

One Watt Darlington Transistors

NPN Silicon

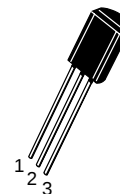
MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CES}	30	Vdc
Collector–Base Voltage	V_{CBO}	30	Vdc
Emitter–Base Voltage	V_{EBO}	10	Vdc
Collector Current — Continuous	I_C	1.0	Adc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	1.0 8.0	Watts mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	2.5 20	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to +150	$^\circ\text{C}$

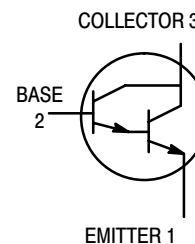
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	125	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	50	$^\circ\text{C/W}$

MPSW13
MPSW14



CASE 29–10, STYLE 1
TO–92 (TO–226AE)



MPSW13 MPSW14

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ($I_C = 100\ \mu\text{Adc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	30	—	Vdc
Collector Cutoff Current ($V_{CB} = 30\ \text{Vdc}$, $I_E = 0$)	I_{CBO}	—	100	nAdc
Emitter Cutoff Current ($V_{EB} = 10\ \text{Vdc}$, $I_C = 0$)	I_{EBO}	—	100	nAdc

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
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ON CHARACTERISTICS⁽¹⁾

DC Current Gain ($I_C = 10\ \text{mAdc}$, $V_{CE} = 5.0\ \text{Vdc}$)	MPSW13 MPSW14	h_{FE}	5,000 10,000	—	—
($I_C = 100\ \text{mAdc}$, $V_{CE} = 5.0\ \text{Vdc}$)	MPSW13 MPSW14		10,000 20,000	— —	
Collector–Emitter Saturation Voltage ($I_C = 100\ \text{mAdc}$, $I_B = 0.1\ \text{mAdc}$)		$V_{CE(sat)}$	—	1.5	Vdc
Base–Emitter On Voltage ($I_C = 100\ \text{mAdc}$, $V_{CE} = 5.0\ \text{Vdc}$)		$V_{BE(on)}$	—	2.0	Vdc

SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product ⁽²⁾ ($I_C = 10\ \text{mAdc}$, $V_{CE} = 5.0\ \text{Vdc}$, $f = 100\ \text{MHz}$)	f_T	125	—	MHz
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1. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.
2. $f_T = |h_{fe}| \cdot f_{test}$.

