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MPSA18

Preferred Device

Low Noise Transistor

NPN Silicon

Features

- These are Pb-Free Devices*

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 @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	625 5.0	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.5 12	W mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

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

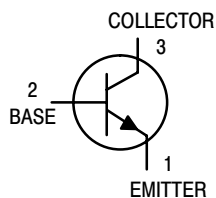
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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

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

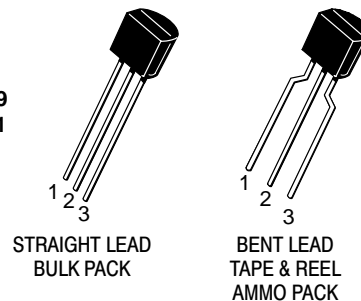


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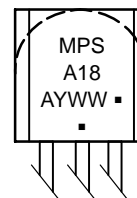
TO-92
CASE 29
STYLE 1



STRAIGHT LEAD
BULK PACK

BENT LEAD
TAPE & REEL
AMMO PACK

MARKING DIAGRAM



A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
MPSA18G	TO-92 (Pb-Free)	5000 Units / Bulk
MPSA18RLRAG	TO-92 (Pb-Free)	2000/Tape & Reel
MPSA18RLRMG	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.

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

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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 mA _{dc} , I _B = 0)	V _{(BR)CEO}	45	–	–	V _{dc}
Collector–Base Breakdown Voltage (I _C = 100 μA _{dc} , I _E = 0)	V _{(BR)CBO}	45	–	–	V _{dc}
Emitter–Base Breakdown Voltage (I _E = 10 μA _{dc} , I _C = 0)	V _{(BR)EBO}	6.5	–	–	V _{dc}
Collector Cutoff Current (V _{CB} = 30 V _{dc} , I _E = 0)	I _{CBO}	–	1.0	50	nA _{dc}

ON CHARACTERISTICS (Note 2)

DC Current Gain (I _C = 10 μA _{dc} , V _{CE} = 5.0 V _{dc}) (I _C = 100 μA _{dc} , V _{CE} = 5.0 V _{dc}) (I _C = 1.0 mA _{dc} , V _{CE} = 5.0 V _{dc}) (I _C = 10 mA _{dc} , V _{CE} = 5.0 V _{dc})	h _{FE}	400 500 500 500	580 850 1100 1150	– – – 1500	–
Collector–Emitter Saturation Voltage (I _C = 10 mA _{dc} , I _B = 0.5 mA _{dc}) (I _C = 50 mA _{dc} , I _B = 5.0 mA _{dc})	V _{CE(sat)}	– –	– 0.08	0.2 0.3	V _{dc}
Base–Emitter On Voltage (I _C = 1.0 mA _{dc} , V _{CE} = 5.0 V _{dc})	V _{BE(on)}	–	0.6	0.7	V _{dc}

SMALL–SIGNAL CHARACTERISTICS

Current–Gain – Bandwidth Product (I _C = 1.0 mA _{dc} , V _{CE} = 5.0 V _{dc} , f = 100 MHz)	f _T	100	160	–	MHz
Collector–Base Capacitance (V _{CB} = 5.0 V _{dc} , I _E = 0, f = 1.0 MHz)	C _{cb}	–	1.7	3.0	pF
Emitter–Base Capacitance (V _{EB} = 0.5 V _{dc} , I _C = 0, f = 1.0 MHz)	C _{eb}	–	5.6	6.5	pF
Noise Figure (I _C = 100 μA _{dc} , V _{CE} = 5.0 V _{dc} , R _S = 10 kΩ, f = 1.0 kHz) (I _C = 100 μA _{dc} , V _{CE} = 5.0 V _{dc} , R _S = 1.0 kΩ, f = 100 Hz)	NF	– –	0.5 4.0	1.5 –	dB
Equivalent Short Circuit Noise Voltage (I _C = 100 μA _{dc} , V _{CE} = 5.0 V _{dc} , R _S = 1.0 kΩ, f = 100 Hz)	V _T	–	6.5	–	nV/√Hz

