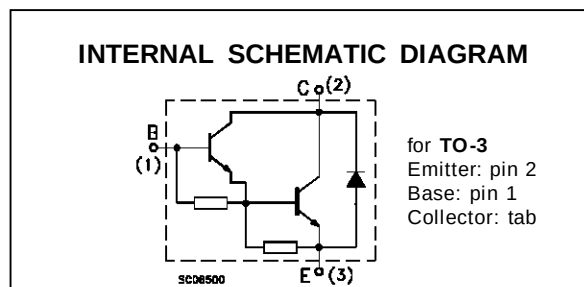
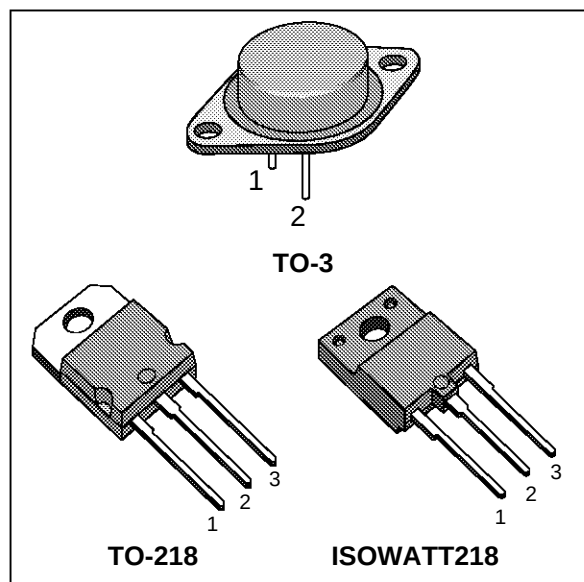
## HIGH VOLTAGE IGNITION COIL DRIVER NPN POWER DARLINGTON

PRELIMINARY DATA

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

### APPLICATIONS

- HIGH RUGGEDNESS ELECTRONIC IGNITIONS



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter                                     | Value      |            |            | Unit             |
|-----------|-----------------------------------------------|------------|------------|------------|------------------|
|           |                                               | BU941      | BU941P     | BU941PFI   |                  |
| $V_{CES}$ | 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 $T_c = 25^\circ\text{C}$ | 180        | 155        | 65         | W                |
| $T_{stg}$ | Storage Temperature                           | -65 to 200 | -65 to 175 | -65 to 175 | $^\circ\text{C}$ |
| $T_j$     | Max. Operating Junction Temperature           | 200        | 175        | 175        | $^\circ\text{C}$ |

## THERMAL DATA

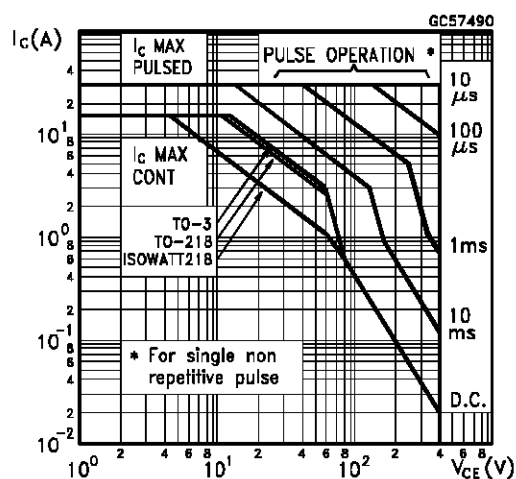
|                |                                      | TO-3 | TO-218 | ISOWATT218 |                      |
|----------------|--------------------------------------|------|--------|------------|----------------------|
| $R_{thj-case}$ | Thermal Resistance Junction-case Max | 0.97 | 0.97   | 2.3   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

