2N4123, 2N4124

General Purpose Transistors

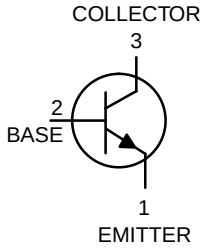
NPN Silicon

ON Semiconductor®

http://onsemi.com

Features

- Pb−Free Packages are Available*



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector−Emitter Voltage 2N4123 2N4124	V_{CEO}	 30 25	Vdc
Collector−Base Voltage 2N4123 2N4124	V_{CBO}	 40 30	Vdc
Emitter−Base Voltage	V_{EBO}	5.0	Vdc
Collector Current − Continuous	I_C	200	mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	 625 5.0	 mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	 1.5 12	 W mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150	°C

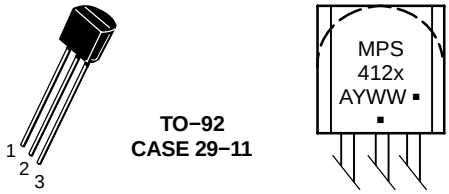
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	83.3	°C/W

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

MARKING DIAGRAM



TO−92
CASE 29−11

MPS412x = Device Code
x = 3 or 4
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping
2N4123RLRM	TO−92	2000/Tape & Ammo
2N4123RLRMG	TO−92 (Pb−Free)	2000/Tape & Ammo
2N4124	TO−92	5000 Units / Bulk
2N4124G	TO−92 (Pb−Free)	5000 Units / Bulk

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector−Emitter Breakdown Voltage (Note 1)		$V_{(BR)CEO}$			Vdc
(I_C = 1.0 mAdc, I_E = 0)	2N4123		30	−	
	2N4124		25	−	
Collector−Base Breakdown Voltage		$V_{(BR)CBO}$			Vdc
(I_C = 10 μAdc, I_E = 0)	2N4123		40	−	
	2N4124		30	−	
Emitter−Base Breakdown Voltage		$V_{(BR)EBO}$			Vdc
(I_E = 10 μAdc, I_C = 0)			5.0	−	
Collector Cutoff Current		I_{CBO}			nAdc
(V_{CB} = 20 Vdc, I_E = 0)			−	50	
Emitter Cutoff Current		I_{EBO}			nAdc
(V_{EB} = 3.0 Vdc, I_C = 0)			−	50	
ON CHARACTERISTICS					
DC Current Gain (Note 1)		h_{FE}			−
(I_C = 2.0 mAdc, V_{CE} = 1.0 Vdc)	2N4123		50	150	
	2N4124		120	360	
(I_C = 50 mAdc, V_{CE} = 1.0 Vdc)	2N4123		25	−	
	2N4124		60	−	
Collector−Emitter Saturation Voltage (Note 1)		$V_{CE(sat)}$			Vdc
(I_C = 50 mAdc, I_B = 5.0 mAdc)			−	0.3	
Base−Emitter Saturation Voltage (Note 1)		$V_{BE(sat)}$			Vdc
(I_C = 50 mAdc, I_B = 5.0 mAdc)			−	0.95	
SMALL−SIGNAL CHARACTERISTICS					
Current−Gain − Bandwidth Product		f_T			MHz
(I_C = 10 mAdc, V_{CE} = 20 Vdc, f = 100 MHz)	2N4123		250	−	
	2N4124		300	−	
Input Capacitance		C_{ibo}			pF
(V_{EB} = 0.5 Vdc, I_C = 0, f = 1.0 MHz)			−	8.0	
Collector−Base Capacitance		C_{cb}			pF
(I_E = 0, V_{CB} = 5.0 V, f = 1.0 MHz)			−	4.0	
Small−Signal Current Gain		h_{fe}			−
(I_C = 2.0 mAdc, V_{CE} = 10 Vdc, R_S = 10 k Ω, f = 1.0 kHz)	2N4123		50	200	
	2N4124		120	480	
Current Gain − High Frequency		$\|h_{fe}\|$			−
(I_C = 10 mAdc, V_{CE} = 20 Vdc, f = 100 MHz)	2N4123		2.5	−	
	2N4124		3.0	−	
(I_C = 2.0 mAdc, V_{CE} = 10 V, f = 1.0 kHz)	2N4123		50	200	
(I_C = 2.0 mAdc, V_{CE} = 10 V, f = 1.0 kHz)	2N4124		120	480	
Noise Figure		NF			dB
(I_C = 100 μAdc, V_{CE} = 5.0 Vdc, R_S = 1.0 k Ω, f = 1.0 kHz)	2N4123		−	6.0	
	2N4124		−	5.0	

