优尚

YOUSHANG SEMICONDUCTOR

# 设计研发新型功率器件

## 各类小信号开关

## 中低压及高压大电流等场效应管

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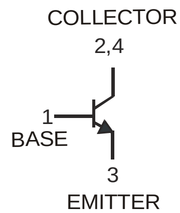
## Features

- Epitaxial Planar Die Construction
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- Complementary PNP Type (NK-2DB1714) Available

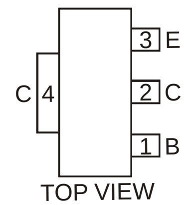
## Mechanical Data

- Case: SOT89-3L
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish — Matte Tin annealed over Copper leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.072 grams (approximate)

Top View




Device Schematic




Pin Out Configuration

## Maximum Ratings @$T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 30 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 30 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 6 | V |
| Peak Pulse Current | $I_{CM}$ | 4 | A |
| Continuous Collector Current | $I_C$ | 2 | A |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation (Note 3) @ $T_A$ = 25°C | $P_D$ | 0.9 | W |
| Thermal Resistance, Junction to Ambient Air (Note 3) @ $T_A$ = 25°C | $R_{\theta JA}$ | 139 | °C/W |
| Power Dissipation (Note 4) @ $T_A$ = 25°C | $P_D$ | 2 | W |
| Thermal Resistance, Junction to Ambient Air (Note 4) @ $T_A$ = 25°C | $R_{\theta JA}$ | 62.5 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

## Electrical Characteristics @$T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Conditions |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | 30 | — | — | V | $I_C$ = 10μA, $I_E$ = 0 |
| Collector-Emitter Breakdown Voltage (Note 5) | $V_{(BR)CEO}$ | 30 | — | — | V | $I_C$ = 1mA, $I_B$ = 0 |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | 6 | — | — | V | $I_E$ = 10μA, $I_C$ = 0 |
| Collector Cut-Off Current | $I_{CBO}$ | — | — | 0.1 | μA | $V_{CB}$ = 30V, $I_E$ = 0 |
| Emitter Cut-Off Current | $I_{EBO}$ | — | — | 0.1 | μA | $V_{EB}$ = 6V, $I_C$ = 0 |
| **ON CHARACTERISTICS (Note 5)** | | | | | | |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | — | 80 | 370 | mV | $I_C$ = 1.5A, $I_B$ = 75mA |
| DC Current Gain | $h_{FE}$ | 270 | — | 680 | — | $V_{CE}$ = 2V, $I_C$ = 200mA |
| **SMALL SIGNAL CHARACTERISTICS** | | | | | | |
| Output Capacitance | $C_{obo}$ | — | 11 | — | pF | $V_{CB}$ = 10V, $I_E$ = 0, f = 1MHz |
| Current Gain-Bandwidth Product | $f_T$ | — | 240 | — | MHz | $V_{CE}$ = 2V, $I_C$ = 100mA, f = 100MHz |

