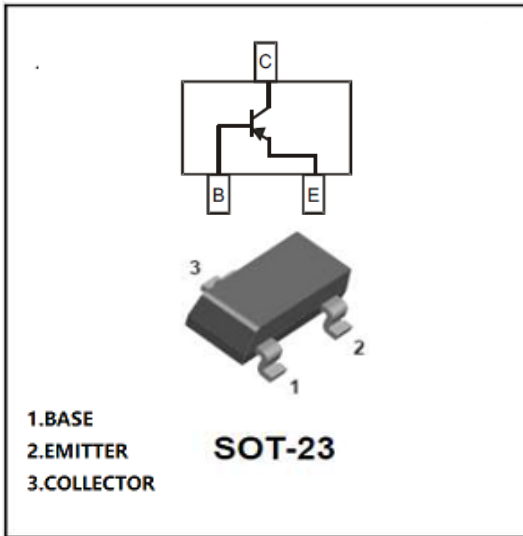


## PNP Transistor



### Features

- Epoxy meets UL-94 V-0 flammability rating
- Halogen free available upon request by adding suffix "HF"
- Moisture Sensitivity Level 1
- High Conductance
- Surface mount package ideally Suited for Automatic Insertion

### Mechanical Data

- **Package:** SOT-23  
Molding compound meets UL 94 V-0 flammability rating, RoHS-compliant, halogen-free
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Marking:** 9B

### ■ Maximum Ratings (Ta=25°C unless otherwise noted)

| Item                        | Symbol    | Unit | Value       |
|-----------------------------|-----------|------|-------------|
| Collector-Base Voltage      | $V_{CBO}$ | V    | -40         |
| Collector-Emitter Voltage   | $V_{CEO}$ | V    | -40         |
| Emitter-Base Voltage        | $V_{EBO}$ | V    | -5          |
| Collector Current           | $I_C$     | A    | -1          |
| Collector Power Dissipation | $P_C$     | mW   | 300         |
| Junction Temperature        | $T_j$     | °C   | 150         |
| Storage Temperature         | $T_{stg}$ | °C   | -55 to +150 |

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

| Item                                 | Symbol        | Unit | Conditions                     | Min | Typ | Max   |
|--------------------------------------|---------------|------|--------------------------------|-----|-----|-------|
| Collector-base breakdown voltage     | $V_{CBO}$     | V    | IC= -10uA, IE=0                | -40 |     |       |
| Collector-emitter breakdown voltage  | $V_{CEO^*}$   | V    | IC= -1mA, IB=0                 | -40 |     |       |
| Emitter-base breakdown voltage       | $V_{EBO}$     | V    | IE= -10uA, IC=0                | -5  |     |       |
| Collector-emitter cut-off current    | $I_{CEO}$     | nA   | VCE= -30V, IB=0                |     |     | -100  |
| Collector-base cut-off current       | $I_{CBO}$     | nA   | VCB= -30V, IE=0                |     |     | -100  |
| Emitter-base cut-off current         | $I_{EBO}$     | nA   | VEB= -5 V, IC=0                |     |     | -100  |
| DC current gain                      | $h_{FE}$      |      | VCE= -5V, IC= -1mA             | 300 |     |       |
|                                      | $h_{FE}$      |      | VCE= -5V, IC= -100mA           | 300 |     | 800   |
|                                      | $h_{FE}$      |      | VCE= -5V, IC= -500mA           | 250 |     |       |
|                                      | $h_{FE}$      |      | VCE= -5V, IC= -1A              | 160 |     |       |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | V    | IC= -100mA, IB= -1mA           |     |     | -0.2  |
|                                      | $V_{CE(sat)}$ | V    | IC= -500mA, IB= -20mA          |     |     | -0.35 |
|                                      | $V_{CE(sat)}$ | V    | IC= -1A, IB= -100mA            |     |     | -0.5  |
| Base-emitter saturation voltage      | $V_{BE(sat)}$ | V    | IC= -1A, IB= -50mA             |     |     | -1.1  |
| Base-emitter voltage                 | $V_{BE}$      | V    | VCE= -5V, IC= -1A              |     |     | -1    |
| Collector-base output capacitance    | Cob           | pF   | VCB= -10V, f=1MHz              |     |     | 12    |
| Transition frequency                 | $f_T$         | MHz  | VCE= -10V, IC= -50mA, f=100MHz | 150 |     |       |

