



SOT-23 Plastic-Encapsulate Transistors

MMBT2222ALT1 TRANSISTOR (NPN)

FEATURES

- Epitaxial planar die construction
- Complementary PNP Type available(MMBT2907ALT1)

MARKING: 1P

SOT-23



1. BASE
2. EMITTER
3. COLLECTOR

MAXIMUM RATINGS* $T_A=25^{\circ}\text{C}$ unless otherwise noted

| Symbol | Parameter | Value | Units |
|----------------|----------------------------------|-----------|--------------------|
| V_{CBO} | Collector-Base Voltage | 75 | V |
| V_{CEO} | Collector-Emitter Voltage | 40 | V |
| V_{EBO} | Emitter-Base Voltage | 6 | V |
| I_C | Collector Current -Continuous | 600 | mA |
| P_C | Collector Dissipation | 300 | mW |
| T_J, T_{stg} | Junction and Storage Temperature | -55to+150 | $^{\circ}\text{C}$ |

ELECTRICAL CHARACTERISTICS ($T_{amb}=25^{\circ}\text{C}$ unless otherwise specified)

| Parameter | Symbol | Test conditions | MIN | TYP | MAX | UNIT |
|--------------------------------------|---------------|--|-----|-----|------------|---------------|
| Collector-base breakdown voltage | $V_{(BR)CBO}$ | $I_C=10\mu\text{A}, I_E=0$ | 75 | | | V |
| Collector-emitter breakdown voltage | $V_{(BR)CEO}$ | $I_C=10\text{mA}, I_B=0$ | 40 | | | V |
| Emitter-base breakdown voltage | $V_{(BR)EBO}$ | $I_E=10\mu\text{A}, I_C=0$ | 6 | | | V |
| Collector cut-off current | I_{CBO} | $V_{CB}=70\text{V}, I_E=0$ | | | 0.1 | μA |
| Collector cut-off current | I_{CEX} | $V_{CE}=60\text{V}, V_{BE(off)}=3\text{V}$ | | | 0.1 | μA |
| Emitter cut-off current | I_{EBO} | $V_{EB}=3\text{V}, I_C=0$ | | | 0.1 | μA |
| DC current gain | $H_{FE(1)}$ | $V_{CE}=10\text{V}, I_C=150\text{mA}$ | 100 | | 300 | |
| | $H_{FE(2)}$ | $V_{CE}=10\text{V}, I_C=0.1\text{mA}$ | 40 | | | |
| | $H_{FE(3)}$ | $V_{CE}=10\text{V}, I_C=500\text{mA}$ | 42 | | | |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C=500\text{mA}, I_B=50\text{mA}$ $I_C=150\text{mA}, I_B=15\text{mA}$ | | | 0.6 0.3 | V |
| Base-emitter saturation voltage | $V_{BE(sat)}$ | $I_C=500\text{mA}, I_B=50\text{mA}$ | | | 1.2 | V |
| Transition frequency | f_T | $V_{CE}=20\text{V}, I_C=20\text{mA}$ $f=100\text{MHz}$ | 300 | | | MHz |
| Delay time | t_d | $V_{CC}=30\text{V}, V_{BE(off)}=-0.5\text{V}$ | | | 10 | nS |
| Rise time | t_r | $I_C=150\text{mA}, I_B=15\text{mA}$ | | | 25 | nS |
| Storage time | t_S | $V_{CC}=30\text{V}, I_C=150\text{mA}$ | | | 225 | nS |
| Fall time | t_f | $I_{B1}=-I_{B2}=15\text{mA}$ | | | 60 | nS |

CLASSIFICATION OF $h_{FE(1)}$

| | | |
|-------|---------|---------|
| Rank | L | H |
| Range | 100-200 | 200-300 |

