

50V PNP SURFACE MOUNT TRANSISTOR IN TO252-3L
Features

- Epitaxial Planar Die Construction
- Low Collector-Emitter Saturation Voltage
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **"Lead Free", RoHS Compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

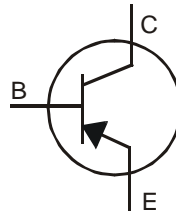
Mechanical Data

- Case: TO252-3L
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin annealed over Copper Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Weight: 0.34 grams (approximate)

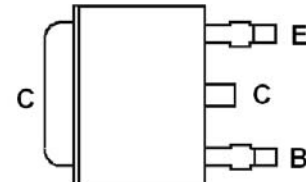
TO252-3L



Top View



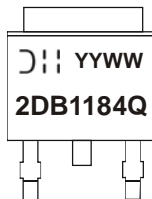
Device Schematic


 Pin Out Configuration
Top view

Ordering Information (Note 3)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|----------|--------------------|-----------------|-------------------|
| 2DB1184Q-13 | 2DB1184Q | 13 | 16 | 2,500 |

- Notes:
1. No purposefully added lead
 2. Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>.
 3. For packaging details, go to our website at <http://www.diodes.com>.

Marking Information


2DB1184Q = Product Type Marking Code
 ☺ = Manufacturers' code marking
 YYWW = Date Code Marking
 YY = Last Digit of Year, (ex: 08 = 2008)
 WW = Week Code 01-52

Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage | V_{CB0} | -60 | V |
| Collector-Emitter Voltage | V_{CEO} | -50 | V |
| Emitter-Base Voltage | V_{EBO} | -5 | V |
| Continuous Collector Current | I_C | -3 | A |
| Peak Pulse Collector Current | I_{CM} | -4.5 | A |

Thermal Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---|-----------------|-------------|--------------------|
| Power Dissipation | P_D | 15 | W |
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 8.3 | $^\circ\text{C/W}$ |
| Power Dissipation (Note 4) | P_D | 1.2 | W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 104 | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

Notes: 4. Device mounted on FR-4 PCB with minimum pad size recommended.

Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--------------------------------------|---------------|-----|-----|------|---------------|---|
| OFF CHARACTERISTICS (Note 5) | | | | | | |
| Collector-Base Breakdown Voltage | BV_{CB0} | -60 | — | — | V | $I_C = -50\mu\text{A}, I_E = 0$ |
| Collector-Emitter Breakdown Voltage | BV_{CEO} | -50 | — | — | V | $I_C = -1\text{mA}, I_B = 0$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | -5 | — | — | V | $I_E = -50\mu\text{A}, I_C = 0$ |
| Collector Cutoff Current | I_{CBO} | — | — | -1 | μA | $V_{CB} = -40\text{V}, I_E = 0$ |
| Emitter Cutoff Current | I_{EBO} | — | — | -1 | μA | $V_{EB} = -4\text{V}, I_C = 0$ |
| ON CHARACTERISTICS (Note 5) | | | | | | |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | — | — | -1 | V | $I_C = -2\text{A}, I_B = -0.2\text{A}$ |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | — | — | -1.2 | V | $I_C = -1.5\text{A}, I_B = -0.15\text{A}$ |
| DC Current Gain | h_{FE} | 120 | — | 270 | — | $V_{CE} = -3\text{V}, I_C = -0.5\text{A}$ |
| SMALL SIGNAL CHARACTERISTICS | | | | | | |
| Current Gain-Bandwidth Product | f_T | — | 110 | — | MHz | $V_{CE} = -5\text{V}, I_C = -0.1\text{A}, f = 30\text{MHz}$ |
| Output Capacitance | C_{obo} | — | 26 | — | pF | $V_{CB} = -10\text{V}, f = 1\text{MHz}$ |

Notes: 5. Measured under pulsed conditions. Pulse width = 300 μs . Duty cycle $\leq 2\%$.

