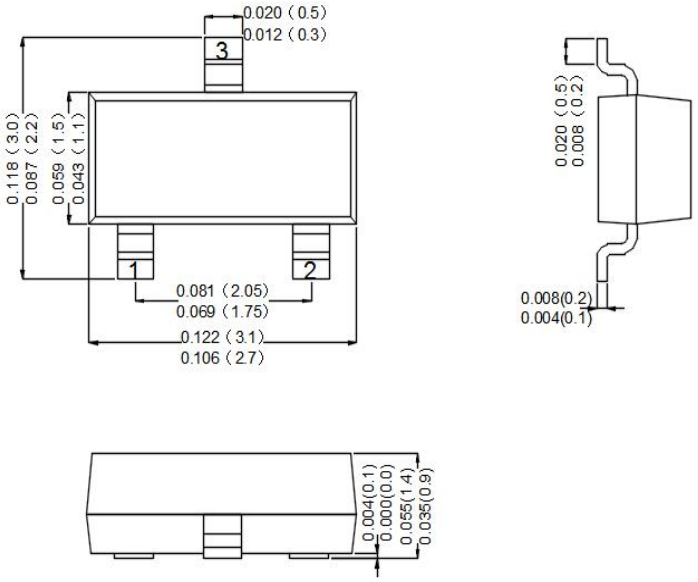
MMBT2369 THRU MMBT2369A

NPN Silicon Epitaxial Planar Transistor

Features

- Epitaxial planar die construction
- Ultra-small surface mount package

SOT-23



Dimensions in inches and (millimeters)

Mechanical Data

- Case:Molded Plastic,SOT-23
- Epoxy:UL 94V-0 rate flame retardant
- Terminals:Plated Leads Solderable perMIL-STD-750,Method-2026.
- Marking: MMBT2369:1J ; MMBT2369A:1JA
- Mounting Position : Any.
- Equivalent Circuit:

Maximum Ratings Maximum Ratings (Rating at 25℃ ambient temperature unless otherwise specified.)

Parameter	Symbol	Value	Unit
Collector Base Voltage	V_{CBO}	40	V
Collector Emitter Voltage	V_{CEO}	15	V
Collector Emitter Voltage	V_{CES}	40	V
Emitter Base Voltage	V_{EBO}	4.5	V
Collector Current Continuous	I_C	200	mA
Total Device Dissipation FR-5 Board[1)] Derate above 25 °C	P_{tot}	300 1.8	mW mW/°C
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature Range	T_J, T_S	-55 to +150	°C

1) FR-5=1×0.75×0.062 in.