Typical Characteristics

MMBT2222ALT1

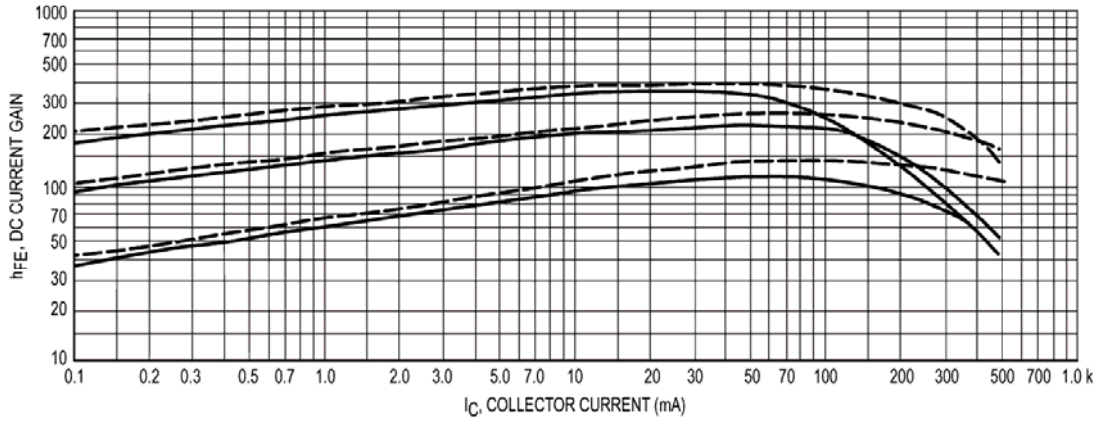


Figure 3. DC Current Gain

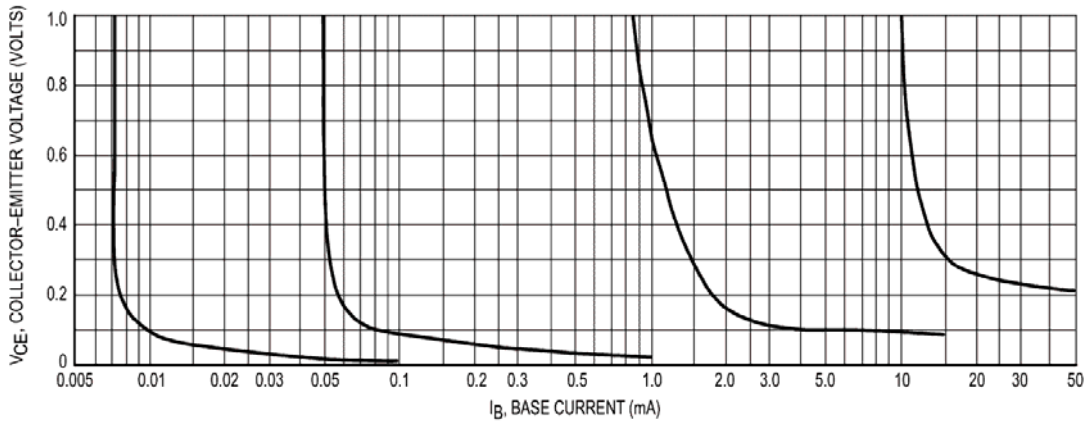


Figure 4. Collector Saturation Region

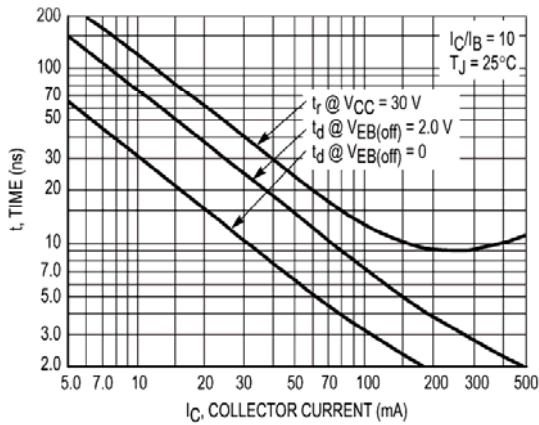


Figure 5. Turn-On Time

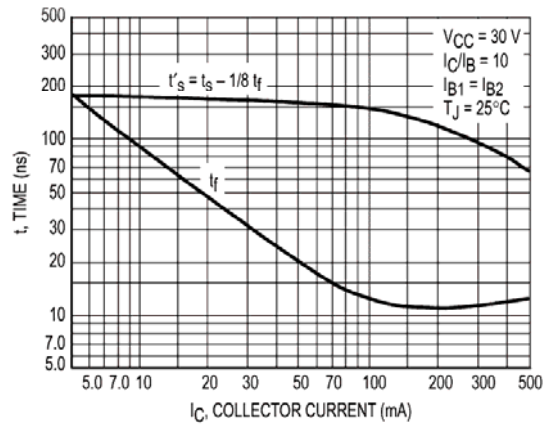


Figure 6. Turn-Off Time

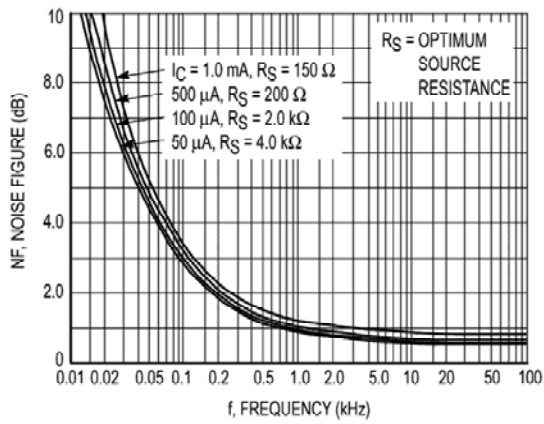


Figure 7. Frequency Effects

