

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

**FEATURES**

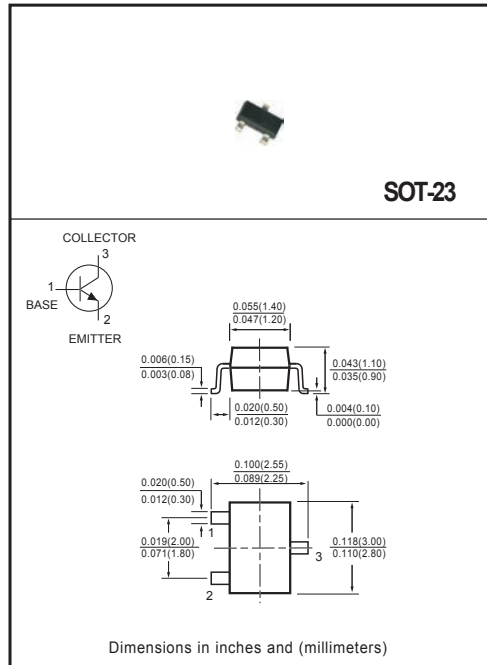
- \* Power dissipation  
P<sub>CM</sub> 0.3 W(T<sub>amb</sub>=25°C)
- \* Collector current  
I<sub>CM</sub> 0.3 A
- \* Collector-base voltage  
V<sub>(BR)CBO</sub>: 30 V
- \* Operating and storage junction temperature range  
T<sub>J</sub>,T<sub>stg</sub>: -55°Cto+150°C

**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
----------------	--------	-----	-----	------

**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

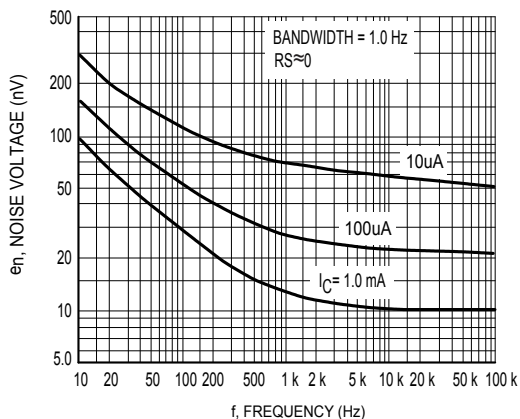
**SMALL-SIGNAL CHARACTERISTICS**

Current-Gain-Bandwidth Product (2) ( $I_C = 10\text{mA}$ , $V_{CE} = 5.0\text{Vdc}$ , $f = 100\text{MHz}$ )	$f_T$	125	-	MHz
---	-------	-----	---	-----

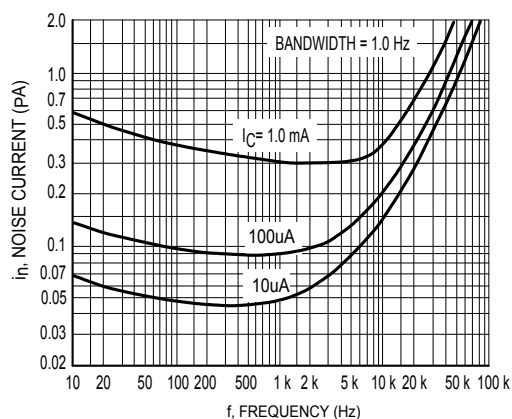
Notes : 1. Pulse Test: Pulse Width  $\leq 300\text{ms}$ , Duty Cycle  $\leq 2.0\%$

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

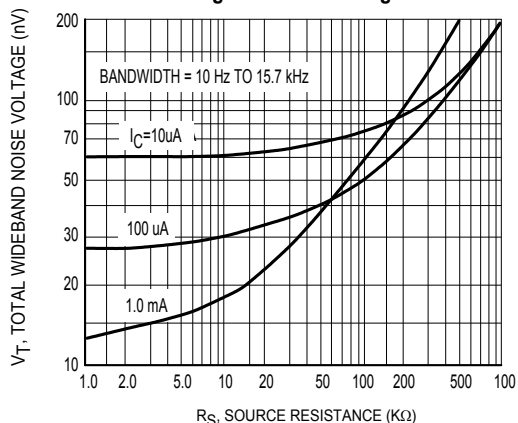
## RATING AND CHARACTERISTICS CURVES ( MMBTA13 )



