



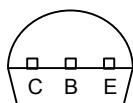
Micro Commercial Components
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MPSA13 MPSA14

Features

- Capable of 1.5Watts of Power Dissipation.
- Collector-current 500mA
- Collector-base Voltage 30V
- Operating and storage junction temperature range: -55°C to +150°C

Pin Configuration
Bottom View



NPN Silicon Darlington Transistor

Maximum Ratings

Symbol	Rating	Rating	Unit
V_{CES}	Collector-Emitter Voltage	30	V
V_{CBO}	Collector-Base Voltage	30	V
V_{EBO}	Emitter-Base Voltage	10	V
I_C	Collector Current Continuous	500	mA
P_D	Total Device Dissipation @ $T_A=25^\circ\text{C}$ Derate above 25°C	625 5.0	mW mW/°C
P_D	Total Device Dissipation @ $T_A=25^\circ\text{C}$ Derate above 25°C	1.5 12	W mW/°C
T_J	Junction Temperature	-55 to +150	°C
T_{STG}	Storage Temperature	-55 to +150	°C

Electrical Characteristics @ 25°C Unless Otherwise Specified

Symbol	Parameter	Min	Max	Units
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OFF CHARACTERISTICS

$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage ($I_C=100\mu\text{Adc}$, $I_B=0$)	30		Vdc
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⁽¹⁾

$h_{FE(1)}$	DC Current Gain ($I_C=10\text{mAdc}$, $V_{CE}=5.0\text{Vdc}$)	MPSA13 MPSA14	5000 10000		
$h_{FE(2)}$	DC Current Gain ($I_C=100\text{mAdc}$, $V_{CE}=5.0\text{Vdc}$)	MPSA13 MPSA14	10000 20000		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ($I_C=100\text{mAdc}$, $I_B=0.1\text{mAdc}$)			1.5	Vdc
$V_{BE(on)}$	Base-Emitter Saturation Voltage ($I_C=100\text{mAdc}$, $V_{CE}=5.0\text{Vdc}$)			2.0	Vdc

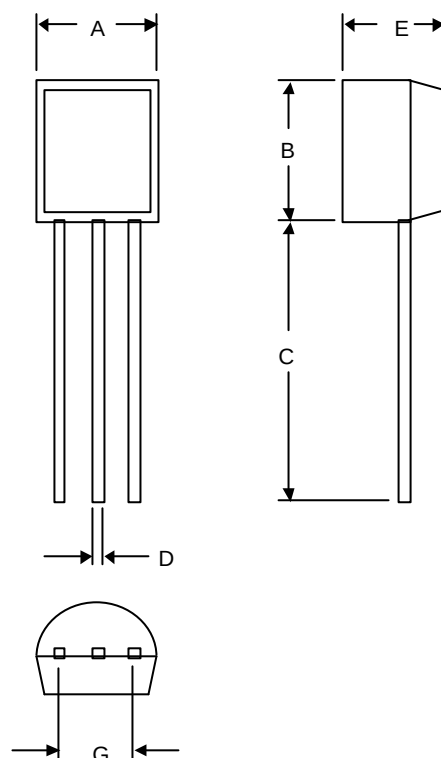
SMALL-SIGNAL CHARACTERISTICS

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

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

TO-92



DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.175	.185	4.45	4.70	
B	.175	.185	4.46	4.70	
C	.500	---	12.7	---	
D	.016	.020	0.41	0.63	
E	.135	.145	3.43	3.68	
G	.095	.105	2.42	2.67	

