

MMBT6428LT1, MMBT6429LT1

Amplifier Transistors

NPN Silicon

Features

- Pb-Free Packages are Available

MAXIMUM RATINGS

| Rating | Symbol | 6428LT1 | 6429LT1 | Unit |
|--------------------------------|-----------|---------|---------|------|
| Collector-Emitter Voltage | V_{CEO} | 50 | 45 | Vdc |
| Collector-Base Voltage | V_{CBO} | 60 | 55 | Vdc |
| Emitter-Base Voltage | V_{EBO} | 6.0 | | Vdc |
| Collector Current - Continuous | I_C | 200 | | mAdc |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

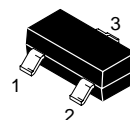
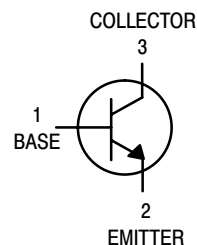
| Rating | Symbol | Value | Unit |
|---|-----------------|-------------|----------------------------|
| Total Device Dissipation FR-5 Board (Note 1) $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 225 | mW |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 1.8 | $\text{mW}/^\circ\text{C}$ |
| Total Device Dissipation Alumina Substrate, (Note 2) $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 300 | mW |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 2.4 | $\text{mW}/^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 417 | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

- FR-5 = $1.0 \times 0.75 \times 0.062$ in.
- Alumina = $0.4 \times 0.3 \times 0.024$ in. 99.5% alumina.



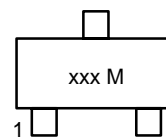
ON Semiconductor®

<http://onsemi.com>



SOT-23 (TO-236)
CASE 318
STYLE 6

MARKING DIAGRAM



xxx = Specific Device Code
MMBT6428LT1 - 1KM
MMBT6429LT1 - 1L
M = Date Code

ORDERING INFORMATION

| Device | Package | Shipping† |
|--------------|---------------------|------------------|
| MMBT6428LT1 | SOT-23 | 3000 Tape & Reel |
| MMBT6428LT1G | SOT-23 (Pb-Free) | 3000 Tape & Reel |
| MMBT6429LT1 | SOT-23 | 3000 Tape & Reel |
| MMBT6429LT1G | SOT-23 (Pb-Free) | 3000 Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

MMBT6428LT1, MMBT6429LT1

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

| Characteristic | | Symbol | Min | Max | Unit |
|---|----------|----------------------|-----|------|------------------|
| OFF CHARACTERISTICS | | | | | |
| Collector–Emitter Breakdown Voltage (I _C = 1.0 mA _{dc} , I _B = 0) (I _C = 1.0 mA _{dc} , I _B = 0) | MMBT6428 | V _{(BR)CEO} | 50 | – | V _{dc} |
| | MMBT6429 | | 45 | – | |
| Collector–Base Breakdown Voltage (I _C = 0.1 mA _{dc} , I _E = 0) (I _C = 0.1 mA _{dc} , I _E = 0) | MMBT6428 | V _{(BR)CBO} | 60 | – | V _{dc} |
| | MMBT6429 | | 55 | – | |
| Collector Cutoff Current (V _{CE} = 30 V _{dc}) | | I _{CES} | – | 0.1 | μA _{dc} |
| Collector Cutoff Current (V _{CB} = 30 V _{dc} , I _E = 0) | | I _{CBO} | – | 0.01 | μA _{dc} |
| Emitter Cutoff Current (V _{EB} = 5.0 V _{dc} , I _C = 0) | | I _{EBO} | – | 0.01 | μA _{dc} |

ON CHARACTERISTICS

| | | | | | |
|---|----------|----------------------|------|------|-----------------|
| DC Current Gain (I _C = 0.01 mA _{dc} , V _{CE} = 5.0 V _{dc}) (I _C = 0.1 mA _{dc} , V _{CE} = 5.0 V _{dc}) (I _C = 1.0 mA _{dc} , V _{CE} = 5.0 V _{dc}) (I _C = 10 mA _{dc} , V _{CE} = 5.0 V _{dc}) | MMBT6428 | h _{FE} | 250 | – | – |
| | MMBT6429 | | 500 | – | |
| | MMBT6428 | | 250 | 650 | |
| | MMBT6429 | | 500 | 1250 | |
| Collector–Emitter Saturation Voltage (I _C = 10 mA _{dc} , I _B = 0.5 mA _{dc}) (I _C = 100 mA _{dc} , I _B = 5.0 mA _{dc}) | | V _{CE(sat)} | – | 0.2 | V _{dc} |
| | | | – | 0.6 | |
| Base–Emitter On Voltage (I _C = 1.0 mA _{dc} , V _{CE} = 5.0 mA _{dc}) | | V _{BE(on)} | 0.56 | 0.66 | V _{dc} |

