

One Watt High Current Transistors

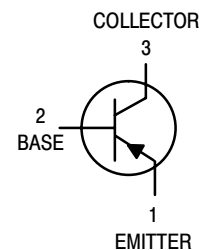
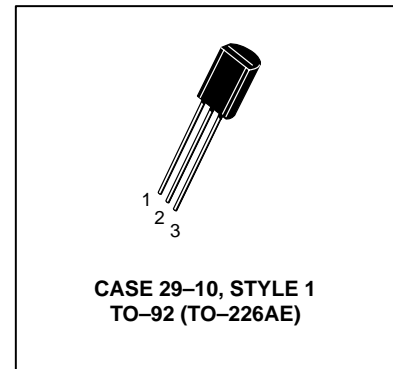
PNP Silicon

MPSW51 MPSW51A*

*ON Semiconductor Preferred Device

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--|----------------|-------------|----------------|
| Collector–Emitter Voltage MPSW51 MPSW51A | V_{CEO} | –30 –40 | Vdc |
| Collector–Base Voltage MPSW51 MPSW51A | V_{CBO} | –40 –50 | Vdc |
| Emitter–Base Voltage | V_{EBO} | –5.0 | Vdc |
| Collector Current — Continuous | I_C | –1000 | mAdc |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 1.0 8.0 | Watts mW/°C |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 2.5 20 | Watts 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 |

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

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

OFF CHARACTERISTICS

| | | | | | |
|--|-------------------|---------------|------------|--------------|-----------|
| Collector–Emitter Breakdown Voltage ⁽¹⁾ ($I_C = -1.0$ mAdc, $I_E = 0$) | MPSW51 MPSW51A | $V_{(BR)CEO}$ | –30 –40 | — — | Vdc |
| Collector–Base Breakdown Voltage ($I_C = -100$ μ Adc, $I_E = 0$) | MPSW51 MPSW51A | $V_{(BR)CBO}$ | –40 –50 | — — | Vdc |
| Emitter–Base Breakdown Voltage ($I_E = -100$ μ Adc, $I_C = 0$) | | $V_{(BR)EBO}$ | –5.0 | — | Vdc |
| Collector Cutoff Current ($V_{CB} = -30$ Vdc, $I_E = 0$) ($V_{CB} = -40$ Vdc, $I_E = 0$) | MPSW51 MPSW51A | I_{CBO} | — — | –0.1 –0.1 | μ Adc |
| Emitter Cutoff Current ($V_{EB} = -3.0$ Vdc, $I_C = 0$) | | I_{EBO} | — | –0.1 | μ Adc |

1. Pulse Test: Pulse Width ≤ 300 μ s, Duty Cycle $\leq 2.0\%$.

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

MPSW51 MPSW51A

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

| Characteristic | Symbol | Min | Max | Unit |
|--|---------------|----------------|-------------|------|
| ON CHARACTERISTICS | | | | |
| DC Current Gain ($I_C = -10\text{ mAdc}$, $V_{CE} = -1.0\text{ Vdc}$) ($I_C = -100\text{ mAdc}$, $V_{CE} = -1.0\text{ Vdc}$) ($I_C = -1000\text{ mAdc}$, $V_{CE} = -1.0\text{ Vdc}$) | h_{FE} | 55 60 50 | — — — | — |
| Collector–Emitter Saturation Voltage ($I_C = -1000\text{ mAdc}$, $I_B = -100\text{ mAdc}$) | $V_{CE(sat)}$ | — | -0.7 | Vdc |
| Base–Emitter On Voltage ($I_C = -1000\text{ mAdc}$, $V_{CE} = -1.0\text{ Vdc}$) | $V_{BE(on)}$ | — | -1.2 | Vdc |
| SMALL-SIGNAL CHARACTERISTICS | | | | |
| Current–Gain – Bandwidth Product ($I_C = -50\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$, $f = 20\text{ MHz}$) | f_T | 50 | — | MHz |
| Output Capacitance ($V_{CB} = -10\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$) | C_{obo} | — | 30 | pF |

