



# STBV32

## HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

| Ordering Code | Marking | Package / Shipment |
|---------------|---------|--------------------|
| STBV32        | BV32    | TO-92 / Bulk       |
| STBV32-AP     | BV32    | TO-92 / Ammopack   |

- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED

### APPLICATIONS:

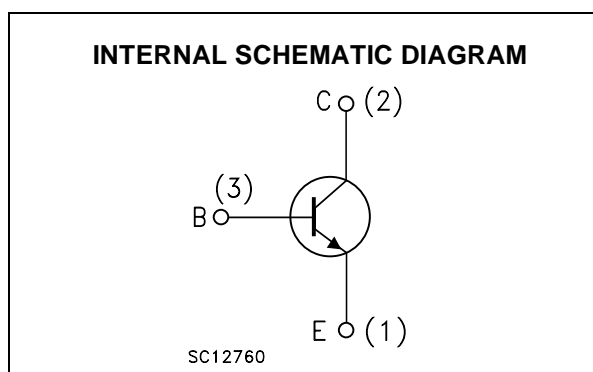
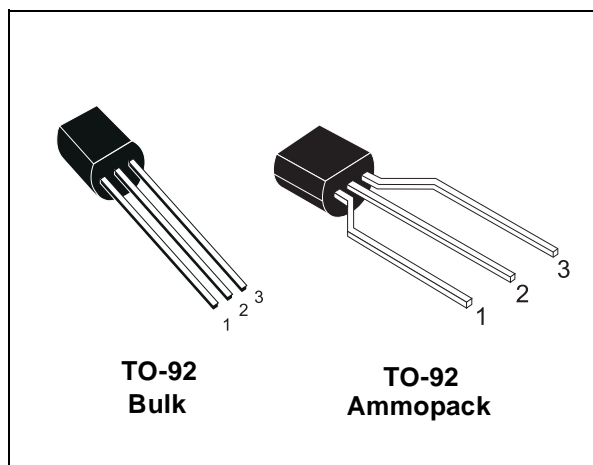
- COMPACT FLUORESCENT LAMPS (CFLS)

### DESCRIPTION

The device is manufactured using High Voltage Multi Epitaxial Planar technology for high switching speeds and high voltage capability.

It uses a Cellular Emitter structure with planar edge termination to enhance switching speeds while maintaining a wide RBSOA.

The STBV series is designed for use in Compact Fluorescent Lamps.



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter  | Value         | Unit             |
|-----------|--|---------------|------------------|
| $V_{CES}$ | Collector-Emitter Voltage ( $V_{BE} = 0$ )                                   | 700           | V                |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ )                                      | 400           | V                |
| $V_{EBO}$ | Emitter-Base Voltage ( $I_C = 0, I_B < 0.5 \text{ A}, t_p < 10 \text{ ms}$ ) | $V_{(BR)EBO}$ | V                |
| $I_C$     | Collector Current  | 1             | A                |
| $I_{CM}$  | Collector Peak Current ( $t_p < 5 \text{ ms}$ )                              | 3             | A                |
| $I_B$     | Base Current   | 0.5           | A                |
| $I_{BM}$  | Base Peak Current ( $t_p < 5 \text{ ms}$ )                                   | 1.5           | A                |
| $P_{tot}$ | Total Dissipation at $T_{amb} = 25 \text{ }^\circ\text{C}$                   | 1.1           | W                |
| $T_{stg}$ | Storage Temperature  | -65 to 150    | $^\circ\text{C}$ |
| $T_j$     | Max. Operating Junction Temperature  | 150           | $^\circ\text{C}$ |