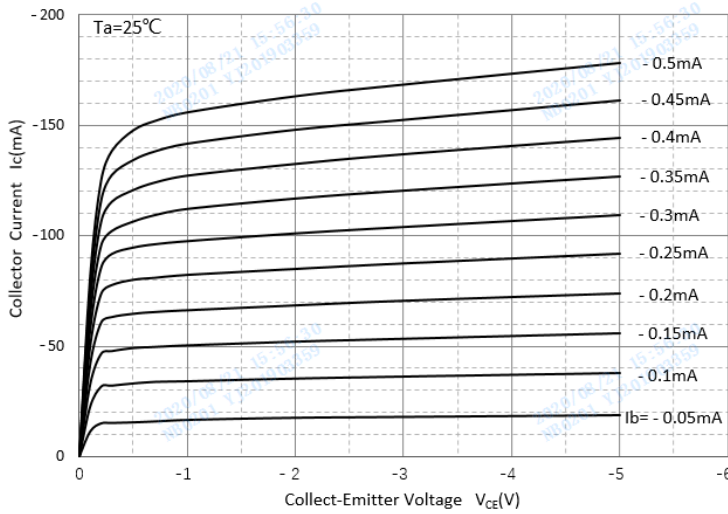
**■ Ordering Information** (Example)

| PREFERRED P/N | PACKING CODE | UNIT WEIGHT(g)    | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|-------------------|----------------------|-------------------------|----------------------------|---------------|
| PMMT591A      | F2           | Approximate 0.008 | 3000                 | 30000                   | 120000                     | 7" reel       |

