Micro Commercial Components
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# MMBT3906

## PNP General Purpose Amplifier

## Features

- Capable of 300mWatts of Power Dissipation
- Surface Mount SOT-23 Package
- Marking:2A
- Case Material:Molded Plastic. UL Flammability Classificatio Rating 94-0 and MSL Rating 1

## Maximum Ratings

| Symbol | Rating | Rating | Unit |
|---|---|---|---|
| $V_{CEO}$ | Collector-Emitter Voltage | -40 | V |
| $V_{CBO}$ | Collector-Base Voltage | -40 | V |
| $V_{EBO}$ | Emitter-Base Voltage | -5.0 | V |
| $I_C$ | Collector Current, Continuous | -0.2 | A |
| $P_D$ | Power Dissipation | 0.3 | W |
| $T_J$ | Operating Junction Temperature | -55 to +150 | $^oC$ |
| $T_{STG}$ | Storage Temperature | -55 to +150 | $^oC$ |

## Electrical Characteristics @ 25°C Unless Otherwise Specified

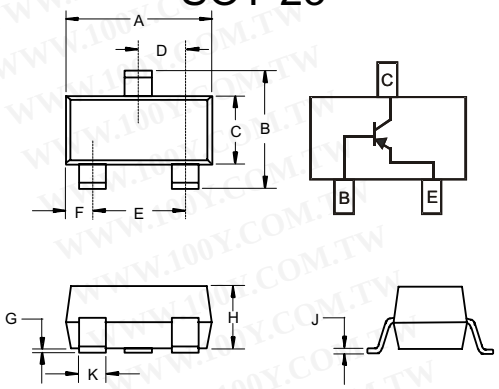
| Symbol | Parameter | Min | Max | Units |
|---|---|---|---|---|
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage* ($I_C$=-1.0mAdc, $I_B$=0) | -40 | | Vdc |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage ($I_C$=-10μAdc, $I_E$=0) | -40 | | Vdc |
| $V_{(BR)EBO}$ | Emitter-Base Breakdown Voltage ($I_E$=-10μAdc, $I_C$=0) | -5.0 | | Vdc |
| $I_{CBO}$ | Collector cut-off Current ($V_{CB}$=-40Vdc, $I_E$=0 | | -0.1 | uAdc |
| $I_{CEX}$ | Collector Cut-off Current ($V_{CE}$=-30Vdc, $V_{BE}$=-3.0Vdc) | | -50 | nAdc |
| $I_{EBO}$ | Emitter cut-off Current ($V_{EB}$=-5Vdc, $I_C$=0 | | -0.1 | uAdc |
| $h_{FE}$ | DC Current Gain* ($I_C$=-10mAdc, $V_{CE}$=-1.0Vdc)<br>($I_C$=-50mAdc, $V_{CE}$=-1.0Vdc)<br>($I_C$=-100mAdc, $V_{CE}$=-1.0Vdc) | 100<br>60<br>30 | 300 | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage ($I_C$=-10mAdc, $I_B$=-1.0mAdc)<br>($I_C$=-50mAdc, $I_B$=-5.0mAdc) | | -0.25<br>-0.4 | Vdc |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage ($I_C$=-10mAdc, $I_B$=-1.0mAdc)<br>($I_C$=-50mAdc, $I_B$=-5.0mAdc) | -0.65 | -0.85<br>-0.95 | Vdc |
| $f_T$ | Current Gain-Bandwidth Product ($I_C$=-10mAdc, $V_{CE}$=-20Vdc, f=100MHz) | 250 | | MHz |

### SWITCHING CHARACTERISTICS

| | | | | |
|---|---|---|---|---|
| $t_d$ | Delay Time | ($V_{CC}$=-3.0Vdc, $V_{BE}$=-0.5Vdc | 35 | ns |
| $t_r$ | Rise Time | $I_C$=-10mAdc, $I_{B1}$=-1.0mAdc) | 35 | ns |
| $t_s$ | Storage Time | ($V_{CC}$=-3.0Vdc, $I_C$=-10mAdc | 225 | ns |
| $t_f$ | Fall Time | $I_{B1}$=$I_{B2}$=-1.0mAdc ) | 75 | ns |

