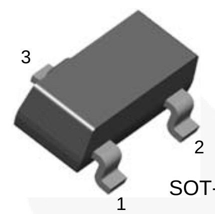
November 2014

MMBT2369A
NPN Switching Transistor

Description

This device is designed for high speed saturated switching at collector currents of 10 mA to 100 mA. Sourced from process 21.



1. Base 2. Emitter 3. Collector

Ordering Information

Part Number	Marking	Package	Packing Method
MMBT2369A	1S	SOT-23 3L	Tape and Reel

Absolute Maximum Ratings[(1),(2)]

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter	Value	Unit
V_{CEO}	Collector-Emitter Voltage	15	V
V_{CBO}	Collector-Base Voltage	40	V
V_{EBO}	Emitter-Base Voltage	4.5	V
I_C	Collector Current - Continuous	200	mA
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	°C

Notes:

1. These ratings are based on a maximum junction temperature of 150°C.
2. These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low-duty-cycle operations.

Thermal Characteristics[3]

Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter	Value	Unit
P_D	Total Device Dissipation	225	mW
	Derate Above 25°C	1.8	mW/°C
R_{qJA}	Thermal Resistance, Junction-to-Ambient	556	°C/W

Note:

3. Device is mounted on FR-4 PCB 1.6 inch X 1.6 inch X 0.06 inch.

Electrical Characteristics

Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Max.	Unit
BV_{CEO}	Collector-Emitter Breakdown Voltage[4]	I_C = 10 mA, I_B = 0	15		V
BV_{CES}	Collector-Emitter Breakdown Voltage	I_C = 10 µA, V_{BE} = 0	40		V
BV_{CBO}	Collector-Base Breakdown Voltage	I_C = 10 µA, I_E = 0	40		V
BV_{EBO}	Emitter-Base Breakdown Voltage	I_E = 10 µA, I_C = 0	4.5		V
I_{CBO}	Collector Cut-Off Current	V_{CB} = 20 V, I_E = 0		0.4	µA
		V_{CB} = 20 V, I_E = 0, T_A = 125°C		30	
h_{FE}	DC Current Gain[4]	I_C = 10 mA, V_{CE} = 1.0 V	40	120	
		I_C = 10 mA, V_{CE} = 0.35 V, T_A = -55°C	20		
		I_C = 100 mA, V_{CE} = 1.0 V	20		
$V_{CE}(sat)$	Collector-Emitter Saturation Voltage[4]	I_C = 10 mA, I_B = 1.0 mA		0.20	V
		I_C = 10 mA, I_B = 1.0 mA, T_A = 125°C		0.30	
		I_C = 30 mA, I_B = 3.0 mA		0.25	
		I_C = 100 mA, I_B = 10 mA		0.50	
$V_{BE}(sat)$	Base-Emitter Saturation Voltage	I_C = 10 mA, I_B = 1.0 mA	0.70	0.85	V
		I_C = 10 mA, I_B = 1.0 mA, T_A = -55°C		1.02	
		I_C = 10 mA, I_B = 1.0 mA, T_A = 125°C	0.59		
		I_C = 30 mA, I_B = 3.0 mA		1.15	
		I_C = 100 mA, I_B = 10 mA		1.60	
C_{obo}	Output Capacitance	V_{CB} = 5.0 V, I_E = 0, f = 1.0 MHz		4.0	pF
C_{ibo}	Input Capacitance	V_{EB} = 0.5 V, I_C = 0, f = 1.0 MHz		5.0	pF
h_{fe}	Small-Signal Current Gain	I_C = 10 mA, V_{CE} = 10 V R_G = 2.0 kΩ, f = 100 MHz	5.0		
t_s	Storage Time	I_{B1} = I_{B2} = I_C = 10 mA		13	ns
t_{on}	Turn-On Time	V_{CC} = 3.0 V, I_C = 10 mA, I_{B1} = 3.0 mA		12	ns
t_{off}	Turn-Off Time	V_{CC} = 3.0 V, I_C = 10 mA, I_{B1} = 3.0 mA, I_{B2} = 1.5 mA		18	ns

