MMBT6428LT1G, MMBT6429LT1G, NSVMMBT6429LT1G

Amplifier Transistors

NPN Silicon

ON Semiconductor®

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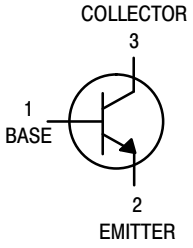
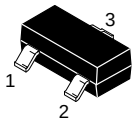
Features

- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant





SOT−23 (TO−236)
CASE 318
STYLE 6

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

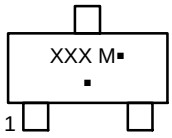
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Rating	Symbol	Value	Unit
Total Device Dissipation FR−5 Board (Note 1) T_A = 25°C Derate above 25°C	P_D	225 1.8	mW mW/°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate, (Note 2) T_A = 25°C Derate above 25°C	P_D	300 2.4	mW mW/°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature	T_J, T_{stg}	−55 to +150	°C

1. FR−5 = 1.0 × 0.75 × 0.062 in.
2. Alumina = 0.4 × 0.3 × 0.024 in. 99.5% alumina.

MARKING DIAGRAM



XXX = Specific Device Code
MMBT6428LT1 − 1KM
NSV/MMBT6429LT1 − M1L
M = Date Code*
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*Date Code orientation and/or overbar may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping†
MMBT6428LT1G	SOT−23 (Pb−Free)	3000 Tape & Reel
MMBT6429LT1G	SOT−23 (Pb−Free)	3000 Tape & Reel
NSVMMBT6429LT1G	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.

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector−Emitter Breakdown Voltage		$V_{(BR)CEO}$			Vdc
(I_C = 1.0 mAdc, I_B = 0)	MMBT6428		50	−	
(I_C = 1.0 mAdc, I_B = 0)	MMBT6429 / NSVMMBT6429		45	−	
Collector−Base Breakdown Voltage		$V_{(BR)CBO}$			Vdc
(I_C = 0.1 mAdc, I_E = 0)	MMBT6428		60	−	
(I_C = 0.1 mAdc, I_E = 0)	MMBT6429 / NSVMMBT6429		55	−	
Collector Cutoff Current		I_{CES}			μAdc
(V_{CE} = 30 Vdc)			−	0.1	
Collector Cutoff Current		I_{CBO}			μAdc
(V_{CB} = 30 Vdc, I_E = 0)			−	0.01	
Emitter Cutoff Current		I_{EBO}			μAdc
(V_{EB} = 5.0 Vdc, I_C = 0)			−	0.01	
ON CHARACTERISTICS					
DC Current Gain		h_{FE}			−
(I_C = 0.01 mAdc, V_{CE} = 5.0 Vdc)	MMBT6428		250	−	
	MMBT6429 / NSVMMBT6429		500	−	
(I_C = 0.1 mAdc, V_{CE} = 5.0 Vdc)	MMBT6428		250	650	
	MMBT6429 / NSVMMBT6429		500	1250	
(I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc)	MMBT6428		250	−	
	MMBT6429 / NSVMMBT6429		500	−	
(I_C = 10 mAdc, V_{CE} = 5.0 Vdc)	MMBT6428		250	−	
	MMBT6429 / NSVMMBT6429		500	−	
Collector−Emitter Saturation Voltage		$V_{CE(sat)}$			Vdc
(I_C = 10 mAdc, I_B = 0.5 mAdc)			−	0.2	
(I_C = 100 mAdc, I_B = 5.0 mAdc)			−	0.6	
Base−Emitter On Voltage		$V_{BE(on)}$			Vdc
(I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc)			0.56	0.66	
SMALL−SIGNAL CHARACTERISTICS					
Current−Gain − Bandwidth Product		f_T			MHz
(I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc, f = 100 MHz)			100	700	
Output Capacitance		C_{obo}			pF
(V_{CB} = 10 Vdc, I_E = 0, f = 1.0 MHz)			−	3.0	
Input Capacitance		C_{ibo}			pF
(V_{EB} = 0.5 Vdc, I_C = 0, f = 1.0 MHz)			−	8.0	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