1. Pulse Test: Pulse Width = 300 μs, Duty Cycle = 2.0%.

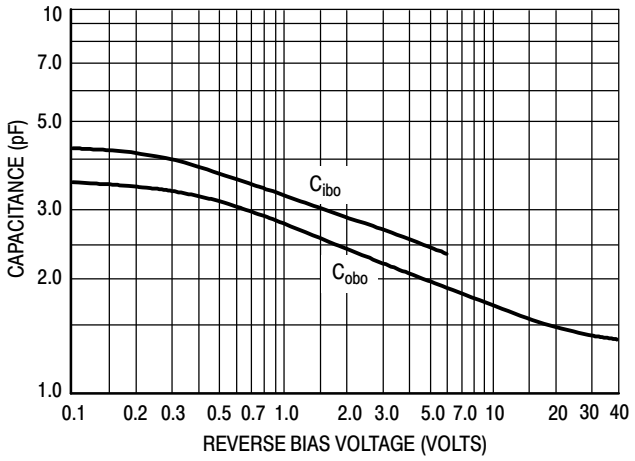


Figure 1. Capacitance

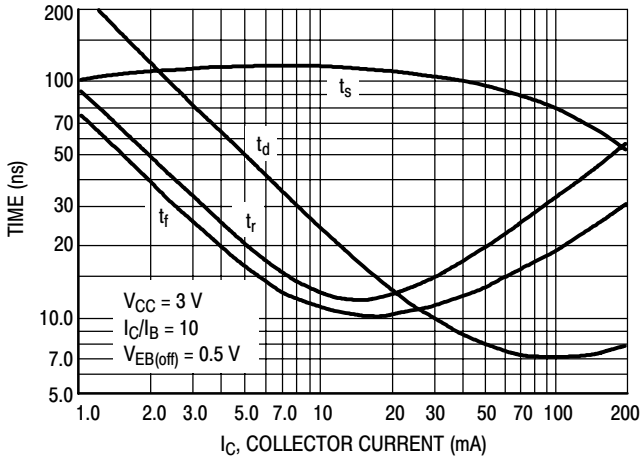


Figure 2. Switching Times

AUDIO SMALL−SIGNAL CHARACTERISTICS

NOISE FIGURE

(V_{CE} = 5 Vdc, T_A = 25°C)

