



## BUL742A

# HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

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

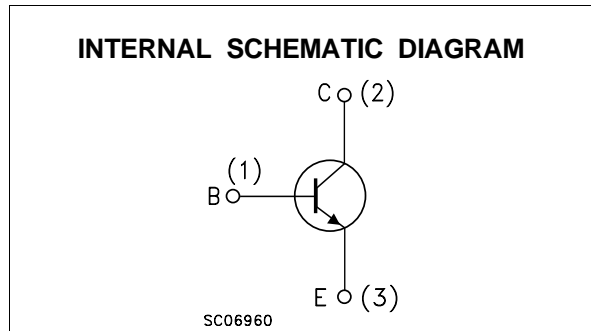
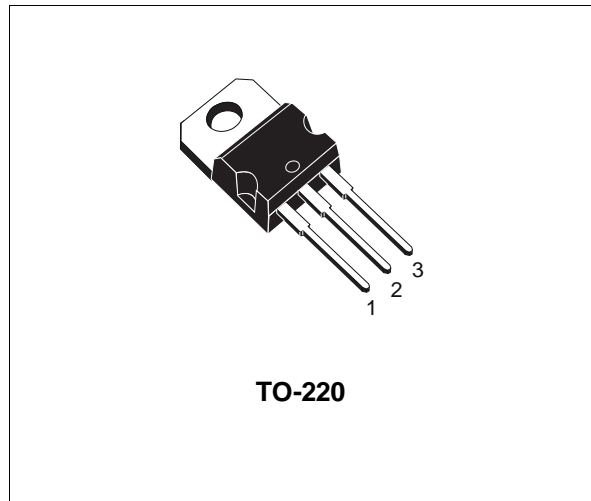
### APPLICATIONS

- FOUR LAMP ELECTRONIC BALLAST FOR:  
120 V MAINS IN PUSH-PULL  
CONFIGURATION;  
277 V MAINS IN HALF BRIDGE CURRENT  
FEED CONFIGURATION.
- SWITCH MODE POWER SUPPLIES

### DESCRIPTION

The BUL742A is manufactured using high voltage Multi Epitaxial Planar technology for high switching speeds and high voltage capability.

Thanks to an increased intermediate layer, it has an intrinsic ruggedness which enables the transistor to withstand an high collector current level during breakdown condition, without using the transil protection usually necessary in typical converters for lamp ballast.



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter   | Value         | Unit       |
|-----------|---|---------------|------------|
| $V_{CES}$ | Collector-Emitter Voltage ( $V_{BE} = 0$ )  | 950           | V          |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ )   | 400           | V          |
| $V_{EBO}$ | Emitter-Base Voltage<br>( $I_C = 0$ , $I_B \leq 2$ A, $t_p < 10\mu s$ , $T_j < 150^\circ C$ ) | $V_{(BR)EBO}$ | V          |
| $I_C$     | Collector Current   | 4             | A          |
| $I_{CM}$  | Collector Peak Current ( $t_p < 5$ ms)  | 8             | A          |
| $I_B$     | Base Current  | 2             | A          |
| $I_{BM}$  | Base Peak Current ( $t_p < 5$ ms)   | 4             | A          |
| $P_{tot}$ | Total Dissipation at $T_c = 25^\circ C$   | 70            | W          |
| $T_{stg}$ | Storage Temperature   | -65 to 150    | $^\circ C$ |
| $T_j$     | Max. Operating Junction Temperature   | 150           | $^\circ C$ |

