

Features

- Integrated antiparallel collector-emitter diode
- High voltage capability
- Low spread of dynamic parameters
- Minimum lot-to-lot spread for reliable operation
- Very high switching speed

Applications

- Electronic transformer for halogen lamp

Description

The device is manufactured using high voltage multi-epitaxial planar technology for high switching speeds while maintaining the wide RBSOA. The device is designed for use in electronic transformer for halogen lamp.

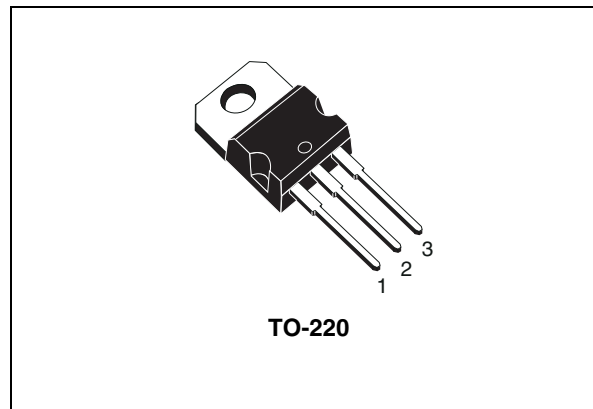


Figure 1. Internal schematic diagram

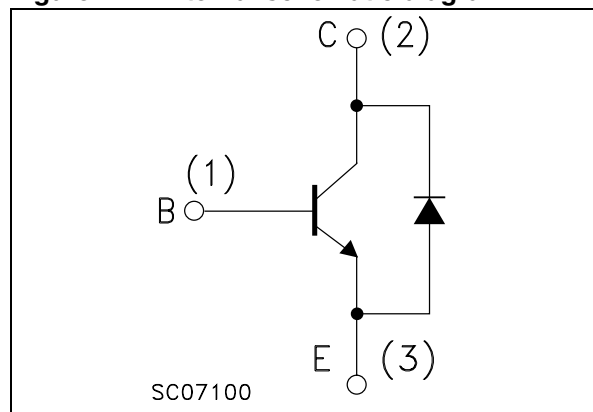


Table 1. Device summary

| Order code | Marking | Package | Packaging |
|------------|---------|---------|-----------|
| BUL129D | BUL129D | TO-220 | Tube |

Contents

| | | |
|----------|---|-----------|
| 1 | Electrical ratings | 3 |
| 2 | Electrical characteristics | 4 |
| | 2.1 Electrical characteristics (curves) | 5 |
| 3 | Test circuit | 7 |
| 4 | Package mechanical data | 8 |
| 5 | Revision history | 10 |

1 Electrical ratings

Table 2. Absolute maximum ratings

| Symbol | Parameter | Value | Unit |
|-----------|--|------------|------|
| V_{CES} | Collector-emitter voltage ($V_{BE} = 0$) | 800 | V |
| V_{CEO} | Collector-emitter voltage ($I_B = 0$) | 450 | V |
| V_{EBO} | Emitter-base voltage ($I_C = 0$) | 9 | 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 $T_C = 25$ °C | 65 | W |
| T_{stg} | Storage temperature | -65 to 150 | °C |
| T_J | Max. operating junction temperature | 150 | °C |

Table 3. Thermal data

| Symbol | Parameter | Max value | Unit |
|----------------|---------------------------------------|-----------|------|
| $R_{thj-case}$ | Thermal resistance junction - case | 1.92 | °C/W |
| $R_{thj-amb}$ | Thermal resistance junction - ambient | 62.5 | °C/W |

2 Electrical characteristics

($T_{\text{case}} = 25\text{ °C}$ unless otherwise specified)

