MPSW45, MPSW45A

MPSW45A is a Preferred Device

One Watt Darlington Transistors

NPN Silicon

Features

- Pb−Free Packages are Available*

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector − Emitter Voltage MPSW45 MPSW45A	V_{CES}	40 50	Vdc
Collector − Base Voltage MPSW45 MPSW45A	V_{CBO}	50 60	Vdc
Emitter − Base Voltage	V_{EBO}	12	Vdc
Collector Current − Continuous	I_C	1.0	Adc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	1.0 8.0	W mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	2.5 20	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	$R_{\theta JA}$	125	°C/W
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	50	°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.

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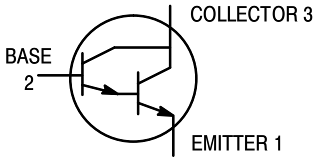
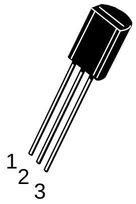
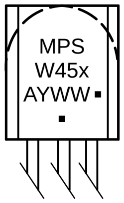




TO−92 (TO−226)
CASE 29−10
STYLE 1

MARKING DIAGRAM



MPSW45x = Device Code
x = 45A Devices
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

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

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

February, 2006 − Rev. 3

Publication Order Number:
MPSW45/D

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector−Emitter Breakdown Voltage (I_C = 100 μAdc, V_{BE} = 0) MPSW45 MPSW45A	$V_{(BR)CES}$	 40 50	 – –	Vdc
Collector−Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0) MPSW45 MPSW45A	$V_{(BR)CBO}$	 50 60	 – –	Vdc
Emitter−Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	$V_{(BR)EBO}$	12	–	Vdc
Collector Cutoff Current (V_{CB} = 30 Vdc, I_E = 0) MPSW45 (V_{CB} = 40 Vdc, I_E = 0) MPSW45A	I_{CBO}	 – –	 100 100	nAdc
Emitter Cutoff Current (V_{EB} = 10 Vdc, I_C = 0)	I_{EBO}	–	100	nAdc
ON CHARACTERISTICS (Note 1)				
DC Current Gain (I_C = 200 mAdc, V_{CE} = 5.0 Vdc) (I_C = 500 mAdc, V_{CE} = 5.0 Vdc) (I_C = 1.0 Adc, V_{CE} = 5.0 Vdc)	h_{FE}	 25,000 15,000 4,000	 150,000 – –	–
Collector−Emitter Saturation Voltage (I_C = 1.0 Adc, I_B = 2.0 mAdc)	$V_{CE(sat)}$	–	1.5	Vdc
Base−Emitter Saturation Voltage (I_C = 1.0 Adc, I_B = 2.0 mAdc)	$V_{BE(sat)}$	–	2.0	Vdc
Base−Emitter On Voltage (I_C = 1.0 Adc, V_{CE} = 5.0 Vdc)	$V_{BE(on)}$	–	2.0	Vdc
SMALL−SIGNAL CHARACTERISTICS				
Current−Gain − Bandwidth Product (I_C = 200 mAdc, V_{CE} = 5.0 Vdc, f = 100 MHz)	f_T	100	–	MHz
Collector−Base Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 1.0 MHz)	C_{cb}	–	6.0	pF

1. Pulse Test: Pulse Width ≤ 300 μs; Duty Cycle ≤ 2.0%.

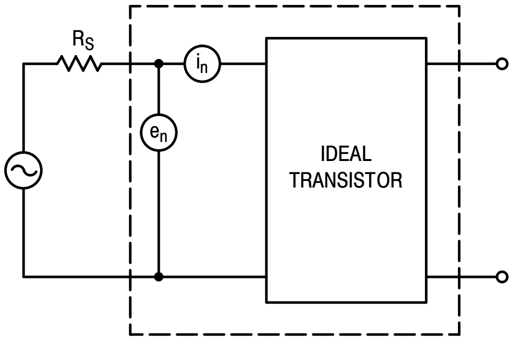


Figure 1. Transistor Noise Model

NOISE CHARACTERISTICS

(V_{CE} = 5.0 Vdc, T_A = 25°C)

