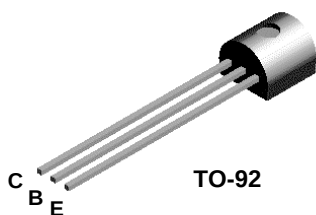
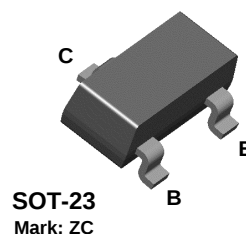


2N4124



MMBT4124



NPN General Purpose Amplifier

This device is designed as a general purpose amplifier and switch. The useful dynamic range extends to 100 mA as a switch and to 100 MHz as an amplifier.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	25	V
V_{CBO}	Collector-Base Voltage	30	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	200	mA
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:

- 1) These ratings are based on a maximum junction temperature of 150 degrees C.
- 2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max		Units
		2N4124	*MMBT4124	
P_D	Total Device Dissipation	625	350	mW
	Derate above 25°C	5.0	2.8	mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3		°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	357	°C/W

*Device mounted on FR-4 PCB 1.6" X 1.6" X 0.06."

NPN General Purpose Amplifier (continued)

2N4124 / MMBT4124

Electrical Characteristics

TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
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OFF CHARACTERISTICS

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 1.0 \text{ mA}$, $I_B = 0$	25		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 10 \text{ }\mu\text{A}$, $I_E = 0$	30		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_C = 10 \text{ }\mu\text{A}$, $I_C = 0$	5.0		V
I_{CBO}	Collector Cutoff Current	$V_{CB} = 20 \text{ V}$, $I_E = 0$		50	nA
I_{EBO}	Emitter Cutoff Current	$V_{EB} = 3.0 \text{ V}$, $I_C = 0$		50	nA

ON CHARACTERISTICS*

h_{FE}	DC Current Gain	$I_C = 2.0 \text{ mA}$, $V_{CE} = 1.0 \text{ V}$ $I_C = 50 \text{ mA}$, $V_{CE} = 1.0 \text{ V}$	120 60	360	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 50 \text{ mA}$, $I_B = 5.0 \text{ mA}$		0.3	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 50 \text{ mA}$, $I_B = 5.0 \text{ mA}$		0.95	V

SMALL SIGNAL CHARACTERISTICS

f_T	Current Gain - Bandwidth Product	$I_C = 10 \text{ mA}$, $V_{CE} = 20 \text{ V}$, $f = 100 \text{ MHz}$	300		MHz
C_{obo}	Output Capacitance	$V_{CB} = 5.0 \text{ V}$, $I_E = 0$, $f = 100 \text{ kHz}$		4.0	pF
C_{ibo}	Input Capacitance	$V_{BE} = 0.5 \text{ V}$, $I_C = 0$, $f = 1.0 \text{ kHz}$		8.0	pF
C_{cb}	Collector-Base Capacitance	$V_{CB} = 5.0 \text{ V}$, $I_E = 0$, $f = 100 \text{ kHz}$		4.0	pF
h_{fe}	Small-Signal Current Gain	$V_{CE} = 10 \text{ V}$, $I_C = 2.0 \text{ mA}$, $f = 1.0 \text{ kHz}$	120	480	
NF	Noise Figure	$I_C = 100 \text{ }\mu\text{A}$, $V_{CE} = 5.0 \text{ V}$, $R_S = 1.0 \text{ k}\Omega$, $f = 10 \text{ Hz to } 15.7 \text{ kHz}$		5.0	dB

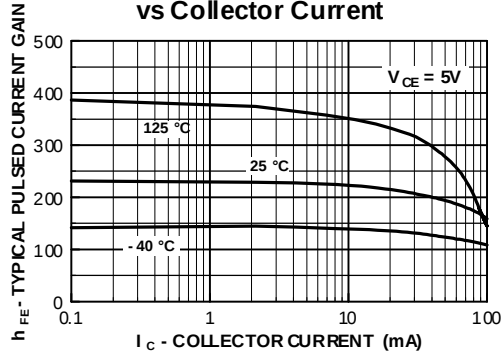
*Pulse Test: Pulse Width $\leq 300 \text{ }\mu\text{s}$, Duty Cycle $\leq 2.0\%$

NPN General Purpose Amplifier (continued)

