

1 Electrical ratings

Table 2. Absolute maximum rating

| Symbol | Parameter | Value | | Unit |
|-----------|--|------------|----------|------|
| | | 2STF2340 | 2STN2340 | |
| | | SOT-89 | SOT-223 | |
| V_{CES} | Collector-emitter voltage ($V_{BE} = 0$) | -40 | | V |
| V_{CEO} | Collector-emitter voltage ($I_B = 0$) | -40 | | V |
| V_{EBO} | Emitter-base voltage ($I_C = 0$) | -5 | | V |
| I_C | Collector current | -3 | | A |
| I_{CM} | Collector peak current ($t_p < 5$ ms) | -6 | | A |
| P_{TOT} | Total dissipation at $T_{amb} = 25$ °C | 1.4 | 1.6 | W |
| T_{STG} | Storage temperature | -65 to 150 | | °C |
| T_J | Max. operating junction temperature | 150 | | °C |

Table 3. Thermal data

| Symbol | Parameter | SOT-89 | SOT-223 | Unit |
|------------------|---|--------|---------|------|
| $R_{thJA}^{(1)}$ | Thermal resistance junction-ambient max | 89 | 78 | °C/W |

1. Device mounted on PCB area of 1 cm²

2 Electrical characteristics

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

Table 4. Electrical characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|--|--|------------|-----------|--------------|---------------|
| I_{CBO} | Collector cut-off current ($I_{\text{E}} = 0$) | $V_{\text{CB}} = -40\text{ V}$ | | | -0.1 | μA |
| I_{EBO} | Emitter cut-off current ($I_{\text{C}} = 0$) | $V_{\text{EB}} = -5\text{ V}$ | | | -0.1 | μA |
| $V_{(\text{BR})\text{CBO}}^{(1)}$ | Collector-base breakdown voltage ($I_{\text{E}} = 0$) | $I_{\text{C}} = -100\text{ }\mu\text{A}$ | -40 | | | V |
| $V_{(\text{BR})\text{CEO}}^{(1)}$ | Collector-emitter breakdown voltage ($I_{\text{B}} = 0$) | $I_{\text{C}} = -10\text{ mA}$ | -40 | | | V |
| $V_{(\text{BR})\text{EBO}}$ | Emitter-base breakdown voltage ($I_{\text{C}} = 0$) | $I_{\text{E}} = -100\text{ }\mu\text{A}$ | -5 | | | V |
| $V_{\text{CE}(\text{sat})}^{(1)}$ | Collector-emitter saturation voltage | $I_{\text{C}} = -2\text{ A}$ $I_{\text{B}} = -100\text{ mA}$ $I_{\text{C}} = -3\text{ A}$ $I_{\text{B}} = -150\text{ mA}$ | | | -250 -350 | mV mV |
| $V_{\text{BE}(\text{sat})}^{(1)}$ | Base-emitter saturation voltage | $I_{\text{C}} = -2\text{ A}$ $I_{\text{B}} = -100\text{ mA}$ | | | -1.2 | V |
| $h_{\text{FE}}^{(1)}$ | DC current gain | $I_{\text{C}} = -0.1\text{ A}$ $V_{\text{CE}} = -2\text{ V}$ $I_{\text{C}} = -1\text{ A}$ $V_{\text{CE}} = -2\text{ V}$ $I_{\text{C}} = -3\text{ A}$ $V_{\text{CE}} = -2\text{ V}$ | 100 180 | 220 | 450 | |
| f_{t} | Transition frequency | $I_{\text{C}} = -0.1\text{ A}$ $V_{\text{CE}} = -5\text{ V}$ $f = 100\text{ MHz}$ | 100 | | | MHz |
| C_{CBO} | Collector-base capacitance ($I_{\text{E}} = 0$) | $V_{\text{CB}} = -10\text{ V}$ $f = 1\text{ MHz}$ | | 50 | | pF |
| t_{on} t_{off} | Resistive load Turn-on time Turn-off time | $I_{\text{C}} = -1.5\text{ A}$ $V_{\text{CC}} = -10\text{ V}$ $I_{\text{B}(\text{on})} = -I_{\text{B}(\text{off})} = -150\text{ mA}$ $V_{\text{BB}(\text{off})} = 5\text{ V}$ | | 80 450 | | ns ns |

