

The RF Line  
**NPN Silicon**  
**High-Frequency Transistor**

Designed for thick and thin-film circuits using surface mount components and requiring low-noise, high-gain signal amplification at frequencies to 1.0 GHz.

- High Gain —  $G_{pe} = 17$  dB Typ @  $f = 450$  MHz
- Low Noise —  $NF = 2.5$  dB Typ @  $f = 450$  MHz
- Available in tape and reel packaging options:  
 T1 suffix = 3,000 units per reel

**MMBR5031LT1**

**RF AMPLIFIER  
 TRANSISTOR  
 NPN SILICON**

**MAXIMUM RATINGS**

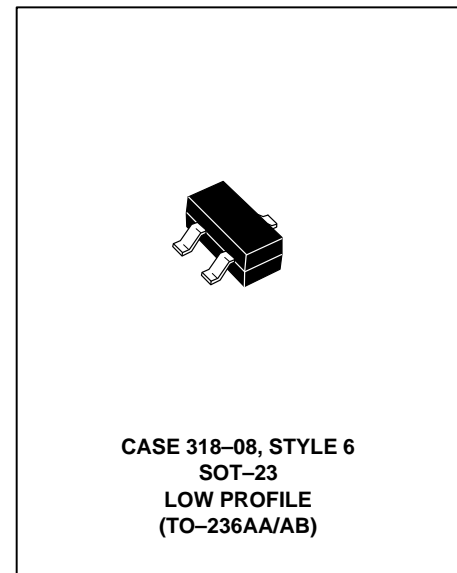
Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	10	Vdc
Collector-Base Voltage	$V_{CBO}$	15	Vdc
Emitter-Base Voltage	$V_{EBO}$	3.0	Vdc
Collector Current — Continuous	$I_C$	20	mAdc
Maximum Junction Temperature	$T_{Jmax}$	150	°C
Power Dissipation, $T_{case} = 75^\circ\text{C}$ (1) Derate linearly above $T_{case} = 75^\circ\text{C}$ @	$P_{D(max)}$	0.300 4.00	W mW/°C

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Storage Temperature	$T_{stg}$	-55 to +150	°C
Thermal Resistance Junction to Case	$R_{\theta JC}$	250	°C/W

**DEVICE MARKING**

MMBR5031LT1 = 7G
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**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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**OFF CHARACTERISTICS**

Collector-Emitter Breakdown Voltage ( $I_C = 1.0$ mAdc, $I_B = 0$ )	$V_{(BR)CEO}$	10	—	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = 0.01$ mAdc, $I_E = 0$ )	$V_{(BR)CBO}$	15	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 0.01$ mAdc, $I_C = 0$ )	$V_{(BR)EBO}$	3.0	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = 6.0$ Vdc, $I_E = 0$ )	$I_{CBO}$	—	—	10	nAdc

**ON CHARACTERISTICS**

DC Current Gain ( $I_C = 1.0$ mAdc, $V_{CE} = 6.0$ Vdc)	$h_{FE}$	25	—	300	—
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**SMALL-SIGNAL CHARACTERISTICS**

Current-Gain — Bandwidth Product ( $I_C = 5.0$ mAdc, $V_{CE} = 6.0$ Vdc, $f = 100$ MHz)	$f_T$	—	1,000	—	MHz
Collector-Base Capacitance ( $V_{CE} = 6.0$ Vdc, $I_E = 0$ , $f = 0.1$ MHz)	$C_{cb}$	—	—	1.5	pF
Minimum Noise Figure ( $I_C = 1.0$ mAdc, $V_{CE} = 6.0$ Vdc, $f = 450$ MHz)	$NF_{min}$	—	2.5	—	dB
Common-Emitter Amplifier Power Gain ( $I_C = 1.0$ mAdc, $V_{CE} = 6.0$ Vdc, $f = 450$ MHz)	$G_{pe}$	—	17	25	dB

NOTE:

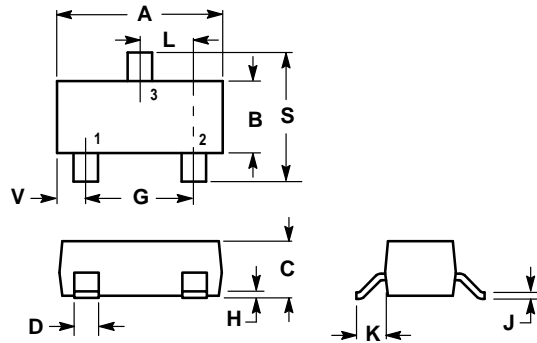
1. Case temperature measured on collector lead immediately adjacent to body of package.

Freescale Semiconductor, Inc. ARCHIVE INFORMATION

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# Freescale Semiconductor, Inc.

## PACKAGE DIMENSIONS



### 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.

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
- EMITTER
- COLLECTOR

**CASE 318-08  
ISSUE AF**

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MMBR5031LT1/D

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