## STBV32

### THERMAL DATA

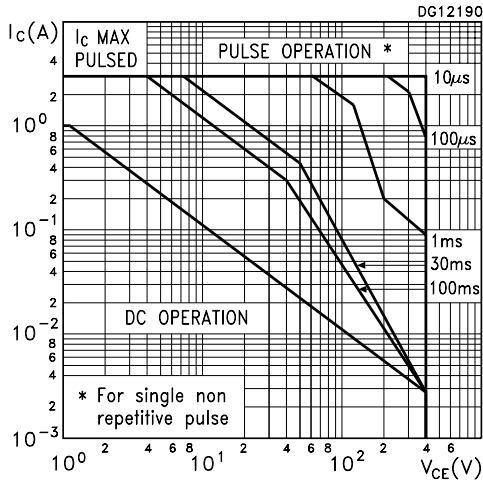
|               |                                     |     |     |      |
|---------------|-------------------------------------|-----|-----|------|
| $R_{thj-amb}$ | Thermal Resistance Junction-ambient | Max | 112 | °C/W |
|---------------|-------------------------------------|-----|-----|------|

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

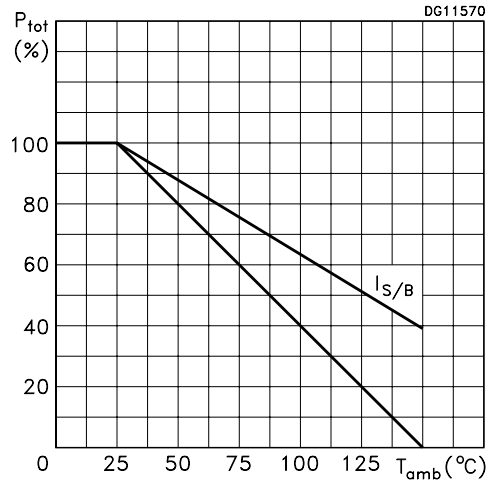
| Symbol                  | Parameter  | Test Conditions  | Min.   | Typ. | Max.            | Unit  |
|-------------------------|--|--|--------|------|-----------------|---|
| $I_{CEV}$               | Collector Cut-off Current ( $V_{BE} = -1.5\text{ V}$ )   | $V_{CE} = 700\text{ V}$<br>$V_{CE} = 700\text{ V}$ $T_j = 125\text{ °C}$   |        |      | 1<br>5          | mA<br>mA  |
| $V_{(BR)EBO}$           | Emitter-Base Breakdown Voltage ( $I_C = 0$ )             | $I_E = 10\text{ mA}$   | 9      |      | 18              | V   |
| $V_{CEO(sus)}^*$        | Collector-Emitter Sustaining Voltage ( $I_B = 0$ )       | $I_C = 10\text{ mA}$   | 400    |      |                 | V   |
| $V_{CE(sat)}^*$         | Collector-Emitter Saturation Voltage                     | $I_C = 0.5\text{ A}$ $I_B = 100\text{ mA}$<br>$I_C = 1\text{ A}$ $I_B = 250\text{ mA}$<br>$I_C = 1.5\text{ A}$ $I_B = 500\text{ mA}$                       |        |      | 0.5<br>1<br>1.5 | V<br>V<br>V                                     |
| $V_{BE(sat)}^*$         | Base-Emitter Saturation Voltage                          | $I_C = 0.5\text{ A}$ $I_B = 100\text{ mA}$<br>$I_C = 1\text{ A}$ $I_B = 250\text{ mA}$   |        |      | 1<br>1.2        | V<br>V  |
| $h_{FE}^*$              | DC Current Gain  | $I_C = 0.5\text{ A}$ $V_{CE} = 2\text{ V}$<br>$I_C = 1\text{ A}$ $V_{CE} = 2\text{ V}$   | 8<br>5 |      | 35<br>25        |   |
| $t_r$<br>$t_s$<br>$t_f$ | RESISTIVE LOAD<br>Rise Time<br>Storage Time<br>Fall Time | $I_C = 1\text{ A}$ $V_{CC} = 125\text{ V}$<br>$I_{B1} = -I_{B2} = 200\text{ mA}$ $t_p = 25\text{ }\mu\text{s}$<br>(See Figure 1)                           |        |      | 1<br>4<br>0.7   | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| $t_s$                   | INDUCTIVE LOAD<br>Storage Time                           | $I_C = 1\text{ A}$ $V_{clamp} = 300\text{ V}$<br>$I_{B1} = 200\text{ mA}$ $V_{BE(off)} = -5\text{ V}$<br>$L = 50\text{ mH}$ $R_{BB} = 0$<br>(See Figure 2) |        | 0.8  |                 | $\mu\text{s}$                                   |