1. Pulse test: pulse duration $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

2.1 Electrical characteristics (curves)

Figure 2. Output characteristics

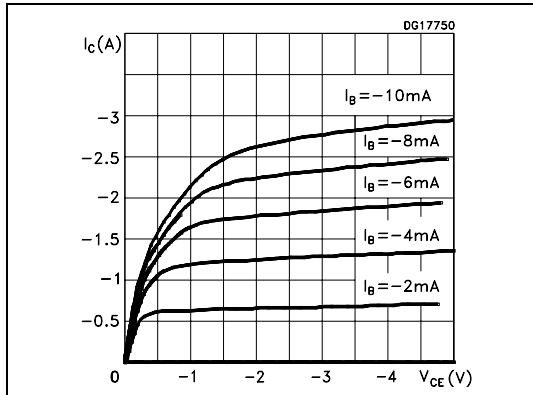


Figure 3. Derating curve

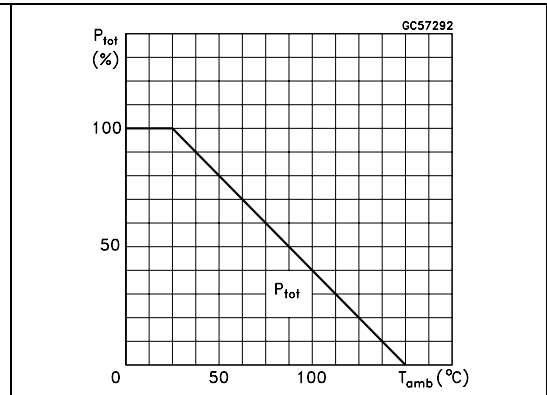


Figure 4. DC current gain ($V_{CE} = -2$ V)

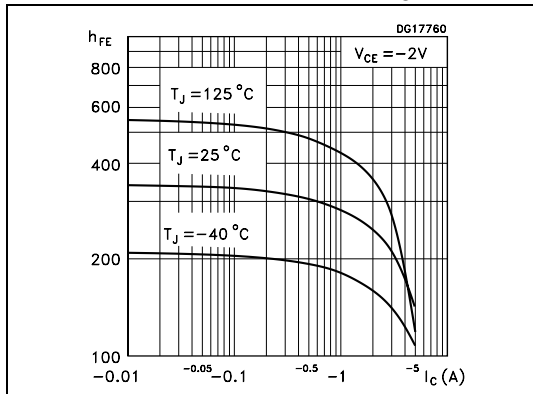


Figure 5. DC current gain ($V_{CE} = -5$ V)

