

# 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

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

#### THERMAL CHARACTERISTICS

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

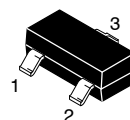
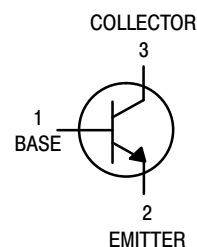
1. FR-5 =  $1.0 \times 0.75 \times 0.062$  in.

2. Alumina =  $0.4 \times 0.3 \times 0.024$  in. 99.5% alumina.



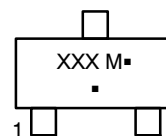
ON Semiconductor®

<http://onsemi.com>



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

#### MARKING DIAGRAM



XXX = Specific Device Code  
MMBT6428LT1 - 1KM  
MMBT6429LT1 - M1L

M = Date Code

■ = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
MMBT6428LT1G	SOT-23 (Pb-Free)	3000 Tape & Reel
MMBT6429LT1	SOT-23	3000 Tape & Reel
MMBT6429LT1G	SOT-23 (Pb-Free)	3000 Tape & Reel

<sup>†</sup>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<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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### OFF CHARACTERISTICS

Collector – Emitter Breakdown Voltage (I <sub>C</sub> = 1.0 mA <sub>dc</sub> , I <sub>B</sub> = 0) (I <sub>C</sub> = 1.0 mA <sub>dc</sub> , I <sub>B</sub> = 0)	MMBT6428 MMBT6429	V <sub>(BR)CEO</sub>	50 45	– –	V <sub>dc</sub>
Collector – Base Breakdown Voltage (I <sub>C</sub> = 0.1 mA <sub>dc</sub> , I <sub>E</sub> = 0) (I <sub>C</sub> = 0.1 mA <sub>dc</sub> , I <sub>E</sub> = 0)	MMBT6428 MMBT6429	V <sub>(BR)CBO</sub>	60 55	– –	V <sub>dc</sub>
Collector Cutoff Current (V <sub>CE</sub> = 30 V <sub>dc</sub> )		I <sub>CES</sub>	–	0.1	μA <sub>dc</sub>
Collector Cutoff Current (V <sub>CB</sub> = 30 V <sub>dc</sub> , I <sub>E</sub> = 0)		I <sub>CBO</sub>	–	0.01	μA <sub>dc</sub>
Emitter Cutoff Current (V <sub>EB</sub> = 5.0 V <sub>dc</sub> , I <sub>C</sub> = 0)		I <sub>EBO</sub>	–	0.01	μA <sub>dc</sub>

### ON CHARACTERISTICS

DC Current Gain (I <sub>C</sub> = 0.01 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> )  (I <sub>C</sub> = 0.1 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> )  (I <sub>C</sub> = 1.0 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> )  (I <sub>C</sub> = 10 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> )	MMBT6428 MMBT6429  MMBT6428 MMBT6429  MMBT6428 MMBT6429  MMBT6428 MMBT6429	h <sub>FE</sub>	250 500  250 500  250 500  250 500	– –  650 1250  – –  – –	–
Collector – Emitter Saturation Voltage (I <sub>C</sub> = 10 mA <sub>dc</sub> , I <sub>B</sub> = 0.5 mA <sub>dc</sub> ) (I <sub>C</sub> = 100 mA <sub>dc</sub> , I <sub>B</sub> = 5.0 mA <sub>dc</sub> )		V <sub>CE(sat)</sub>	– –	0.2 0.6	V <sub>dc</sub>
Base – Emitter On Voltage (I <sub>C</sub> = 1.0 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> )		V <sub>BE(on)</sub>	0.56	0.66	V <sub>dc</sub>

### SMALL-SIGNAL CHARACTERISTICS

Current – Gain – Bandwidth Product (I <sub>C</sub> = 1.0 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> , f = 100 MHz)		f <sub>T</sub>	100	700	MHz
Output Capacitance (V <sub>CB</sub> = 10 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)		C <sub>obo</sub>	–	3.0	pF
Input Capacitance (V <sub>EB</sub> = 0.5 V <sub>dc</sub> , I <sub>C</sub> = 0, f = 1.0 MHz)		C <sub>ibo</sub>	–	8.0	pF

