

MMBTA13LT1, MMBTA14LT1

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

OFF CHARACTERISTICS

| | | | | |
|--|---------------|----|-----|-----|
| Collector – Emitter Breakdown Voltage ($I_C = 100\ \mu\text{A}$, $V_{BE} = 0$) | $V_{(BR)CES}$ | 30 | – | Vdc |
| Collector Cutoff Current ($V_{CB} = 30\ \text{Vdc}$, $I_E = 0$) | I_{CBO} | – | 100 | nA |
| Emitter Cutoff Current ($V_{EB} = 10\ \text{Vdc}$, $I_C = 0$) | I_{EBO} | – | 100 | nA |

ON CHARACTERISTICS (Note 3)

| | | | | | |
|---|--------------------|---------------|------------------|-----|-----|
| DC Current Gain ($I_C = 10\ \text{mA}$, $V_{CE} = 5.0\ \text{Vdc}$) | MMBTA13 MMBTA14 | h_{FE} | 5000 10,000 | – | – |
| ($I_C = 100\ \text{mA}$, $V_{CE} = 5.0\ \text{Vdc}$) | MMBTA13 MMBTA14 | | 10,000 20,000 | – | – |
| Collector – Emitter Saturation Voltage ($I_C = 100\ \text{mA}$, $I_B = 0.1\ \text{mA}$) | | $V_{CE(sat)}$ | – | 1.5 | Vdc |
| Base – Emitter On Voltage ($I_C = 100\ \text{mA}$, $V_{CE} = 5.0\ \text{Vdc}$) | | V_{BE} | – | 2.0 | Vdc |

SMALL-SIGNAL CHARACTERISTICS

| | | | | |
|---|-------|-----|---|-----|
| Current – Gain – Bandwidth Product (Note 4) ($I_C = 10\ \text{mA}$, $V_{CE} = 5.0\ \text{Vdc}$, $f = 100\ \text{MHz}$) | f_T | 125 | – | MHz |
|---|-------|-----|---|-----|

3. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

4. $f_T = |h_{fe}| \cdot f_{test}$.

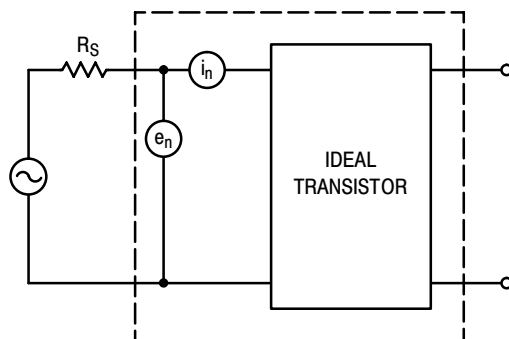


Figure 1. Transistor Noise Model

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NOISE CHARACTERISTICS

($V_{CE} = 5.0 \text{ Vdc}$, $T_A = 25^\circ\text{C}$)

