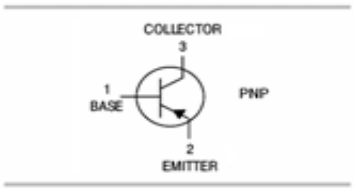
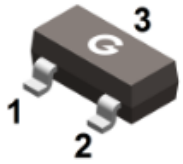
# PNP General Purpose Transistor MMBT589

## FEATURES

- Epitaxial planar die construction.
- Also available in lead free version.

HF




**SOT-23**

## APPLICATIONS

- High current surface mount PNP silicon switching transistor for load management in portable appilications.

## ORDERING INFORMATION

| Type No. | Marking | Package Code |
|---|---|---|
| MMBT589 | 589 | SOT-23 |

## MAXIMUM RATING @ Ta=25℃ unless otherwise specified

| Symbol | Parameter | Value | UNIT |
|---|---|---|---|
| $V_{CBO}$ | collector-base voltage | -50 | V |
| $V_{CEO}$ | collector-emitter voltage | -30 | V |
| $V_{EBO}$ | emitter-base voltage | -5 | V |
| $I_C$ | collector current (DC) | -1.0 | A |
| $I_{CM}$ | Collector Current-Peak | -2.0 | A |
| $P_C$ | Collector dissipation | 0.31 | W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 403 | °C/W |
| $T_j$ ,$T_{stg}$ | junction and storage temperature | -55 to +150 | °C |

# PNP General Purpose Transistor MMBT589

## ELECTRICAL CHARACTERISTICS @ Ta=25℃ unless otherwise specified

| Symbol | Parameter | Test conditions | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $V_{(BR)CBO}$ | Collector-base breakdown voltage | $I_C$=-100μA,$I_E$=0 | -50 | | V |
| $V_{(BR)CEO}$ | Collector-emitter breakdown voltage | $I_C$=-10mA,$I_B$=0 | -30 | | V |
| $V_{(BR)EBO}$ | Emitter-base breakdown voltage | $I_E$=-100μA,$I_C$=0 | -5 | | V |
| $I_{CBO}$ | Collector cut-off current | $I_E$ = 0; $V_{CB}$ = -30V | - | -0.1 | μA |
| $I_{CES}$ | Collector-emitter cutoff current | $V_{CES}$=-30V | - | -0.1 | μA |
| $I_{EBO}$ | Emitter cut-off current | $I_C$ = 0; $V_{EB}$ = -4V | - | -0.1 | μA |
| $h_{FE}$ | DC current gain | $V_{CE}$ = -2V; $I_C$= -1mA<br>$V_{CE}$ = -2V;$I_C$ = -500mA<br>$V_{CE}$ = -2V;$I_C$ = -1.0A<br>$V_{CE}$ = -2V;$I_C$ = -2.0A | 100<br>100<br>80<br>40 | -<br>300<br>-<br>- | |
| $V_{CE(sat)}$ | collector-emitter saturation voltage | $I_C$ = -0.5A; $I_B$ = -0.05A<br>$I_C$ = -1.0A; $I_B$ = -0.1A<br>$I_C$ = -2.0A; $I_B$ = -0.2A | -<br>-<br>- | -0.25<br>-0.30<br>-0.65 | V |
| $V_{BE(sat)}$ | base-emitter saturation voltage | $I_C$ = -1.0A; $I_B$ = -0.1A | - | -1.2 | V |
| $V_{BE(on)}$ | Base-emitter Turn-on voltage | $I_C$=-1.0A,$V_{CE}$=-2.0V | - | -1.1 | V |
| $f_T$ | transition frequency | $I_C$ = -100mA; $V_{CE}$ = -5V; f = 100MHz | 100 | - | MHz |
| $C_{obo}$ | Output capacitance | f=1.0MHz | - | 15 | pF |