Bandwidth = 1.0 Hz

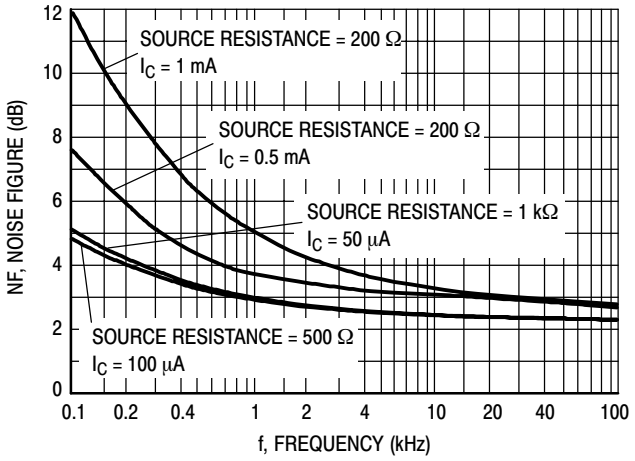


Figure 3. Frequency Variations

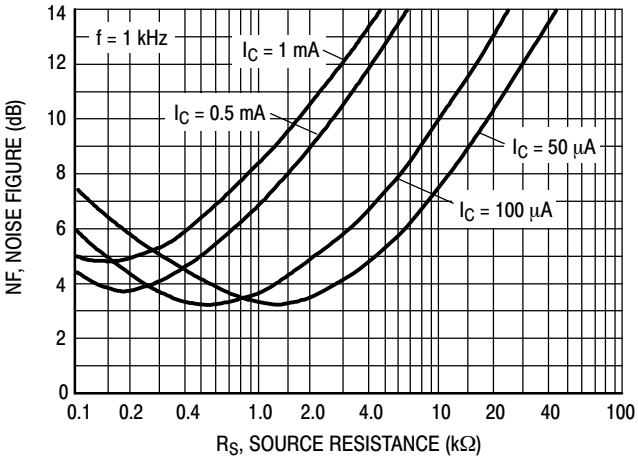


Figure 4. Source Resistance

h PARAMETERS

(V_{CE} = 10 V, f = 1 kHz, T_A = 25°C)