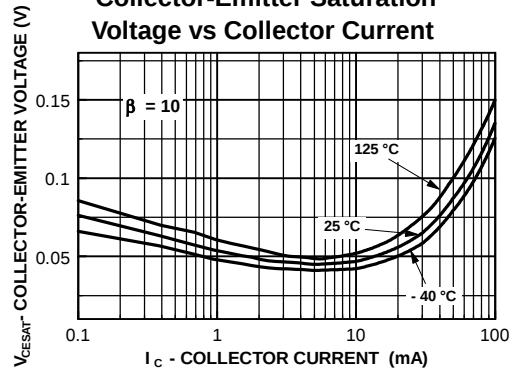
2N4124 / MMBT4124

Typical Characteristics

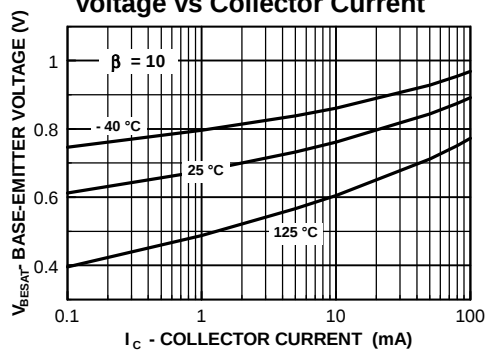
Typical Pulsed Current Gain
vs Collector Current



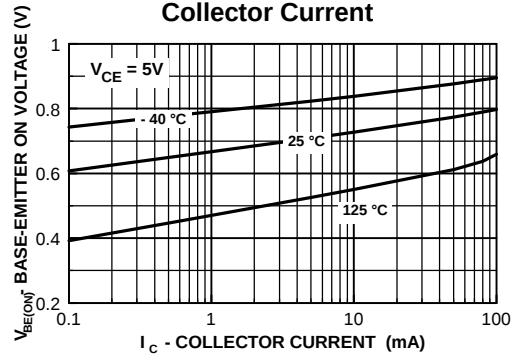
Collector-Emitter Saturation
Voltage vs Collector Current



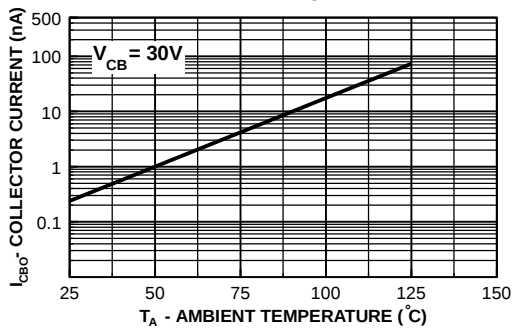
Base-Emitter Saturation
Voltage vs Collector Current



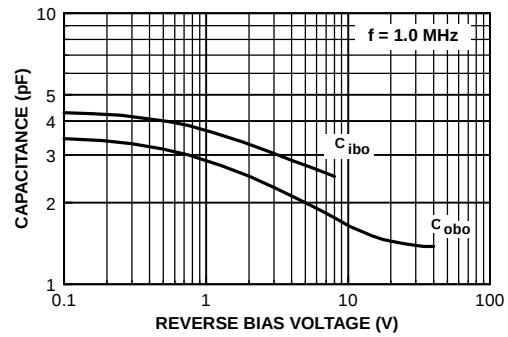
Base-Emitter ON Voltage vs
Collector Current