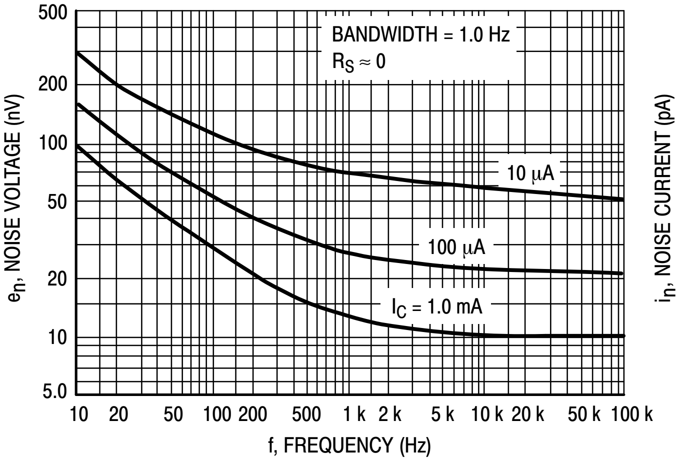


Figure 2. Noise Voltage

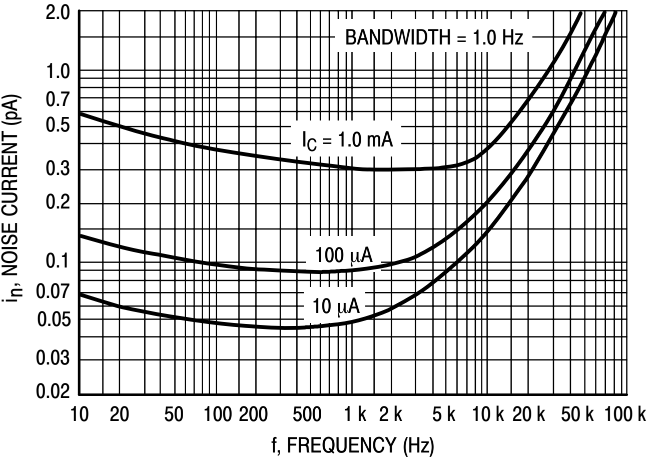


Figure 3. Noise Current

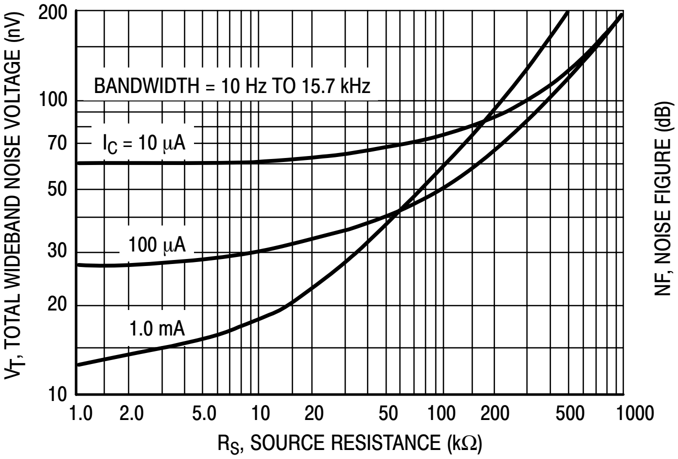


Figure 4. Total Wideband Noise Voltage

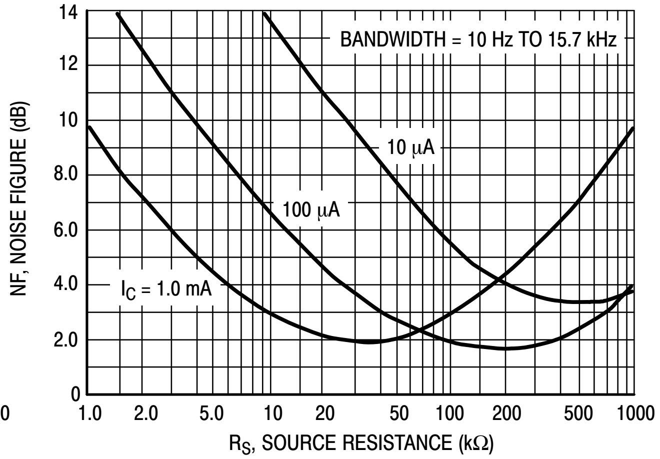


Figure 5. Wideband Noise Figure

SMALL−SIGNAL CHARACTERISTICS

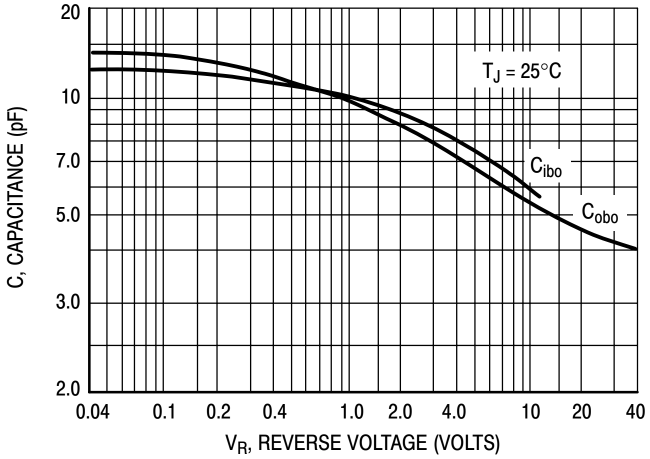


Figure 6. Capacitance

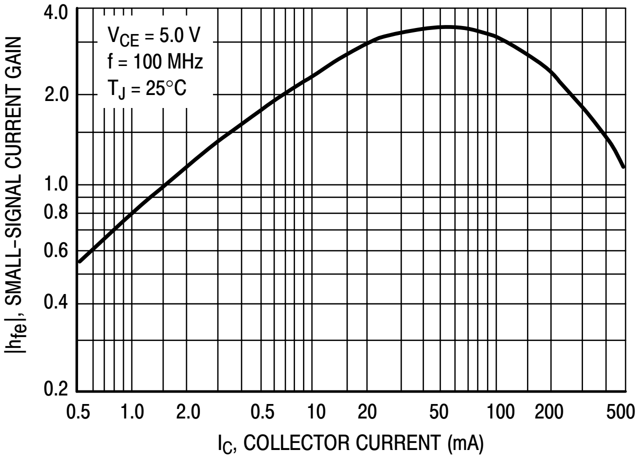


Figure 7. High Frequency Current Gain

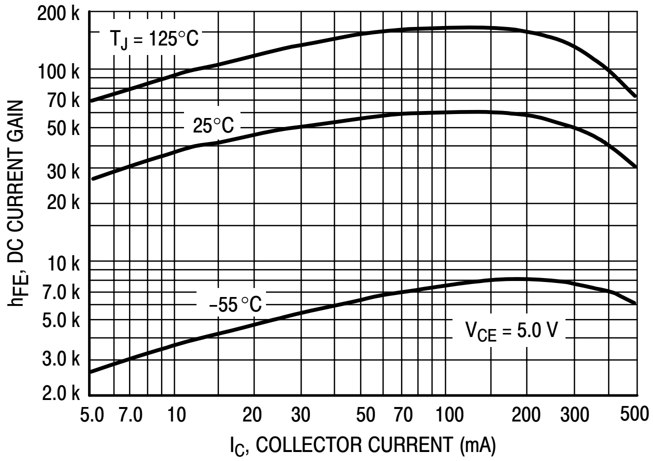


Figure 8. DC Current Gain