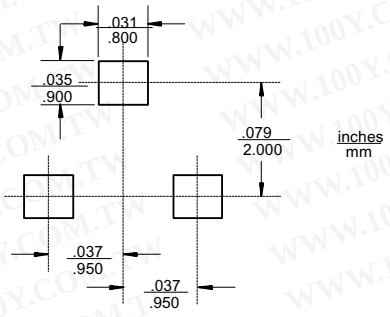
*Pulse Width ≤ 300μs, Duty Cycle≤ 2.0%

SOT-23

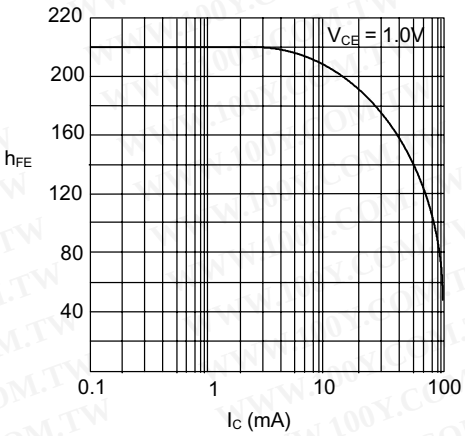



| DIMENSIONS | | | | | |
|---|---|---|---|---|---|
| | INCHES | | MM | | |
| DIM | MIN | MAX | MIN | MAX | NOTE |
| A | .110 | .120 | 2.80 | 3.04 | |
| B | .083 | .098 | 2.10 | 2.64 | |
| C | .047 | .055 | 1.20 | 1.40 | |
| D | .035 | .041 | .89 | 1.03 | |
| E | .070 | .081 | 1.78 | 2.05 | |
| F | .018 | .024 | .45 | .60 | |
| G | .0005 | .0039 | .013 | .100 | |
| H | .035 | .044 | .89 | 1.12 | |
| J | .003 | .007 | .085 | .180 | |
| K | .015 | .020 | .37 | .51 | |

