Micro Commercial Components

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20736 Marilla Street Chatsworth
CA 91311
Phone: (818) 701-4933
Fax: (818) 701-4939

# MMBT3906T

## PNP General Purpose Transistor

## Features

- Lead Free Finish/RoHS Compliant ("P" Suffix designates RoHS Compliant. See ordering information)
- Surface Mount SOT-523 Package
- Epitaxial Planar Die Construction
- Epoxy meets UL 94 V-0 flammability rating
- Moisure Sensitivity Level 1
- Marking:3N

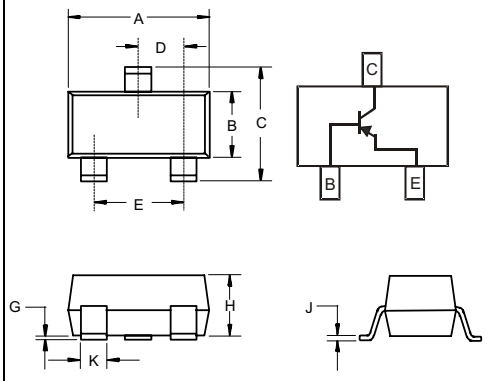
## Maximum Ratings

| 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 | -200 | mA |
| $R_{\theta JA}$ | Typical Thermal Resistance Junction to Ambient | 833 | ℃/W |
| $P_D$ | Power Dissipation | 150 | mW |
| $T_J$ | Junction Temperature | -55 to +150 | ℃ |
| $T_{STG}$ | Storage Temperature | -55 to +150 | ℃ |

## Electrical Characteristics @ 25°C Unless Otherwise Specified

| Symbol | Parameter | Min | Max | Units |
|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | |
| $V_{(BR)CEO}$ | 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 ($V_{CB}$=-30Vdc, $I_E$=0) | | -50 | nAdc |
| $I_{EBO}$ | Emitter Cut-off Current ($V_{EB}$=-5Vdc, $I_C$=0) | | -50 | nAdc |
| **ON CHARACTERISTICS** | | | | |
| $h_{FE}$ | DC Current Gain*<br>($I_C$=-0.1mAdc, $V_{CE}$=-1.0Vdc)<br>($I_C$=-1.0mAdc, $V_{CE}$=-1.0Vdc)<br>($I_C$=-10mAdc, $V_{CE}$=-1.0Vdc)<br>($I_C$=-50mAdc, $V_{CE}$=-1.0Vdc)<br>($I_C$=-100mAdc, $V_{CE}$=-1.0Vdc) | <br>60<br>80<br>100<br>60<br>30 | <br><br><br>300<br><br> | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage<br>($I_C$=-10mAdc, $I_B$=-1.0mAdc)<br>($I_C$=-50mAdc, $I_B$=-5.0mAdc) | | <br>-0.25<br>-0.4 | Vdc |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage<br>($I_C$=-10mAdc, $I_B$=-1.0mAdc)<br>($I_C$=-50mAdc, $I_B$=-5.0mAdc) | <br>-0.65 | <br>-0.85<br>-0.95 | Vdc |

SOT-523




| DIMENSIONS | | | | | |
|---|---|---|---|---|---|
| | INCHES | | MM | | |
| DIM | MIN | MAX | MIN | MAX | NOTE |
| A | .059 | .067 | 1.50 | 1.70 | |
| B | .030 | .033 | 0.75 | 0.85 | |
| C | .057 | .069 | 1.45 | 1.75 | |
| D | .020 Nominal | | 0.50Nominal | | |
| E | .035 | .043 | 0.90 | 1.10 | |
| G | .000 | .004 | .000 | .100 | |
| H | .028 | .031 | .70 | 0.80 | |
| J | .004 | .008 | .100 | .200 | |
| K | .010 | .014 | .25 | .35 | |



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## SMALL-SIGNAL CHARACTERISTICS

| Symbol | Parameter | Min | Max | Units |
|---|---|---|---|---|
| $f_T$ | Current Gain-Bandwidth Product ($I_C$=-10mAdc, $V_{CE}$=-20Vdc, f=100MHz) | 250 | | MHz |
| $C_{obo}$ | Output Capacitance ($V_{CB}$=-5.0Vdec, $I_E$=0, f=1MHz) | | 4.5 | pF |
| $C_{ibo}$ | Input Capacitance ($V_{BE}$=-0.5Vdc, $I_C$=0, f=1kHz) | | 10.0 | pF |
| NF | Noise Figure ($I_C$=-100μAdc, $V_{CE}$=-5.0Vdc, $R_S$=1.0kΩ, f=1KHz) | | 4.0 | dB |

