



# MMBTH10

## VHF/UHF NPN SILICON TRANSISTOR

**VOLTAGE** 25 Volts **POWER** 225 mW

### FEATURES

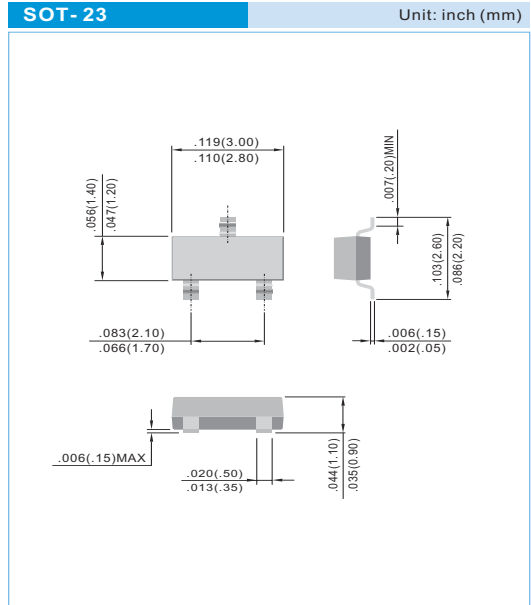
- NPN Silicon
- In compliance with EU RoHS 2002/95/EC directives

### MECHANICAL DATA

Case : SOT-23, Plastic

Terminals : Solderable per MIL-STD-750, Method 2026

Approx weight : 0.008 gram



### MAXIMUM RATINGS

RATING	SYMBOL	VALUE	UNIT
Collector-Emitter Voltage	$V_{CE0}$	25	Vdc
Collector-Base Voltage	$V_{CB0}$	30	Vdc
Emitter-Base Voltage	$V_{EB0}$	3.0	Vdc

### THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNITS
Total Device Dissipation FR-5 Board (Note 1) $T_A=25^{\circ}\text{C}$ Derate above $25^{\circ}\text{C}$	$P_D$	225 1.8	mW mW/ $^{\circ}\text{C}$
Thermal Resistance Junction to Ambient (Note 1)	$R_{\theta JA}$	556	$^{\circ}\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate (Note 2) $T_A=25^{\circ}\text{C}$ Derate above $25^{\circ}\text{C}$	$P_D$	300 2.4	mW mW/ $^{\circ}\text{C}$
Thermal Resistance Junction to Ambient (Note 2)	$R_{\theta JA}$	417	$^{\circ}\text{C}/\text{W}$
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^{\circ}\text{C}$

Note 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



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### ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise noted)