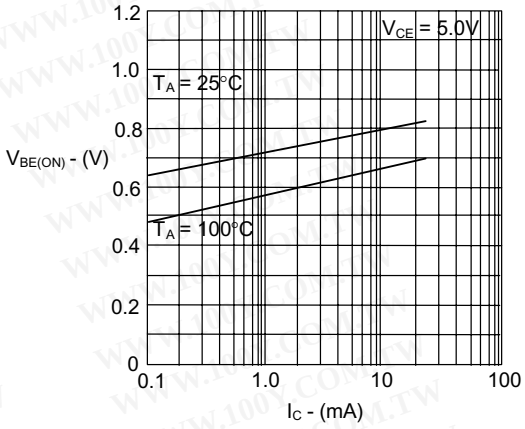
Suggested Solder Pad Layout



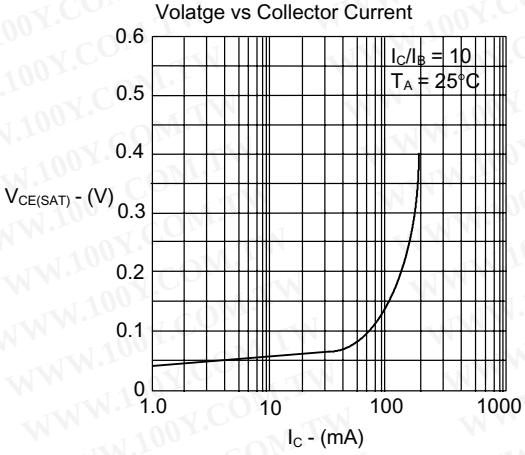
DC Current Gain vs Collector Current



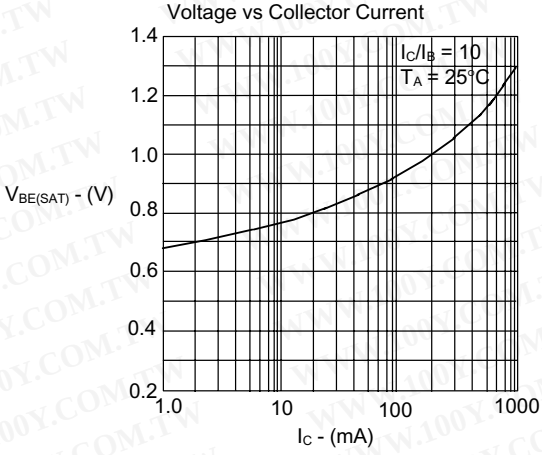

Base-Emitter ON Voltage vs Collector Current



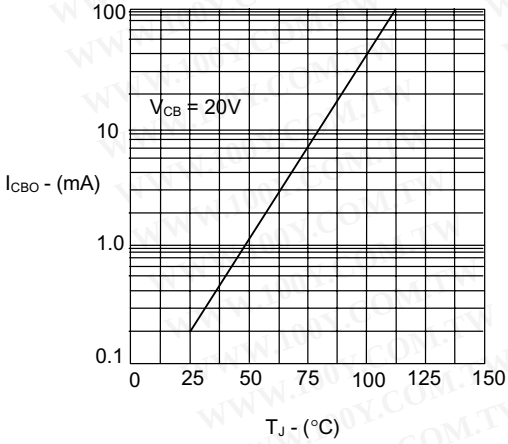

Collector-Emitter Saturation Volatge vs Collector Current



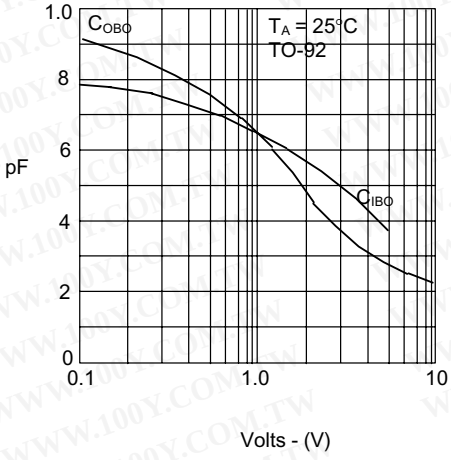

Base-Emitter Saturation Voltage vs Collector Current



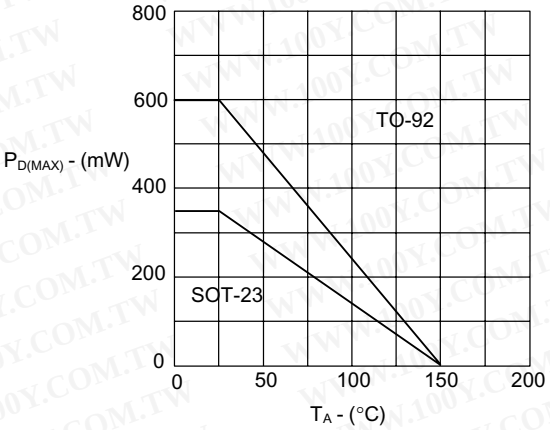

Collector-Base Diode Reverse Current vs Temperature



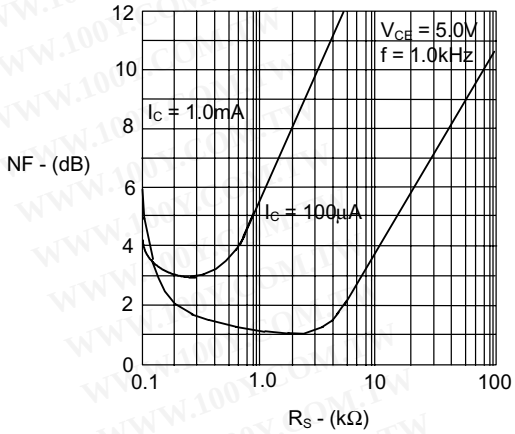

Common Base Open Circuit Input and Output Capacitance vs Reverse Bias Voltage



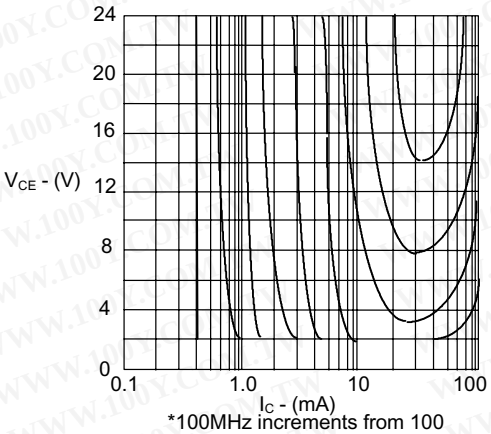
Maximum Power Dissipation vs Ambient Temperature




Noise Figure vs Source Resistance

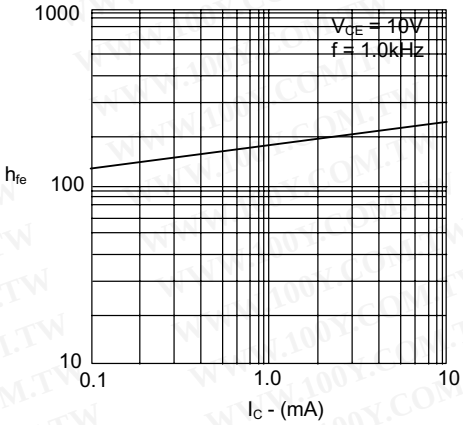



Contours of Constant Gain Bandwidth Product ($f_T$)