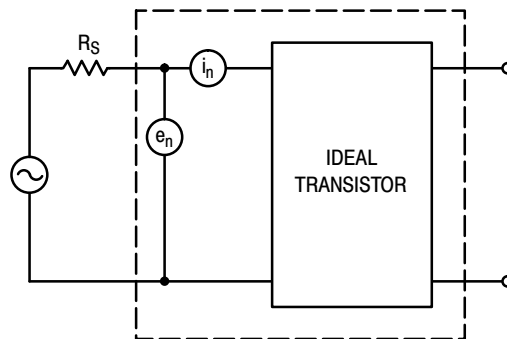


Figure 1. Transistor Noise Model

# MMBT6428LT1, MMBT6429LT1

## NOISE CHARACTERISTICS

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

### NOISE VOLTAGE

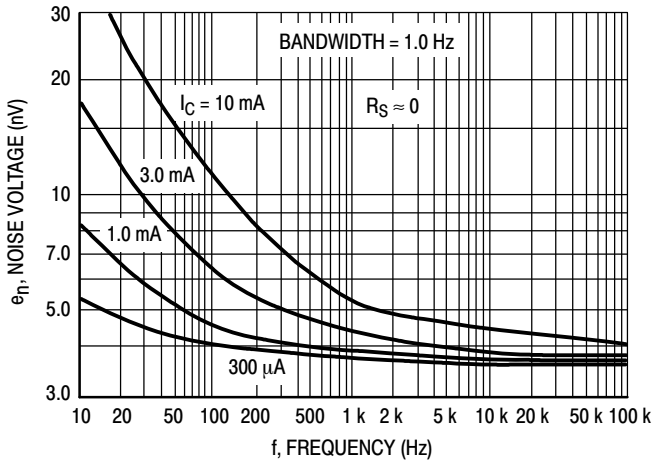


Figure 2. Effects of Frequency

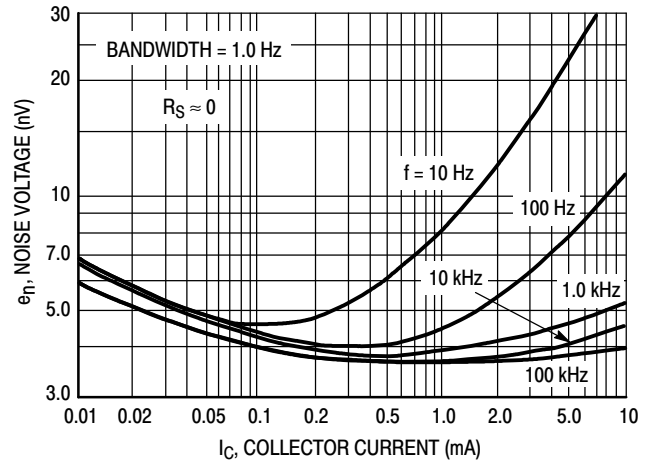


Figure 3. Effects of Collector Current