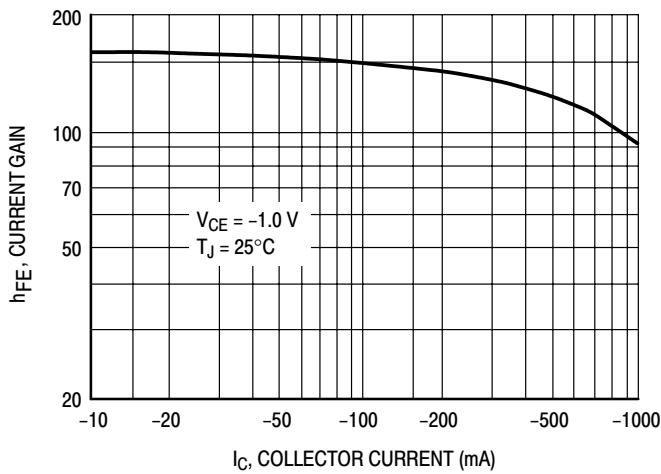


Figure 1. DC Current Gain

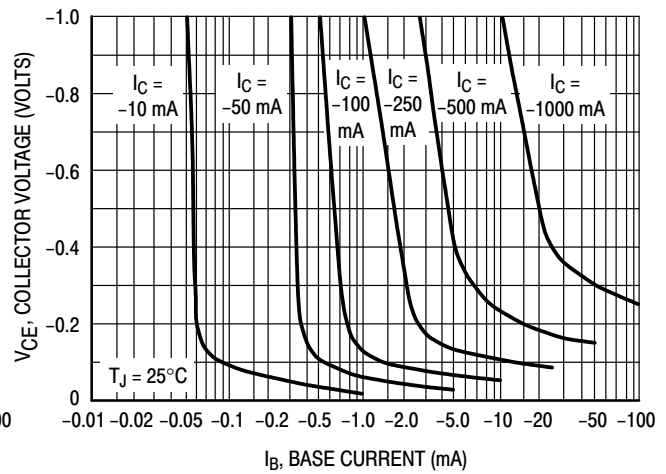


Figure 2. Collector Saturation Region

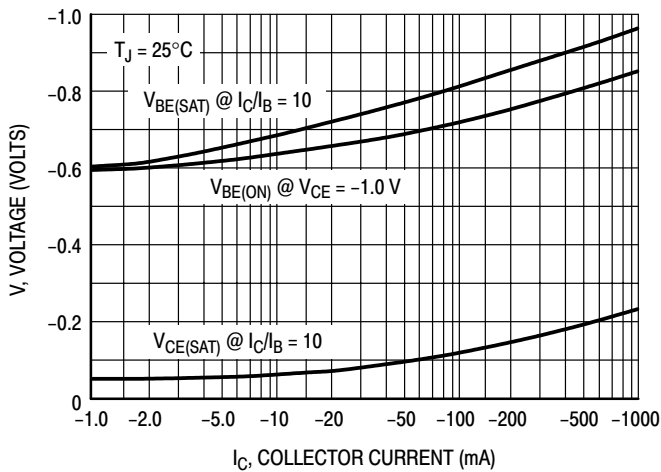


Figure 3. "ON" Voltages

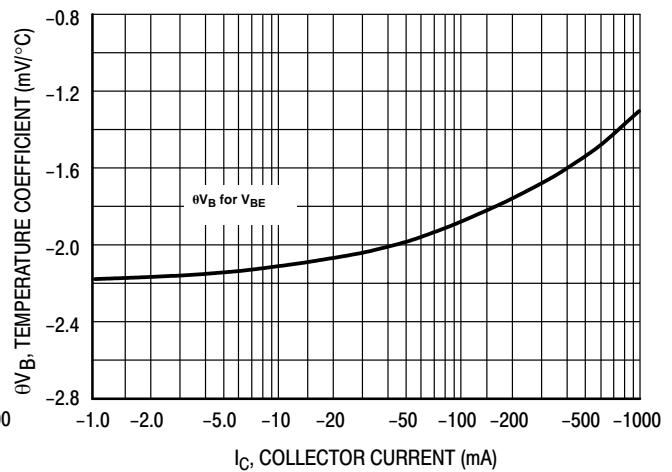


Figure 4. Temperature Coefficient

MPSW51 MPSW51A

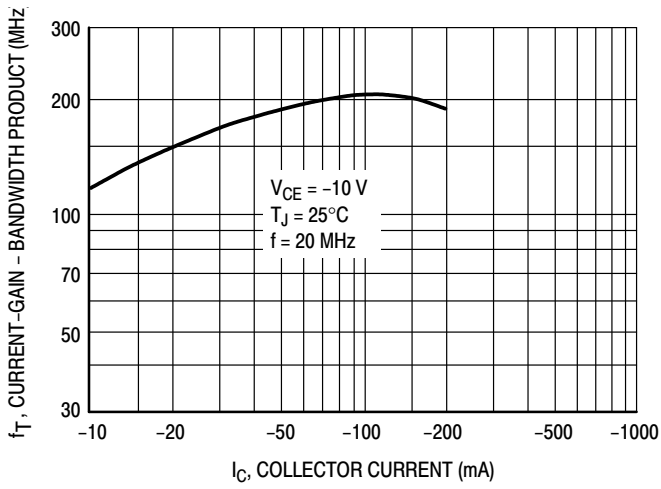


Figure 5. Current Gain — Bandwidth Product

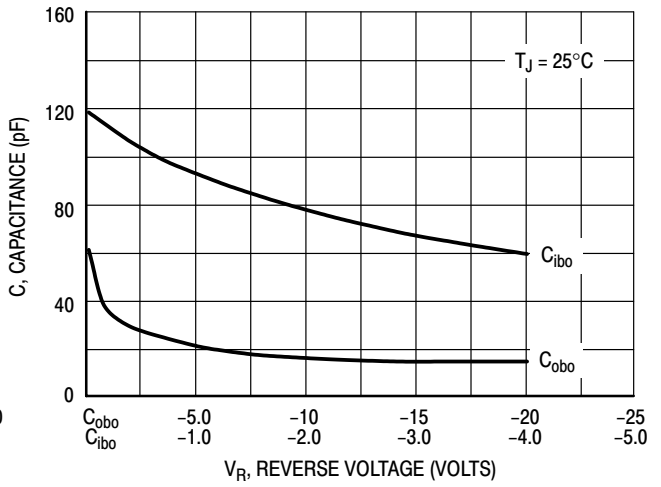