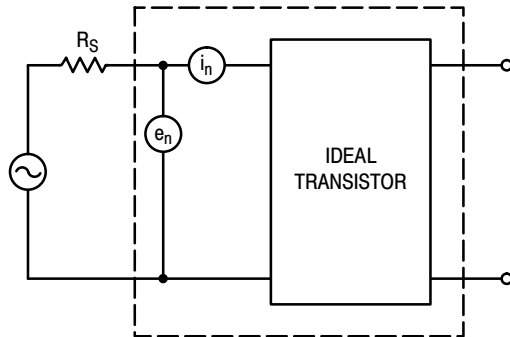


Figure 1. Transistor Noise Model

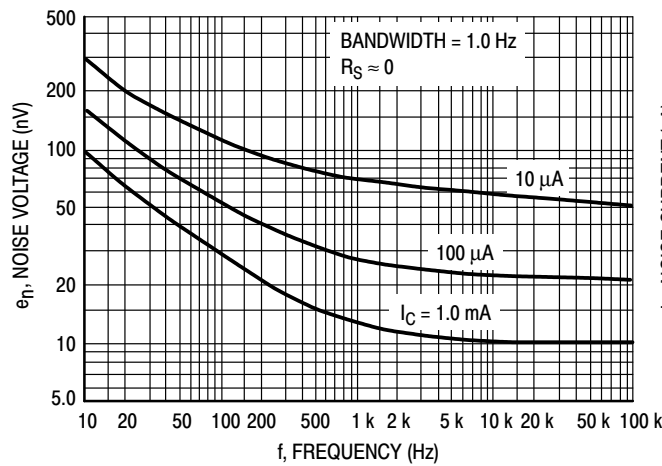


Figure 2. Noise Voltage

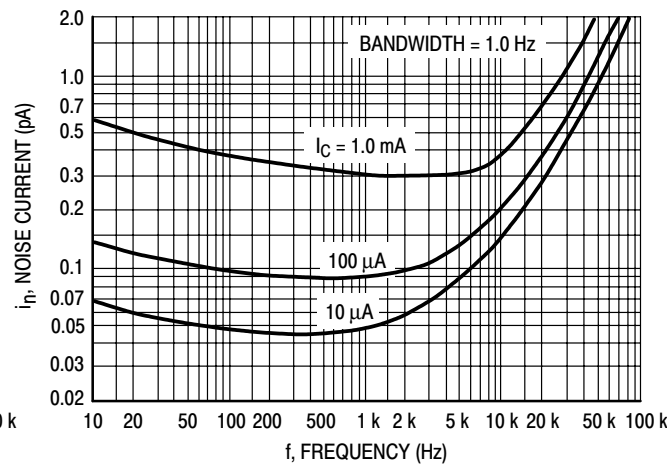


Figure 3. Noise Current

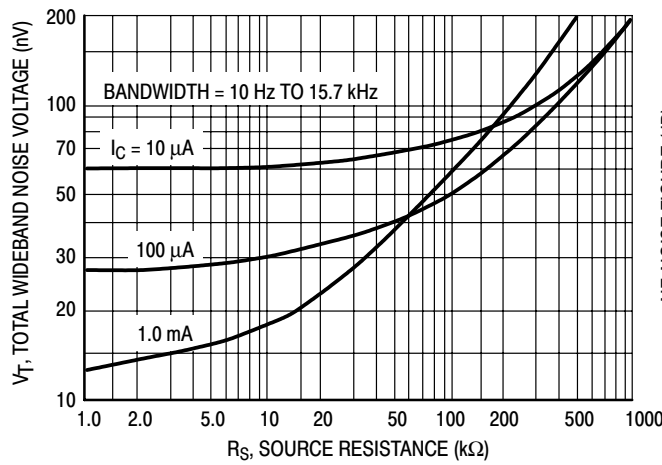


Figure 4. Total Wideband Noise Voltage

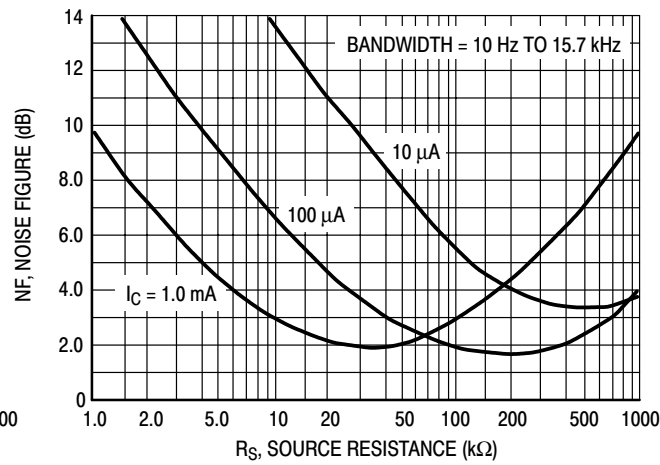


Figure 5. Wideband Noise Figure