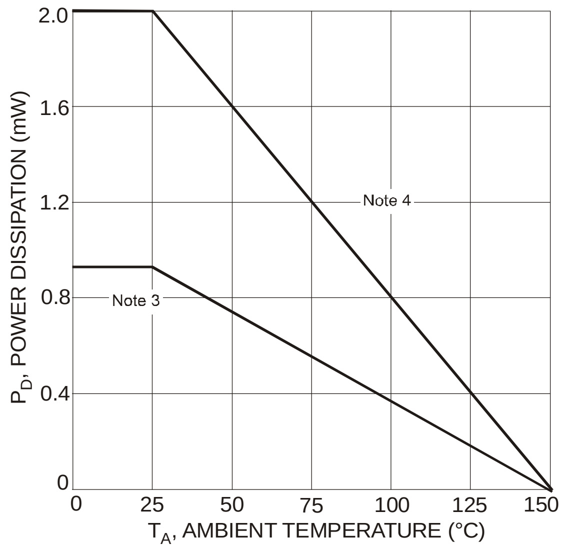



Fig. 1 Power Dissipation vs. Ambient Temperature

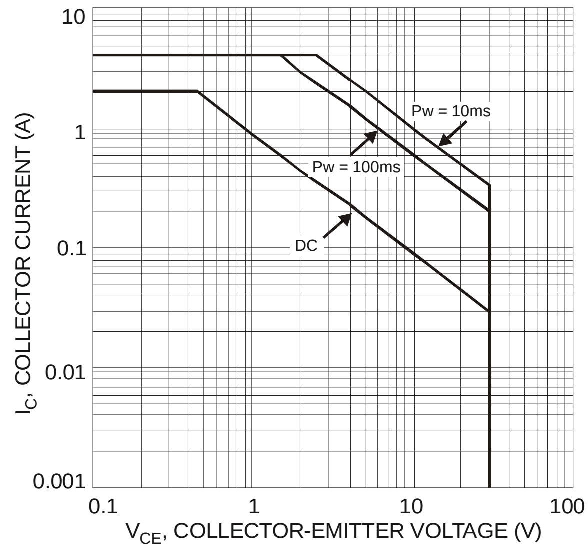



Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage (Note 3)

