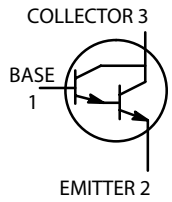
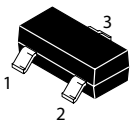
WEITRON

MMBTA13
MMBTA14

NPN Transistors Darlington Amplifier

Lead(Pb)-Free





SOT-23

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector- Emitter Voltage	V_{CES}	30	Vdc
Collector- Base Voltage	V_{CBO}	30	Vdc
Emitter- Base Voltage	V_{EBO}	10	Vdc
Collector Current - Continuous	I_C	300	mAdc

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR±5 Board(1) $T_A = 25^\circ C$	P_D	225	mW
Derate above 25 °C		1.8	mW/°C
Thermal Resistance Junction to Ambient	R_{JA}	556	°C/W
Total Device Dissipation Alumina Substrate,(2) $T_A = 25^\circ C$	P_D	300	mW
Derate above 25°C		2.4	mW/ C
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature	T_J, T_{stg}	- 55 to +150	°C

DEVICE MARKING

MMBTA13 = 1M; MMBTA14LT1 = 1N

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ C$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector- Emitter Breakdown Voltage (I_C = 100 uAdc, V_{BE} = 0)	$V_{(BR)CES}$	30	-	Vdc
Collector Cutoff Current (V_{CB} = 30 Vdc, I_E = 0)	I_{CBO}	-	100	nAdc
Emitter Cutoff Current (V_{EB} = 10 Vdc, I_C = 0)	I_{EBO}	-	100	nAdc

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

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

Characteristic		Symbol	Min	Max	Unit
ON CHARACTERISTICS(3)					
DC Current Gain		h_{FE}			-
(I_C = 10 mAdc, V_{CE} = 5.0 Vdc)	MMBTA13		5000	-	
	MMBTA14		10,000	-	
(I_C = 100 mAdc, V_{CE} = 5.0 Vdc)	MMBTA13		10,000	-	
	MMBTA14		20,000	-	
Collector- Emitter Saturation Voltage (I_C = 100 mAdc, I_B = 0.1 mAdc)		$V_{CE(sat)}$	-	1.5	Vdc
Base- Emitter On Voltage (I_C = 100 mAdc, V_{CE} = 5.0 Vdc)		V_{BE}	-	2.0	Vdc
SMALL- SIGNAL CHARACTERISTICS					
Current- Gain - Bandwidth Product (4) (I_C = 10 mAdc, V_{CE} = 5.0 Vdc, f = 100 MHz)		f_T	125	-	MHz

