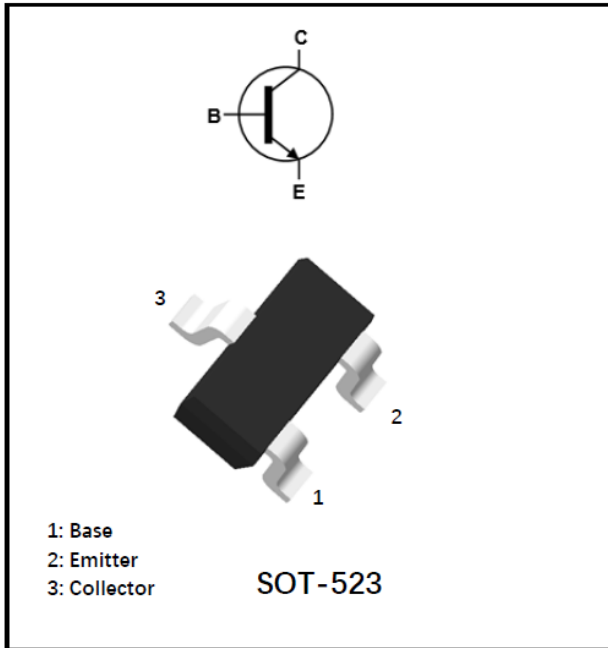


NPN General Purpose Amplifier



Features

- Moisture Sensitivity Level 1
- Surface mount package ideally Suited for Automatic Insertion
- Epoxy meets UL-94 V-0 flammability rating, halogen-free

Mechanical Data

- **Package:** SOT-523
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Marking:** 1N

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

| Item | Symbol | Unit | Conditions | Value |
|--|-----------------|------|----------------------------|-------------|
| Collector-Emitter Voltage | V_{CEO} | V | $I_C=1.0\text{mA}, I_B=0$ | 40 |
| Collector-Base Voltage | V_{CBO} | V | $I_C=10\mu\text{A}, I_E=0$ | 60 |
| Emitter-Base Voltage | V_{EBO} | V | $I_E=10\mu\text{A}, I_C=0$ | 6.0 |
| Collector Current | I_C | mA | | 200 |
| Collector Power Dissipation | P_C | mW | | 150 |
| Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | °C/W | | 833 |
| Operation Junction Temperature | T_J | °C | | -55 to +150 |
| Storage Temperature | T_{STG} | °C | | -55 to +150 |



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■ Electrical Characteristics (Ta=25°C unless otherwise specified)

| Item | Symbol | Unit | Conditions | Min | Max |
|--------------------------------------|---------------|------|--|------|------|
| Collector-Emitter Voltage | V_{CE0} | V | $I_C=1.0\text{mA}, I_B=0$ | 40 | |
| Collector-Base Voltage | V_{CBO} | V | $I_C=10\mu\text{A}, I_E=0$ | 60 | |
| Emitter-Base Voltage | V_{EBO} | V | $I_E=10\mu\text{A}, I_C=0$ | 6.0 | |
| Collector-base Cut-off Current | I_{CBO} | nA | $V_{CB}=30\text{Vdc}$ | | 50 |
| Emitter-base cut-off current | I_{EBO} | nA | $V_{EB}=5\text{Vdc}$ | | 50 |
| Collector-emitter Cut-off Current | I_{CEX} | nA | $V_{CE}=30\text{Vdc}, V_{EB}=3\text{Vdc}$ | | 50 |
| DC Current Gain | h_{FE} | | $I_C=0.1\text{mA}, V_{CE}=1.0\text{Vdc}$ | 40 | |
| | | | $I_C=1.0\text{mA}, V_{CE}=1.0\text{Vdc}$ | 70 | |
| | | | $I_C=10\text{mA}, V_{CE}=1.0\text{Vdc}$ | 100 | 300 |
| | | | $I_C=50\text{mA}, V_{CE}=1.0\text{Vdc}$ | 60 | |
| | | | $I_C=100\text{mA}, V_{CE}=1.0\text{Vdc}$ | 30 | |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | V | $I_C=10\text{mA}, I_B=1.0\text{mA}$ | | 0.2 |
| | | | $I_C=50\text{mA}, I_B=5.0\text{mA}$ | | 0.3 |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | V | $I_C=10\text{mA}, I_B=1.0\text{mA}$ | 0.65 | 0.85 |
| | | | $I_C=50\text{mA}, I_B=5.0\text{mA}$ | | 0.95 |
| Collector-base Output Capacitance | C_{obo} | pF | $V_{CB}=5.0\text{Vdc}, f=1.0\text{MHz}, I_E=0$ | | 4 |
| Transition frequency | f_T | MHz | $I_C=10\text{mA}, V_{CE}=20\text{V}, f=100\text{MHz}$ | 300 | |
| Delay Time | t_d | ns | $V_{CC}=3.0\text{V}, V_{BE}=0.5\text{V}, I_C=10\text{mA}, I_{B1}=1.0\text{mA}$ | 35 | |
| Rise Time | t_r | ns | | 35 | |
| Storage Time | t_s | ns | $V_{CC}=3.0\text{V}, I_C=10\text{mA}, I_{B1}=I_{B2}=1.0\text{mA}$ | 200 | |
| Fall Time | t_f | ns | | 50 | |