CHARACTERISTIC	SYMBOL	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>					
Collector-Emitter Breakdown Voltage (I <sub>c</sub> =1.0mA <sub>dc</sub> , I <sub>B</sub> =0)	V <sub>(BR)CEO</sub>	25	-	-	V <sub>dc</sub>
Collector-Base Breakdown Voltage (I <sub>c</sub> =100μA <sub>dc</sub> , I <sub>E</sub> =0)	V <sub>(BR)CBO</sub>	30	-	-	V <sub>dc</sub>
Emitter-Base Breakdown Voltage (I <sub>E</sub> =10μA <sub>dc</sub> , I <sub>C</sub> =0)	V <sub>(BR)EBO</sub>	3.0	-	-	V <sub>dc</sub>
Collector Cutoff Current (V <sub>CB</sub> =25V <sub>dc</sub> , I <sub>E</sub> =0)	I <sub>CBO</sub>	-	-	100	nA <sub>dc</sub>
Emitter Cutoff Current (V <sub>EB</sub> =2.0V <sub>dc</sub> , I <sub>C</sub> =0)	I <sub>EBO</sub>	-	-	100	nA <sub>dc</sub>
<b>ON CHARACTERISTICS</b>					
DC Current Gain (I <sub>c</sub> =4.0mA <sub>dc</sub> , V <sub>CE</sub> =10V <sub>dc</sub> )	h <sub>FE</sub>	60	-	-	-
Collector-Emitter Saturation Voltage (I <sub>c</sub> =4.0mA <sub>dc</sub> , I <sub>B</sub> =0.4mA <sub>dc</sub> )	V <sub>CE(sat)</sub>	-	-	0.5	V <sub>dc</sub>
Base-Emitter On Voltage (I <sub>c</sub> =4.0mA <sub>dc</sub> , V <sub>CE</sub> =10V <sub>dc</sub> )	V <sub>BE</sub>	-	-	0.95	V <sub>dc</sub>
<b>SMALL-SIGNAL CHARACTERISTICS</b>					
Current-Gain-Bandwidth Product (I <sub>c</sub> =4.0mA <sub>dc</sub> , V <sub>CE</sub> =10V <sub>dc</sub> , f=100MHz)	f <sub>T</sub>	650	-	-	MHz
Collector-Base Capacitance (V <sub>CB</sub> =10V <sub>dc</sub> , I <sub>E</sub> =0, f=1.0MHz)	C <sub>cb</sub>	-	-	0.7	pF
Common-Base Feedback Capacitance (V <sub>CB</sub> =10V <sub>dc</sub> , I <sub>E</sub> =0, f=1.0MHz)	C <sub>rb</sub>	-	-	0.65	pF
Collector-Base Time Constant (I <sub>c</sub> =4.0mA <sub>dc</sub> , V <sub>CB</sub> =10V <sub>dc</sub> , f=31.8MHz)	r <sub>b</sub> 'C <sub>c</sub>	-	-	9.0	ps



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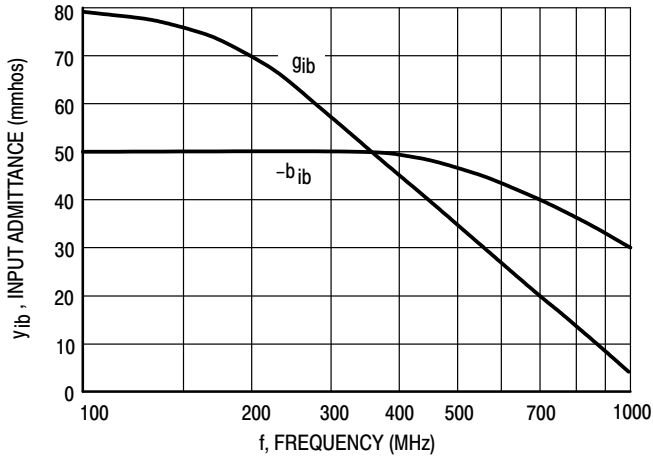


