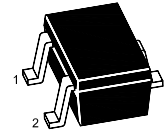


MMBT2222W / MMBT2222AW

NPN Silicon Epitaxial Planar Medium Power Transistor
for switching and amplifier applications



1.Base 2.Emitter 3.Collector
SOT-323 Plastic Package

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

| Parameter | Symbol | Value | | Unit |
|---------------------------|-----------|---------------|------------|------------------|
| | | MMBT2222W | MMBT2222AW | |
| Collector Base Voltage | V_{CBO} | 60 | 75 | V |
| Collector Emitter Voltage | V_{CEO} | 30 | 40 | V |
| Emitter Base Voltage | V_{EBO} | 5 | 6 | V |
| Collector Current | I_C | 600 | | mA |
| Total Power Dissipation | P_{tot} | 200 | | mW |
| Junction Temperature | T_j | 150 | | $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | - 55 to + 150 | | $^\circ\text{C}$ |



MMBT2222W / MMBT2222AW

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

| Parameter | Symbol | Min. | Max. | Unit |
|--|---------------|------|------|------|
| DC Current Gain | | | | |
| at $V_{CE} = 10\text{ V}$, $I_C = 0.1\text{ mA}$ | h_{FE} | 35 | - | - |
| at $V_{CE} = 10\text{ V}$, $I_C = 1\text{ mA}$ | h_{FE} | 50 | - | - |
| at $V_{CE} = 10\text{ V}$, $I_C = 10\text{ mA}$ | h_{FE} | 75 | - | - |
| at $V_{CE} = 1\text{ V}$, $I_C = 150\text{ mA}$ | h_{FE} | 50 | - | - |
| at $V_{CE} = 10\text{ V}$, $I_C = 150\text{ mA}$ | h_{FE} | 100 | 300 | - |
| at $V_{CE} = 10\text{ V}$, $I_C = 500\text{ mA}$ | h_{FE} | 30 | - | - |
| | MMBT2222W | | | |
| | MMBT2222AW | | | |
| Collector Base Voltage | | | | |
| at $I_C = 10\text{ }\mu\text{A}$ | V_{CBO} | 60 | - | V |
| | MMBT2222W | 75 | - | |
| | MMBT2222AW | | | |
| Collector Emitter Voltage | | | | |
| at $I_C = 10\text{ mA}$ | V_{CEO} | 30 | - | V |
| | MMBT2222W | 40 | - | |
| | MMBT2222AW | | | |
| Emitter Base Voltage | | | | |
| at $I_E = 10\text{ }\mu\text{A}$ | V_{EBO} | 5 | - | V |
| | MMBT2222W | 6 | - | |
| | MMBT2222AW | | | |
| Collector Base Cutoff Current | | | | |
| at $V_{CB} = 50\text{ V}$ | I_{CBO} | - | 100 | nA |
| at $V_{CB} = 60\text{ V}$ | I_{CBO} | - | 100 | |
| | MMBT2222W | | | |
| | MMBT2222AW | | | |
| Emitter Base Cutoff Current | | | | |
| at $V_{EB} = 3\text{ V}$ | I_{EBO} | - | 100 | nA |
| | MMBT2222W | | | |
| | MMBT2222AW | | | |
| Collector Emitter Saturation Voltage | | | | |
| at $I_C = 150\text{ mA}$, $I_B = 15\text{ mA}$ | $V_{CE(sat)}$ | - | 0.4 | V |
| | MMBT2222W | - | 0.3 | |
| | MMBT2222AW | - | 1.6 | |
| at $I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$ | $V_{CE(sat)}$ | - | 1 | |
| | MMBT2222W | | | |
| | MMBT2222AW | | | |
| Base Emitter Saturation Voltage | | | | |
| at $I_C = 150\text{ mA}$, $I_B = 15\text{ mA}$ | $V_{BE(sat)}$ | - | 1.3 | V |
| | MMBT2222W | 0.6 | 1.2 | |
| | MMBT2222AW | - | 2.6 | |
| at $I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$ | $V_{BE(sat)}$ | - | 2 | |
| | MMBT2222W | | | |
| | MMBT2222AW | | | |
| Transition Frequency | | | | |
| at $V_{CE} = 20\text{ V}$, $-I_E = 20\text{ mA}$, $f = 100\text{ MHz}$ | f_T | 300 | - | MHz |
| Collector Output Capacitance | | | | |
| at $V_{CB} = 10\text{ V}$, $f = 100\text{ KHz}$ | C_{ob} | - | 8 | pF |
| Emitter Input Capacitance | | | | |
| at $V_{EB} = 0.5\text{ V}$, $f = 100\text{ KHz}$ | C_{ib} | - | 25 | pF |
| Delay Time | | | | |
| at $V_{CC} = 30\text{ V}$, $V_{BE(OFF)} = 0.5\text{ V}$, $I_C = 150\text{ mA}$, $I_{B1} = 15\text{ mA}$ | t_d | - | 10 | ns |
| Rise Time | | | | |
| at $V_{CC} = 30\text{ V}$, $V_{BE(OFF)} = 0.5\text{ V}$, $I_C = 150\text{ mA}$, $I_{B1} = 15\text{ mA}$ | t_r | - | 25 | ns |
| Storage Time | | | | |
| at $V_{CC} = 30\text{ V}$, $I_C = 150\text{ mA}$, $I_{B1} = -I_{B2} = 15\text{ mA}$ | t_{stg} | - | 225 | ns |
| Fall Time | | | | |
| at $V_{CC} = 30\text{ V}$, $I_C = 150\text{ mA}$, $I_{B1} = -I_{B2} = 15\text{ mA}$ | t_f | - | 60 | ns |