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

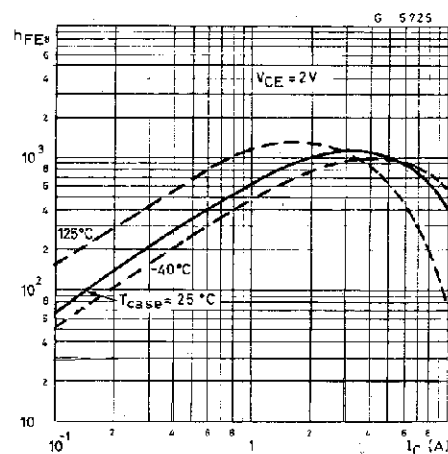
| Symbol          | Parameter                                                   | Test Conditions                                                                                                                                            | Min. | Typ.      | Max.              | Unit                                   |
|-----------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------|-------------------|----------------------------------------|
| $I_{CES}$       | Collector Cut-off Current ( $V_{BE} = 0$ )                  | $V_{CE} = 500\text{ V}$<br>$V_{CE} = 500\text{ V}$ $T_j = 125^{\circ}\text{C}$                                                                             |      |           | 100<br>0.5        | $\mu\text{A}$<br>$\text{mA}$           |
| $I_{CEO}$       | Collector Cut-off Current ( $I_B = 0$ )                     | $V_{CE} = 450\text{ V}$<br>$V_{CE} = 450\text{ V}$ $T_j = 125^{\circ}\text{C}$                                                                             |      |           | 100<br>0.5        | $\mu\text{A}$<br>$\text{mA}$           |
| $I_{EBO}$       | Emitter Cut-off Current ( $I_C = 0$ )                       | $V_{EB} = 5\text{ V}$                                                                                                                                      |      |           | 20                | $\text{mA}$                            |
| $V_{CEO(sus)*}$ | Collector-Emitter Sustaining Voltage                        | $I_C = 100\text{ mA}$ $L = 10\text{ mH}$ $I_B = 0$<br>$V_{CLAMP} = \text{RATED } V_{CEO}$ (See FIG.4)                                                      | 400  |           |                   | $\text{V}$                             |
| $V_{CE(sat)*}$  | Collector-Emitter Saturation Voltage                        | $I_C = 8\text{ A}$ $I_B = 100\text{ mA}$<br>$I_C = 10\text{ A}$ $I_B = 250\text{ mA}$<br>$I_C = 12\text{ A}$ $I_B = 300\text{ mA}$                         |      |           | 1.6<br>1.8<br>2   | $\text{V}$<br>$\text{V}$<br>$\text{V}$ |
| $V_{BE(sat)*}$  | Base-Emitter Saturation Voltage                             | $I_C = 8\text{ A}$ $I_B = 100\text{ mA}$<br>$I_C = 10\text{ A}$ $I_B = 250\text{ mA}$<br>$I_C = 12\text{ A}$ $I_B = 300\text{ mA}$                         |      |           | 2.2<br>2.5<br>2.7 | $\text{V}$<br>$\text{V}$<br>$\text{V}$ |
| $h_{FE*}$       | 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               | $\text{V}$                             |
|                 | Functional Test (see fig. 1)                                | $V_{CC} = 24\text{ V}$ $V_{clamp} = 400\text{ V}$ $L = 7\text{ mH}$                                                                                        | 10   |           |                   | $\text{A}$                             |
| $t_s$<br>$t_f$  | INDUCTIVE LOAD<br>Storage Time<br>Fall Time<br>(see fig. 3) | $V_{CC} = 12\text{ V}$ $V_{clamp} = 300\text{ V}$ $L = 7\text{ mH}$<br>$I_C = 7\text{ A}$ $I_B = 70\text{ mA}$<br>$V_{BE} = 0$ $R_{BE} = 47\text{ }\Omega$ |      | 15<br>0.5 |                   | $\mu\text{s}$<br>$\mu\text{s}$         |

\* Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %

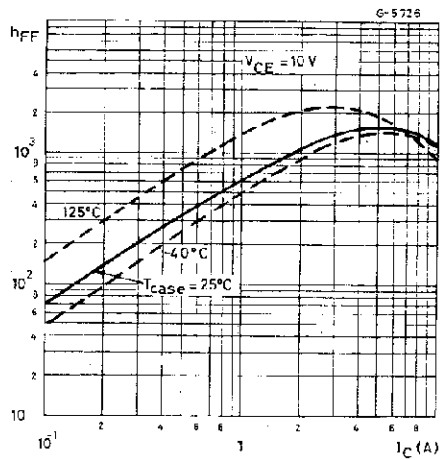
## Safe Operating Areas



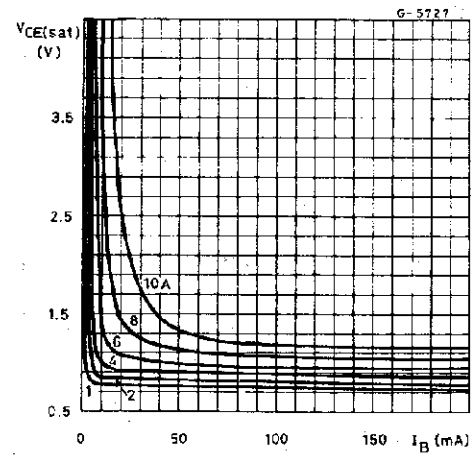
## DC Current Gain



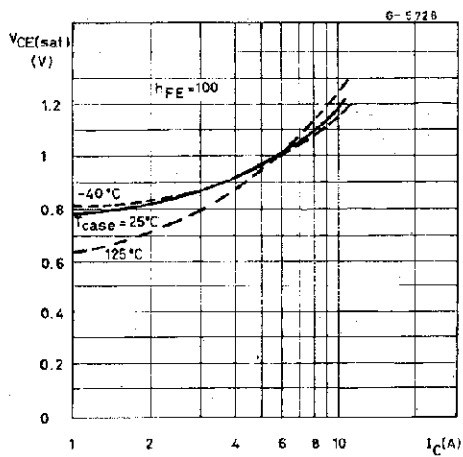
### DC Current Gain



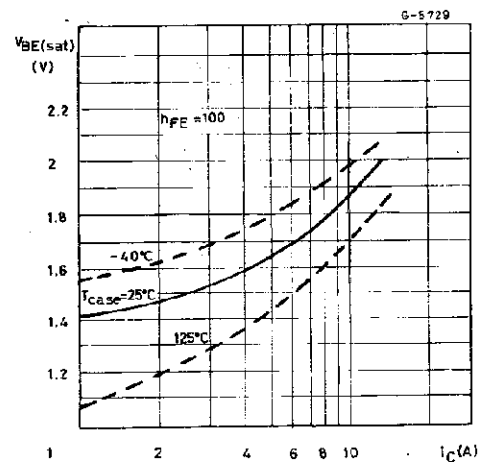
### Collector-emitter Saturation Voltage



