



Micro Commercial Components
 21201 Itasca Street Chatsworth
 CA 91311
 Phone: (818) 701-4933
 Fax: (818) 701-4939

MMBTA13 MMBTA14

NPN Darlington Amplifier Transistor

Features

- Operating And Storage Temperatures -55°C to 150°C
- $R_{\theta JA}$ is 556°C/W (Mounted on FR-5 PCB $1.0'' \times 0.75'' \times 0.062''$)
- Capable of 225mWatts of Power Dissipation
- Marking Code: MMBTA13 ---K2D; MMBTA14 ---- 1N

Electrical Characteristics @ 25°C Unless Otherwise Specified

Symbol	Parameter	Min	Max	Units
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OFF CHARACTERISTICS

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage* ($I_C=100\mu\text{Adc}$, $I_B=0$)	30		Vdc
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	30		Vdc
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	10		Vdc
I_C	Collector Current-Continuous	300		mAdc
I_{CBO}	Collector Cutoff Current ($V_{CB}=30\text{Vdc}$, $I_E=0$)		100	nAdc
I_{EBO}	Emitter Cutoff Current ($V_{EB}=10\text{Vdc}$, $I_C=0$)		100	nAdc

ON CHARACTERISTICS

h_{FE}	DC Current Gain*			
MMBTA13 MMBTA14	($I_C=10\text{mAdc}$, $V_{CE}=5.0\text{Vdc}$)	5000 10000		
MMBTA13 MMBTA14	($I_C=150\text{mAdc}$, $V_{CE}=1.0\text{Vdc}$)	10000 20000		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ($I_C=100\text{mAdc}$, $I_B=0.1\text{mAdc}$)		1.5	Vdc
$V_{BE(sat)}$	Base-Emitter Saturation Voltage ($I_C=100\text{mAdc}$, $V_{CE}=5.0\text{Vdc}$)		2.0	Vdc

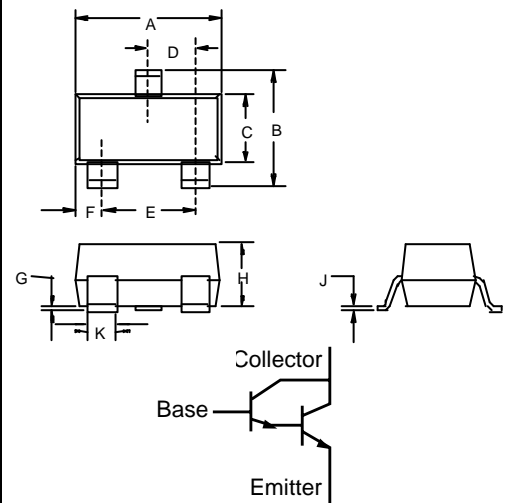
SMALL-SIGNAL CHARACTERISTICS

f_T	Current Gain-Bandwidth Product ($I_C=10\text{mAdc}$, $V_{CE}=5.0\text{Vdc}$, $f=100\text{MHz}$)	125		MHz
C_{obo}	Output Capacitance ($V_{CB}=10\text{Vdc}$, $I_E=0$, $f=1.0\text{MHz}$)		8.0	pF
C_{ibo}	Input Capacitance ($V_{BE}=0.5\text{Vdc}$, $I_C=0$, $f=1.0\text{MHz}$)		15	pF

SWITCHING CHARACTERISTICS

t_d	Delay Time	($V_{CC}=30\text{Vdc}$, $V_{BE}=0.5\text{Vdc}$)	10	ns
t_r	Rise Time	$I_C=150\text{mAdc}$, $I_B=15\text{mAdc}$	25	ns
t_s	Storage Time	($V_{CC}=30\text{Vdc}$, $I_C=150\text{mAdc}$)	225	ns
t_f	Fall Time	$I_B=I_{B2}=15\text{mAdc}$	60	ns