Electrical Characteristics (Rating at 25℃ ambient temperature unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector−Emitter Breakdown Voltage (Note 3) (I_C = 10 mAdc, I_B = 0)	$V_{(BR)CEO}$	15	–	–	Vdc
Collector−Emitter Breakdown Voltage (I_C = 10 μAdc, V_{BE} = 0)	$V_{(BR)CES}$	40	–	–	Vdc
Collector−Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	$V_{(BR)CBO}$	40	–	–	Vdc
Emitter−Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	$V_{(BR)EBO}$	4.5	–	–	Vdc
Collector Cutoff Current (V_{CB} = 20 Vdc, I_E = 0) (V_{CB} = 20 Vdc, I_E = 0, T_A = 150°C)	I_{CBO}	– –	– –	0.4 30	μAdc
Collector Cutoff Current MMBT2369A (V_{CE} = 20 Vdc, V_{BE} = 0)	I_{CES}	–	–	0.4	μAdc
ON CHARACTERISTICS					
DC Current Gain (Note 3) MMBT2369 (I_C = 10 mAdc, V_{CE} = 1.0 Vdc) MMBT2369A (I_C = 10 mAdc, V_{CE} = 1.0 Vdc) MMBT2369A (I_C = 10 mAdc, V_{CE} = 0.35 Vdc) MMBT2369A (I_C = 10 mAdc, V_{CE} = 0.35 Vdc, T_A = −55°C) MMBT2369A (I_C = 30 mAdc, V_{CE} = 0.4 Vdc) MMBT2369 (I_C = 100 mAdc, V_{CE} = 2.0 Vdc) MMBT2369A (I_C = 100 mAdc, V_{CE} = 1.0 Vdc)	h_{FE}	 40 – 40 20 30 20 20	 – – – – – – – –	 120 120 – – – – –	–
Collector−Emitter Saturation Voltage (Note 3) MMBT2369 (I_C = 10 mAdc, I_B = 1.0 mAdc) MMBT2369A (I_C = 10 mAdc, I_B = 1.0 mAdc) MMBT2369A (I_C = 10 mAdc, I_B = 1.0 mAdc, T_A = +125°C) MMBT2369A (I_C = 30 mAdc, I_B = 3.0 mAdc) MMBT2369A (I_C = 100 mAdc, I_B = 10 mAdc)	$V_{CE(sat)}$	 – – – – –	 – – – – –	 0.25 0.20 0.30 0.25 0.50	Vdc
Base−Emitter Saturation Voltage (Note 3) MMBT2369/A (I_C = 10 mAdc, I_B = 1.0 mAdc) MMBT2369A (I_C = 10 mAdc, I_B = 1.0 mAdc, T_A = −55°C) MMBT2369A (I_C = 30 mAdc, I_B = 3.0 mAdc) MMBT2369A (I_C = 100 mAdc, I_B = 10 mAdc)	$V_{BE(sat)}$	 0.7 – – –	 – – – –	 0.85 1.02 1.15 1.60	Vdc
SMALL−SIGNAL CHARACTERISTICS					
Output Capacitance (V_{CB} = 5.0 Vdc, I_E = 0, f = 1.0 MHz)	C_{obo}	–	–	4.0	pF
Small Signal Current Gain (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 100 MHz)	h_{fe}	5.0	–	–	–
SWITCHING CHARACTERISTICS					
Storage Time (I_{B1} = I_{B2} = I_C = 10 mAdc)	t_s	–	5.0	13	ns
Turn−On Time (V_{CC} = 3.0 Vdc, I_C = 10 mAdc, I_{B1} = 3.0 mAdc)	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)	t_{off}	–	10	18	ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