# BUL742A

## THERMAL DATA

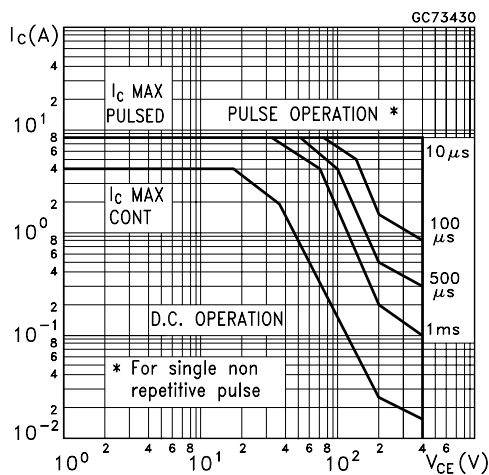
|                       |                                     |     |      |      |
|-----------------------|-------------------------------------|-----|------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-Case    | Max | 1.78 | °C/W |
| R <sub>thj-amb</sub>  | Thermal Resistance Junction-Ambient | Max | 62.5 | °C/W |

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

| Symbol                           | Parameter   | Test Conditions  |  | Min.     | Typ.       | Max.       | Unit     |
|----------------------------------|---|--|--|----------|------------|------------|----------|
| I <sub>CES</sub>                 | Collector Cut-off Current (V <sub>BE</sub> = 0)           | V <sub>CE</sub> = 950 V  |  |          |            | 100        | μA       |
| I <sub>CEO</sub>                 | Collector Cut-off Current (I <sub>B</sub> = 0)            | V <sub>CE</sub> = 400 V  |  |          |            | 250        | μA       |
| V <sub>CEO(sus)*</sub>           | Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0) | I <sub>C</sub> = 10 mA   | L = 25 mH  | 400      |            |            | V        |
| V <sub>(BR)EBO</sub>             | Emitter-Base Breakdown Voltage (I <sub>C</sub> = 0)       | I <sub>E</sub> = 1 mA  |  | 12       |            | 24         | V        |
| V <sub>CE(sat)*</sub>            | Collector-Emitter Saturation Voltage                      | I <sub>C</sub> = 1 A<br>I <sub>C</sub> = 3.5 A                               | I <sub>B</sub> = 0.2 A<br>I <sub>B</sub> = 1 A                     |          |            | 0.5<br>1.5 | V<br>V   |
| V <sub>BE(sat)*</sub>            | Base-Emitter Saturation Voltage                           | I <sub>C</sub> = 3.5 A   | I <sub>B</sub> = 1 A   |          |            | 1.5        | V        |
| h <sub>FE</sub> *                | DC Current Gain   | I <sub>C</sub> = 800 mA<br>I <sub>C</sub> = 10 mA                            | V <sub>CE</sub> = 3 V<br>V <sub>CE</sub> = 5 V                     | 16<br>10 |            | 40         |          |
| t <sub>s</sub><br>t <sub>f</sub> | RESISTIVE LOAD<br>Storage Time<br>Fall Time               | V <sub>CC</sub> = 250 V<br>I <sub>B1</sub> = 0.5 A<br>t <sub>p</sub> = 30 μs | I <sub>C</sub> = 2.5 A<br>I <sub>B2</sub> = -1 A<br>(see figure 2) |          | 0.9<br>100 |            | μs<br>ns |
| E <sub>sb</sub>                  | Avalanche Energy  | L = 2 mH   | (see figure 1)   | 6        |            |            | mJ       |