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

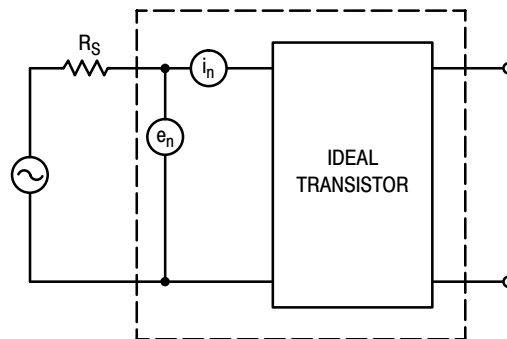


Figure 1. Transistor Noise Model

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NOISE CHARACTERISTICS

($V_{CE} = 5.0 \text{ Vdc}$, $T_A = 25^\circ\text{C}$)

NOISE VOLTAGE

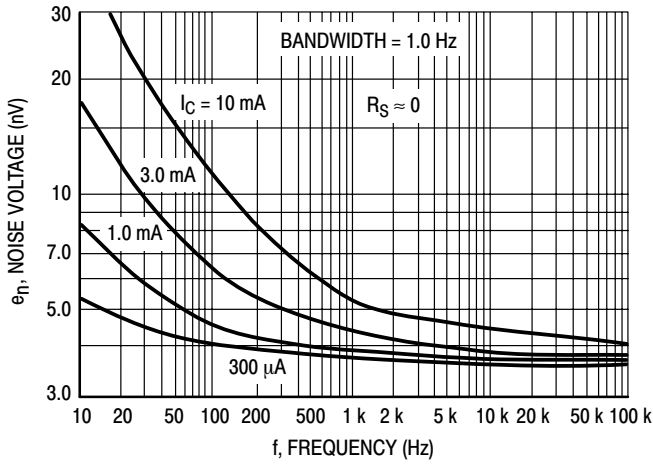


Figure 2. Effects of Frequency

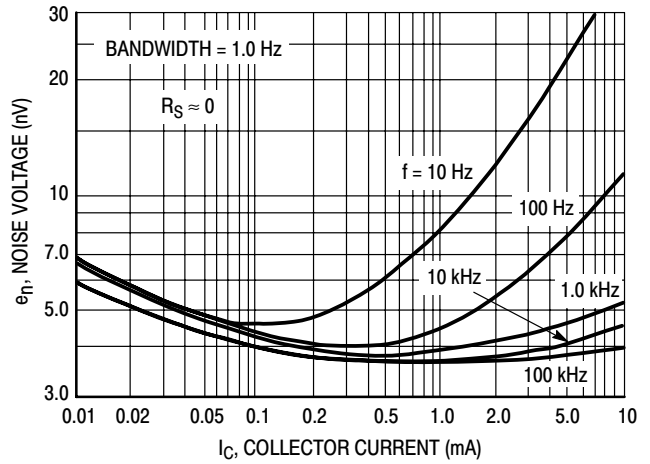


Figure 3. Effects of Collector Current

