MPSA18

Preferred Device

Low Noise Transistor

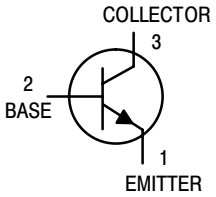
NPN Silicon

ON Semiconductor®

http://onsemi.com

Features

- Pb−Free Packages are Available*



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector−Emitter Voltage	V_{CEO}	45	Vdc
Collector−Base Voltage	V_{CBO}	45	Vdc
Emitter−Base Voltage	V_{EBO}	6.5	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

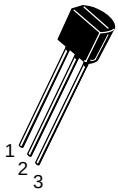
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Ambient (Note 1)	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	83.3	°C/W

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.

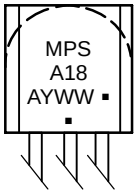
1. $R_{\theta JA}$ is measured with the device soldered into a typical printed circuit board.

*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
STYLE 1



MPSA18 = Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
MPSA18	TO−92	5000 Units/Box
MPSA18G	TO−92 (Pb−Free)	5000 Units/Box
MPSA18RLRA	TO−92	2000/Tape & Reel
MPSA18RLRAG	TO−92 (Pb−Free)	2000/Tape & Reel
MPSA18RLRM	TO−92	2000/Ammo Pack
MPSA18RLRMG	TO−92 (Pb−Free)	2000/Ammo Pack
MPSA18RLRP	TO−92	2000/Ammo Pack
MPSA18RLRPG	TO−92 (Pb−Free)	2000/Ammo Pack

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

Preferred devices are recommended choices for future use and best overall value.

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector−Emitter Breakdown Voltage (Note 2) (I_C = 10 mAdc, I_B = 0)	$V_{(BR)CEO}$	45	−	−	Vdc
Collector−Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)	$V_{(BR)CBO}$	45	−	−	Vdc
Emitter−Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	$V_{(BR)EBO}$	6.5	−	−	Vdc
Collector Cutoff Current (V_{CB} = 30 Vdc, I_E = 0)	I_{CBO}	−	1.0	50	nAdc
ON CHARACTERISTICS (Note 2)					
DC Current Gain (I_C = 10 μAdc, V_{CE} = 5.0 Vdc) (I_C = 100 μAdc, V_{CE} = 5.0 Vdc) (I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc) (I_C = 10 mAdc, V_{CE} = 5.0 Vdc)	h_{FE}	 400 500 500 500	 580 850 1100 1150	 − − − 1500	−
Collector−Emitter Saturation Voltage (I_C = 10 mAdc, I_B = 0.5 mAdc) (I_C = 50 mAdc, I_B = 5.0 mAdc)	$V_{CE(sat)}$	 − −	 − 0.08	 0.2 0.3	Vdc
Base−Emitter On Voltage (I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc)	$V_{BE(on)}$	−	0.6	0.7	Vdc
SMALL−SIGNAL CHARACTERISTICS					
Current−Gain − Bandwidth Product (I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc, f = 100 MHz)	f_T	100	160	−	MHz
Collector−Base Capacitance (V_{CB} = 5.0 Vdc, I_E = 0, f = 1.0 MHz)	C_{cb}	−	1.7	3.0	pF
Emitter−Base Capacitance (V_{EB} = 0.5 Vdc, I_C = 0, f = 1.0 MHz)	C_{eb}	−	5.6	6.5	pF
Noise Figure (I_C = 100 μAdc, V_{CE} = 5.0 Vdc, R_S = 10 kΩ, f = 1.0 kHz) (I_C = 100 μAdc, V_{CE} = 5.0 Vdc, R_S = 1.0 kΩ, f = 100 Hz)	NF	 − −	 0.5 4.0	 1.5 −	dB
Equivalent Short Circuit Noise Voltage (I_C = 100 μAdc, V_{CE} = 5.0 Vdc, R_S = 1.0 kΩ, f = 100 Hz)	V_T	−	6.5	−	$nV/\sqrt{Hz}$

2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

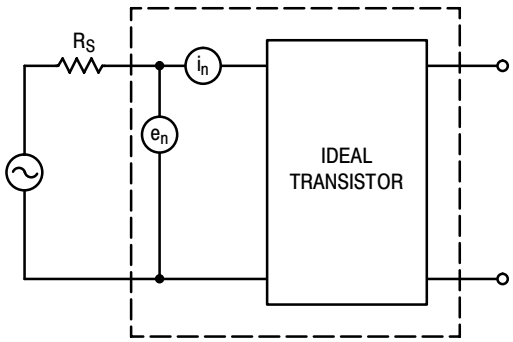


Figure 1. Transistor Noise Model

NOISE CHARACTERISTICS

(V_{CE} = 5.0 Vdc, T_A = 25°C)