SMALL–SIGNAL CHARACTERISTICS

| | | | | | |
|---|--|------------------|-----|-----|-----|
| Current–Gain – Bandwidth Product (I _C = 1.0 mA _{dc} , V _{CE} = 5.0 V _{dc} , f = 100 MHz) | | f _T | 100 | 700 | MHz |
| Output Capacitance (V _{CB} = 10 V _{dc} , I _E = 0, f = 1.0 MHz) | | C _{obo} | – | 3.0 | pF |
| Input Capacitance (V _{EB} = 0.5 V _{dc} , I _C = 0, f = 1.0 MHz) | | C _{ibo} | – | 8.0 | pF |

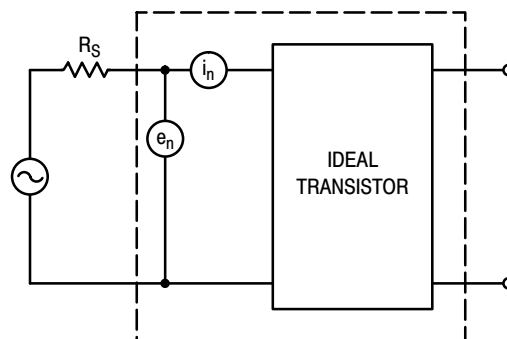


Figure 1. Transistor Noise Model

MMBT6428LT1, MMBT6429LT1

NOISE CHARACTERISTICS

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