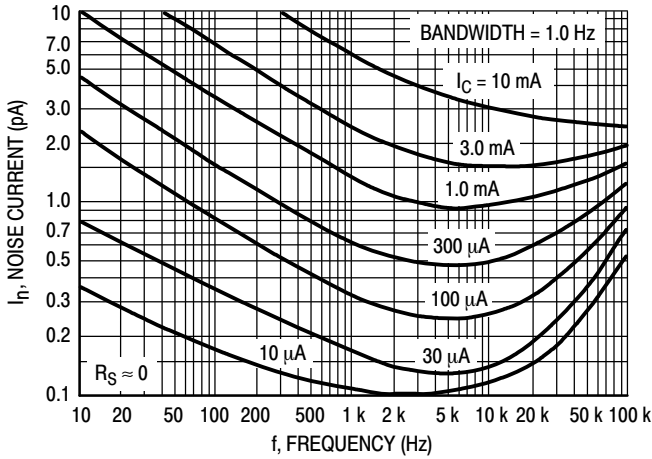


Figure 4. Noise Current

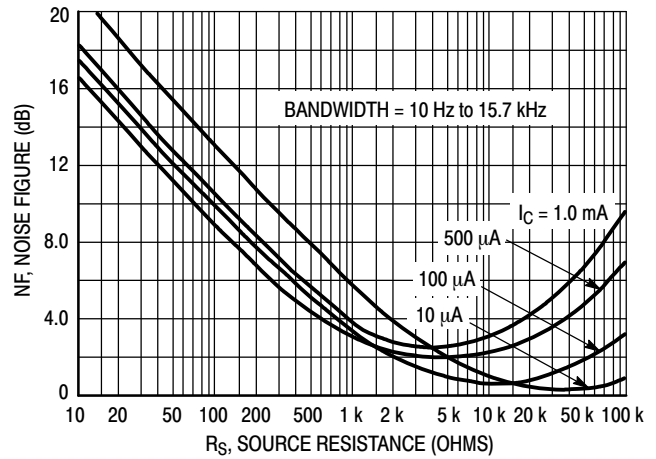


Figure 5. Wideband Noise Figure

### 100 Hz NOISE DATA

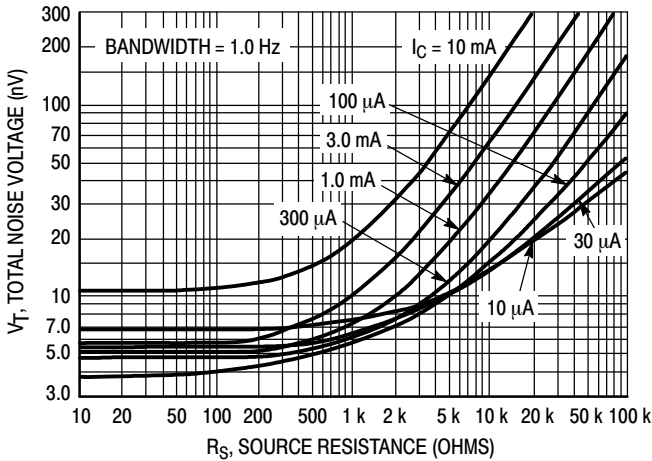


Figure 6. Total Noise Voltage

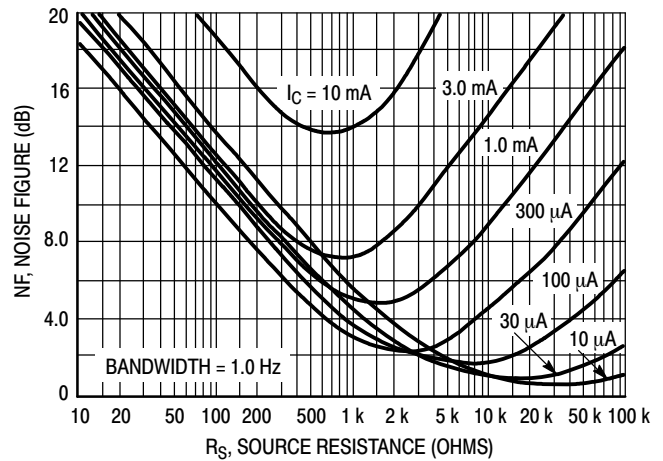


Figure 7. Noise Figure

# MMBT6428LT1, MMBT6429LT1

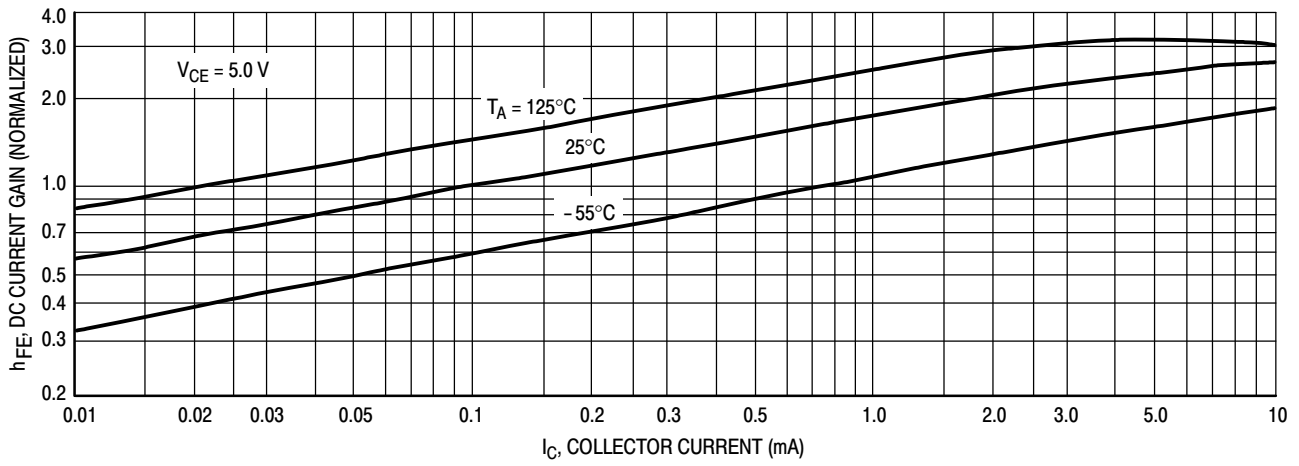


