

MMBTH10LT1, MMBTH10-4LT1

Preferred Devices

VHF/UHF Transistor

NPN Silicon

- Device Marking: 3EM

Features

- Pb-Free Package May be Available. The G-Suffix Denotes a Pb-Free Lead Finish

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

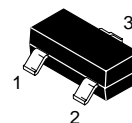
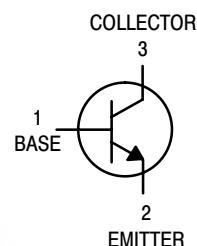
Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board (Note 1) $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	225 1.8	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	556	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate (Note 2)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

- FR-5 = 1.0 x 0.75 x 0.062 in.
- Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina



ON Semiconductor®

<http://onsemi.com>



CASE 318
SOT-23
STYLE 6

ORDERING INFORMATION

Device	Package	Shipping†
MMBTH10LT1	SOT-23	3000/Tape & Reel
MMBTH10LT1G	SOT-23 (Pb-Free)	3000/Tape & Reel
MMBTH10-4LT1	SOT-23	3000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

Preferred devices are recommended choices for future use and best overall value.

MMBTH10LT1, MMBTH10-4LT1

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage (I _C = 1.0 mA _{dc} , I _B = 0)	V _{(BR)CEO}	25	-	-	V _{dc}
Collector-Base Breakdown Voltage (I _C = 100 μA _{dc} , I _E = 0)	V _{(BR)CBO}	30	-	-	V _{dc}
Emitter-Base Breakdown Voltage (I _E = 10 μA _{dc} , I _C = 0)	V _{(BR)EBO}	3.0	-	-	V _{dc}
Collector Cutoff Current (V _{CB} = 25 V _{dc} , I _E = 0)	I _{CBO}	-	-	100	nA _{dc}
Emitter Cutoff Current (V _{EB} = 2.0 V _{dc} , I _C = 0)	I _{EBO}	-	-	100	nA _{dc}

ON CHARACTERISTICS

DC Current Gain (I _C = 4.0 mA _{dc} , V _{CE} = 10 V _{dc})	h _{FE}	60 120	-	-	-
Collector-Emitter Saturation Voltage (I _C = 4.0 mA _{dc} , I _B = 0.4 mA _{dc})	V _{CE(sat)}	-	-	0.5	V _{dc}
Base-Emitter On Voltage (I _C = 4.0 mA _{dc} , V _{CE} = 10 V _{dc})	V _{BE}	-	-	0.95	V _{dc}

SMALL-SIGNAL CHARACTERISTICS

Current-Gain – Bandwidth Product (I _C = 4.0 mA _{dc} , V _{CE} = 10 V _{dc} , f = 100 MHz)	f _T	650 800	-	-	MHz
Collector-Base Capacitance (V _{CB} = 10 V _{dc} , I _E = 0, f = 1.0 MHz)	C _{cb}	-	-	0.7	pF
Common-Base Feedback Capacitance (V _{CB} = 10 V _{dc} , I _E = 0, f = 1.0 MHz)	C _{rb}	-	-	0.65	pF
Collector Base Time Constant (I _C = 4.0 mA _{dc} , V _{CB} = 10 V _{dc} , f = 31.8 MHz)	r _b 'C _c	-	-	9.0	ps