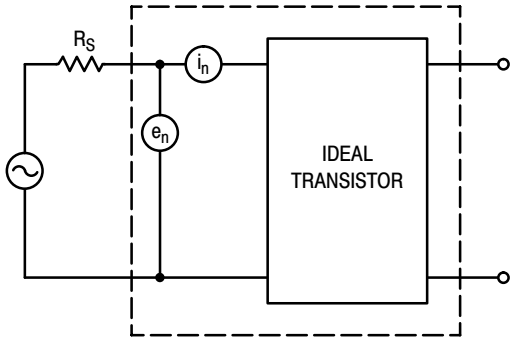


Figure 1. Transistor Noise Model

NOISE CHARACTERISTICS

(V_{CE} = 5.0 Vdc, T_A = 25°C)

NOISE VOLTAGE

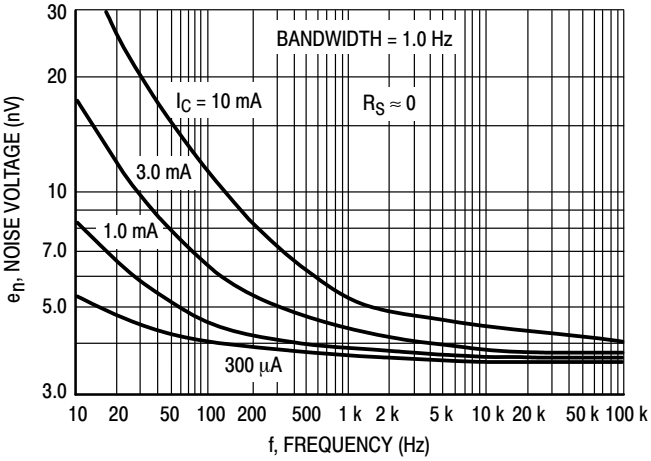


Figure 2. Effects of Frequency

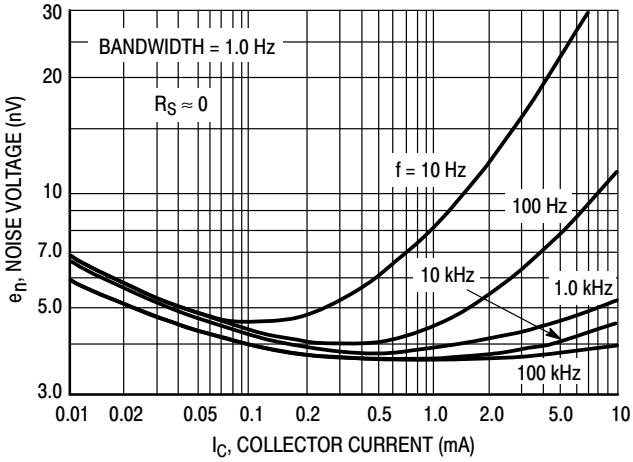


Figure 3. Effects of Collector Current