Table 4. Electrical characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-----------------------------|---|--|---------|------|----------------------|--------------------------------|
| I_{CES} | Collector cut-off current ($V_{\text{BE}} = 0$) | $V_{\text{CE}} = 800\text{ V}$ $V_{\text{CE}} = 800\text{ V}$ $T_{\text{C}} = 125\text{ °C}$ | | | 100 500 | μA μA |
| V_{EBO} | Emitter base voltage ($I_{\text{C}} = 0$) | $I_{\text{E}} = 10\text{ mA}$ | 9 | | | V |
| $V_{\text{CEO(sus)}}^{(1)}$ | Collector-emitter sustaining voltage ($I_{\text{B}} = 0$) | $I_{\text{C}} = 10\text{ mA}$ | 450 | | | V |
| $V_{\text{CE(sat)}}^{(1)}$ | Collector-emitter saturation voltage | $I_{\text{C}} = 0.5\text{ A}$ $I_{\text{B}} = 0.1\text{ A}$ $I_{\text{C}} = 1\text{ A}$ $I_{\text{B}} = 0.2\text{ A}$ $I_{\text{C}} = 2.5\text{ A}$ $I_{\text{B}} = 0.5\text{ A}$ $I_{\text{C}} = 4\text{ A}$ $I_{\text{B}} = 1\text{ A}$ | | 0.7 | 0.7 1 1.5 V | V V V V |
| $V_{\text{BE(sat)}}^{(1)}$ | Base-emitter saturation voltage | $I_{\text{C}} = 0.5\text{ A}$ $I_{\text{B}} = 0.1\text{ A}$ $I_{\text{C}} = 1\text{ A}$ $I_{\text{B}} = 0.2\text{ A}$ $I_{\text{C}} = 2\text{ A}$ $I_{\text{B}} = 0.5\text{ A}$ | | | 1.1 1.2 1.3 | V V V |
| $h_{\text{FE}}^{(1)}$ | DC current gain | $I_{\text{C}} = 10\text{ mA}$ $V_{\text{CE}} = 5\text{ V}$ $I_{\text{C}} = 4.5\text{ A}$ $V_{\text{CE}} = 10\text{ V}$ | 10 4 | | | |
| t_{s} | Inductive load Storage time | $I_{\text{C}} = 2\text{ A}$ $V_{\text{clamp}} = 300\text{ V}$ $I_{\text{B1}} = 0.4\text{ A}$ $V_{\text{BE(off)}} = -5\text{ V}$ | | 0.75 | 1.6 | μs |
| t_{f} | Fall time | $R_{\text{BB}} = 0$ | | 0.1 | 0.2 | μs |
| V_{F} | Diode forward voltage | $I_{\text{F}} = 2\text{ A}$ | | | 1.5 | V |

1. Pulsed duration = 300 μs , duty cycle $\leq 1.5\%$

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

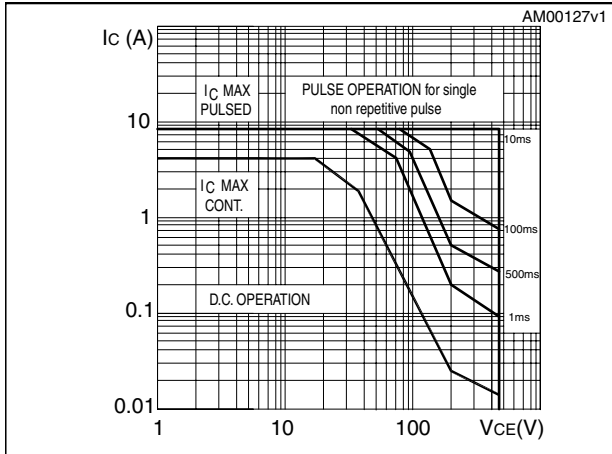


Figure 3. Derating

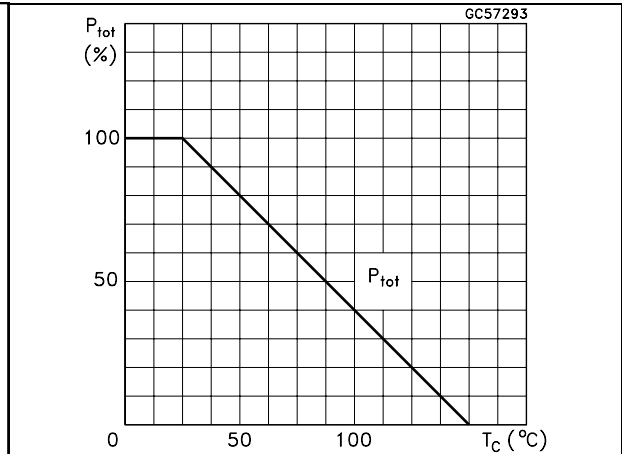


Figure 4. DC current gain (1 V)

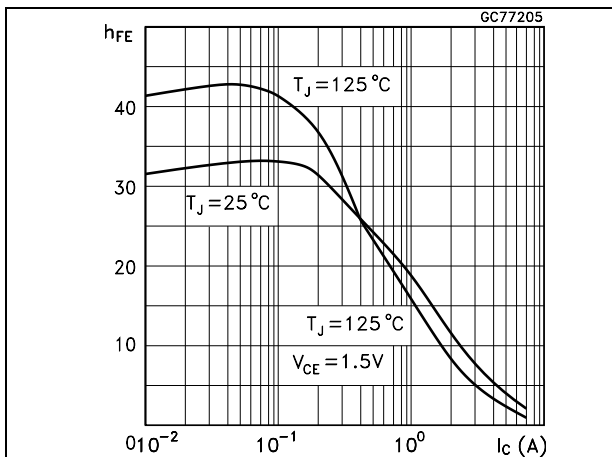


Figure 5. DC current gain (5 V)