■ Ordering Information (Example)

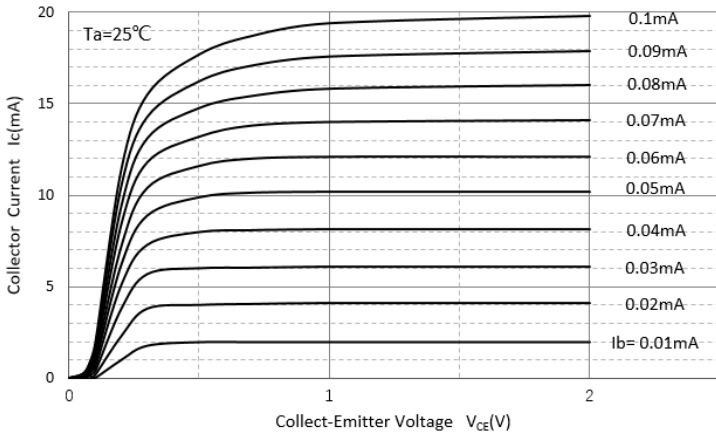
| Preferred P/N | Packing Code | Unit Weight(G) | Minimum Package(Pcs) | Inner Box Quantity(Pcs) | Outer Carton Quantity(Pcs) | Delivery Mode |
|---------------|--------------|--------------------|----------------------|-------------------------|----------------------------|---------------|
| MMBT3904T | F2 | Approximate 0.0027 | 3000 | 30000 | 120000 | 7" reel |



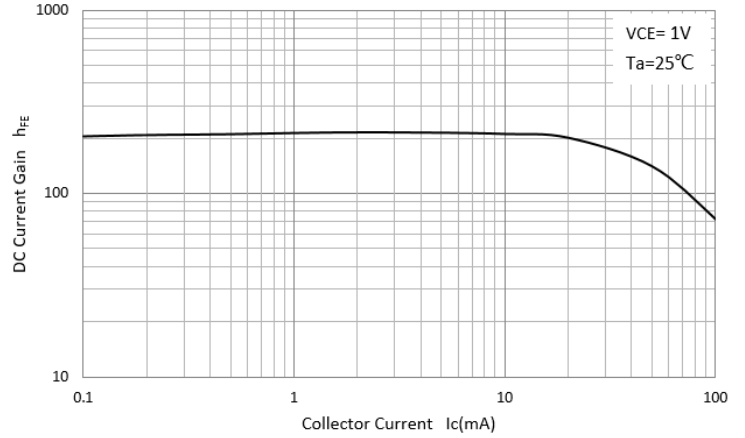
MMBT3904T

■ Characteristics (Typical)

