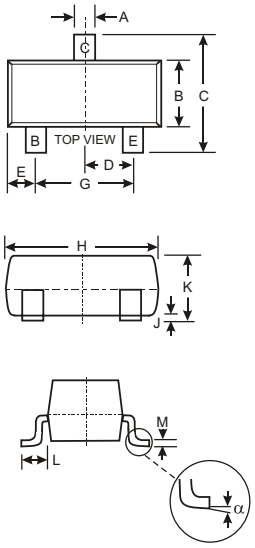
HAICHUANG SEMI

# MMBT5551

## NPN SMALL SIGNAL SURFACE MOUNT TRANSISTOR

## Features

- Epitaxial Planar Die Construction
- Complementary PNP Type Available (MMBT5401)
- Ideal for Low Power Amplification and Switching
- Marking Code:G1




| SOT-23 | | |
|---|---|---|
| **Dim** | **Min** | **Max** |
| **A** | 0.37 | 0.51 |
| **B** | 1.20 | 1.40 |
| **C** | 2.30 | 2.50 |
| **D** | 0.89 | 1.03 |
| **E** | 0.45 | 0.60 |
| **G** | 1.78 | 2.05 |
| **H** | 2.80 | 3.00 |
| **J** | 0.013 | 0.10 |
| **K** | 0.903 | 1.10 |
| **L** | 0.45 | 0.61 |
| **M** | 0.085 | 0.180 |
| α | 0° | 8° |
| **All Dimensions in mm** | | |

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

| Rating | Symbol | Max | Unit |
|---|---|---|---|
| Collector-Emitter Voltage | VCEO | 160 | V |
| Collector-Base Voltage | VCBO | 180 | V |
| Emitter-Base Voltage | VEBO | 6 | V |
| Collector Current | I C | 600 | mAdc |

## • THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Total Device Dissipation FR-5 Board,(1)<br>TA=25°C<br>Derate above 25°C | PD | 225<br>1.8 | mW<br>mW/°C |
| Thermal Resistance,Junction to Ambient | R ΘJA | 556 | °C/W |
| Total Device Dissipation<br>Alumina Substrate,(2) TA=25°C<br>Derate above 25°C | PD | 300<br>2.4 | mW<br>mW/°C |
| Thermal Resistance,Junction to Ambient | RΘJA | 417 | °C/W |
| Junction and Storage Temperature | T j, Tstg | -55 to +150 | °C |

1. FR–5 = 1.0 x 0.75 x 0.062 in.
2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

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

### OFF CHARACTERISTICS

| Characteristic | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Collector-Emitter Breakdown Voltage<br>(IC = 1.0 mA, IB = 0) | V(BR)CEO | 160 | - | - | V |
| Collector-Base Breakdown voltage<br>(IC = 100μA, IE = 0) | V(BR)CBO | 180 | - | - | V |
| Emitter-Base Breakdown Voltage<br>(IE = 10 μA, IC = 0) | V(BR)EBO | 6 | - | - | V |
| Collector Cutoff Current<br>(VCB = 120 V, IE = 0)<br>(VCB = 120 V, IE = 0, TA = 100°C) | ICBO | -<br>- | -<br>- | 50<br>50 | nA<br>μA |
| Emitter Cutoff Current<br>(VEB = 4.0 V, IC = 0) | IEBO | - | - | 50 | nA |

### ON CHARACTERISTICS

| | | | | | |
|---|---|---|---|---|---|
| DC Current Gain<br>(IC = 1.0 mA, VCE = 5.0 V)<br>(IC = 10 mA, VCE = 5.0 V)<br>(IC = 50 mA, VCE = 5.0 V) | HFE | 80<br>80<br>30 | -<br>-<br>- | -<br>250<br>- | |
| Collector-Emitter Saturation Voltage<br>(IC = 10 mA, IB = 1.0 mA)<br>(IC = 50 mA, IB = 5.0 mA) | VCE(S) | -<br>- | -<br>- | 0.15<br>0.2 | V |
| Base-Emitter Saturation Voltage<br>(IC = 10 mA, IB = 1.0 mA)<br>(IC = 50 mA, IB = 5.0 mA) | VBE(S) | -<br>- | -<br>- | 1<br>1 | V |
| Collector Emitter Cut-off Current<br>(VCB = 10 V)<br>(VCB = 75 V) | ICES | -<br>- | -<br>- | 50<br>100 | nA |