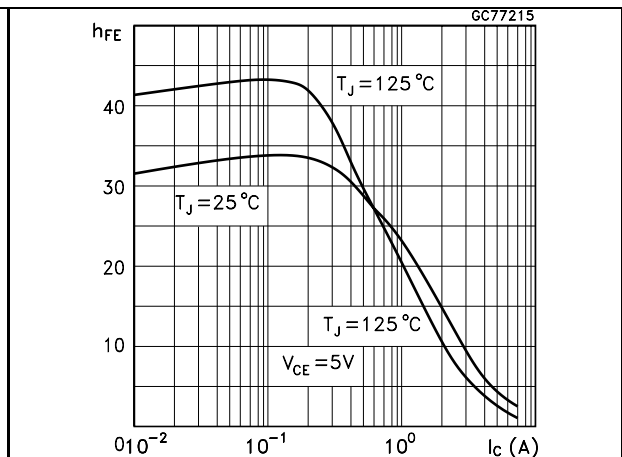


Figure 6. Collector emitter saturation voltage Figure 7. Base emitter saturation voltage

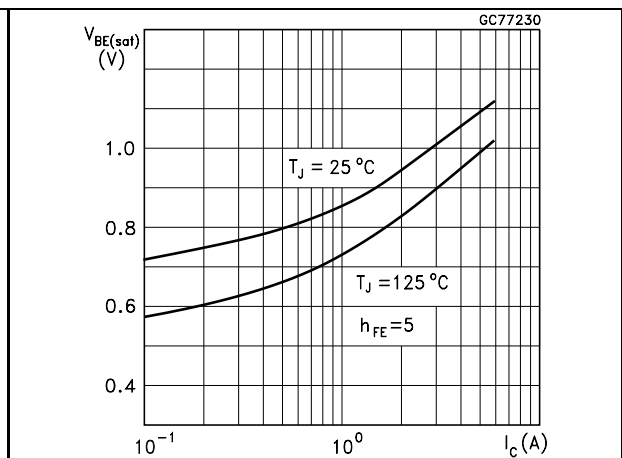
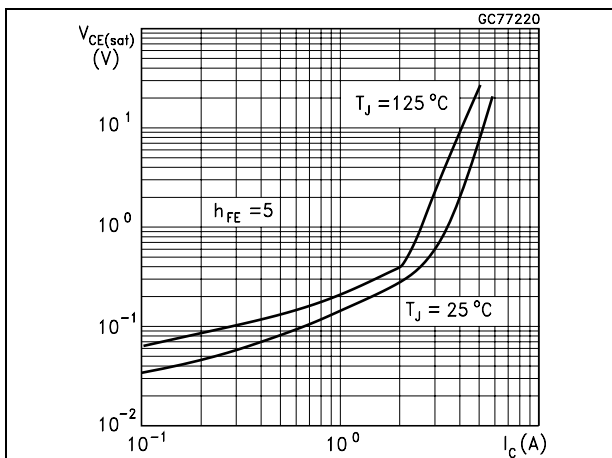