MMBT2222W / MMBT2222AW

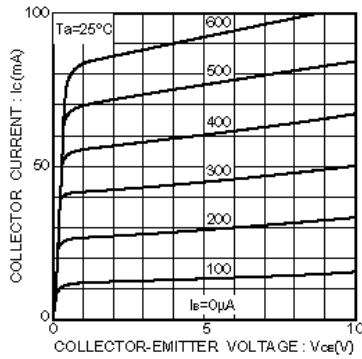


Fig.1 Grounded emitter output characteristics

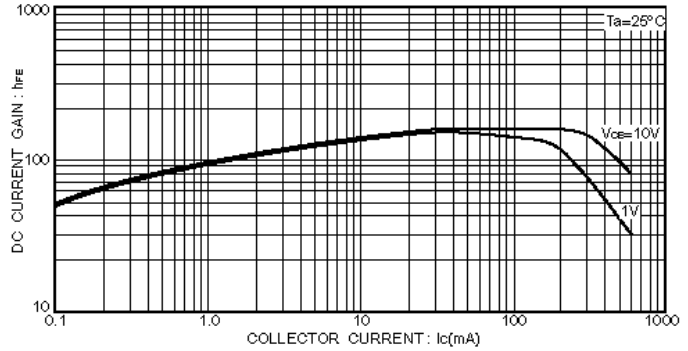


Fig.3 DC current gain vs. collector current(I)

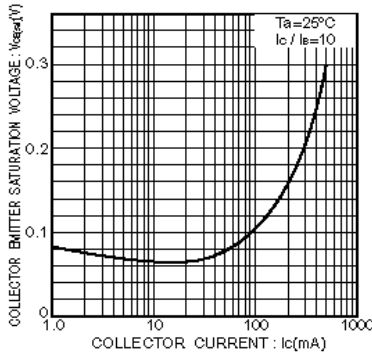


Fig.2 Collector-emitter saturation voltage vs. collector current

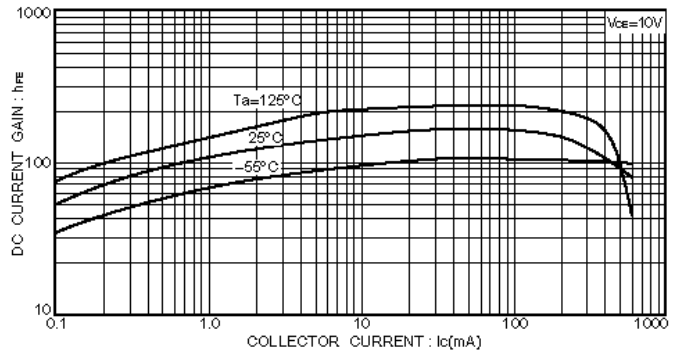


Fig.4 DC current gain vs. collector current(II)