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

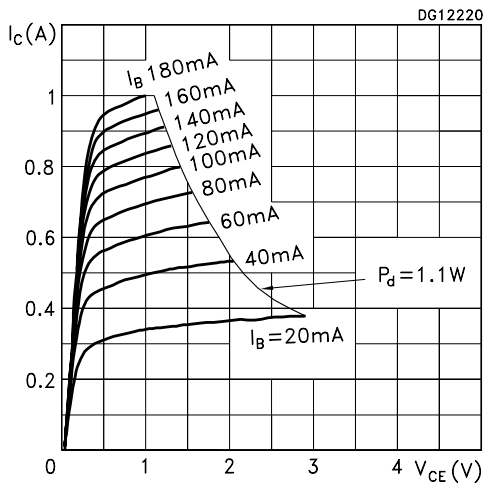
Safe Operating Area



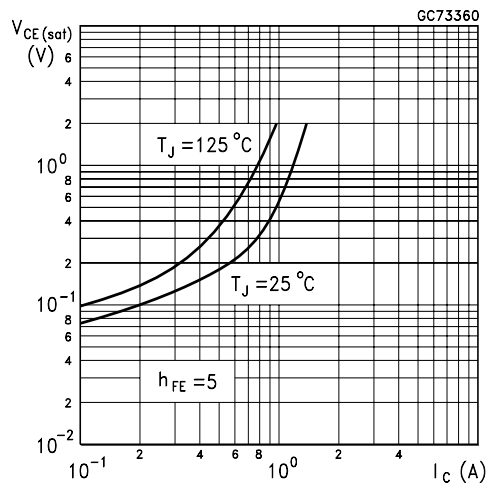
Derating Curve



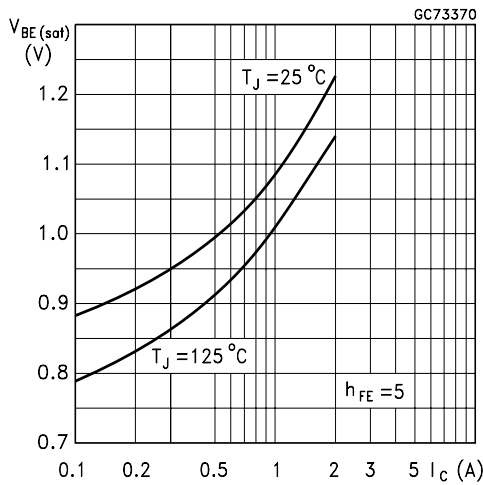
Output characteristics



