



## STD1802

# LOW VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

### PRELIMINARY DATA

| Ordering Code | Marking | Shipment    |
|---------------|---------|-------------|
| STD1802T4     | D1802   | Tape & Reel |
| STD1802-1     | D1802   | Tube        |

- VERY LOW COLLECTOR TO EMITTER SATURATION VOLTAGE
- HIGH CURRENT GAIN CHARACTERISTIC
- FAST-SWITCHING SPEED
- THROUGH-HOLE IPAK (TO-251) POWER PACKAGE IN TUBE (Suffix "-1")
- SURFACE-MOUNTING DPAK (TO-252) POWER PACKAGE IN TAPE & REEL (Suffix "T4")

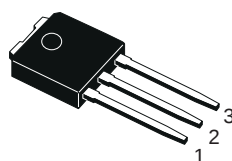
#### APPLICATIONS:

- CCFL DRIVERS
- VOLTAGE REGULATORS
- RELAY DRIVERS
- HIGH EFFICIENCY LOW VOLTAGE SWITCHING APPLICATIONS

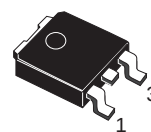
#### DESCRIPTION

The device is manufactured in NPN Planar Technology by using a "Base Island" layout.

The resulting Transistor shows exceptional high gain performance coupled with very low saturation voltage.

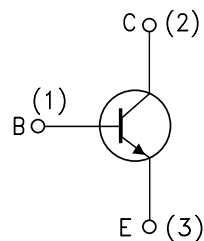


**IPAK  
(TO-251)**  
(Suffix "-1")



**DPAK  
(TO-252)**  
(Suffix "T4")

#### INTERNAL SCHEMATIC DIAGRAM



#### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter                               | Value      | Unit |
|-----------|-----------------------------------------|------------|------|
| $V_{CBO}$ | Collector-Base Voltage ( $I_E = 0$ )    | 80         | V    |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ ) | 60         | V    |
| $V_{EBO}$ | Emitter-Base Voltage ( $I_C = 0$ )      | 6          | V    |
| $I_C$     | Collector Current                       | 3          | A    |
| $I_{CM}$  | Collector Peak Current ( $t_p < 5$ ms)  | 6          | A    |
| $I_B$     | Base Current                            | 1          | A    |
| $P_{tot}$ | Total Dissipation at $T_{amb} = 25$ °C  | 15         | W    |
| $T_{stg}$ | Storage Temperature                     | -65 to 150 | °C   |
| $T_j$     | Max. Operating Junction Temperature     | 150        | °C   |

## THERMAL DATA

|                       |                                  |     |      |      |
|-----------------------|----------------------------------|-----|------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-case | Max | 8.33 | °C/W |
|-----------------------|----------------------------------|-----|------|------|

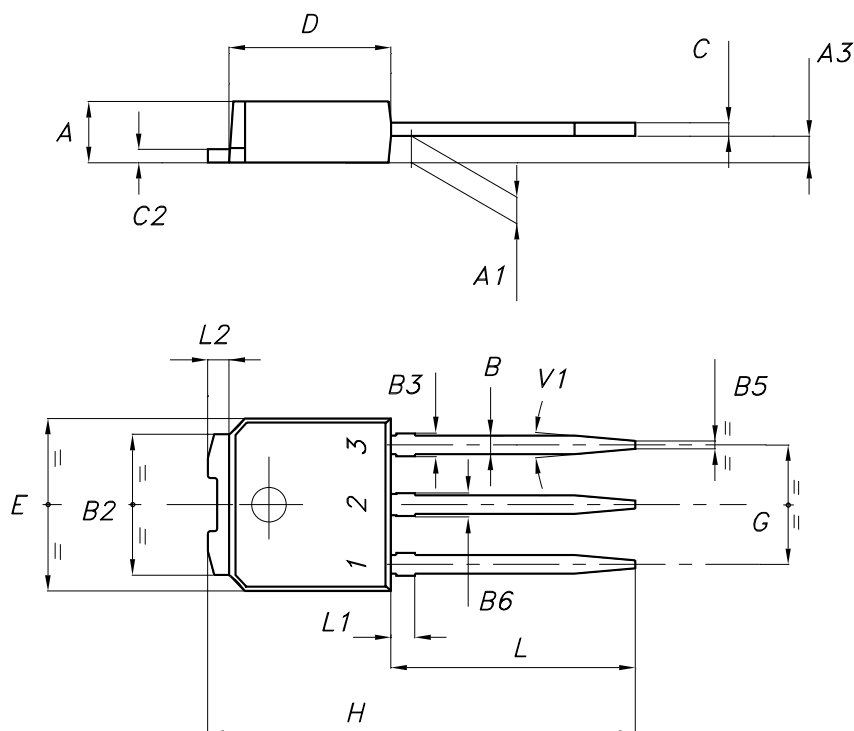
ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