Figure 8. DC Current Gain

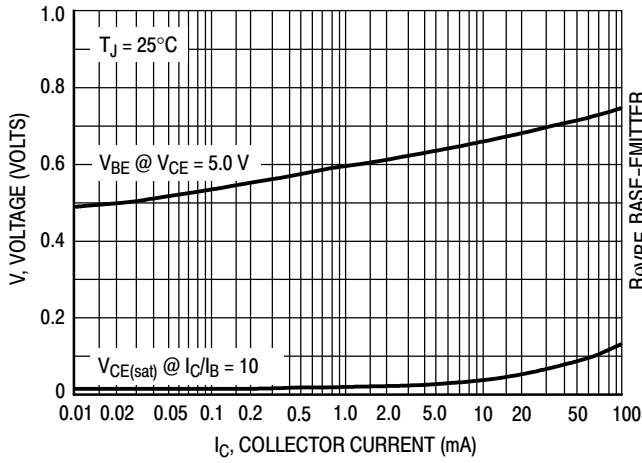


Figure 9. "On" Voltages

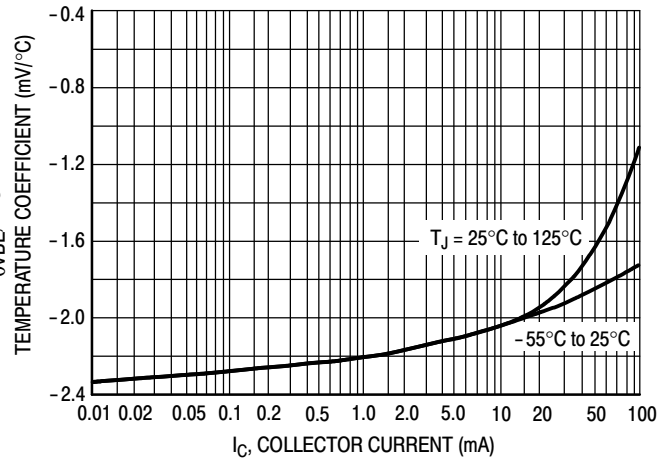


Figure 10. Temperature Coefficients

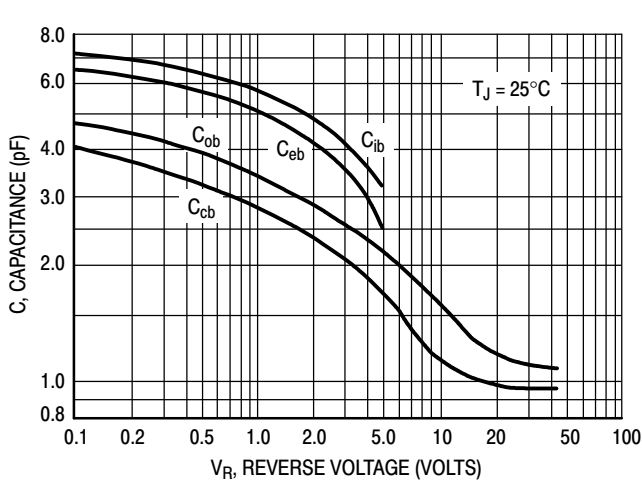


Figure 11. Capacitance

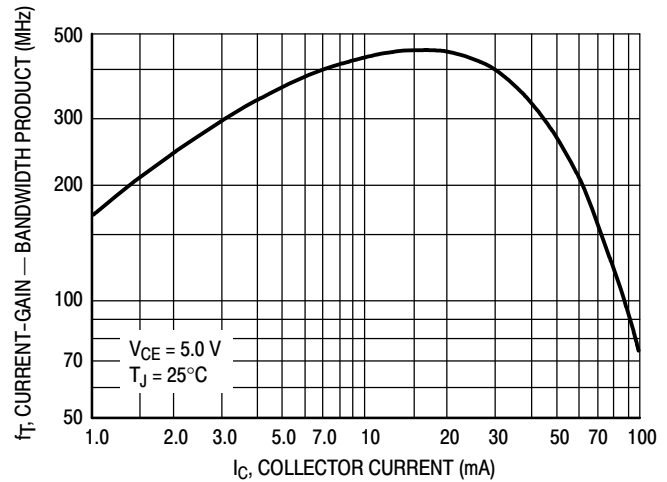
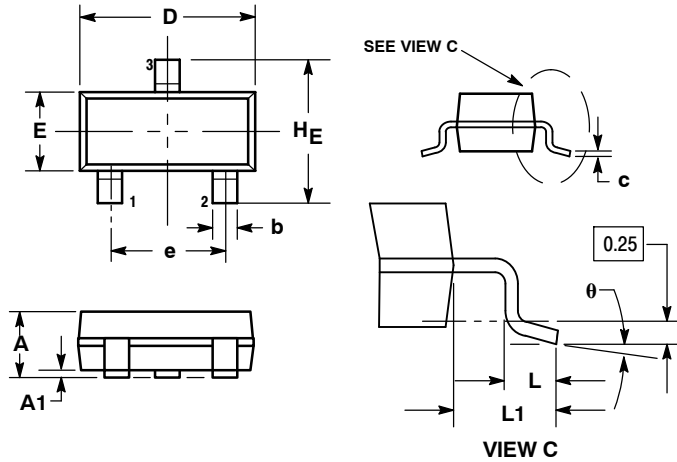


Figure 12. Current-Gain — Bandwidth Product

# MMBT6428LT1, MMBT6429LT1

## PACKAGE DIMENSIONS

SOT-23 (TO236)  
CASE 318-08  
ISSUE AN



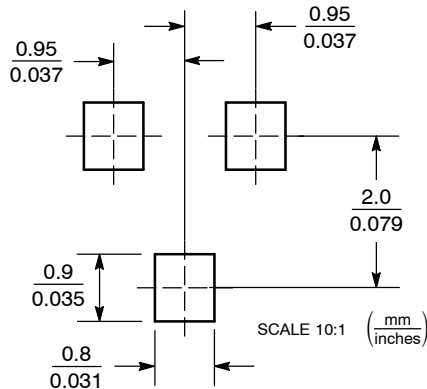
NOTES:

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:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

## SOLDERING FOOTPRINT



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