

| Symbol | Parameter                           | Value | Unit |
|--------|-------------------------------------|-------|------|
| $T_J$  | Max. Operating Junction Temperature | 150   | °C   |

**Table 3: Thermal Data**

|                |                                     |     |      |      |
|----------------|-------------------------------------|-----|------|------|
| $R_{thj-case}$ | Thermal Resistance Junction-Case    | Max | 1.14 | °C/W |
| $R_{thj-amb}$  | Thermal Resistance Junction-Ambient | Max | 62.5 | °C/W |

**Table 4: Electrical Characteristics ( $T_{case} = 25\text{ °C}$  unless otherwise specified)**

| Symbol           | Parameter  | Test Conditions   | Min.           | Typ.       | Max.       | Unit                           |
|------------------|--|---|----------------|------------|------------|--------------------------------|
| $I_{CES}$        | Collector Cut-off Current<br>( $V_{BE} = 0\text{ V}$ ) | $V_{CE} = 1600\text{ V}$<br>$V_{CE} = 1600\text{ V}$ $T_J = 125\text{ °C}$  |                |            | 100<br>500 | $\mu\text{A}$<br>$\mu\text{A}$ |
| $I_{CEO}$        | Collector Cut-off Current<br>( $I_B = 0$ )             | $V_{CE} = 800\text{ V}$   |                |            | 250        | $\mu\text{A}$                  |
| $V_{CEO(sus)}^*$ | Collector-Emitter Sustaining Voltage<br>( $I_B = 0$ )  | $I_C = 100\text{ mA}$ $L = 25\text{ mH}$  | 800            |            |            | V                              |
| $V_{EBO}$        | Emitter-Base Voltage<br>( $I_C = 0$ )                  | $I_E = 10\text{ mA}$  | 9              |            |            | V                              |
| $V_{CE(sat)}^*$  | Collector-Emitter Saturation Voltage                   | $I_C = 2\text{ A}$ $I_B = 0.4\text{ A}$<br>$I_C = 4\text{ A}$ $I_B = 1.33\text{ A}$   |                |            | 1.5<br>3   | V<br>V                         |
| $V_{BE(sat)}^*$  | Base-Emitter Saturation Voltage                        | $I_C = 2\text{ A}$ $I_B = 0.4\text{ A}$<br>$I_C = 4\text{ A}$ $I_B = 1.33\text{ A}$   |                |            | 1.2<br>1.5 | V<br>V                         |
| $h_{FE}^*$       | DC Current Gain  | $I_C = 10\text{ mA}$ $V_{CE} = 5\text{ V}$<br>$I_C = 0.7\text{ A}$ $V_{CE} = 5\text{ V}$<br>Group A<br>Group B  | 10<br>12<br>25 |            | 27<br>40   |                                |
| $t_s$<br>$t_f$   | INDUCTIVE LOAD<br>Storage Time<br>Fall Time            | $I_C = 3\text{ A}$ $I_{B1} = 1\text{ A}$<br>$V_{BE(off)} = -5\text{ V}$ $R_{BB} = 0\text{ }\Omega$<br>$V_{clamp} = 200\text{ V}$ $L = 200\text{ }\mu\text{H}$<br>(see figure 12)                          |                | 2.3<br>650 |            | $\mu\text{s}$<br>ns            |
| $t_s$<br>$t_f$   | INDUCTIVE LOAD<br>Storage Time<br>Fall Time            | $I_C = 3\text{ A}$ $I_{B1} = 1\text{ A}$<br>$V_{BE(off)} = -5\text{ V}$ $R_{BB} = 0\text{ }\Omega$<br>$V_{clamp} = 200\text{ V}$ $L = 200\text{ }\mu\text{H}$<br>$T_J = 100\text{ °C}$<br>(see figure 12) |                | 3<br>680   |            | $\mu\text{s}$<br>ns            |

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

# Note: Product is pre-selected in DC current gain (Group A and Group B). STMicroelectronics reserves the right to ship either groups according to production availability. Please contact your nearest STMicroelectronics sales office for delivery details.