| Symbol                                              | Parameter                                                    | Test Conditions                                                                               |                                                    | Min.       | Typ.              | Max.       | Unit           |
|-----------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------|------------|-------------------|------------|----------------|
| I <sub>CBO</sub>                                    | Collector Cut-off Current (I <sub>E</sub> = 0)               | V <sub>CB</sub> = 40 V                                                                        |                                                    |            |                   | 0.1        | μA             |
| I <sub>EBO</sub>                                    | Emitter Cut-off Current (I <sub>C</sub> = 0)                 | V <sub>EB</sub> = 4 V                                                                         |                                                    |            |                   | 0.1        | μA             |
| V <sub>(BR)CBO</sub> *                              | Collector-Base Breakdown Voltage (I <sub>E</sub> = 0)        | I <sub>C</sub> = 10 μA                                                                        |                                                    | 80         |                   |            | V              |
| V <sub>(BR)CEO</sub> *                              | Collector-Emitter Breakdown Voltage (I <sub>B</sub> = 0)     | I <sub>C</sub> = 1 mA                                                                         |                                                    | 60         |                   |            | V              |
| V <sub>(BR)EBO</sub> *                              | Emitter-Base Breakdown Voltage (I <sub>C</sub> = 0)          | I <sub>E</sub> = 10 μA                                                                        |                                                    | 6          |                   |            | V              |
| V <sub>CE(sat)</sub> *                              | Collector-Emitter Saturation Voltage                         | I <sub>C</sub> = 2 A<br>I <sub>C</sub> = 3 A                                                  | I <sub>B</sub> = 100 mA<br>I <sub>B</sub> = 150 mA |            | 150<br>200        | 300<br>400 | mV<br>mV       |
| V <sub>BE(sat)</sub> *                              | Base-Emitter Saturation Voltage                              | I <sub>C</sub> = 2 A<br>I <sub>B</sub> = 100 mA                                               |                                                    |            | 0.9               | 1.2        | V              |
| h <sub>FE</sub> *                                   | DC Current Gain                                              | I <sub>C</sub> = 100 mA<br>I <sub>C</sub> = 3 A                                               | V <sub>CE</sub> = 2 V<br>V <sub>CE</sub> = 2 V     | 200<br>100 |                   | 400        |                |
| f <sub>T</sub>                                      | Transition frequency                                         | V <sub>CE</sub> = 10 V<br>I <sub>C</sub> = 50 mA                                              |                                                    |            | 150               |            | MHz            |
| C <sub>CBO</sub>                                    | Collector-Base Capacitance                                   | V <sub>CB</sub> = 10 V<br>f = 1 MHz                                                           |                                                    |            | 50                |            | pF             |
| t <sub>ON</sub><br>t <sub>s</sub><br>t <sub>f</sub> | RESISTIVE LOAD<br>Turn- on Time<br>Storage Time<br>Fall Time | I <sub>C</sub> = 1 A<br>I <sub>B1</sub> = - I <sub>B2</sub> = 0.1 A<br>V <sub>CC</sub> = 30 V |                                                    |            | 50<br>1.35<br>120 |            | ns<br>μs<br>ns |