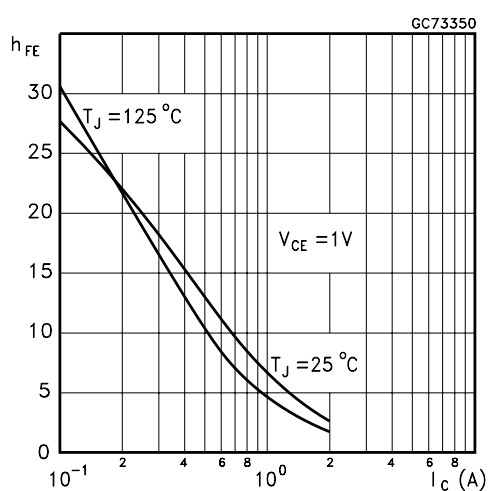
Collector-Emitter Saturation Voltage



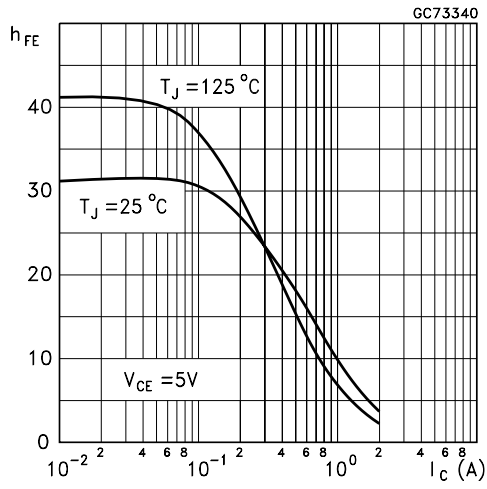
Base-Emitter Saturation Voltage



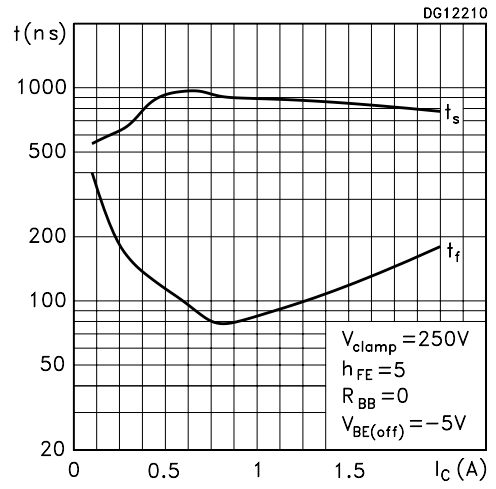
DC Current Gain



DC Current Gain



Inductive Load Switching Times