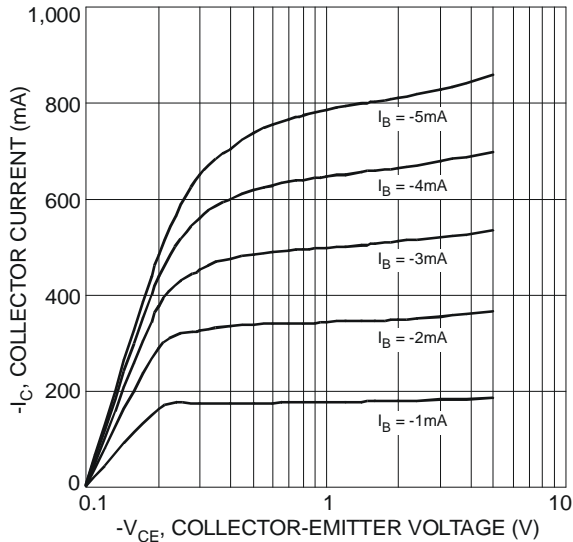


Fig. 1 Typical Collector Current vs. Collector-Emitter Voltage

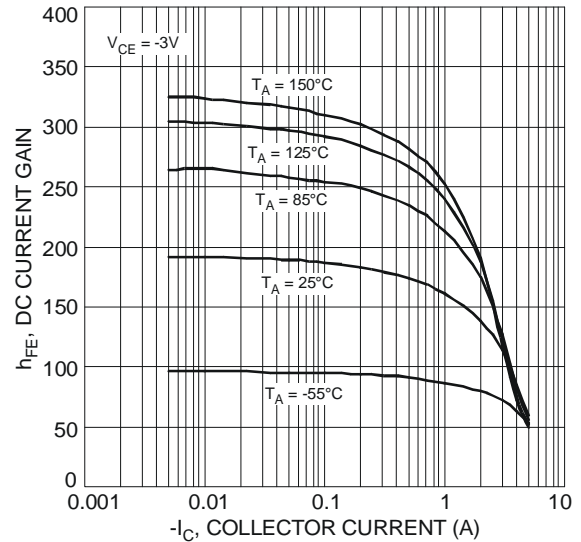


Fig. 2 Typical DC Current Gain vs. Collector Current

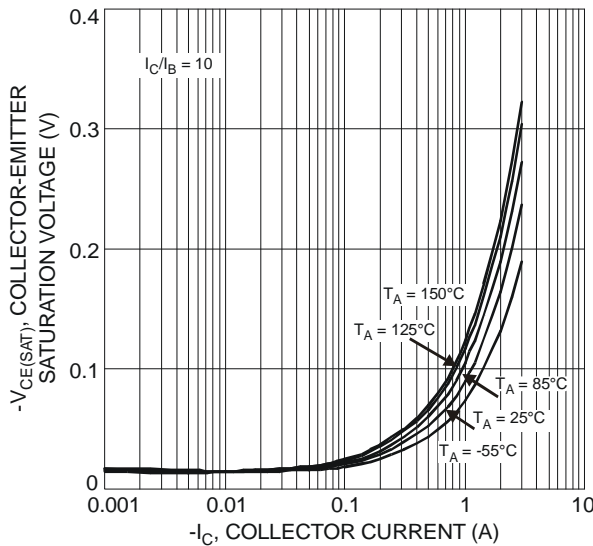


Fig. 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

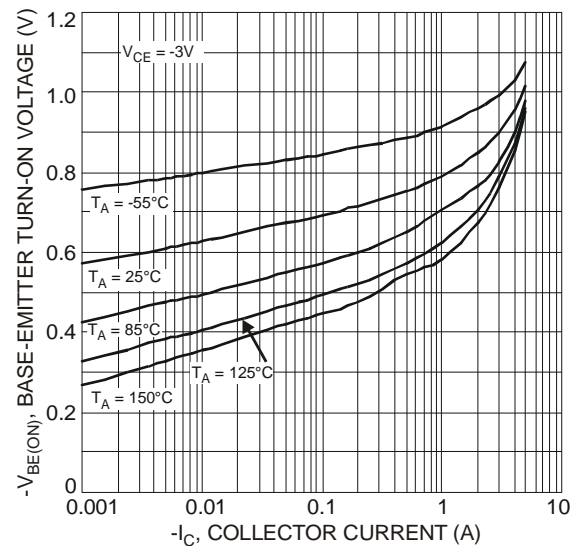


Fig. 4 Typical Base-Emitter Turn-On Voltage vs. Collector Current