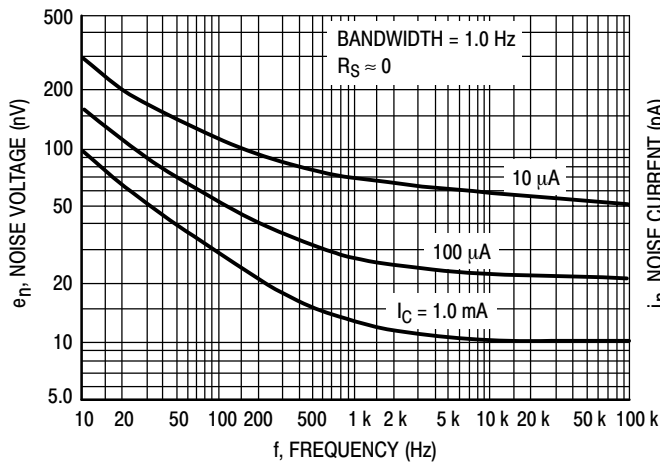


Figure 2. Noise Voltage

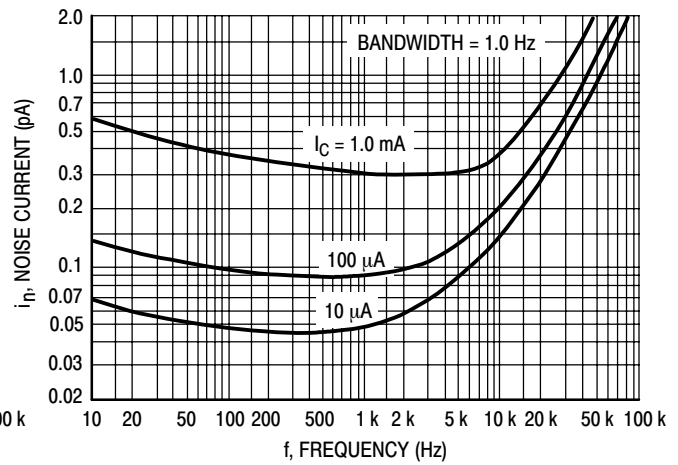


Figure 3. Noise Current

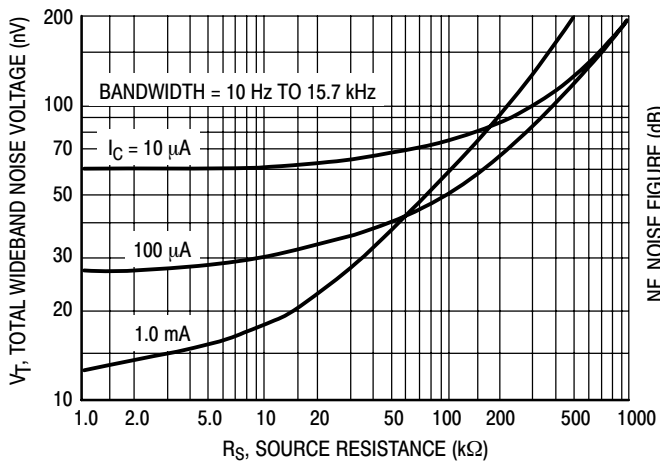


Figure 4. Total Wideband Noise Voltage

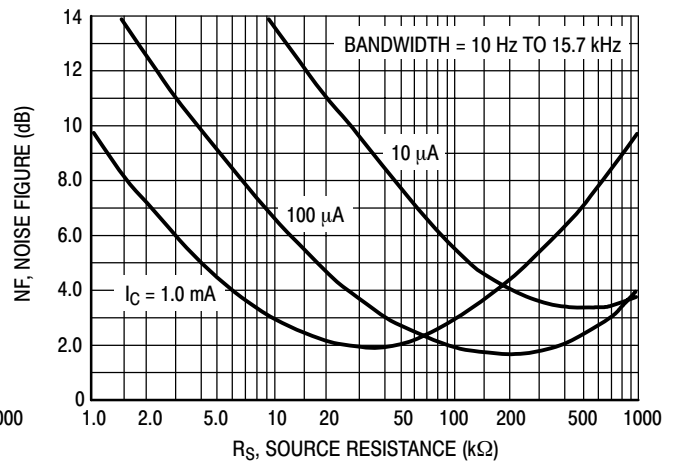


Figure 5. Wideband Noise Figure

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SMALL-SIGNAL CHARACTERISTICS

