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

**Table 3: Thermal Data**

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

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

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

* Pulsed: Pulsed duration = 300 µs, duty cycle ≤ 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 STMicrolectronics sales office for delivery datails.

**Figure 3: Safe Operating Area**

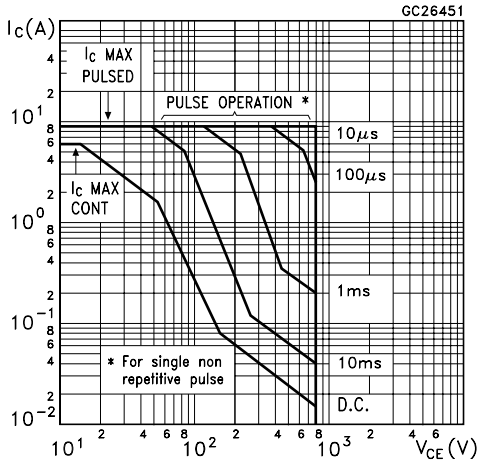



**Figure 4: DC Current Gain**

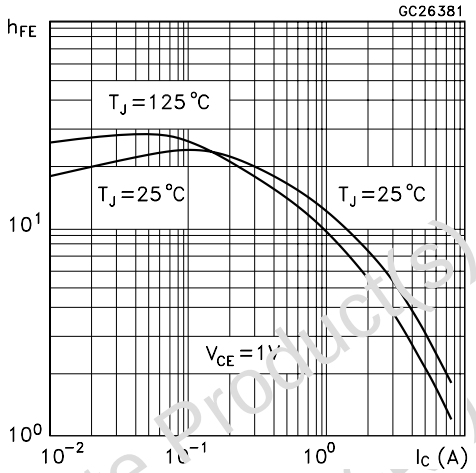



**Figure 5: Collector-Emitter Saturation Voltage**

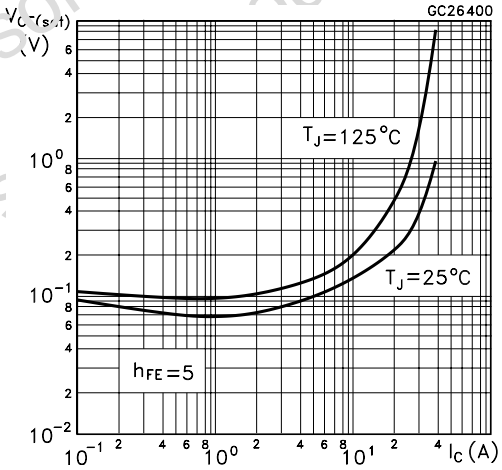



**Figure 6: Derating Curve**

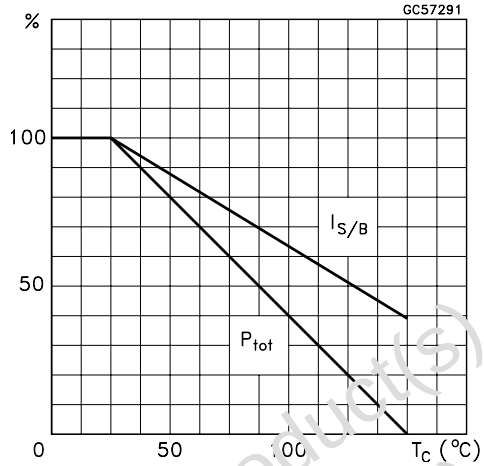