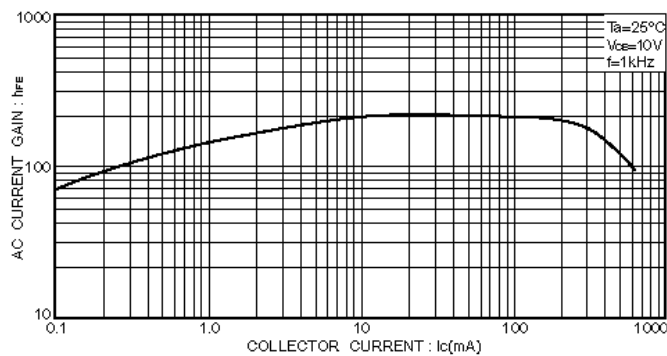


Fig.5 AC current gain vs. collector current

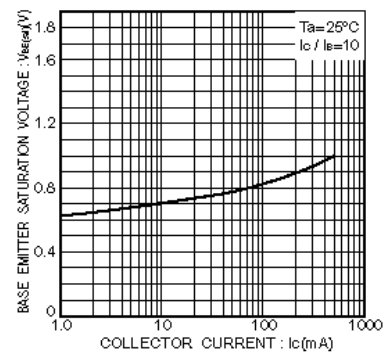


Fig.6 Base-emitter saturation voltage vs. collector current



MMBT2222W / MMBT2222AW

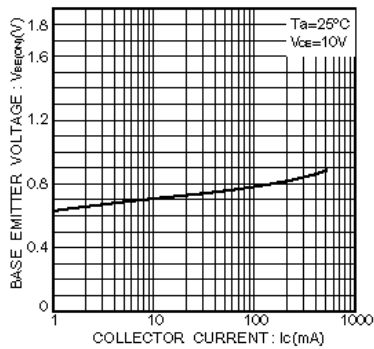


Fig.7 Grounded emitter propagation characteristics

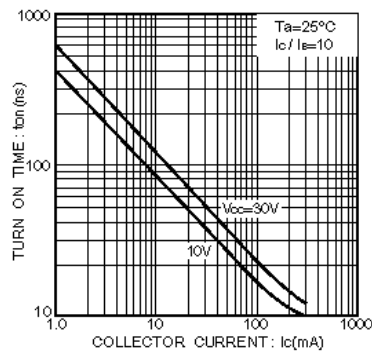


Fig.8 Turn-on time vs. collector current

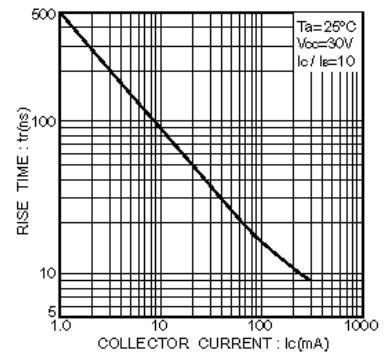


Fig.9 Rise time vs. collector current

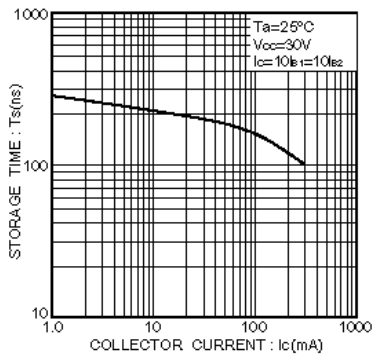


Fig.10 Storage time vs. collector current

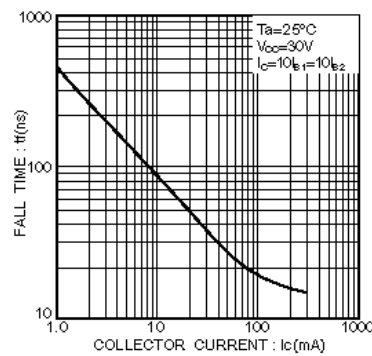


Fig.11 Fall time vs. collector current

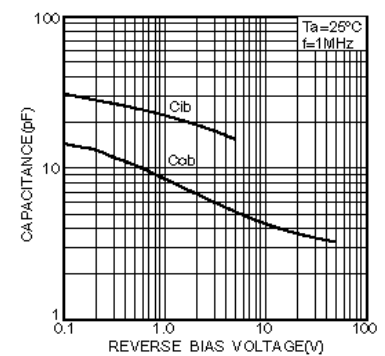


Fig.12 Input / output capacitance vs. voltage

