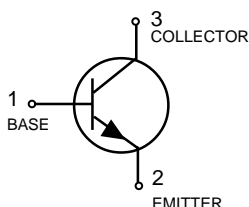
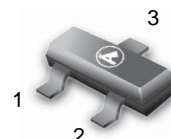


## VHF/UHF Transistors


**LMBTH10QLT1**

**SOT-23**

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	25	Vdc
Collector–Base Voltage	$V_{CBO}$	30	Vdc
Emitter–Base Voltage	$V_{EBO}$	3.0	Vdc

### 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

LMBTH10QLT1 = 3EQ

### 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 ( $I_C = 1.0 \text{ mAdc}, I_E = 0$ )	$V_{(BR)CEO}$	25	—	—	Vdc
Collector–Base Breakdown Voltage ( $I_C = 100 \mu\text{Adc}, I_E = 0$ )	$V_{(BR)CBO}$	30	—	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 10 \mu\text{Adc}, I_C = 0$ )	$V_{(BR)EBO}$	3.0	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = 25\text{Vdc}, I_E = 0$ )	$I_{CBO}$	—	—	100	nAdc
Emitter Cutoff Current ( $V_{EB} = 2.0\text{Vdc}, I_C = 0$ )	$I_{EBO}$	—	—	100	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.

**LMBTH10QLT1**
**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted) (Continued)

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

DC Current Gain ( $I_C = 4.0\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )	$h_{FE}$	120	—	—	—
Collector–Emitter Saturation Voltage ( $I_C = 4.0\text{ mA}$ , $I_B = 0.4\text{ mA}$ )	$V_{CE(sat)}$	—	—	0.5	Vdc
Base–Emitter On Voltage ( $I_C = 4.0\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )	$V_{BE}$	—	—	0.95	Vdc

**SMALL–SIGNAL CHARACTERISTICS**

Current Gain–Bandwidth Product ( $V_{CE} = 10\text{ Vdc}$ , $I_C = 4.0\text{ mA}$ , $f = 100\text{ MHz}$ )	$f_T$	650	—	—	MHz
Collector –Base Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{cb}$	—	—	0.7	pF
Collector –Base Feedback Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{fb}$	—	—	0.65	pF
Collector Base Time Constant ( $I_C = 4.0\text{ mA}$ , $V_{CB} = 10\text{ Vdc}$ , $f = 31.8\text{ MHz}$ )	$r_b' C_C$	—	—	9.0	ps

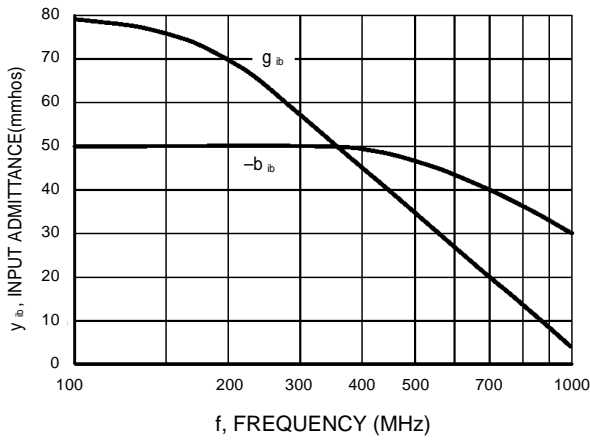
**LMBTH10QLT1**

**TYPICAL CHARACTERISTICS**

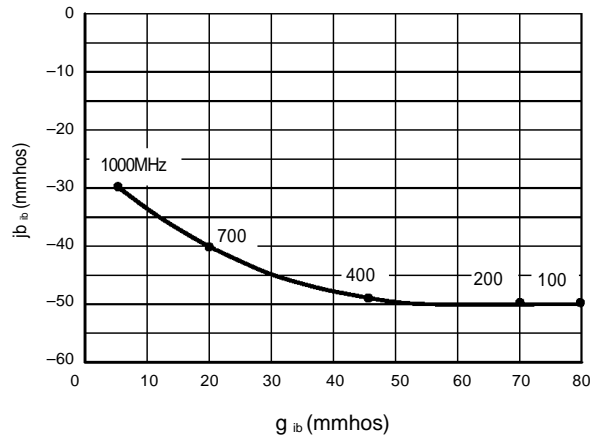
**COMMON-BASE y PARAMETERS versus FREQUENCY**

