

## SOT-23 Plastic-Encapsulate Transistors

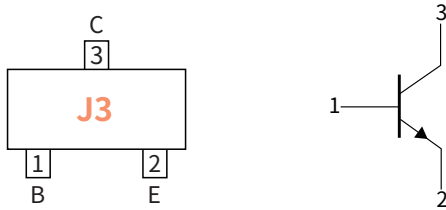
### Features

- Complementary to S9012
- Power dissipation of 300mW
- High stability and high reliability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260°C

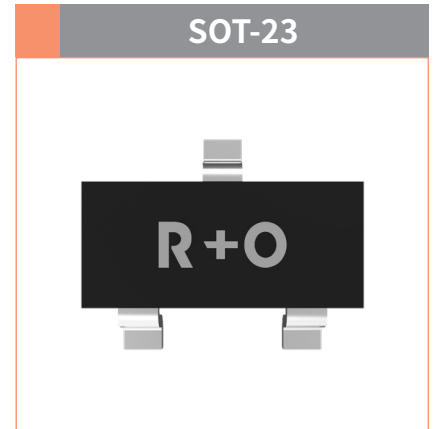
### Mechanical Data

- 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 40V  
**Collector Current**  
0.5Ampere



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

| PARAMETER                   | SYMBOL           | UNIT  | VALUE     |
|-----------------------------|------------------|-------|-----------|
| Collector-Base Voltage      | $V_{CBO}$        | V     | 40        |
| Collector-Emitter Voltage   | $V_{CEO}$        |       | 25        |
| Emitter-Base Voltage        | $V_{EBO}$        |       | 5.0       |
| Collector Current           | $I_C$            | A     | 0.5       |
| Collector Power Dissipation | $P_C$            | mW    | 300       |
| Storage temperature         | $T_{stg}$        | °C    | -55 ~+150 |
| Junction temperature        | $T_j$            | °C    | -55 ~+150 |
| Typical Thermal Resistance  | $R_{\theta J-A}$ | °C /W | 417       |

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

| PARAMETER                            | SYMBOL        | UNIT    | Condition                | Min | Max |
|--------------------------------------|---------------|---------|--------------------------|-----|-----|
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | V       | $I_C=100\mu A, I_E=0$    | 40  | —   |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ |         | $I_C=0.1mA, I_B=0$       | 25  | —   |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ |         | $I_E=100\mu A, I_C=0$    | 5.0 | —   |
| Collector-Emitter cut-off current    | $I_{CEO}$     | $\mu A$ | $V_{CE}=20V, I_B=0$      | —   | 0.1 |
| Collector-Base cut-off current       | $I_{CBO}$     |         | $V_{CB}=40V, I_E=0$      | —   | 0.1 |
| Emitter-Base cut-off current         | $I_{EBO}$     |         | $V_{EB}=5.0V, I_C=0$     | —   | 0.1 |
| DC Current Gain                      | $h_{FE(1)}$   | —       | $I_C=50mA, V_{CE}=1.0V$  | 120 | 400 |
|                                      | $h_{FE(2)}$   |         | $I_C=500mA, V_{CE}=1.0V$ | 40  | —   |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | V       | $I_C=500mA, I_B=50mA$    | —   | 0.6 |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)}$ | V       | $I_C=500mA, I_B=50mA$    | —   | 1.2 |

## ● Classification Of $h_{FE}$

| RANK  | L       | H       | J       |
|-------|---------|---------|---------|
| Range | 120-200 | 200-350 | 300-400 |