Figure 8. Inductive load fall time

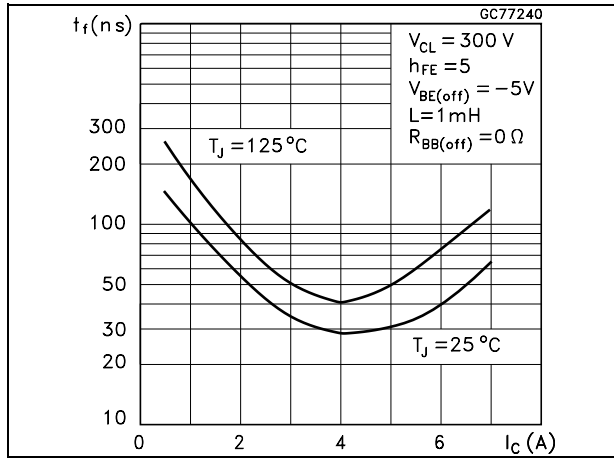


Figure 9. Inductive load storage time

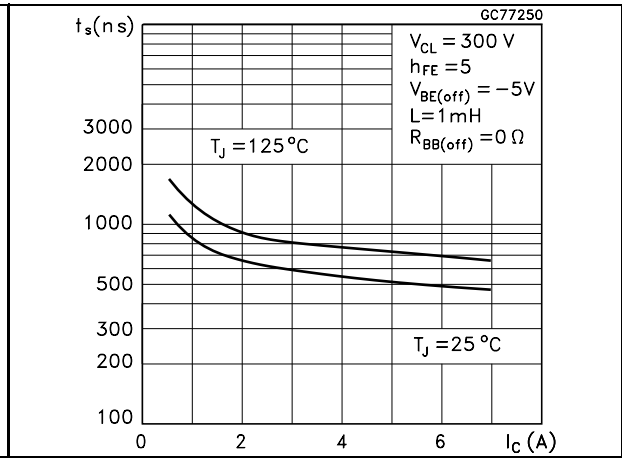
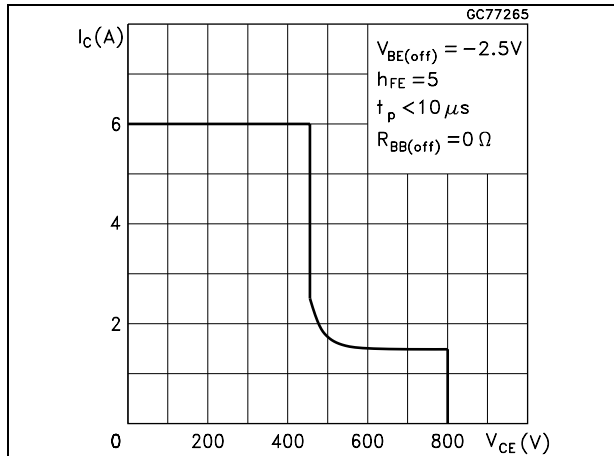
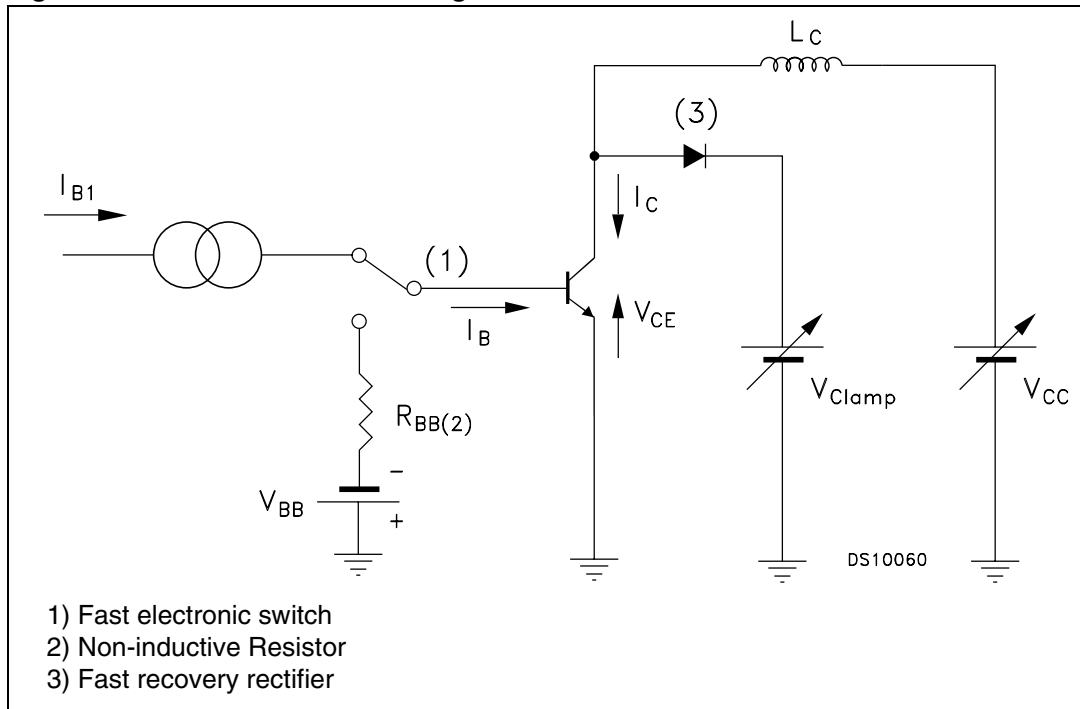


