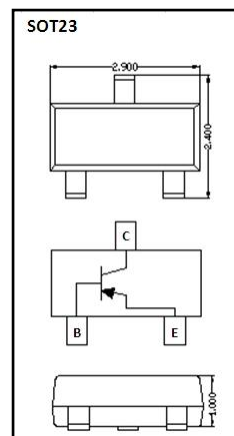


## DATA SHEET

### MMBT3906

- ◇ Capable of 200mWatts of Power Dissipation and 200mA  $I_c$
- ◇ Operating and Storage Junction Temperatures:  $-55^{\circ}\text{C}$  to  $150^{\circ}\text{C}$
- ◇ Surface Mount SOT-23 Package
- ◇ RoHS compliant / Green EMC

| Device Marking Code |    |
|---------------------|----|
| MMBT3906            | 2A |



### MAXIMUM RATINGS ( $T_a=25^{\circ}\text{C}$ unless otherwise noted)

| Symbol          | Parameter                                   | Value           | Unit                        |
|-----------------|---------------------------------------------|-----------------|-----------------------------|
| $V_{CB0}$       | Collector-Base Voltage                      | -40             | V                           |
| $V_{CE0}$       | Collector-Emitter Voltage                   | -40             | V                           |
| $V_{EB0}$       | Emitter-Base Voltage                        | -5              | V                           |
| $I_c$           | Collector Current                           | -200            | mA                          |
| $P_c$           | Collector Power Dissipation                 | 200             | mW                          |
| $R_{\theta JA}$ | Thermal Resistance From Junction To Ambient | 625             | $^{\circ}\text{C}/\text{W}$ |
| $T_j$           | Junction Temperature                        | 150             | $^{\circ}\text{C}$          |
| $T_{stg}$       | Storage Temperature                         | $-55 \sim +150$ | $^{\circ}\text{C}$          |

### ELECTRICAL CHARACTERISTICS @ $25^{\circ}\text{C}$ Unless Otherwise Specified

| Symbol    | Parameter                           | Test Conditions                | Min  | Max  | Units |
|-----------|-------------------------------------|--------------------------------|------|------|-------|
| $V_{CE0}$ | Collector-Emitter Breakdown Voltage | $I_c=-1.0\text{mA}$ , $I_B=0$  | -40  |      | V     |
| $V_{CB0}$ | Collector-Base Breakdown Voltage    | $I_c=-10\mu\text{A}$ , $I_E=0$ | -40  |      | V     |
| $V_{EB0}$ | Emitter-Base Breakdown Voltage      | $I_E=-10\mu\text{A}$ , $I_c=0$ | -5.0 |      | V     |
| $I_{CB0}$ | Collector Cutoff Current            | $V_{CB}=-40\text{V}$ , $I_E=0$ |      | -100 | nA    |

|               |                                      |                                                                                      |                 |                |     |
|---------------|--------------------------------------|--------------------------------------------------------------------------------------|-----------------|----------------|-----|
| $I_{CEX}$     | Collector Cutoff Current             | $V_{CE}=-30V, V_{BE}=-3.0V$                                                          |                 | -50            | nA  |
| $h_{FE}$      | DC Current Gain                      | $I_C=-10mA, V_{CE}=-1.0V$<br>$I_C=-50mA, V_{CE}=-1.0V$<br>$I_C=-100mA, V_{CE}=-1.0V$ | 100<br>60<br>30 | 300            |     |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C=-10mA, I_B=-1.0mA$<br>$I_C=-50mA, I_B=-5.0mA$                                   |                 | -0.25<br>-0.4  | V   |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage      | $I_C=-10mA, I_B=-1.0mA$<br>$I_C=-50mA, I_B=-5.0mA$                                   | -0.65           | -0.85<br>-0.95 | V   |
| $f_T$         | Current Gain-Bandwidth Product       | $I_C=-10mA,$<br>$V_{CE}=-20V, f=100MHz$                                              | 250             |                | MHZ |
| $C_{obo}$     | Output Capacitance                   | $V_{CB}=-5.0V, I_E=0,$<br>$f=1.0MHz$                                                 |                 | 4.5            | PF  |
| $C_{ibo}$     | Input Capacitance                    | $V_{BE}=-0.5V, I_C=0,$<br>$f=1.0MHz$                                                 |                 | 10             | PF  |
| NF            | Noise Figure                         | $(I_C=-100\mu A, V_{CE}=-5.0V,$<br>$R_s=1.0k\Omega, f=1.0KHz)$                       |                 | 4.0            | dB  |