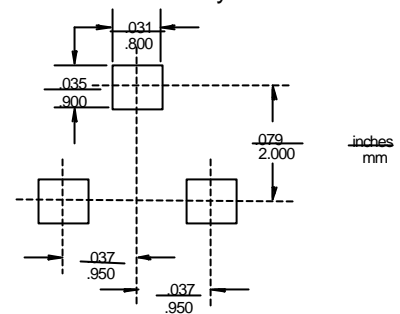
SOT-23



DIMENSIONS

DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.110	.120	2.80	3.04	
B	.083	.098	2.10	2.64	
C	.047	.055	1.20	1.40	
D	.035	.041	.89	1.03	
E	.070	.081	1.78	2.05	
F	.018	.024	.45	.60	
G	.0005	.0039	.013	.100	
H	.035	.044	.89	1.12	
J	.003	.007	.085	.180	
K	.015	.020	.37	.51	

Suggested Solder Pad Layout



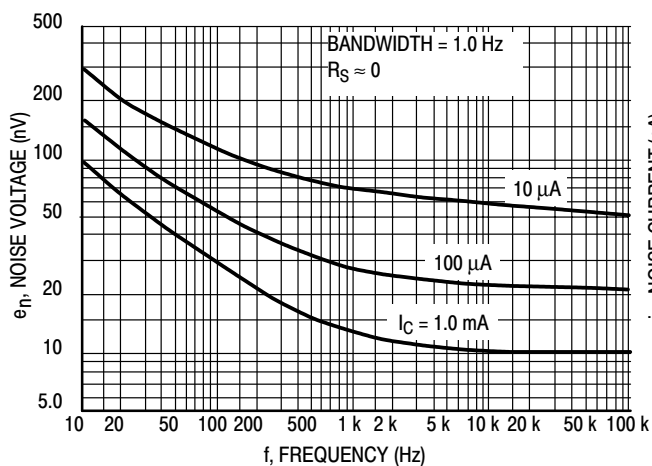


Figure 2. Noise Voltage

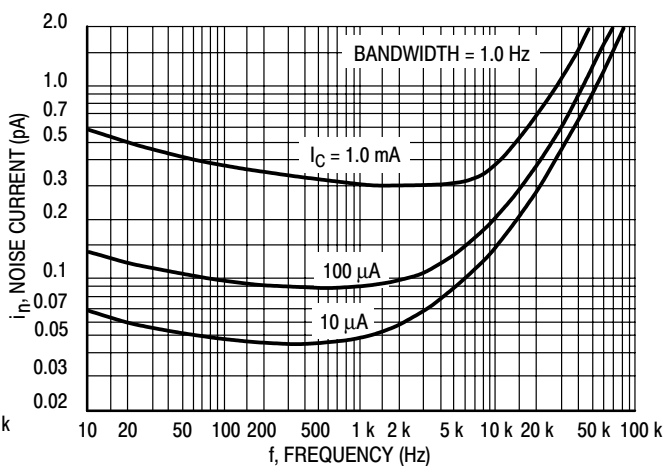


Figure 3. Noise Current

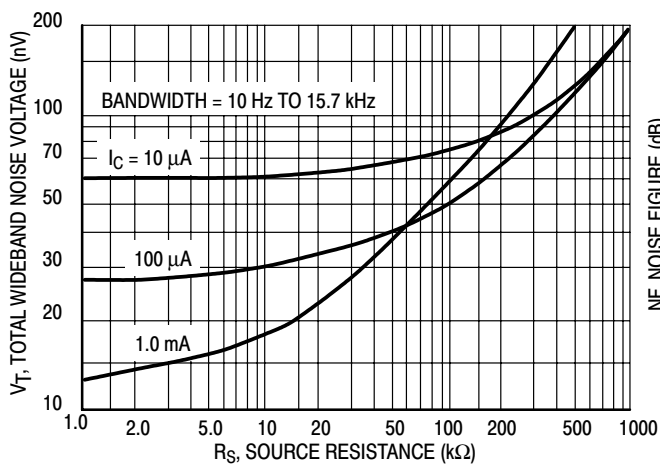


Figure 4. Total Wideband Noise Voltage

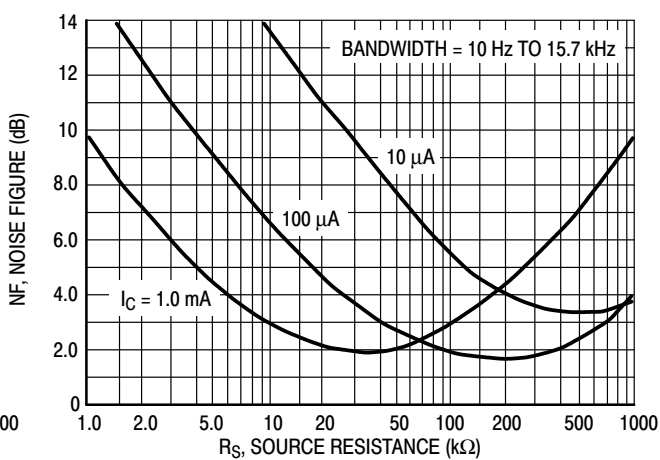


Figure 5. Wideband Noise Figure

