

High gain low voltage PNP power transistor

Features

- Very low collector to emitter saturation voltage
- DC current gain > 100 (h_{FE})
- 3 A continuous collector current (I_C)

Applications

- Power management in portable equipments
- Switching regulator in battery charger applications

Description

The device is manufactured in low voltage PNP Planar Technology with "Base Island" layout. The resulting Transistor shows exceptional high gain performance coupled with very low saturation voltage.

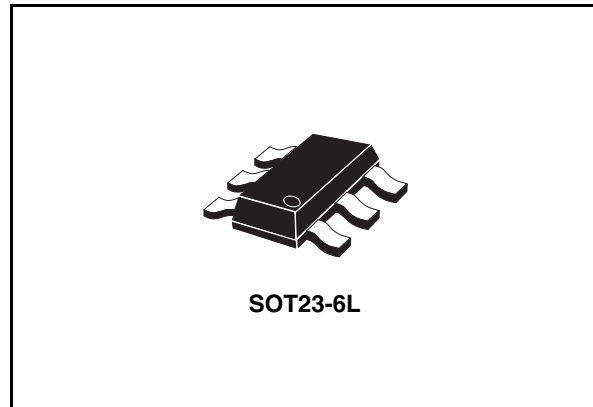


Figure 1. Internal schematic diagram

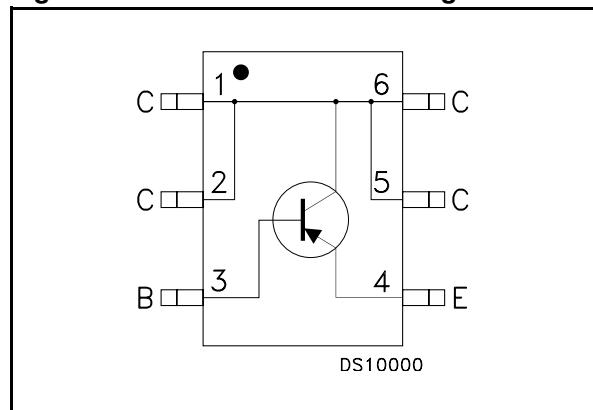


Table 1. Device summary

| Order code | Marking | Package | Packaging |
|------------|---------|----------|-------------|
| STT818B | 818B | SOT23-6L | Tape & reel |

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1 Electrical ratings

Table 2. Absolute maximum rating

| Symbol | Parameter | Value | Unit |
|-----------|---|------------|------------------|
| V_{CBO} | Collector-base voltage ($I_E = 0$) | -30 | V |
| V_{CEO} | Collector-emitter voltage ($I_B = 0$) | -30 | V |
| V_{EBO} | Emitter-base voltage ($I_C = 0$) | -5 | V |
| I_C | Collector current | -3 | A |
| I_{CM} | Collector peak current ($t_P < 5\text{ms}$) | -6 | A |
| I_B | Base current | -0.2 | A |
| I_{BM} | Base peak current ($t_P < 5\text{ms}$) | -0.5 | A |
| P_{tot} | Total dissipation at $T_{amb} = 25^\circ\text{C}$ | 1.2 | W |
| T_{stg} | Storage temperature | -65 to 150 | $^\circ\text{C}$ |
| T_J | Max. operating junction temperature | 150 | $^\circ\text{C}$ |

Table 3. Thermal data

| Symbol | Parameter | Value | Unit |
|----------------------|--|-------|--------------------|
| $R_{thj-amb}$ (1) | Thermal resistance junction-ambient max | 104.2 | $^\circ\text{C/W}$ |

