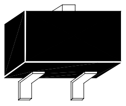
**HI-SINCERITY**
**MICROELECTRONICS CORP.**

# HMBTA06

NPN SILICON TRANSISTOR



SOT-23

## Description

Amplifier Transistor

## Absolute Maximum Ratings

- Maximum Temperatures
  Storage Temperature .......... -55 ~ +150 °C
  Junction Temperature .......... +150 °C Maximum
- Maximum Power Dissipation
  Total Power Dissipation ($T_A$=25°C) .......... 225 mW
- Maximum Voltages and Currents ($T_A$=25°C)
  $V_{CBO}$ Collector to Base Voltage .......... 80 V
  $V_{CEO}$ Collector to Emitter Voltage .......... 80 V
  $V_{EBO}$ Emitter to Base Voltage .......... 4 V
  $I_C$ Collector Current .......... 500 mA

## Thermal Characteristic

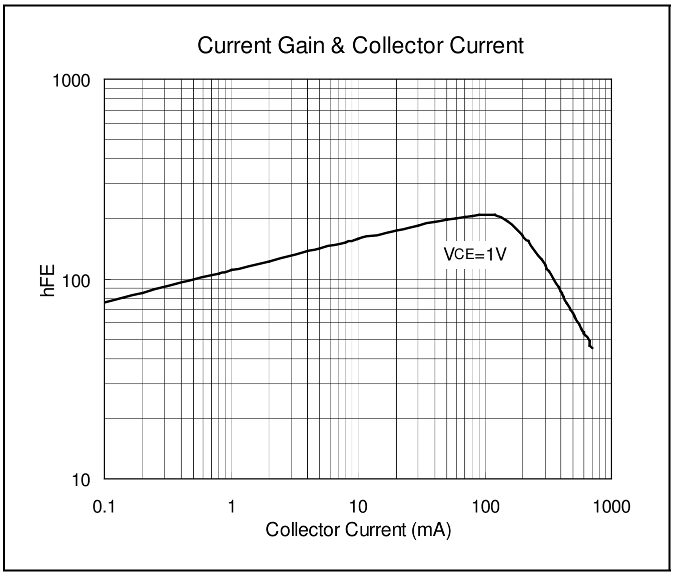
| Symbol | Characteristic | Max. | Unit |
|---|---|---|---|
| $R_{\theta ja}$ | Thermal Resistance, junction to ambient ($T_A$=25°C) | 556 | °C/W |

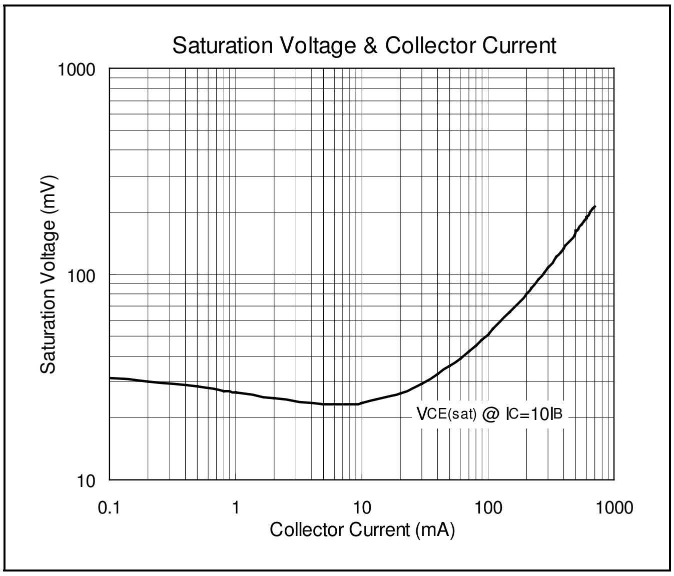
## Electrical Characteristics ($T_A$=25°C)