**Figure 7: DC Current Gain**

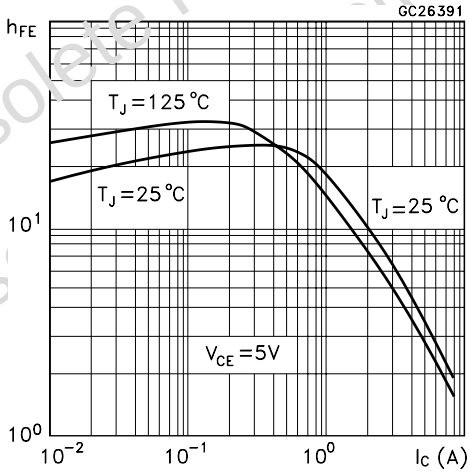



**Figure 8: Base-Emitter Saturation Voltage**

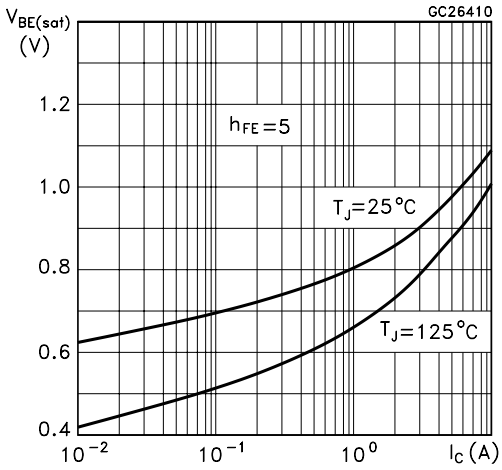


**Figure 9: Inductive Load Fall Time**

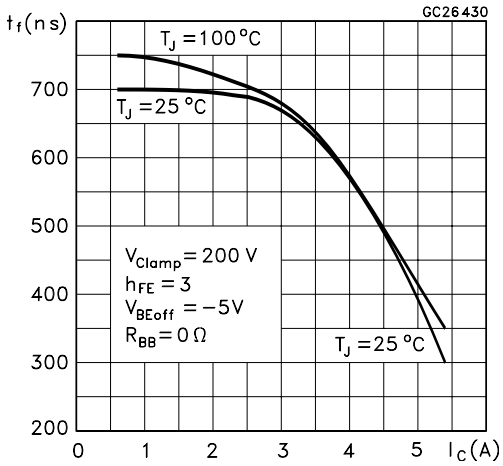



**Figure 10: Reverse Biased SOA**

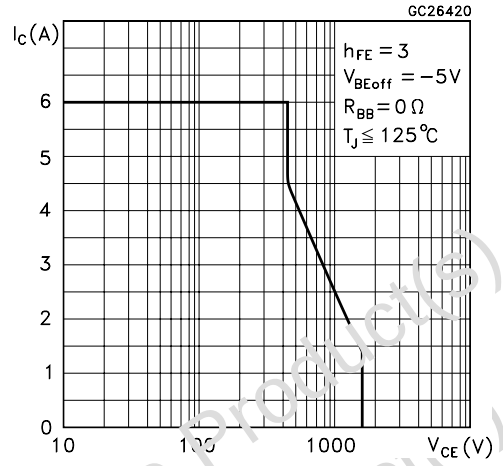



**Figure 11: Resistive Load Stoarage Time**

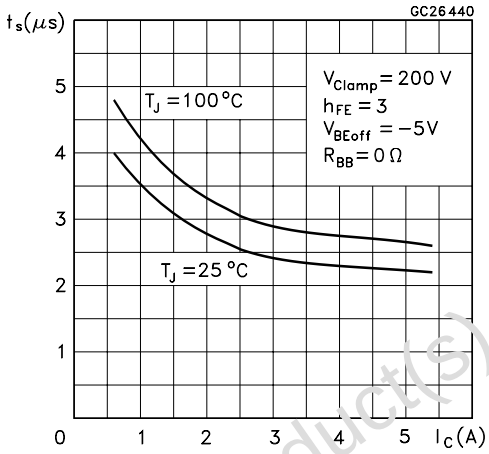
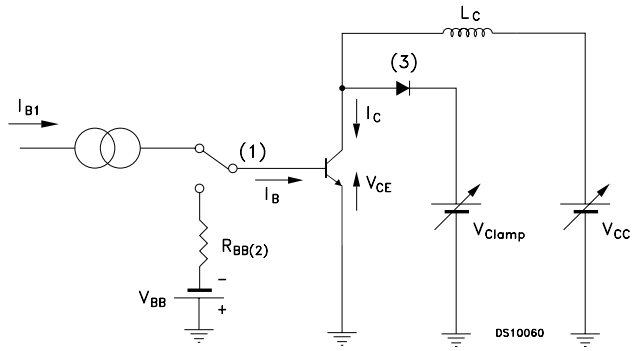


**Figure 12: Inductive Load Switching Test Circuit**




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

## 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 | | 2.95 | 0.104 | | 0.116 |

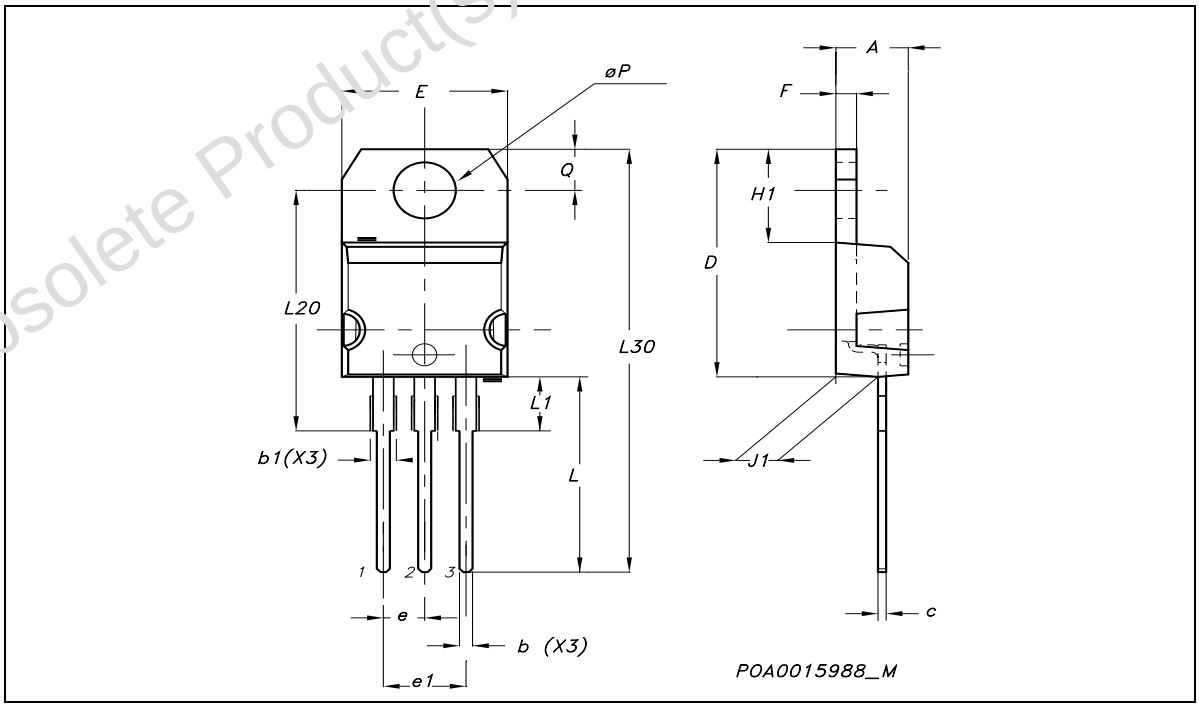


**Table 5:**

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