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Switching Transistors

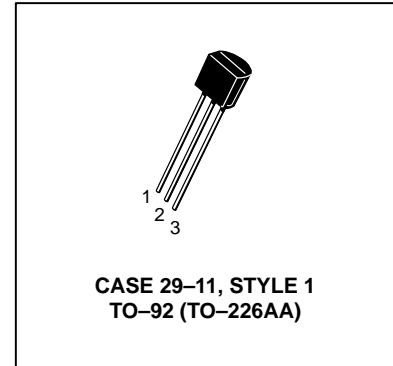
NPN Silicon

MPS2369 MPS2369A*

*ON Semiconductor Preferred Device

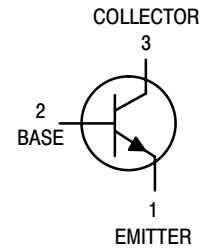
MAXIMUM RATINGS

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	$^\circ\text{C}$



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
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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⁾ ($I_C = 10\text{ mA}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 10\text{ mA}$, $V_{CE} = 1.0\text{ Vdc}$, $T_A = -55^\circ\text{C}$) ($I_C = 10\text{ mA}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 10\text{ mA}$, $V_{CE} = 0.35\text{ Vdc}$) ($I_C = 10\text{ mA}$, $V_{CE} = 0.35\text{ Vdc}$, $T_A = -55^\circ\text{C}$) ($I_C = 30\text{ mA}$, $V_{CE} = 0.4\text{ Vdc}$) ($I_C = 100\text{ mA}$, $V_{CE} = 2.0\text{ Vdc}$) ($I_C = 100\text{ mA}$, $V_{CE} = 1.0\text{ Vdc}$)	MPS2369A MPS2369 MPS2369 MPS2369A MPS2369A MPS2369A MPS2369 MPS2369A	h_{FE}	— 20 40 40 20 30 20 20	— — — — — — — —	120 — 120 — — — — —	—
Collector–Emitter Saturation Voltage ⁽¹⁾ ($I_C = 10\text{ mA}$, $I_B = 1.0\text{ mA}$) ($I_C = 10\text{ mA}$, $I_B = 1.0\text{ mA}$) ($I_C = 10\text{ mA}$, $I_B = 1.0\text{ mA}$, $T_A = +125^\circ\text{C}$) ($I_C = 30\text{ mA}$, $I_B = 3.0\text{ mA}$) ($I_C = 100\text{ mA}$, $I_B = 10\text{ mA}$)	MPS2369 MPS2369A MPS2369A MPS2369A MPS2369A	$V_{CE(sat)}$	— — — — —	— — — — —	0.25 0.20 0.30 0.25 0.50	Vdc
Base–Emitter Saturation Voltage ⁽¹⁾ ($I_C = 10\text{ mA}$, $I_B = 1.0\text{ mA}$) ($I_C = 10\text{ mA}$, $I_B = 1.0\text{ mA}$, $T_A = +125^\circ\text{C}$) ($I_C = 10\text{ mA}$, $I_B = 1.0\text{ mA}$, $T_A = -55^\circ\text{C}$) ($I_C = 30\text{ mA}$, $I_B = 3.0\text{ mA}$) ($I_C = 100\text{ mA}$, $I_B = 10\text{ mA}$)	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 ($I_C = 10\text{ mA}$, $V_{CE} = 10\text{ Vdc}$, $f = 100\text{ MHz}$)	MPS2369,A	h_{fe}	5.0	—	—	—

SWITCHING CHARACTERISTICS

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

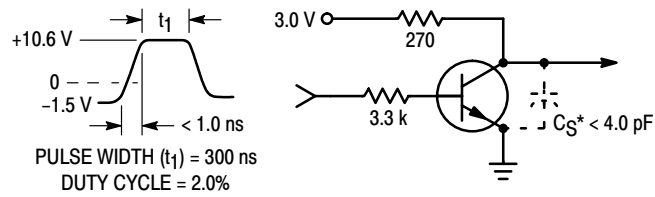


Figure 1. t_{on} Circuit

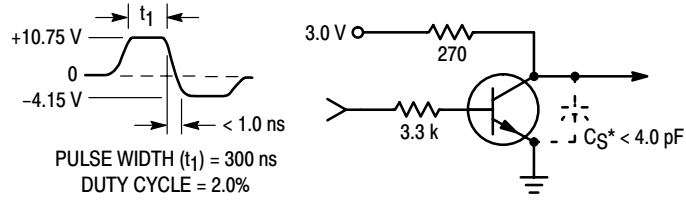


Figure 2. t_{off} Circuit

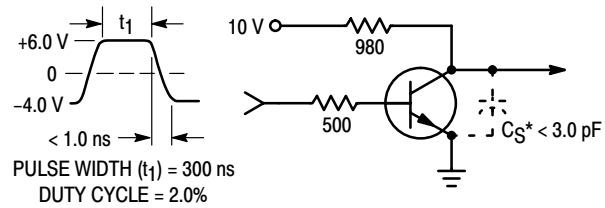


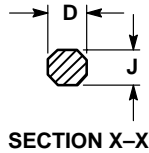
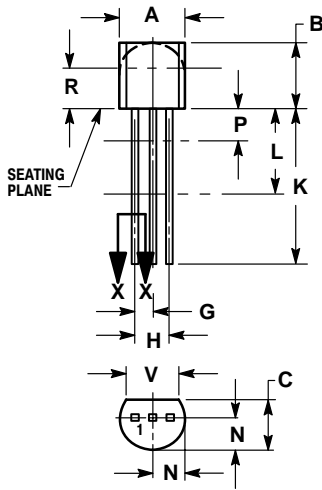
Figure 3. Storage Test Circuit

*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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