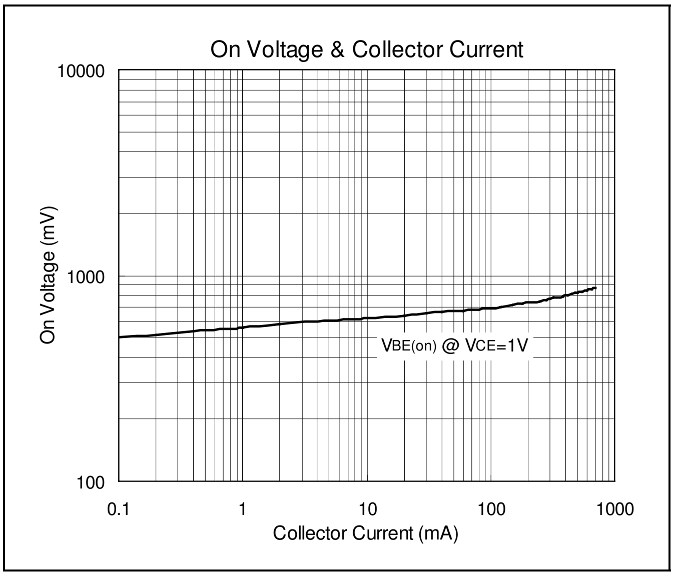
| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|
| $BV_{CBO}$ | 80 | - | - | V | $I_C$=100uA |
| $BV_{CEO}$ | 80 | - | - | V | $I_C$=1mA |
| $BV_{EBO}$ | 4 | - | - | V | $I_E$=100uA |
| $I_{CBO}$ | - | - | 100 | nA | $V_{CB}$=80V |
| $I_{CEO}$ | - | - | 100 | nA | $V_{CE}$=60V |
| *$V_{CE(sat)}$ | - | - | 0.25 | V | $I_C$=100mA, $I_B$=10mA |
| $V_{BE(on)}$ | - | - | 1.2 | V | $I_C$=100mA, $V_{CE}$=1V |
| *$h_{FE1}$ | 50 | - | - |  | $I_C$=10mA, $V_{CE}$=1V |
| *$h_{FE2}$ | 50 | - | - |  | $I_C$=100mA, $V_{CE}$=1V |
| $f_T$ | 100 | - | - | MHz | $I_C$=10mA, $V_{CE}$=2V, f=100MHz |

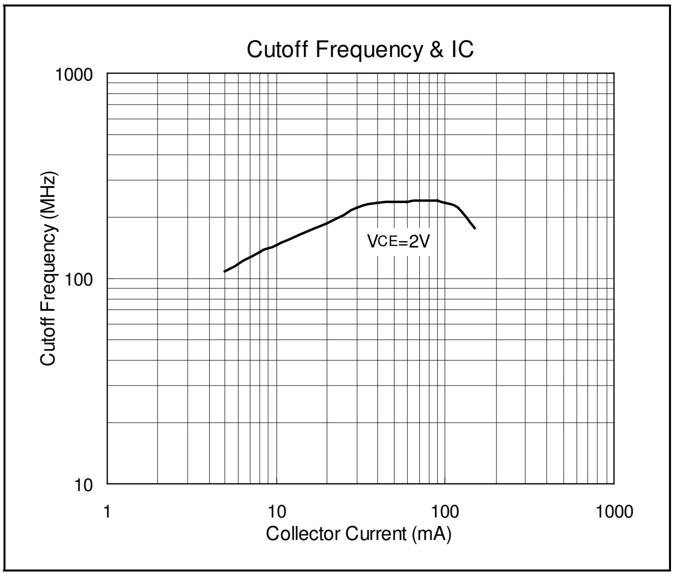
*Pulse Test: Pulse Width ≤380us, Duty Cycle≤2%

