RECTRON
SEMICONDUCTOR
TECHNICAL SPECIFICATION

**MMBT2222LT1**

# *SOT-23 BIPOLAR TRANSISTORS*
# *TRANSISTOR(NPN)*

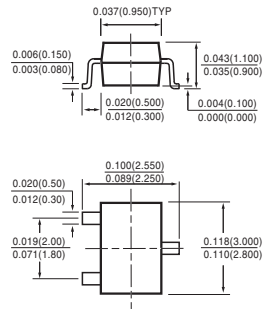
## FEATURES

* Power dissipation
  $P_{CM}$ 0.3 W(Tamb=25°C)
* Collector current
  $I_{CM}$ 0.6 A
* Collector-base voltage
  $V_{(BR)CBO}$: 60 V
* Operating and storage junction temperature range
  $T_J$,Tstg: -55°Cto+150°C

## MECHANICAL DATA

* Case: Molded plastic
* Epoxy: UL 94V-O rate flame retardant
* Lead: MIL-STD-202E method 208C guaranteed
* Mounting position: Any
* Weight: 0.008 gram

SOT-23




Dimensions in inches and (millimeters)

## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified.

| RATINGS | SYMBOL | VALUE | UNITS |
|---|---|---|---|
| Zener Current ( see Table "Characteristics" ) | - | - | - |
| Max. Steady State Power Dissipation (1) @$T_A$=25°C Derate above 25°C | $P_D$ | 300 | mW |
| Max. Operating Temperature Range | $T_J$ | -55 to +150 | °C |
| Storage Temperature Range | $T_{STG}$ | -55 to +150 | °C |

ELECTRICAL CHARACTERISTICS ( At $T_A$ = 25°C unless otherwise noted )

| CHARACTERISTICS | SYMBOL | MIN. | TYP. | MAX. | UNITS |
|---|---|---|---|---|---|
| Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | - | - | 417 | °C/W |
| Max. Instantaneous Forward Voltage at $I_F$= 10mA | $V_F$ | - | - | - | Volts |

NOTES : 1. Alumina=0.4*0.3*0.024in. 99.5% alumina.

**ELECTRICAL CHARACTERISTICS** (@TA=25°C unless otherwise noted)

| Chatacteristic | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | |
| Collector-Emitter Breakdown Voltage ($I_C$= 10mAdc, $I_B$= 0) | $V_{(BR)CEO}$ | 30 | - | Vdc |
| Collector-Base Breakdown Voltage ($I_C$= 10μAdc, $I_E$= 0) | $V_{(BR)CBO}$ | 60 | - | Vdc |
| Emitter-Base Breakdown Voltage ($I_E$= 10μAdc, $I_C$= 0) | $V_{(BR)EBO}$ | 5.0 | - | Vdc |
| Collector Cutoff Current ($V_{CE}$= 60Vdc,$V_{EB(off)}$= 3.0Vdc | $I_{CEX}$ | - | 0.1 | μAdc |
| Collector Cutoff Current ($V_{CB}$= 60Vdc, $I_E$= 0) | $I_{CBO}$ | - | 0.01 | μAdc |
| ($V_{CB}$= 60Vdc, $I_E$= 0, TA= 125°C) | | - | 10 | |
| **ON CHARACTERISTICS** | | | | |
| DC Current Gain ($I_C$= 0.1mAdc, $V_{CE}$= 10Vdc) | hFE | 35 | - | - |
| ($I_C$= 1.0mAdc, $V_{CE}$= 10Vdc) | | 50 | - | |
| ($I_C$= 10mAdc, $V_{CE}$= 10Vdc) | | 75 | - | |
| ($I_C$= 150mAdc, $V_{CE}$= 10Vdc) (2) | | 100 | - | |
| ($I_C$= 500mAdc, $V_{CE}$= 10Vdc) (2) | | 30 | - | |
| Collector-Emitter Saturation Voltage (2) ($I_C$= 150mAdc, $I_B$= 15mAdc) | $V_{CE(sat)}$ | - | 0.4 | Vdc |
| ($I_C$= 500mAdc, $I_B$= 50mAdc) | | - | 1.6 | |
| Base-Emitter Saturation Voltage (2) ($I_C$= 150mAdc, $I_B$= 15mAdc) | $V_{BE(sat)}$ | - | 1.3 | Vdc |
| ($I_C$= 500mAdc, $I_B$= 50mAdc) | | - | 2.6 | |
| **SMALL-SIGNAL CHARACTERISTICS** | | | | |
| Current-Gain-Bandwidth Product (3) ($I_C$= 20mAdc, $V_{CE}$= 20Vdc, f= 100MHz) | $f_T$ | 250 | - | MHz |
| Input Capacitance ($V_{EB}$=0.5Vdc, $I_C$= 0, f= 1.0MHz) | $C_{ibo}$ | - | 30 | pF |