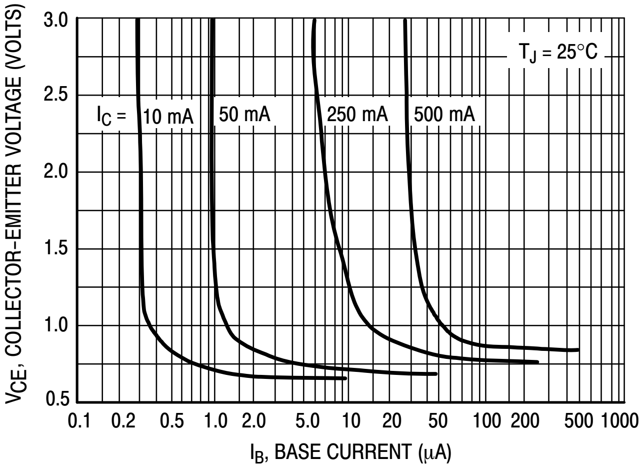


Figure 9. Collector Saturation Region

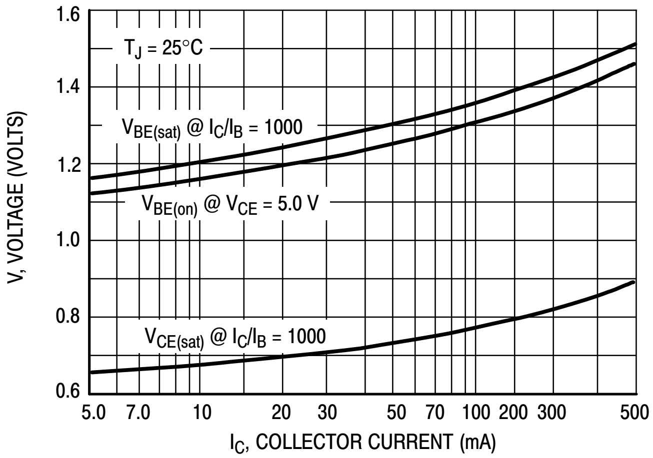


Figure 10. “On” Voltages

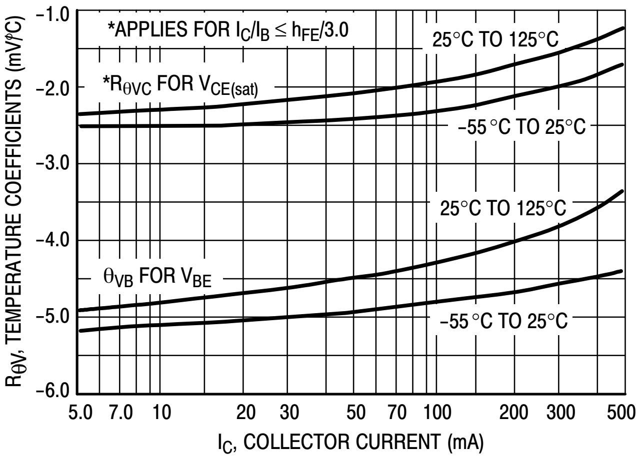


Figure 11. Temperature Coefficients

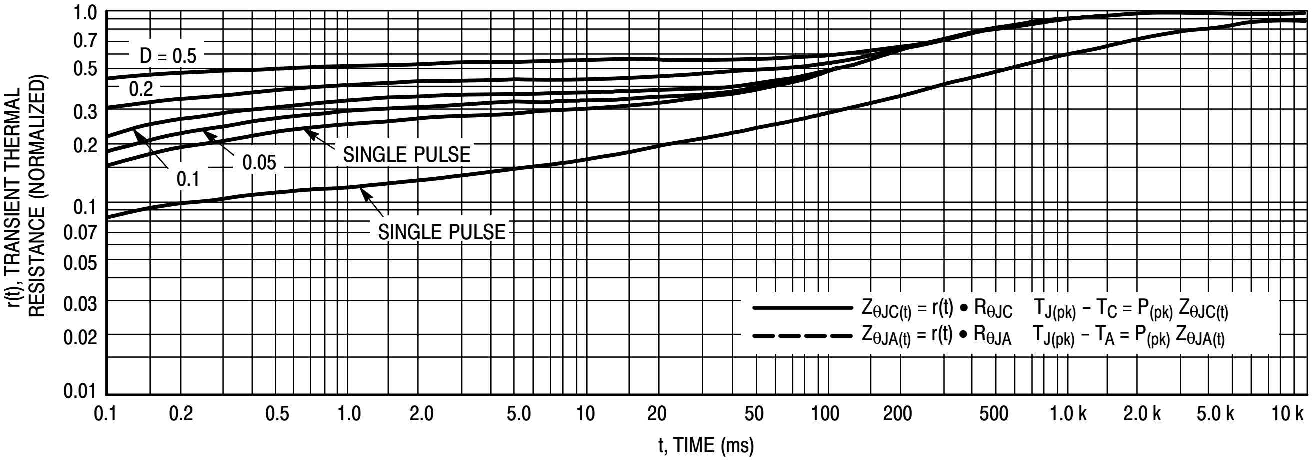


Figure 12. Thermal Response

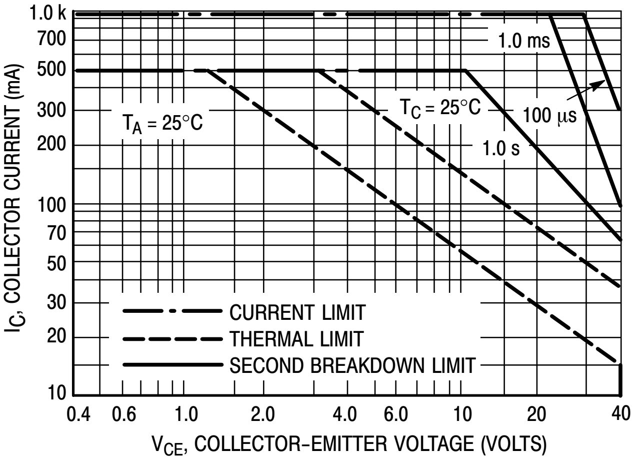
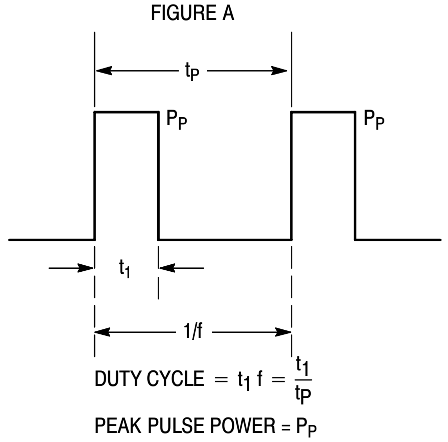


Figure 13. Active Region Safe Operating Area



Design Note: Use of Transient Thermal Resistance Data

ORDERING INFORMATION

Device	Package	Shipping†
MPSW45	TO−92	5,000 Units / Box