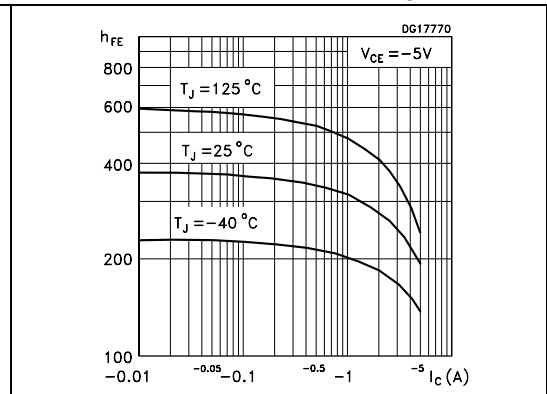


Figure 6. Collector-emitter saturation voltage

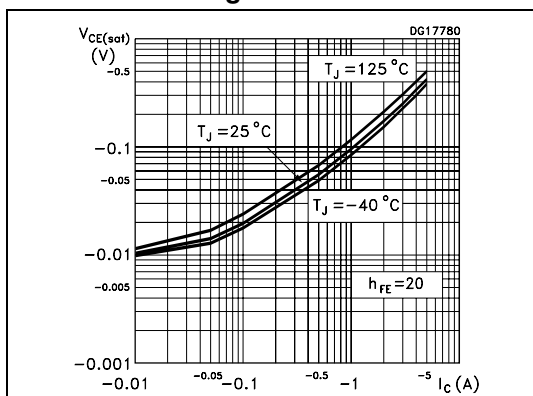


Figure 7. Base-emitter saturation voltage

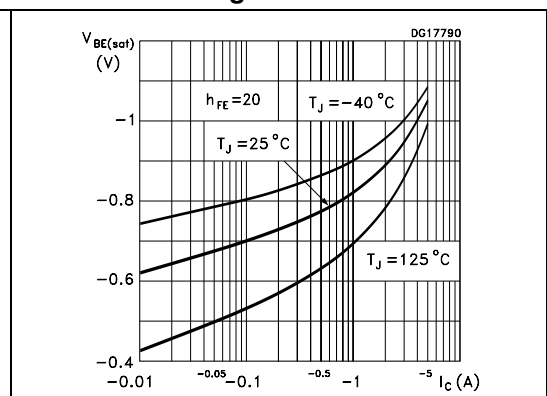


Figure 8. Resistive load switching on

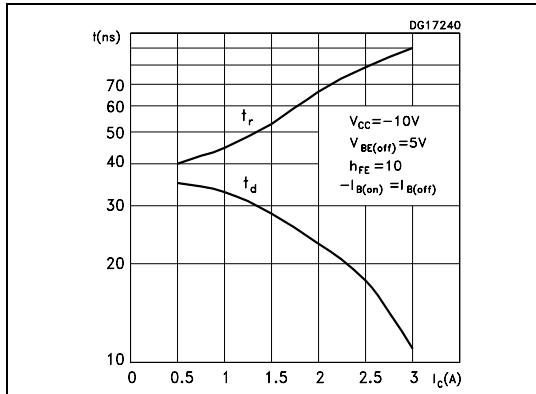


Figure 9. Resistive load switching off

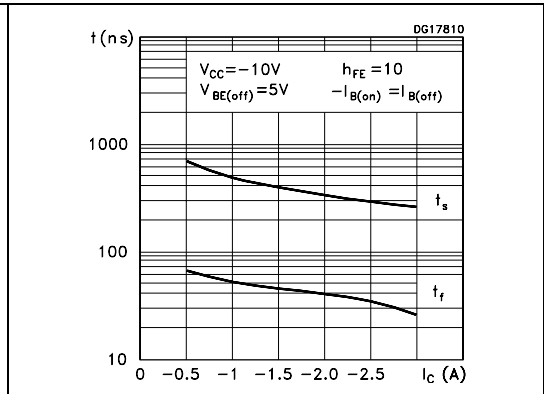
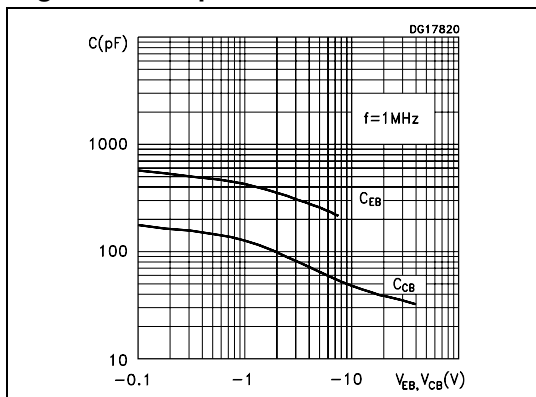
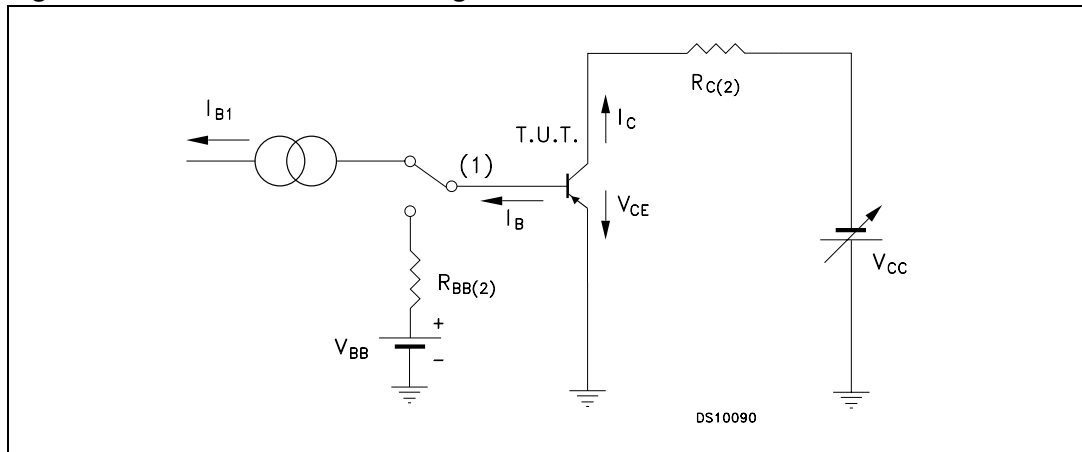