( $V_{CB} = 10 \text{ Vdc}$ ,  $I_C = 4.0 \text{ mAdc}$ ,  $T_A = 25^\circ\text{C}$ )

**$y_{ib}$ , INPUT ADMITTANCE**

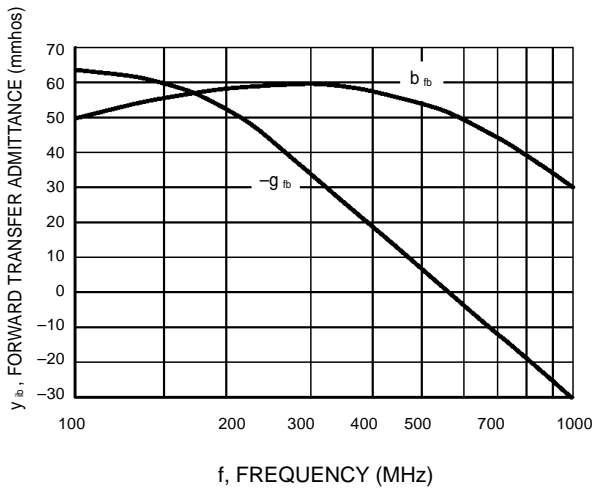


**Figure 1. Rectangular Form**

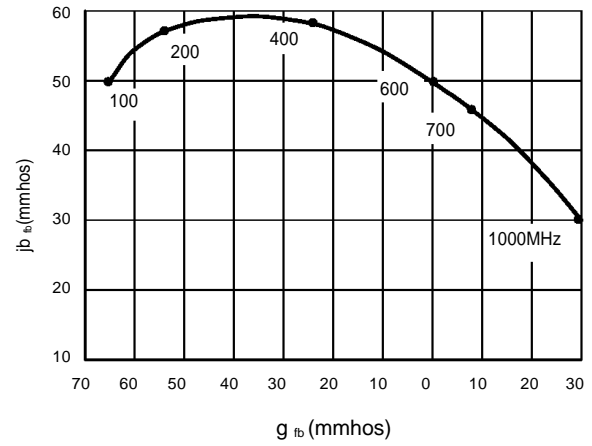


**Figure 2. Polar Form**

**$y_{fb}$ , FORWARD TRANSFER ADMITTANCE**



**Figure 3. Rectangular Form**



**Figure 4. Polar Form**

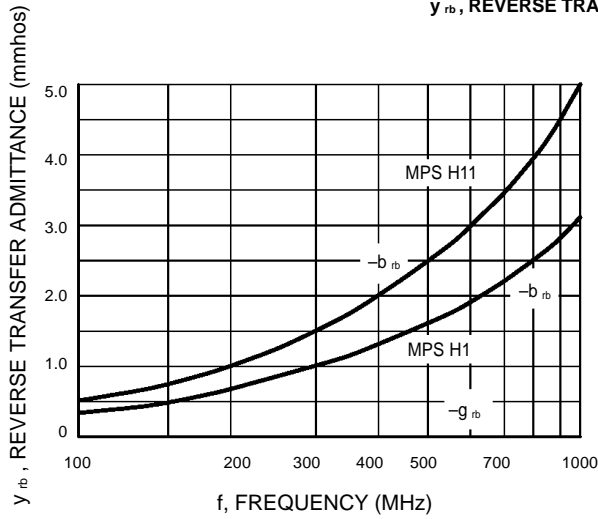
**LMBTH10QLT1**

**TYPICAL CHARACTERISTICS**

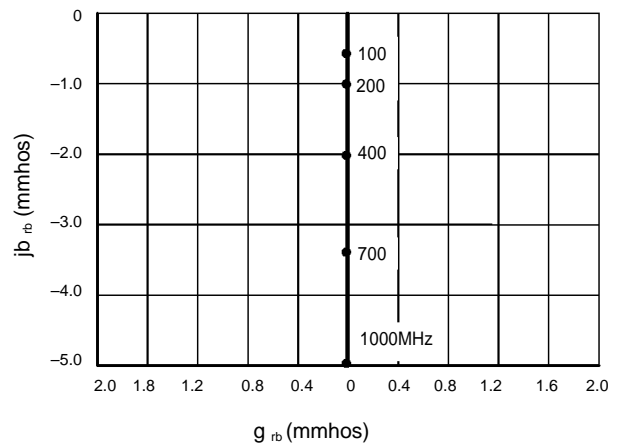
**COMMON-BASE  $y$  PARAMETERS versus FREQUENCY**

( $V_{CB} = 10$  Vdc,  $I_C = 4.0$  mAdc,  $T_A = 25^\circ\text{C}$ )