Collector-Cutoff Current
vs Ambient Temperature



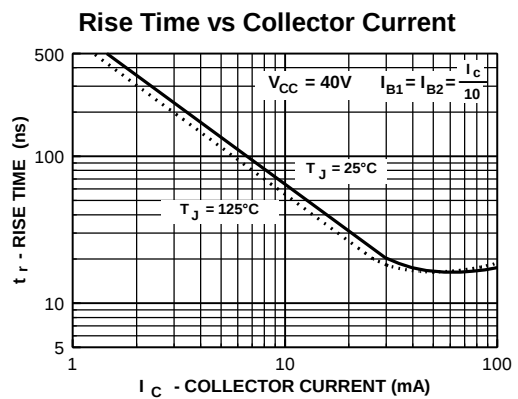
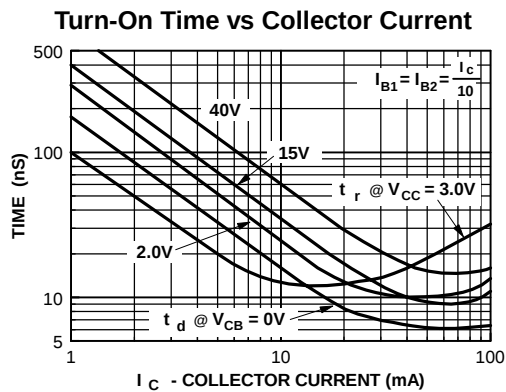
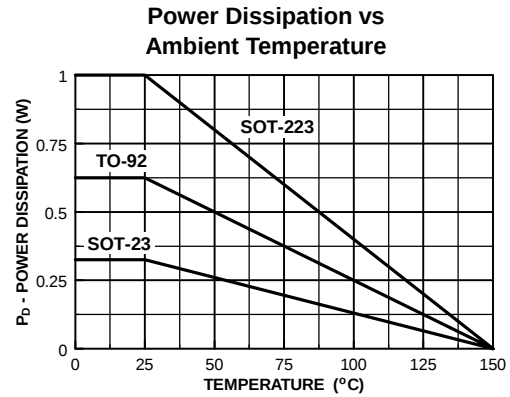
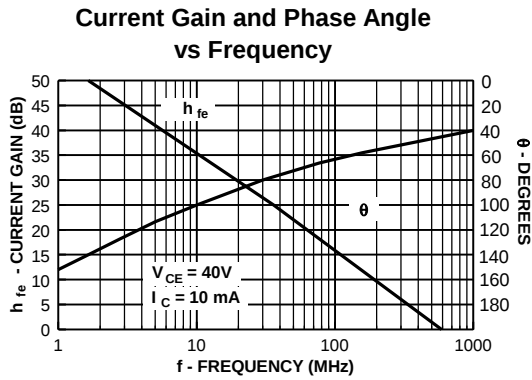
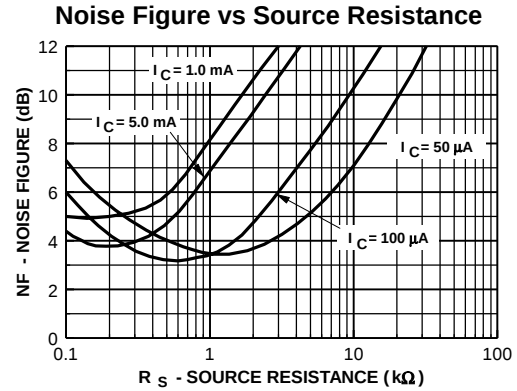
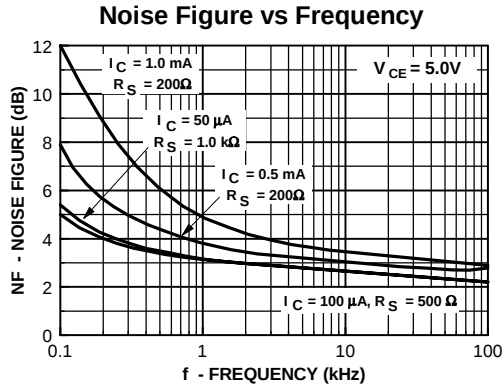
Capacitance vs
Reverse Bias Voltage



NPN General Purpose Amplifier

(continued)

Typical Characteristics (continued)

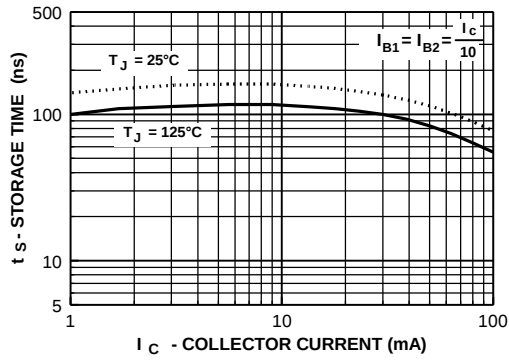


NPN General Purpose Amplifier (continued)

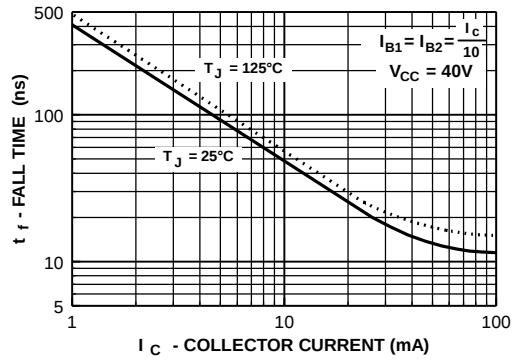
2N4124 / MMBT4124

Typical Characteristics (continued)