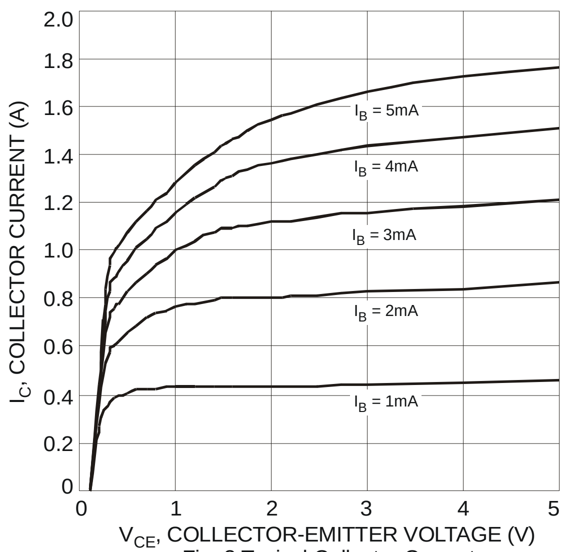



Fig. 3 Typical Collector Current vs. Collector-Emitter Voltage

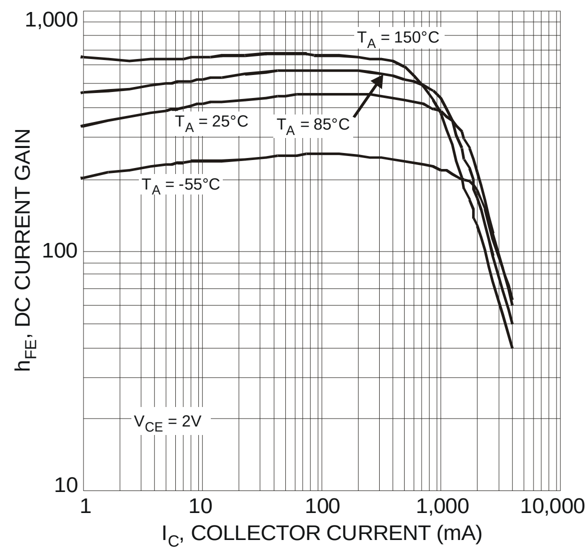



Fig. 4 Typical DC Current Gain vs. Collector Current

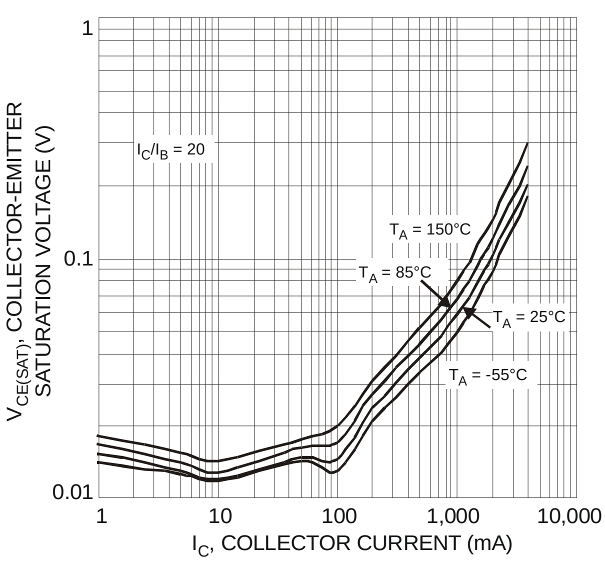



Fig. 5 Typical Collector-Emitter Saturation Voltage vs. Collector Current

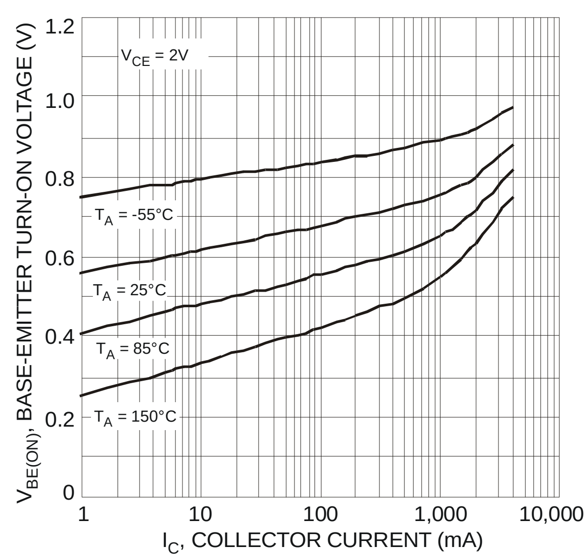



Fig. 6 Typical Base-Emitter Turn-On Voltage vs. Collector Current

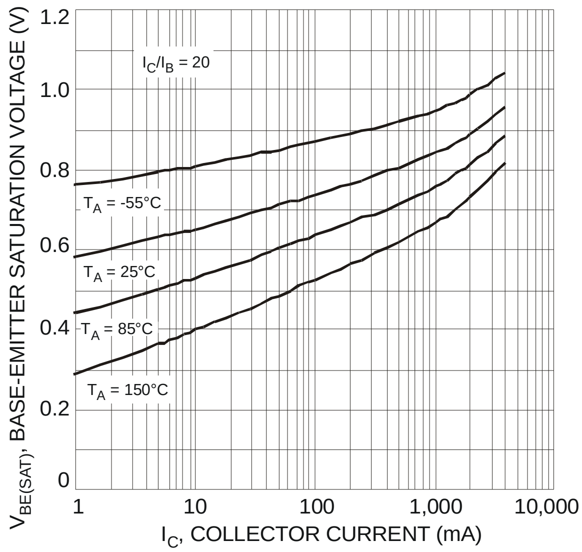



Fig. 7 Typical Base-Emitter Saturation Voltage vs. Collector Current

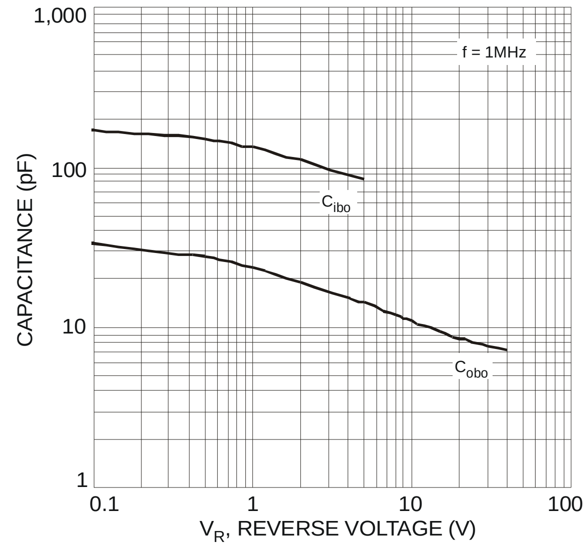



Fig. 8 Typical Capacitance Characteristics

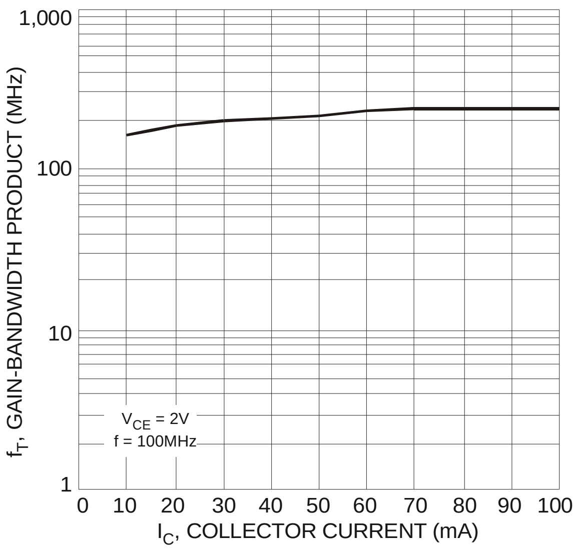



Fig. 9 Typical Gain-Bandwidth Product vs. Collector Current