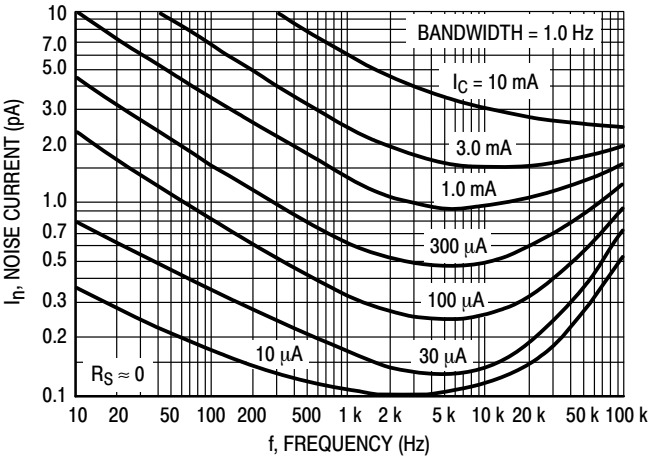


Figure 4. Noise Current

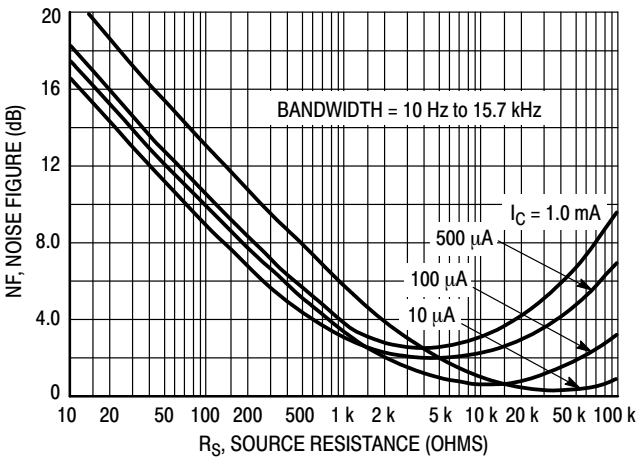


Figure 5. Wideband Noise Figure

100 Hz NOISE DATA

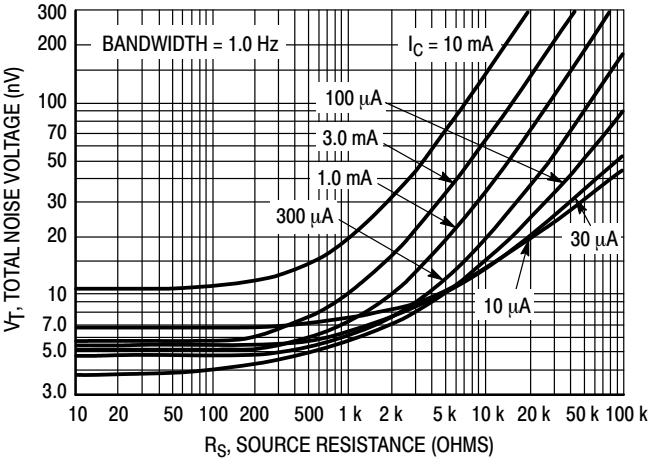


Figure 6. Total Noise Voltage

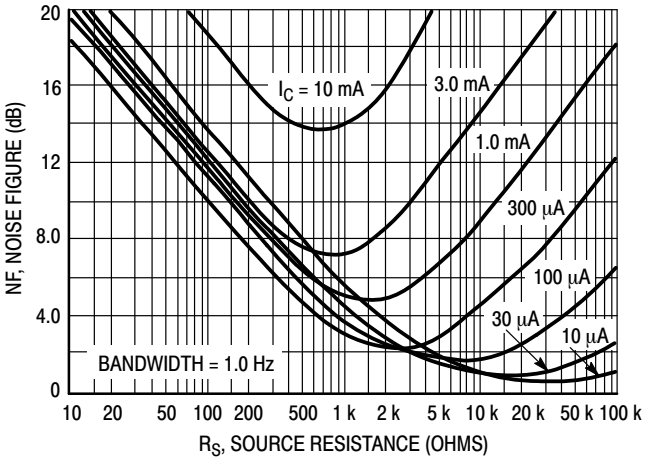


Figure 7. Noise Figure

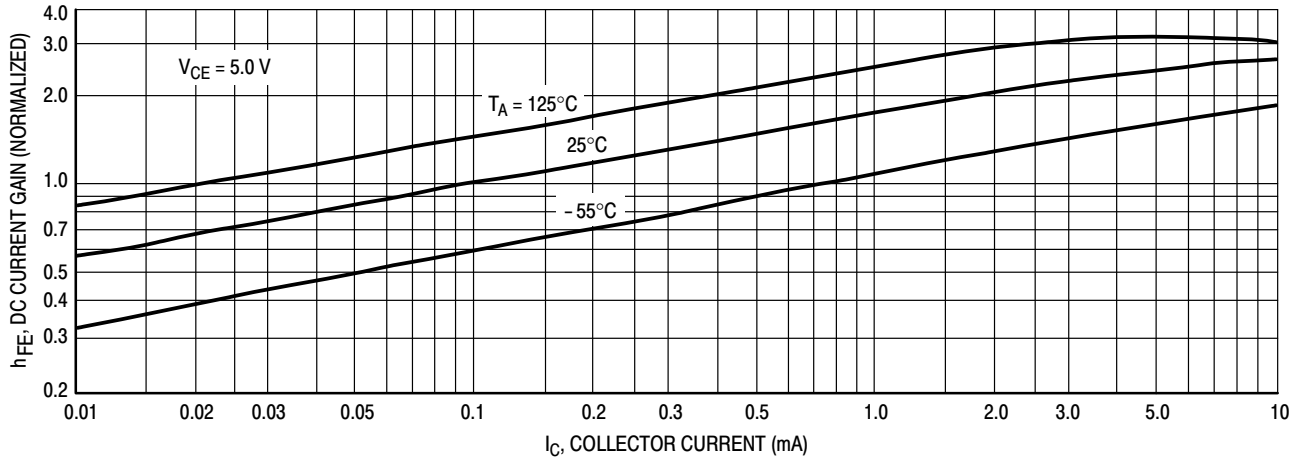