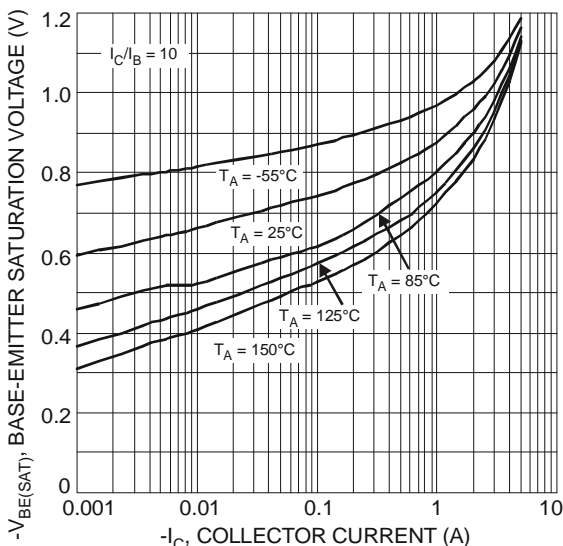


Fig. 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

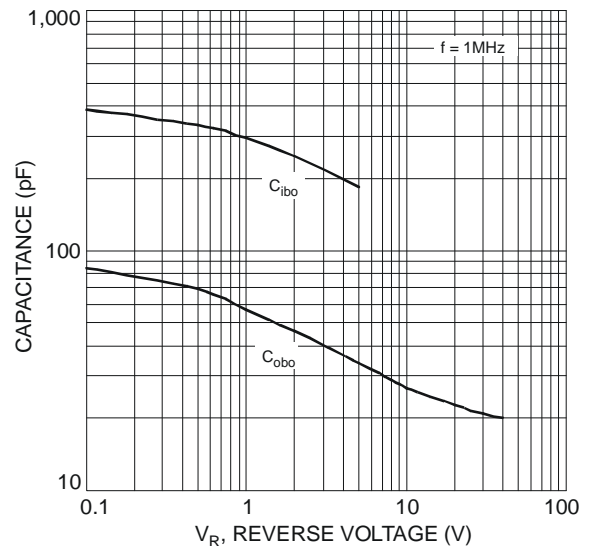


Fig. 6 Typical Capacitance Characteristics

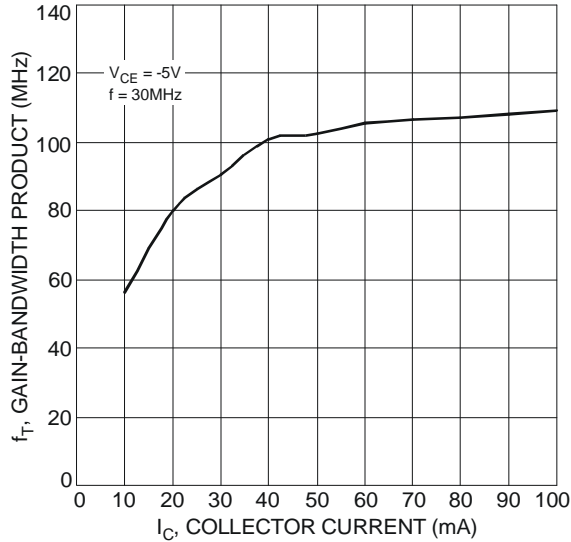


Fig. 7 Typical Gain-Bandwidth Product vs. Collector Current

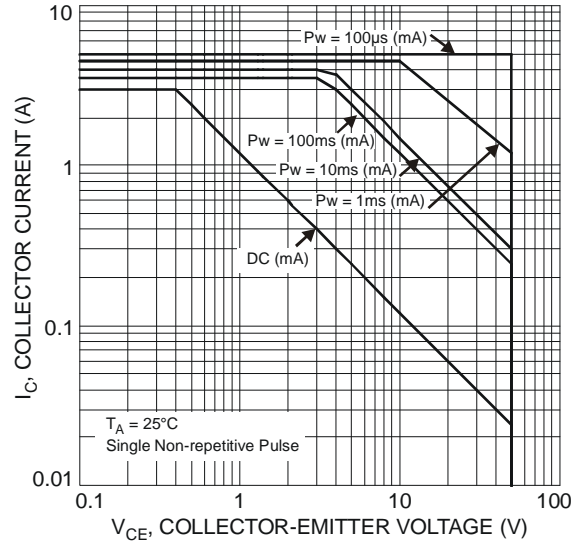


Fig. 8 Safe Operating Area (Note 3)