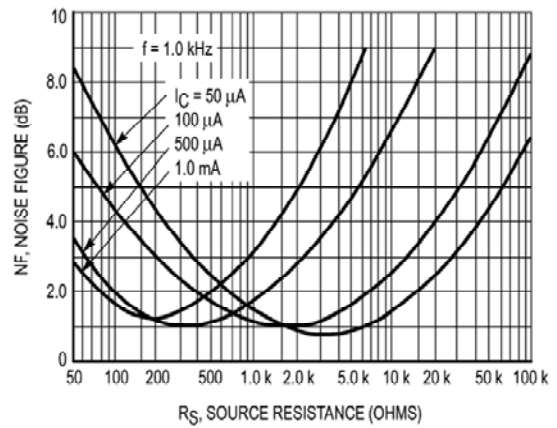


Figure 8. Source Resistance Effects

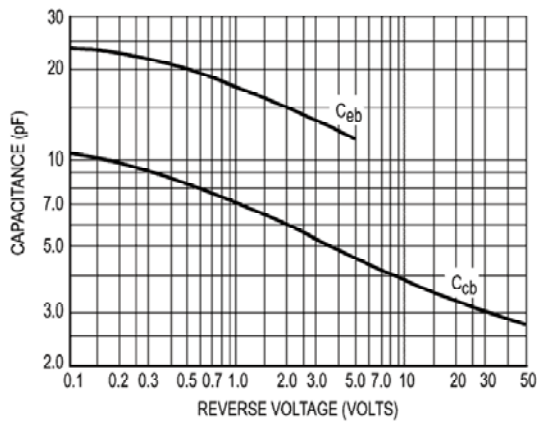


Figure 9. Capacitances

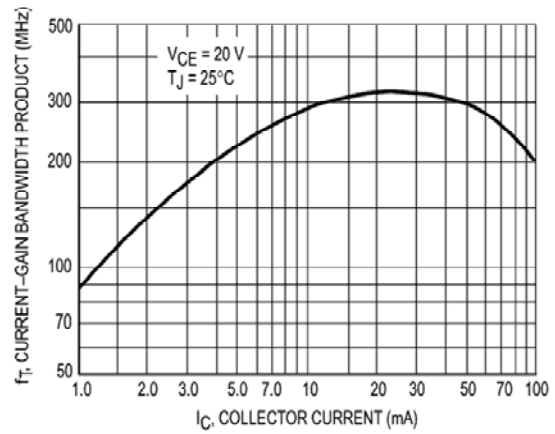


Figure 10. Current-Gain Bandwidth Product

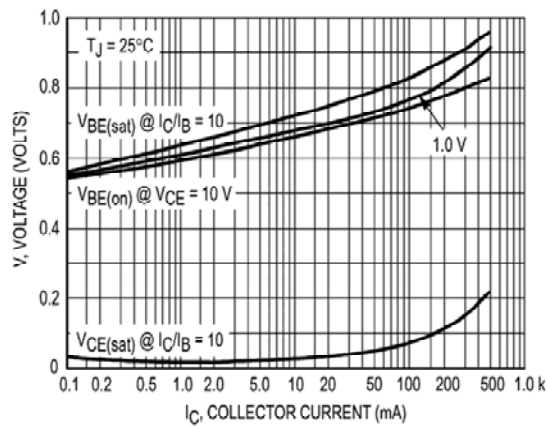


Figure 11. "On" Voltages

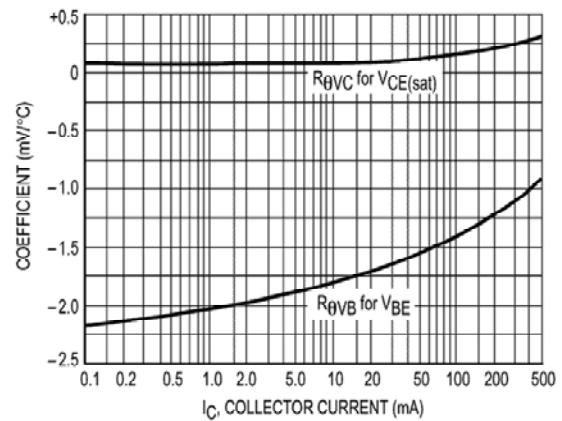


Figure 12. Temperature Coefficients