

SOT-23 Plastic-Encapsulate Transistors

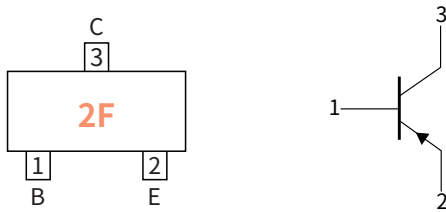
Features

- Complementary to MMBT2222A
- Power dissipation of 250mW
- High stability and high reliability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260°C

Mechanical Data

- Case: SOT-23
Molding compound meets UL 94V-0 flammability rating, RoHS-compliant, halogen-free
- Terminals: Solder plated, solderable per MIL-STD-750, Method 2026

Function Diagram



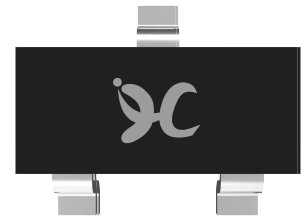
Collector-Base Voltage

VCBO -60V

Collector Current

-0.6 Ampere

SOT-23



Maximum Ratings (Ta=25°C Unless otherwise specified)

| PARAMETER | SYMBOL | UNIT | VALUE |
|-----------------------------|------------------|-------|-----------|
| Collector-Base Voltage | V_{CBO} | V | -60 |
| Collector-Emitter Voltage | V_{CEO} | | -60 |
| Emitter-Base Voltage | V_{EBO} | | -5.0 |
| Collector Current | I_C | A | -0.6 |
| Collector Power Dissipation | P_C | mW | 250 |
| Storage temperature | T_{stg} | °C | -55 ~+150 |
| Junction temperature | T_j | °C | -55 ~+150 |
| Typical Thermal Resistance | $R_{\theta J-A}$ | °C /W | 417 |

Classification Of h_{FE}

| RANK | L | H |
|-------|---------|---------|
| Range | 100-200 | 200-300 |

Small-signal Characteristics

| ITEM | SYMBOL | Condition | UNIT | Min | Max |
|----------------------|--------|--|------|-----|-----|
| Transition frequency | f_T | $I_C = -50mA, V_{CE} = -20V, f = 100MHz$ | MHz | 200 | — |

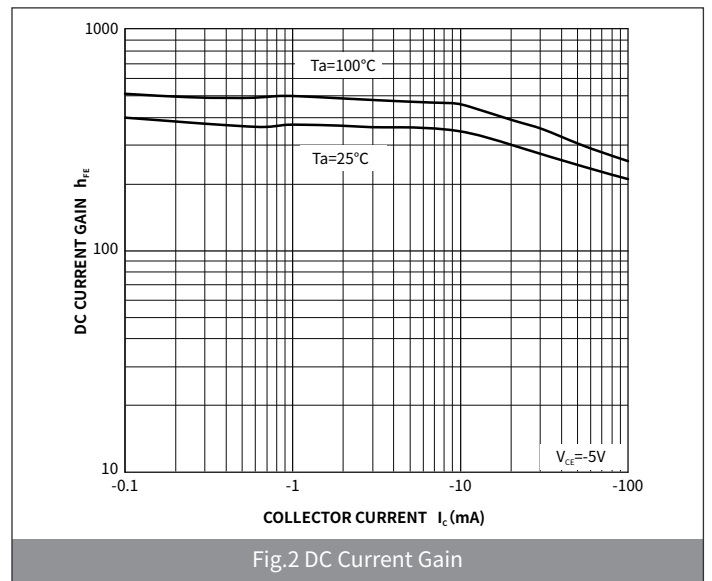
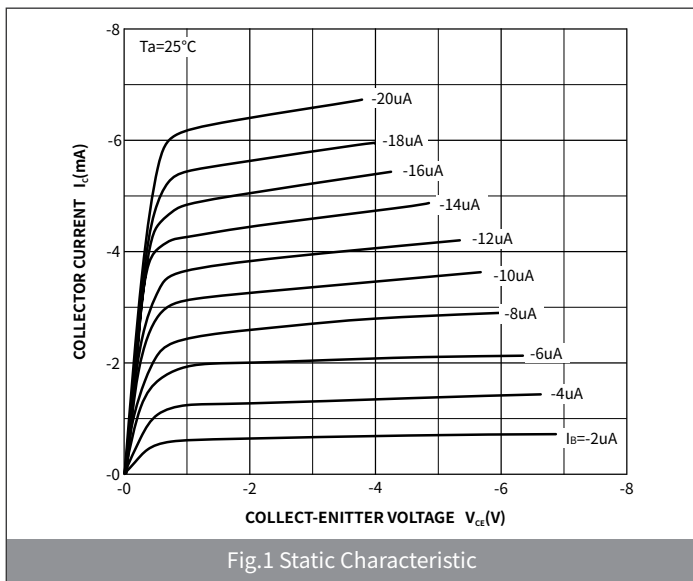
Ordering Information

| PACKAGE | PACKAGE CODE | UNIT WEIGHT(g) | REEL(pcs) | BOX(pcs) | CARTON(pcs) | DELIVERY MODE |
|---------|--------------|----------------|-----------|----------|-------------|---------------|
| SOT-23 | R1 | 0.008 | 3000 | 30000 | 120000 | 7" |