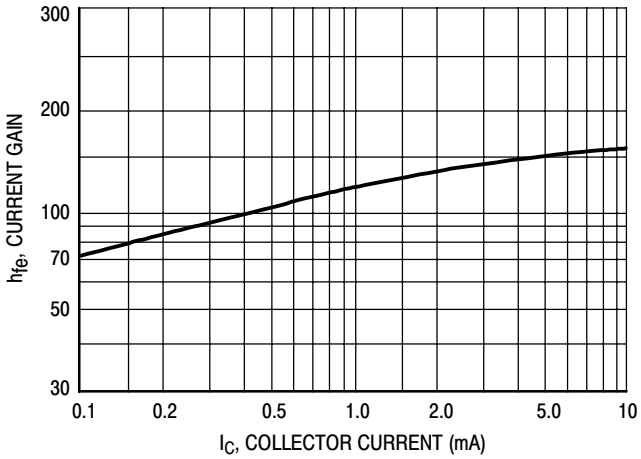


Figure 5. Current Gain

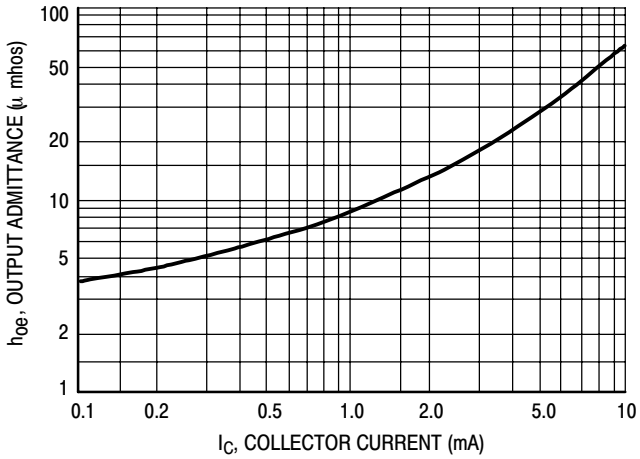


Figure 6. Output Admittance

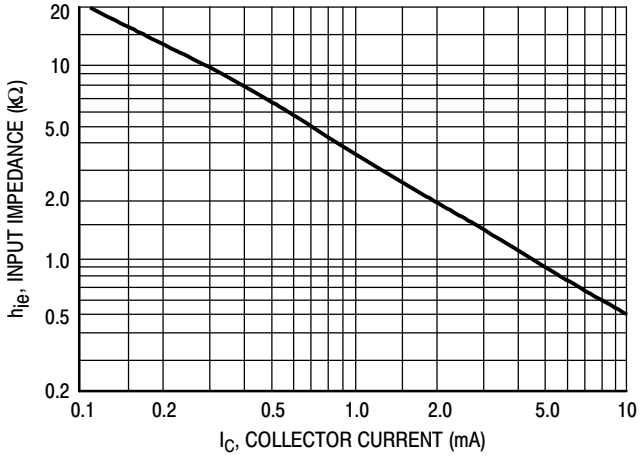


Figure 7. Input Impedance

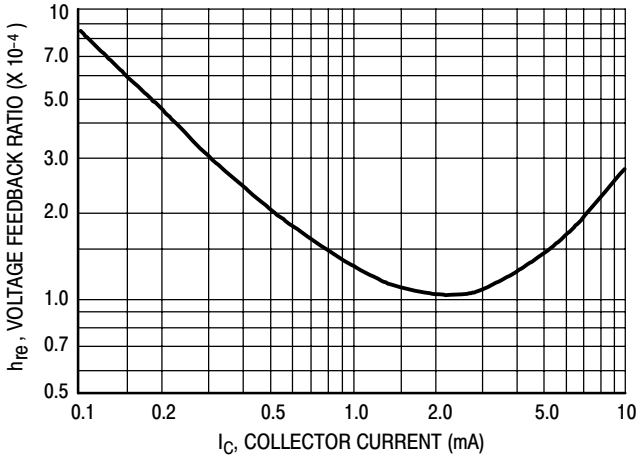


Figure 8. Voltage Feedback Ratio

STATIC CHARACTERISTICS

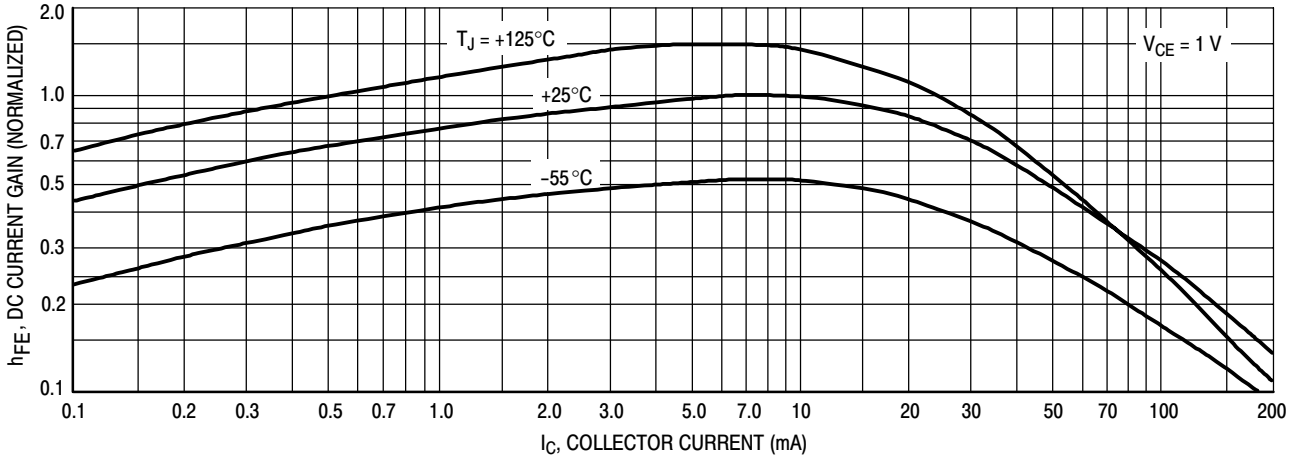


Figure 9. DC Current Gain

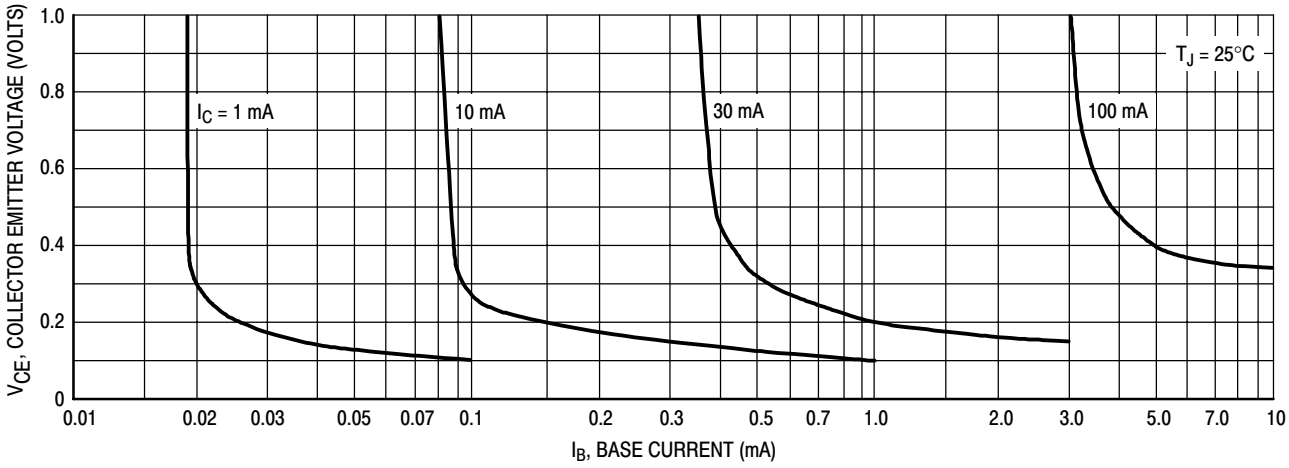


Figure 10. Collector Saturation Region