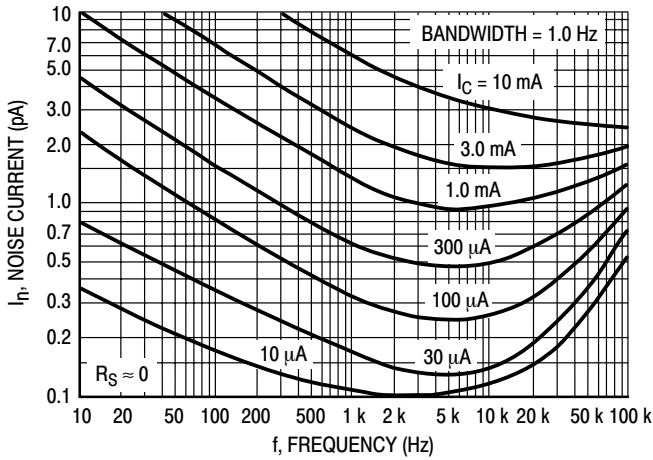


Figure 4. Noise Current

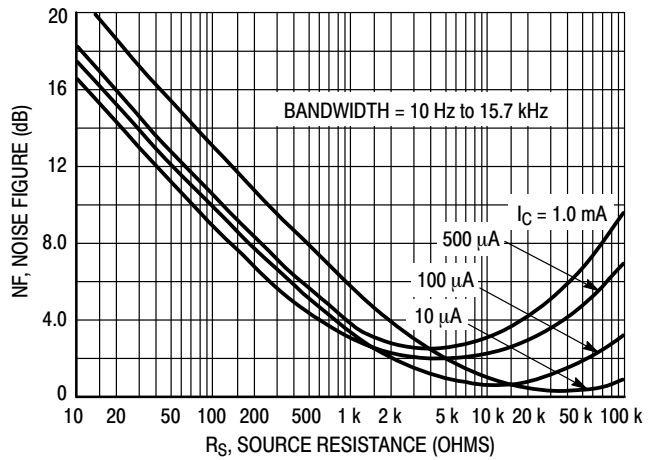


Figure 5. Wideband Noise Figure

100 Hz NOISE DATA

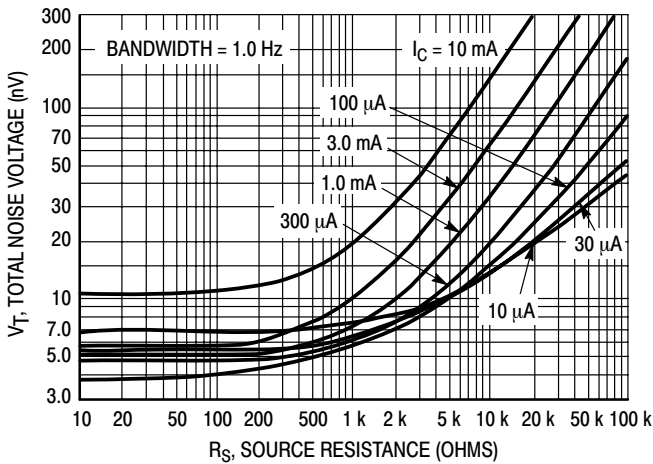


Figure 6. Total Noise Voltage

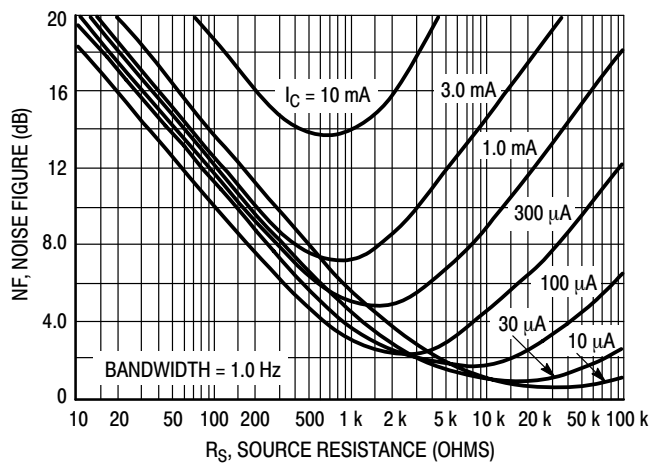


Figure 7. Noise Figure

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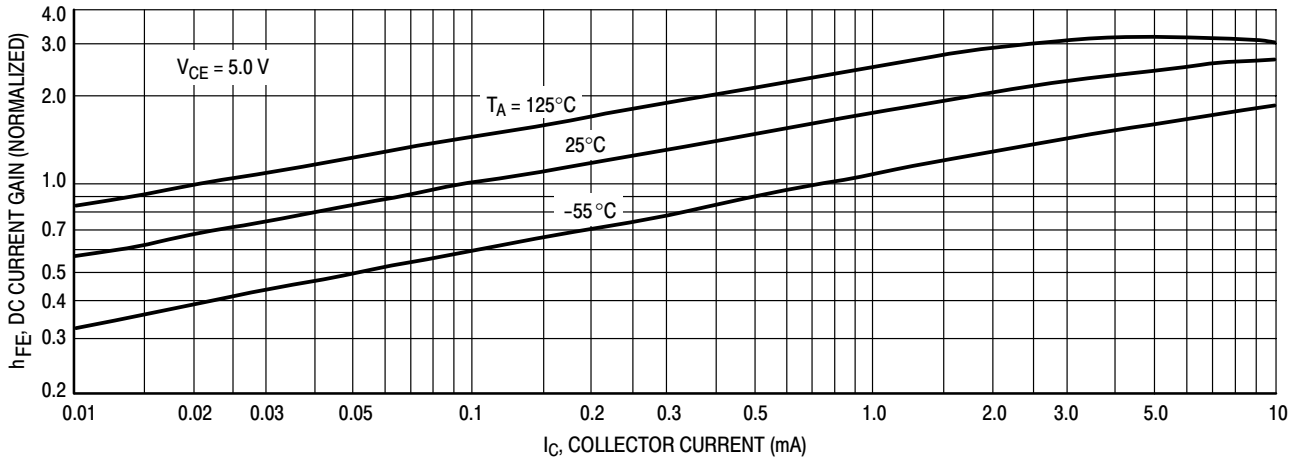