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TYPICAL CHARACTERISTICS

COMMON-BASE y PARAMETERS versus FREQUENCY

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

y_{ib} , INPUT ADMITTANCE

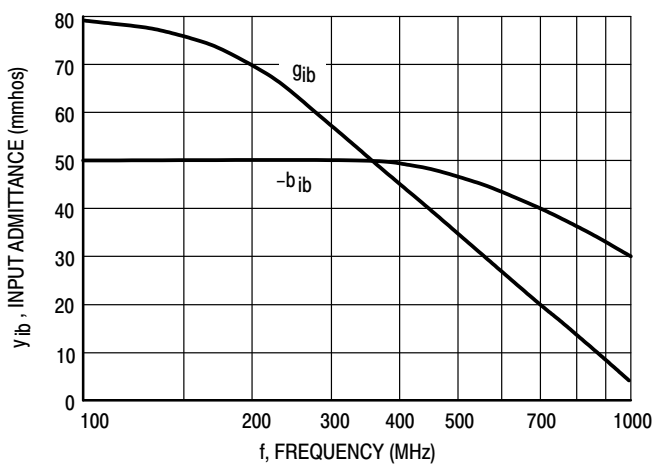


Figure 1. Rectangular Form

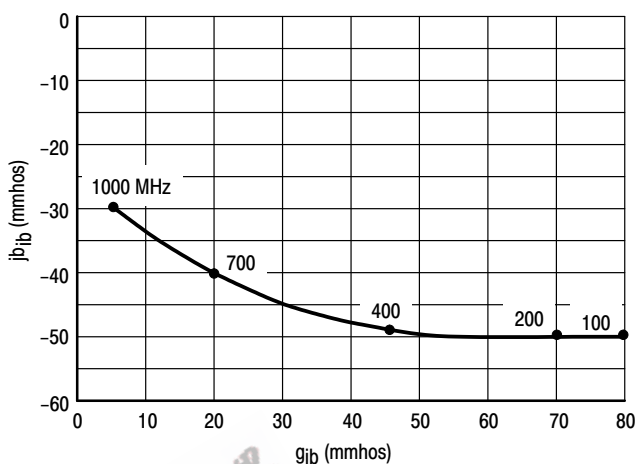


Figure 2. Polar Form

y_{fb} , FORWARD TRANSFER ADMITTANCE

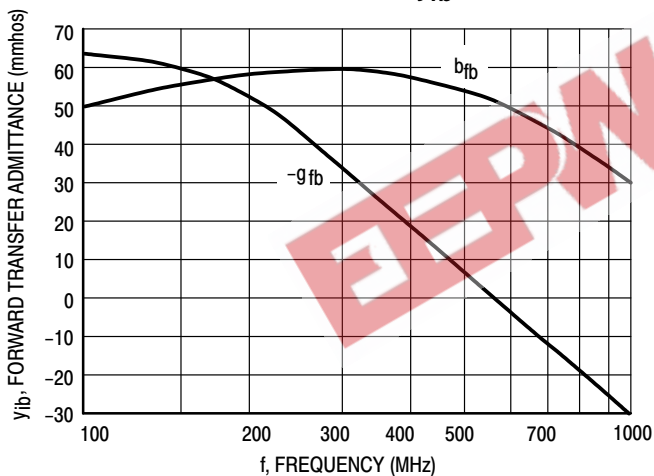


Figure 3. Rectangular Form

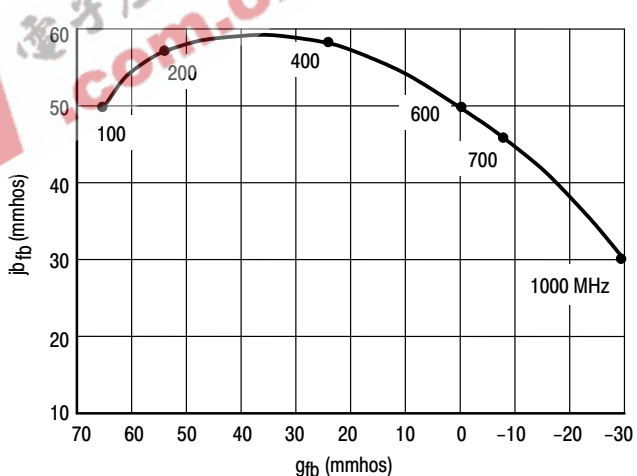


Figure 4. Polar Form

MMBTH10LT1, MMBTH10-4LT1

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

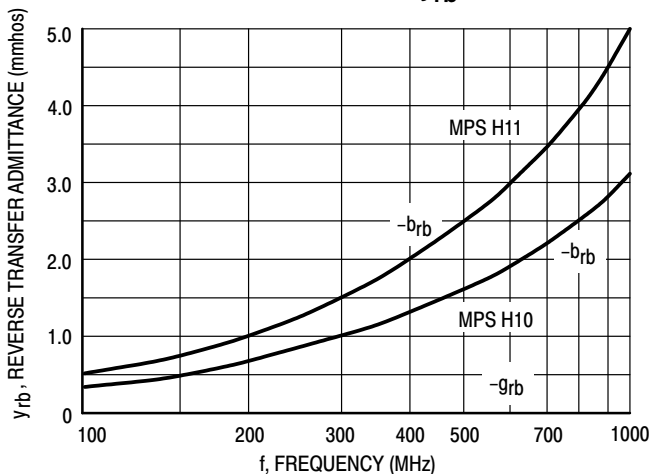


Figure 5. Rectangular Form

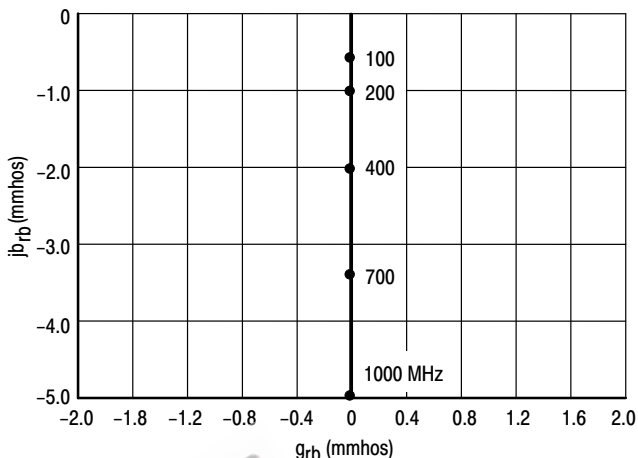