MPSA13 thru MPSA14

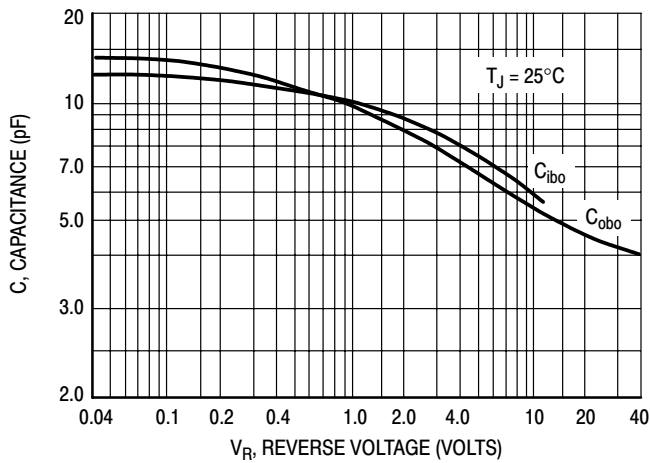


Figure 6. Capacitance

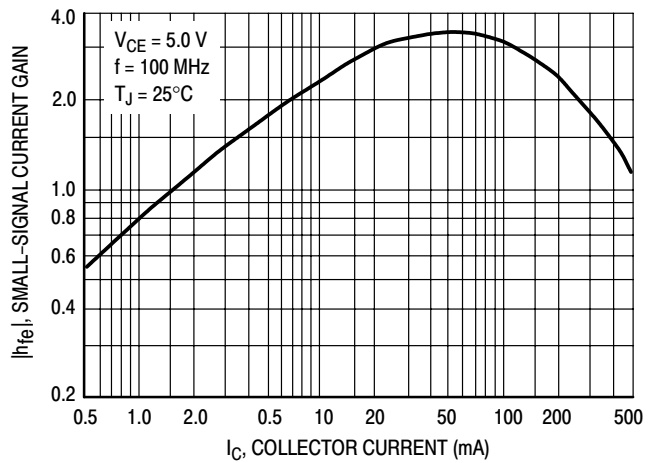


Figure 7. High Frequency Current Gain

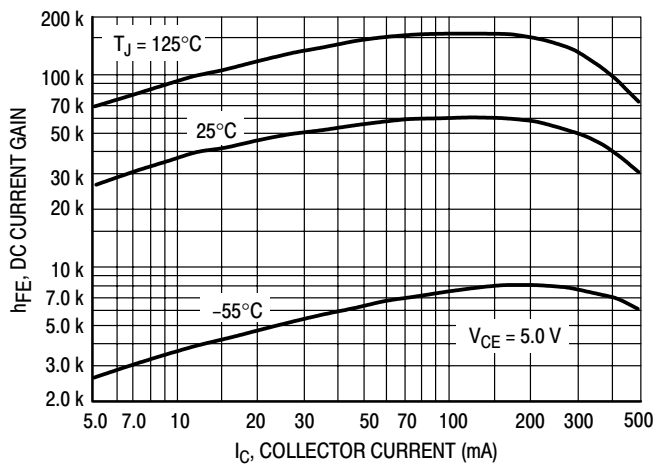


Figure 8. DC Current Gain

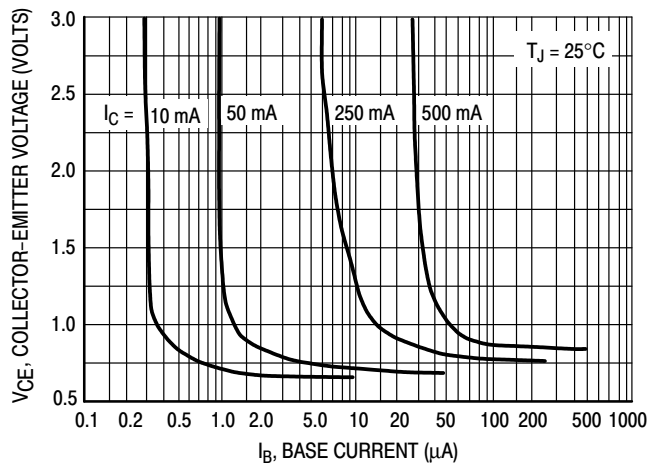


Figure 9. Collector Saturation Region

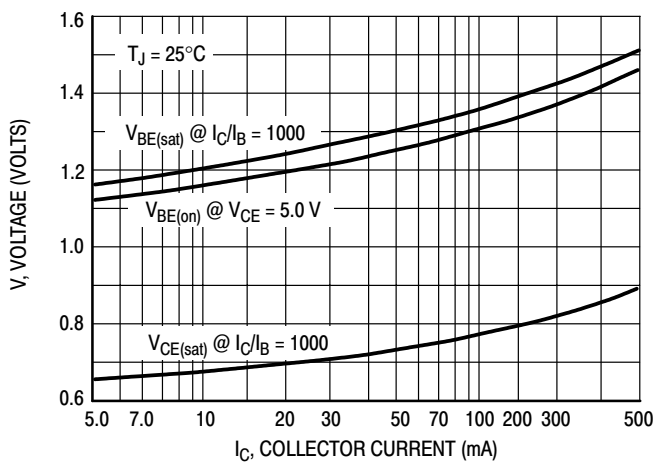