Reverse Biased Safe Operating Area

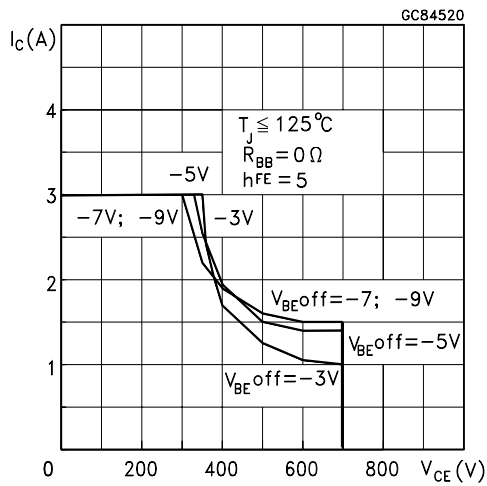


Figure 1: Resistive Load Switching Test Circuit

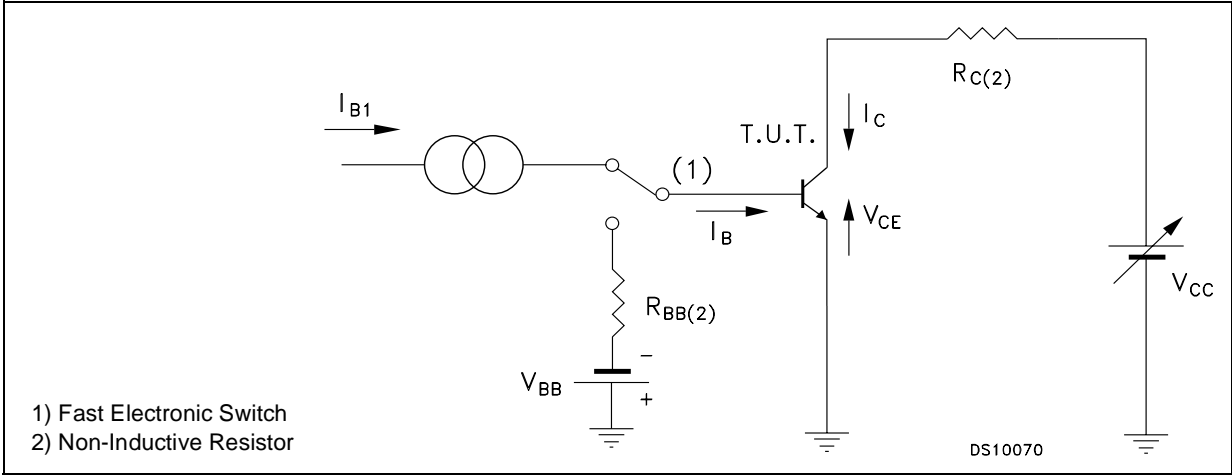
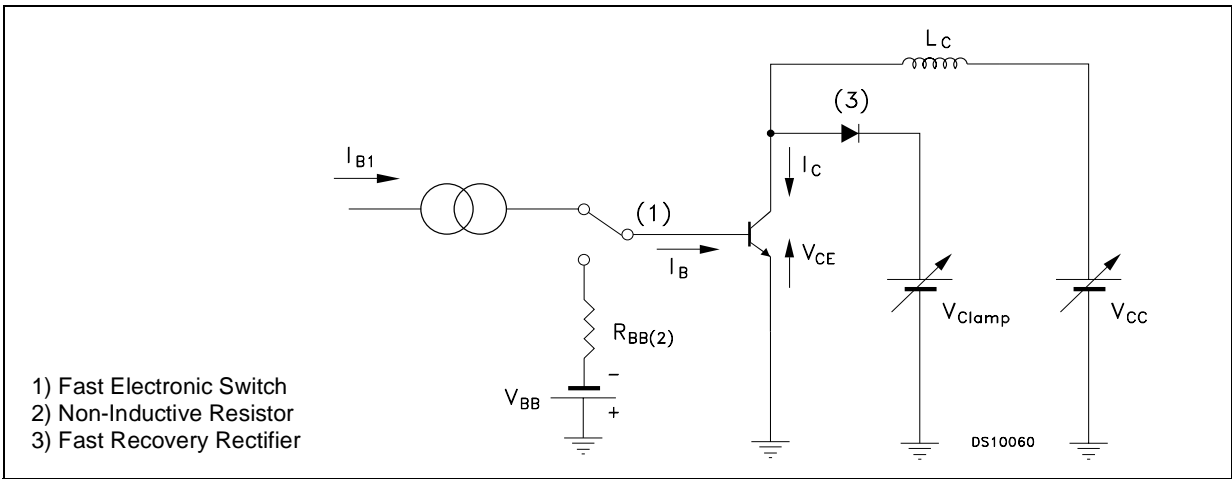
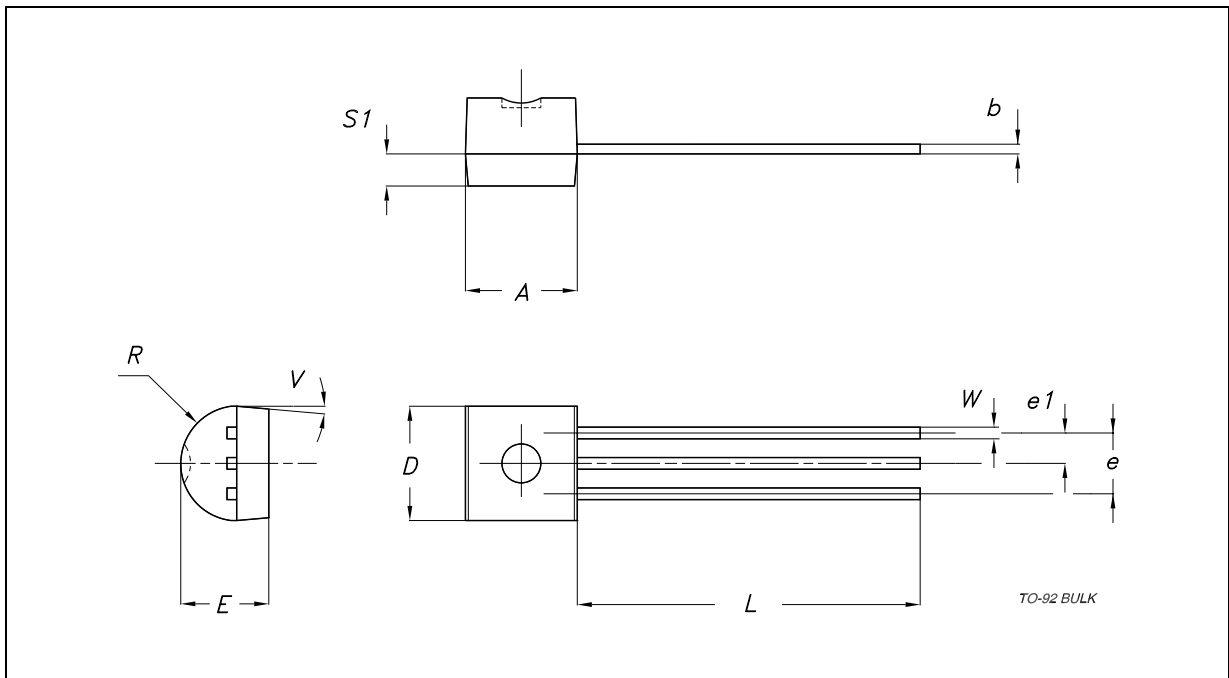


