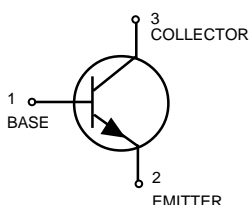
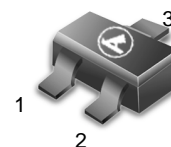


# VHF/UHF Transistors



**LMBTH10QWT1**



**SC-70/SOT-323**

## 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 $25^\circ\text{C}$		1.8	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	$^\circ\text{C/W}$
Total Device Dissipation Alumina Substrate, (2) $T_A = 25^\circ\text{C}$	$P_D$	300	mW
Derate above $25^\circ\text{C}$		2.4	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Junction and Storage Temperature	$T_J, T_{stg}$	–55 to +150	$^\circ\text{C}$

## DEVICE MARKING

LMBTH10QWT1 = 3Q

## 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 ( $I_C = 100\text{ }\mu\text{Adc}, I_E = 0$ )	$V_{(BR)CBO}$	30	—	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 10\text{ }\mu\text{Adc}, I_C = 0$ )	$V_{(BR)EBO}$	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 =  $1.0 \times 0.75 \times 0.062$  in.

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

**LMBTH10QWT1**
**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted) (Continued)

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

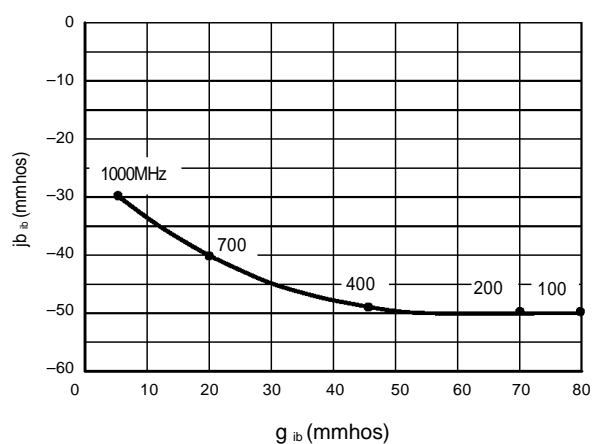
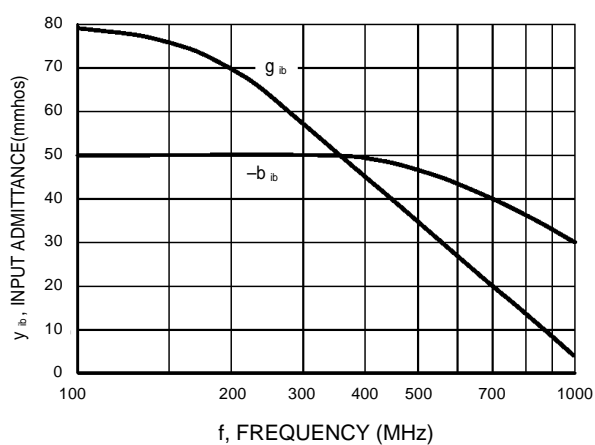
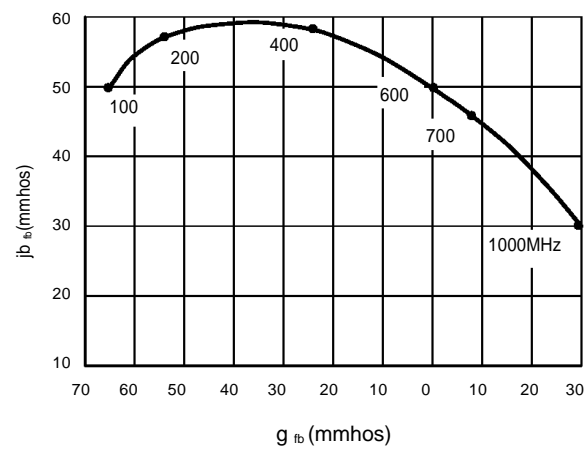
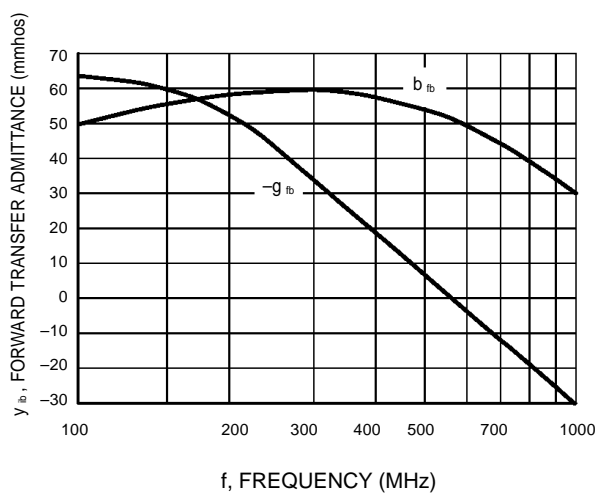
DC Current Gain ( $I_C = 4.0\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )	$h_{FE}$	120	—	—	—
Collector–Emitter Saturation Voltage ( $I_C = 4.0\text{ mAdc}$ , $I_B = 0.4\text{ mAdc}$ )	$V_{CE(sat)}$	—	—	0.5	Vdc
Base–Emitter On Voltage ( $I_C = 4.0\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )	$V_{BE}$	—	—	0.95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