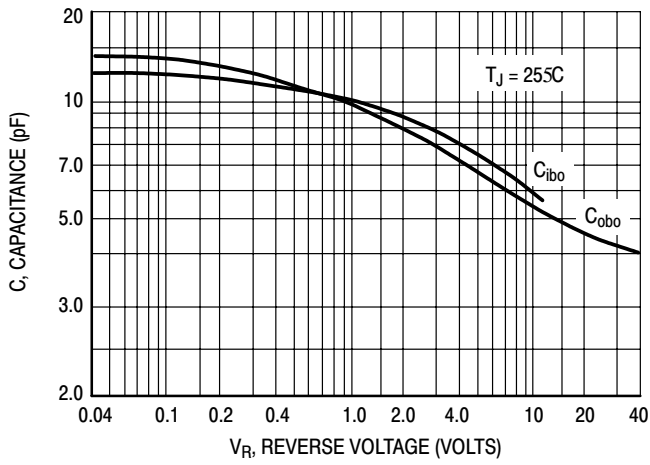


Figure 6. Capacitance

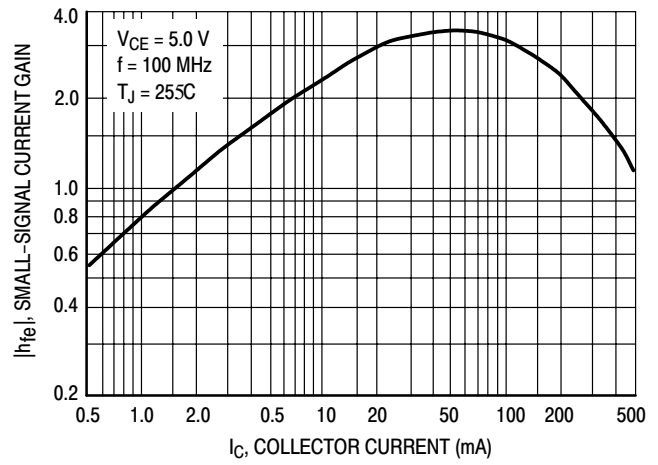


Figure 7. High Frequency Current Gain

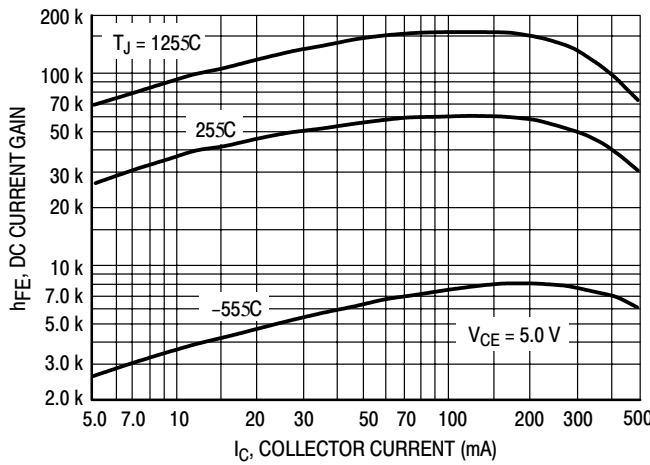


Figure 8. DC Current Gain

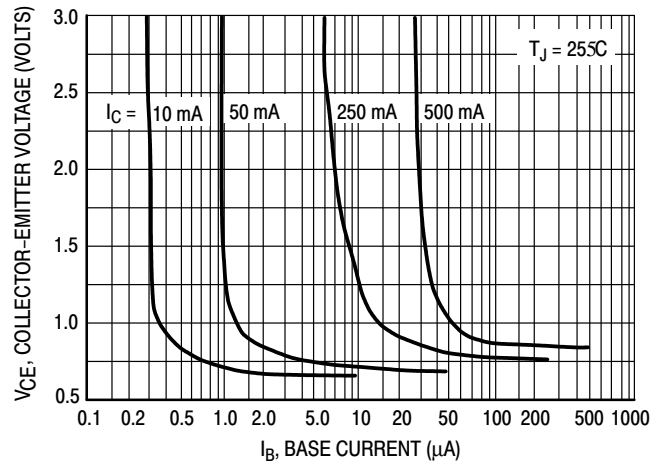


Figure 9. Collector Saturation Region

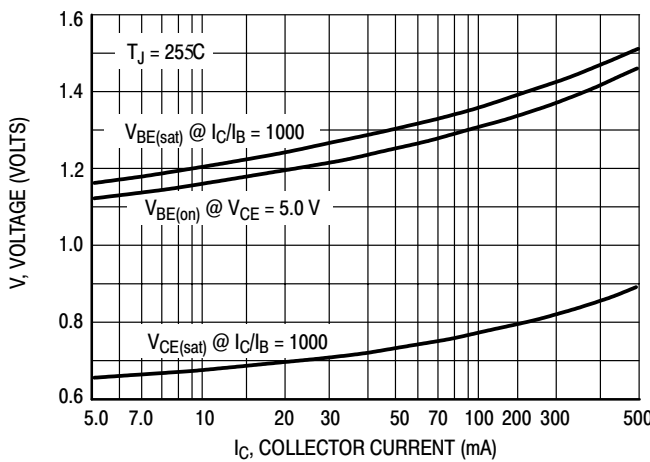


Figure 10. "On" Voltages

