



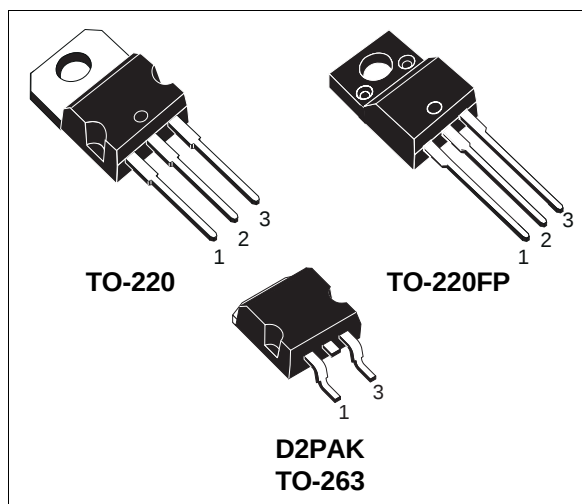
# BU941ZT/BU941ZTFP BUB941ZT

## HIGH VOLTAGE IGNITION COIL DRIVER NPN POWER DARLINGTON

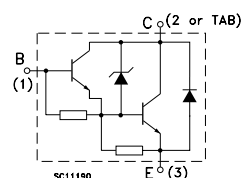
- VERY RUGGED BIPOLAR TECHNOLOGY
- BUILT IN CLAMPING ZENER
- HIGH OPERATING JUNCTION TEMPERATURE
- WIDE RANGE OF PACKAGES
- SURFACE-MOUNTING D2PAK (TO-263)  
POWER PACKAGE IN TUBE (NO SUFFIX)  
OR IN TAPE & REEL (SUFFIX "T4")

### APPLICATIONS

- HIGH RUGGEDNESS ELECTRONIC IGNITIONS



### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter                                     | Value          |                  |                 | Unit             |
|-----------|-----------------------------------------------|----------------|------------------|-----------------|------------------|
| $V_{CEO}$ | 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                |
|           |                                               | <b>BU941ZT</b> | <b>BU941ZTFP</b> | <b>BUB941ZT</b> |                  |
| $P_{tot}$ | Total Dissipation at $T_c = 25^\circ\text{C}$ | 150            | 55               | 150             | W                |
| $T_{stg}$ | Storage Temperature                           | -65 to 175     | -65 to 175       | -65 to 175      | $^\circ\text{C}$ |
| $T_j$     | Max. Operating Junction Temperature           | 175            | 175              | 175             | $^\circ\text{C}$ |

BU941ZT / BU941ZTFP / BUB941ZT

THERMAL DATA

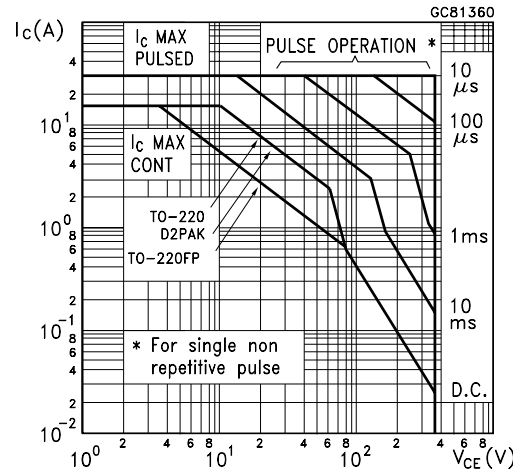
|                       |                                  |     | TO-220<br>D2PAK | TO-220FP |      |
|-----------------------|----------------------------------|-----|-----------------|----------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-case | Max | 1               | 2.7      | °C/W |

ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

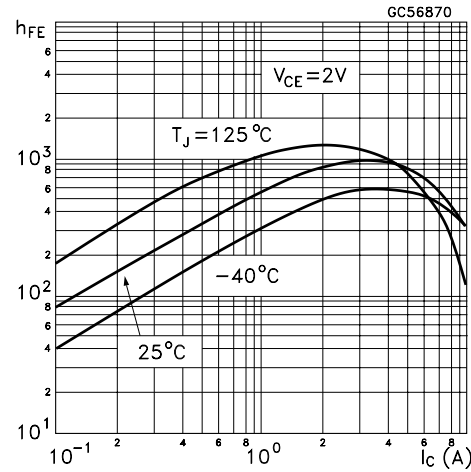
| Symbol                           | Parameter                                             | Test Conditions                                                                                                                                        | Min. | Typ.      | Max.       | Unit     |
|----------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------|------------|----------|
| I <sub>CEO</sub>                 | Collector Cut-off Current (I <sub>B</sub> = 0)        | V <sub>CE</sub> = 300 V<br>V <sub>CE</sub> = 300 V T <sub>J</sub> = 125 °C                                                                             |      |           | 100<br>0.5 | μA<br>mA |
| I <sub>EBO</sub>                 | Emitter Cut-off Current (I <sub>C</sub> = 0)          | V <sub>EB</sub> = 5 V                                                                                                                                  |      |           | 20         | mA       |
| V <sub>CL</sub> *                | Clamping Voltage                                      | I <sub>C</sub> = 100 mA                                                                                                                                | 350  |           | 500        | V        |
| V <sub>CE(sat)</sub> *           | Collector-Emitter Saturation Voltage                  | I <sub>C</sub> = 8 A I <sub>B</sub> = 100 mA<br>I <sub>C</sub> = 10 A I <sub>B</sub> = 250 mA                                                          |      |           | 1.8<br>1.8 | V<br>V   |
| V <sub>BE(sat)</sub> *           | Base-Emitter Saturation Voltage                       | I <sub>C</sub> = 8 A I <sub>B</sub> = 100 mA<br>I <sub>C</sub> = 10 A I <sub>B</sub> = 250 mA                                                          |      |           | 2.2<br>2.5 | V<br>V   |
| h <sub>FE</sub> *                | DC Current Gain                                       | I <sub>C</sub> = 5 A V <sub>CE</sub> = 10 V                                                                                                            | 300  |           |            |          |
| V <sub>F</sub>                   | Diode Forward Voltage                                 | I <sub>F</sub> = 10 A                                                                                                                                  |      |           | 2.5        | V        |
|                                  | Functional Test (see fig. 1)                          | V <sub>CC</sub> = 24 V L = 7 mH                                                                                                                        | 10   |           |            | A        |
| t <sub>s</sub><br>t <sub>f</sub> | INDUCTIVE LOAD Storage Time<br>Fall Time (see fig. 3) | V <sub>CC</sub> = 12 V L = 7 mH V <sub>clamp</sub> = 300V<br>I <sub>C</sub> = 7 A I <sub>B</sub> = 70 mA<br>V <sub>BE</sub> = 0 R <sub>BE</sub> = 47 Ω |      | 15<br>0.5 |            | μs<br>μs |