Figure 2: Inductive Load Switching Test Circuit



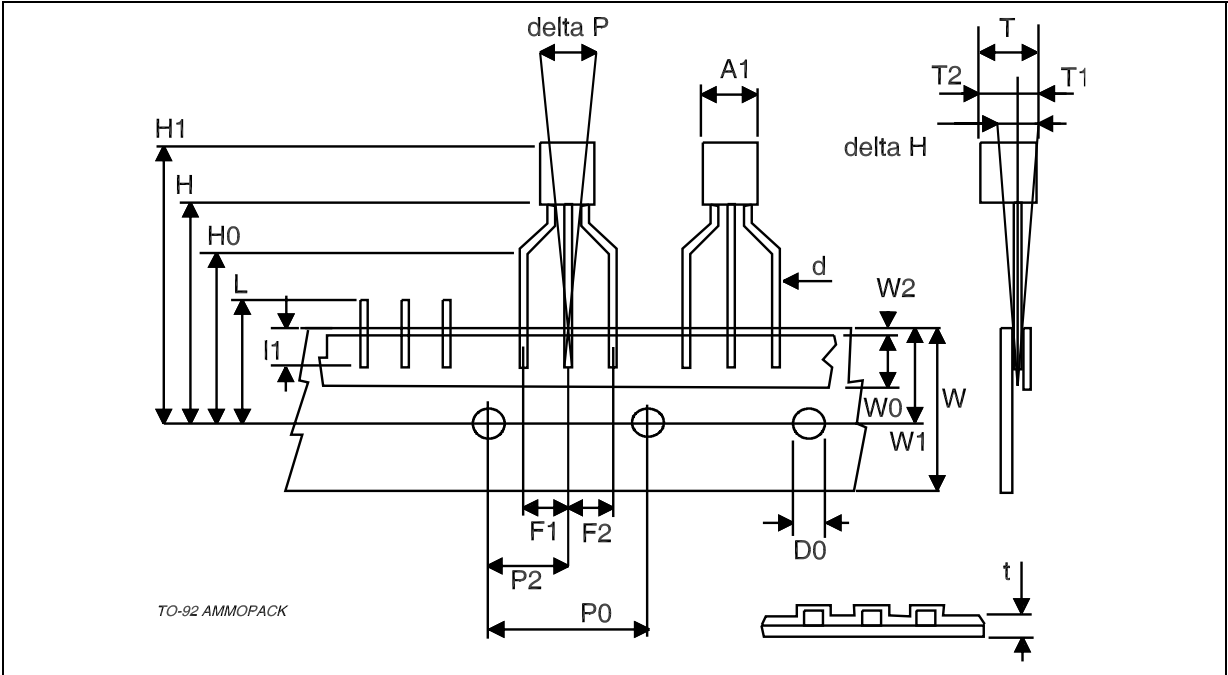
**TO-92 BULK SHIPMENT MECHANICAL DATA**

| DIM. | mm.   |      |       | inch  |      |       |
|------|-------|------|-------|-------|------|-------|
|      | MIN.  | TYP. | MAX.  | MIN.  | TYP. | MAX.  |
| A    | 4.32  |      | 4.95  | 0.170 |      | 0.195 |
| b    | 0.36  |      | 0.51  | 0.014 |      | 0.020 |
| D    | 4.45  |      | 4.95  | 0.175 |      | 0.195 |
| E    | 3.30  |      | 3.94  | 0.130 |      | 0.155 |
| e    | 2.41  |      | 2.67  | 0.095 |      | 0.105 |
| e1   | 1.14  |      | 1.40  | 0.045 |      | 0.055 |
| L    | 12.70 |      | 15.49 | 0.500 |      | 0.610 |
| R    | 2.16  |      | 2.41  | 0.085 |      | 0.095 |
| S1   | 0.92  |      | 1.52  | 0.036 |      | 0.060 |
| W    | 0.41  |      | 0.56  | 0.016 |      | 0.022 |
| V    |       | 5°   |       |       | 5°   |       |



**TO-92 AMMOPACK SHIPMENT (Suffix “-AP”) MECHANICAL DATA**

| DIM.    | mm.   |       |       | inch   |       |       |
|---------|-------|-------|-------|--------|-------|-------|
|         | MIN.  | TYP.  | MAX.  | MIN.   | TYP.  | MAX.  |
| A1      |       |       | 4.80  |        |       | 0.189 |
| T       |       |       | 3.80  |        |       | 0.150 |