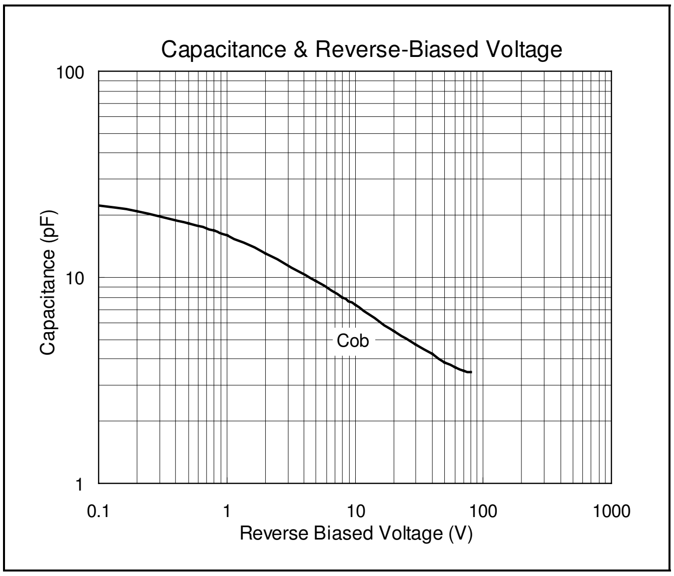
## Characteristics Curve

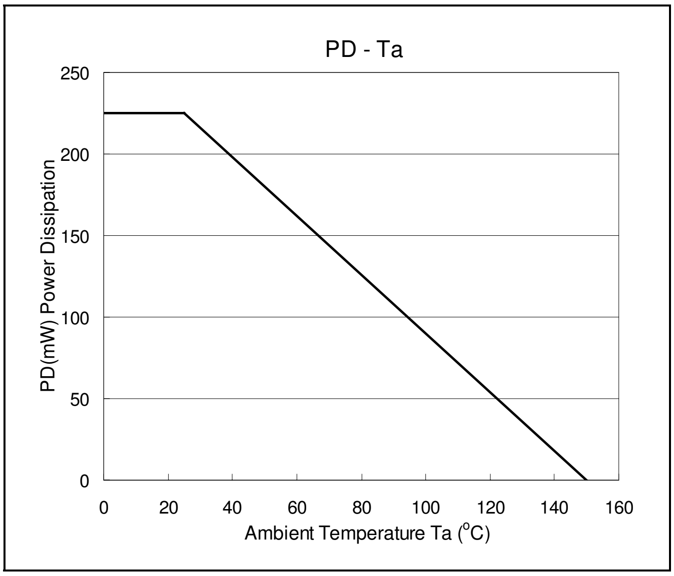

Current Gain & Collector Current


Saturation Voltage & Collector Current

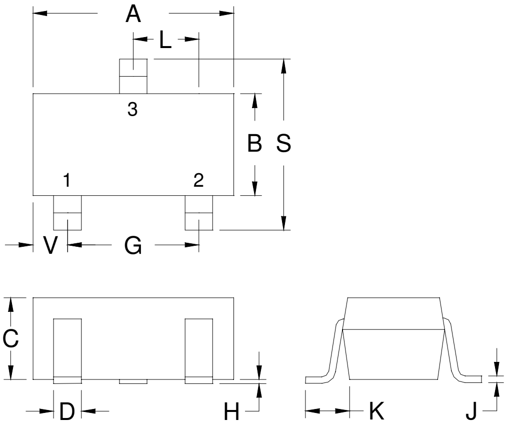

On Voltage & Collector Current


Cutoff Frequency & IC


Capacitance & Reverse-Biased Voltage

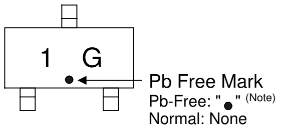

PD - Ta

## SOT-23 Dimension



3-Lead SOT-23 Plastic
Surface Mounted Package
HSMC Package Code: N

Marking:



Note: Pb-free product can distinguish by the green label or the extra description on the right side of the label.

