

One Watt Darlington Transistors

NPN Silicon

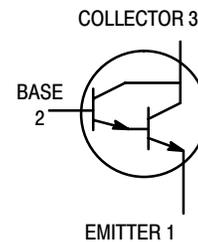
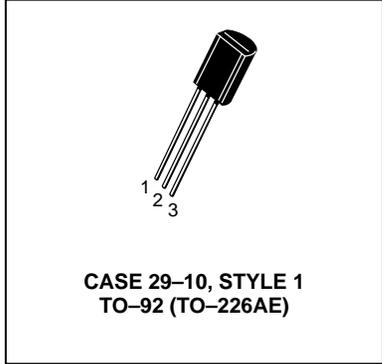
MAXIMUM RATINGS

| 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 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 50 | $^\circ\text{C}/\text{W}$ |

MPSW13
MPSW14



MPSW13 MPSW14

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) | V _{(BR)CES} | 30 | — | Vdc |
| Collector Cutoff Current (V _{CB} = 30 Vdc, I _E = 0) | I _{CBO} | — | 100 | nAdc |
| Emitter Cutoff Current (V _{EB} = 10 Vdc, I _C = 0) | I _{EBO} | — | 100 | nAdc |

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

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

ON CHARACTERISTICS⁽¹⁾

| | | | | | |
|--|----------------------|--------|--------|-----|---|
| DC Current Gain (I _C = 10 mAdc, V _{CE} = 5.0 Vdc) | h _{FE} | MPSW13 | 5,000 | — | — |
| | | MPSW14 | 10,000 | — | |
| (I _C = 100 mAdc, V _{CE} = 5.0 Vdc) | | MPSW13 | 10,000 | — | |
| | | MPSW14 | 20,000 | — | |
| Collector–Emitter Saturation Voltage (I _C = 100 mAdc, I _B = 0.1 mAdc) | V _{CE(sat)} | — | 1.5 | Vdc | |
| Base–Emitter On Voltage (I _C = 100 mAdc, V _{CE} = 5.0 Vdc) | V _{BE(on)} | — | 2.0 | Vdc | |

SMALL–SIGNAL CHARACTERISTICS

| | | | | |
|---|----------------|-----|---|-----|
| Current–Gain — Bandwidth Product ⁽²⁾ (I _C = 10 mAdc, V _{CE} = 5.0 Vdc, f = 100 MHz) | f _T | 125 | — | MHz |
|---|----------------|-----|---|-----|

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
2. f_T = |h_{fe}| • f_{test}.