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

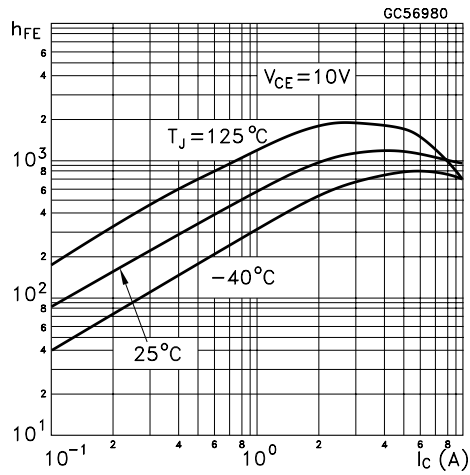
Safe Operating Area



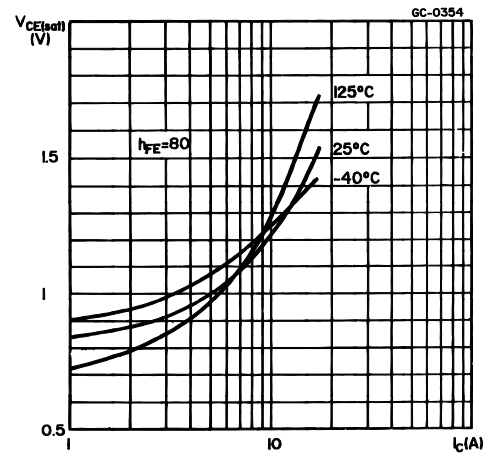
DC Current Gain



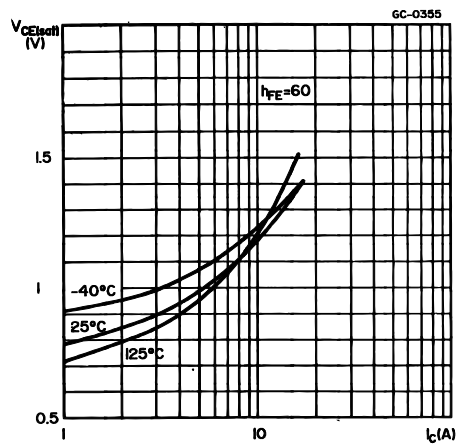
DC Current Gain



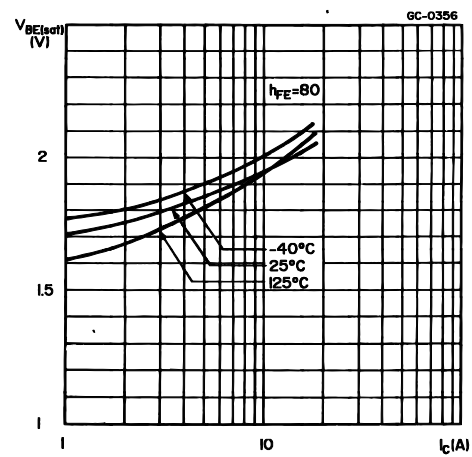
Collector-emitter Saturation Voltage



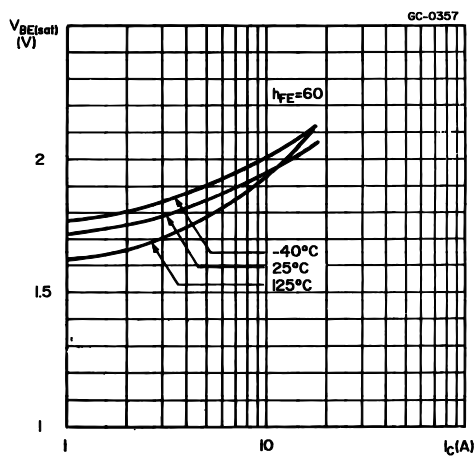
Collector-emitter Saturation Voltage