### Collector-emitter Saturation Voltage



### Base-emitter Saturation Voltage



### Switching Times Inductive Load (see fig. 3)

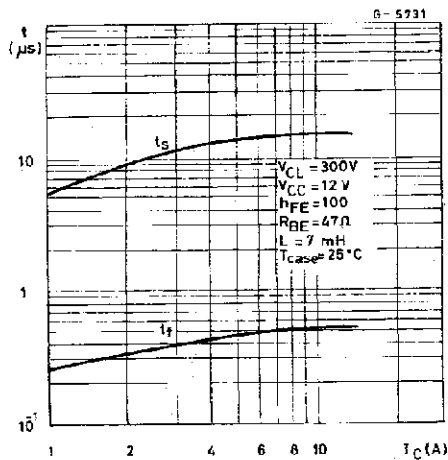


FIGURE 1: Functional Test Circuit

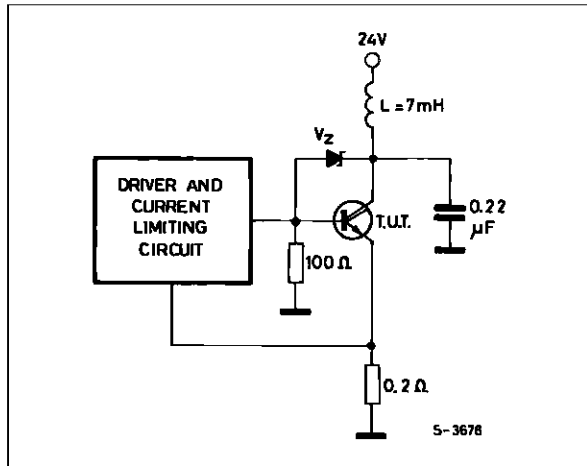