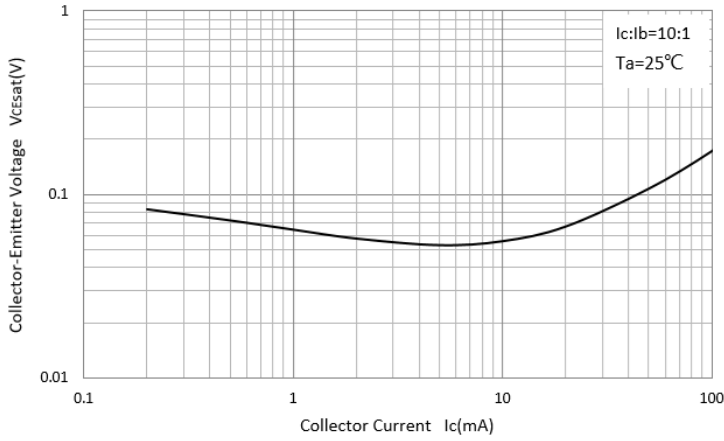
Static Characteristic



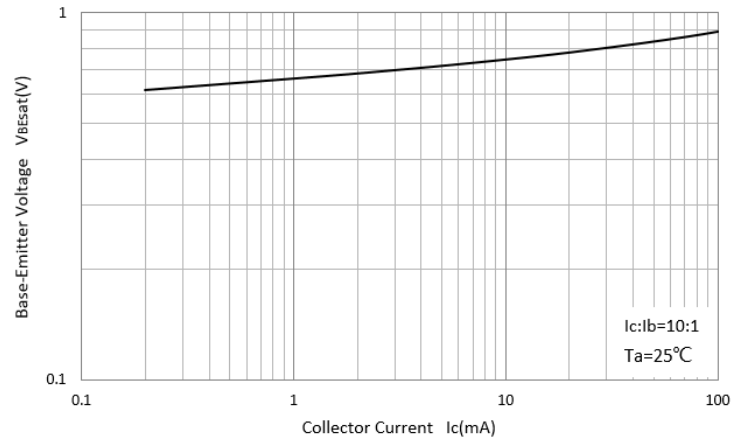
DC Current Gain



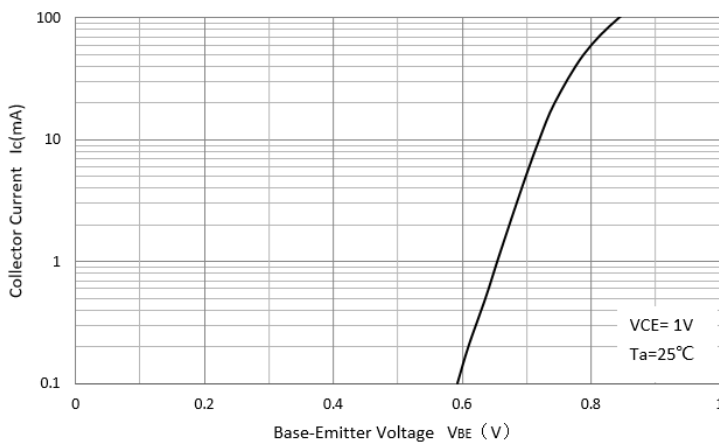
Collector-Emmitter Saturation Voltage



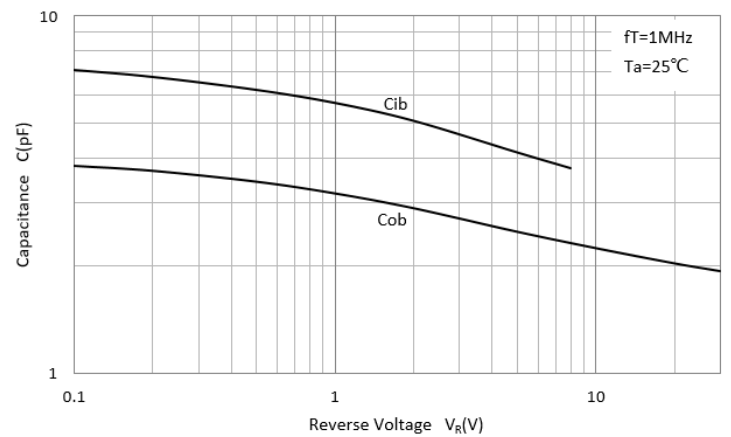
Base-Emmitter Saturation Voltage



Base-Emmitter On Voltage



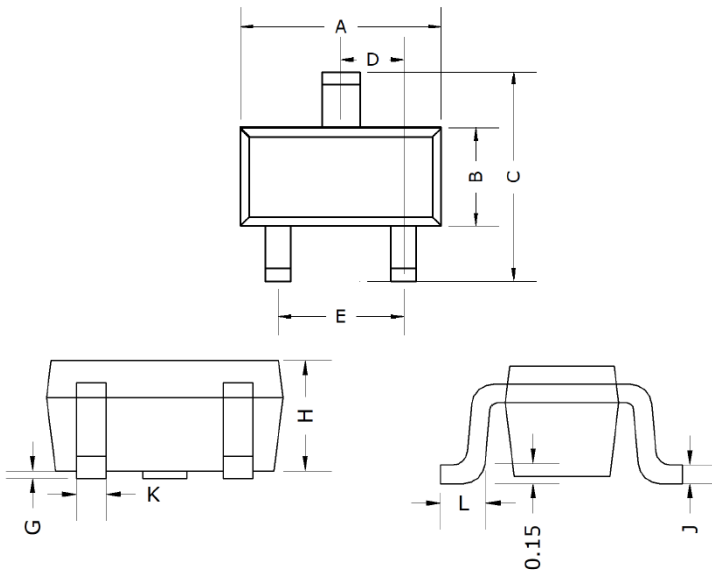
Cob/Cib-V_{CB}/V_{EB}





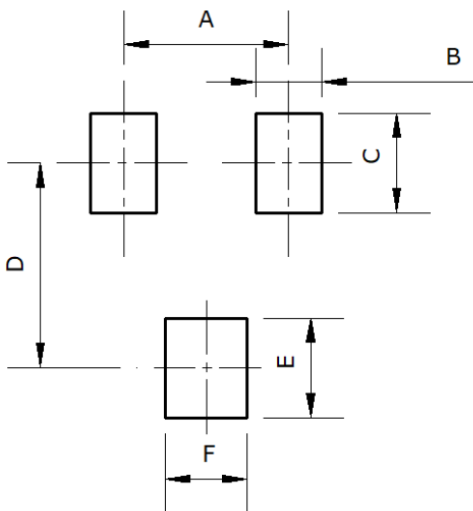
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■ SOT-523 Package Outline Dimensions



| DIMENSIONS | | | | |
|------------|----------|-------|---------|------|
| DIM | INCHES | | MM | |
| | MIN | MAX | MIN | MAX |
| A | 0.059 | 0.067 | 1.50 | 1.70 |
| B | 0.030 | 0.033 | 0.75 | 0.85 |
| C | 0.057 | 0.069 | 1.45 | 1.75 |
| D | 0.020TYP | | 0.50TYP | |
| E | 0.035 | 0.043 | 0.90 | 1.10 |
| G | 0.000 | 0.004 | 0.00 | 0.10 |
| H | 0.024 | 0.031 | 0.60 | 0.80 |
| J | 0.004 | 0.008 | 0.10 | 0.20 |
| K | 0.006 | 0.014 | 0.15 | 0.35 |
| L | 0.010 | 0.018 | 0.26 | 0.46 |

■ SOT-523 Suggested Pad Layout



| DIMENSIONS | |
|------------|----------|
| DIM | MM (TYP) |
| A | 1.00 |
| B | 0.40 |
| C | 0.60 |
| D | 1.24 |
| E | 0.60 |
| F | 0.50 |



MMBT3904T

Disclaimer

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