Note:

4. Pulse test: Pulse width ≤ 300 µs, duty cycle ≤ 2%

Typical Performance Characteristics

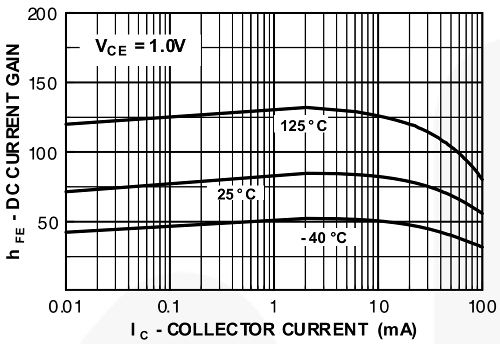


Figure 1. DC Current Gain vs. Collector Current

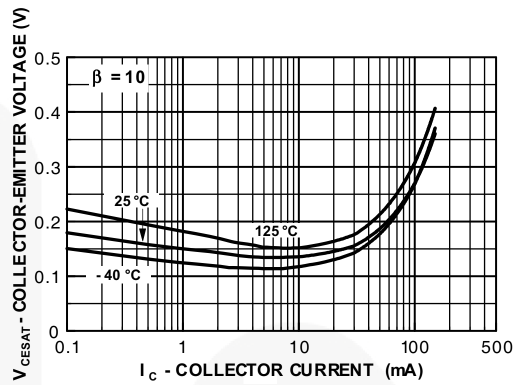


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

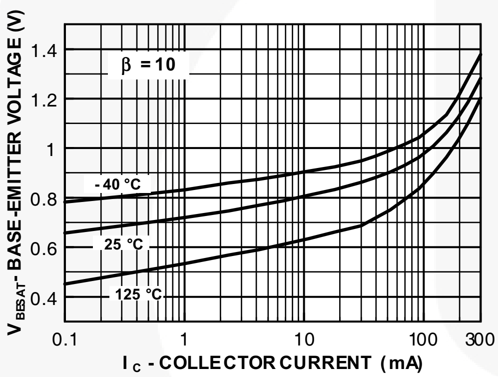


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

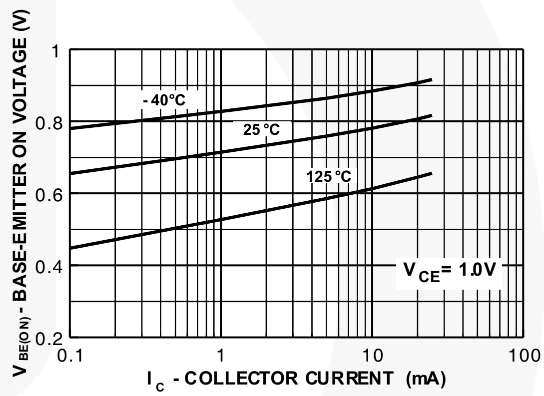


Figure 4. Base-Emitter On Voltage vs. Collector Current

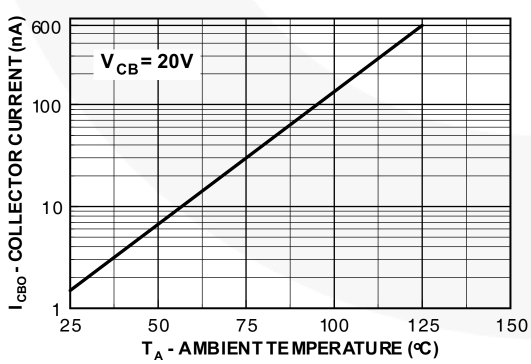


Figure 5. Collector Cut-Off Current vs. Ambient Temperature

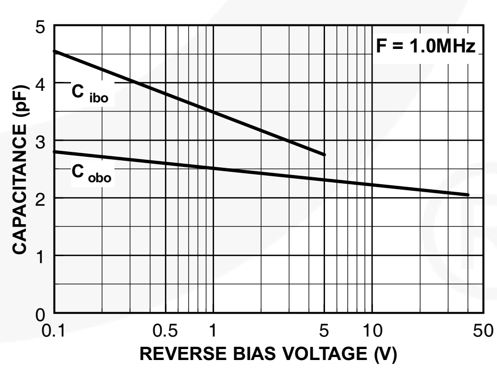


Figure 6. Output Capacitance vs. Reverse Bias Voltage

Typical Performance Characteristics (Continued)