Figure 10. Reverse biased safe operating area



3 Test circuit

Figure 11. Inductive load switching test circuit

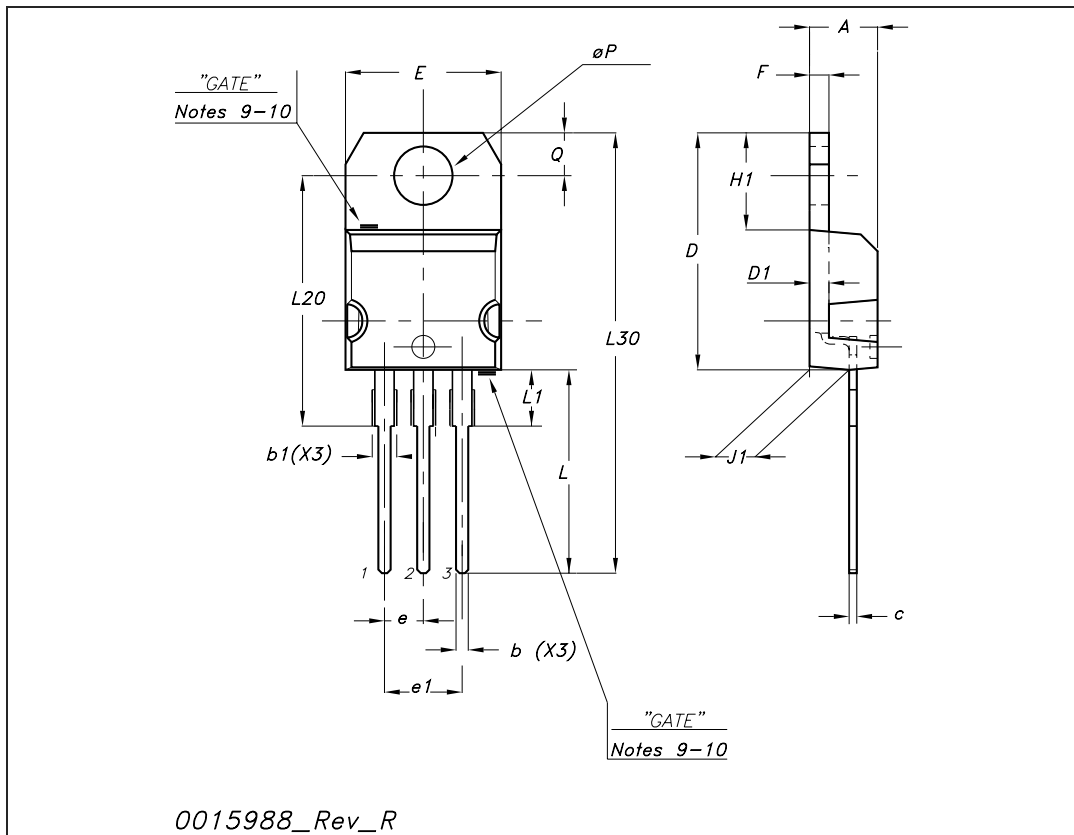


4 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

TO-220 mechanical data

| Dim | mm | | | inch | | |
|-----|-------|-------|-------|-------|-------|-------|
| | Min | Typ | Max | Min | Typ | Max |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| b | 0.61 | | 0.88 | 0.024 | | 0.034 |
| b1 | 1.14 | | 1.70 | 0.044 | | 0.066 |
| c | 0.48 | | 0.70 | 0.019 | | 0.027 |
| D | 15.25 | | 15.75 | 0.6 | | 0.62 |
| D1 | | 1.27 | | | 0.050 | |
| E | 10 | | 10.40 | 0.393 | | 0.409 |
| e | 2.40 | | 2.70 | 0.094 | | 0.106 |
| e1 | 4.95 | | 5.15 | 0.194 | | 0.202 |
| F | 1.23 | | 1.32 | 0.048 | | 0.051 |
| H1 | 6.20 | | 6.60 | 0.244 | | 0.256 |
| J1 | 2.40 | | 2.72 | 0.094 | | 0.107 |
| L | 13 | | 14 | 0.511 | | 0.551 |
| L1 | 3.50 | | 3.93 | 0.137 | | 0.154 |
| L20 | | 16.40 | | | 0.645 | |
| L30 | | 28.90 | | | 1.137 | |
| ∅P | 3.75 | | 3.85 | 0.147 | | 0.151 |
| Q | 2.65 | | 2.95 | 0.104 | | 0.116 |



5 Revision history

Table 5. Document revision history

| Date | Revision | Changes |
|-------------|----------|-----------------|
| 15-Jan-2009 | 1 | Initial release |

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