

BUL510

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- STMicroelectronics PREFERRED SALESTYPE
- NPN TRANSISTOR
- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- VERY HIGH SWITCHING SPEED
- FULLY CHARACTERIZED AT 125°C

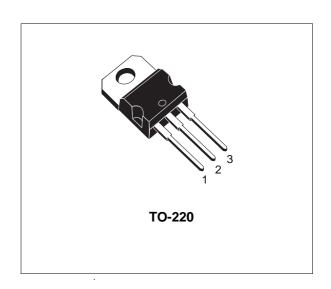
APPLICATIONS

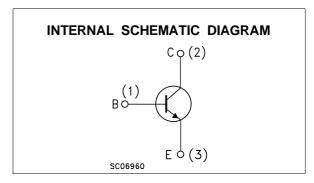
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES
- ELECTRONIC TRANSFORMER FOR HALOGEN LAMP



The BUL510 is manufactured using high voltage Multiepitaxial Mesa technology for cost-effective high performance. It uses a Hollow Emitter structure to enhance switching speeds.

The BUL series is designed for use in lighting applications and low cost switch-mode power supplies.





ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|------------------|---|------------|------|
| V _{CES} | Collector-Emitter Voltage (V _{BE} = 0) | 1000 | V |
| V _{CEO} | Collector-Emitter Voltage (I _B = 0) | 450 | V |
| V_{EBO} | Emitter-Base Voltage (I _C = 0) | 9 | V |
| Ic | Collector Current | 10 | Α |
| I _{CM} | Collector Peak Current (t _p < 5 ms) | 18 | Α |
| lв | Base Current | 3.5 | Α |
| I _{BM} | Base Peak Current (t _p < 5 ms) | 7 | Α |
| P_{tot} | Total Dissipation at T _c = 25 °C | 100 | W |
| T _{stg} | Storage Temperature | -65 to 150 | °C |
| Tj | Max. Operating Junction Temperature | 150 | °C |

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THERMAL DATA

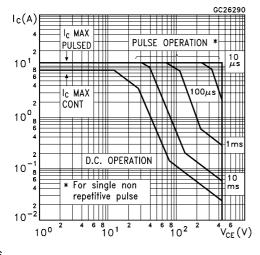
| R _{thj-case} | Thermal Resistance Junction-Case | Max | 1.25 | °C/W |
|-----------------------|-------------------------------------|-----|------|------|
| R _{thj-amb} | Thermal Resistance Junction-Ambient | Max | 62.5 | °C/W |

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

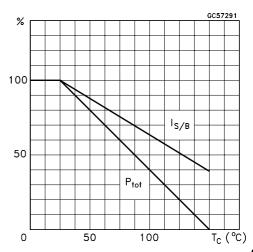
| Symbol | Parameter | Test (| Conditions | Min. | Тур. | Max. | Unit |
|-------------------------|---|--|--|----------|-----------|-----------------|-------------|
| I _{CES} | Collector Cut-off Current (V _{BE} = 0) | V _{CE} = 1000 V V _{CE} = 1000 V | T _c = 125 °C | | | 100 500 | μA μA |
| I _{CEO} | Collector Cut-off Current (I _B = 0) | V _{CE} = 450 V | | | | 250 | μΑ |
| V _{CEO(sus)} * | Collector-Emitter Sustaining Voltage (I _B = 0) | I _C = 100 mA | L = 25 mH | 450 | | | V |
| V _{EBO} | Emitter-Base Voltage (I _C = 0) | I _E = 10 mA | | 9 | | | V |
| V _{CE(sat)} * | Collector-Emitter Saturation Voltage | I _C = 3 A I _C = 4 A I _C = 5 A | I _B = 0.6 A I _B = 0.8 A I _B = 1.25 A | | | 0.8 1 1.5 | V V V |
| V _{BE(sat)} * | Base-Emitter Saturation Voltage | I _C = 3 A I _C = 5 A | I _B = 0.6 A I _B = 1.25 A | | | 1.2 1.5 | V V |
| h _{FE} * | DC Current Gain | I _C = 1 A I _C = 10 mA | V _{CE} = 5 V V _{CE} = 5 V | 15 10 | | 45 | |
| t _s | INDUCTIVE LOAD Storage Time Fall Time | I _C = 4 A I _{B1} = 0.8 A L = 200 μH | V _{CL} = 300 V I _{B2} = -1.6 A | | 2.2 80 | 3.4 150 | μs ns |
| t _s | INDUCTIVE LOAD Storage Time Fall Time | I _C = 4 A I _{B1} = 0.8 A L = 200 μH | $V_{CL} = 300 \text{ V}$ $I_{B2} = -1.6 \text{ A}$ $T_{c} = 125 ^{\circ}\text{C}$ | | 3 120 | | μs ns |