Figure 3: Safe Operating Area

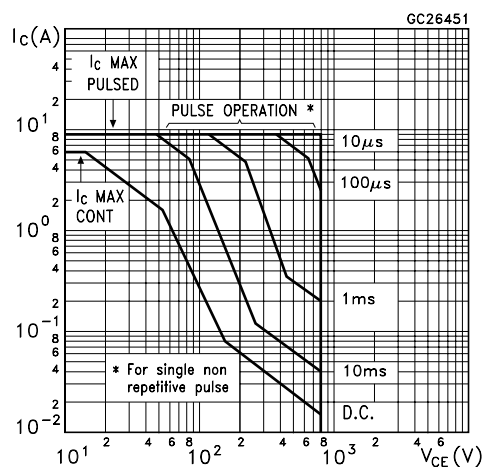


Figure 4: DC Current Gain

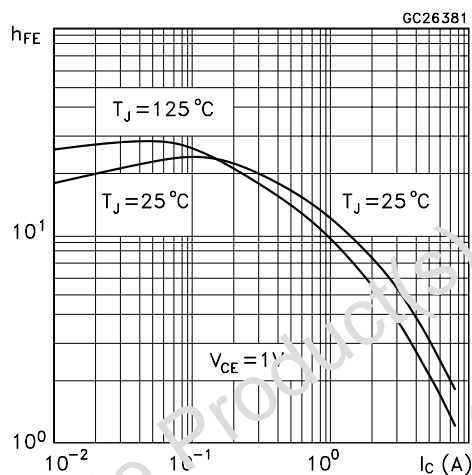


Figure 5: Collector-Emitter Saturation Voltage

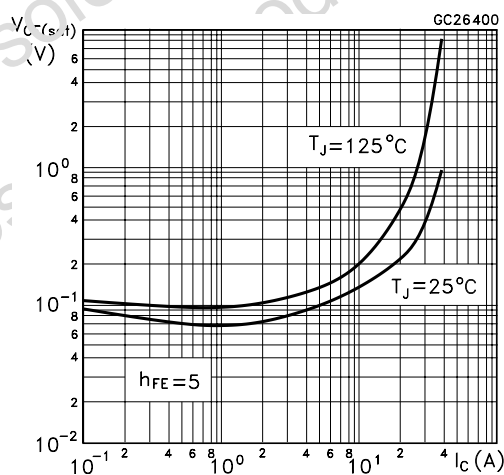


Figure 6: Derating Curve

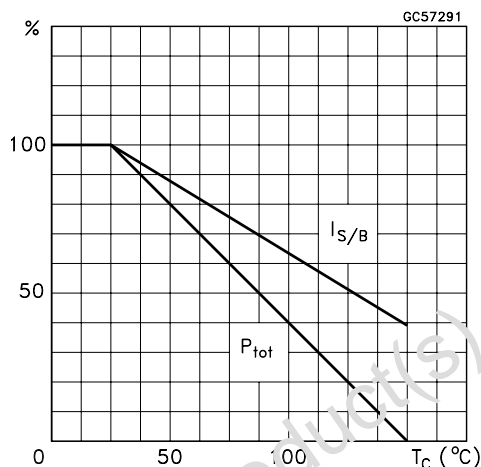


Figure 7: DC Current Gain

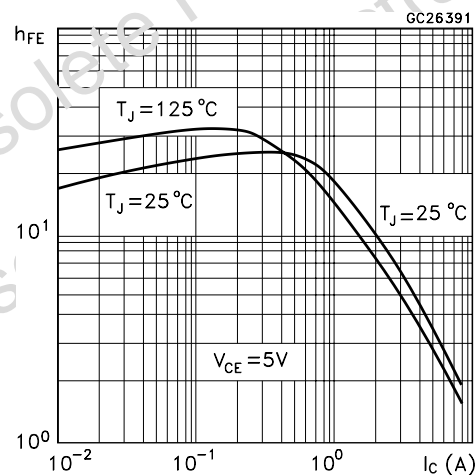


