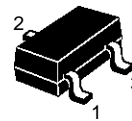


SMALL SIGNAL NPN TRANSISTORS

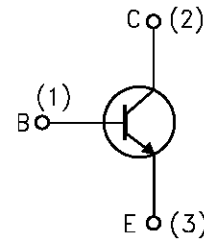
Type	Marking
BSV52	B2
SO2369	N11
SO2369A	N81

- SILICON EPITAXIAL PLANAR NPN TRANSISTORS
- MINIATURE PLASTIC PACKAGE FOR APPLICATION IN SURFACE MOUNTING CIRCUITS
- LOW CURRENT, FAST SWITCHING APPLICATIONS.



SOT-23

INTERNAL SCHEMATIC DIAGRAM



SC08960

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		SO2369/A	BSV52	
V_{CES}	Collector-Emitter Voltage ($V_{BE} = 0$)	40	20	V
V_{CBO}	Collector-Base Voltage ($I_E = 0$)	40	20	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)	15	12	V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	4.5	5	V
I_{CM}	Collector Peak Current	0.2		A
P_{tot}	Total Dissipation at $T_c = 25^\circ\text{C}$	200		mW
T_{stg}	Storage Temperature	-65 to 150		$^\circ\text{C}$
T_j	Max. Operating Junction Temperature	150		$^\circ\text{C}$

BSV52/SO2369/SO2369A

THERMAL DATA

$R_{thj-amb}$	Thermal Resistance Junction-Ambient	Max	620	$^{\circ}\text{C}/\text{W}$
R_{thj-SR}	Thermal Resistance Junction-Substrate	Max	400	$^{\circ}\text{C}/\text{W}$

• Mounted on a ceramic substrate area = 7 x 5 x 0.5 mm

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cut-off Current ($I_E = 0$)	$V_{CB} = 20\text{ V}$ for SO2369/SO2369A $V_{CB} = 10\text{ V}$ for BSV52 $V_{CB} = 10\text{ V}$ $T_j = 150^{\circ}\text{C}$ for BSV52			400 100 5	nA nA μA
I_{CES}	Collector Cut-off Current ($V_{BE} = 0$)	$V_{CB} = 20\text{ V}$ for SO2369A			400	nA
$V_{(BR)CES}^*$	Collector-Emitter Breakdown Voltage ($I_B = 0$)	$I_C = 10\text{ }\mu\text{A}$ for SO2369/SO2369A for BSV52	40 20			V V
$V_{(BR)CEO}^*$	Collector-Emitter Breakdown Voltage ($I_B = 0$)	$I_C = 10\text{ mA}$ for SO2369/SO2369A for BSV52	15 12			V V
$V_{(BR)CBO}^*$	Collector-Base Breakdown Voltage ($I_B = 0$)	$I_C = 10\text{ }\mu\text{A}$ for SO2369/SO2369A for BSV52	40 20			V V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage ($I_C = 0$)	$I_E = 10\text{ }\mu\text{A}$ for SO2369/SO2369A for BSV52	4.5 5			V V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 10\text{ mA}$ $I_B = 0.3\text{ mA}$ for BSV52 $I_C = 10\text{ mA}$ $I_B = 1\text{ mA}$ for SO2369A for BSV52 $I_C = 30\text{ mA}$ $I_B = 3\text{ mA}$ for SO2369 BSV52 $I_C = 50\text{ mA}$ $I_B = 5\text{ mA}$ for BSV52 $I_C = 100\text{ mA}$ $I_B = 10\text{ mA}$ for SO2369A			0.3 0.2 0.25 0.25 0.4 0.5	V V V V V V
$V_{BE(sat)}^*$	Collector-Base Saturation Voltage	$I_C = 10\text{ mA}$ $I_B = 1\text{ mA}$ $I_C = 30\text{ mA}$ $I_B = 3\text{ mA}$ for SO2369A $I_C = 50\text{ mA}$ $I_B = 5\text{ mA}$ for BSV52 $I_C = 100\text{ mA}$ $I_B = 10\text{ mA}$ for SO2369A	0.7		0.85 1.15 1.2 1.6	V V V V
h_{FE}^*	DC Current Gain	$I_C = 1\text{ mA}$ $V_{CE} = 1\text{ V}$ for BSV52 $I_C = 10\text{ mA}$ $V_{CE} = 0.35\text{ V}$ for SO2369A $I_C = 10\text{ mA}$ $V_{CE} = 1\text{ V}$ for All types $I_C = 30\text{ mA}$ $V_{CE} = 0.4\text{ V}$ for SO2369A $I_C = 50\text{ mA}$ $V_{CE} = 1\text{ V}$ for BSV52 $I_C = 100\text{ mA}$ $V_{CE} = 1\text{ V}$ for SO2369A $I_C = 100\text{ mA}$ $V_{CE} = 2\text{ V}$ for SO2369	25 40 40 30 25 20 20		120 120	