Figure 10. "On" Voltages

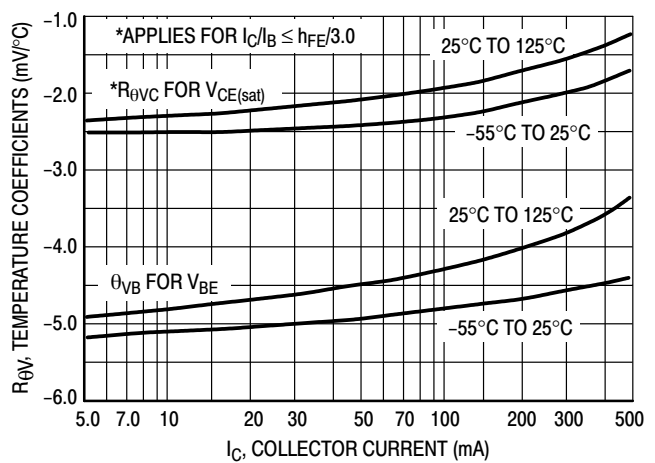


Figure 11. Temperature Coefficients

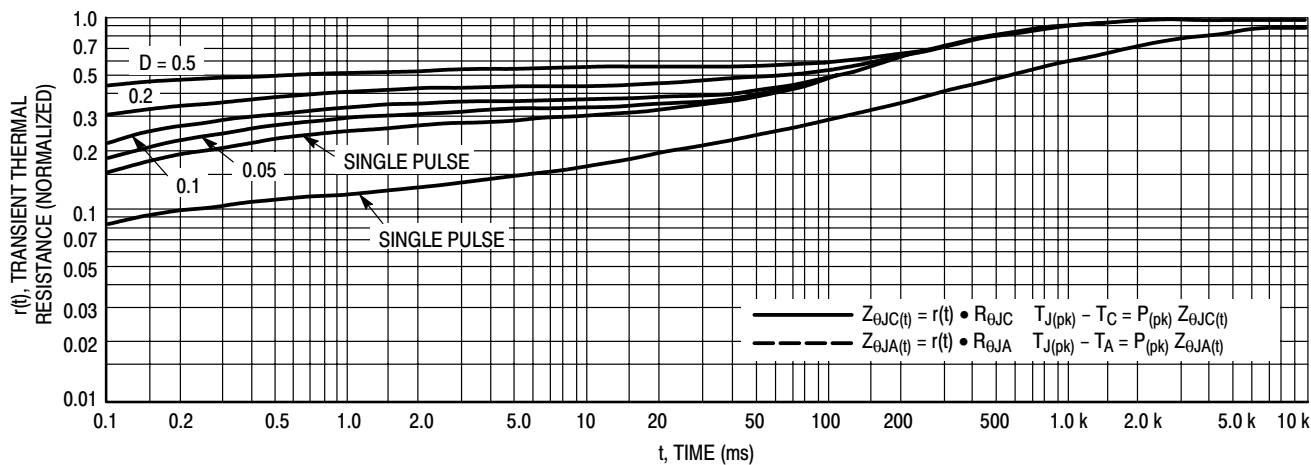


Figure 12. Thermal Response

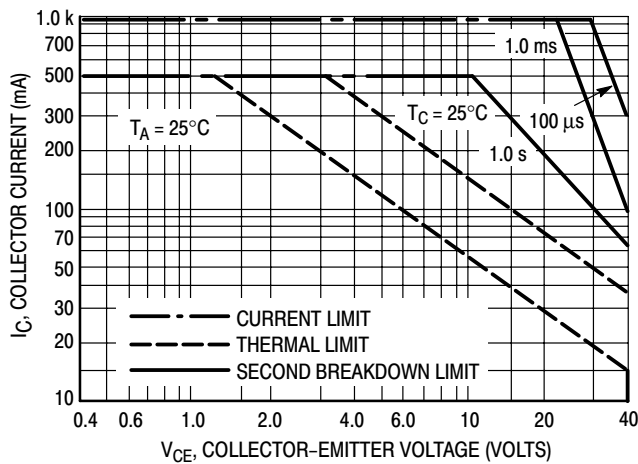
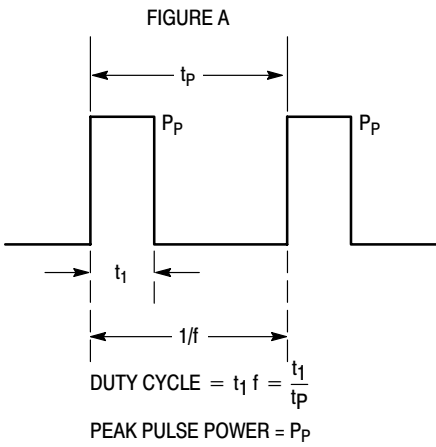


Figure 13. Active Region Safe Operating Area



Design Note: Use of Transient Thermal Resistance Data