$y_{rb}$ , REVERSE TRANSFER ADMITTANCE

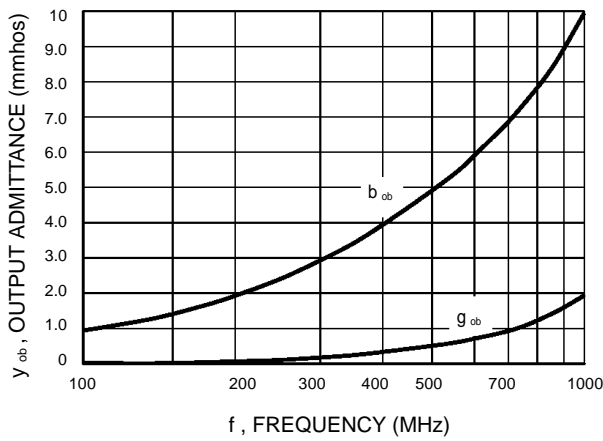


**Figure 5. Rectangular Form**

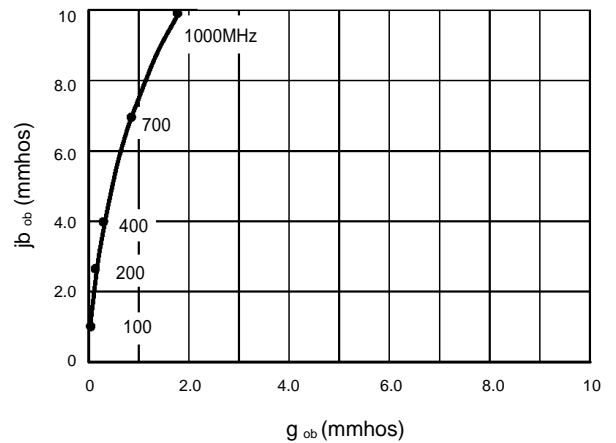


**Figure 6. Polar Form**

**$y_{ob}$ , OUTPUT ADMITTANCE**



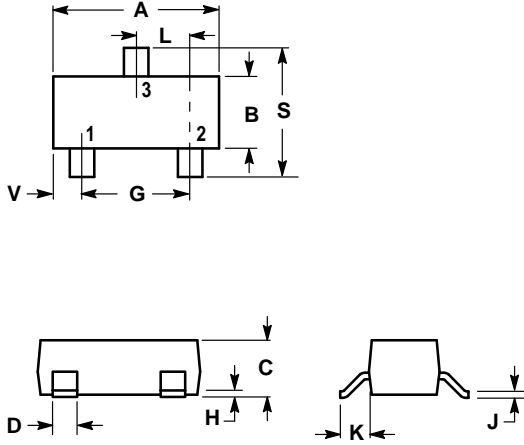
**Figure 7. Rectangular Form**



**Figure 8. Polar Form**

**LMBTH10QLT1**

**SOT-23**



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

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

- PIN 1. BASE  
 2. EMITTER  
 3. COLLECTOR

