

Switching Transistors

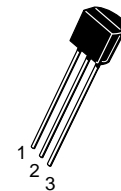
NPN Silicon

MPS2369 MPS2369A*

*ON Semiconductor Preferred Device

MAXIMUM RATINGS

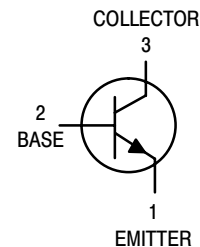
| Rating | Symbol | Value | Unit |
|--|----------------|-------------|----------------------------|
| Collector–Emitter Voltage | V_{CEO} | 15 | Vdc |
| Collector–Emitter Voltage | V_{CES} | 40 | Vdc |
| Collector–Base Voltage | V_{CBO} | 40 | Vdc |
| Emitter–Base Voltage | V_{EBO} | 4.5 | Vdc |
| Collector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



CASE 29–11, STYLE 1
TO–92 (TO–226AA)

THERMAL CHARACTERISTICS

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



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

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

OFF CHARACTERISTICS

| | | | | | | |
|---|-----------|---------------|--------|--------|-----------|-----------------|
| Collector–Emitter Breakdown Voltage ⁽¹⁾ ($I_C = 10 \text{ mAdc}, I_B = 0$) | MPS2369A | $V_{(BR)CEO}$ | 15 | — | — | Vdc |
| Collector–Emitter Breakdown Voltage ($I_C = 10 \text{ }\mu\text{Adc}, V_{BE} = 0$) | MPS2369,A | $V_{(BR)CES}$ | 40 | — | — | Vdc |
| Collector–Base Breakdown Voltage ($I_C = 10 \text{ }\mu\text{Adc}, I_E = 0$) | MPS2369,A | $V_{(BR)CBO}$ | 40 | — | — | Vdc |
| Emitter–Base Breakdown Voltage ($I_E = 10 \text{ }\mu\text{Adc}, I_C = 0$) | MPS2369,A | $V_{(BR)EBO}$ | 4.5 | — | — | Vdc |
| Collector Cutoff Current ($V_{CB} = 20 \text{ Vdc}, I_E = 0$) ($V_{CB} = 20 \text{ Vdc}, I_E = 0, T_A = 125^\circ\text{C}$) | MPS2369,A | I_{CBO} | — — | — — | 0.4 30 | μAdc |
| Collector Cutoff Current ($V_{CE} = 20 \text{ Vdc}, V_{BE} = 0$) | MPS2369,A | I_{CES} | — | — | 0.4 | μAdc |

1. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

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

MPS2369 MPS2369A

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

| Characteristic | Symbol | Min | Typ | Max | Unit | |
|--|---|---------------|---|--------------------------------------|--|-----|
| ON CHARACTERISTICS | | | | | | |
| DC Current Gain ⁽¹⁾ ($I_C = 10\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 10\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$, $T_A = -55^\circ\text{C}$) ($I_C = 10\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 10\text{ mAdc}$, $V_{CE} = 0.35\text{ Vdc}$) ($I_C = 10\text{ mAdc}$, $V_{CE} = 0.35\text{ Vdc}$, $T_A = -55^\circ\text{C}$) ($I_C = 30\text{ mAdc}$, $V_{CE} = 0.4\text{ Vdc}$) ($I_C = 100\text{ mAdc}$, $V_{CE} = 2.0\text{ Vdc}$) ($I_C = 100\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$) | MPS2369A MPS2369 MPS2369 MPS2369A MPS2369A MPS2369A MPS2369 MPS2369A | h_{FE} | — 20 40 40 20 30 20 20 | — — — — — — — — | 120 — 120 — — — — — | — |
| Collector–Emitter Saturation Voltage ⁽¹⁾ ($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$) ($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$) ($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$, $T_A = +125^\circ\text{C}$) ($I_C = 30\text{ mAdc}$, $I_B = 3.0\text{ mAdc}$) ($I_C = 100\text{ mAdc}$, $I_B = 10\text{ mAdc}$) | MPS2369 MPS2369A MPS2369A MPS2369A MPS2369A | $V_{CE(sat)}$ | — — — — — | — — — — — | 0.25 0.20 0.30 0.25 0.50 | Vdc |
| Base–Emitter Saturation Voltage ⁽¹⁾ ($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$) ($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$, $T_A = +125^\circ\text{C}$) ($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$, $T_A = -55^\circ\text{C}$) ($I_C = 30\text{ mAdc}$, $I_B = 3.0\text{ mAdc}$) ($I_C = 100\text{ mAdc}$, $I_B = 10\text{ mAdc}$) | MPS2369 MPS2369A MPS2369A MPS2369A MPS2369A | $V_{BE(sat)}$ | 0.7 0.5 — — — | — — — — — | 0.85 — 1.02 1.15 1.60 | Vdc |