3. Pulse Test: Pulse Width ≤ 300 us, Duty Cycle ≤ 2.0%.
4. $f_T = |h_{fe}| \cdot f_{test}$.

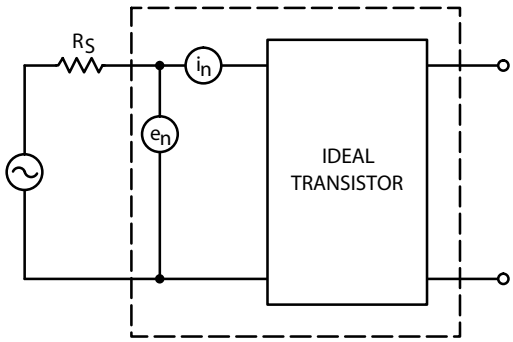


FIG.1. Transistor Noise Model

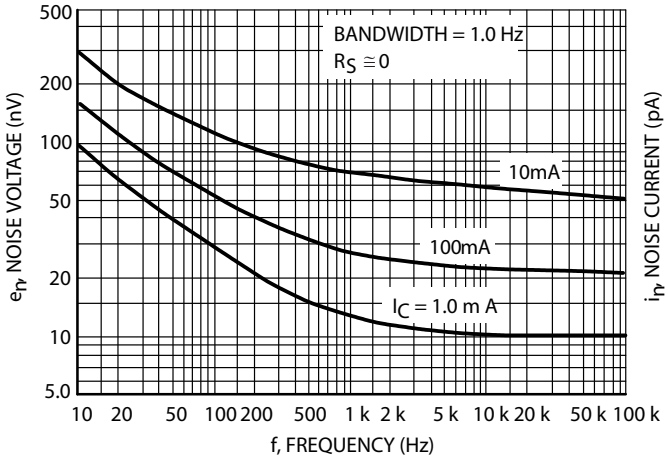


FIG.2 Noise Voltage

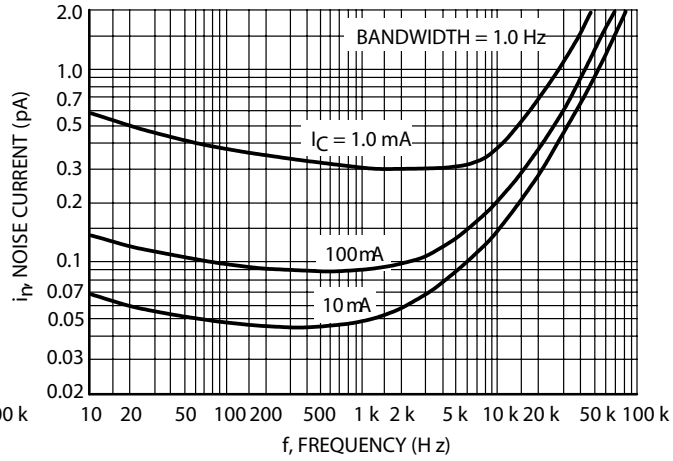


FIG.3 Noise Current

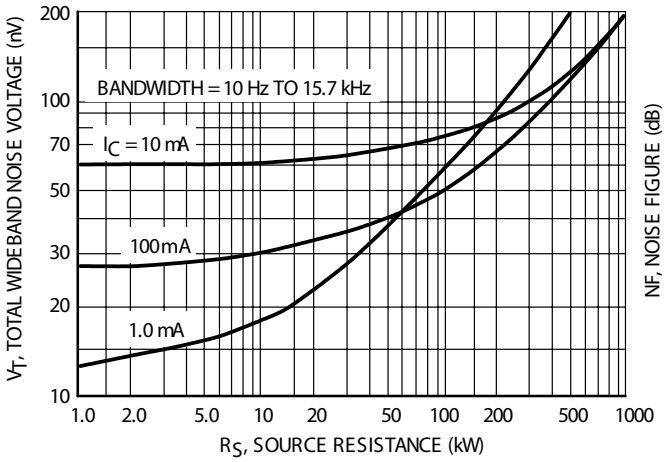