NOISE VOLTAGE

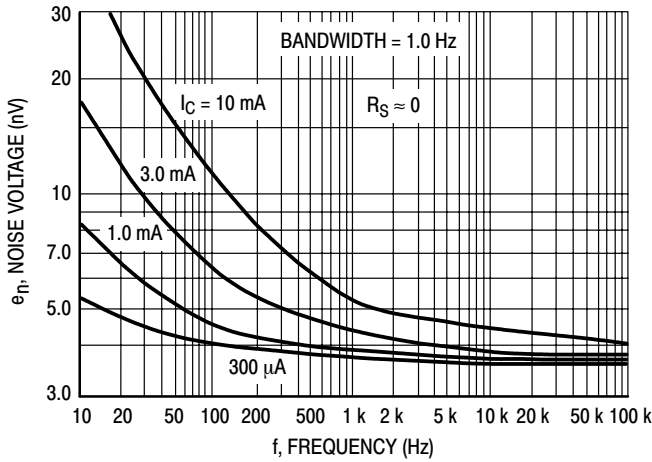


Figure 2. Effects of Frequency

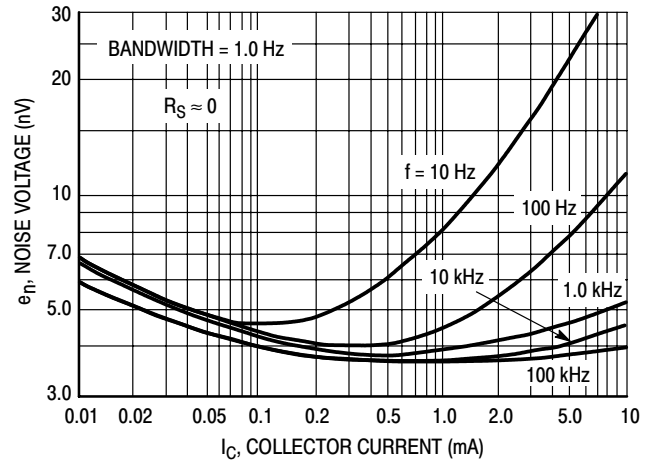


Figure 3. Effects of Collector Current

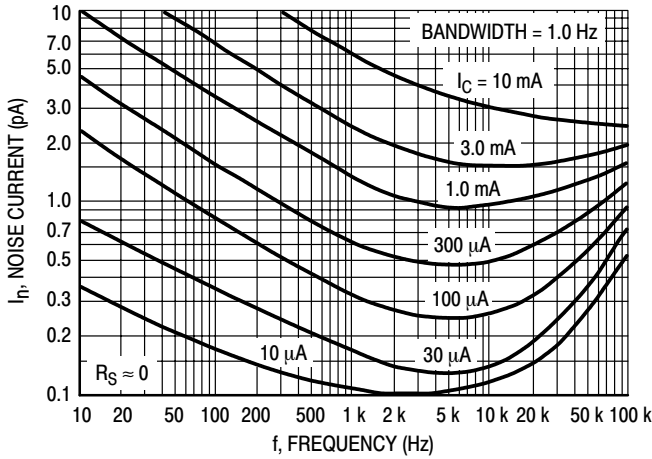


Figure 4. Noise Current

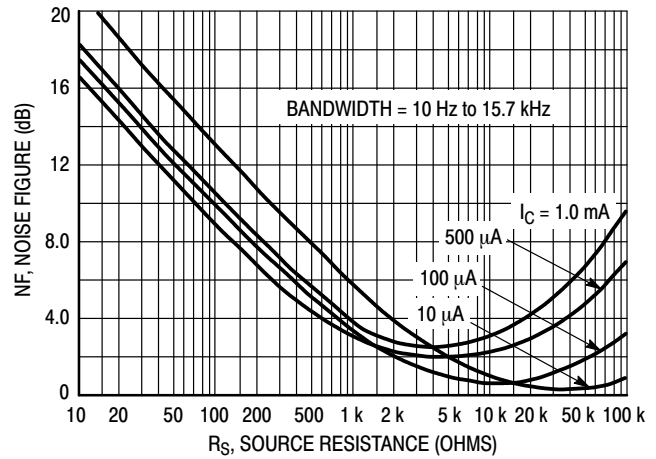


Figure 5. Wideband Noise Figure

100 Hz NOISE DATA

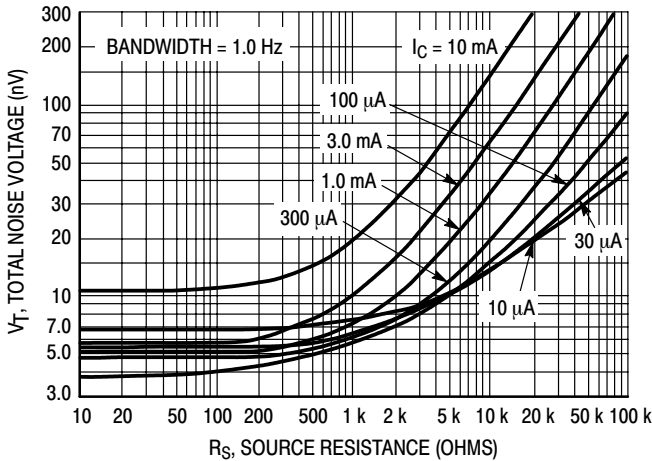


Figure 6. Total Noise Voltage

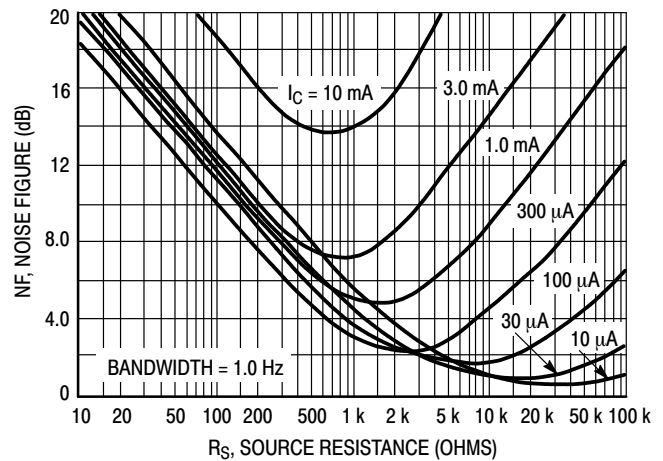


Figure 7. Noise Figure

MMBT6428LT1, MMBT6429LT1

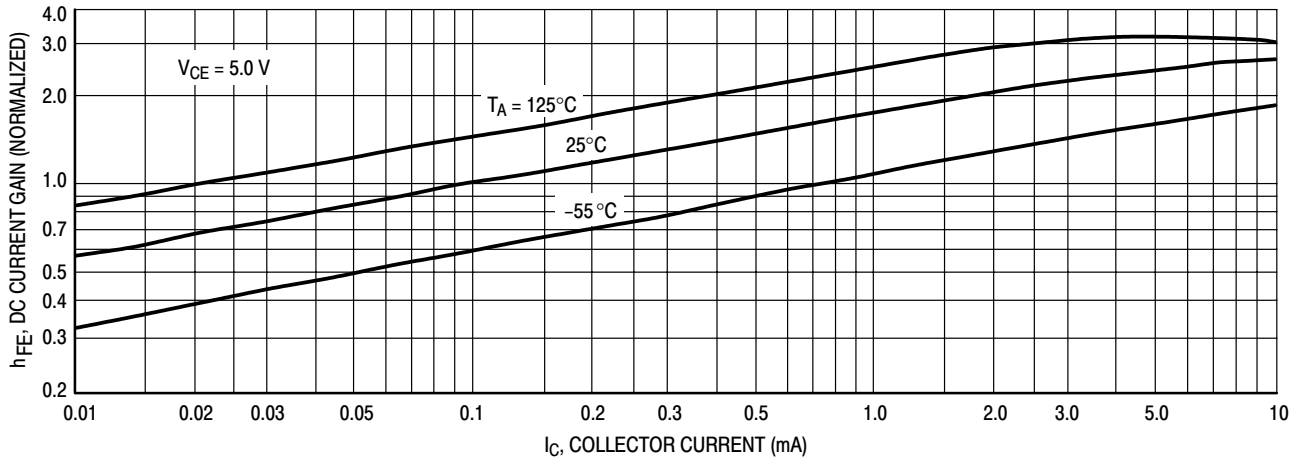


Figure 8. DC Current Gain

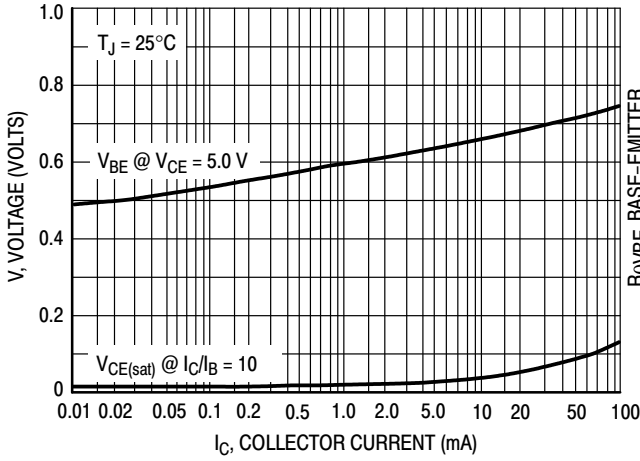