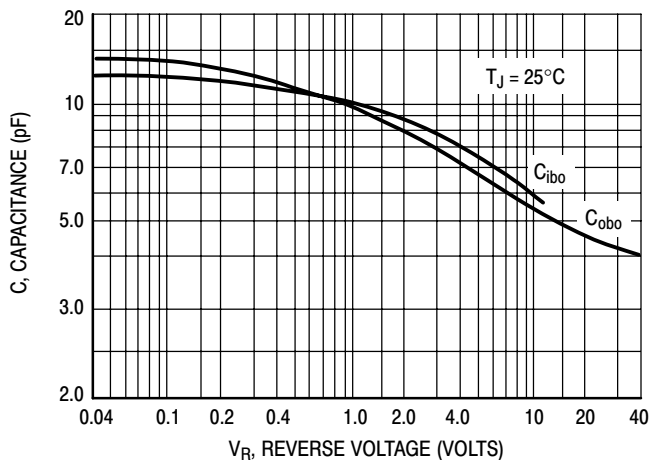


Figure 6. Capacitance

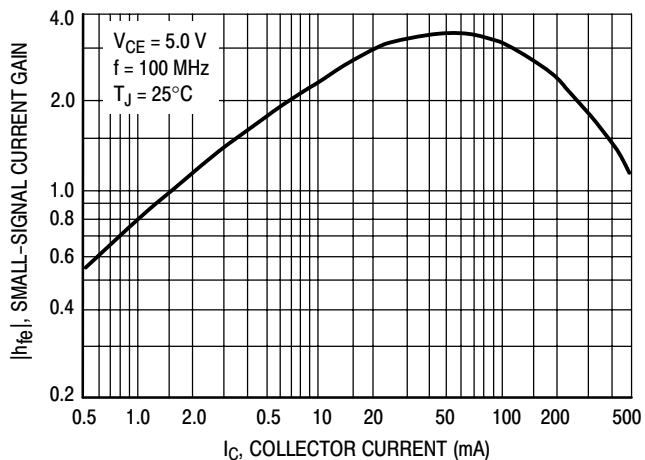


Figure 7. High Frequency Current Gain

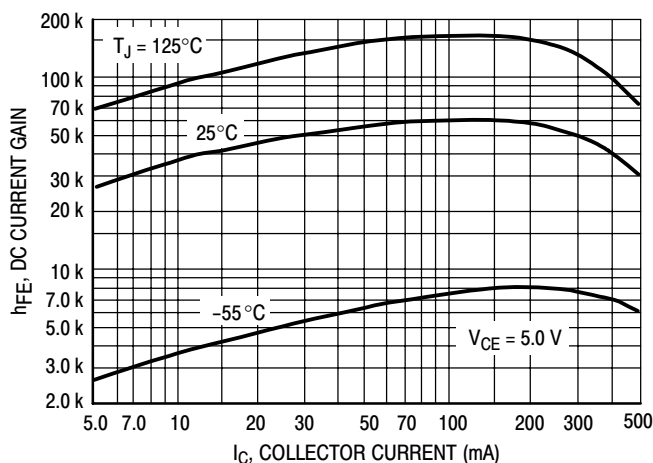


Figure 8. DC Current Gain

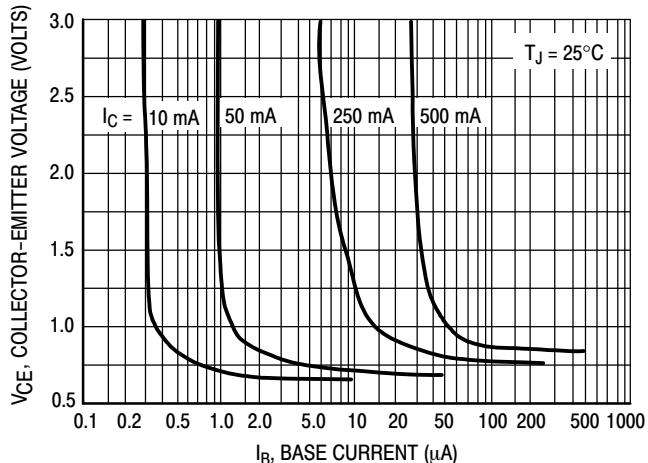