## TYPICAL CHARACTERISTICS @ Ta=25℃ unless otherwise specified

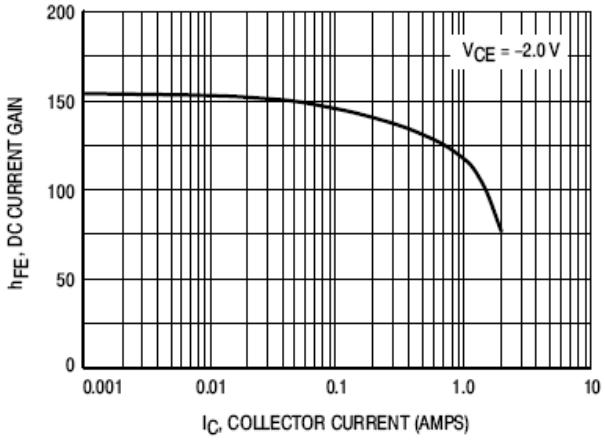



Figure 1. DC Current Gain versus Collector Current

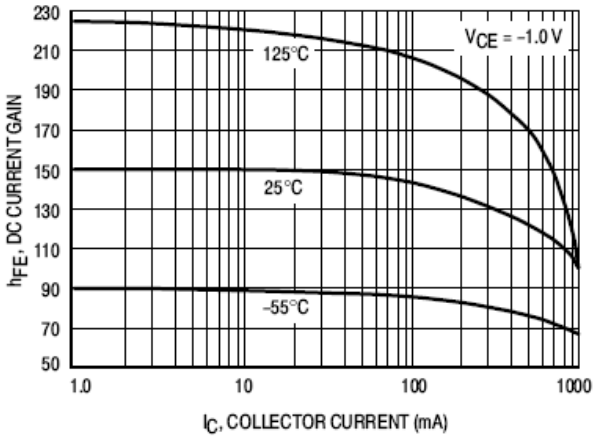



Figure 2. DC Current Gain versus Collector Current

# PNP General Purpose Transistor MMBT589

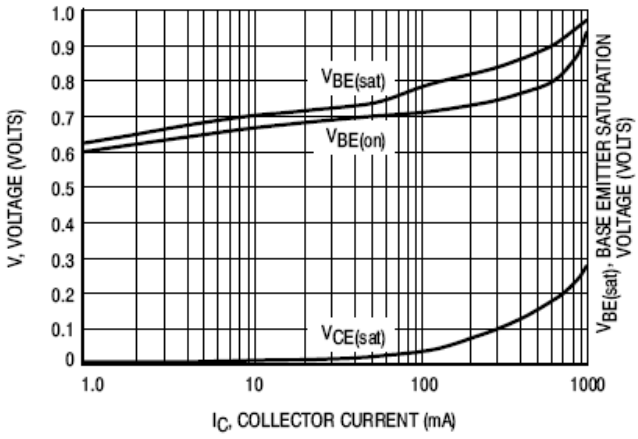



Figure 3. "On" Voltages

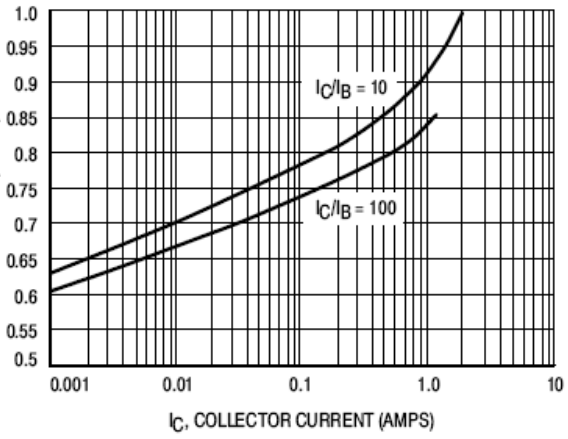



Figure 4. Base Emitter Saturation Voltage versus Collector Current

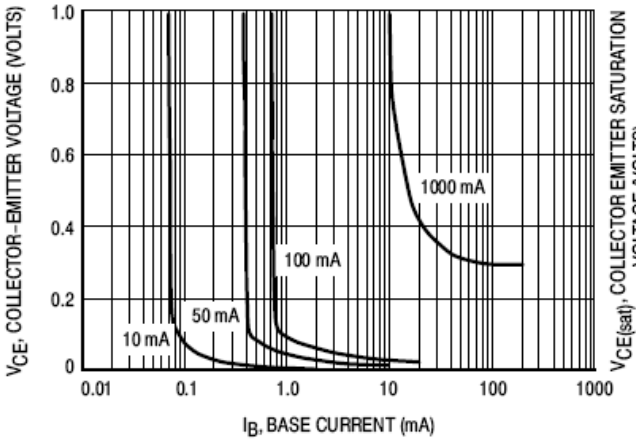



Figure 5. Collector Emitter Saturation Voltage versus Collector Current

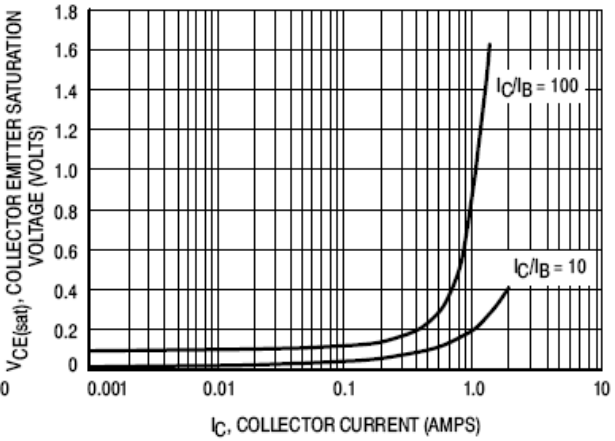



Figure 6. Collector Emitter Saturation Voltage versus Collector Current