^{*} Pulsed: Pulse duration = 300 μs, duty cycle 1.5 %

Safe Operating Areas

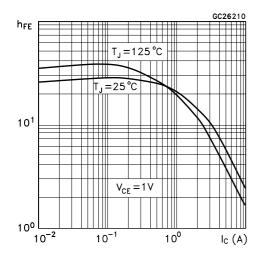


Derating Curve

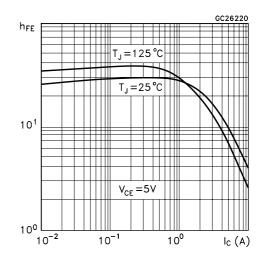


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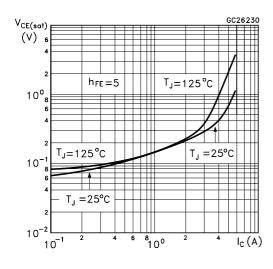
DC Current Gain



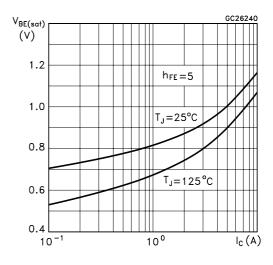
DC Current Gain



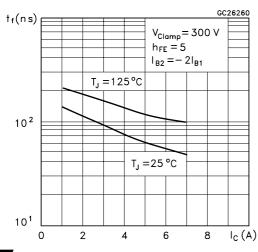
Collector Emitter Saturation Voltage



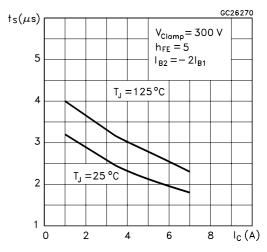
Base Emitter Saturation Voltage



Inductive Fall Time

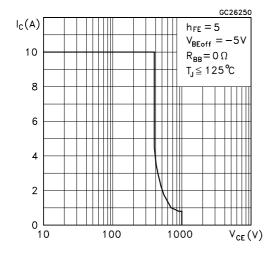


Inductive Storage Time

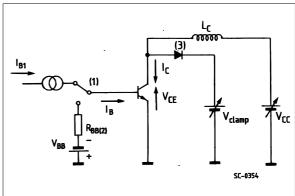


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Reverse Biased SOA



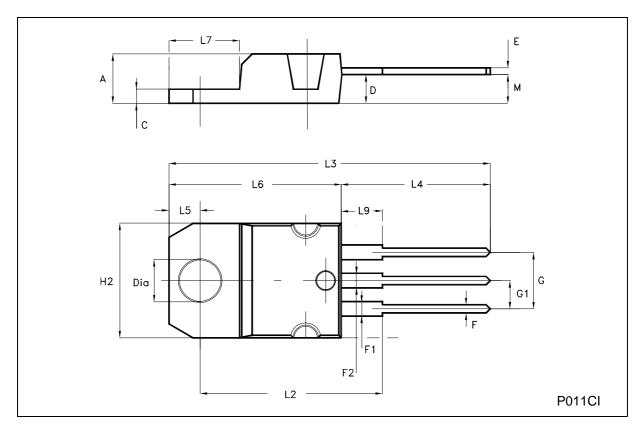
RBSOA and Inductive Load Switching Test Circuits



- (1) Fast electronic switch (2) Non-inductive Resistor (3) Fast recovery rectifier

TO-220 MECHANICAL DATA

| DIM | mm | | | inch | | | |
|------|-------|-------|-------|-------|-------|-------|--|
| DIM. | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. | |
| Α | 4.40 | | 4.60 | 0.173 | | 0.181 | |
| С | 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 | |
| М | | 2.60 | | | 0.102 | | |
| DIA. | 3.75 | | 3.85 | 0.147 | | 0.151 | |



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