Figure 8. DC Current Gain

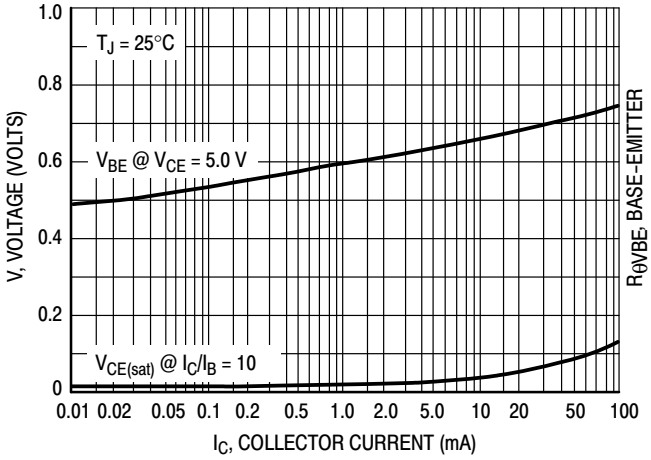


Figure 9. “On” Voltages

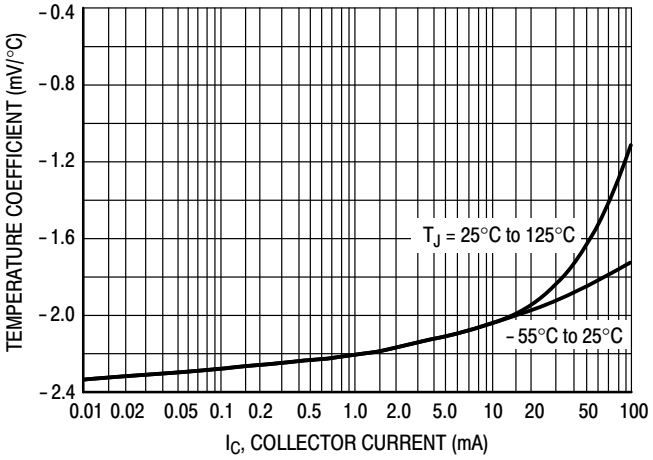


Figure 10. Temperature Coefficients

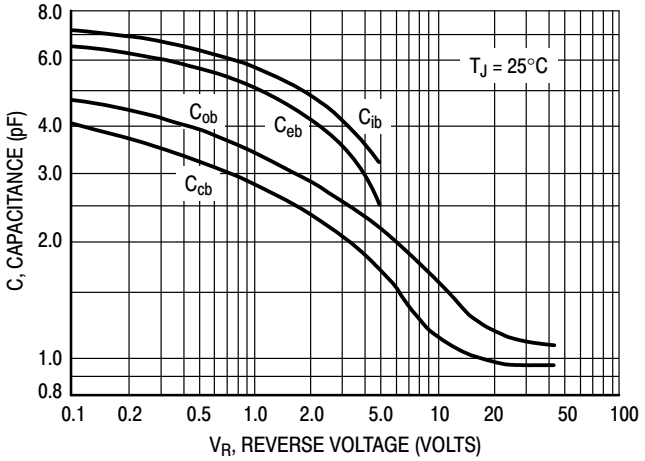


Figure 11. Capacitance

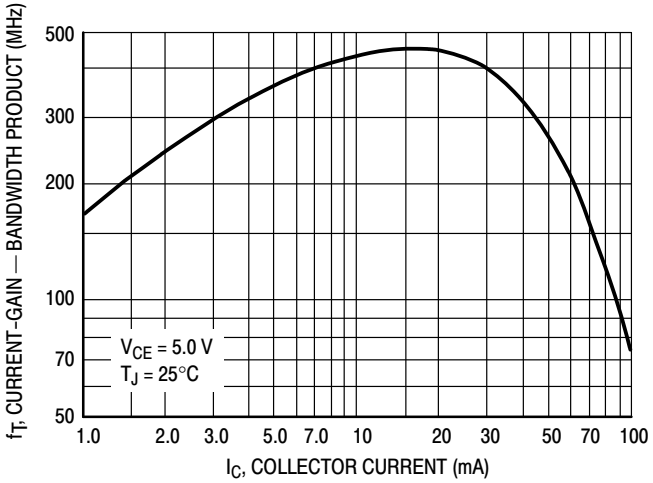
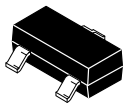


