



## DESCRIPTION

The MBTA13~ MBTA14 are available in SOT-23 package.

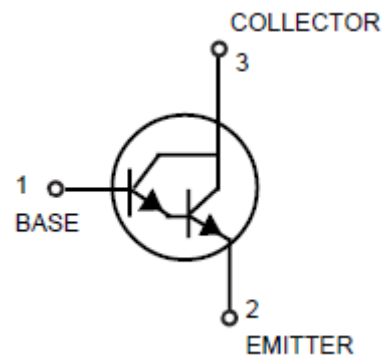
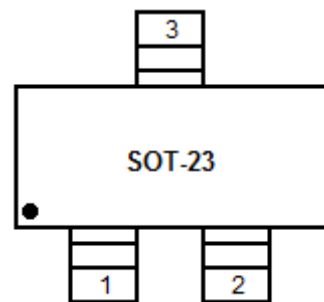
## FEATURES

- Available in SOT-23 package

## ORDERING INFORMATION

Package Type	Part Number
SOT-23	MBTA13
	MBTA14
Package	SPQ: 3,000pcs/Reel
AiT provides all RoHS Compliant Products	

## PIN DESCRIPTION





## ABSOLUTE MAXIMUM RATINGS

V <sub>CEO</sub> , Collector–Emitter Voltage	30Vdc
V <sub>CBO</sub> , Collector-Base Voltage	30Vdc
V <sub>EBO</sub> , Emitter–Base Voltage	10Vdc
I <sub>C</sub> , Collector Current—Continuous	300mAdc

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## THERMAL CHARACTERISTICS

Parameter	Symbol	Max	Unit
Total Device Dissipation FR-5 Board, <sup>NOTE1</sup> T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	225 1.8	mW mW/°C
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	556	°C/W
Total Device Dissipation Alumina Substrate, <sup>NOTE2</sup> T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	300 2.4	mW mW/°C
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	417	°C/W
Junction and Storage Temperature	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

NOTE1: FR-5 = 1.0 x 0.75 x 0.062 in.

NOTE2: Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.



## ELECTRICAL CHARACTERISTICS

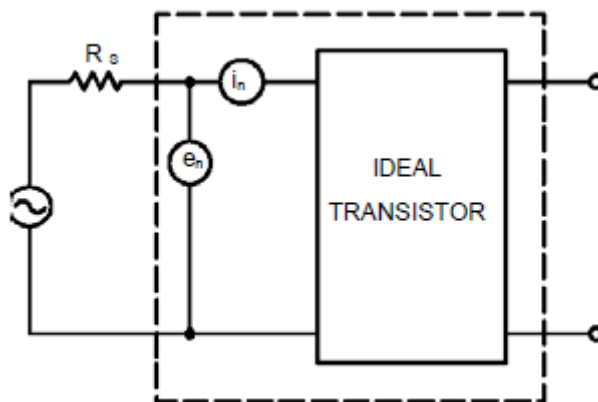
T<sub>A</sub> = 25°C, unless otherwise noted

Parameter	Symbol	Characteristic	Min	Max	Unit	
<b>OFF CHARACTERISTICS</b>						
Collector–Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> = 100μAdc, V <sub>BE</sub> = 0	30	-	Vdc	
Collector Cutoff Current	I <sub>CBO</sub>	V <sub>CB</sub> = 30Vdc, I <sub>E</sub> = 0	-	100	nAdc	
Emitter Cutoff Current	I <sub>EBO</sub>	V <sub>EB</sub> = 10Vdc, I <sub>C</sub> = 0	-	100	nAdc	
<b>ON CHARACTERISTICS</b> <sup>NOTE3</sup>						
DC Current Gain	h <sub>FE</sub>	I <sub>C</sub> = 10mAdc, V <sub>CE</sub> = 5.0Vdc	MBTA13	5,000	-	-
			MBTA14	10,000	-	
		I <sub>C</sub> = 100mAdc, V <sub>CE</sub> = 5.0Vdc	MBTA13	10,000	-	
			MBTA14	20,000	-	
Collector–Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> = 100mAdc, I <sub>B</sub> = 0.1mAdc	-	1.5	Vdc	
Base–Emitter On Voltage	V <sub>BE</sub>	I <sub>C</sub> = 100mAdc, V <sub>CE</sub> = 5.0Vdc	-	2.0	Vdc	
<b>SMALL–SIGNAL CHARACTERISTICS</b>						
Current – Gain–Bandwidth Product <sup>NOTE4</sup>	f <sub>T</sub>	V <sub>CE</sub> = 5.0Vdc, I <sub>C</sub> = 10mAdc, f = 100MHz	125	-	MHz	

