

**SOT-23 BIPOLAR TRANSISTORS  
TRANSISTOR(NPN)**

**FEATURES**

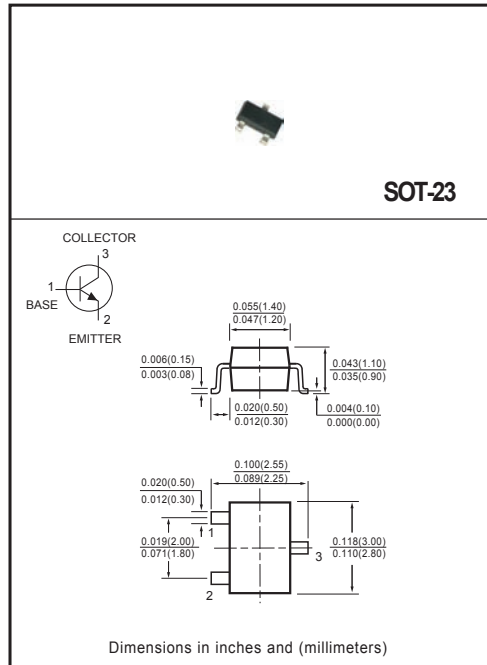
- \* Power dissipation  
P<sub>CM</sub> 0.3 W(T<sub>amb</sub>=25°C)
- \* Collector current  
I<sub>CM</sub> 0.3 A
- \* Collector-base voltage  
V<sub>(BR)CBO</sub>: 30 V
- \* Operating and storage junction temperature range  
T<sub>J</sub>,T<sub>stg</sub>: -55°Cto+150°C

**MECHANICAL DATA**

- \* Case: Molded plastic
- \* Epoxy: UL 94V-O rate flame retardant
- \* Lead: MIL-STD-202E method 208C guaranteed
- \* Mounting position: Any
- \* Weight: 0.008 gram

**MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS**

Ratings at 25 °C ambient temperature unless otherwise specified.  
Single phase, half wave, 60 Hz, resistive or inductive load.  
For capacitive load, derate current by 20%.



**MAXIMUM RATINGS ( @ TA = 25°C unless otherwise noted )**

RATINGS	SYMBOL	VALUE	UNITS
Max. Steady State Power Dissipation <sup>(1)</sup> @TA=25°C Derate above 25°C	P <sub>D</sub>	300	mW
Max. Operating Temperature Range	T <sub>J</sub>	150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 to +150	°C

**ELECTRICAL CHARACTERISTICS ( @ TA = 25°C unless otherwise noted )**

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS
Thermal Resistance Junction to Ambient	R <sub>θJA</sub>	-	-	417	°C/W

Notes: 1. Alumina=0.4\*0.3\*0.024in.99.5% alumina  
2. "Fully ROHS Compliant", "100% Sn plating (Pb-free)".

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

Characteristic	Symbol	Min	Max	Unit
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**OFF CHARACTERISTICS**

Collector-Emitter Breakdown Voltage ( $I_C = 100\mu\text{A}$ , $V_{BE} = 0$ )	$V_{(BR)CES}$	30	-	Vdc
Collector Cutoff Current ( $V_{CB} = 30\text{Vdc}$ , $I_E = 0$ )	$I_{CBO}$	-	100	nVdc
Emitter Cutoff Current ( $V_{EB} = 10\text{Vdc}$ , $I_C = 0$ )	$I_{EBO}$	-	100	nVdc

**ON CHARACTERISTICS(1)**

DC Current Gain ( $I_C = 10\text{mA}$ , $V_{CE} = 5.0\text{Vdc}$ ) ( $I_C = 100\text{mA}$ , $V_{CE} = 5.0\text{Vdc}$ )	$h_{FE}$	5000 10,000	- -	-
Collector-Emitter Saturation Voltage ( $I_C = 100\text{mA}$ , $I_B = 0.1\text{mA}$ )	$V_{CE(sat)}$	-	1.5	Vdc
Base-Emitter On Voltage ( $I_C = 100\text{mA}$ , $V_{CE} = 5.0\text{Vdc}$ )	$V_{BE}$	-	2.0	Vdc

**SMALL-SIGNAL CHARACTERISTICS**

Current-Gain-Bandwidth Product (2) ( $I_C = 10\text{mA}$ , $V_{CE} = 5.0\text{Vdc}$ , $f = 100\text{MHz}$ )	$f_T$	125	-	MHz
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Notes : 1. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