Figure 9. Collector Saturation Region

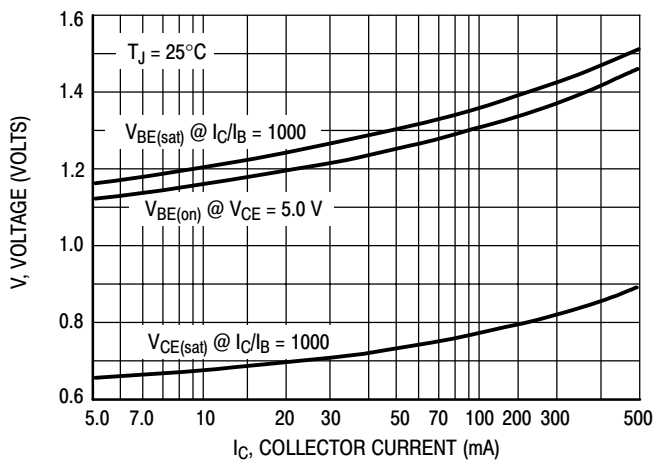


Figure 10. "On" Voltages

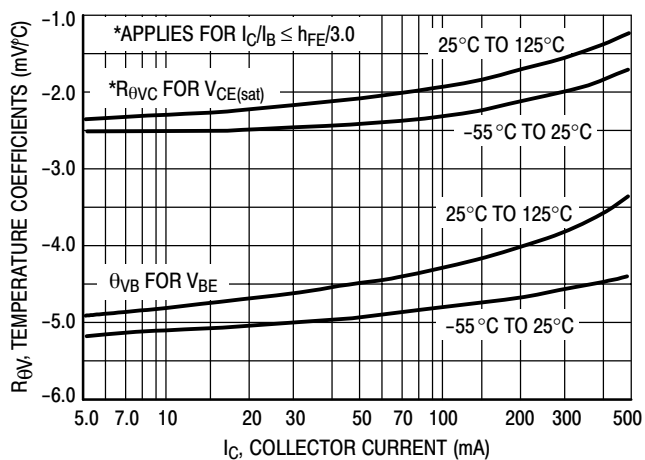


Figure 11. Temperature Coefficients

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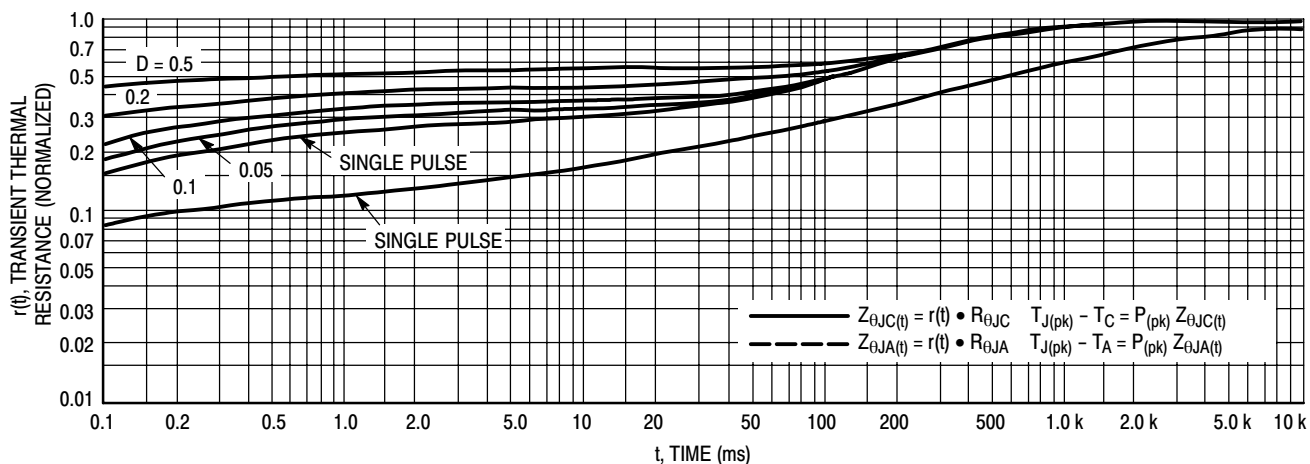