Base-emitter Saturation Voltage



Base-emitter Saturation Voltage



Collector-emitter Saturation Voltage

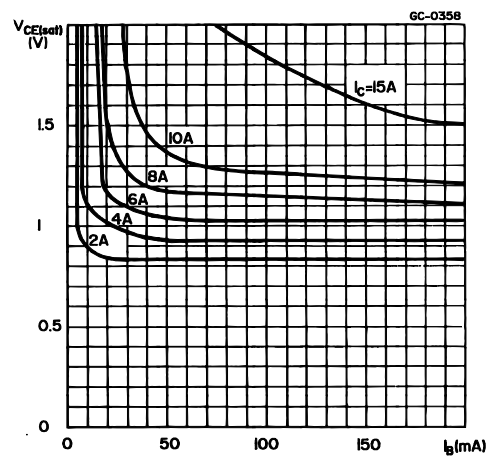


FIGURE 1: Functional Test Circuit

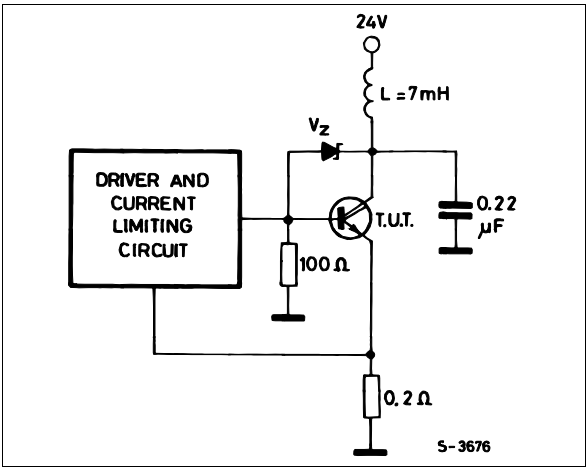


FIGURE 2: Functional Test Waveforms

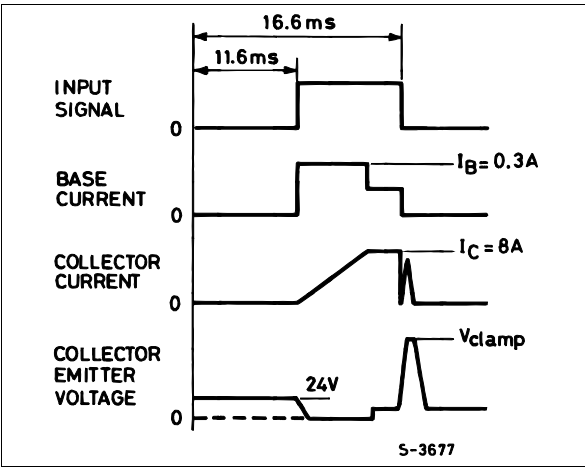
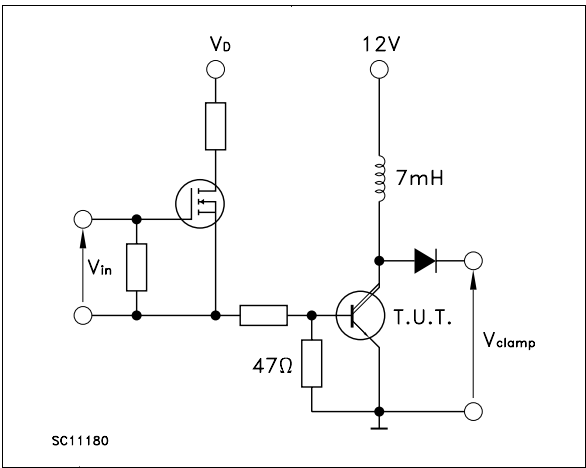
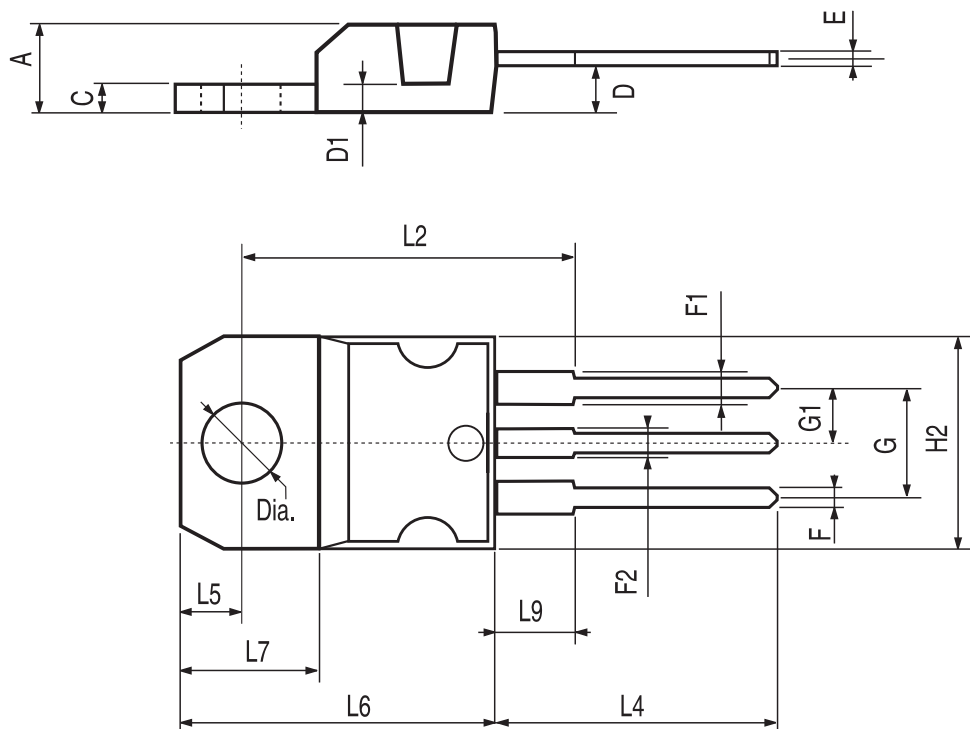