Figure 8. DC Current Gain

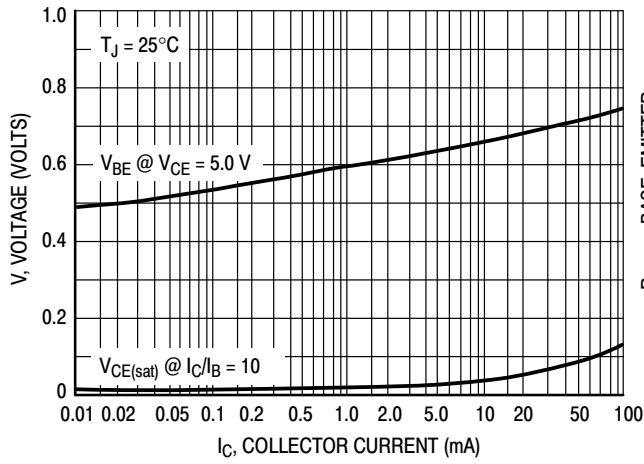


Figure 9. "On" Voltages

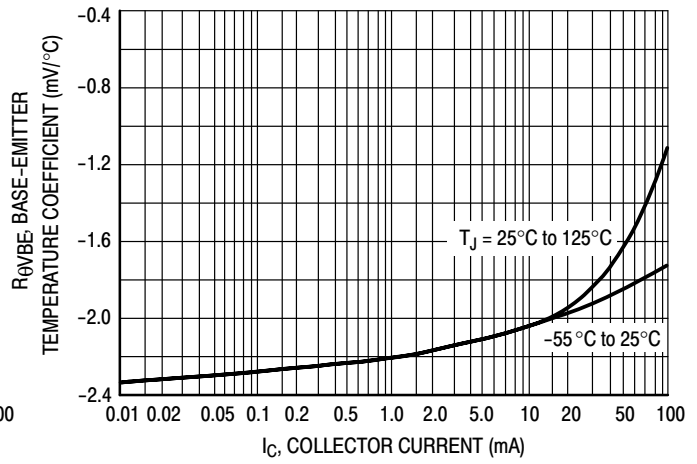


Figure 10. Temperature Coefficients

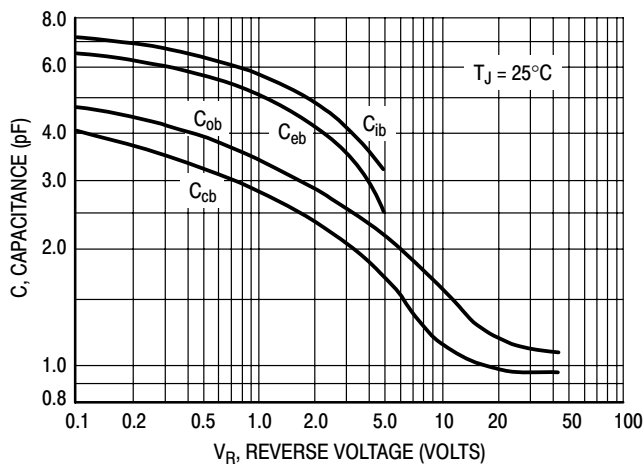


Figure 11. Capacitance

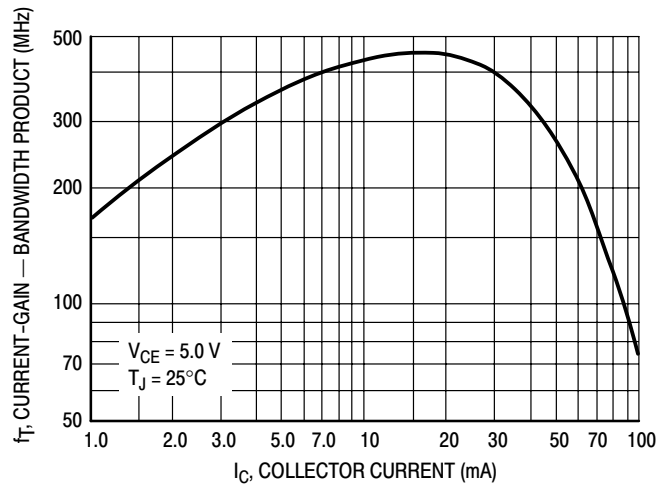
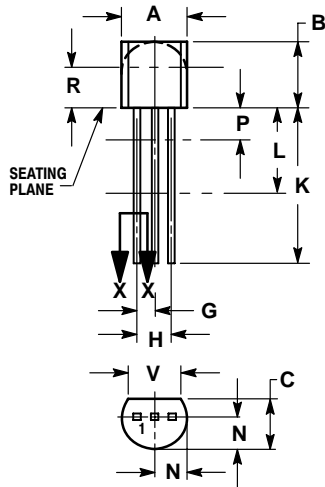


Figure 12. Current-Gain - Bandwidth Product

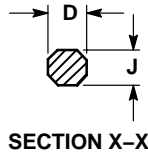
MPSA18

PACKAGE DIMENSIONS

TO-92 (TO-226)
CASE 29-11
ISSUE AM



STRAIGHT LEAD
BULK PACK

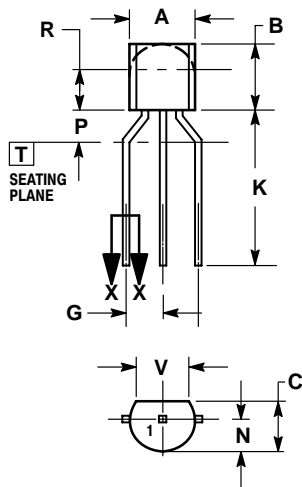


SECTION X-X

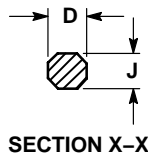
NOTES:

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.

DIM	INCHES		MILLIMETERS	
	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	---



BENT LEAD
TAPE & REEL
AMMO PACK



SECTION X-X

NOTES:

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3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	MILLIMETERS	
	MIN	MAX
A	4.45	5.20
B	4.32	5.33
C	3.18	4.19
D	0.40	0.54
G	2.40	2.80
J	0.39	0.50
K	12.70	---
N	2.04	2.66
P	1.50	4.00
R	2.93	---
V	3.43	---

STYLE 1:

1. EMITTER
2. BASE
3. COLLECTOR

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