NOTES : 2. Pulse Test: Pulse Width≤300μs,Duty Cycle≤2.0%

3. $f_T$ is defined as the frequency at which $|h_{fe}|$ extrapolates to unity

# RATING AND CHARACTERISTICS CURVES ( MMBT2222LT1 )

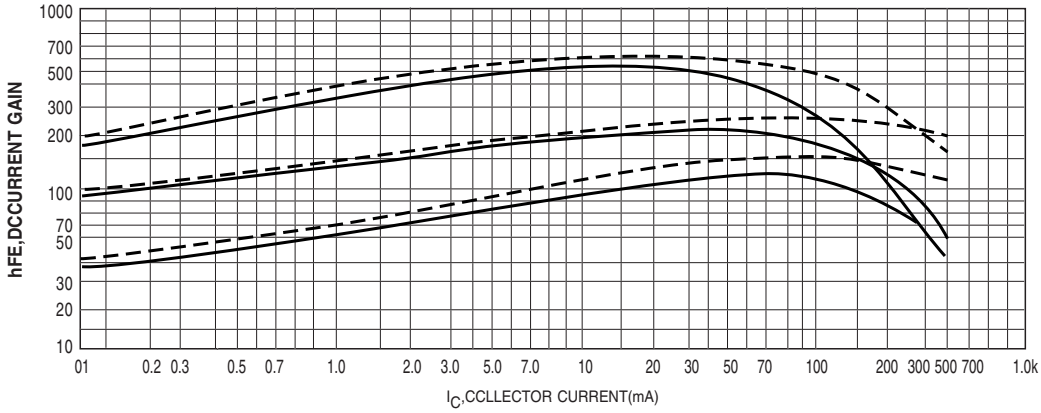



**Figure 1. DC Current Gain**

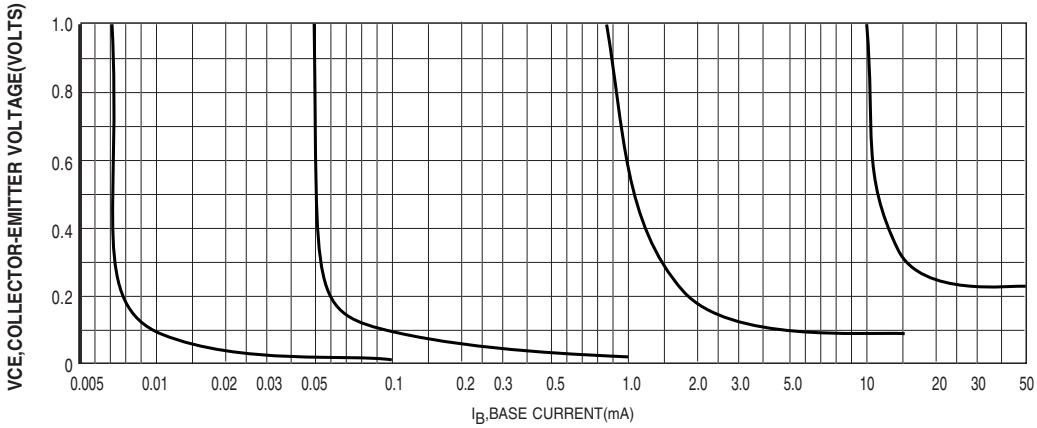



**Figure 2. Collector Saturation Region**

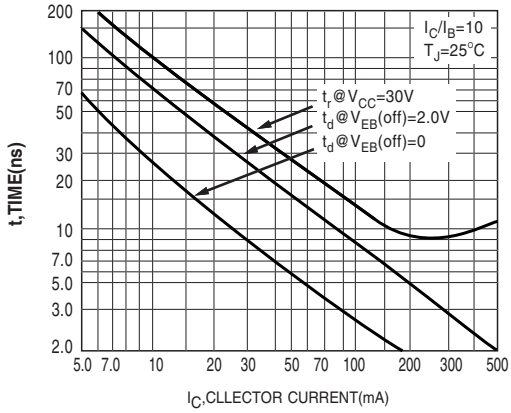



**Figure 3.Turn-On Time**

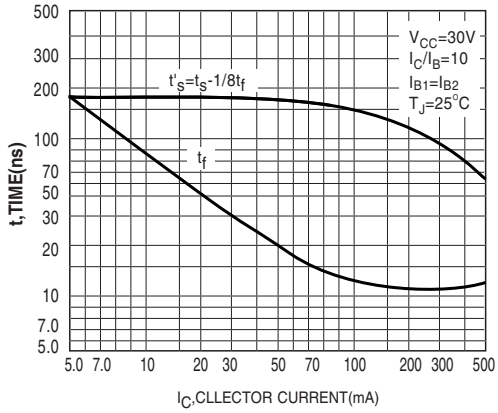