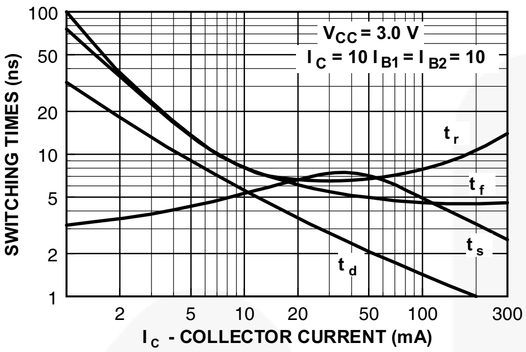


Figure 7. Switching Times vs. Collector Current

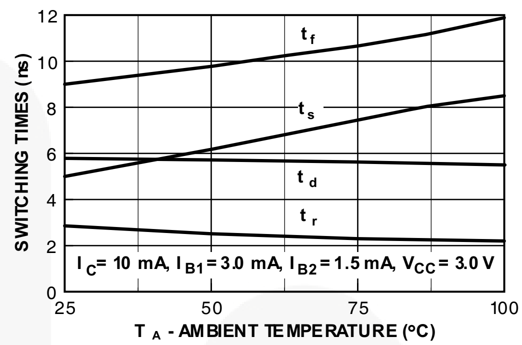


Figure 8. Switching Times vs. Ambient Temperature

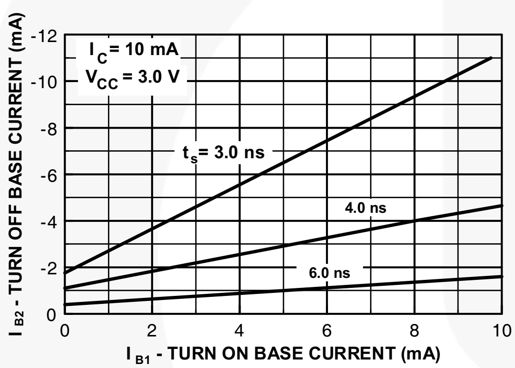


Figure 9. Storage Time vs. Turn-On and Turn-Off Base Currents

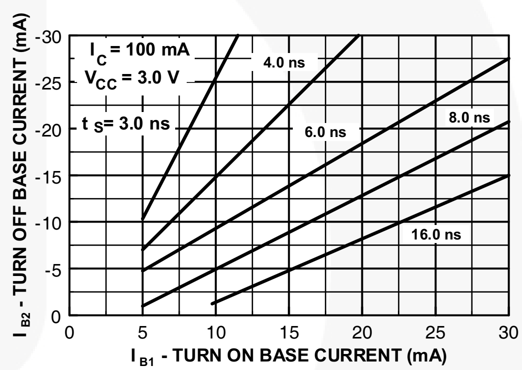


Figure 10. Storage Time vs. Turn-On and Turn-Off Base Currents

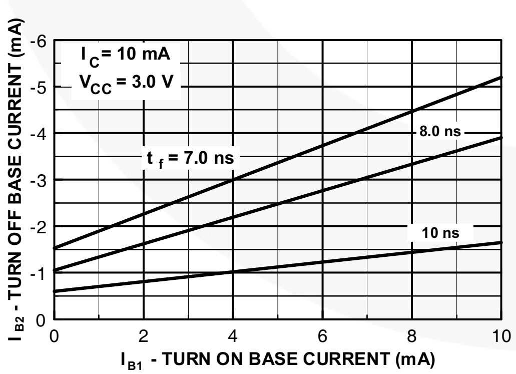


Figure 11. Fall Time vs. Turn-On and Turn-Off Base Currents

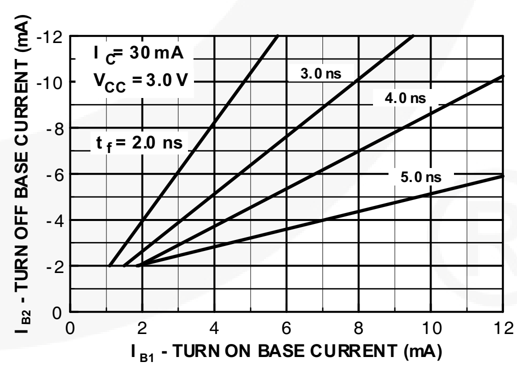


Figure 12. Fall Time vs. Turn-On and Turn-Off Base Currents

Typical Performance Characteristics (Continued)

