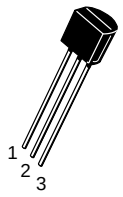
# Switching Transistors
## NPN Silicon

# MPS2369
# MPS2369A*

*ON Semiconductor Preferred Device

### MAXIMUM RATINGS

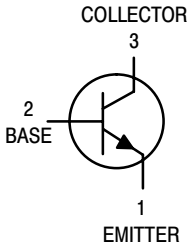
| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Collector–Emitter Voltage | $V_{CEO}$ | 15 | Vdc |
| Collector–Emitter Voltage | $V_{CES}$ | 40 | Vdc |
| Collector–Base Voltage | $V_{CBO}$ | 40 | Vdc |
| Emitter–Base Voltage | $V_{EBO}$ | 4.5 | Vdc |
| Collector Current — Continuous | $I_C$ | 200 | mAdc |
| Total Device Dissipation @ $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | 625<br>5.0 | mW<br>mW/°C |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{stg}$ | –55 to +150 | °C |




**CASE 29–11, STYLE 1**
**TO–92 (TO–226AA)**

### THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 200 | °C/W |




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

| Characteristic | | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Collector–Emitter Breakdown Voltage(1)<br>($I_C$ = 10 mAdc, $I_B$ = 0) | MPS2369A | $V_{(BR)CEO}$ | 15 | — | — | Vdc |
| Collector–Emitter Breakdown Voltage<br>($I_C$ = 10 μAdc, $V_{BE}$ = 0) | MPS2369,A | $V_{(BR)CES}$ | 40 | — | — | Vdc |
| Collector–Base Breakdown Voltage<br>($I_C$ = 10 μAdc, $I_E$ = 0) | MPS2369,A | $V_{(BR)CBO}$ | 40 | — | — | Vdc |
| Emitter–Base Breakdown Voltage<br>($I_E$ = 10 μAdc, $I_C$ = 0) | MPS2369,A | $V_{(BR)EBO}$ | 4.5 | — | — | Vdc |
| Collector Cutoff Current<br>($V_{CB}$ = 20 Vdc, $I_E$ = 0)<br>($V_{CB}$ = 20 Vdc, $I_E$ = 0, $T_A$ = 125°C) | <br><br>MPS2369,A | $I_{CBO}$ | <br>—<br>— | <br>—<br>— | <br>0.4<br>30 | μAdc |
| Collector Cutoff Current<br>($V_{CE}$ = 20 Vdc, $V_{BE}$ = 0) | MPS2369,A | $I_{CES}$ | — | — | 0.4 | μAdc |

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

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



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Publication Order Number:
MPS2369/D

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

| Characteristic | | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **ON CHARACTERISTICS** | | | | | | |
| DC Current Gain(1) | | $h_{FE}$ | | | | — |
| ($I_C$ = 10 mAdc, $V_{CE}$ = 1.0 Vdc) | MPS2369A | | — | — | 120 | |
| ($I_C$ = 10 mAdc, $V_{CE}$ = 1.0 Vdc, $T_A$ = –55°C) | MPS2369 | | 20 | — | — | |
| ($I_C$ = 10 mAdc, $V_{CE}$ = 1.0 Vdc) | MPS2369 | | 40 | — | 120 | |
| ($I_C$ = 10 mAdc, $V_{CE}$ = 0.35 Vdc) | MPS2369A | | 40 | — | — | |
| ($I_C$ = 10 mAdc, $V_{CE}$ = 0.35 Vdc, $T_A$ = –55°C) | MPS2369A | | 20 | — | — | |
| ($I_C$ = 30 mAdc, $V_{CE}$ = 0.4 Vdc) | MPS2369A | | 30 | — | — | |
| ($I_C$ = 100 mAdc, $V_{CE}$ = 2.0 Vdc) | MPS2369 | | 20 | — | — | |
| ($I_C$ = 100 mAdc, $V_{CE}$ = 1.0 Vdc) | MPS2369A | | 20 | — | — | |
| Collector–Emitter Saturation Voltage(1) | | $V_{CE(sat)}$ | | | | Vdc |
| ($I_C$ = 10 mAdc, $I_B$ = 1.0 mAdc) | MPS2369 | | — | — | 0.25 | |
| ($I_C$ = 10 mAdc, $I_B$ = 1.0 mAdc) | MPS2369A | | — | — | 0.20 | |
| ($I_C$ = 10 mAdc, $I_B$ = 1.0 mAdc, $T_A$ = +125°C) | MPS2369A | | — | — | 0.30 | |
| ($I_C$ = 30 mAdc, $I_B$ = 3.0 mAdc) | MPS2369A | | — | — | 0.25 | |
| ($I_C$ = 100 mAdc, $I_B$ = 10 mAdc) | MPS2369A | | — | — | 0.50 | |
| Base–Emitter Saturation Voltage(1) | | $V_{BE(sat)}$ | | | | Vdc |
| ($I_C$ = 10 mAdc, $I_B$ = 1.0 mAdc) | MPS2369 | | 0.7 | — | 0.85 | |
| ($I_C$ = 10 mAdc, $I_B$ = 1.0 mAdc, $T_A$ = +125°C) | MPS2369A | | 0.5 | — | — | |
| ($I_C$ = 10 mAdc, $I_B$ = 1.0 mAdc, $T_A$ = –55°C) | MPS2369A | | — | — | 1.02 | |
| ($I_C$ = 30 mAdc, $I_B$ = 3.0 mAdc) | MPS2369A | | — | — | 1.15 | |
| ($I_C$ = 100 mAdc, $I_B$ = 10 mAdc) | MPS2369A | | — | — | 1.60 | |
| **SMALL–SIGNAL CHARACTERISTICS** | | | | | | |
| Output Capacitance ($V_{CB}$ = 5.0 Vdc, $I_E$ = 0, f = 1.0 MHz) | MPS2369,A | $C_{obo}$ | — | — | 4.0 | pF |
| Small–Signal Current Gain ($I_C$ = 10 mAdc, $V_{CE}$ = 10 Vdc, f = 100 MHz) | MPS2369,A | $h_{fe}$ | 5.0 | — | — | — |
| **SWITCHING CHARACTERISTICS** | | | | | | |
| Storage Time ($I_{B1}$ = $I_{B2}$ = $I_C$ = 10 mAdc) (Figure 3) | MPS2369,A | $t_s$ | — | 5.0 | 13 | ns |
| Turn–On Time ($V_{CC}$ = 3.0 Vdc, $I_C$ = 10 mAdc, $I_{B1}$ = 3.0 mAdc) (Figure 1) | MPS2369,A | $t_{on}$ | — | 8.0 | 12 | ns |
| Turn–Off Time ($V_{CC}$ = 3.0 Vdc, $I_C$ = 10 mAdc, $I_{B1}$ = 3.0 mAdc, $I_{B2}$ = 1.5 mAdc) (Figure 2) | MPS2369,A | $t_{off}$ | — | 10 | 18 | ns |