NOISE VOLTAGE

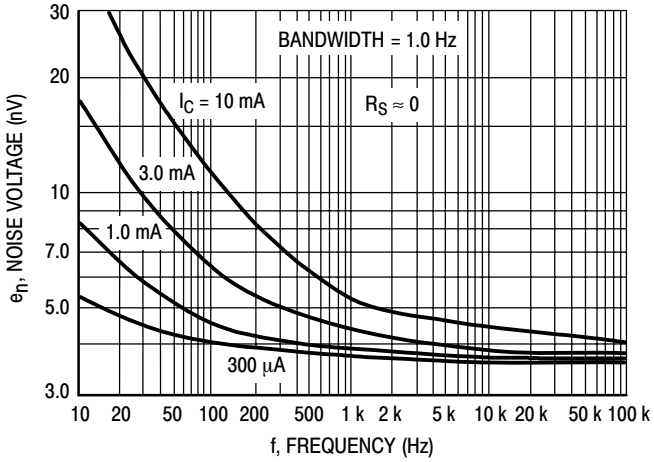


Figure 2. Effects of Frequency

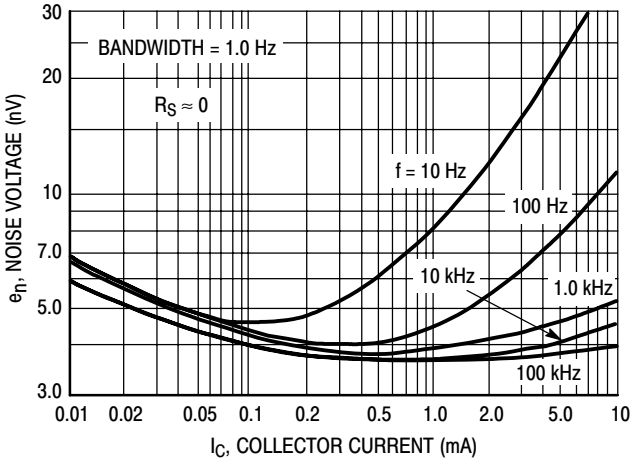


Figure 3. Effects of Collector Current

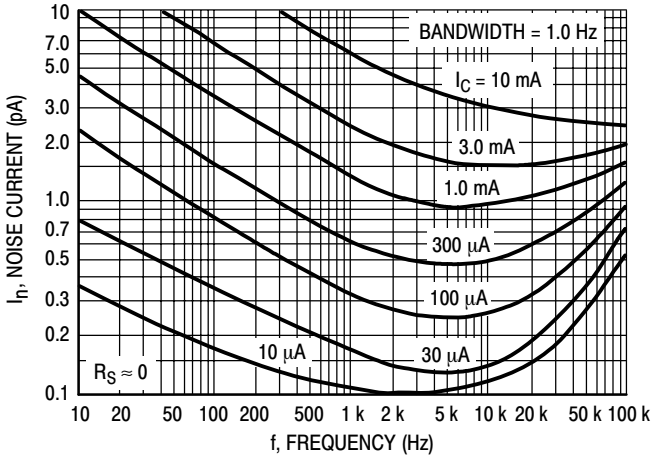


Figure 4. Noise Current

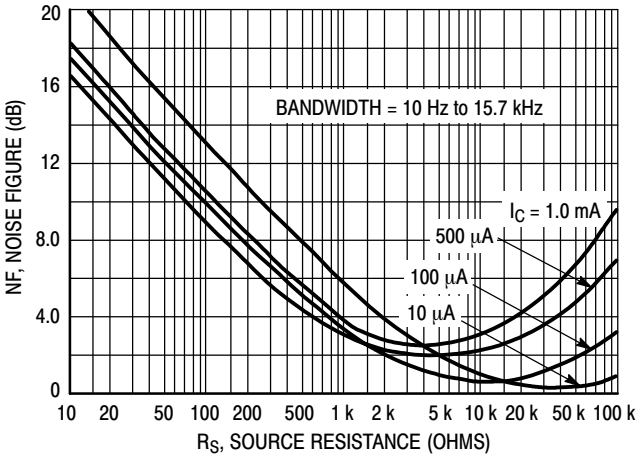


Figure 5. Wideband Noise Figure

100 Hz NOISE DATA

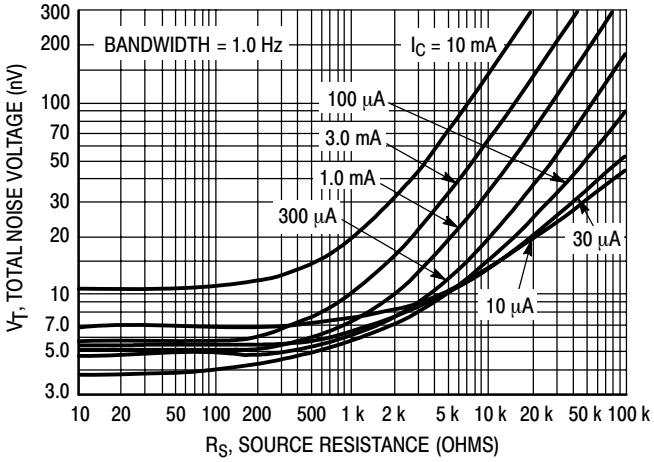


Figure 6. Total Noise Voltage