* Pulsed: Pulse duration = 300 μs , duty cycle $\leq 2\%$

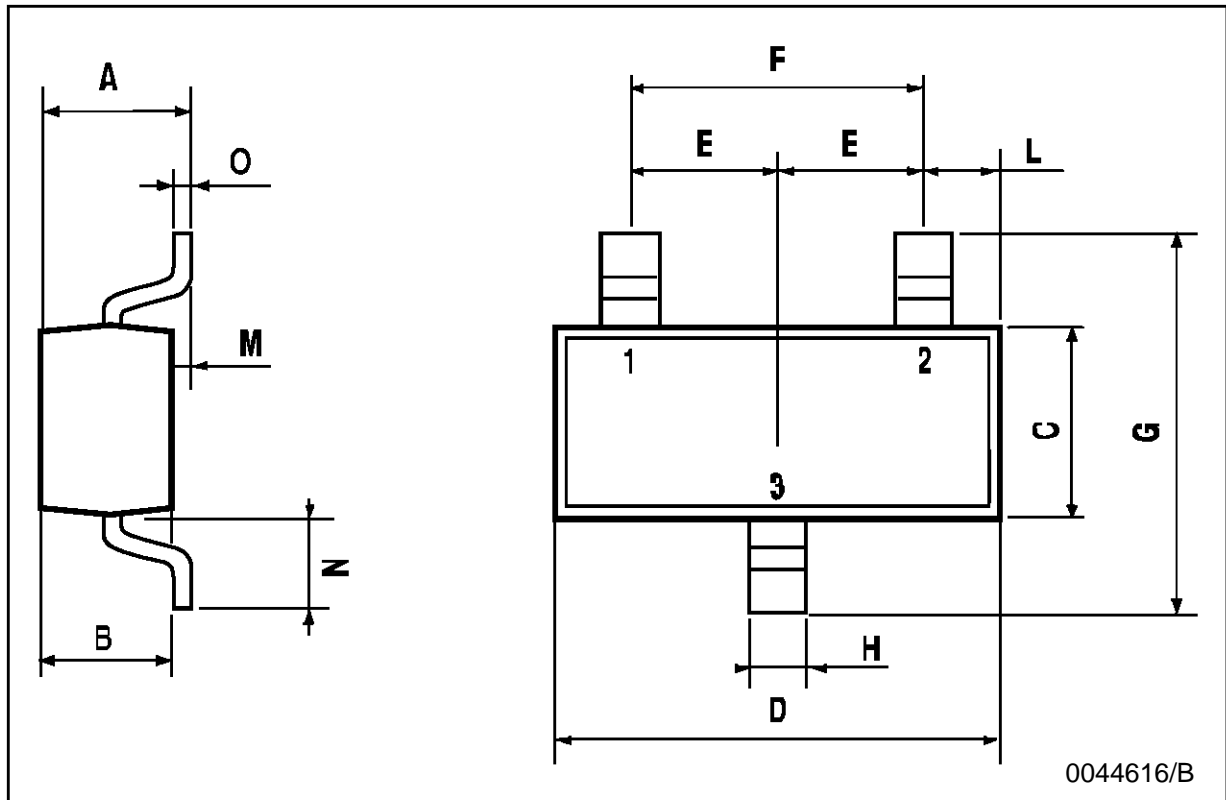
ELECTRICAL CHARACTERISTICS (Continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
f_T	Transition Frequency	$I_C = 10 \text{ mA}$ $V_{CE} = 10 \text{ V}$ $f = 100 \text{ MHz}$ for SO2369A for BSV52/SO2369	500 400			MHz MHz
C_{CB}	Collector Base Capacitance	$I_E = 0$ $V_{CE} = 5 \text{ V}$ $f = 1 \text{ MHz}$			4	pF
C_{EB}	Emitter Base Capacitance	$I_C = 0$ $V_{EB} = 1 \text{ V}$ $f = 1 \text{ MHz}$ for BSV52			4.5	pF
t_{on}	Turn On Time	$I_C = 10 \text{ mA}$ $V_{BE} = -0.5 \text{ V}$ $I_B = 3 \text{ mA}$			12	ns
t_s	Storage Time	$I_C = 10 \text{ mA}$ $I_{B1} = -I_{B2} = 10 \text{ mA}$			13	ns
t_{off}	Turn Off Time	$I_C = 10 \text{ mA}$ $I_{B1} = 3 \text{ mA}$ $I_{B2} = -1.5 \text{ mA}$			18	ns

* Pulsed: Pulse duration = 300 μs , duty cycle $\leq 2\%$

SOT-23 MECHANICAL DATA

DIM.	mm			mils		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	0.85		1.1	33.4		43.3
B	0.65		0.95	25.6		37.4
C	1.20		1.4	47.2		55.1
D	2.80		3	110.2		118
E	0.95		1.05	37.4		41.3
F	1.9		2.05	74.8		80.7
G	2.1		2.5	82.6		98.4
H	0.38		0.48	14.9		18.8
L	0.3		0.6	11.8		23.6
M	0		0.1	0		3.9
N	0.3		0.65	11.8		25.6
O	0.09		0.17	3.5		6.7



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