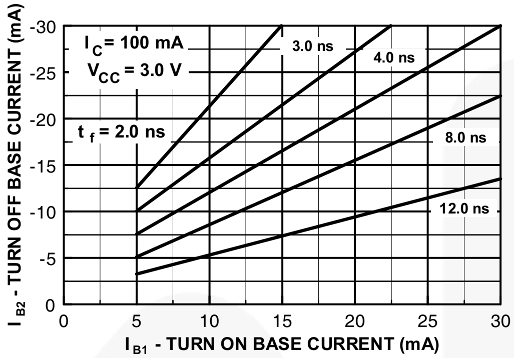


Figure 13. Fall Time vs. Turn-On and Turn-Off Base Currents

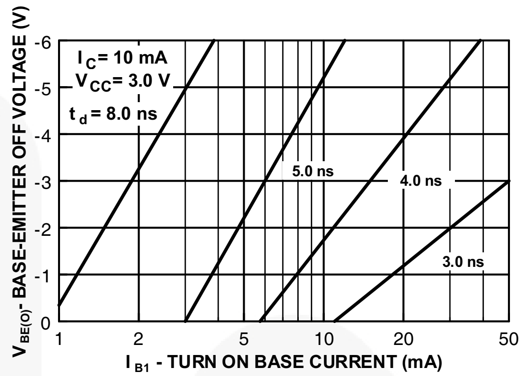


Figure 14. Delay Time vs. Base-Emitter Off Voltage and Turn-On Base Current

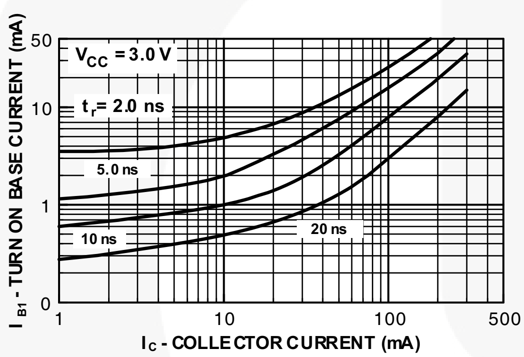