1. Package mounted on FR4 pcb 25mm x 25mm.

2 Electrical characteristics

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

Table 4. Electrical characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-----------------------------------|--|--|------------|-----------------|-----------------------|--------------------------------|
| I_{CBO} | Collector cut-off current ($I_{\text{E}} = 0$) | $V_{\text{CB}} = -30 \text{ V}$ $V_{\text{CB}} = -30 \text{ V}$ $T_{\text{C}} = 125^{\circ}\text{C}$ | | | -0.1 -20 | μA μA |
| I_{EBO} | Collector-cut-off current ($I_{\text{C}} = 0$) | $V_{\text{EB}} = -5 \text{ V}$ | | | -0.1 | μA |
| $V_{(\text{BR})\text{CEO}}^{(1)}$ | Collector-emitter breakdown voltage ($I_{\text{B}} = 0$) | $I_{\text{C}} = -10 \text{ mA}$ | -30 | | | V |
| $V_{\text{CE}(\text{sat})}^{(1)}$ | Collector-emitter saturation voltage | $I_{\text{C}} = -0.5 \text{ A}$ $I_{\text{B}} = -5 \text{ mA}$ $I_{\text{C}} = -1.2 \text{ A}$ $I_{\text{B}} = -12 \text{ mA}$ $I_{\text{C}} = -2 \text{ A}$ $I_{\text{B}} = -20 \text{ mA}$ | | -0.075 -0.21 | -0.15 -0.3 -0.5 | V V V |
| $V_{\text{BE}(\text{sat})}^{(1)}$ | Base-emitter saturation voltage | $I_{\text{C}} = -0.5 \text{ A}$ $I_{\text{B}} = -5 \text{ mA}$ $I_{\text{C}} = -1.2 \text{ A}$ $I_{\text{B}} = -12 \text{ mA}$ $I_{\text{C}} = -2 \text{ A}$ $I_{\text{B}} = -20 \text{ mA}$ | | -0.74 | -1.1 -1.1 -1.2 | V V V |
| $h_{\text{FE}}^{(1)}$ | DC current gain | $I_{\text{C}} = -0.5 \text{ A}$ $V_{\text{CE}} = -1 \text{ V}$ $I_{\text{C}} = -2.5 \text{ A}$ $V_{\text{CE}} = -3 \text{ V}$ | 100 100 | | | |
| $V_{\text{BE}(\text{ON})}^{(1)}$ | Base-emitter voltage | $I_{\text{C}} = -0.5 \text{ A}$ $V_{\text{CE}} = -2 \text{ V}$ | | -0.71 | -1.1 | V |