Pin Style: 1.Base 2.Emitter 3.Collector

Material:
- Lead solder plating: Sn60/Pb40 (Normal), Sn/3.0Ag/0.5Cu or Pure-Tin (Pb-free)
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

| DIM | Min. | Max. |
|---|---|---|
| A | 2.80 | 3.04 |
| B | 1.20 | 1.60 |
| C | 0.89 | 1.30 |
| D | 0.30 | 0.50 |
| G | 1.70 | 2.30 |
| H | 0.013 | 0.10 |
| J | 0.085 | 0.177 |
| K | 0.32 | 0.67 |
| L | 0.85 | 1.15 |
| S | 2.10 | 2.75 |
| V | 0.25 | 0.65 |

*: Typical, Unit: mm

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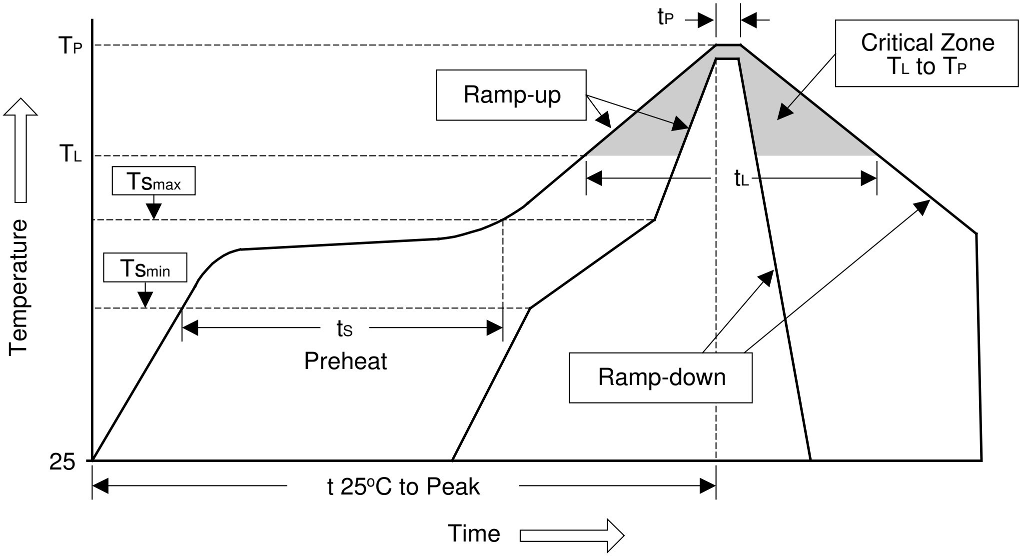
## Soldering Methods for HSMC's Products

1. Storage environment: Temperature=10°C~35°C Humidity=65%±15%

2. Reflow soldering of surface-mount devices

Figure 1: Temperature profile



| Profile Feature | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|---|---|---|
| Average ramp-up rate ($T_L$ to $T_P$) | <3°C/sec | <3°C/sec |
| Preheat<br>- Temperature Min ($Ts_{min}$)<br>- Temperature Max ($Ts_{max}$)<br>- Time (min to max) (ts) | <br>100°C<br>150°C<br>60~120 sec | <br>150°C<br>200°C<br>60~180 sec |
| Tsmax to $T_L$<br>- Ramp-up Rate | <br><3°C/sec | <br><3°C/sec |
| Time maintained above:<br>- Temperature ($T_L$)<br>- Time ($t_L$) | <br>183°C<br>60~150 sec | <br>217°C<br>60~150 sec |
| Peak Temperature ($T_P$) | 240°C +0/-5°C | 260°C +0/-5°C |
| Time within 5°C of actual Peak Temperature ($t_P$) | 10~30 sec | 20~40 sec |
| Ramp-down Rate | <6°C/sec | <6°C/sec |
| Time 25°C to Peak Temperature | <6 minutes | <8 minutes |

3. Flow (wave) soldering (solder dipping)

| Products | Peak temperature | Dipping time |
|---|---|---|
| Pb devices. | 245°C ±5°C | 5sec ±1sec |
| Pb-Free devices. | 260°C +0/-5°C | 5sec ±1sec |