MPSW13 MPSW14

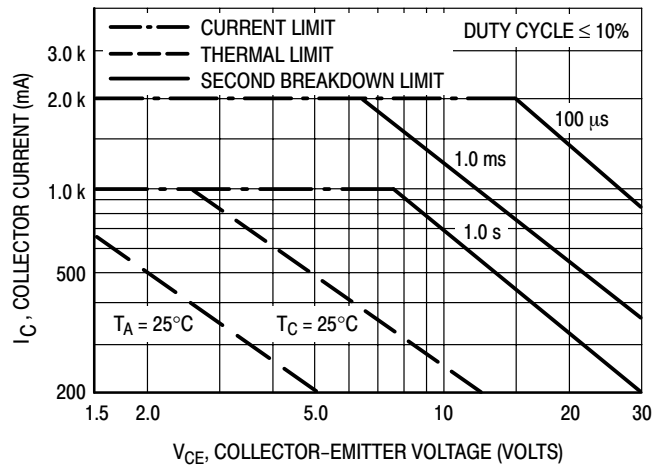


Figure 1. Active Region — Safe Operating Area

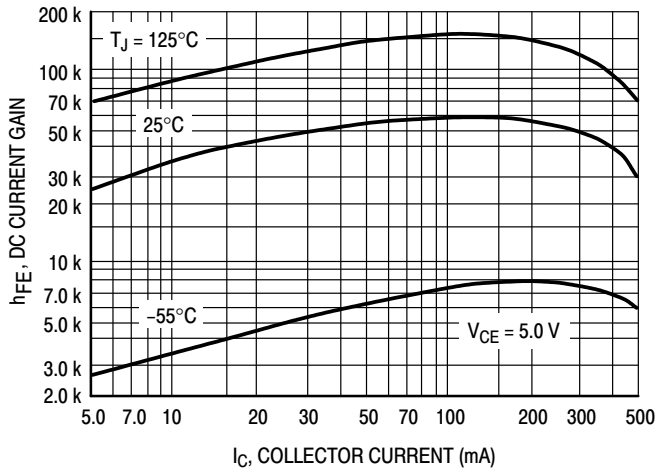


Figure 2. DC Current Gain

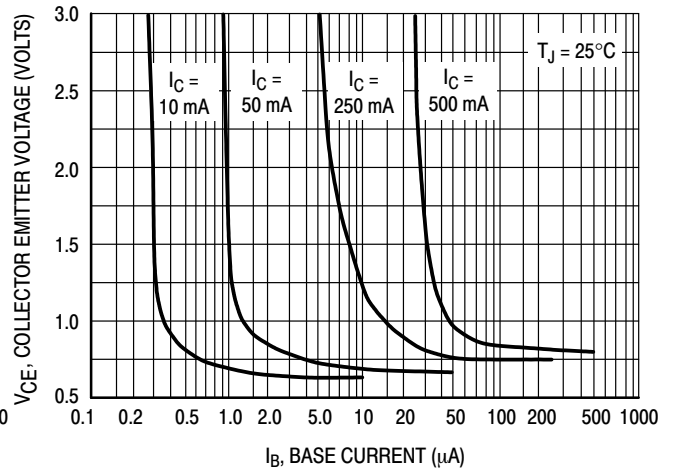


Figure 3. Collector Saturation Region

MPSW13 MPSW14

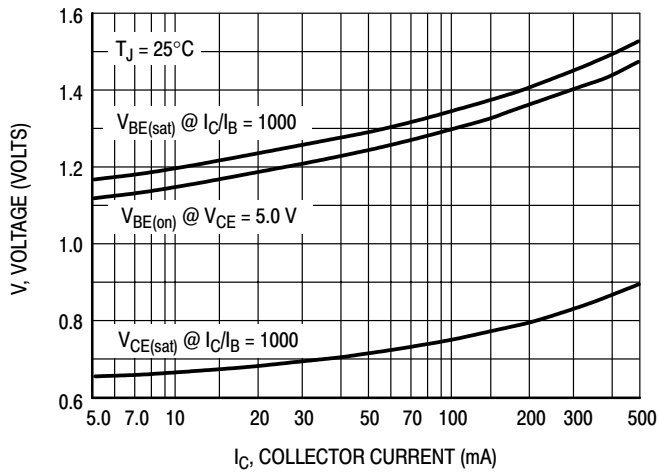


Figure 4. "ON" Voltages

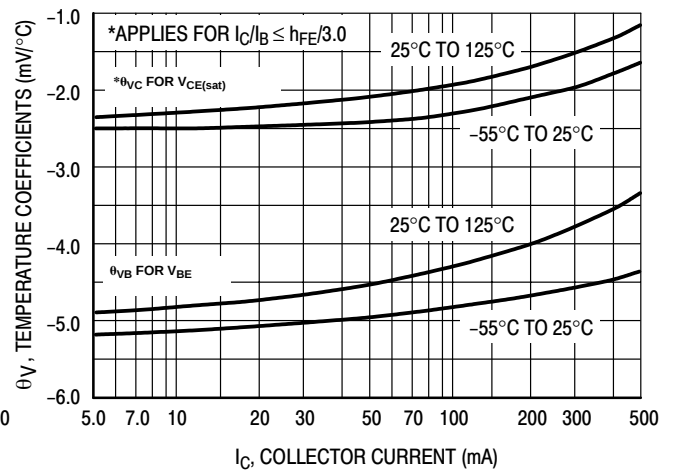


Figure 5. Temperature Coefficients

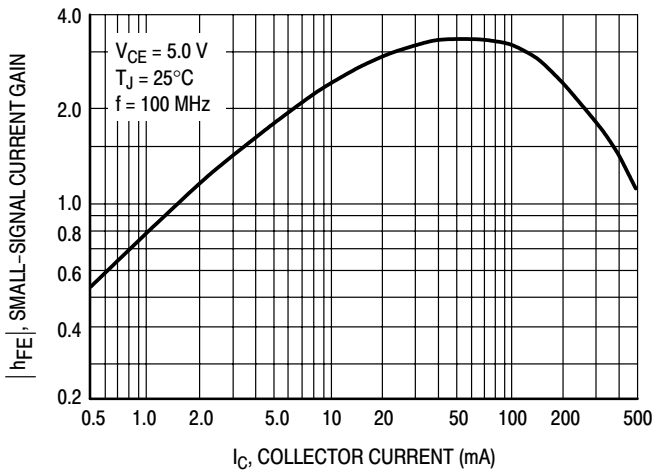


Figure 6. High Frequency Current Gain

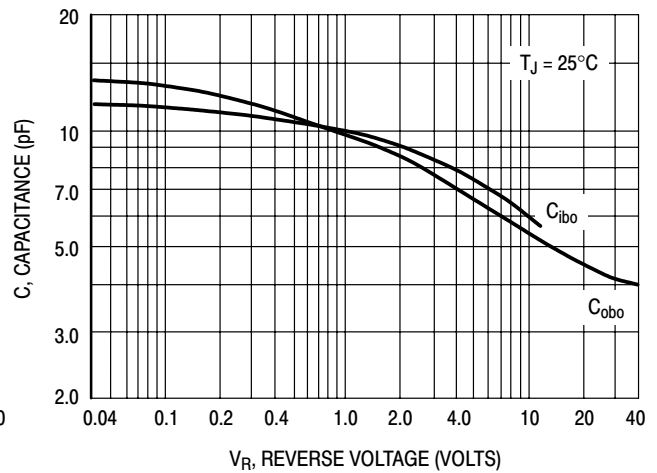
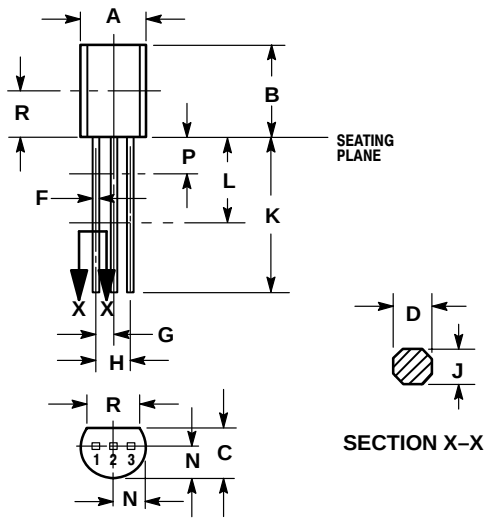


Figure 7. Capacitance

MPSW13 MPSW14

PACKAGE DIMENSIONS

TO-92 (TO-226)
CASE 29-10
ISSUE AL



SECTION X-X

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

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 MINIMUM. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	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	---

Notes

Notes

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