Figure 9. "On" Voltages

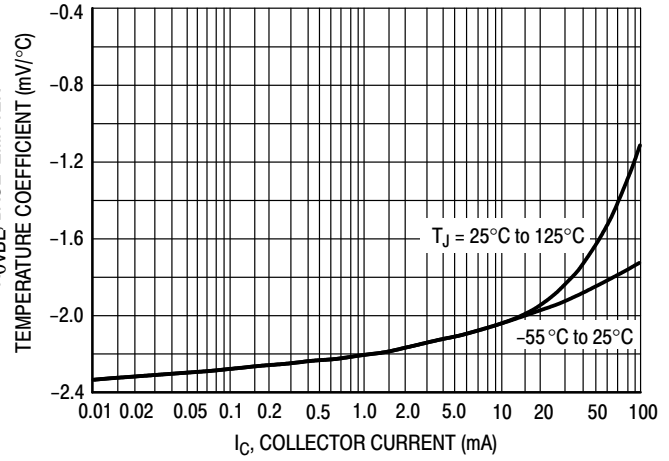


Figure 10. Temperature Coefficients

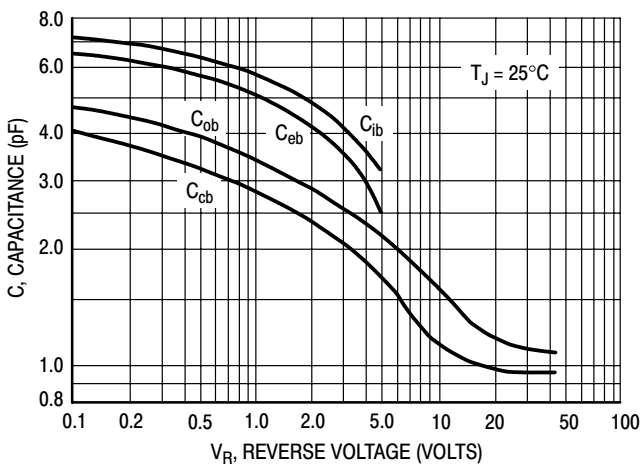


Figure 11. Capacitance

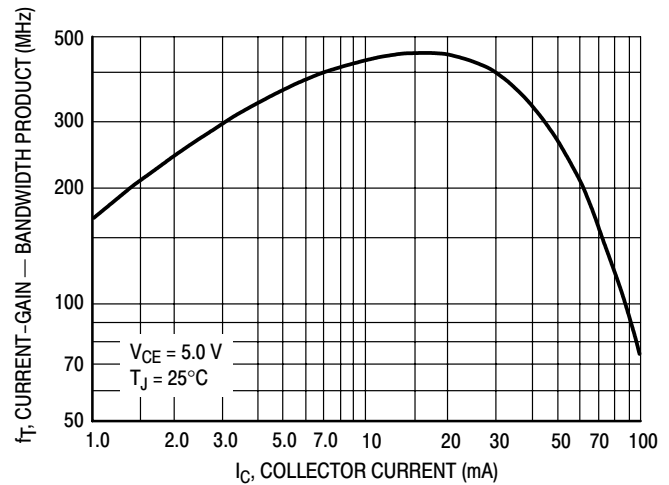
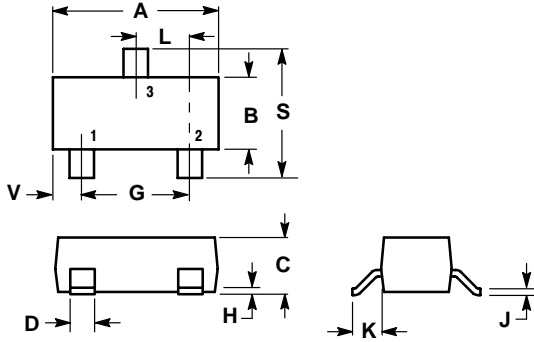


Figure 12. Current-Gain — Bandwidth Product

MMBT6428LT1, MMBT6429LT1

PACKAGE DIMENSIONS

SOT-23 (TO236)
CASE 318-18
ISSUE AK

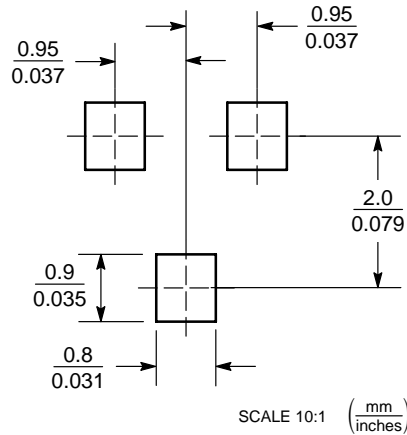


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
 4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

| DIM | INCHES | | MILLIMETERS | |
|-----|--------|--------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.1102 | 0.1197 | 2.80 | 3.04 |
| B | 0.0472 | 0.0551 | 1.20 | 1.40 |
| C | 0.0350 | 0.0440 | 0.89 | 1.11 |
| D | 0.0150 | 0.0200 | 0.37 | 0.50 |
| G | 0.0701 | 0.0807 | 1.78 | 2.04 |
| H | 0.0005 | 0.0040 | 0.013 | 0.100 |
| J | 0.0034 | 0.0070 | 0.085 | 0.177 |
| K | 0.0140 | 0.0285 | 0.35 | 0.69 |
| L | 0.0350 | 0.0401 | 0.89 | 1.02 |
| S | 0.0830 | 0.1039 | 2.10 | 2.64 |
| V | 0.0177 | 0.0236 | 0.45 | 0.60 |


STYLE 6:
PIN 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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