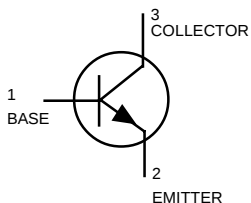


VHF/UHF Transistors

NPN Silicon



MMBTH10LT1



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

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/ $^\circ\text{C}$
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°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

MMBTH10LT1 = 3EM

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 = $1.0 \times 0.75 \times 0.062$ in.

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

MMBTH10LT1

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

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS					
DC Current Gain (I _C = 4.0 mA, V _{CE} = 10 Vdc)	h _{FE}	60	—	—	—
Collector–Emitter Saturation Voltage (I _C = 4.0mA, I _B = 0.4 mA)	V _{CE(sat)}	—	—	0.5	Vdc
Base–Emitter On Voltage (I _C = 4.0mA, V _{CE} = 10Vdc)	V _{BE}	—	—	0.95	Vdc

SMALL–SIGNAL CHARACTERISTICS

Current Gain–Bandwidth Product (V _{CE} = 10 Vdc, I _C = 4.0mA, f = 100MHz)	f _T	650	—	—	MHz
Collector –Base Capacitance (V _{CB} = 10 Vdc, I _E = 0, f = 1.0 MHz)	C _{cb}	—	—	0.7	pF
Collector –Base Feedback Capacitance (V _{CB} = 10 Vdc, I _E = 0, f = 1.0 MHz)	C _{rb}	—	—	0.65	pF
Collector Base Time Constant (I _C = 4.0mA, V _{CB} = 10 Vdc, f = 31.8 MHz)	rb' C _C	—	—	9.0	ps