Figure 8: Base-Emitter Saturation Voltage

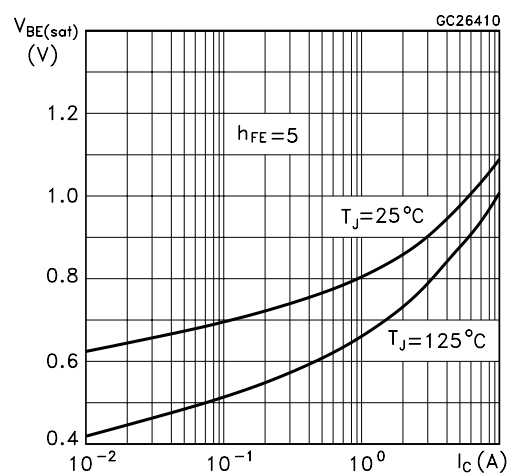


Figure 9: Inductive Load Fall Time

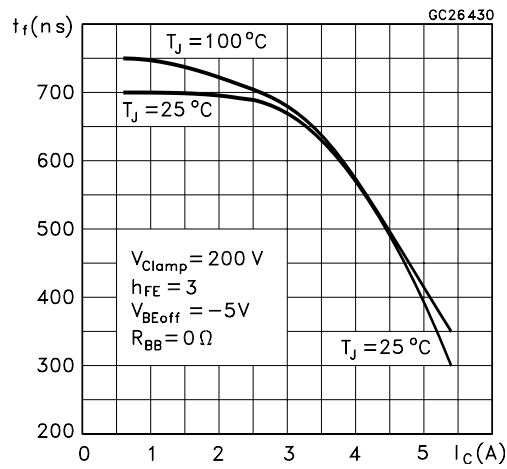


Figure 11: Resistive Load Storage Time

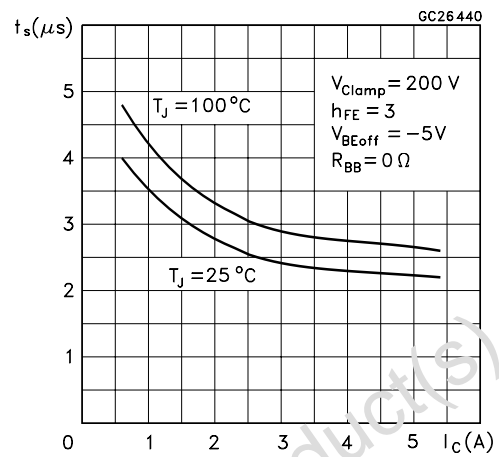


Figure 10: Reverse Biased SOA

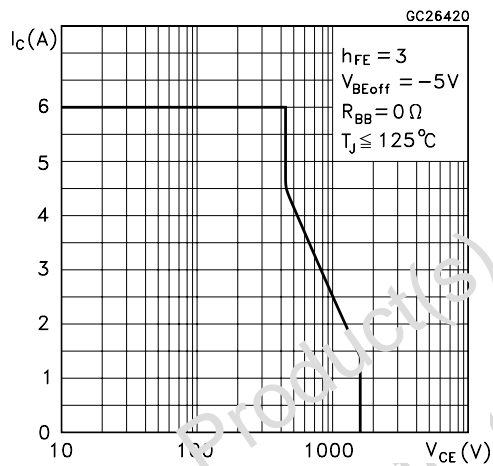
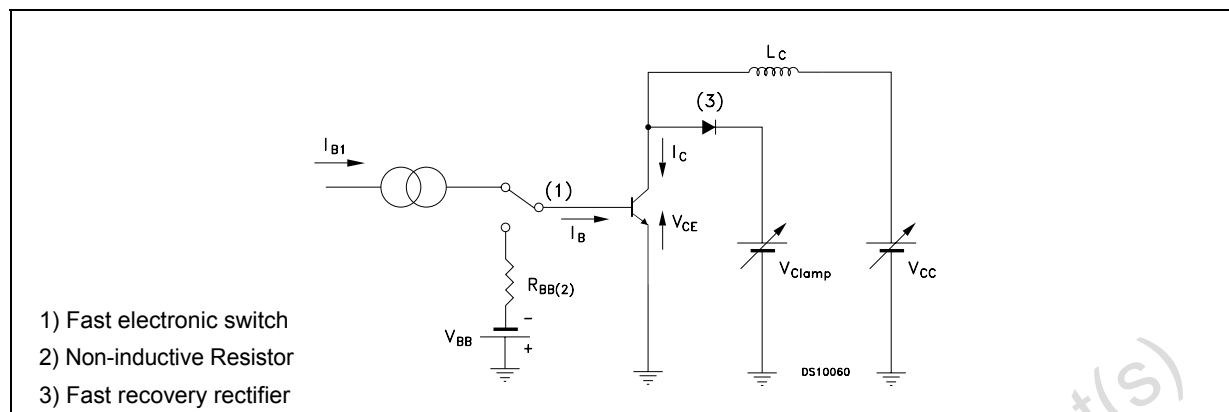