**SMALL–SIGNAL CHARACTERISTICS**

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

**LMBTH10QWT1**
**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**

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


## LMBTH10QWT1

### 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

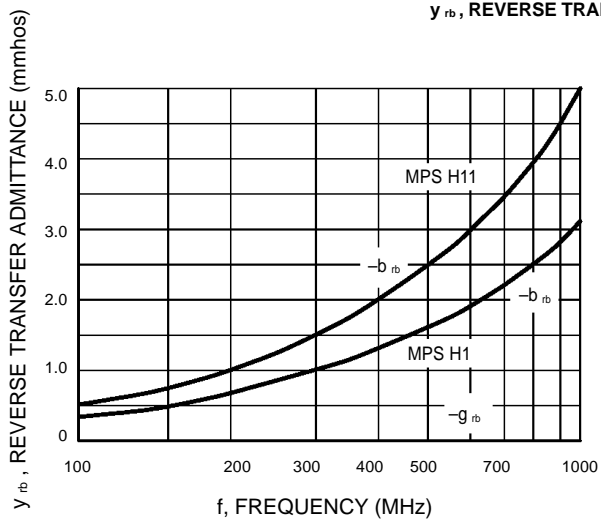


Figure 5. Rectangular Form

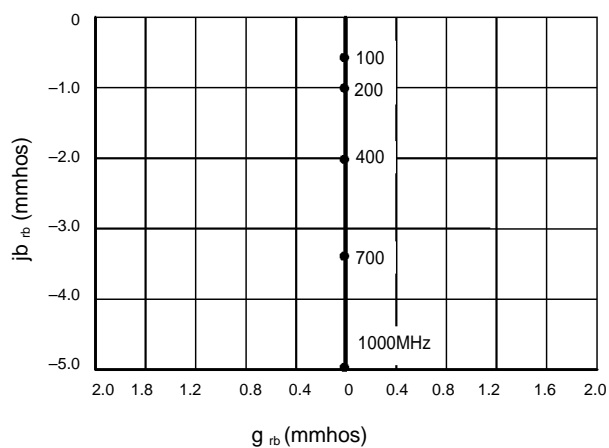


Figure 6. Polar Form

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

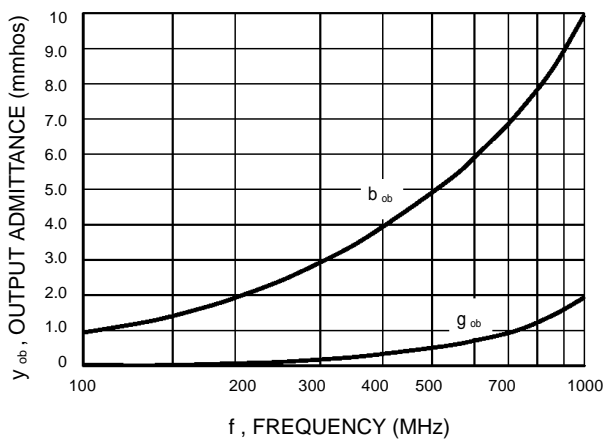


Figure 7. Rectangular Form

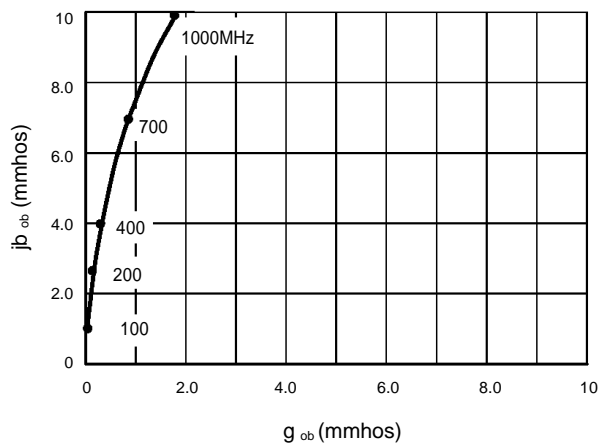


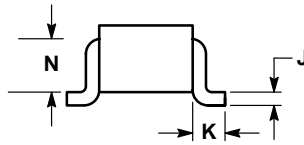
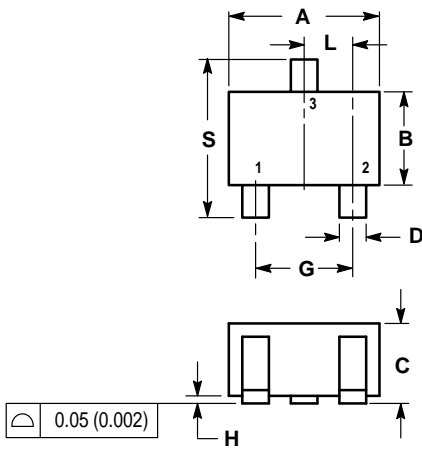
Figure 8. Polar Form

LMBTH10QWT1

SC-70 / SOT-323

NOTES:

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



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.032	0.040	0.80	1.00
D	0.012	0.016	0.30	0.40
G	0.047	0.055	1.20	1.40
H	0.000	0.004	0.00	0.10
J	0.004	0.010	0.10	0.25
K	0.017 REF		0.425 REF	
L	0.026 BSC		0.650 BSC	
N	0.028 REF		0.700 REF	
S	0.079	0.095	2.00	2.40

- PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