FIGURE 2: Functional Test Waveforms

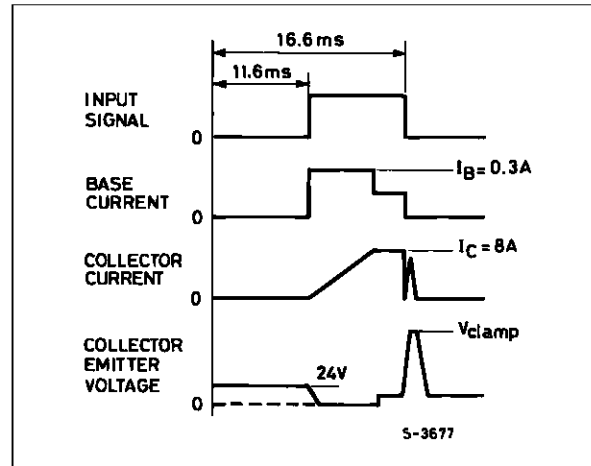


FIGURE 3: Switching Time Test Circuit

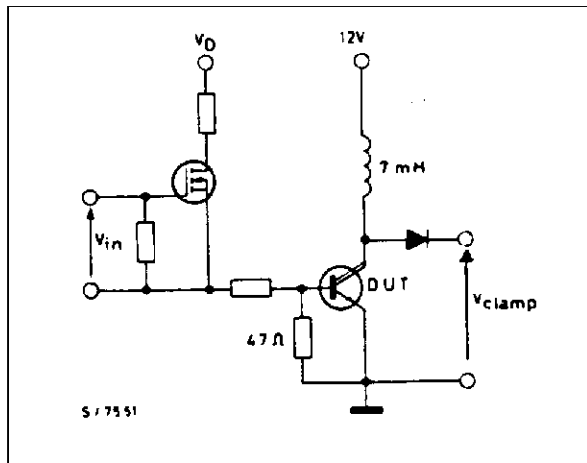
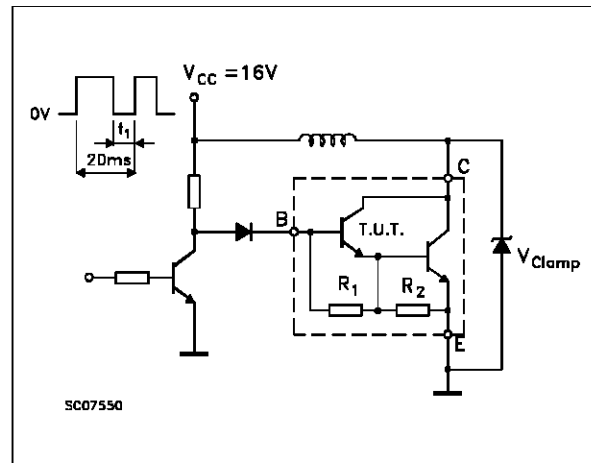
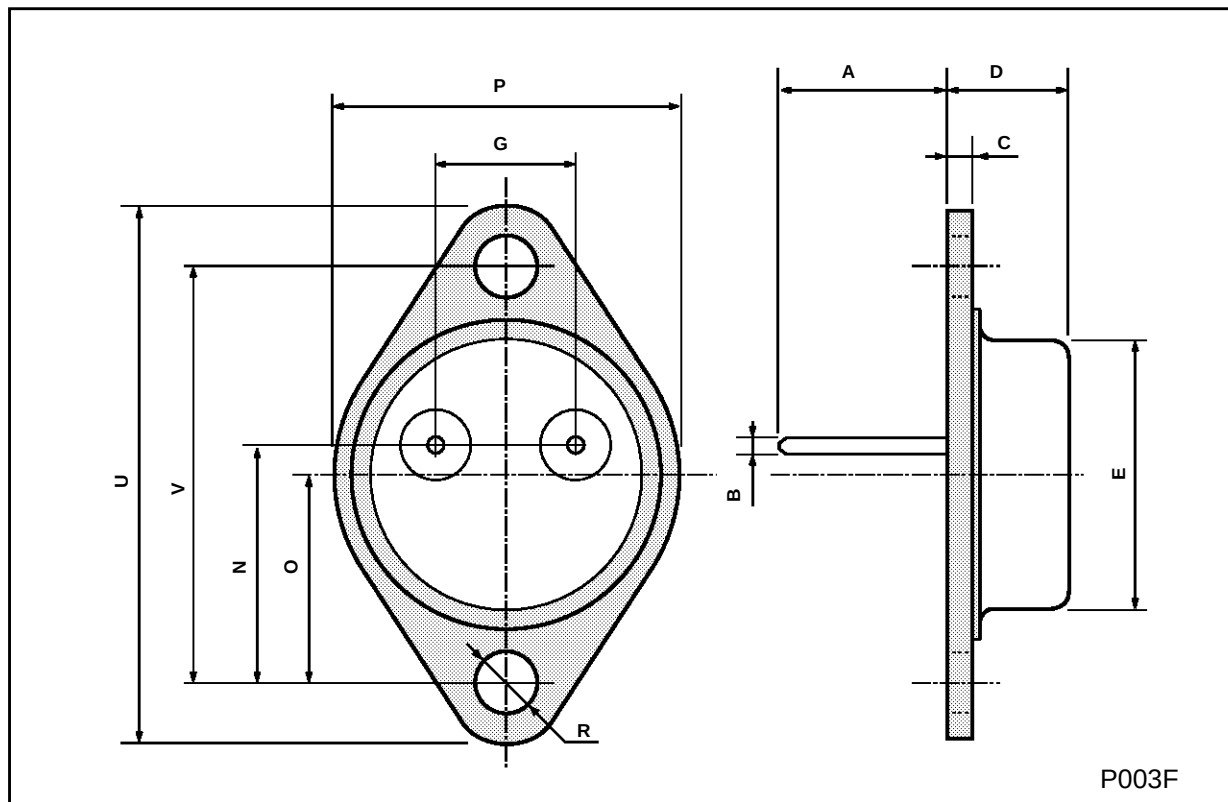