## SWITCHING CHARACTERISTICS

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



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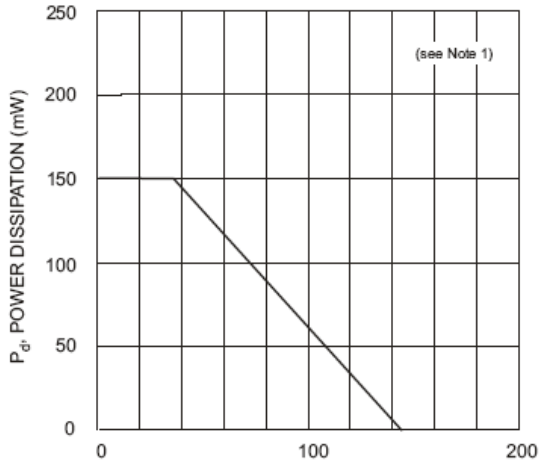


Fig. 1, Power Derating Curve

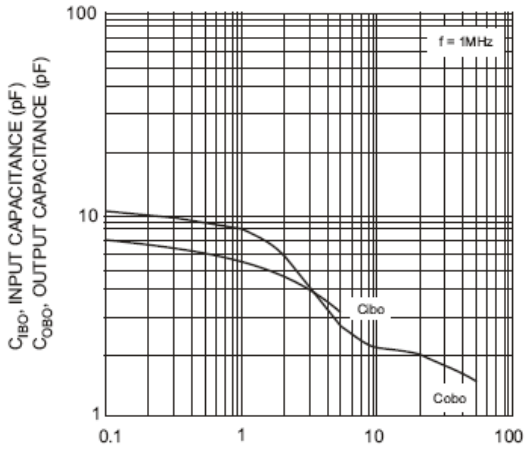


Fig. 2, Input and Output Capacitance vs. Collector-Base Voltage

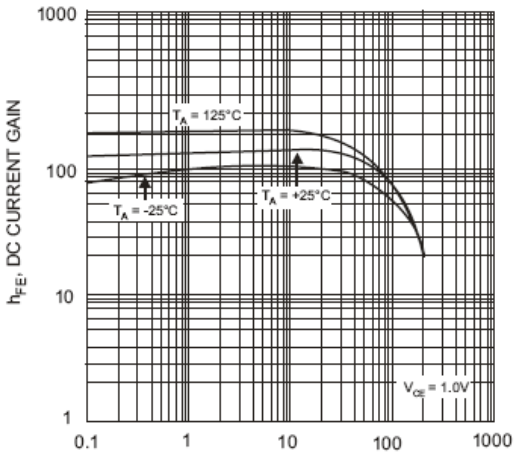


Fig. 3, Typical DC Current Gain vs Collector Current

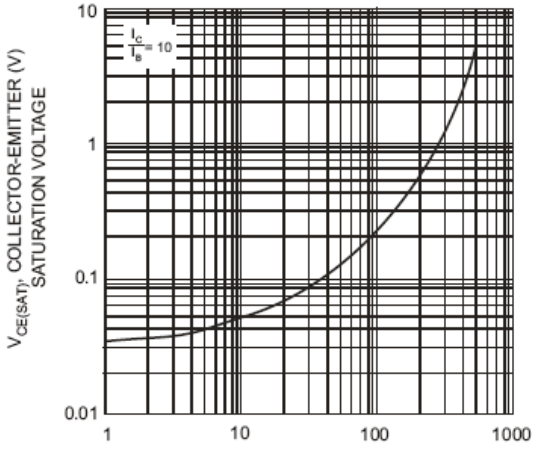


Fig. 4, Typical Collector-Emitter Saturation Voltage vs. Collector Current

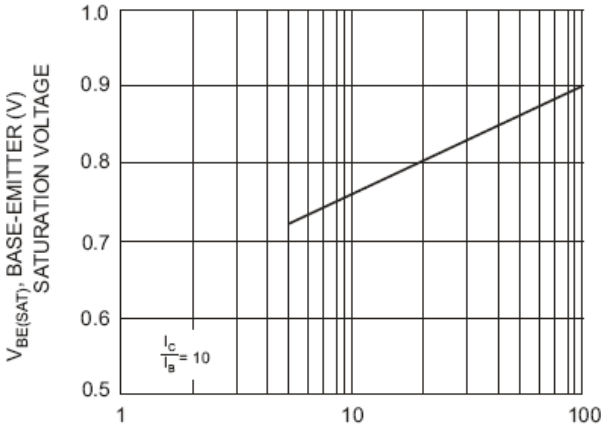


Fig. 5, Typical Base-Emitter Saturation Voltage vs. Collector Current



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## Ordering Information :

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

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|---|
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