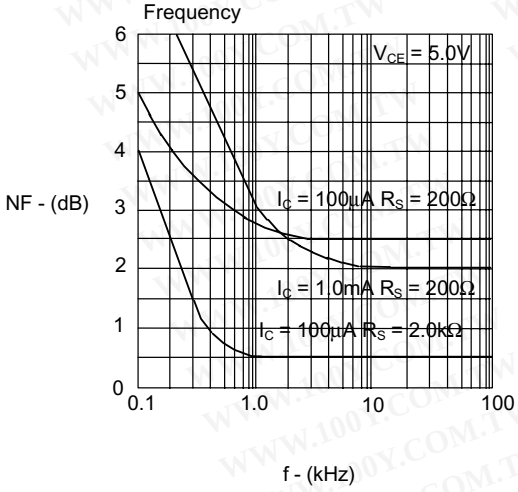



*100MHz increments from 100 to 700, 750 and 800MHz

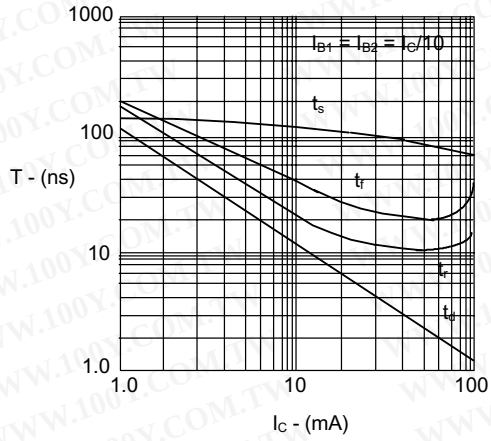
Current Gain



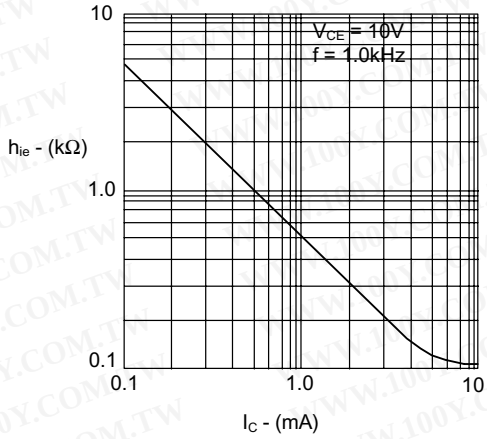

Noise Figure vs Frequency



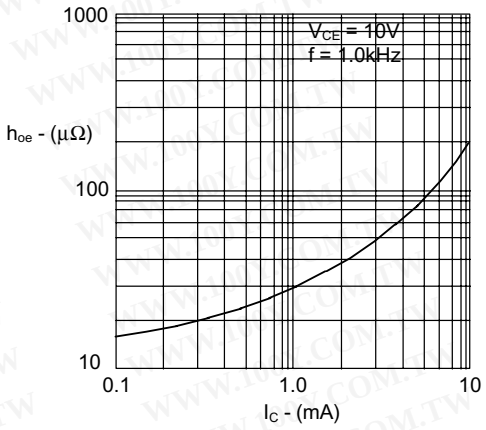

Switching Times vs Collector Current



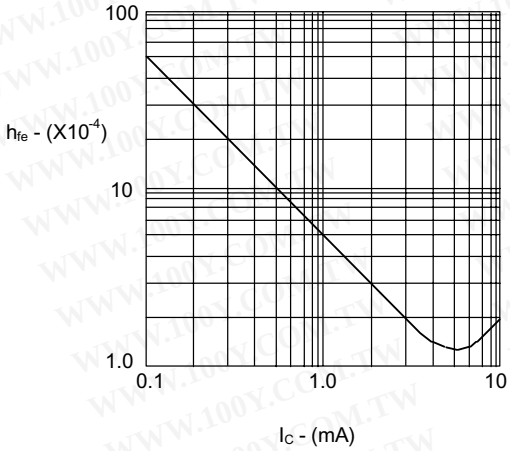
Input Impedance



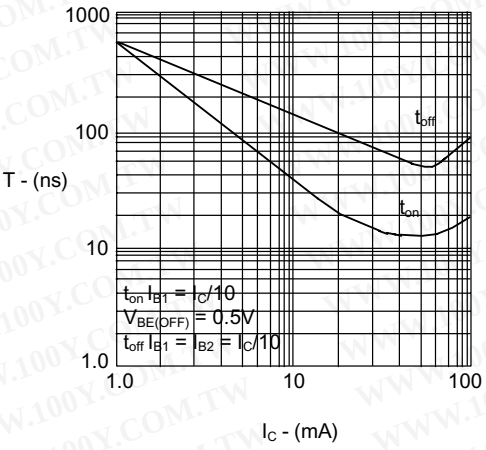

Output Admittance




Voltage Feedback Ratio




Turn On and Turn Off Times vs Collector Current



## Ordering Information

| Device | Packing |
|---|---|
| (Part Number)-TP | Tape&Reel;3Kpcs/Reel |