| T1      |       |       | 1.60  |        |       | 0.063 |
| T2      |       |       | 2.30  |        |       | 0.091 |
| d       |       |       | 0.48  |        |       | 0.019 |
| P0      | 12.50 | 12.70 | 12.90 | 0.492  | 0.500 | 0.508 |
| P2      | 5.65  | 6.35  | 7.05  | 0.222  | 0.250 | 0.278 |
| F1, F2  | 2.44  | 2.54  | 2.94  | 0.096  | 0.100 | 0.116 |
| delta H | -2.00 |       | 2.00  | -0.079 |       | 0.079 |
| W       | 17.50 | 18.00 | 19.00 | 0.689  | 0.709 | 0.748 |
| W0      | 5.70  | 6.00  | 6.30  | 0.224  | 0.236 | 0.248 |
| W1      | 8.50  | 9.00  | 9.25  | 0.335  | 0.354 | 0.364 |
| W2      |       |       | 0.50  |        |       | 0.020 |
| H       | 18.50 |       | 20.50 | 0.728  |       | 0.807 |
| H0      | 15.50 | 16.00 | 16.50 | 0.610  | 0.630 | 0.650 |
| H1      |       |       | 25.00 |        |       | 0.984 |
| D0      | 3.80  | 4.00  | 4.20  | 0.150  | 0.157 | 0.165 |
| t       |       |       | 0.90  |        |       | 0.035 |
| L       |       |       | 11.00 |        |       | 0.433 |
| l1      | 3.00  |       |       | 0.118  |       |       |
| delta P | -1.00 |       | 1.00  | -0.039 |       | 0.039 |



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