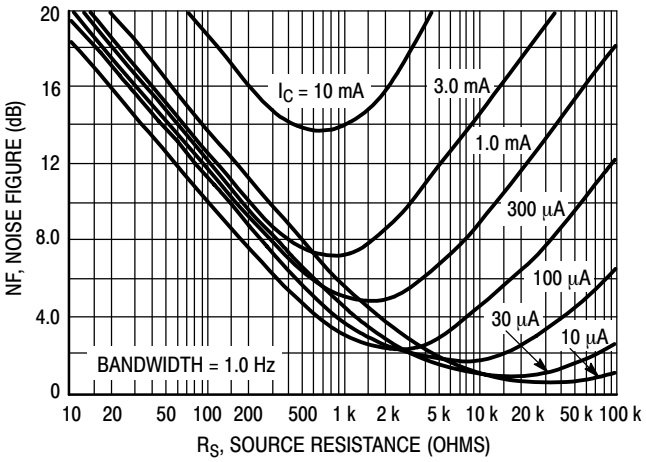


Figure 7. Noise Figure

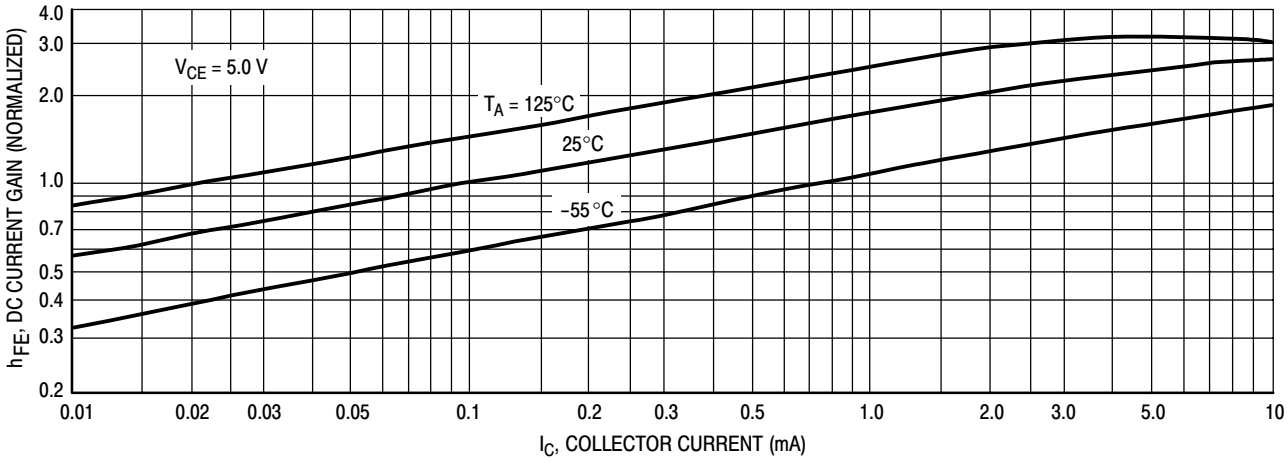


Figure 8. DC Current Gain

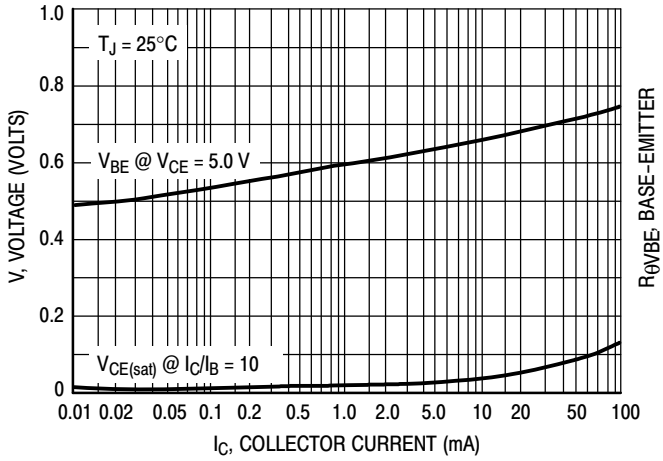


Figure 9. “On” Voltages

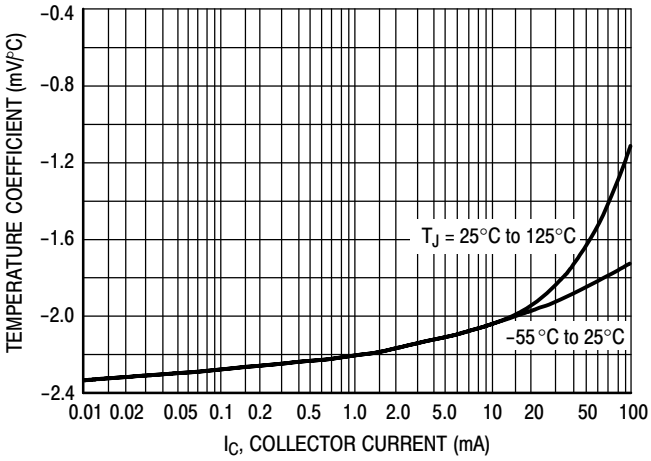


Figure 10. Temperature Coefficients

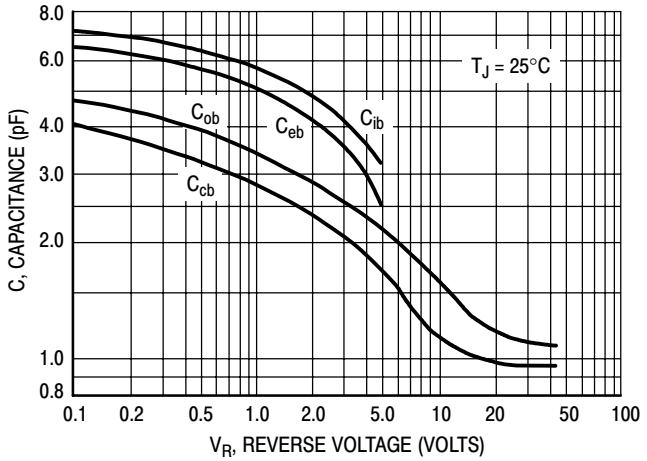


Figure 11. Capacitance

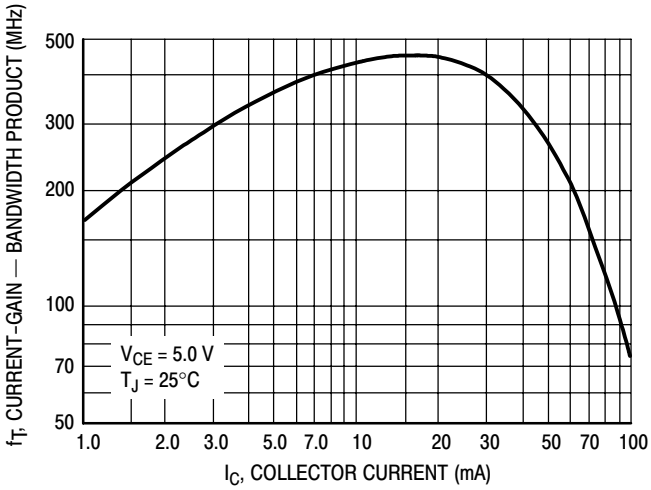
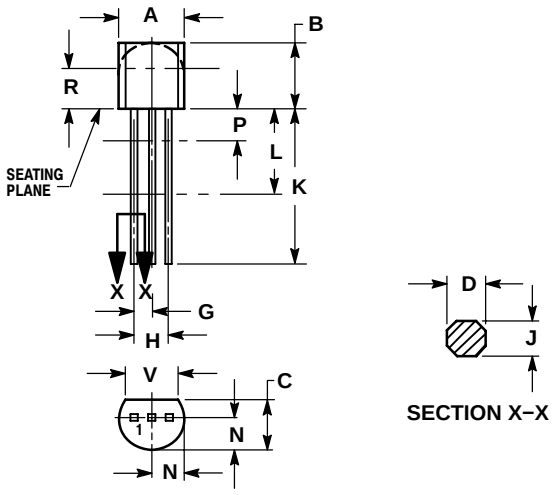


Figure 12. Current−Gain − Bandwidth Product

MPSA18

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	---

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 61312, Phoenix, Arizona 85082−1312 USA
Phone: 480−829−7710 or 800−344−3860 Toll Free USA/Canada
Fax: 480−829−7709 or 800−344−3867 Toll Free USA/Canada
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