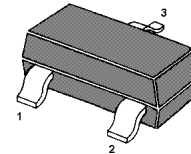


# MMBT9013

## NPN Silicon Epitaxial Planar Transistors

for switching and amplifier applications.

As complementary types the PNP transistor  
MMBT9012 is recommended.



1. Base 2. Emitter 3. Collector  
SOT-23 Plastic Package

### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

| Parameter                 | Symbol    | Value         | Unit             |
|---------------------------|-----------|---------------|------------------|
| Collector Base Voltage    | $V_{CBO}$ | 40            | V                |
| Collector Emitter Voltage | $V_{CEO}$ | 30            | V                |
| Emitter Base Voltage      | $V_{EBO}$ | 5             | V                |
| Collector Current         | $I_C$     | 500           | mA               |
| Power Dissipation         | $P_{tot}$ | 200           | mW               |
| Junction Temperature      | $T_j$     | 150           | $^\circ\text{C}$ |
| Storage Temperature Range | $T_{stg}$ | - 55 to + 150 | $^\circ\text{C}$ |

### Characteristics at $T_a = 25^\circ\text{C}$

| Parameter                                                                               | Symbol                                                     | Min. | Max. | Unit |
|-----------------------------------------------------------------------------------------|------------------------------------------------------------|------|------|------|
| DC Current Gain<br>at $V_{CE} = 1\text{ V}$ , $I_C = 50\text{ mA}$                      | Current Gain Group G H<br>$h_{FE}$<br>$h_{FE}$<br>$h_{FE}$ | 100  | 250  | -    |
|                                                                                         |                                                            | 160  | 400  | -    |
| at $V_{CE} = 1\text{ V}$ , $I_C = 500\text{ mA}$                                        |                                                            | 40   | -    | -    |
| Collector Base Cutoff Current<br>at $V_{CB} = 35\text{ V}$                              | $I_{CBO}$                                                  | -    | 100  | nA   |
| Emitter Base Cutoff Current<br>at $V_{EB} = 5\text{ V}$                                 | $I_{EBO}$                                                  | -    | 100  | nA   |
| Collector Base Breakdown Voltage<br>at $I_C = 100\text{ }\mu\text{A}$                   | $V_{(BR)CBO}$                                              | 40   | -    | V    |
| Collector Emitter Breakdown Voltage<br>at $I_C = 1\text{ mA}$                           | $V_{(BR)CEO}$                                              | 30   | -    | V    |
| Emitter Base Breakdown Voltage<br>at $I_E = 100\text{ }\mu\text{A}$                     | $V_{(BR)EBO}$                                              | 5    | -    | V    |
| Collector Emitter Saturation Voltage<br>at $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$ | $V_{CE(sat)}$                                              | -    | 0.6  | V    |
| Base Emitter Saturation Voltage<br>at $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$      | $V_{BE(sat)}$                                              | -    | 1.2  | V    |
| Base Emitter Voltage<br>at $V_{CE} = 1\text{ V}$ , $I_C = 100\text{ mA}$                | $V_{BE}$                                                   | -    | 1    | V    |
| Gain Bandwidth Product<br>at $V_{CE} = 6\text{ V}$ , $I_C = 20\text{ mA}$               | $f_T$                                                      | 100  | -    | MHz  |