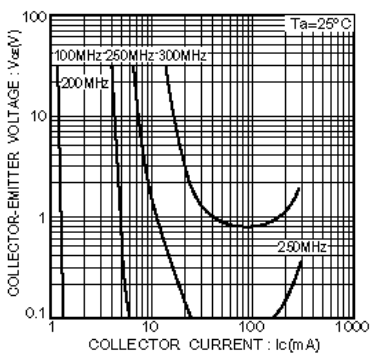


Fig.13 Gain bandwidth product

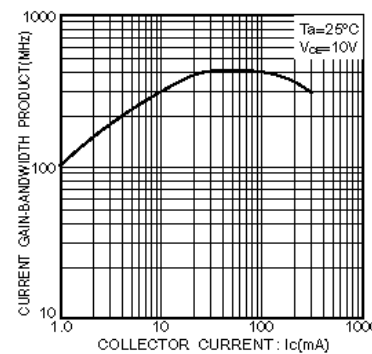
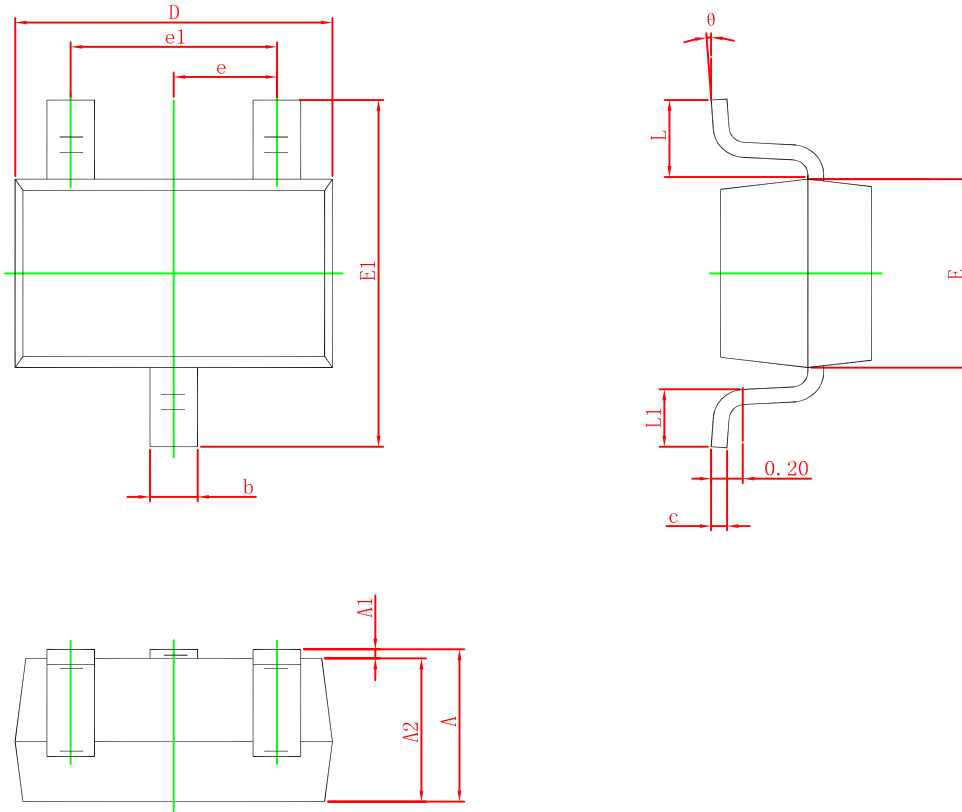


Fig.14 Gain bandwidth product vs. collector current



SOT-323 PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.900 | 1.100 | 0.035 | 0.043 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.000 | 0.035 | 0.039 |
| b | 0.200 | 0.400 | 0.008 | 0.016 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.000 | 2.200 | 0.079 | 0.087 |
| E | 1.150 | 1.350 | 0.045 | 0.053 |
| E1 | 2.150 | 2.450 | 0.085 | 0.096 |
| e | 0.650 TYP. | | 0.026 TYP. | |
| e1 | 1.200 | 1.400 | 0.047 | 0.055 |
| L | 0.525 REF. | | 0.021 REF. | |
| L1 | 0.260 | 0.460 | 0.010 | 0.018 |
| θ | 0° | 8° | 0° | 8° |