Figure 12. Thermal Response

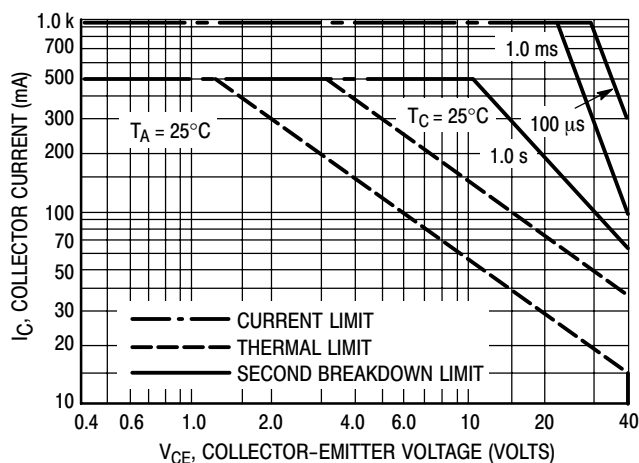
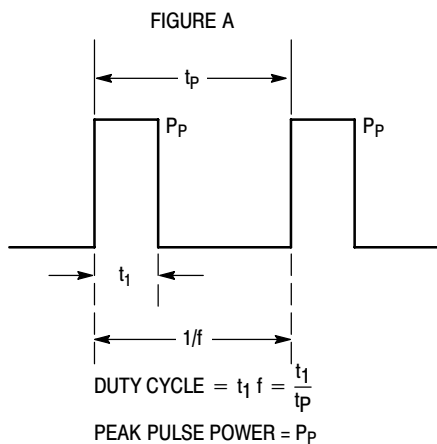


Figure 13. Active Region Safe Operating Area



Design Note: Use of Transient Thermal Resistance Data

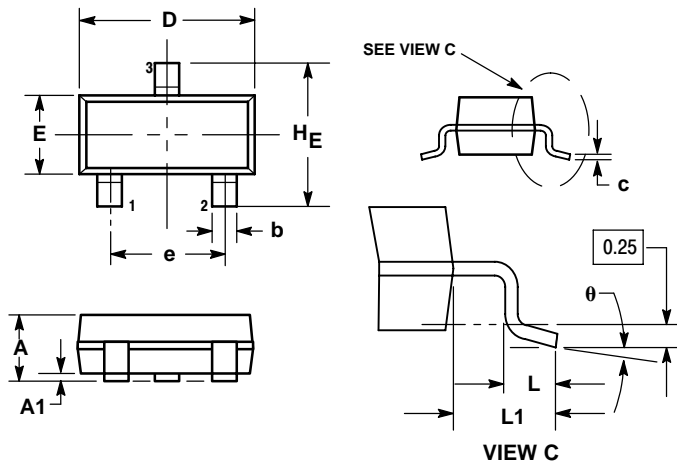
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PACKAGE DIMENSIONS

SOT-23 (TO-236)

CASE 318-08

ISSUE AN



NOTES:

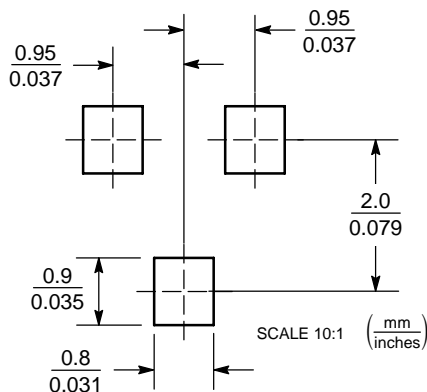
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

| DIM | MILLIMETERS | | | INCHES | | |
|-----|-------------|------|------|--------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.89 | 1.00 | 1.11 | 0.035 | 0.040 | 0.044 |
| A1 | 0.01 | 0.06 | 0.10 | 0.001 | 0.002 | 0.004 |
| b | 0.37 | 0.44 | 0.50 | 0.015 | 0.018 | 0.020 |
| c | 0.09 | 0.13 | 0.18 | 0.003 | 0.005 | 0.007 |
| D | 2.80 | 2.90 | 3.04 | 0.110 | 0.114 | 0.120 |
| E | 1.20 | 1.30 | 1.40 | 0.047 | 0.051 | 0.055 |
| e | 1.78 | 1.90 | 2.04 | 0.070 | 0.075 | 0.081 |
| L | 0.10 | 0.20 | 0.30 | 0.004 | 0.008 | 0.012 |
| L1 | 0.35 | 0.54 | 0.69 | 0.014 | 0.021 | 0.029 |
| HE | 2.10 | 2.40 | 2.64 | 0.083 | 0.094 | 0.104 |

STYLE 6:

1. BASE
2. EMITTER
3. COLLECTOR

SOLDERING FOOTPRINT*



*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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