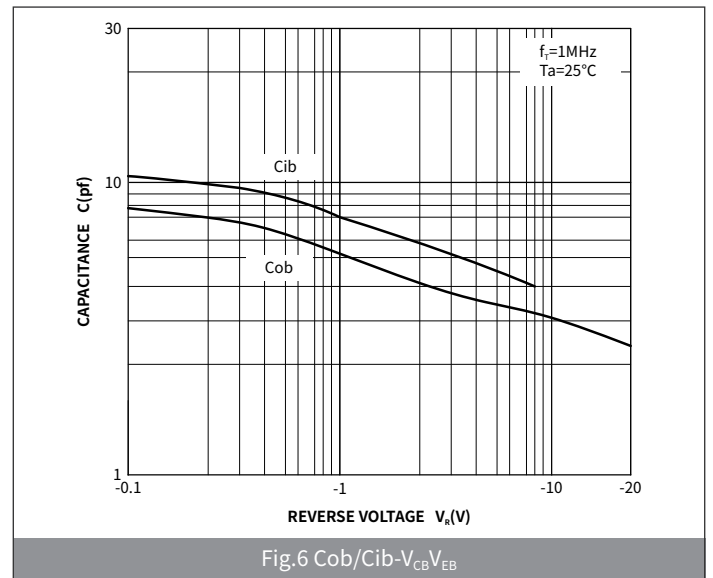
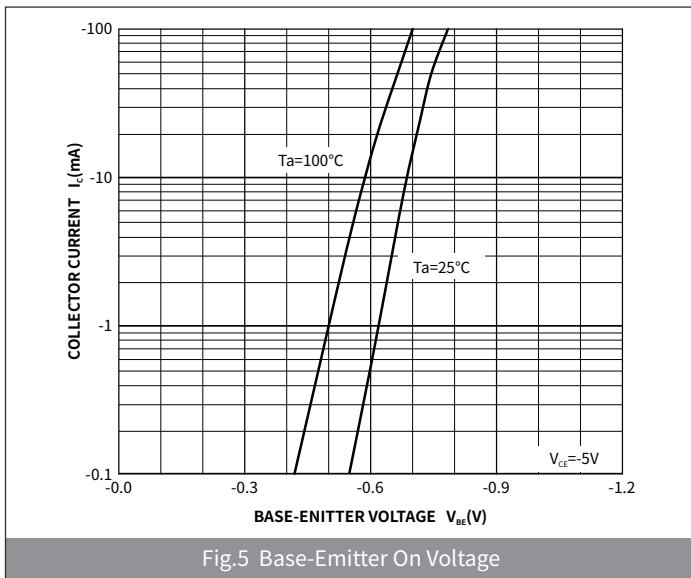
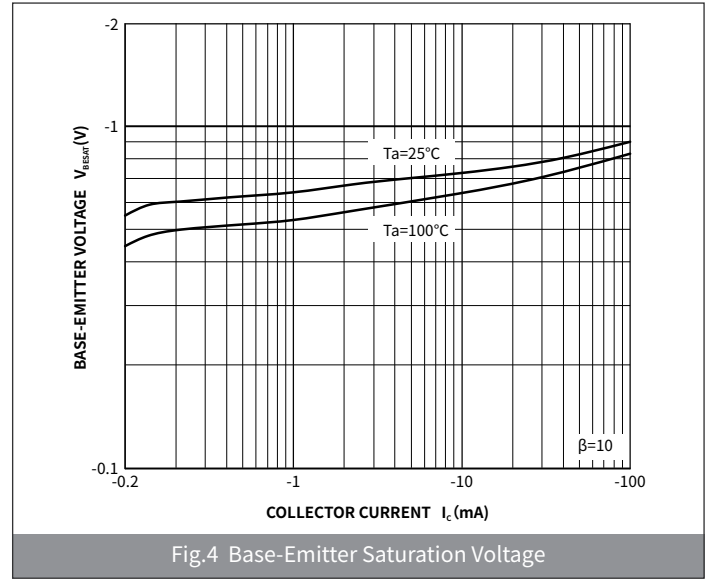
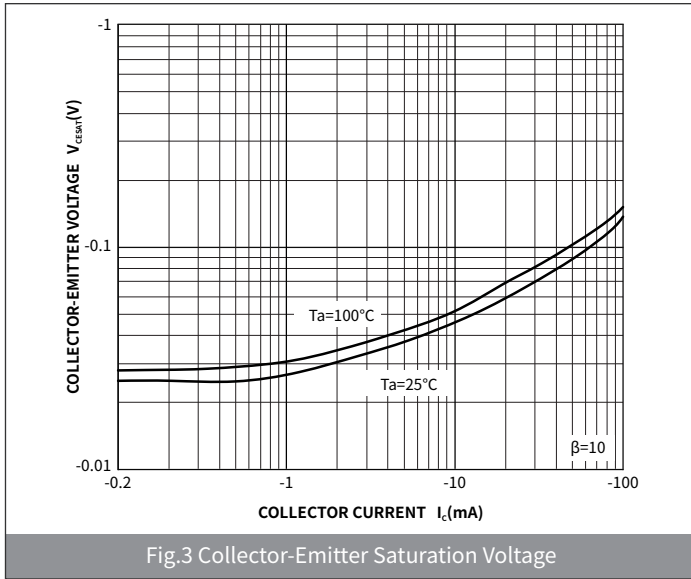
● **Electrical Characteristics** (Ta=25°C Unless otherwise noted)