**Figure 4.Turn-Off Time**

# RATING AND CHARACTERISTICS CURVES ( MMBT2222LT1 )

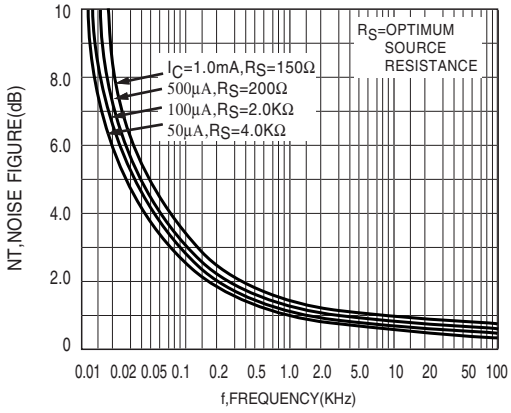



**Figure 5.Frequency Effects**

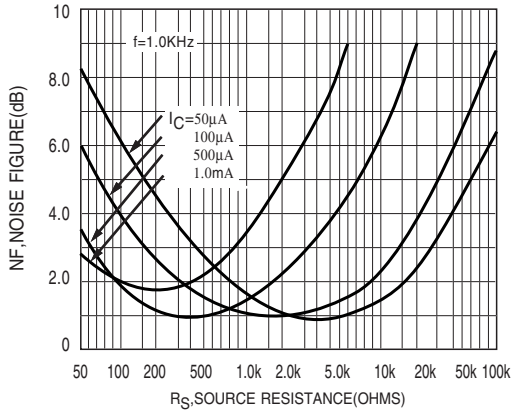



**Figure 6.Source Resistance Effects**

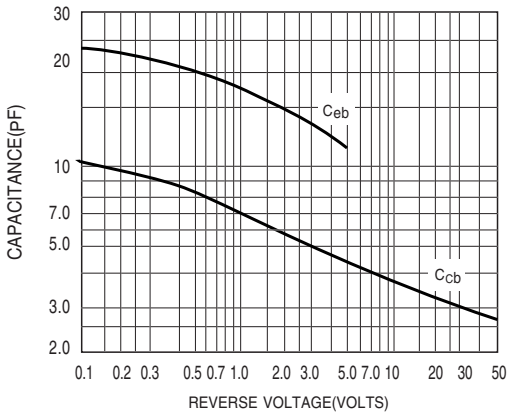



**Figure 7.Capacitances**

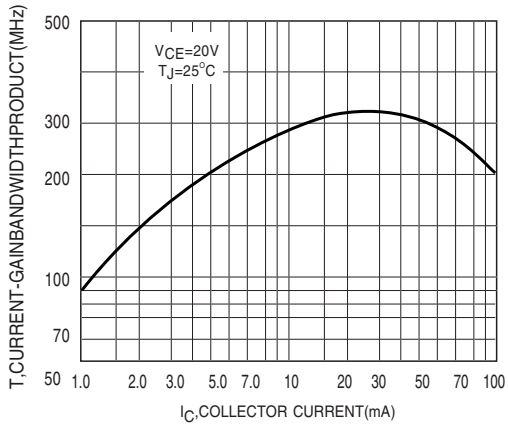



**Figure 8.Currunt-Gain Bandwidth Product**

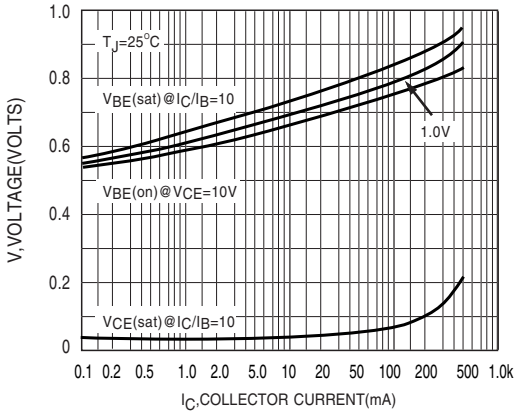



**Figure 9."On" Voltages**

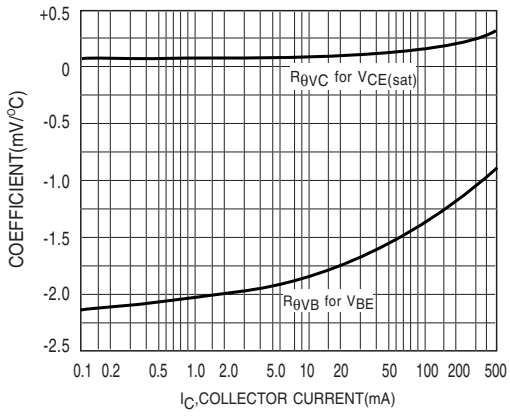



**Figure 10.Temperature Coefficients**