## SWITCHING CHARACTERISTICS

| Symbol | Parameter    | Test Conditions                  | Min | Max | Units |
|--------|--------------|----------------------------------|-----|-----|-------|
| $t_d$  | Delay Time   | $V_{CC}=-3.0V, V_{BE}=-0.5V$     |     | 35  | ns    |
| $t_r$  | Rise Time    | $I_C=-10mA, I_{B1}=I_{B2}=1.0mA$ |     | 35  | ns    |
| $t_s$  | Storage Time | $V_{CC}=-3.0V, I_C=-10mA$        |     | 225 | ns    |
| $t_f$  | Fall Time    | $I_{B1}=I_{B2}=-1.0mA$           |     | 75  | ns    |

## ORDERING INFORMATION

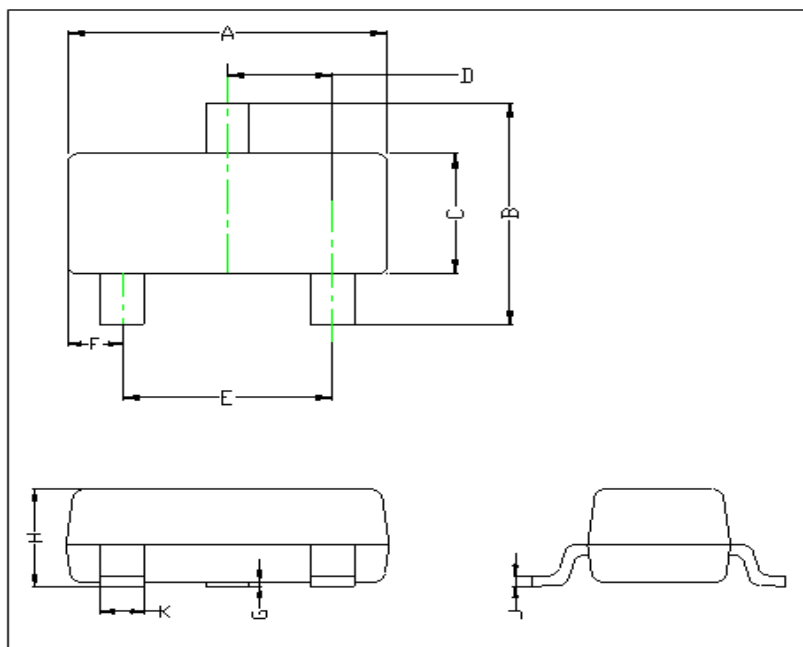
| Device   | Package | Shipping                        | Tape wide | Emboss pitch | Tape specification | Notes |
|----------|---------|---------------------------------|-----------|--------------|--------------------|-------|
| MMBT3904 | SOT23   | Tape & Reel<br>3000pcs /7" Reel | 8mm       | 4mm          | Conductive         |       |



ANMEI Semiconductor

## PACKAGE DIMENSIONS

### Package Outline : SOT23



SOT23 Package Outline

| Symbol | Dimensions in mm |       |
|--------|------------------|-------|
|        | Min.             | Max.  |
| A      | 2.800            | 3.040 |
| B      | 2.100            | 2.640 |
| C      | 1.200            | 1.400 |
| D      | 0.890            | 1.030 |
| E      | 1.780            | 2.050 |
| F      | 0.450            | 0.600 |
| G      | 0.013            | 0.100 |
| H      | 0.900            | 1.110 |
| J      | 0.090            | 0.180 |
| K      | 0.370            | 0.510 |

**Note:**

1. Halogen free ,EMC
2. Pb free solder
3. Lead thickness solder plating
4. Lead frame CAC-5
5. Other Tolerance  $\pm 0.05$
6. Dimensions are exclusive of Burrs Mold Flash and Tie Bar extrusions
7. Unit :mm