Rating And Characteristic Curves

Fig 1. Junction Capacitance Variations

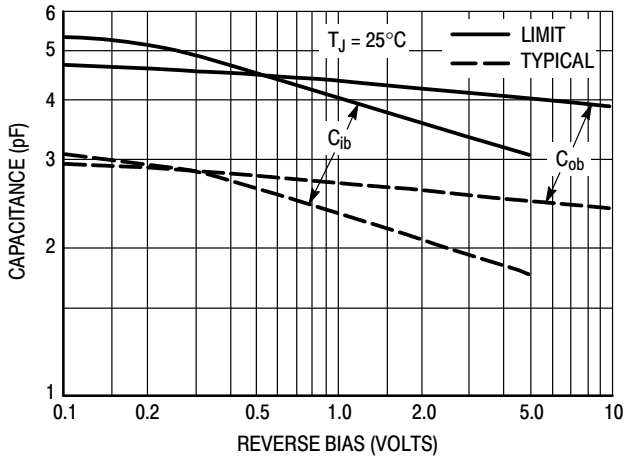


Fig 2. Typical Switching Times

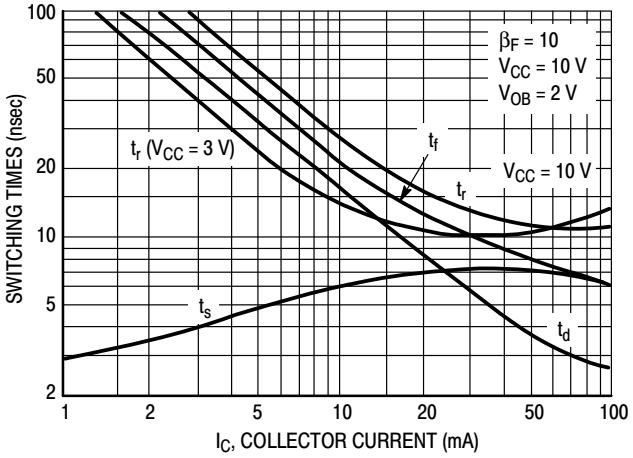


Fig 3. Maximum Collector Saturation Voltage Characteristics

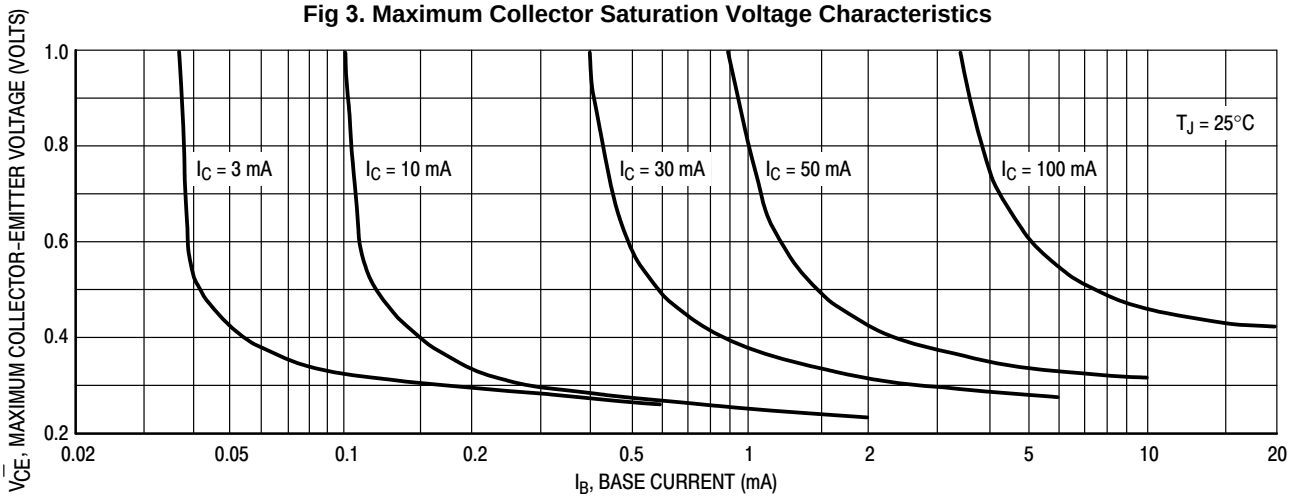
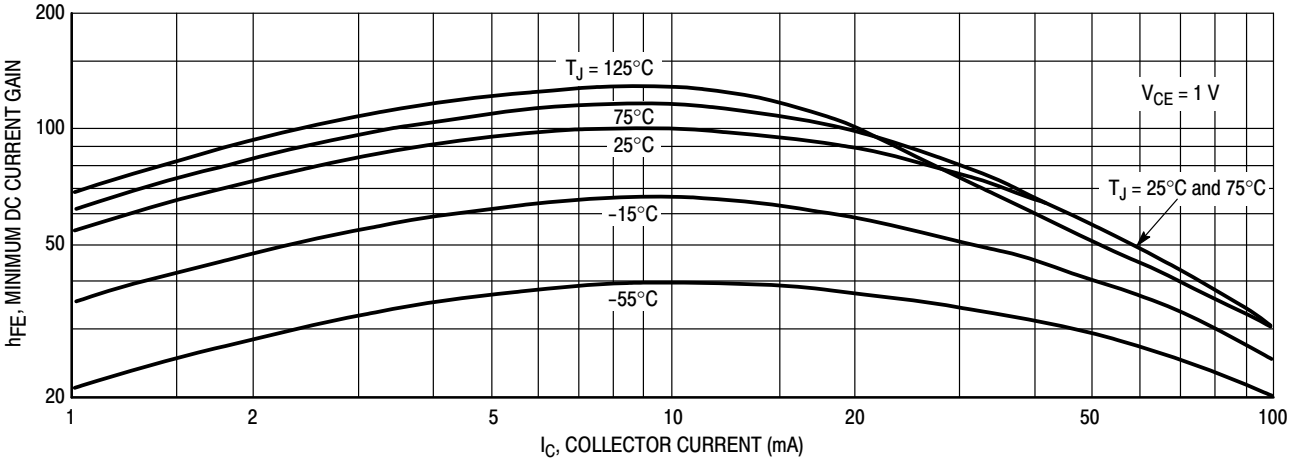


Fig 4. Minimum Current Gain Characteristics



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