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

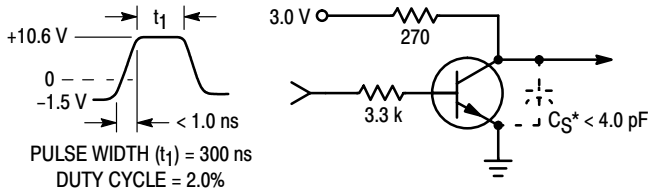



**Figure 1. $t_{on}$ Circuit**

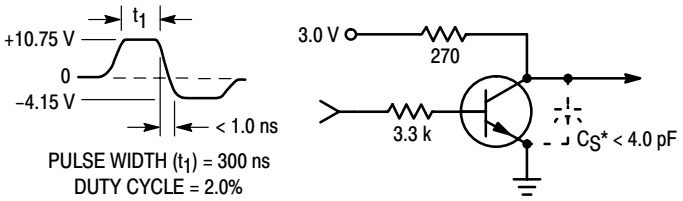



**Figure 2. $t_{off}$ Circuit**

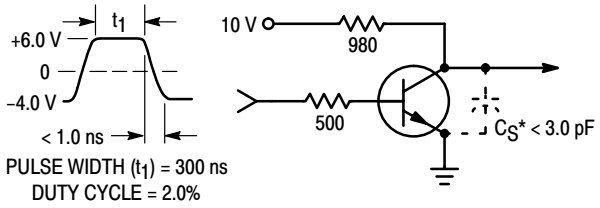
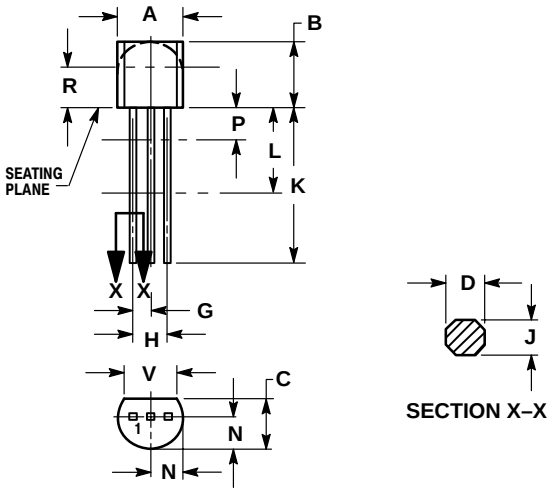



**Figure 3. Storage Test Circuit**

*Total shunt capacitance of test jig and connectors.

## PACKAGE DIMENSIONS

### TO–92 (TO–226)
### CASE 29–11
### 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. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| DIM | 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 | --- |



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