FIGURE 4: Sustaining Voltage Test Circuit



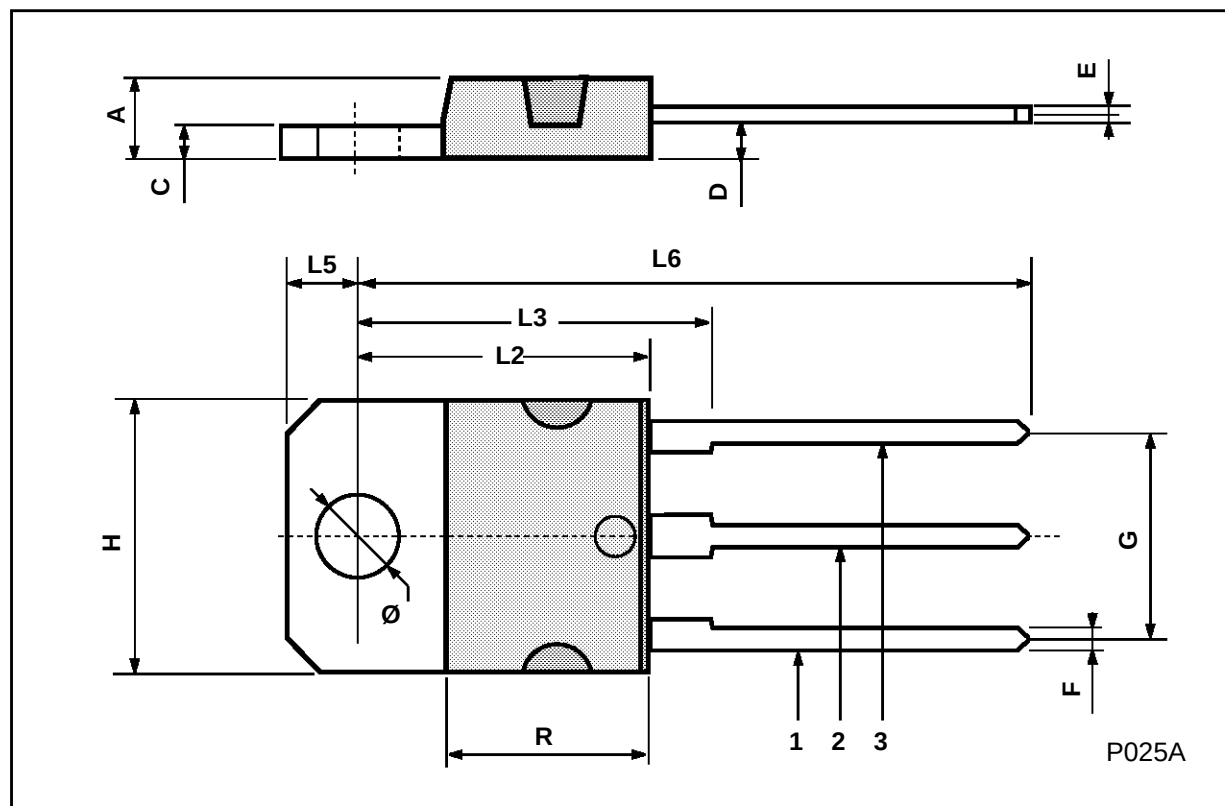
## TO-3 MECHANICAL DATA

| 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 |



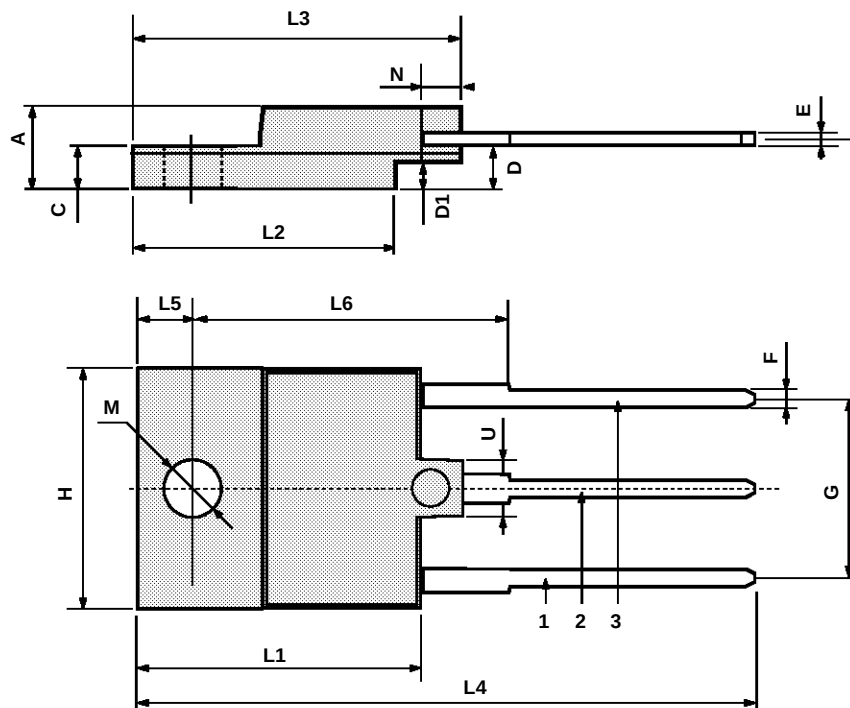
## TO-218 (SOT-93) MECHANICAL DATA

| 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    | 0.45  |      | 1     | 0.017 |       | 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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