MPSW45G	TO−92 (Pb−Free)	5,000 Units / Box
MPSW45RLRE	TO−92	2,000 / Tape & Reel
MPSW45RLREG	TO−92 (Pb−Free)	2,000 / Tape & Reel
MPSW45A	TO−92	5,000 Units / Box
MPSW45AG	TO−92 (Pb−Free)	5,000 Units / Box
MPSW45ARLRA	TO−92	2,000 / Tape & Reel
MPSW45ARLRAG	TO−92 (Pb−Free)	2,000 / Tape & Reel
MPSW45AZL1	TO−92	2,000 / Ammo Pack
MPSW45AZL1G	TO−92 (Pb−Free)	2,000 / Ammo Pack

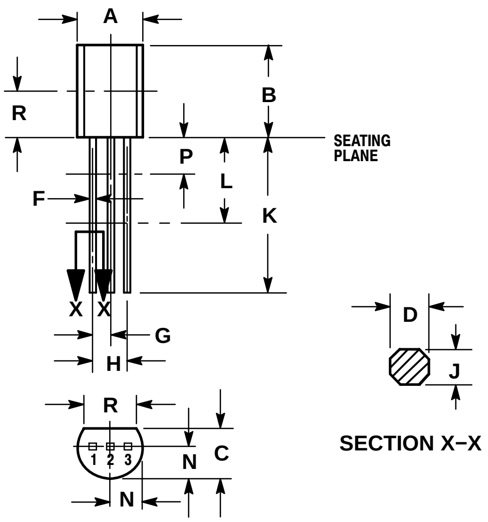
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

PACKAGE DIMENSIONS

TO−92 (TO−226)

CASE 29−10

ISSUE AL



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. DIMENSION F APPLIES BETWEEN P AND L. DIMENSIONS D AND J APPLY BETWEEN L AND K MIMIMUM. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.175	0.205	4.44	5.21
B	0.290	0.310	7.37	7.87
C	0.125	0.165	3.18	4.19
D	0.018	0.021	0.457	0.533
F	0.016	0.019	0.407	0.482
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.018	0.024	0.46	0.61
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	0.135	−−−	3.43	−−−

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

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