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

## Safe Operating Areas



## Derating Curve

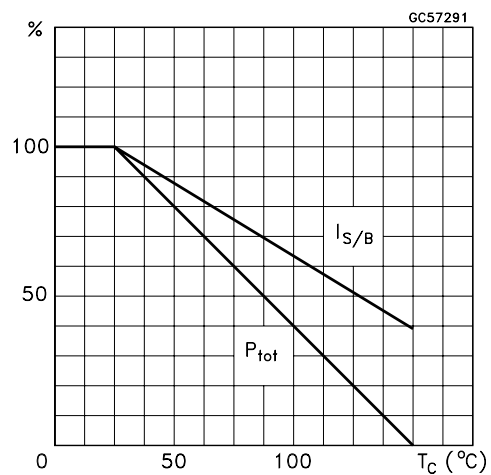


Figure 1: Energy Rating Test Circuit

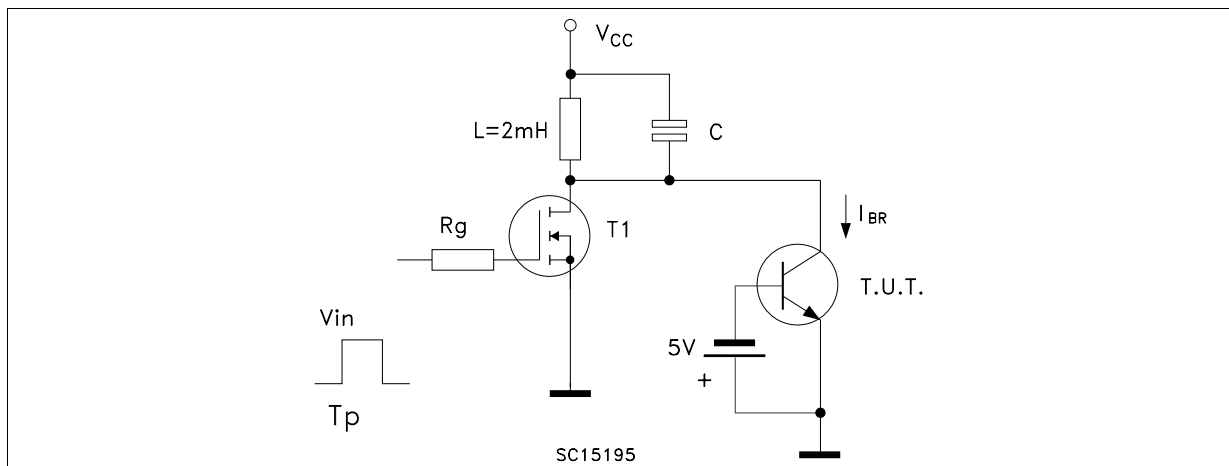
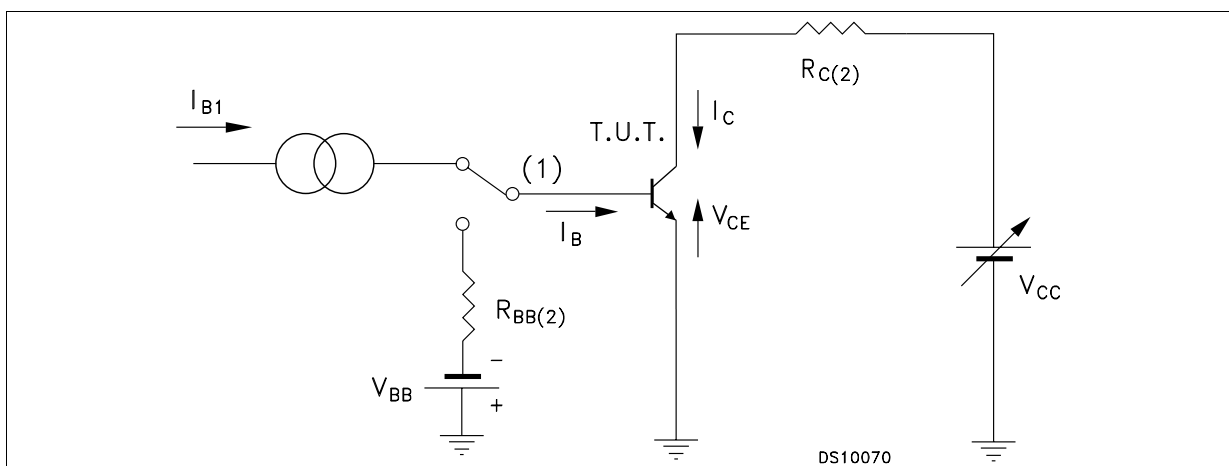
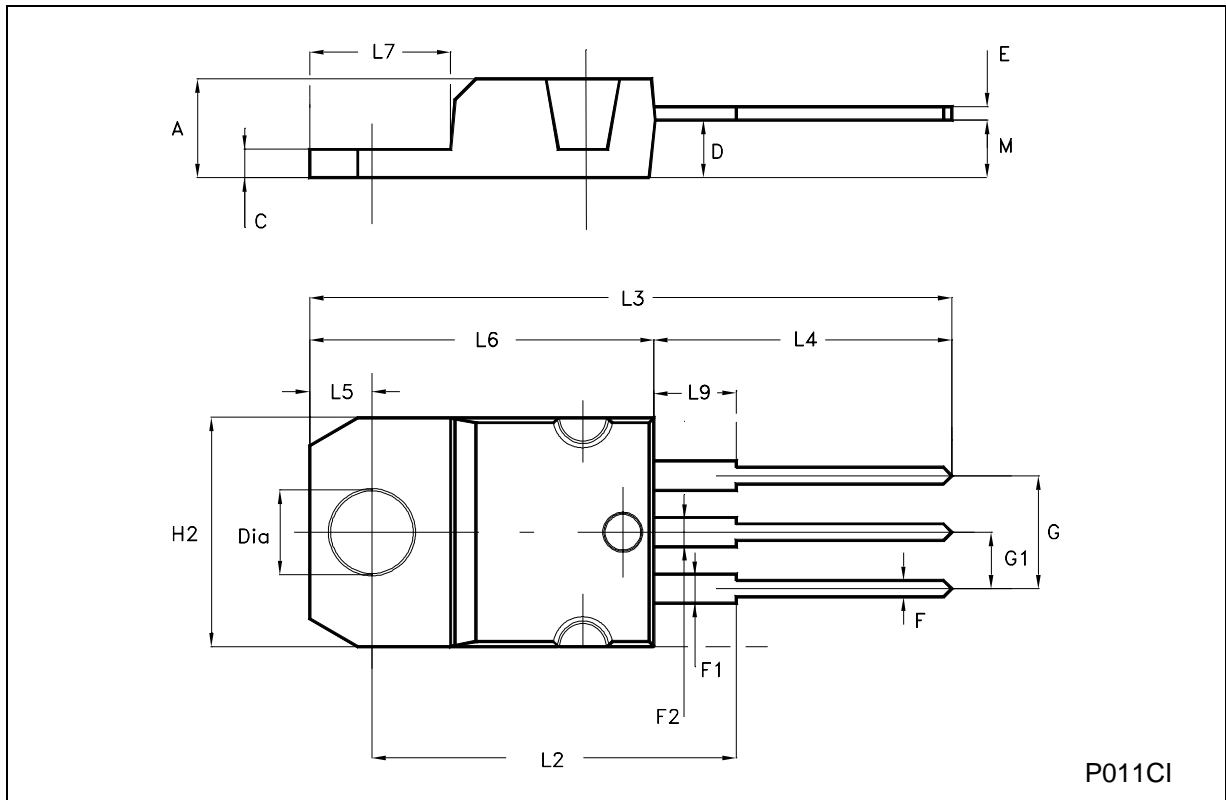


Figure 2: Resistive Load Switching Test Circuit



**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 |       | 0.052 |
| D    | 2.40  |       | 2.72  | 0.094 |       | 0.107 |
| 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 |       | 0.202 |
| G1   | 2.40  |       | 2.70  | 0.094 |       | 0.106 |
| H2   | 10.00 |       | 10.40 | 0.394 |       | 0.409 |
| L2   |       | 16.40 |       |       | 0.645 |       |
| L4   | 13.00 |       | 14.00 | 0.511 |       | 0.551 |
| L5   | 2.65  |       | 2.95  | 0.104 |       | 0.116 |
| L6   | 15.25 |       | 15.75 | 0.600 |       | 0.620 |
| L7   | 6.20  |       | 6.60  | 0.244 |       | 0.260 |
| L9   | 3.50  |       | 3.93  | 0.137 |       | 0.154 |
| M    |       | 2.60  |       |       | 0.102 |       |
| DIA. | 3.75  |       | 3.85  | 0.147 |       | 0.151 |



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