Figure 10. Capacitance curves



2.2 Test circuits

Figure 11. Resistive load switching test circuit



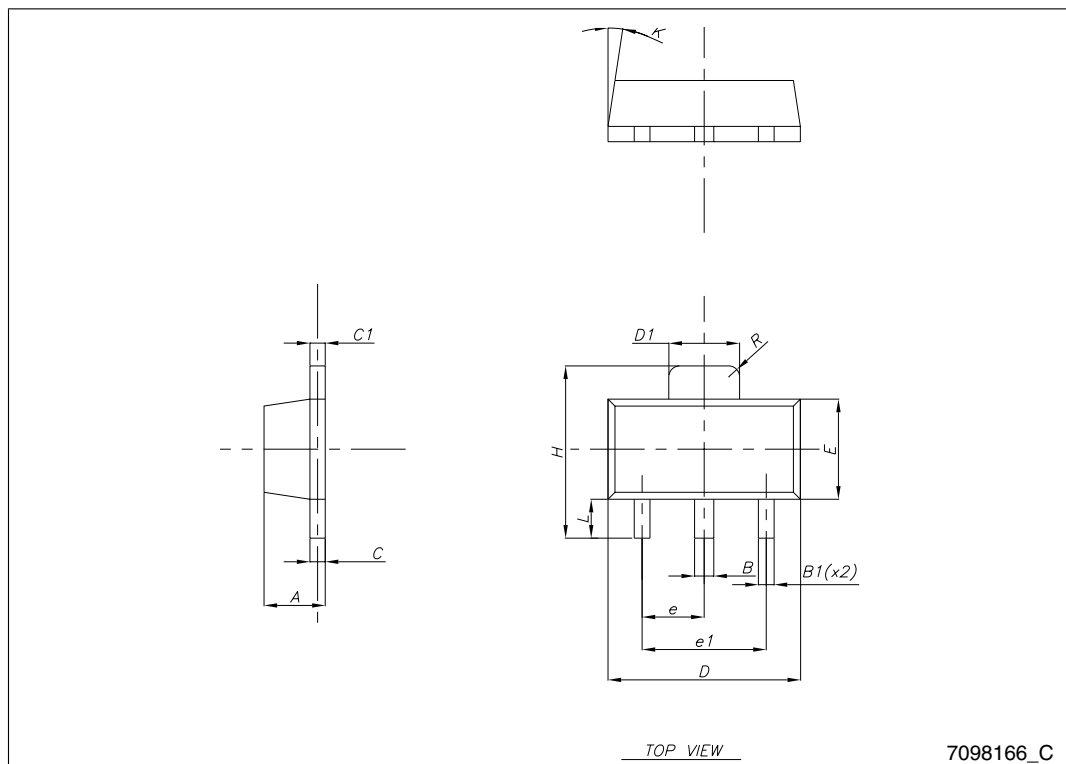
1. Fast electronic switch
2. Non-inductive resistor