NOTE3: Pulse Test: Pulse Width <300μs, Duty Cycle <2.0%.

NOTE4: f<sub>T</sub> = |h<sub>FE</sub>| \* f<sub>test</sub>

Transistor Noise Model





## NOISE CHARACTERISTICS

$V_{CE} = 5.0V_{dc}$ ,  $T_A = 25^\circ C$

Figure 1. Noise Voltage

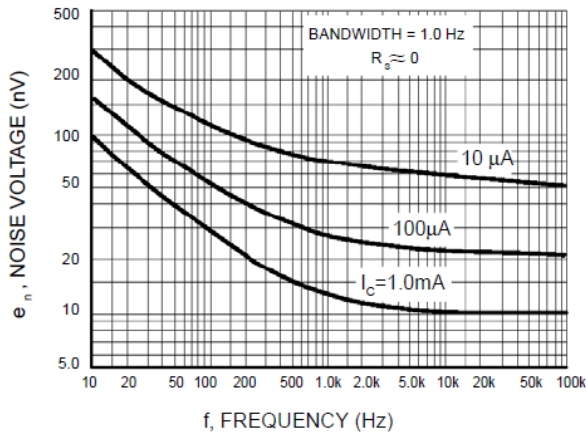


Figure 2. Noise Current

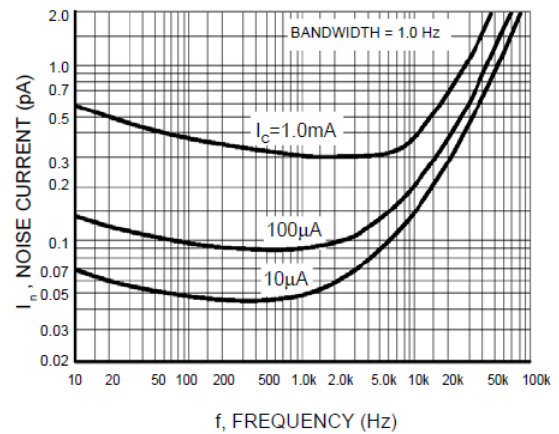


Figure 3. Total Wideband Noise Voltage

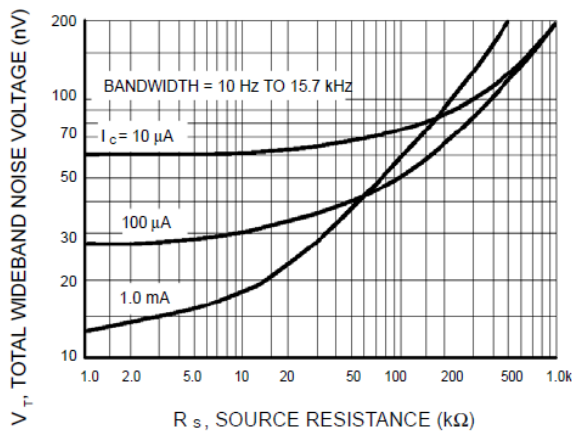
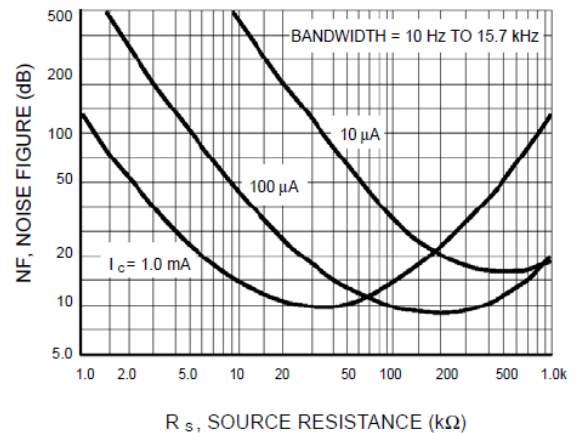