FIG.4 Total Wideband Noise Voltage

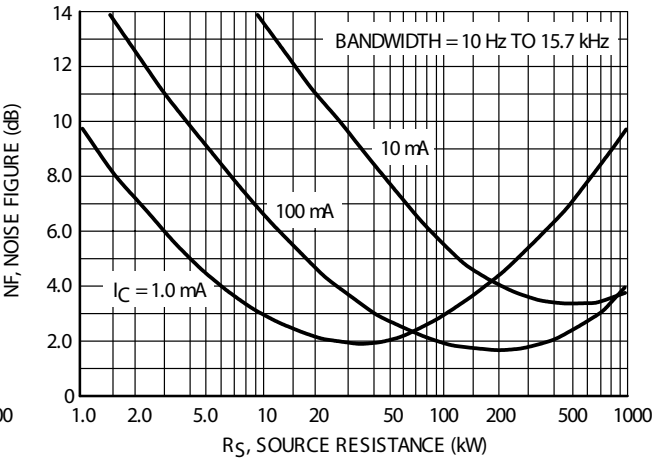


FIG.5 Wideband Noise Figure

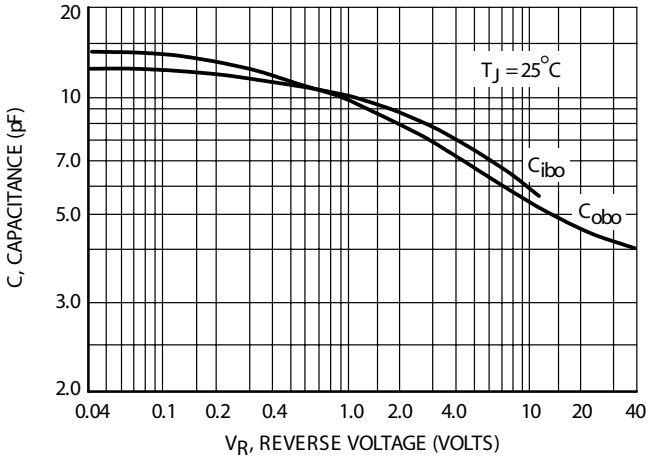


FIG.6 Capacitance

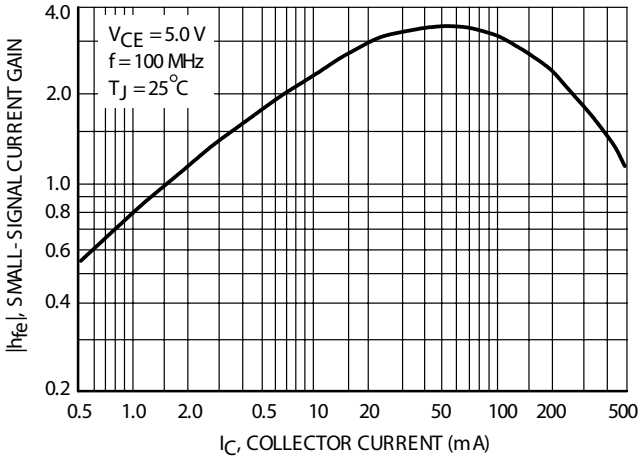


FIG.7 High Frequency Current Gain

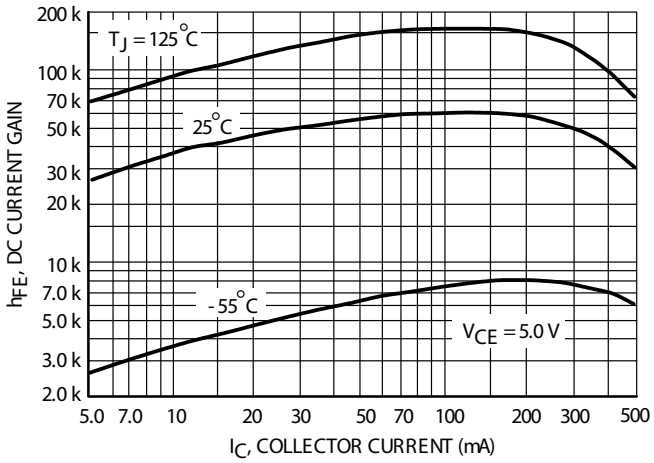


FIG.8 DC Current Gain

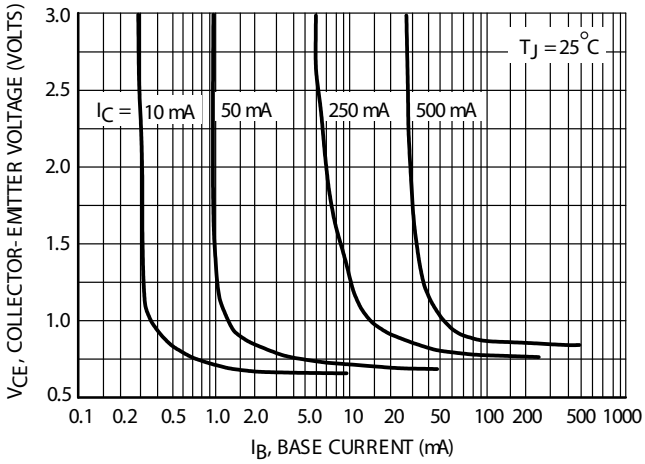