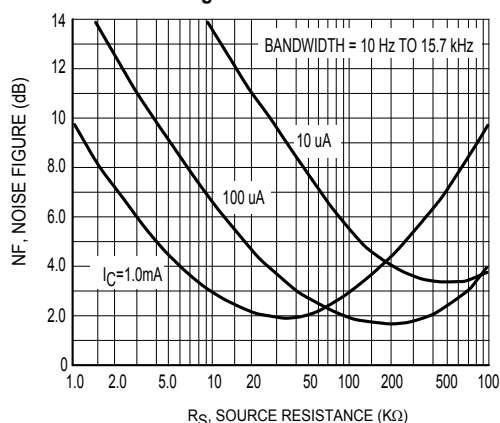
**Figure 1 Noise Voltage**



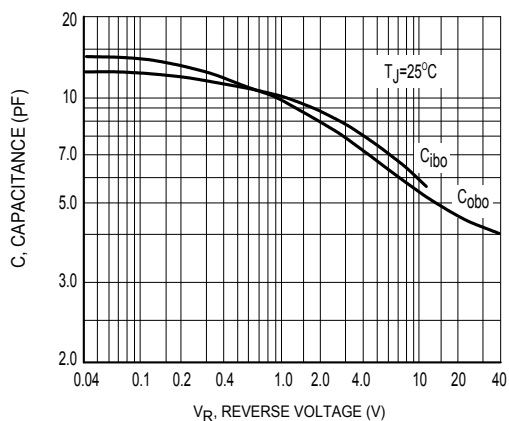
**Figure 2 Noise Current**



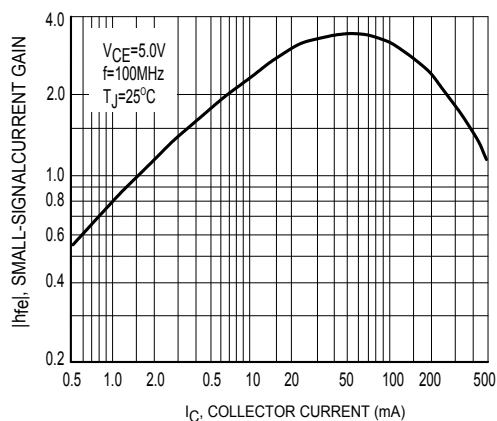
**Figure 3. Total Wideband Noise Voltage**



**Figure 4 Wideband Noise Figure**

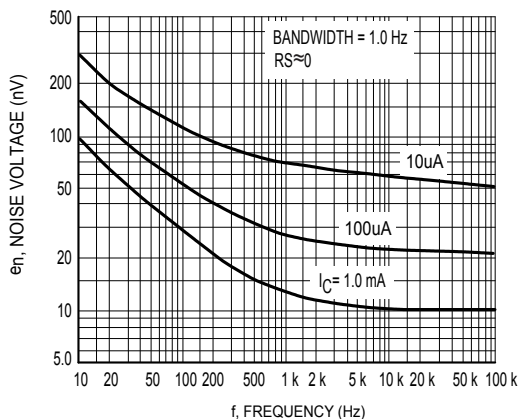


**Figure 5 Capacitance**

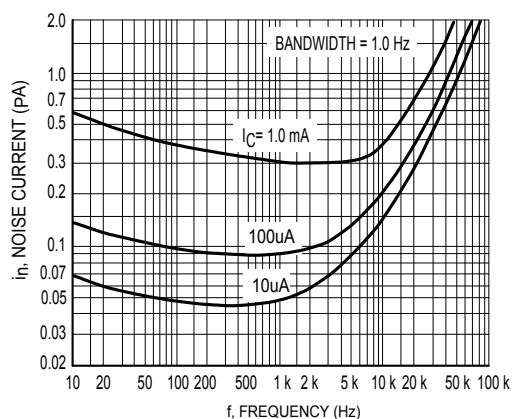


**Figure 6 High Frequency Current Gain**

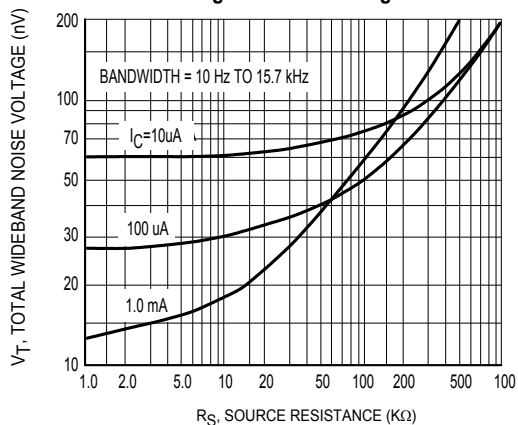
## RATING AND CHARACTERISTICS CURVES ( MMBTA13 )