Figure 4. Wideband Noise Figure





**SMALL-SIGNAL CHARACTERISTICS**

Figure 5. Capacitance

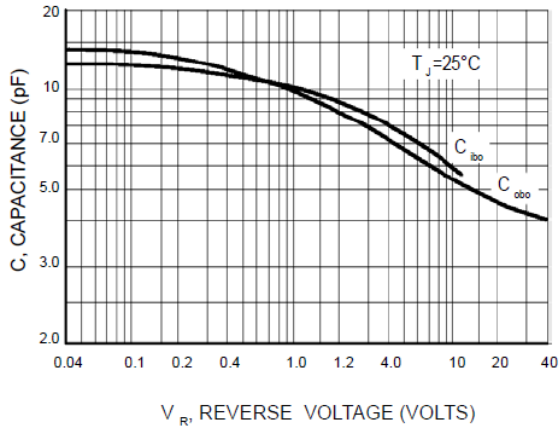


Figure 6. High Frequency Current Gain

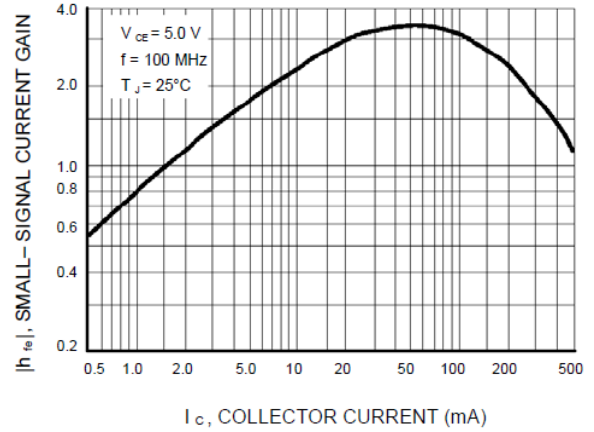


Figure 7. DC Current Gain

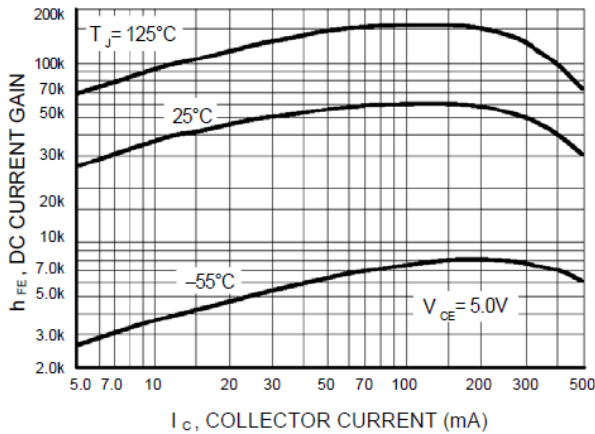


Figure 8. Collector Saturation Region

