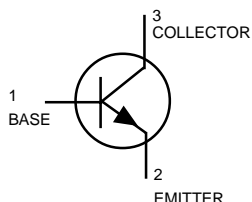
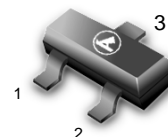


# VHF Mixer Transistors

## NPN Silicon


**MMBTH24LT1**

 CASE 318-08, STYLE 6  
 SOT-23 (TO-236AB)

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	30	Vdc
Collector-Base Voltage	$V_{CBO}$	40	Vdc
Emitter-Base Voltage	$V_{EBO}$	4.0	Vdc
Collector Current -Continuous	$I_C$	50	mAdc

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board, (1) $T_A = 25^\circ\text{C}$	$P_D$	225	mW
Derate above 25°C		1.8	mW/°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate, (2) $T_A = 25^\circ\text{C}$	$P_D$	300	mW
Derate above 25°C		2.4	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

### DEVICE MARKING

MMBTH24LT1 = M3A

### 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 ( $I_C = 1.0 \text{ mAdc}, I_E = 0$ )	$V_{(BR)CEO}$	30	—	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = 100 \mu\text{Adc}, I_E = 0$ )	$V_{(BR)CBO}$	40	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 10 \mu\text{Adc}, I_C = 0$ )	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = 15\text{Vdc}, I_E = 0$ )	$I_{CBO}$	—	—	50	nAdc

1. FR-5 = 1.0 x 0.75 x 0.062 in.

2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

**MMBTH24LT1**
**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>ON CHARACTERISTICS</b>					
DC Current Gain ( $I_C = 8.0\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )	$h_{FE}$	30	—	—	—
<b>SMALL-SIGNAL CHARACTERISTICS</b>					
Current Gain–Bandwidth Product ( $V_{CE} = 10\text{ Vdc}$ , $I_C = 8.0\text{ mAdc}$ , $f = 100\text{ MHz}$ )	$f_T$	400	620	—	MHz
Collector –Base Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{cb}$	—	0.25	0.45	pF
Conversion Gain (213MHz to 45MHz) ( $V_{CC} = 20\text{ Vdc}$ , $I_C = 8.0\text{ mAdc}$ , Oscillator Injection = 150 mVrms)	—	—	—	—	dB
(60MHz to 45MHz) ( $V_{CC} = 20\text{ Vdc}$ , $I_C = 8.0\text{ mAdc}$ , Oscillator Injection = 150 mVrms)	$C_G$	19	24	—	
		24	20	—	

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