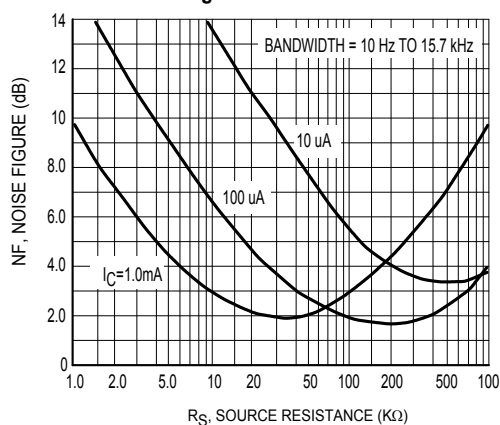
**Figure 1 Noise Voltage**



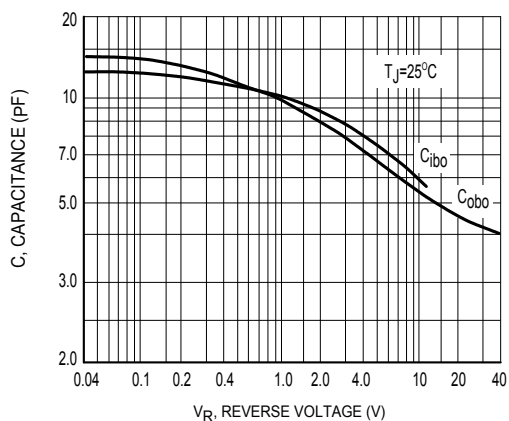
**Figure 2 Noise Current**



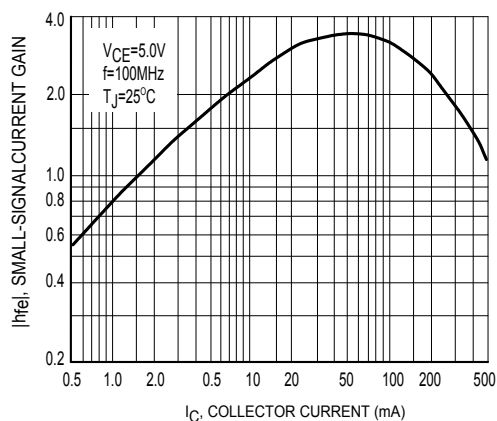
**Figure 3. Total Wideband Noise Voltage**



**Figure 4 Wideband Noise Figure**



**Figure 5 Capacitance**



**Figure 6 High Frequency Current Gain**

## RATING AND CHARACTERISTICS CURVES ( MMBTA13 )

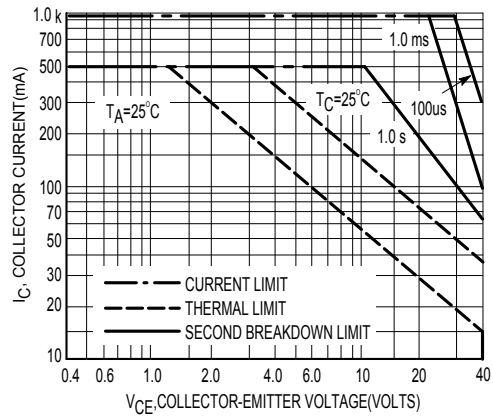


Figure 12 Active Region Safe Operating Area

## DISCLAIMER NOTICE

Rectron Inc reserves the right to make changes without notice to any product specification herein, to make corrections, modifications, enhancements or other changes. Rectron Inc or anyone on its behalf assumes no responsibility or liability for any errors or inaccuracies. Data sheet specifications and its information contained are intended to provide a product description only. "Typical" parameters which may be included on RECTRON data sheets and/ or specifications can and do vary in different applications and actual performance may vary over time. Rectron Inc does not assume any liability arising out of the application or use of any product or circuit.

Rectron products are not designed, intended or authorized for use in medical, life-saving implant or other applications intended for life-sustaining or other related applications where a failure or malfunction of component or circuitry may directly or indirectly cause injury or threaten a life without expressed written approval of Rectron Inc. Customers using or selling Rectron components for use in such applications do so at their own risk and shall agree to fully indemnify Rectron Inc and its subsidiaries harmless against all claims, damages and expenditures.