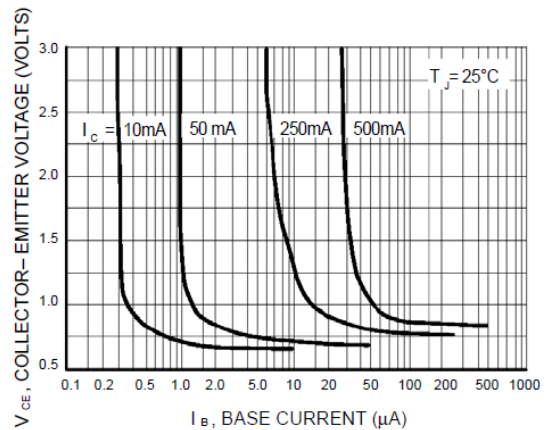


Figure 9. "ON" Voltages

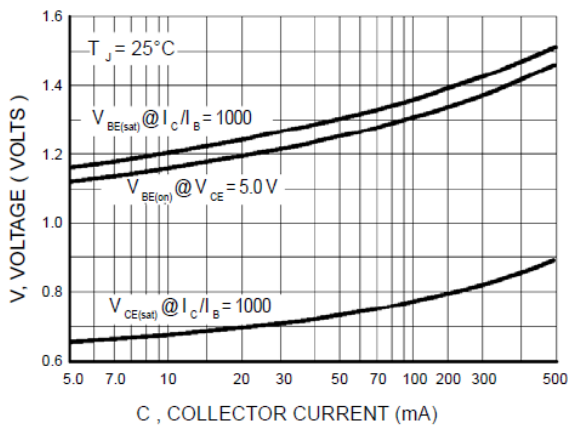


Figure 10. Temperature Coefficients

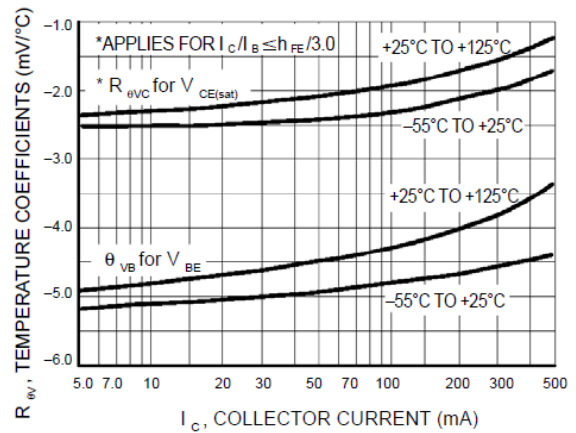




Figure 11. Thermal Response

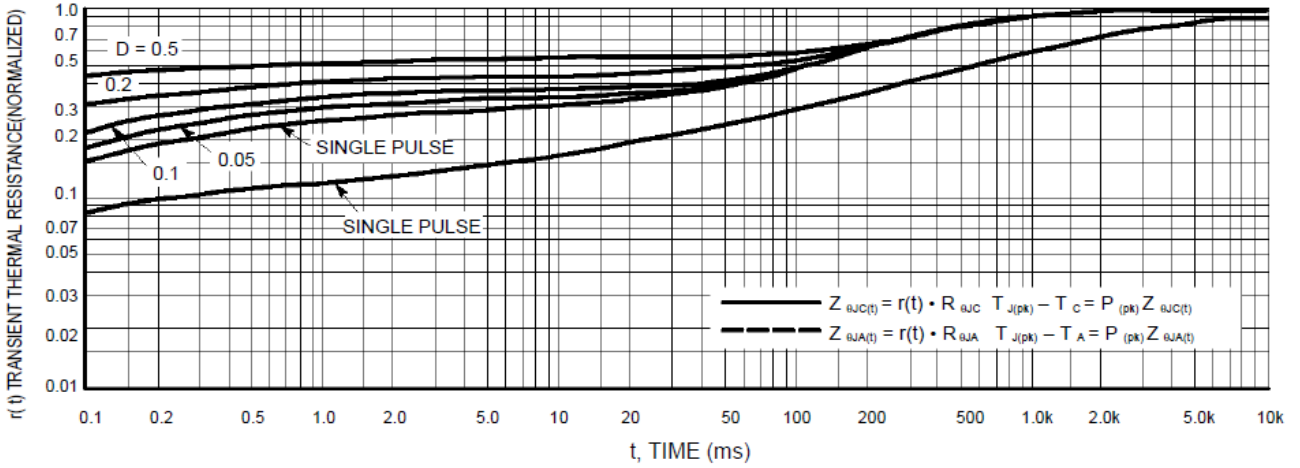
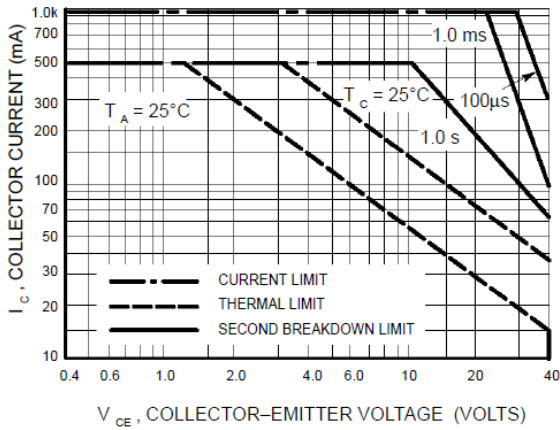
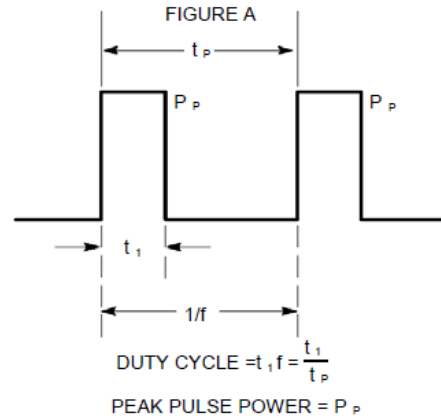