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

## TO-251 (IPAK) MECHANICAL DATA

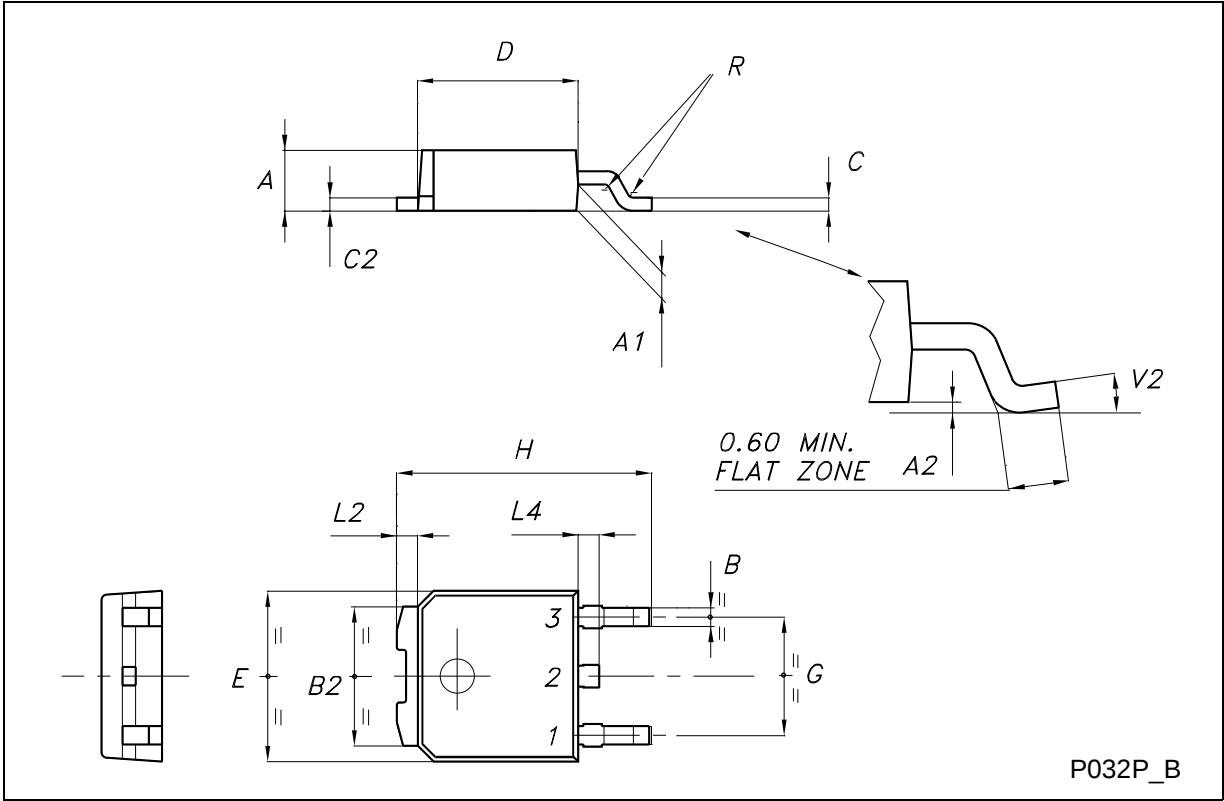
| DIM. | mm    |      |       | inch  |       |       |
|------|-------|------|-------|-------|-------|-------|
|      | MIN.  | TYP. | MAX.  | MIN.  | TYP.  | MAX.  |
| A    | 2.20  |      | 2.40  | 0.087 |       | 0.094 |
| A1   | 0.90  |      | 1.10  | 0.035 |       | 0.043 |
| A3   | 0.70  |      | 1.30  | 0.028 |       | 0.051 |
| B    | 0.64  |      | 0.90  | 0.025 |       | 0.035 |
| B2   | 5.20  |      | 5.40  | 0.204 |       | 0.213 |
| B3   |       |      | 0.85  |       |       | 0.033 |
| B5   |       | 0.30 |       |       | 0.012 |       |
| B6   |       |      | 0.95  |       |       | 0.037 |
| C    | 0.45  |      | 0.60  | 0.018 |       | 0.024 |
| C2   | 0.48  |      | 0.60  | 0.019 |       | 0.024 |
| D    | 6.00  |      | 6.20  | 0.237 |       | 0.244 |
| E    | 6.40  |      | 6.60  | 0.252 |       | 0.260 |
| G    | 4.40  |      | 4.60  | 0.173 |       | 0.181 |
| H    | 15.90 |      | 16.30 | 0.626 |       | 0.642 |
| L    | 9.00  |      | 9.40  | 0.354 |       | 0.370 |
| L1   | 0.80  |      | 1.20  | 0.031 |       | 0.047 |
| L2   |       | 0.80 | 1.00  |       | 0.031 | 0.039 |
| V1   |       | 10°  |       |       | 10°   |       |



P032N\_E

TO-252 (DPAK) MECHANICAL DATA

| DIM. | mm   |      |       | inch  |       |       |
|------|------|------|-------|-------|-------|-------|
|      | MIN. | TYP. | MAX.  | MIN.  | TYP.  | MAX.  |
| A    | 2.20 |      | 2.40  | 0.087 |       | 0.094 |
| A1   | 0.90 |      | 1.10  | 0.035 |       | 0.043 |
| A2   | 0.03 |      | 0.23  | 0.001 |       | 0.009 |
| B    | 0.64 |      | 0.90  | 0.025 |       | 0.035 |
| B2   | 5.20 |      | 5.40  | 0.204 |       | 0.213 |
| C    | 0.45 |      | 0.60  | 0.018 |       | 0.024 |
| C2   | 0.48 |      | 0.60  | 0.019 |       | 0.024 |
| D    | 6.00 |      | 6.20  | 0.236 |       | 0.244 |
| E    | 6.40 |      | 6.60  | 0.252 |       | 0.260 |
| G    | 4.40 |      | 4.60  | 0.173 |       | 0.181 |
| H    | 9.35 |      | 10.10 | 0.368 |       | 0.398 |
| L2   |      | 0.8  |       |       | 0.031 |       |
| L4   | 0.60 |      | 1.00  | 0.024 |       | 0.039 |
| V2   | 0°   |      | 8°    | 0°    |       | 0°    |



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