Figure 12. Current−Gain — Bandwidth Product

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

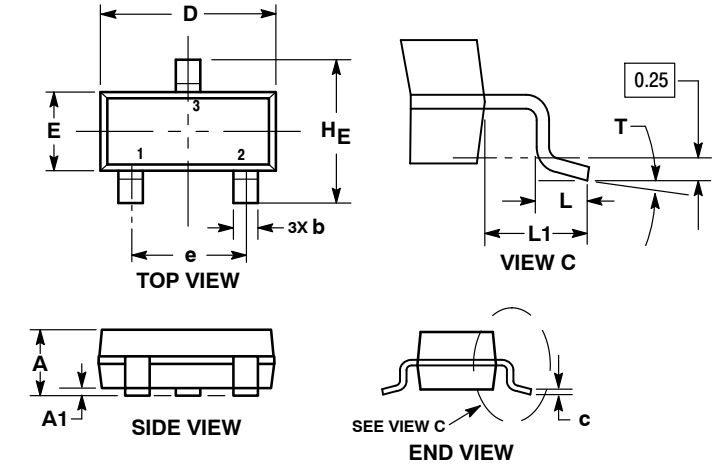
ON Semiconductor®



SOT−23 (TO−236)
CASE 318−08
ISSUE AS

DATE 30 JAN 2018

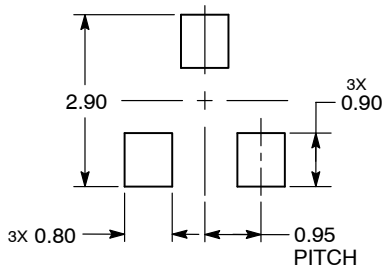
SCALE 4:1



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

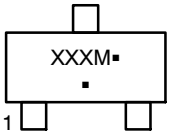
	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.039	0.044
A1	0.01	0.06	0.10	0.000	0.002	0.004
b	0.37	0.44	0.50	0.015	0.017	0.020
c	0.08	0.14	0.20	0.003	0.006	0.008
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.080
L	0.30	0.43	0.55	0.012	0.017	0.022
L1	0.35	0.54	0.69	0.014	0.021	0.027
H_E	2.10	2.40	2.64	0.083	0.094	0.104
T	0°	−−−	10°	0°	−−−	10°

RECOMMENDED SOLDERING FOOTPRINT



DIMENSIONS: MILLIMETERS

GENERIC MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “ ▪”, may or may not be present.

STYLE 1 THRU 5:
CANCELLED

STYLE 6:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 7:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 8:
PIN 1. ANODE
2. NO CONNECTION
3. CATHODE

STYLE 9:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 10:
PIN 1. DRAIN
2. SOURCE
3. GATE

STYLE 11:
PIN 1. ANODE
2. CATHODE
3. CATHODE−ANODE

STYLE 12:
PIN 1. CATHODE
2. CATHODE
3. ANODE

STYLE 13:
PIN 1. SOURCE
2. DRAIN
3. GATE

STYLE 14:
PIN 1. CATHODE
2. GATE
3. ANODE

STYLE 15:
PIN 1. GATE
2. CATHODE
3. ANODE

STYLE 16:
PIN 1. ANODE
2. CATHODE
3. CATHODE

STYLE 17:
PIN 1. NO CONNECTION
2. ANODE
3. CATHODE

STYLE 18:
PIN 1. NO CONNECTION
2. CATHODE
3. ANODE

STYLE 19:
PIN 1. CATHODE
2. ANODE
3. CATHODE−ANODE

STYLE 20:
PIN 1. CATHODE
2. ANODE
3. GATE

STYLE 21:
PIN 1. GATE
2. SOURCE
3. DRAIN

STYLE 22:
PIN 1. RETURN
2. OUTPUT
3. INPUT

STYLE 23:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 24:
PIN 1. GATE
2. DRAIN
3. SOURCE

STYLE 25:
PIN 1. ANODE
2. CATHODE
3. GATE

STYLE 26:
PIN 1. CATHODE
2. ANODE
3. NO CONNECTION

STYLE 27:
PIN 1. CATHODE
2. CATHODE
3. CATHODE

STYLE 28:
PIN 1. ANODE
2. ANODE
3. ANODE

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DESCRIPTION:	SOT−23 (TO−236)	PAGE 1 OF 1

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