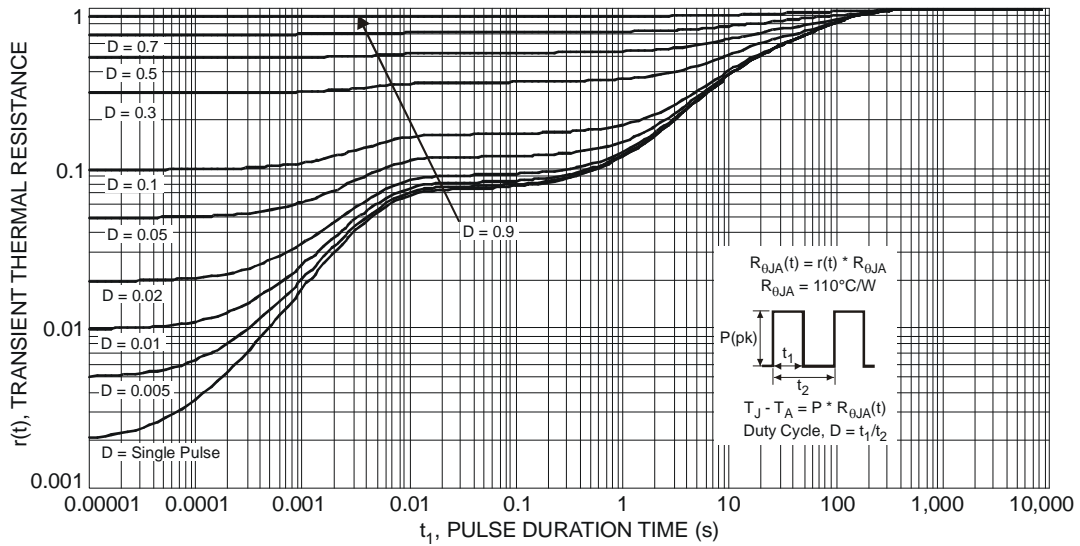
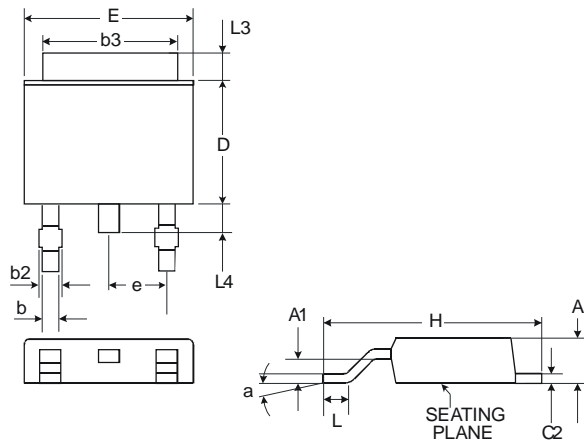


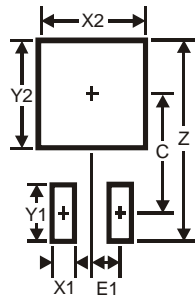
Fig. 9 Transient Thermal Response

Package Outline Dimensions



| TO252-3L | | | |
|----------------------|------------|------|-------|
| Dim | Min | Typ | Max |
| A | 2.19 | 2.29 | 2.39 |
| A1 | 0.97 | 1.07 | 1.17 |
| b | 0.64 | 0.76 | 0.88 |
| b2 | 0.76 | 0.95 | 1.14 |
| b3 | 5.21 | 5.33 | 5.50 |
| C2 | 0.45 | 0.51 | 0.58 |
| D | 6.00 | 6.10 | 6.20 |
| E | 6.45 | 6.58 | 6.70 |
| e | 2.286 Typ. | | |
| H | 9.40 | 9.91 | 10.41 |
| L | 1.40 | 1.59 | 1.78 |
| L3 | 0.88 | 1.08 | 1.27 |
| L4 | 0.64 | 0.83 | 1.02 |
| a | 0° | - | 10° |
| All Dimensions in mm | | | |

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 11.6 |
| X1 | 1.5 |
| X2 | 7.0 |
| Y1 | 2.5 |
| Y2 | 7.0 |
| C | 6.9 |
| E1 | 2.3 |

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