1. Pulse duration = 300 μs , duty cycle 1.5 %.

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

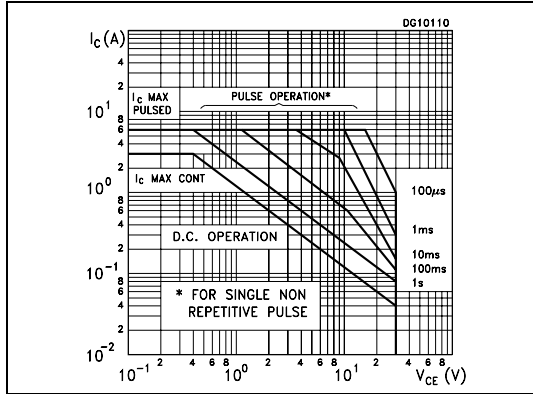


Figure 3. Derating curve

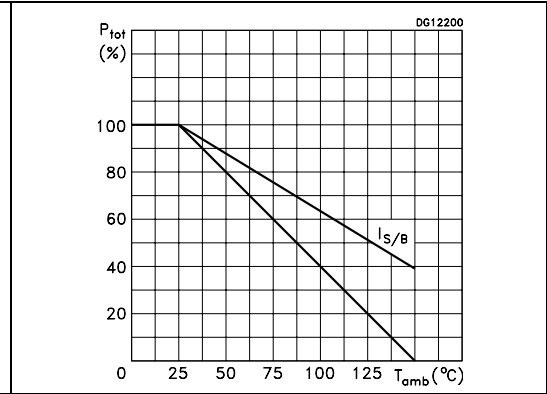


Figure 4. DC Current Gain

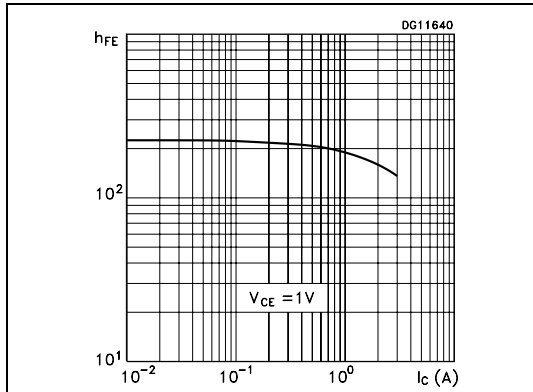


Figure 5. DC Current Gain

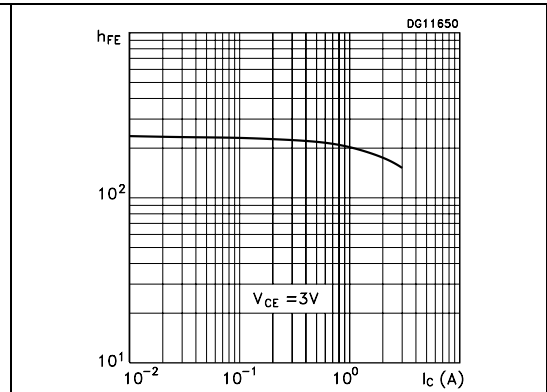


Figure 6. Collector-emitter saturation voltage

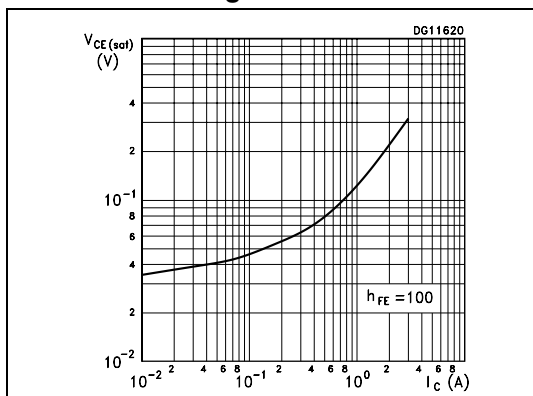


Figure 7. Base-emitter saturation voltage

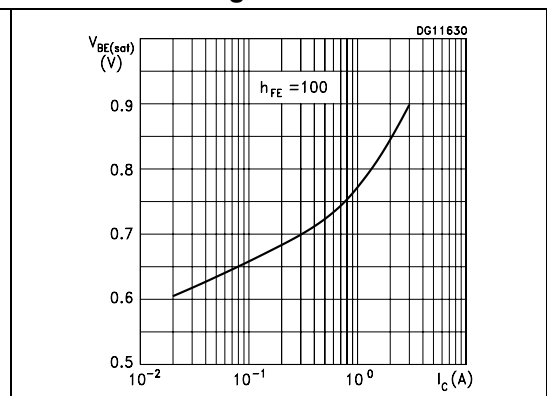


Figure 8. Switching times resistive load

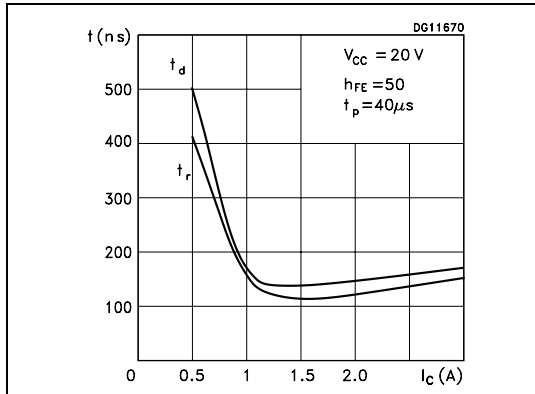
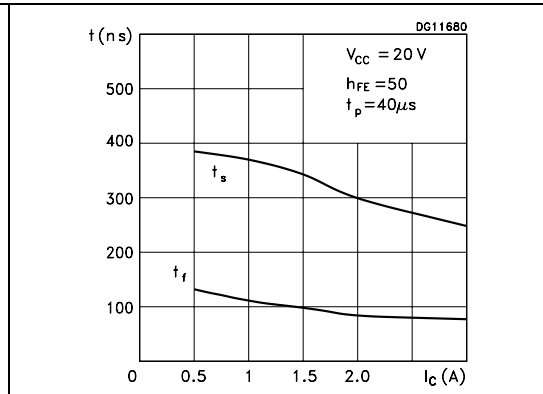