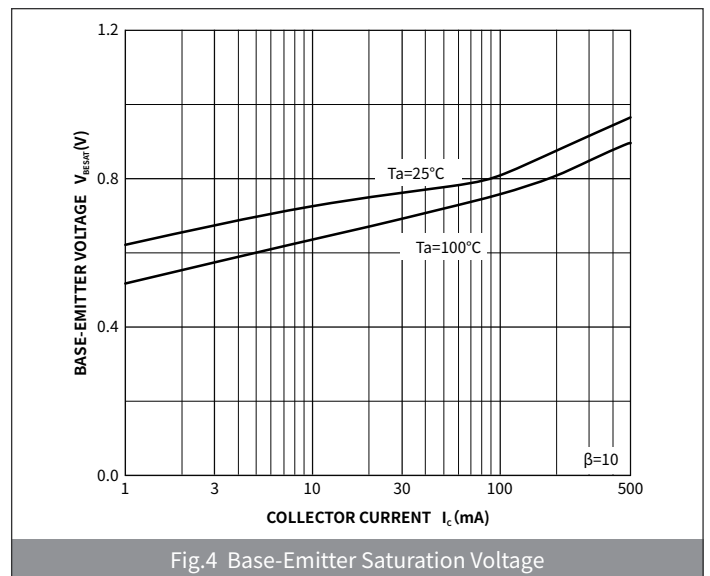
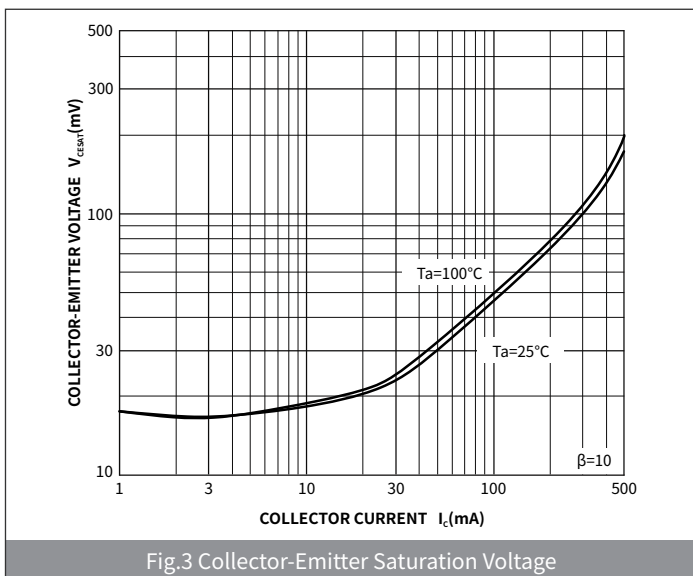
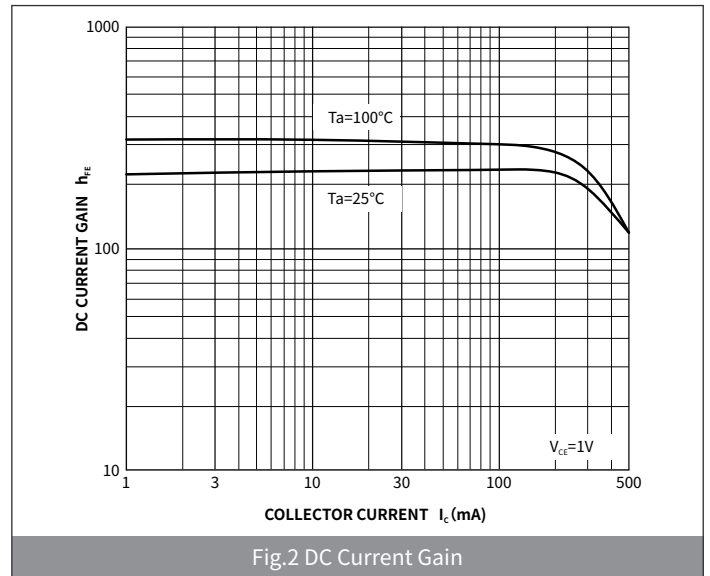
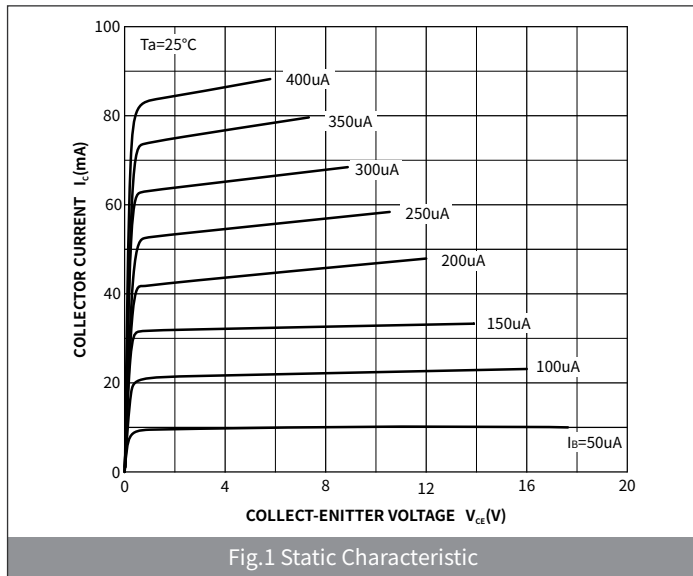
## ● Small-signal Characteristics

| ITEM                 | SYMBOL | Condition                      | UNIT | Min | Max |
|----------------------|--------|--------------------------------|------|-----|-----|
| Transition frequency | $f_T$  | $I_C=20mA, V_{CE}=6V, f=30MHz$ | MHz  | 150 | —   |