| PARAMETER | SYMBOL | UNIT | Condition | Min | Max |
|--------------------------------------|----------------|------|---|------|------|
| Collector-Base Breakdown Voltage | V_{CBO} | V | $I_C = -10\mu A, I_E = 0$ | -60 | — |
| Collector-Emitter Breakdown Voltage | V_{CEO} | | $I_C = -10mA, I_B = 0$ | -60 | — |
| Emitter-Base Breakdown Voltage | V_{EBO} | | $I_E = -10\mu A, I_C = 0$ | -5.0 | — |
| Collector-Base cut-off current | I_{CBO} | nA | $V_{CB} = -50V, I_E = 0$ | — | -20 |
| Collector cut-off current | I_{CEX} | | $V_{CE} = -30V, V_{BE(off)} = -0.5V$ | — | -50 |
| Emitter-Base cut-off current | I_{EBO} | | $V_{EB} = -3.0V, I_C = 0$ | — | -10 |
| DC Current Gain | h_{FE} | — | $I_C = -150mA, V_{CE} = -10V$ | 100 | 300 |
| | | | $I_C = -0.1mA, V_{CE} = -10V$ | 75 | — |
| | | | $I_C = -1.0mA, V_{CE} = -10V$ | 100 | — |
| | | | $I_C = -10mA, V_{CE} = -10V,$ | 100 | — |
| | | | $I_C = -500mA, V_{CE} = -10V,$ | 50 | — |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)1}$ | V | $I_C = -150mA, I_B = -15mA$ | — | -0.4 |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)2}$ | | $I_C = -500mA, I_B = -50mA$ | — | -1.6 |
| Base-Emitter Saturation Voltage | $V_{BE(sat)1}$ | | $I_C = -150mA, I_B = -15mA$ | — | -1.3 |
| Base-Emitter Saturation Voltage | $V_{BE(sat)2}$ | | $I_C = -500mA, I_B = -50mA$ | — | -2.6 |
| Delay time | t_d | ns | $V_{CC} = -30V, I_C = -150mA, I_{B1} = -15mA$ | — | 10 |
| Rise time | t_r | | | — | 25 |
| Storage time | t_s | | $V_{CC} = -6.0V, I_C = -150mA, I_{B1} = I_{B2} = -15mA$ | — | 225 |
| Fall time | t_f | | | — | 60 |

● **Ratings And Characteristics Curves** (Ta=25°C Unless otherwise specified)



● Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)



● Package Outline Dimensions (SOT-23)

| Symbol | Dimensions | | | |
|----------|-------------|------|----------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 0.90 | 1.15 | 0.035 | 0.045 |
| A1 | - | 0.10 | - | 0.004 |
| A2 | 0.90 | 1.05 | 0.035 | 0.041 |
| b | 0.30 | 0.50 | 0.012 | 0.020 |
| c | 0.10 | 0.20 | 0.004 | 0.008 |
| D | 2.80 | 3.00 | 0.110 | 0.118 |
| E | 1.20 | 1.40 | 0.047 | 0.055 |
| E1 | 2.25 | 2.55 | 0.089 | 0.100 |
| e | 0.950TYP | | 0.037TYP | |
| e1 | 1.80 | 2.00 | 0.071 | 0.079 |
| L | 0.550REF | | 0.022REF | |
| L1 | 0.30 | 0.50 | 0.012 | 0.020 |
| θ | - | 8° | - | 8° |

● Suggested Pad Layout

| Symbol | Dimensions | | | |
|--------|-------------|------|--------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| J | 0.75 | 0.85 | 0.030 | 0.033 |
| K | 0.85 | 0.95 | 0.033 | 0.037 |
| M | 1.95 | 2.05 | 0.077 | 0.081 |
| N | 1.85 | 1.95 | 0.073 | 0.077 |