2.  $f_T = |h_{fe}| \cdot f_{test}$

## RATING AND CHARACTERISTICS CURVES ( MMBTA13 )

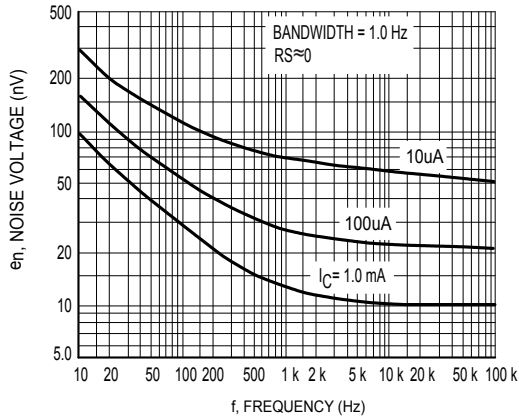


Figure 1 Noise Voltage

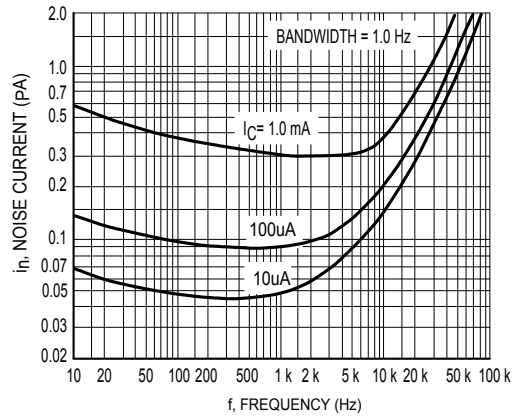


Figure 2 Noise Current

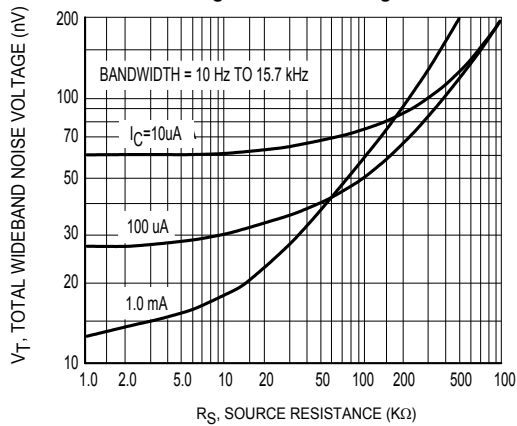


Figure 3. Total Wideband Noise Voltage

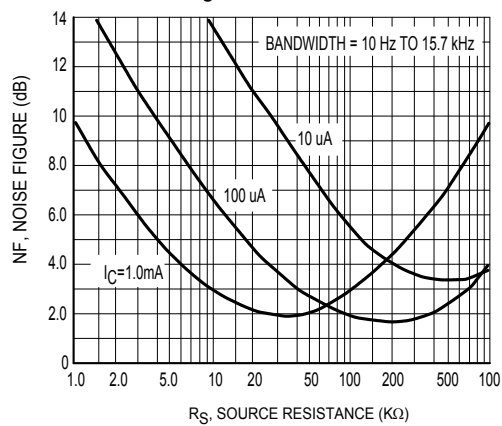


Figure 4 Wideband Noise Figure

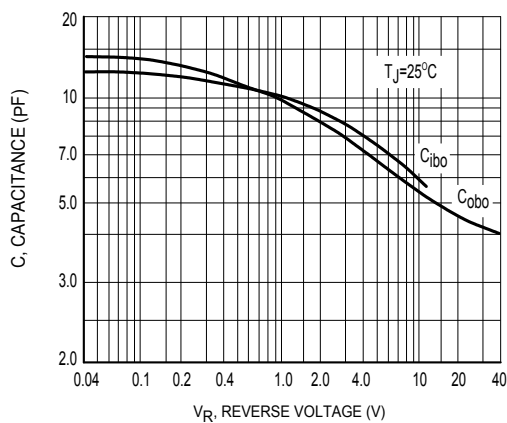


Figure 5 Capacitance

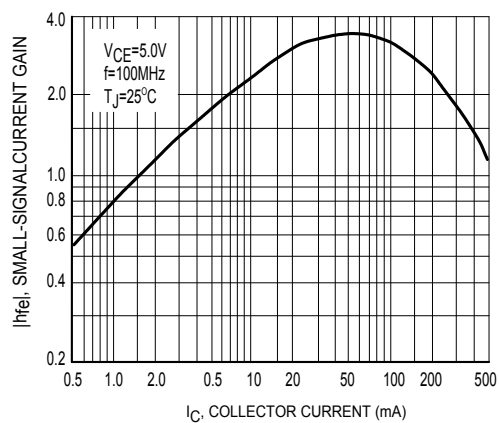


Figure 6 High Frequency Current Gain

## RATING AND CHARACTERISTICS CURVES ( MMBTA13 )

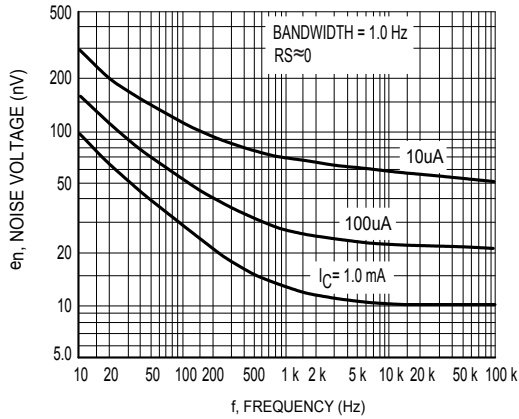