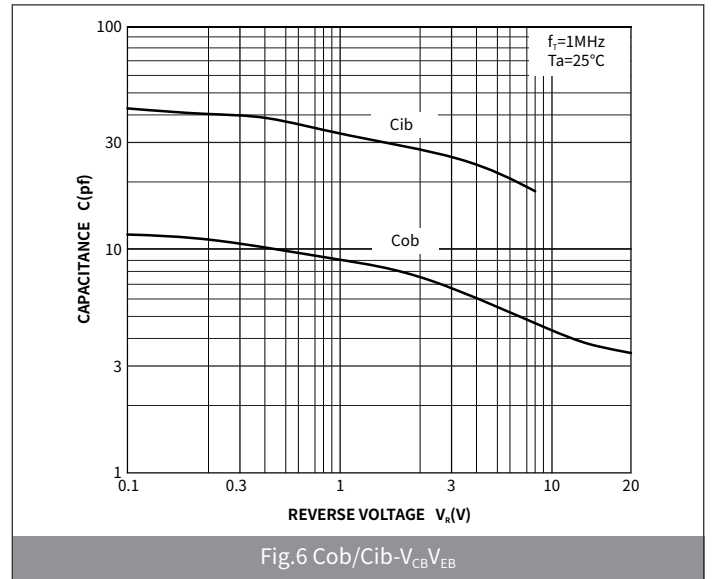
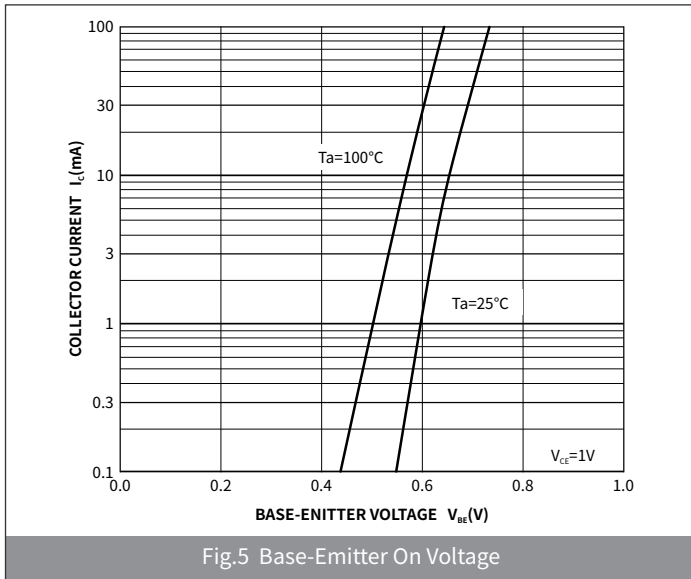
## ● Ordering Information

| PACKAGE | PACKAGE CODE | UNIT WEIGHT(g) | REEL(pcs) | BOX(pcs) | CARTON(pcs) | DELIVERY MODE |
|---------|--------------|----------------|-----------|----------|-------------|---------------|
| SOT-23  | R1           | 0.008          | 3000      | 45000    | 180000      | 7"            |

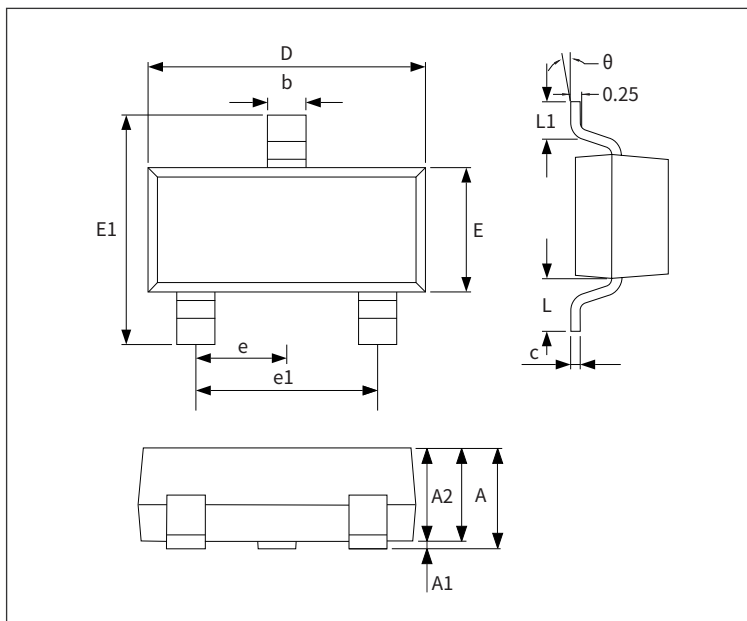
## ● Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)



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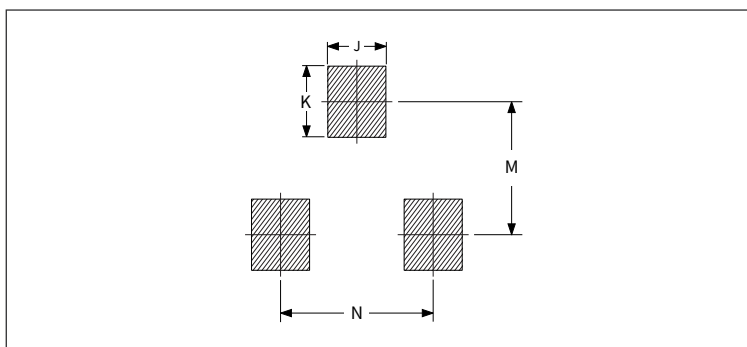


● Package Outline Dimensions (SOT-23)



| 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 |