

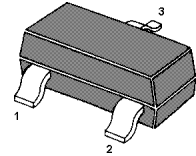
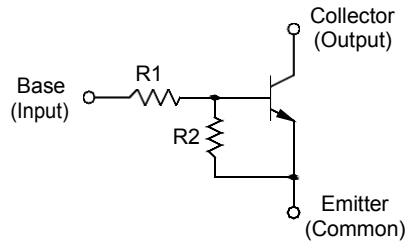


NPN Silicon Epitaxial Planar Transistor

for switching, interface circuit and drive circuit applications

Features

- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process



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

Resistor Values

| Type | R1 (KΩ) | R2 (KΩ) | MARKING |
|-------------|---------|---------|---------|
| MMBTRC116SS | 1 | 10 | 16BR |
| MMBTRC117SS | 2.2 | 2.2 | 17BR |
| MMBTRC118SS | 2.2 | 10 | 18BR |
| MMBTRC119SS | 4.7 | 10 | 19BR |
| MMBTRC120SS | 10 | 4.7 | 20BR |
| MMBTRC121SS | 47 | 10 | 21BR |
| MMBTRC122SS | 100 | 100 | 22BR |

Absolute Maximum Ratings (T_a = 25 °C)

| Parameter | | Symbol | Value | Unit |
|---------------------------|-------------|------------------|---------------|------|
| Output Voltage | | V _o | 50 | V |
| Input Voltage | MMBTRC116SS | V _i | 10, - 5 | V |
| | MMBTRC117SS | | 12, - 10 | |
| | MMBTRC118SS | | 12, - 5 | |
| | MMBTRC119SS | | 20, - 7 | |
| | MMBTRC120SS | | 30, - 10 | |
| | MMBTRC121SS | | 40, - 15 | |
| | MMBTRC122SS | | 40, - 10 | |
| Output Current | | I _o | 100 | mA |
| Total Power Dissipation | | P _{tot} | 200 | mW |
| Junction Temperature | | T _j | 150 | °C |
| Storage Temperature Range | | T _s | - 55 to + 150 | °C |



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

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|--|---------------------|------|------|------|------|
| DC Current Gain | | | | | |
| at $V_O = 5\text{ V}$, $I_O = 5\text{ mA}$ | MMBTRC116SS | 33 | - | - | - |
| at $V_O = 5\text{ V}$, $I_O = 20\text{ mA}$ | MMBTRC117SS | 20 | - | - | - |
| at $V_O = 5\text{ V}$, $I_O = 10\text{ mA}$ | MMBTRC118SS | 33 | - | - | - |
| at $V_O = 5\text{ V}$, $I_O = 10\text{ mA}$ | MMBTRC119SS | 30 | - | - | - |
| at $V_O = 5\text{ V}$, $I_O = 10\text{ mA}$ | MMBTRC120SS | 24 | - | - | - |
| at $V_O = 5\text{ V}$, $I_O = 5\text{ mA}$ | MMBTRC121SS | 33 | - | - | - |
| at $V_O = 5\text{ V}$, $I_O = 5\text{ mA}$ | MMBTRC122SS | 62 | - | - | - |
| Output Cutoff Current at $V_O = 50\text{ V}$ | $I_{O(OFF)}$ | - | - | 500 | nA |
| Input Current at $V_I = 5\text{ V}$ | | | | | |
| | MMBTRC116SS | - | - | 7.2 | mA |
| | MMBTRC117SS | - | - | 3.8 | |
| | MMBTRC118SS | - | - | 3.8 | |
| | MMBTRC119SS | - | - | 1.8 | |
| | MMBTRC120SS | - | - | 0.88 | |
| | MMBTRC121SS | - | - | 0.16 | |
| | MMBTRC122SS | - | - | 0.15 | |
| Output Voltage | | | | | |
| at $I_O = 10\text{ mA}$, $I_I = 0.5\text{ mA}$ | MMBTRC116SS | - | - | 0.3 | V |
| at $I_O = 10\text{ mA}$, $I_I = 0.5\text{ mA}$ | MMBTRC117SS | - | - | 0.3 | |
| at $I_O = 10\text{ mA}$, $I_I = 0.5\text{ mA}$ | MMBTRC118SS | - | - | 0.3 | |
| at $I_O = 10\text{ mA}$, $I_I = 0.5\text{ mA}$ | MMBTRC119SS | - | - | 0.3 | |
| at $I_O = 10\text{ mA}$, $I_I = 0.5\text{ mA}$ | MMBTRC120SS | - | - | 0.3 | |
| at $I_O = 10\text{ mA}$, $I_I = 0.5\text{ mA}$ | MMBTRC121SS | - | - | 0.3 | |
| at $I_O = 5\text{ mA}$, $I_I = 0.25\text{ mA}$ | MMBTRC122SS | - | - | 0.3 | |
| Input Voltage (ON) | | | | | |
| at $V_O = 0.3\text{ V}$, $I_O = 20\text{ mA}$ | MMBTRC116SS | - | - | 3 | V |
| at $V_O = 0.3\text{ V}$, $I_O = 20\text{ mA}$ | MMBTRC117SS | - | - | 3 | |
| at $V_O = 0.3\text{ V}$, $I_O = 20\text{ mA}$ | MMBTRC118SS | - | - | 3 | |
| at $V_O = 0.3\text{ V}$, $I_O = 20\text{ mA}$ | MMBTRC119SS | - | - | 2.5 | |
| at $V_O = 0.3\text{ V}$, $I_O = 2\text{ mA}$ | MMBTRC120SS | - | - | 3 | |
| at $V_O = 0.3\text{ V}$, $I_O = 2\text{ mA}$ | MMBTRC121SS | - | - | 5 | |
| at $V_O = 0.3\text{ V}$, $I_O = 1\text{ mA}$ | MMBTRC122SS | - | - | 3 | |
| Input Voltage (OFF) | | | | | |
| at $V_{CC} = 5\text{ V}$, $I_O = 100\text{ }\mu\text{A}$ | MMBTRC116SS | 0.3 | - | - | V |
| | MMBTRC117SS | 0.5 | - | - | |
| | MMBTRC118SS | 0.3 | - | - | |
| | MMBTRC119SS | 0.3 | - | - | |
| | MMBTRC120SS | 0.8 | - | - | |
| | MMBTRC121SS | 1 | - | - | |
| | MMBTRC122SS | 0.5 | - | - | |
| Transition Frequency at $V_O = 10\text{ V}$, $I_O = 5\text{ mA}$ | f_T ¹⁾ | - | 250 | - | MHz |

1) Characteristic of transistor only.