Figure 12: Inductive Load Switching Test Circuit



## TO-220 MECHANICAL DATA

| DIM. | mm.   |       |       | inch  |       |       |
|------|-------|-------|-------|-------|-------|-------|
|      | MIN.  | TYP.  | MAX.  | MIN.  | TYP.  | MAX.  |
| A    | 4.40  |       | 4.60  | 0.173 |       | 0.181 |
| b    | 0.61  |       | 0.88  | 0.024 |       | 0.034 |
| b1   | 1.15  |       | 1.70  | 0.045 |       | 0.066 |
| c    | 0.49  |       | 0.70  | 0.019 |       | 0.027 |
| D    | 15.25 |       | 15.75 | 0.60  |       | 0.620 |
| 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 |       | 0.052 |
| 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 |       |
| øP   | 3.75  |       | 3.85  | 0.147 |       | 0.151 |
| Q    | 2.65  |       | 2.55  | 0.104 |       | 0.116 |

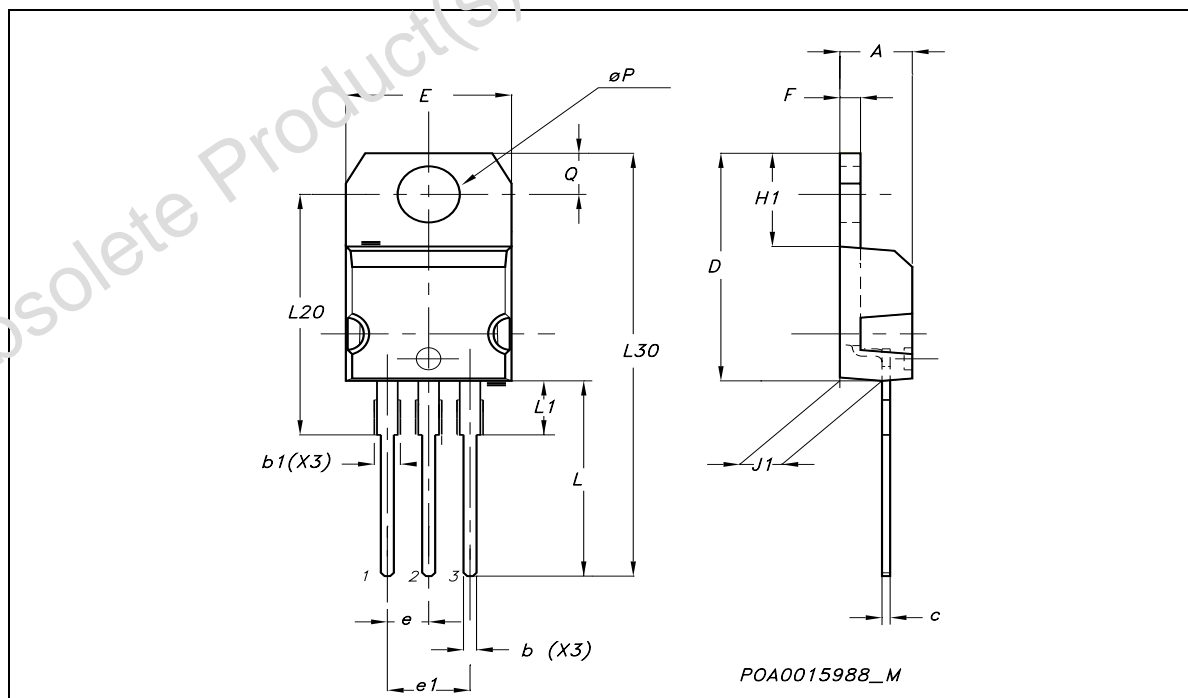


Table 5:

| Version     | Release Date | Change Designator |
|-------------|--------------|-------------------|
| 14-Jan-2004 | 1            | First Release.    |
| 09-Sep-2004 | 2            | Second Release.   |
| 26-Jan-2005 | 3            | Third Release.    |

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Obsolete Product(s) - Obsolete Product(s)

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