SMALL–SIGNAL CHARACTERISTICS

| | | | | | | |
|---|-----------|-----------|-----|---|-----|----|
| Output Capacitance ($V_{CB} = 5.0\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$) | MPS2369,A | C_{obo} | — | — | 4.0 | pF |
| Small–Signal Current Gain ($I_C = 10\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 100\text{ MHz}$) | MPS2369,A | h_{fe} | 5.0 | — | — | — |

SWITCHING CHARACTERISTICS

| | | | | | | |
|---|-----------|-----------|---|-----|----|----|
| Storage Time ($I_{B1} = I_{B2} = I_C = 10\text{ mAdc}$) (Figure 3) | MPS2369,A | t_s | — | 5.0 | 13 | ns |
| Turn–On Time ($V_{CC} = 3.0\text{ Vdc}$, $I_C = 10\text{ mAdc}$, $I_{B1} = 3.0\text{ mAdc}$) (Figure 1) | MPS2369,A | t_{on} | — | 8.0 | 12 | ns |
| Turn–Off Time ($V_{CC} = 3.0\text{ Vdc}$, $I_C = 10\text{ mAdc}$, $I_{B1} = 3.0\text{ mAdc}$, $I_{B2} = 1.5\text{ mAdc}$) (Figure 2) | MPS2369,A | t_{off} | — | 10 | 18 | ns |

1. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

MPS2369 MPS2369A

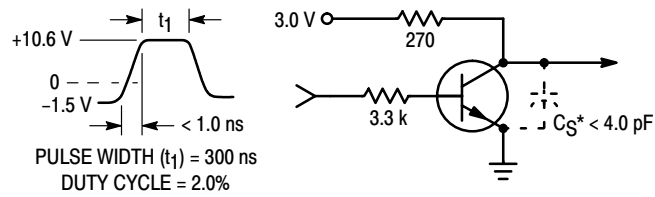


Figure 1. t_{on} Circuit

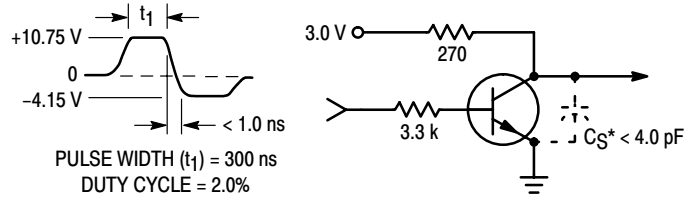


Figure 2. t_{off} Circuit

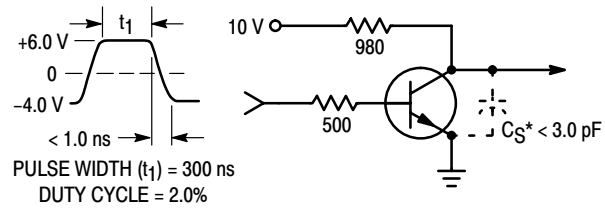


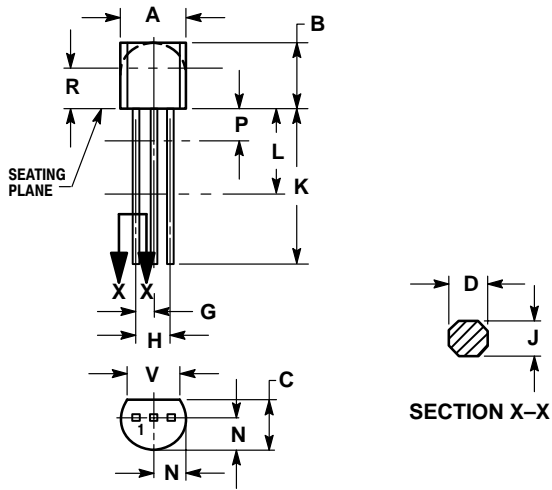
Figure 3. Storage Test Circuit

*Total shunt capacitance of test jig and connectors.

MPS2369 MPS2369A

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.

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