Figure 1. Rectangular Form

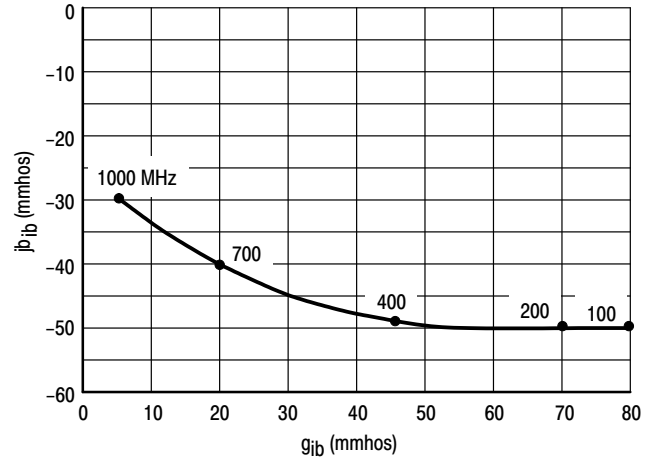


Figure 2. Polar Form

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

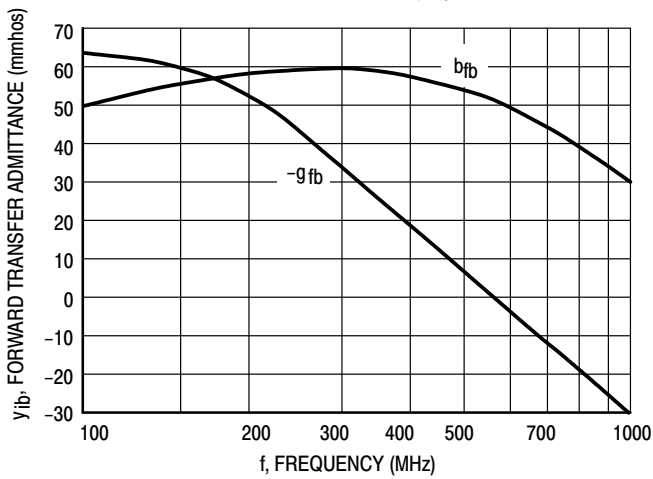


Figure 3. Rectangular Form

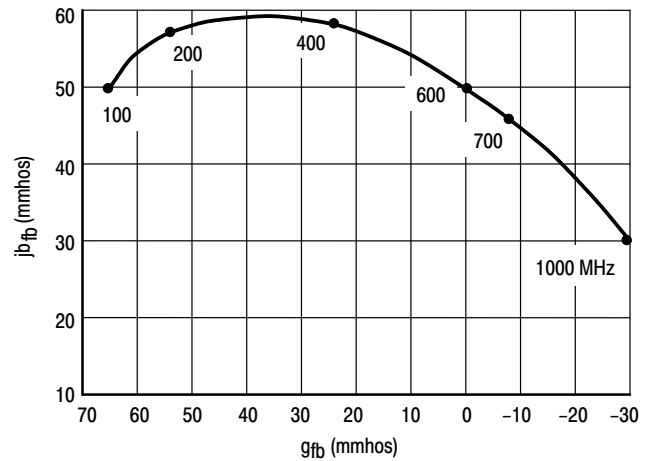


Figure 4. Polar Form



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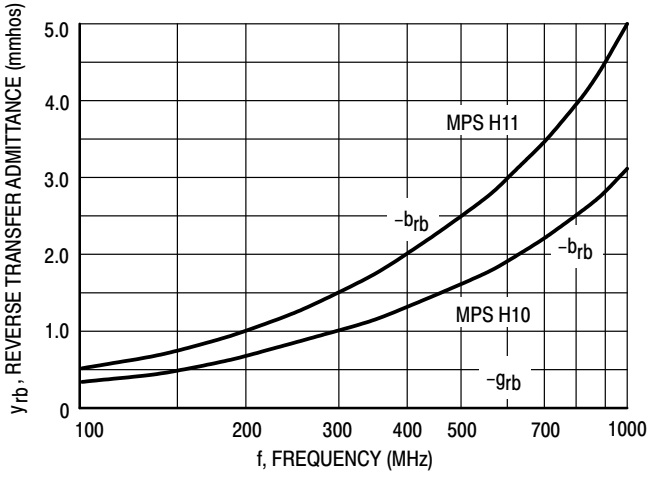