Figure 1 Noise Voltage

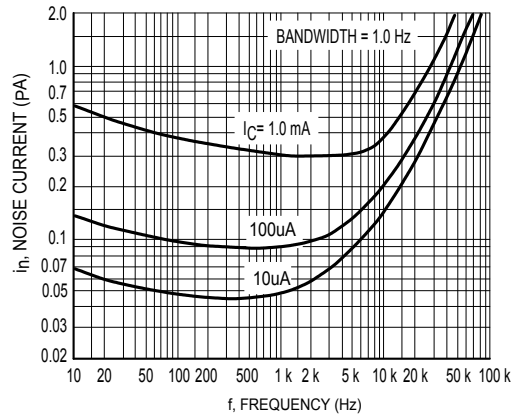


Figure 2 Noise Current

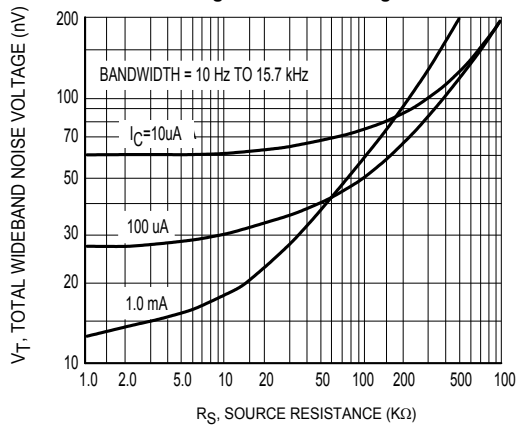


Figure 3. Total Wideband Noise Voltage

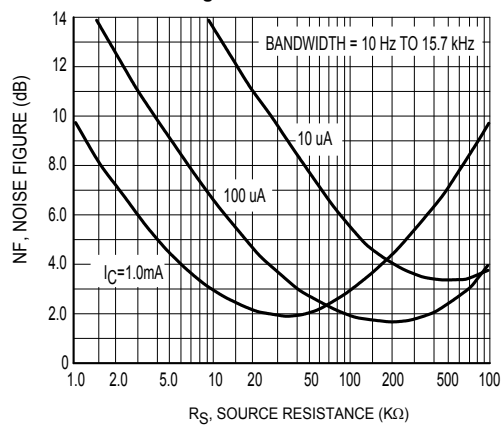


Figure 4 Wideband Noise Figure

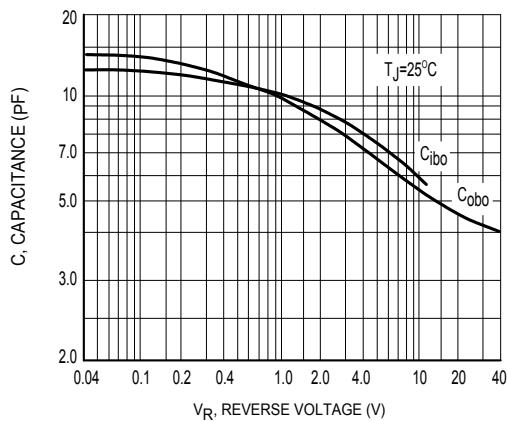


Figure 5 Capacitance

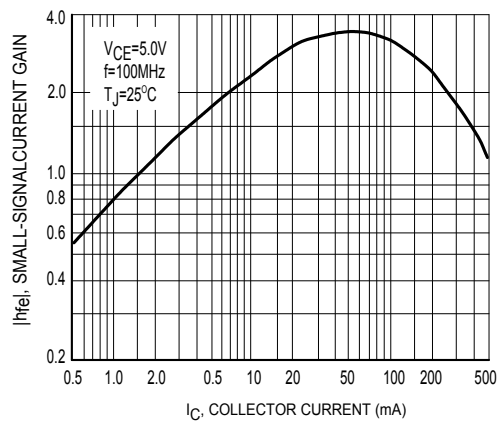


Figure 6 High Frequency Current Gain

## RATING AND CHARACTERISTICS CURVES ( MMBTA13 )

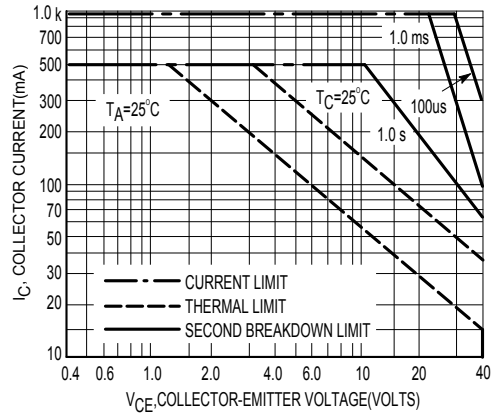


Figure 12 Active Region Safe Operating Area

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