MPSW13 MPSW14

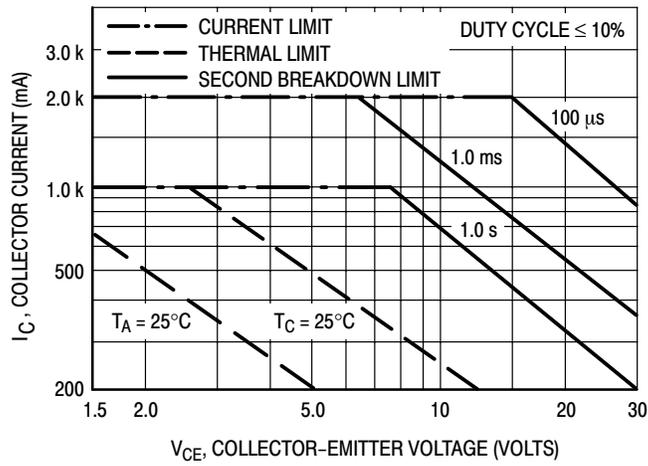


Figure 1. Active Region — Safe Operating Area

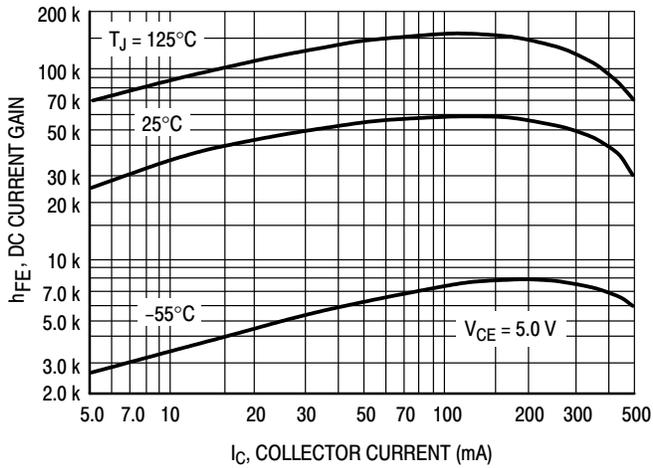


Figure 2. DC Current Gain

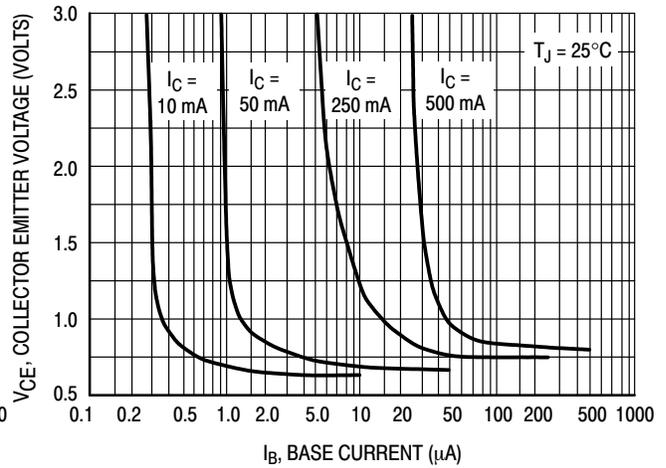


Figure 3. Collector Saturation Region

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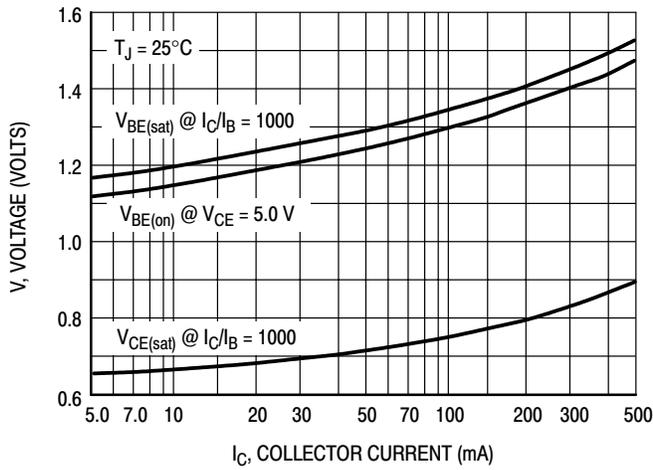


Figure 4. "ON" Voltages

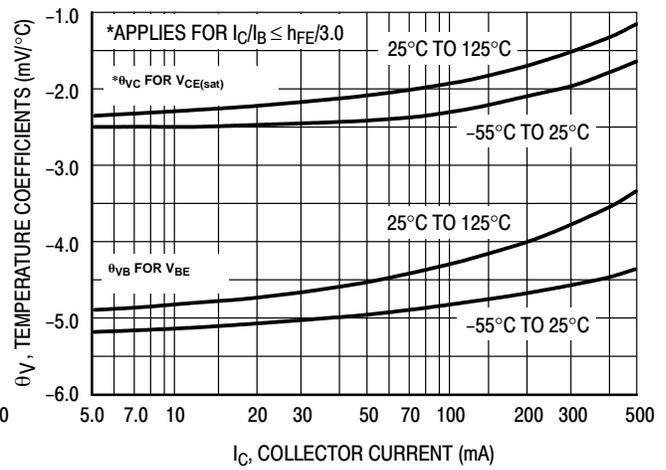


Figure 5. Temperature Coefficients

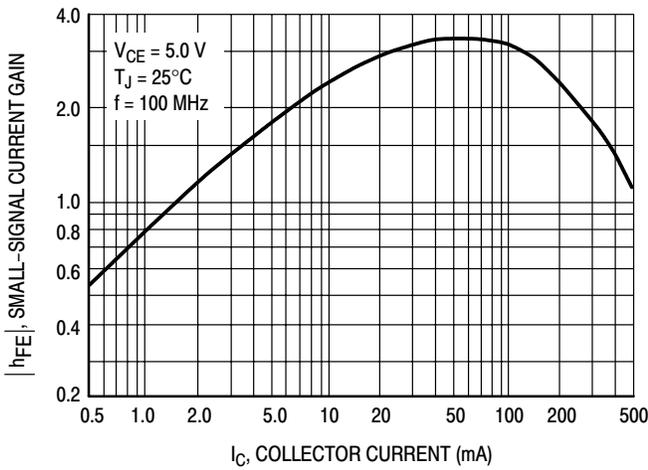


Figure 6. High Frequency Current Gain

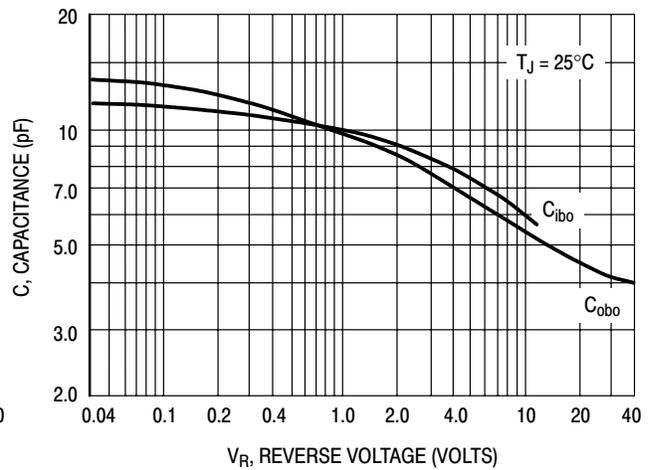
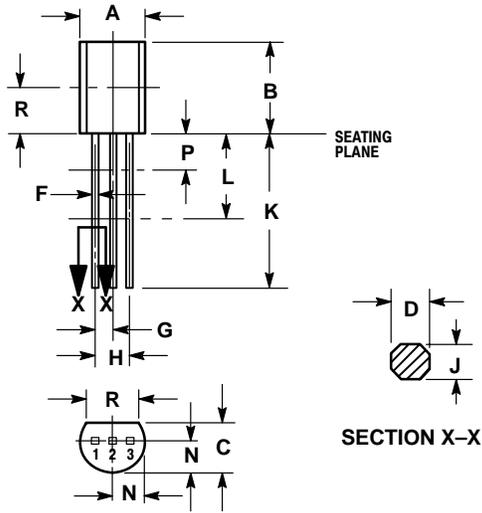


Figure 7. Capacitance

MPSW13 MPSW14

PACKAGE DIMENSIONS

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



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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JAPAN: ON Semiconductor, Japan Customer Focus Center

4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan 141-0031
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