Figure 6. Capacitance

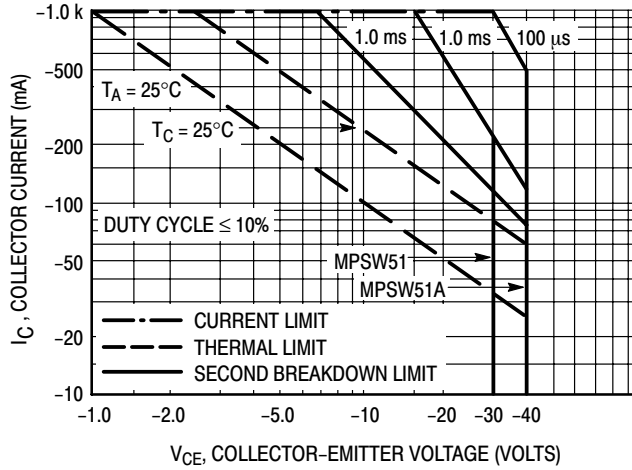
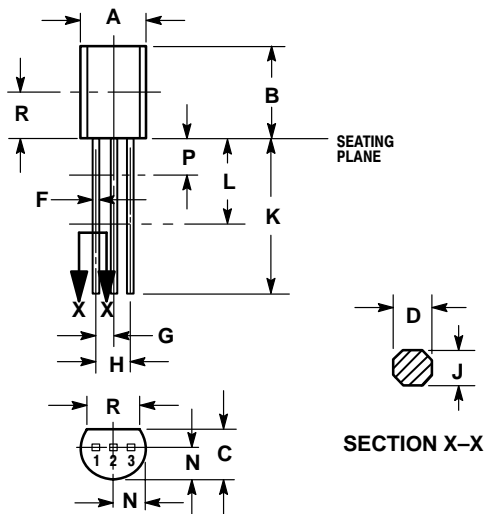


Figure 7. Active Region — Safe Operating Area

MPSW51 MPSW51A

PACKAGE DIMENSIONS

TO-92 (TO-226)
CASE 29-10
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. 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 | --- |

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

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