FIG.9 Collector Saturation Region

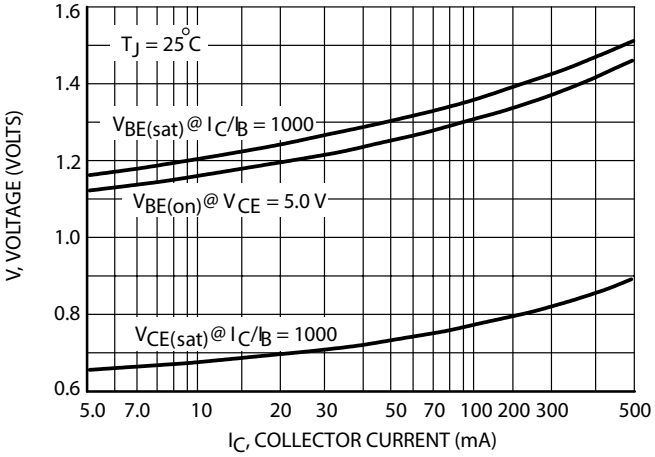


FIG.10. "On" Voltages

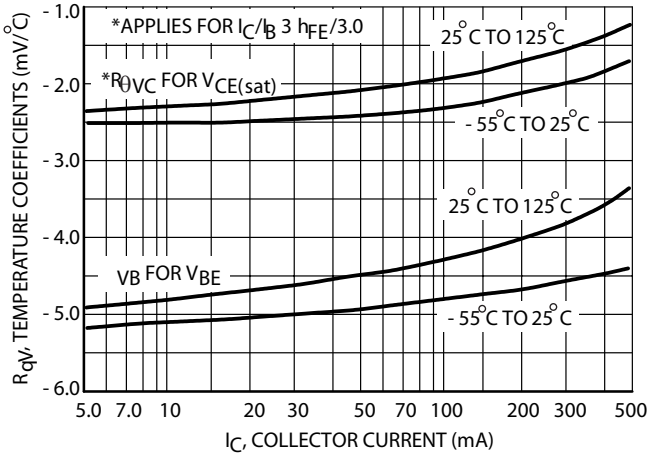


FIG.11 Temperature Coefficients

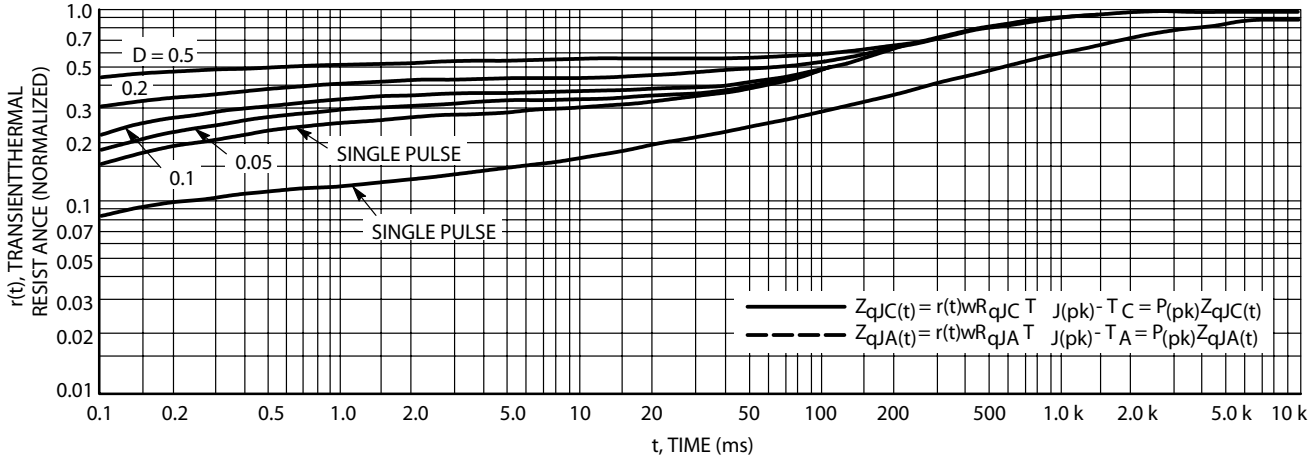


FIG.12 Thermal Response

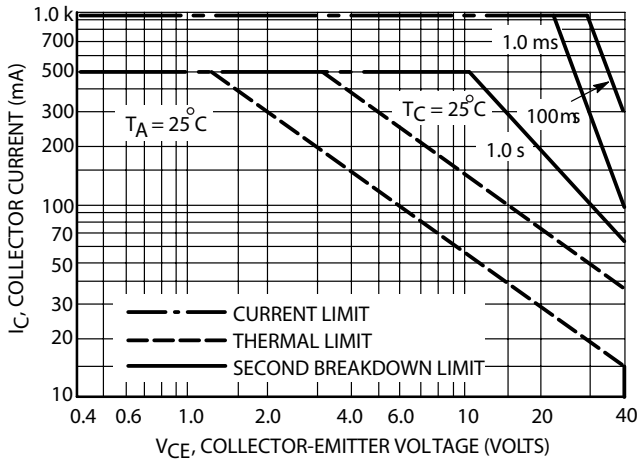
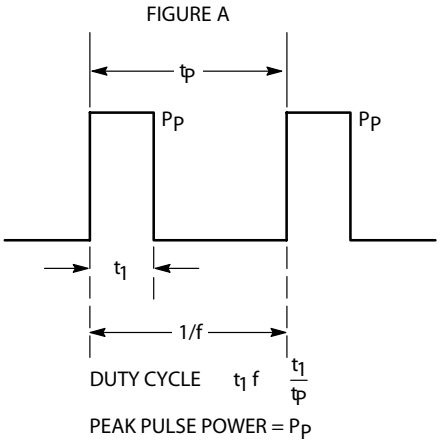