Figure 5. Rectangular Form

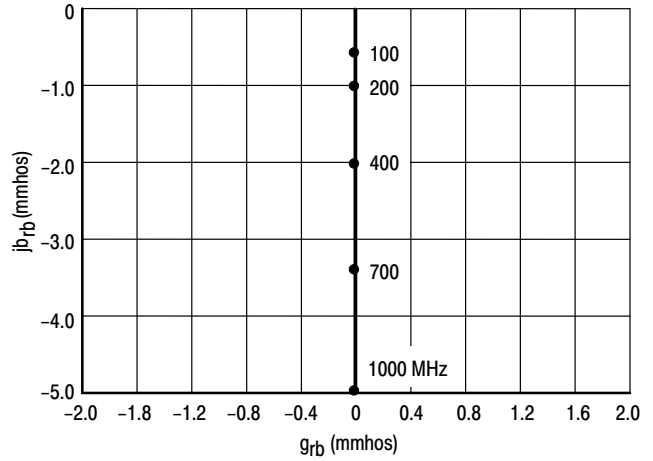


Figure 6. Polar Form

## y<sub>ob</sub>: OUTPUT ADMITTANCE

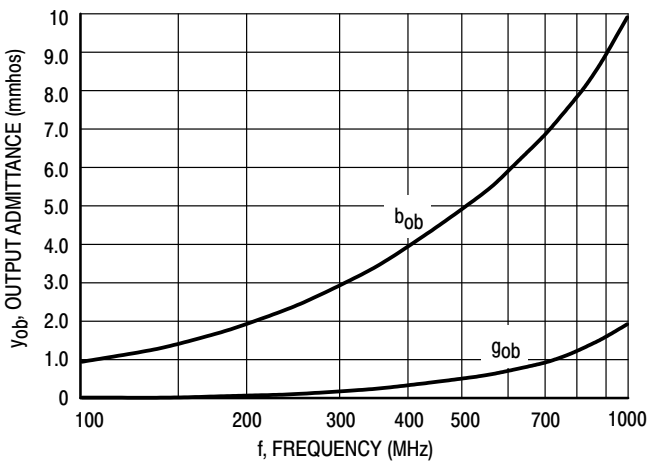


Figure 7. Rectangular Form

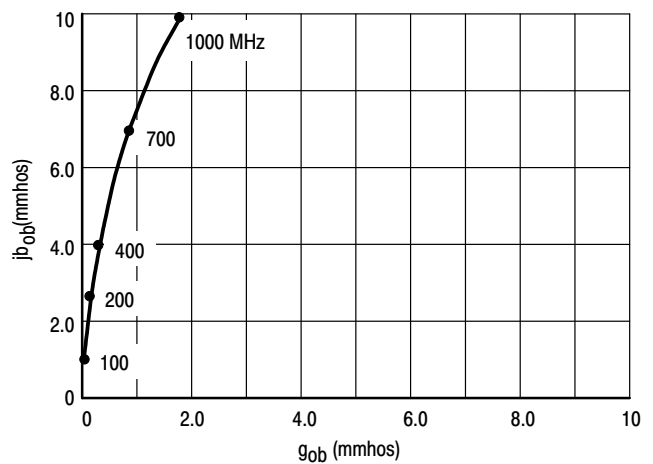
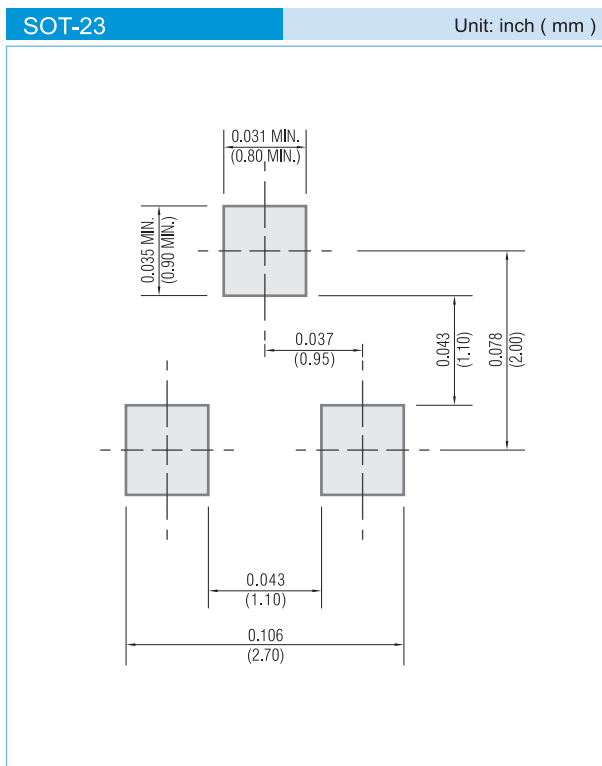


Figure 8. Polar Form



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## MOUNTING PAD LAYOUT



### ORDER INFORMATION

- Packing information
  - T/R - 12K per 13" plastic Reel
  - T/R - 3K per 7" plastic Reel

### LEGAL STATEMENT

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