Figure 12. Active Region Safe Operating Area



Design Note: Use of Transient Thermal

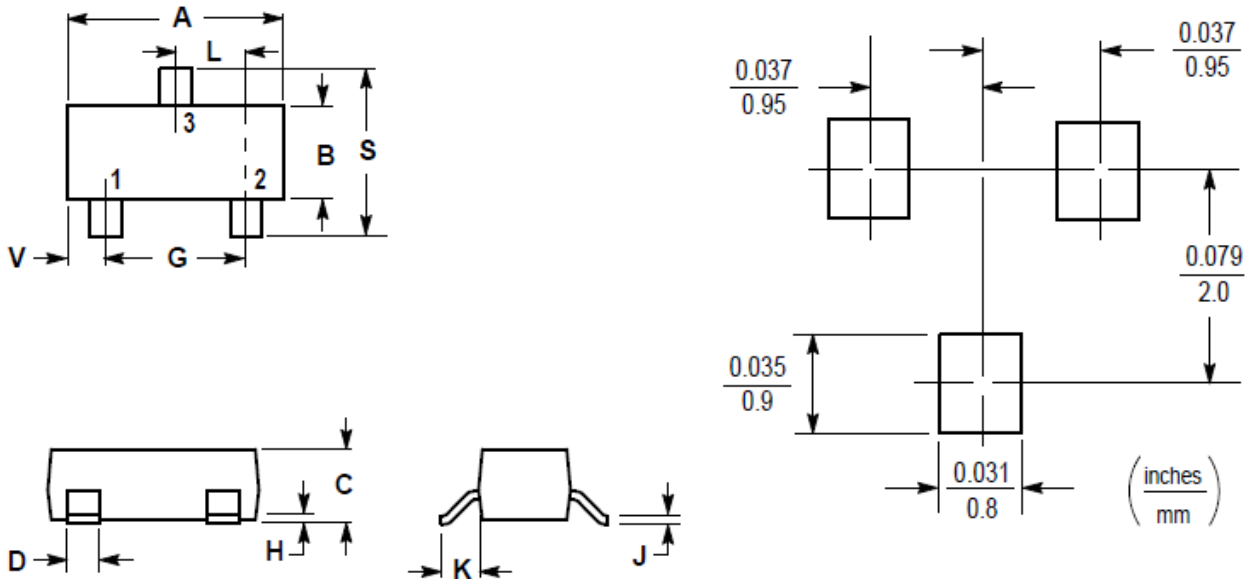
Resistance Data





**PACKAGE INFORMATION**

Dimension in SOT-23 Package (Unit: mm)



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



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