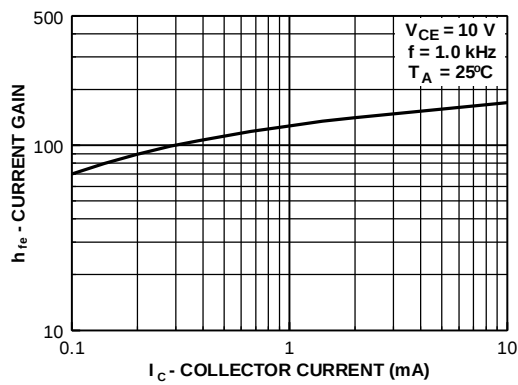
Storage Time vs Collector Current



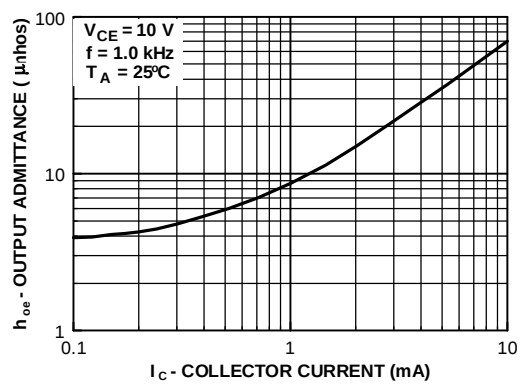
Fall Time vs Collector Current



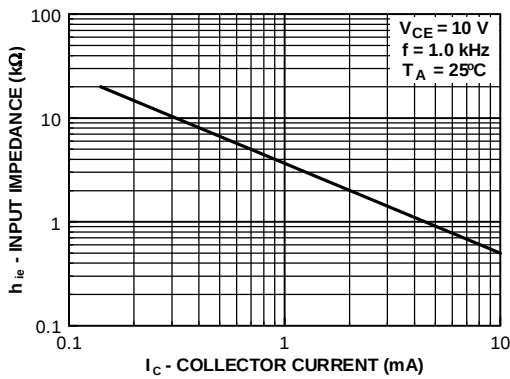
Current Gain



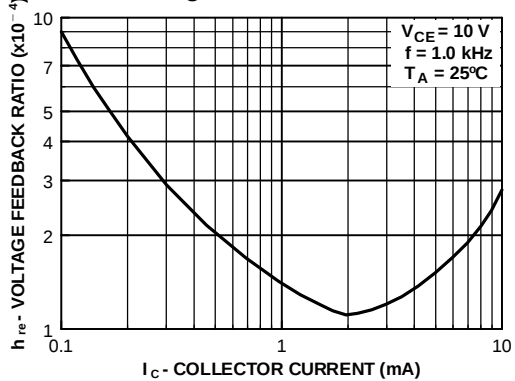
Output Admittance



Input Impedance



Voltage Feedback Ratio



Test Circuits

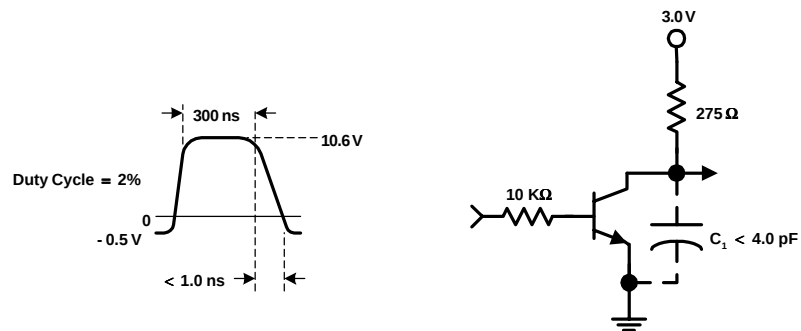


FIGURE 1: Delay and Rise Time Equivalent Test Circuit

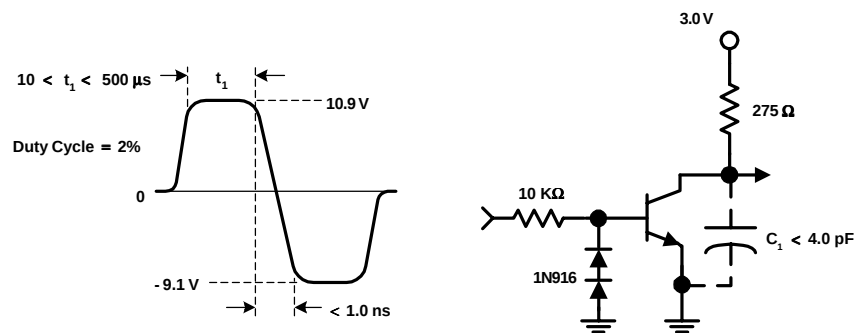


FIGURE 2: Storage and Fall Time Equivalent Test Circuit

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