Figure 9. Switching times resistive load

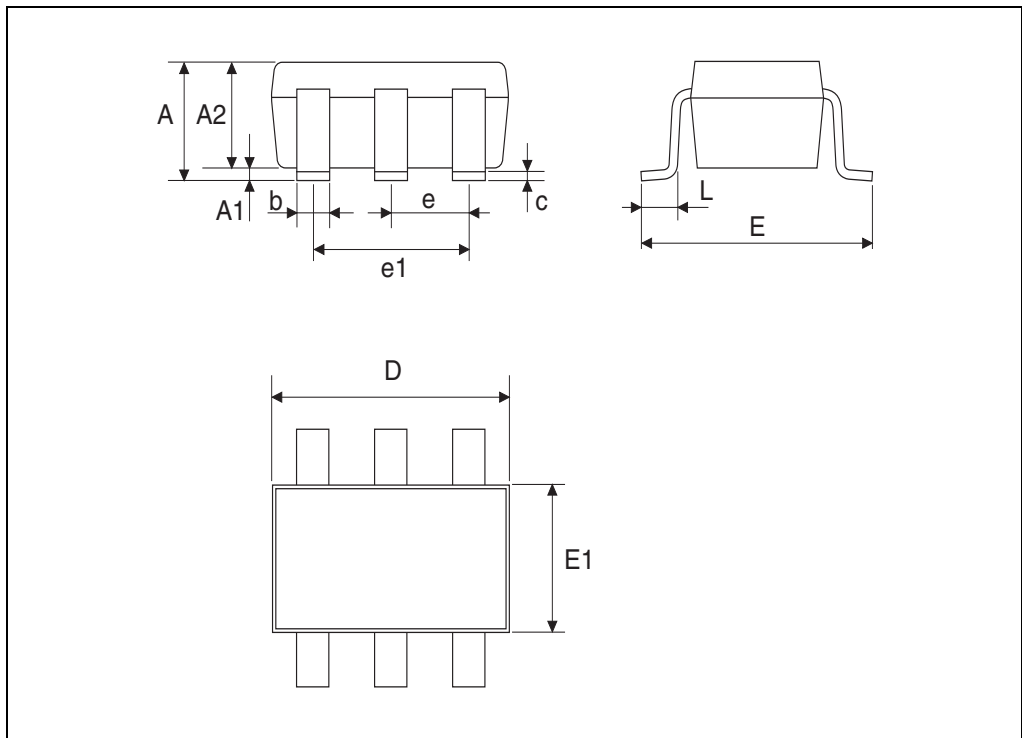


3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

SOT23-6L MECHANICAL DATA

| DIM. | mm | | | mils | | |
|------|------|------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 0.90 | | 1.45 | 0.035 | | 0.057 |
| A1 | 0.00 | | 0.15 | 0.000 | | 0.006 |
| A2 | 0.90 | | 1.30 | 0.035 | | 0.051 |
| b | 0.25 | | 0.50 | 0.010 | | 0.020 |
| C | 0.09 | | 0.20 | 0.004 | | 0.008 |
| D | 2.80 | | 3.10 | 0.110 | | 0.122 |
| E | 2.60 | | 3.00 | 0.102 | | 0.118 |
| E1 | 1.50 | | 1.75 | 0.059 | | 0.069 |
| L | 0.35 | | 0.55 | 0.014 | | 0.022 |
| e | | 0.95 | | | 0.037 | |
| e1 | | 1.90 | | | 0.075 | |



4 Revision history

Table 5. Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| 12-Jul-2002 | 4 | No content change; the document has been reformatted |
| 08-Aug-2007 | 5 | Updated Figure 3 |

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