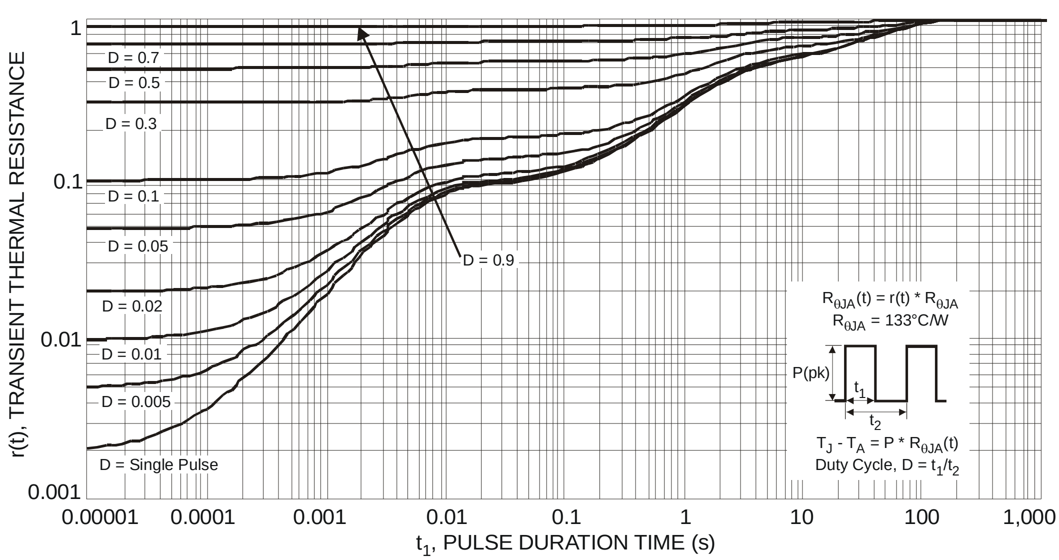
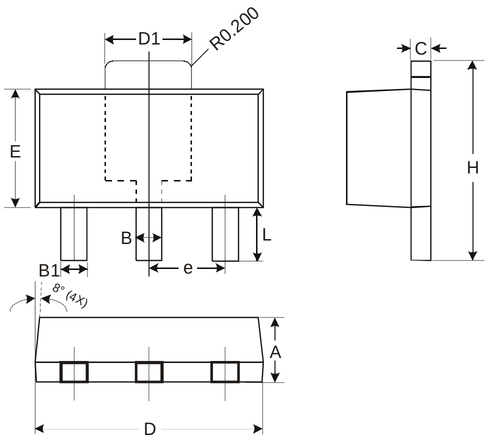


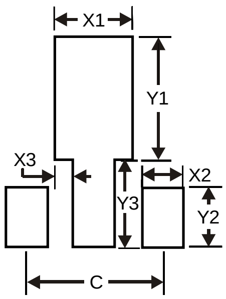

Fig. 10 Transient Thermal Response

## Package Outline Dimensions




| SOT89-3L | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 1.40 | 1.60 | 1.50 |
| **B** | 0.45 | 0.55 | 0.50 |
| **B1** | 0.37 | 0.47 | 0.42 |
| **C** | 0.35 | 0.43 | 0.38 |
| **D** | 4.40 | 4.60 | 4.50 |
| **D1** | 1.50 | 1.70 | 1.60 |
| **E** | 2.40 | 2.60 | 2.50 |
| **e** | — | — | 1.50 |
| **H** | 3.95 | 4.25 | 4.10 |
| **L** | 0.90 | 1.20 | 1.05 |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout




| Dimensions | Value (in mm) |
|---|---|
| **X1** | 1.7 |
| **X2** | 0.9 |
| **X3** | 0.4 |
| **Y1** | 2.7 |
| **Y2** | 1.3 |
| **Y3** | 1.9 |
| **C** | 3.0 |