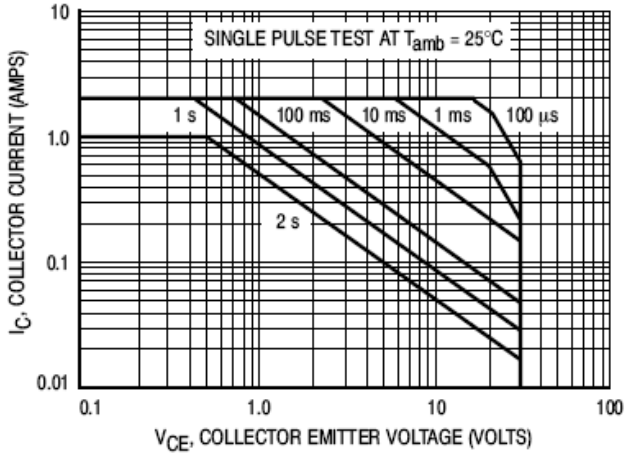
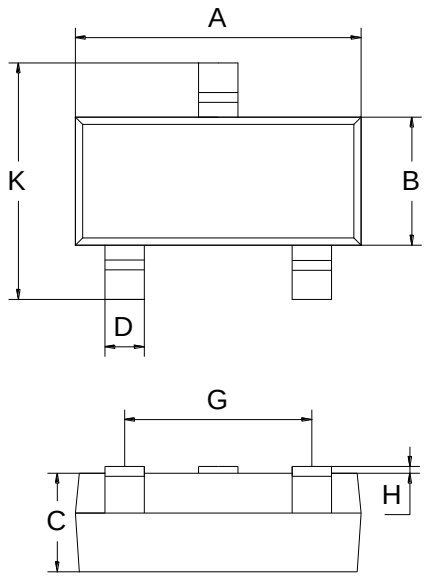



Figure 7. Safe Operating Area

# PNP General Purpose Transistor MMBT589

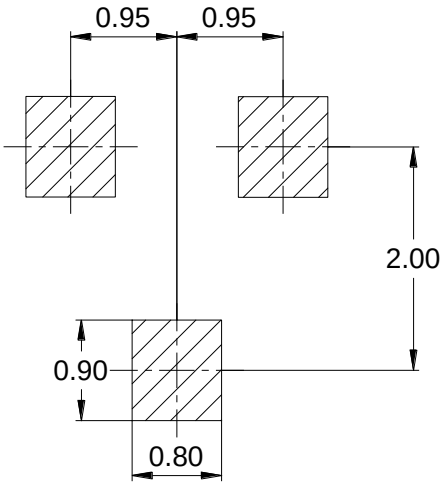
## PACKAGE OUTLINE

Plastic surface mounted package SOT-23




| SOT-23 | | |
|---|---|---|
| Dim | Min | Max |
| A | 2.70 | 3.10 |
| B | 1.10 | 1.50 |
| C | 0.90 | 1.10 |
| D | 0.30 | 0.50 |
| E | 0.35 | 0.48 |
| G | 1.80 | 2.00 |
| H | 0.02 | 0.10 |
| J | 0.05 | 0.15 |
| K | 2.20 | 2.60 |
| All Dimensions in mm | | |

## SOLDERING FOOTPRINT




Unit: mm

## PACKAGE INFORMATION

| Device | Package | Shipping |
|---|---|---|
| MMBT589 | SOT-23 | 3000 pcs / Tape & Reel |