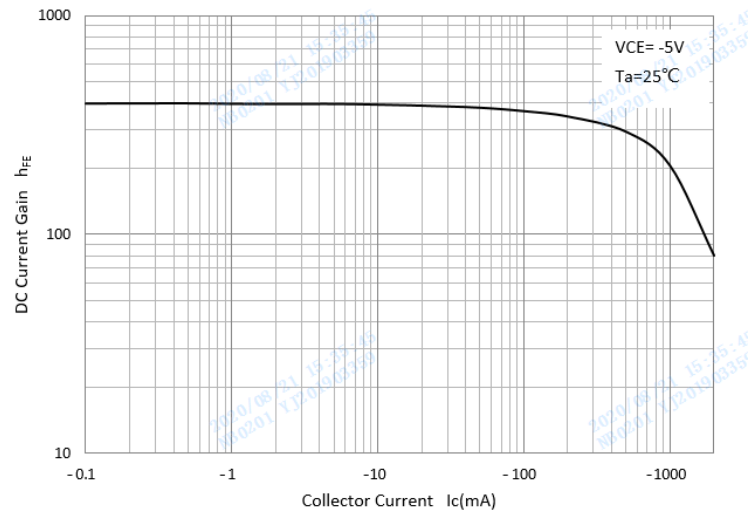


## ■ Characteristics (Typical)

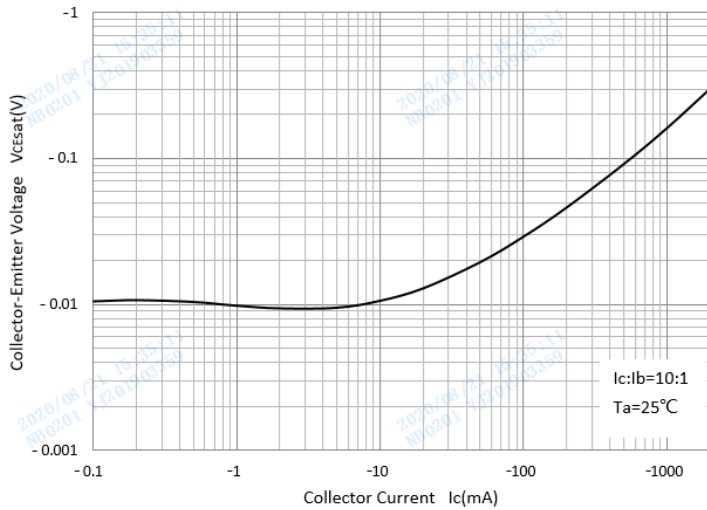
Static Characteristic



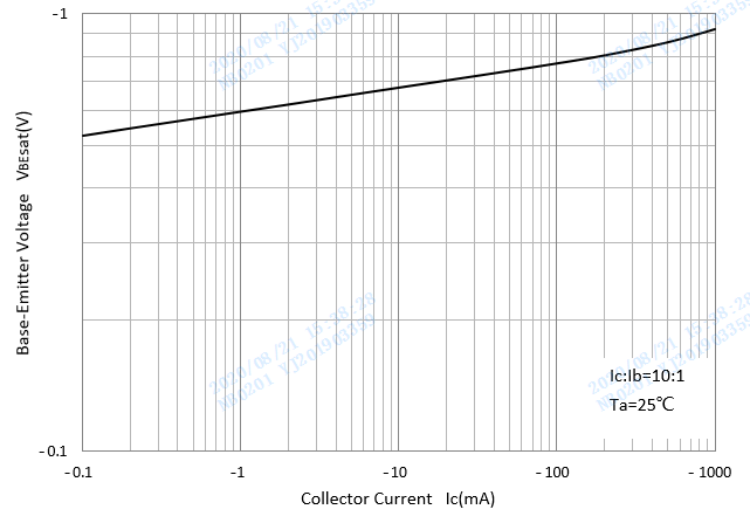
DC Current Gain



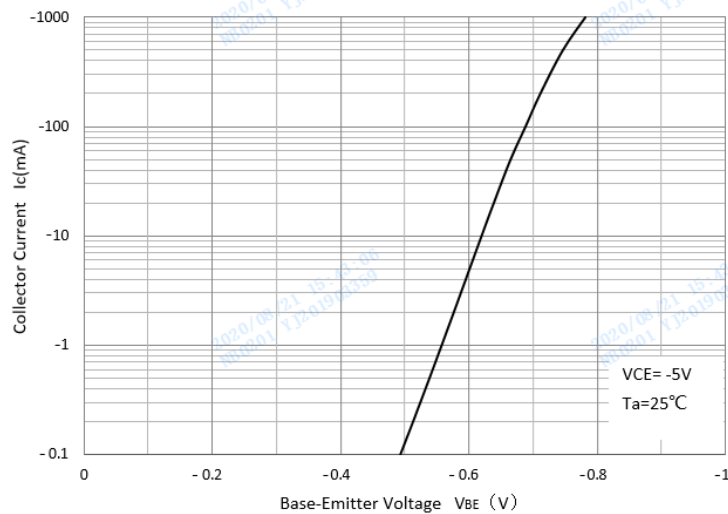
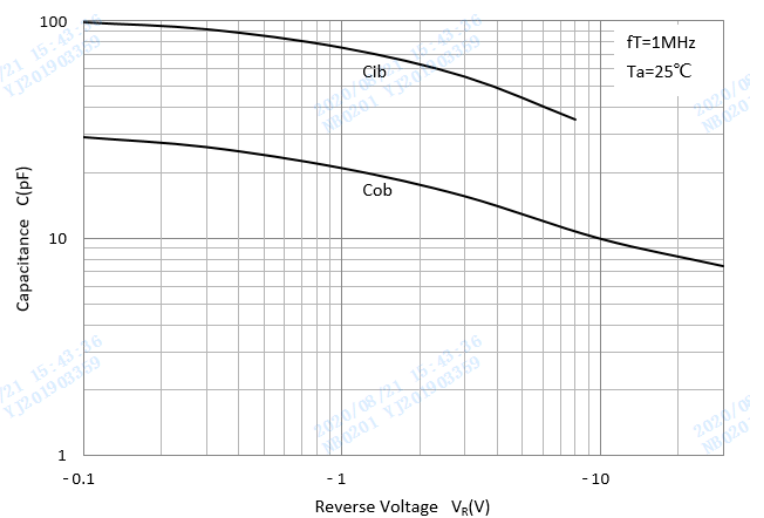
Collector-Emitter Saturation Voltage



Base-Emitter Saturation Voltage

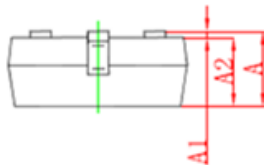
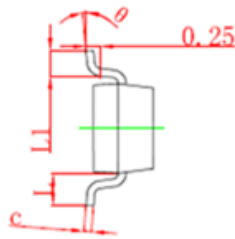
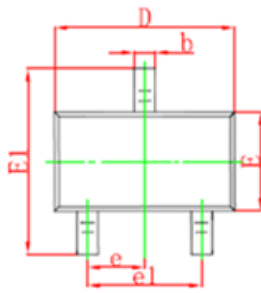


Base-Emitter On Voltage

 $C_{ob}/C_{ib}-V_{CB}/V_{EB}$ 

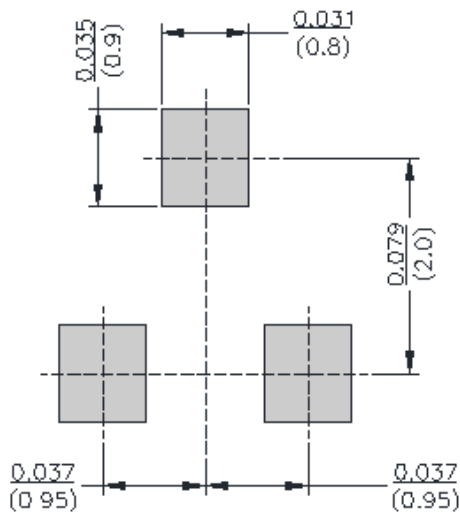


## ■SOT-23 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 0.900                     | 1.150 | 0.035                | 0.045 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.050 | 0.035                | 0.041 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.100                     | 0.200 | 0.004                | 0.008 |
| D      | 2.800                     | 3.000 | 0.110                | 0.118 |
| E      | 1.200                     | 1.400 | 0.047                | 0.055 |
| E1     | 2.250                     | 2.550 | 0.089                | 0.100 |
| e      | 0.950TYP                  |       | 0.037TYP             |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.550REF                  |       | 0.022REF             |       |
| L1     | 0.300                     | 0.500 | 0.012                | 0.020 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

## ■SOT-23 Soldering Footprint





## Disclaimer

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