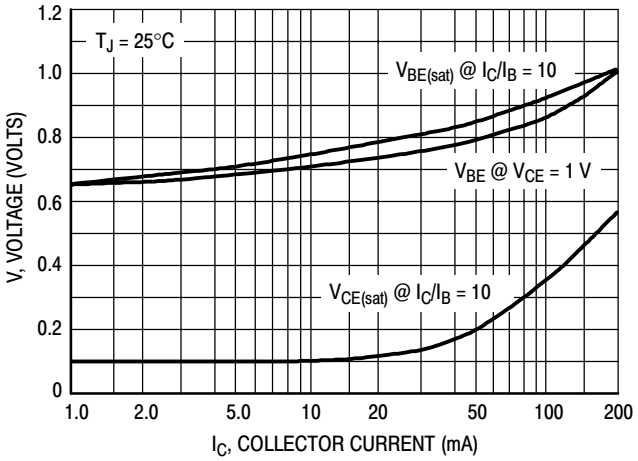


Figure 11. “On” Voltages

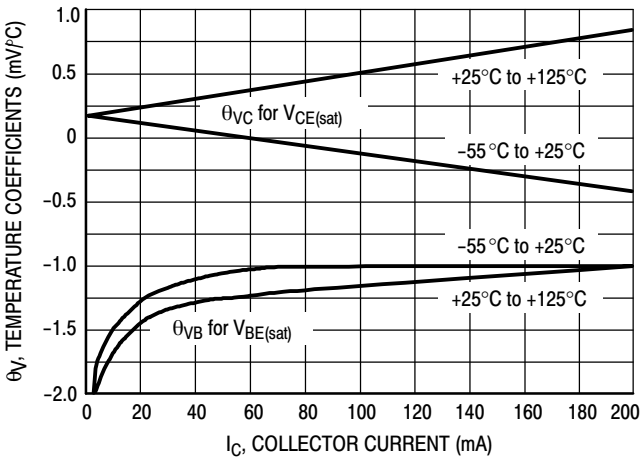
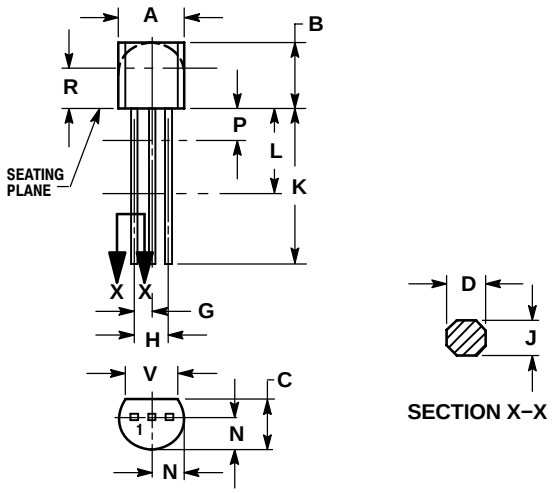


Figure 12. Temperature Coefficients

PACKAGE DIMENSIONS

TO−92 (TO−226)
CASE 29−11
ISSUE AL



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.115	---	2.93	---
V	0.135	---	3.43	---

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
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