TYPICAL CHARACTERISTICS

COMMON-BASE y PARAMETERS versus FREQUENCY

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

y_{ib} , INPUT ADMITTANCE

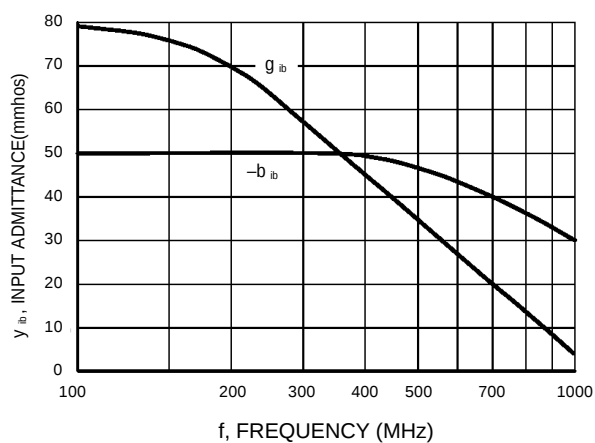


Figure 1. Rectangular Form

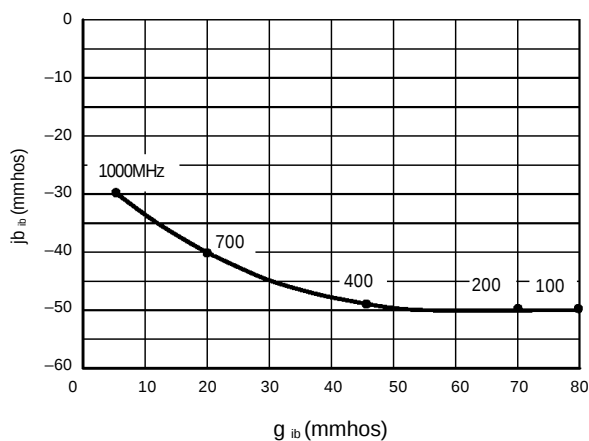


Figure 2. Polar Form

y_{fb} , FORWARD TRANSFER ADMITTANCE

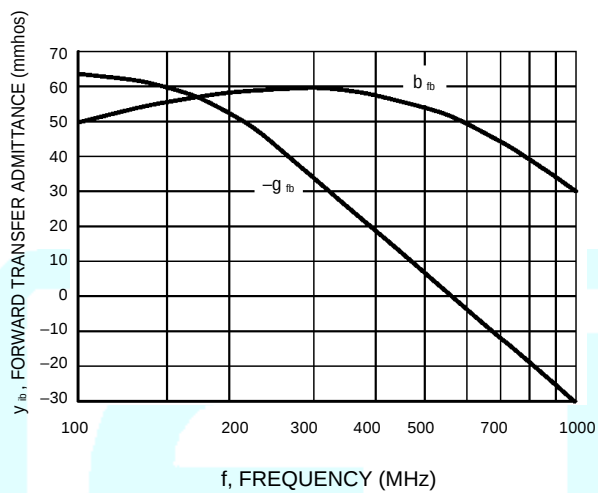


Figure 3. Rectangular Form

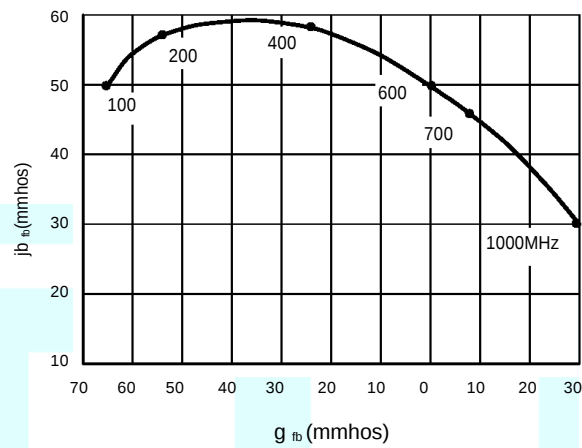


Figure 4. Polar Form

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

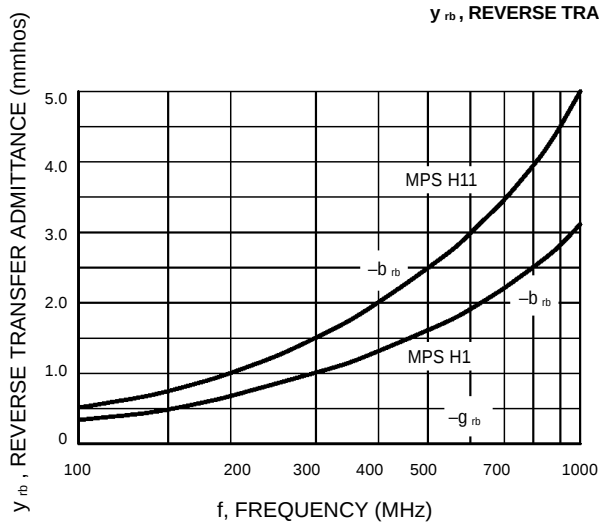


Figure 5. Rectangular Form

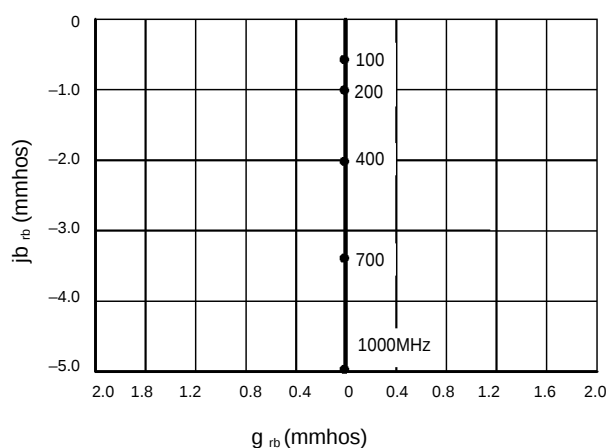


Figure 6. Polar Form

y_{ob} , OUTPUT ADMITTANCE

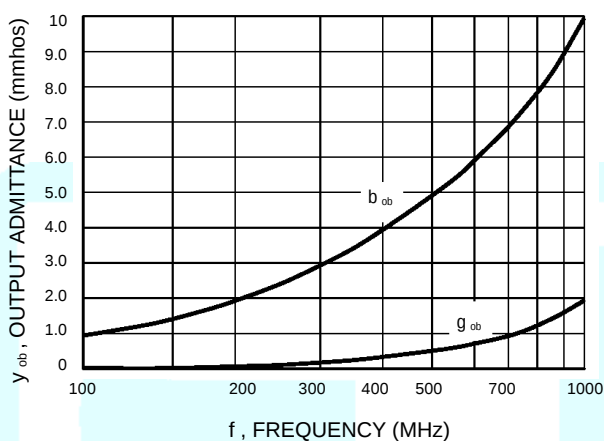


Figure 7. Rectangular Form

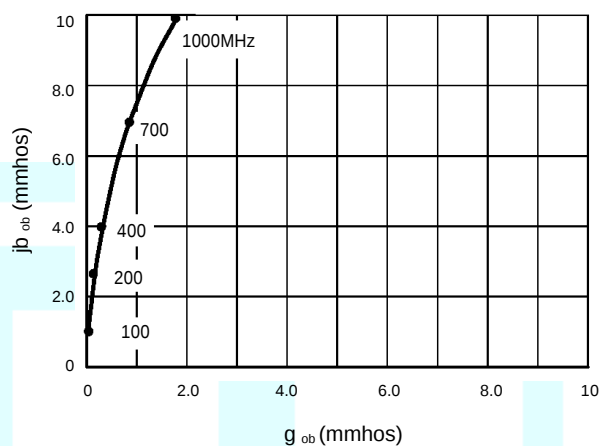


Figure 8. Polar Form