Figure 15. Rise Time vs. Turn-On Base Current and Collector Current

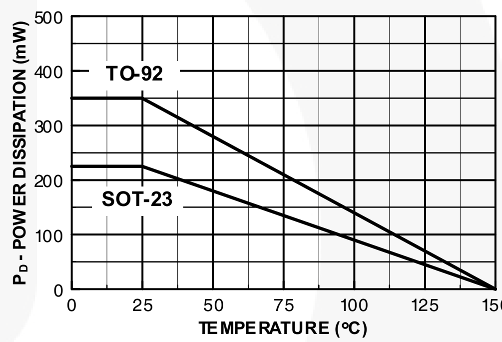


Figure 16. Power Dissipation vs. Ambient Temperature

Physical Dimensions

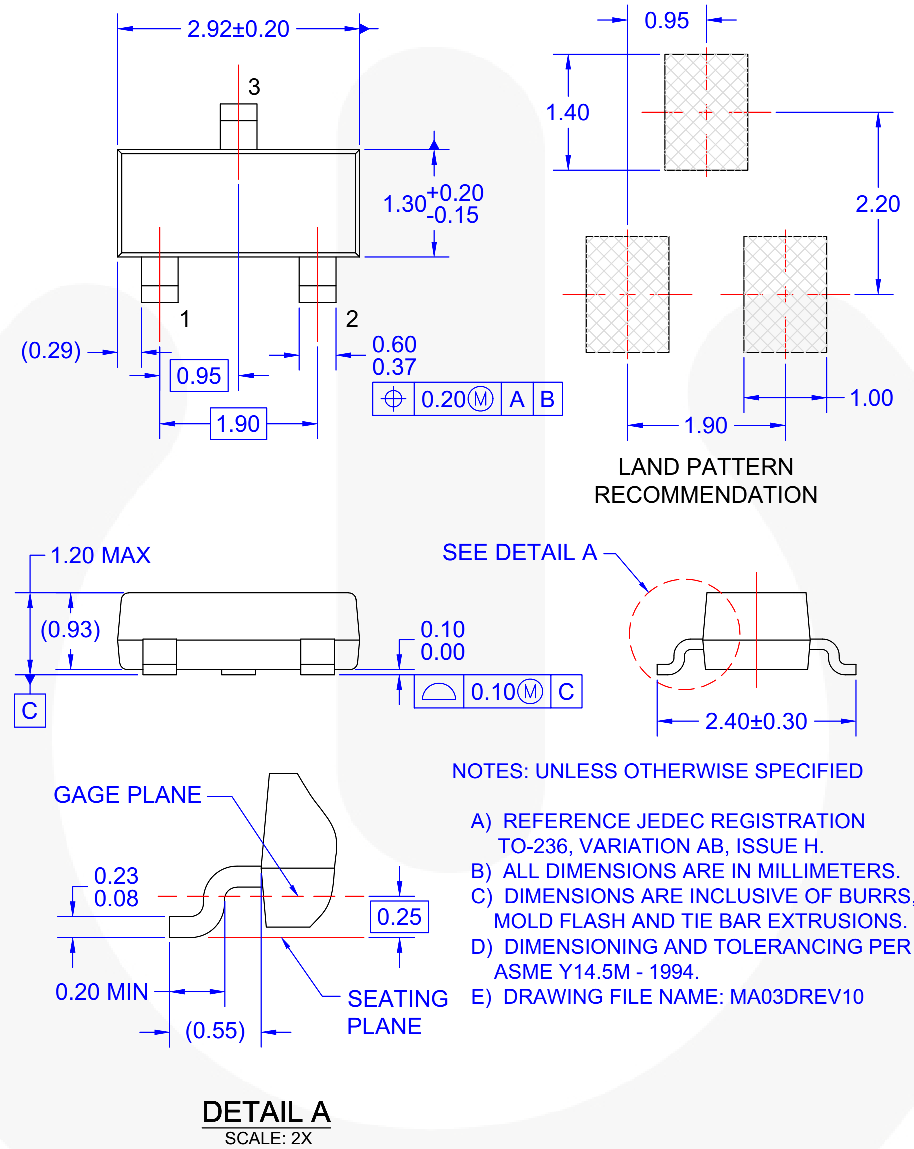


Figure 17. 3-LEAD, SOT23, JEDEC TO-236, LOW PROFILE

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