Figure 6. Polar Form

y_{ob} , OUTPUT ADMITTANCE

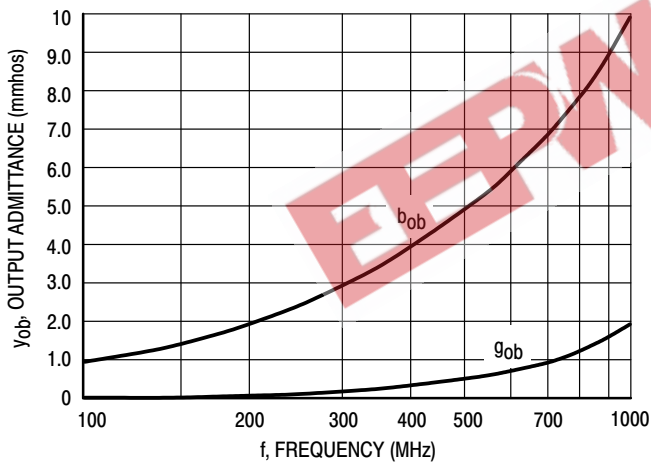


Figure 7. Rectangular Form

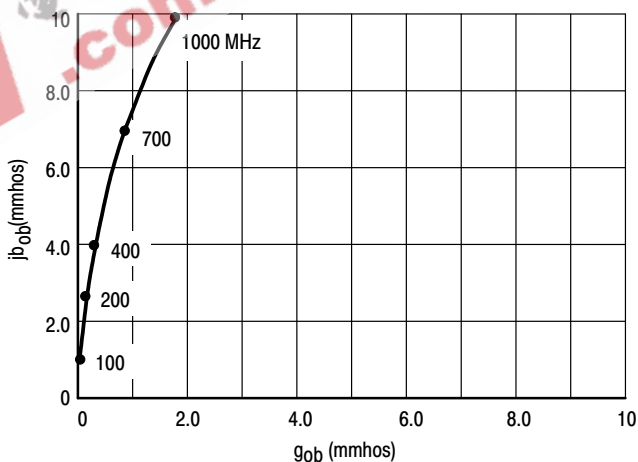


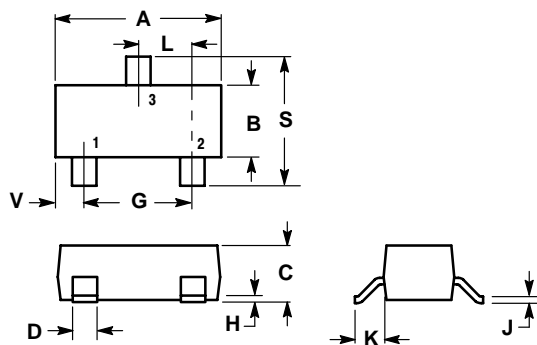
Figure 8. Polar Form

MMBTH10LT1, MMBTH10-4LT1

PACKAGE DIMENSIONS

SOT-23
(TO-236AB)
CASE 318-08
ISSUE AH

- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
 4. 318-03 AND -07 OBSOLETE, NEW STANDARD 318-08.



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

STYLE 6:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

SOLDERING FOOTPRINT*

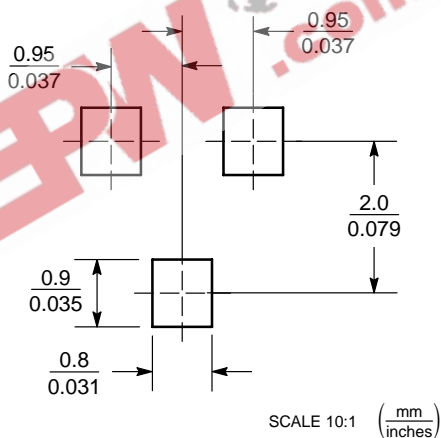



Figure 9. SOT-23

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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