3. Pulse Test: Pulse Width = 300 μs, Duty Cycle = 2.0%.

## TYPICAL TRANSIENT CHARACTERISTICS

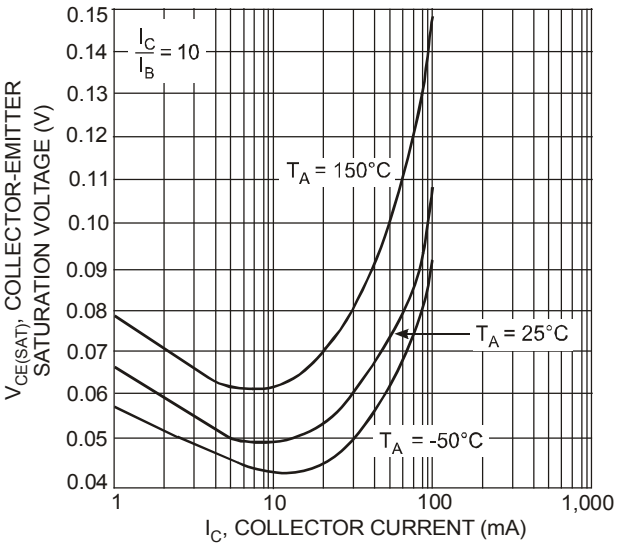



Fig. 1 Typical Collector-Emitter Saturation Voltage vs. Collector Current

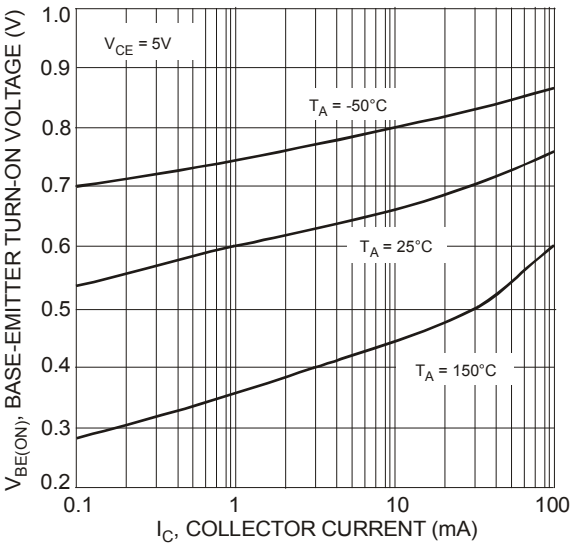



Fig. 2 Typical Base-Emitter Turn-On Voltage vs. Collector Current

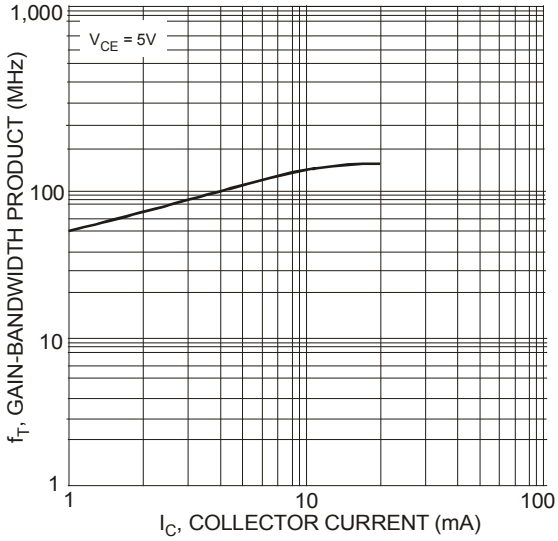



Fig. 3 Typical Gain-Bandwidth Product vs. Collector Current

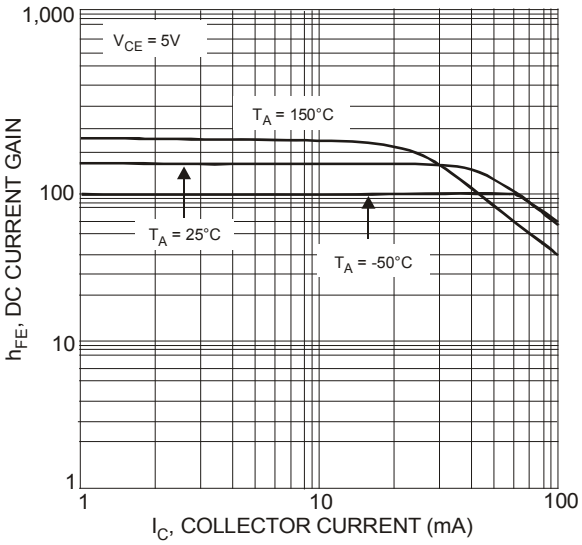



Fig. 4 Typical DC Current Gain vs. Collector Current

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