3 Package mechanical data

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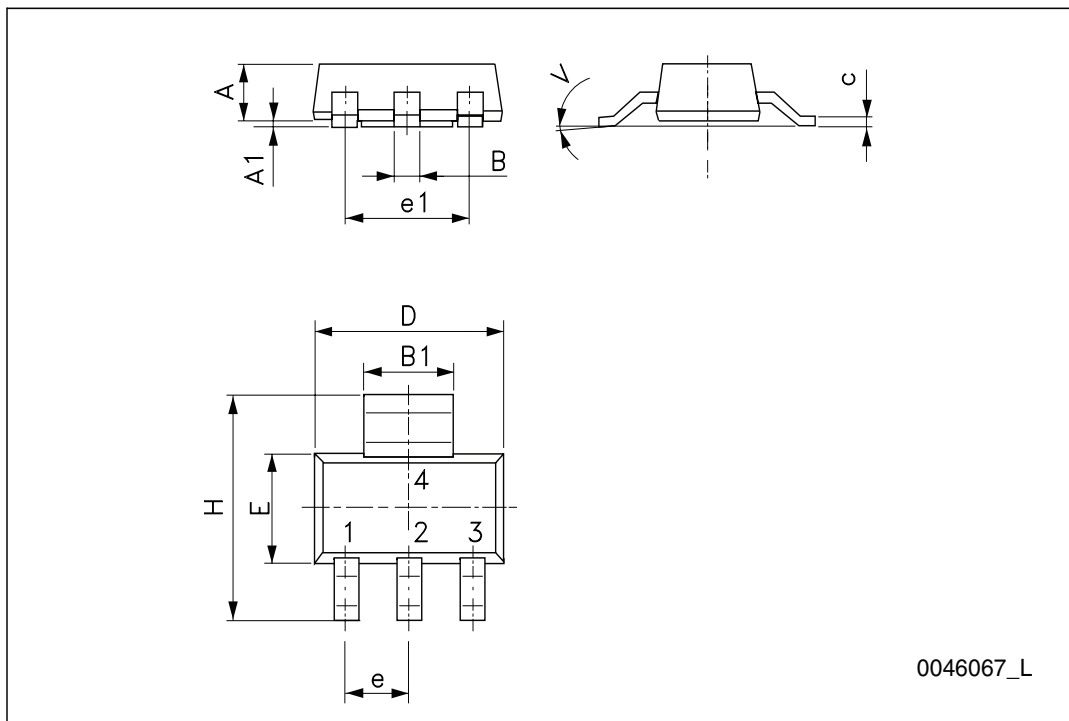
SOT-89 mechanical data

| Dim. | mm | | |
|------|------|------|------|
| | Min. | Typ. | Max. |
| A | 1.40 | | 1.60 |
| B | 0.44 | | 0.56 |
| B1 | 0.36 | | 0.48 |
| C | 0.35 | | 0.44 |
| C1 | 0.35 | | 0.44 |
| D | 4.40 | | 4.60 |
| D1 | 1.62 | | 1.83 |
| E | 2.29 | | 2.60 |
| e | 1.42 | | 1.57 |
| e1 | 2.92 | | 3.07 |
| H | 3.94 | | 4.25 |
| K | 1° | | 8° |
| L | 0.89 | | 1.20 |
| R | | 0.25 | |



SOT-223 mechanical data

| DIM. | mm. | | |
|------|------|------|------|
| | min. | typ | max. |
| A | | | 1.80 |
| A1 | 0.02 | | 0.1 |
| B | 0.60 | 0.70 | 0.85 |
| B1 | 2.90 | 3.00 | 3.15 |
| c | 0.24 | 0.26 | 0.35 |
| D | 6.30 | 6.50 | 6.70 |
| e | | 2.30 | |
| e1 | | 4.60 | |
| E | 3.30 | 3.50 | 3.70 |
| H | 6.70 | 7.00 | 7.30 |
| V | | | 10° |



4 Revision history

Table 5. Document revision history

| Date | Revision | Changes |
|-------------|----------|---------------------------------------|
| 04-Dec-2007 | 1 | Initial release. |
| 19-Oct-2009 | 2 | Inserted 2STN2340 in SOT-223 package. |

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