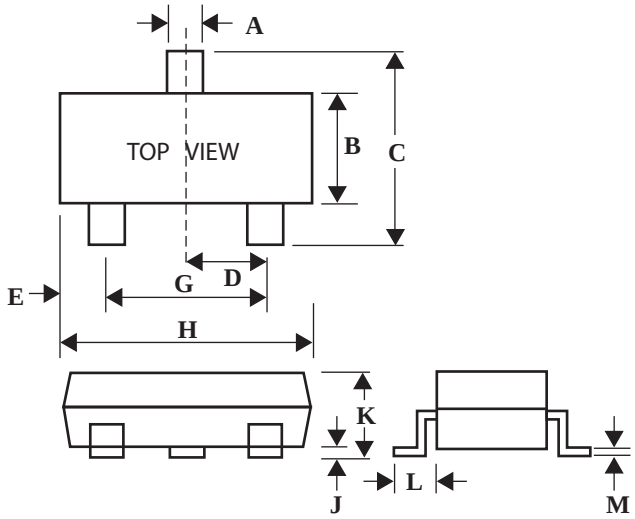
FIG.13 Active Region Safe Operating Area



Design Note: Use of Transient Thermal Resistance Data

SOT-23 Package Outline Dimensions

Unit:mm



Dim	Min	Max
A	0.35	0.51
B	1.19	1.80
C	2.10	3.00
D	0.85	1.05
E	0.46	1.00
G	1.70	2.10
H	2.70	3.10
J	0.01	0.13
K	0.89	1.60
L	0.30	0.61
M	0.076	0.25