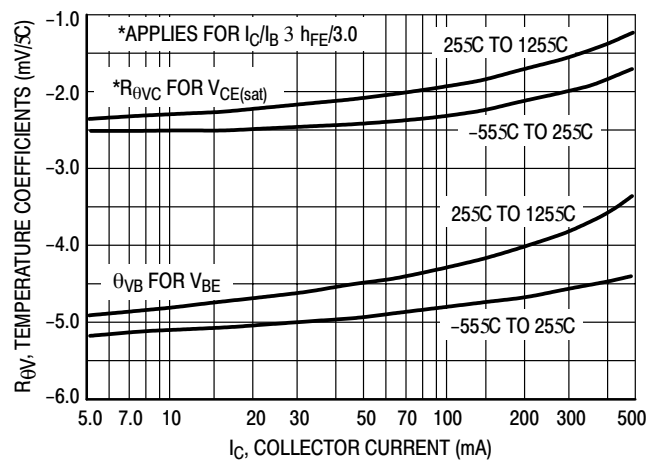


Figure 11. Temperature Coefficients

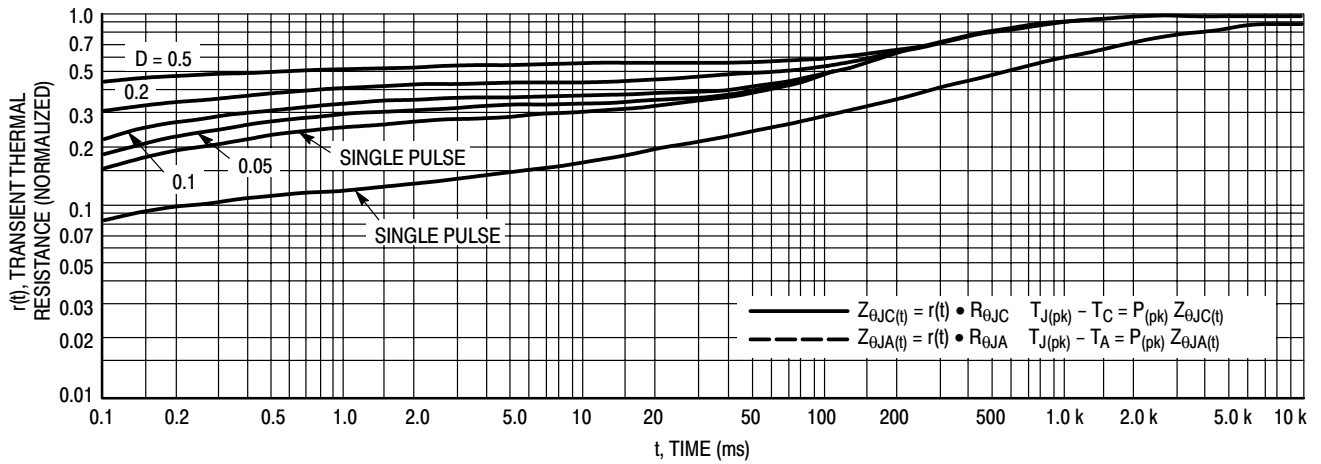


Figure 12. Thermal Response

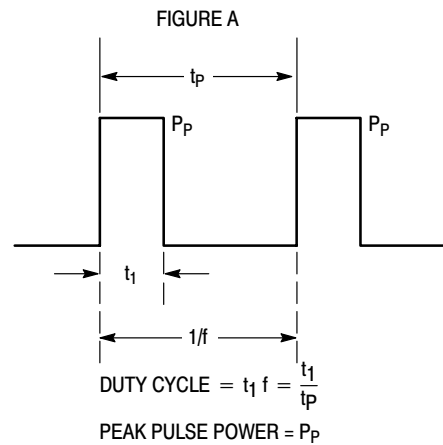
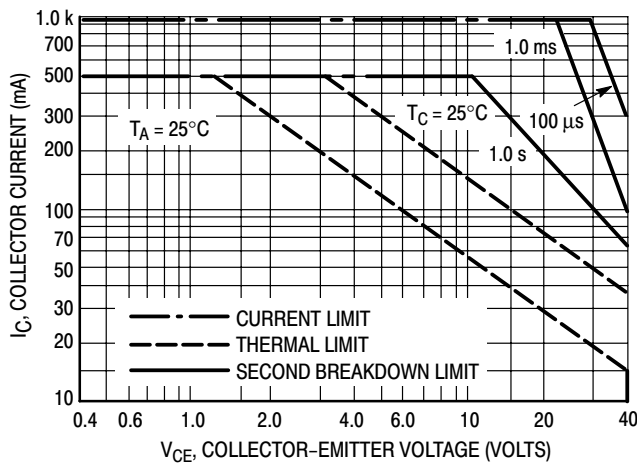


Figure 13. Active Region Safe Operating Area Design Note: Use of Transient Thermal Resistance Data