FIGURE 3: Switching Time Test Circuit



## TO-220 MECHANICAL DATA

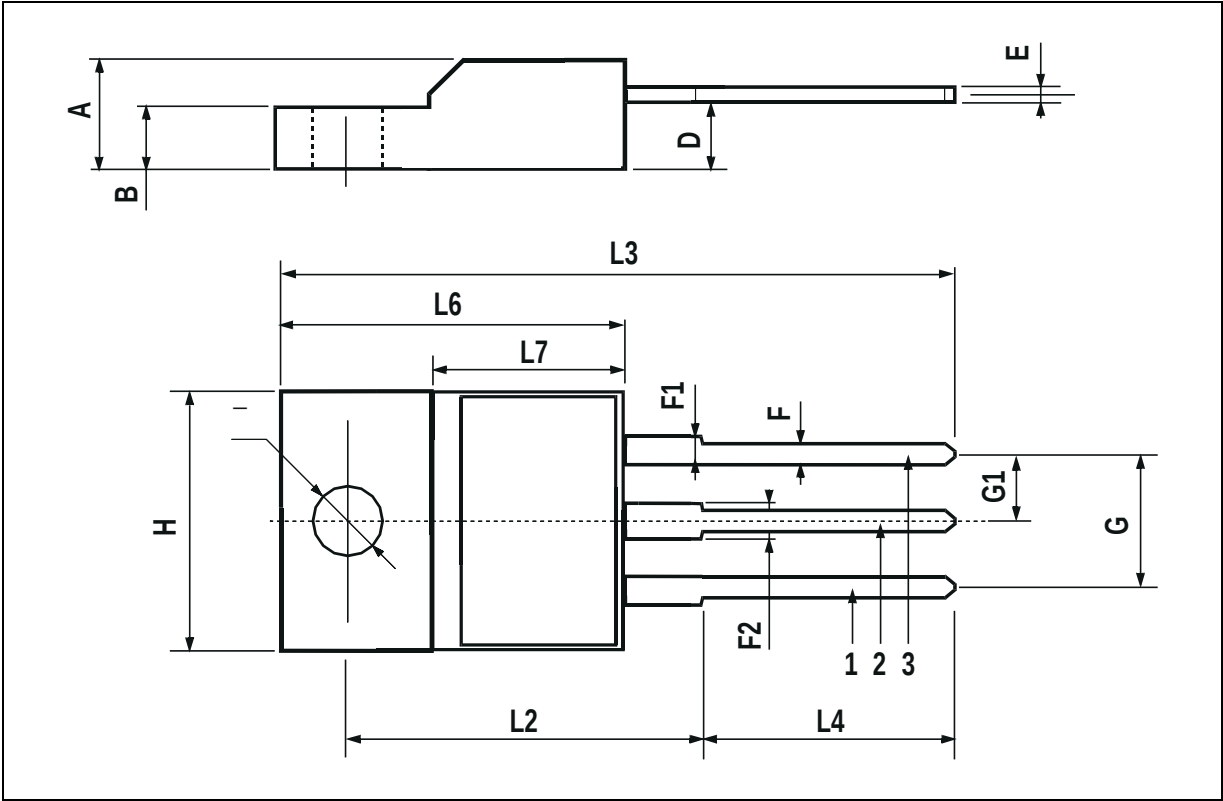
| DIM. | mm    |      |       | inch  |       |       |
|------|-------|------|-------|-------|-------|-------|
|      | MIN.  | TYP. | MAX.  | MIN.  | TYP.  | MAX.  |
| A    | 4.40  |      | 4.60  | 0.173 |       | 0.181 |
| C    | 1.23  |      | 1.32  | 0.048 |       | 0.051 |
| D    | 2.40  |      | 2.72  | 0.094 |       | 0.107 |
| D1   |       | 1.27 |       |       | 0.050 |       |
| E    | 0.49  |      | 0.70  | 0.019 |       | 0.027 |
| F    | 0.61  |      | 0.88  | 0.024 |       | 0.034 |
| F1   | 1.14  |      | 1.70  | 0.044 |       | 0.067 |
| F2   | 1.14  |      | 1.70  | 0.044 |       | 0.067 |
| G    | 4.95  |      | 5.15  | 0.194 |       | 0.203 |
| G1   | 2.4   |      | 2.7   | 0.094 |       | 0.106 |
| H2   | 10.0  |      | 10.40 | 0.393 |       | 0.409 |
| L2   |       | 16.4 |       |       | 0.645 |       |
| L4   | 13.0  |      | 14.0  | 0.511 |       | 0.551 |
| L5   | 2.65  |      | 2.95  | 0.104 |       | 0.116 |
| L6   | 15.25 |      | 15.75 | 0.600 |       | 0.620 |
| L7   | 6.2   |      | 6.6   | 0.244 |       | 0.260 |
| L9   | 3.5   |      | 3.93  | 0.137 |       | 0.154 |
| DIA. | 3.75  |      | 3.85  | 0.147 |       | 0.151 |



P011C

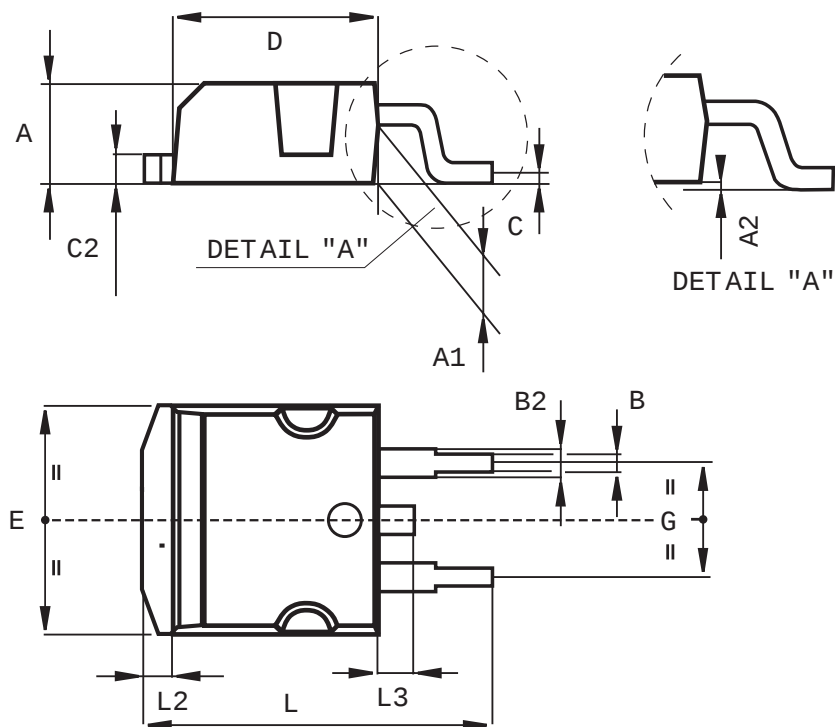
TO-220FP MECHANICAL DATA

| DIM. | mm   |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN. | TYP. | MAX. | MIN.  | TYP.  | 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 |      | 0.7  | 0.017 |       | 0.027 |
| F    | 0.75 |      | 1    | 0.030 |       | 0.039 |
| F1   | 1.15 |      | 1.7  | 0.045 |       | 0.067 |
| F2   | 1.15 |      | 1.7  | 0.045 |       | 0.067 |
| G    | 4.95 |      | 5.2  | 0.195 |       | 0.204 |
| G1   | 2.4  |      | 2.7  | 0.094 |       | 0.106 |
| H    | 10   |      | 10.4 | 0.393 |       | 0.409 |
| L2   |      | 16   |      |       | 0.630 |       |
| L3   | 28.6 |      | 30.6 | 1.126 |       | 1.204 |
| L4   | 9.8  |      | 10.6 | 0.385 |       | 0.417 |
| L6   | 15.9 |      | 16.4 | 0.626 |       | 0.645 |
| L7   | 9    |      | 9.3  | 0.354 |       | 0.366 |
| Ø    | 3    |      | 3.2  | 0.118 |       | 0.126 |



TO-263 (D<sup>2</sup>PAK) MECHANICAL DATA

| DIM. | mm   |      |       | inch  |      |       |
|------|------|------|-------|-------|------|-------|
|      | MIN. | TYP. | MAX.  | MIN.  | TYP. | MAX.  |
| A    | 4.4  |      | 4.6   | 0.173 |      | 0.181 |
| A1   | 2.49 |      | 2.69  | 0.098 |      | 0.106 |
| B    | 0.7  |      | 0.93  | 0.027 |      | 0.036 |
| B2   | 1.14 |      | 1.7   | 0.044 |      | 0.067 |
| C    | 0.45 |      | 0.6   | 0.017 |      | 0.023 |
| C2   | 1.21 |      | 1.36  | 0.047 |      | 0.053 |
| D    | 8.95 |      | 9.35  | 0.352 |      | 0.368 |
| E    | 10   |      | 10.4  | 0.393 |      | 0.409 |
| G    | 4.88 |      | 5.28  | 0.192 |      | 0.208 |
| L    | 15   |      | 15.85 | 0.590 |      | 0.624 |
| L2   | 1.27 |      | 1.4   | 0.050 |      | 0.055 |
| L3   | 1.4  |      | 1.75  | 0.055 |      | 0.068 |



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