



**THE DATASHEET OF  
MMBT2131T1**



# MMBT2131T1G

## General Purpose Transistors

### PNP Bipolar Junction Transistor

**NOTE: Voltage and Current are negative for the PNP Transistor.**

#### Features

- These Devices are Pb-Free and are RoHS Compliant

#### MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	30	V
Collector-Base Voltage	$V_{CBO}$	40	V
Emitter-Base Voltage	$V_{EBO}$	5.0	V
Collector Current	$I_C$	700	mA
Base Current	$I_B$	350	mA
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	$P_D$	342	mW
Total Power Dissipation @ $T_C = 85^\circ\text{C}$	$P_D$	178	mW
Thermal Resistance, Junction-to-Ambient (Note 1)	$R_{\theta JA}$	366	$^\circ\text{C/W}$
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	$P_D$	665	mW
Total Power Dissipation @ $T_C = 85^\circ\text{C}$	$P_D$	346	mW
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	188	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

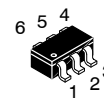
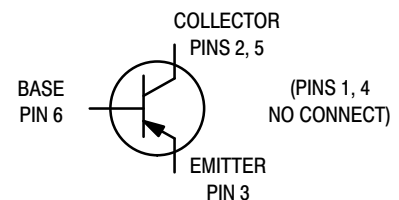
1. Minimum FR-4 or G-10 PCB, Operating to Steady State.
2. Mounted onto a 2" square FR-4 Board (1" sq. 2 oz Cu 0.06" thick single sided), Operating to Steady State.



**ON Semiconductor®**

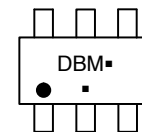
<http://onsemi.com>

**0.7 AMPERES**  
**30 VOLTS –  $V_{(BR)CEO}$**   
**342 mW**



**SC-74**  
**CASE 318F**  
**STYLE 2**

#### MARKING DIAGRAM



DB = Device Code  
M = Date Code\*  
▪ = Pb-Free Package

(Note: Microdot may be in either location)  
\*Date Code orientation may vary depending upon manufacturing location.

#### ORDERING INFORMATION

Device	Package	Shipping†
MMBT2131T1G	SC-74 (Pb-Free)	3000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

# MMBT2131T1G

## ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector-Base Breakdown Voltage (I <sub>C</sub> = 100 μA)	V <sub>(BR)CBO</sub>	40	-	-	V
Collector-Emitter Breakdown Voltage (I <sub>C</sub> = 10 mA)	V <sub>(BR)CEO</sub>	30	-	-	V
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 100 μA)	V <sub>(BR)EBO</sub>	5.0	-	-	V
Collector Cutoff Current (V <sub>CB</sub> = 25 V, I <sub>E</sub> = 0 A) (V <sub>CB</sub> = 25 V, I <sub>E</sub> = 0 A, T <sub>A</sub> = 125°C)	I <sub>CBO</sub>	-	-	1.0 10	μA
Emitter Cutoff Current (V <sub>EB</sub> = 5.0 V, I <sub>C</sub> = 0 A)	I <sub>EBO</sub>	-	-	10	μA
<b>ON CHARACTERISTICS</b>					
DC Current Gain (V <sub>CE</sub> = 3.0 V, I <sub>C</sub> = 100 mA)	h <sub>FE</sub>	150	-	-	V
Collector-Emitter Saturation Voltage (I <sub>C</sub> = 500 mA, I <sub>B</sub> = 50 mA)	V <sub>CE(sat)</sub>	-	-	0.25	V
Collector-Emitter Saturation Voltage (I <sub>C</sub> = 700 mA, I <sub>B</sub> = 70 mA)	V <sub>CE(sat)</sub>	-	-	0.4	V
Base-Emitter Saturation Voltage (I <sub>C</sub> = 700 mA, I <sub>B</sub> = 70 mA)	V <sub>BE(sat)</sub>	-	-	1.1	V
Collector-Emitter Saturation Voltage (I <sub>C</sub> = 700 mA, V <sub>CE</sub> = 1.0 V)	V <sub>BE(on)</sub>	-	-	1.0	V

## TYPICAL CHARACTERISTICS

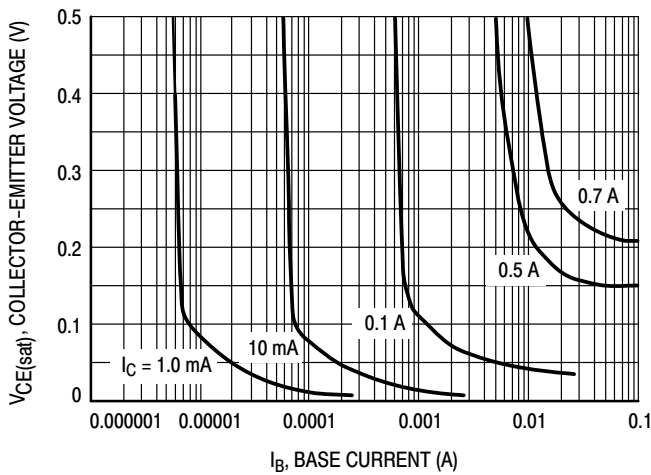


Figure 1. Collector Saturation Region

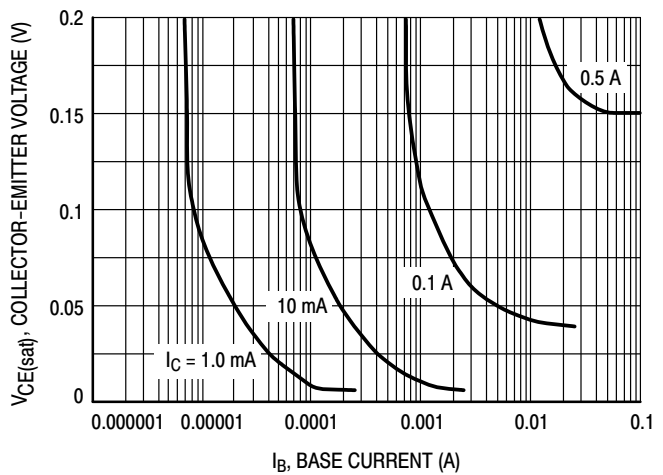


Figure 2. Collector Saturation Region

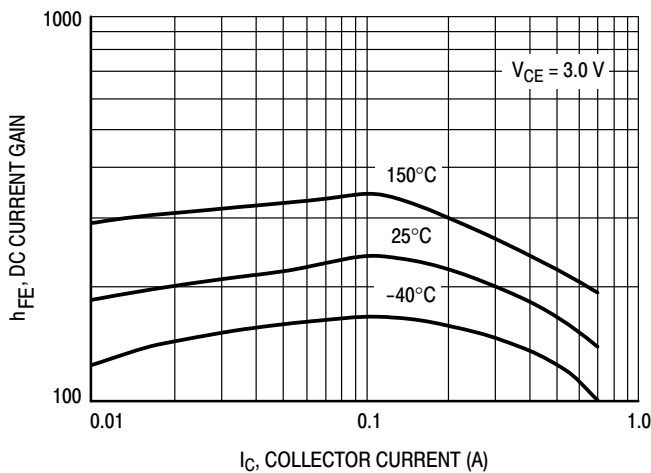


Figure 3. DC Current Gain

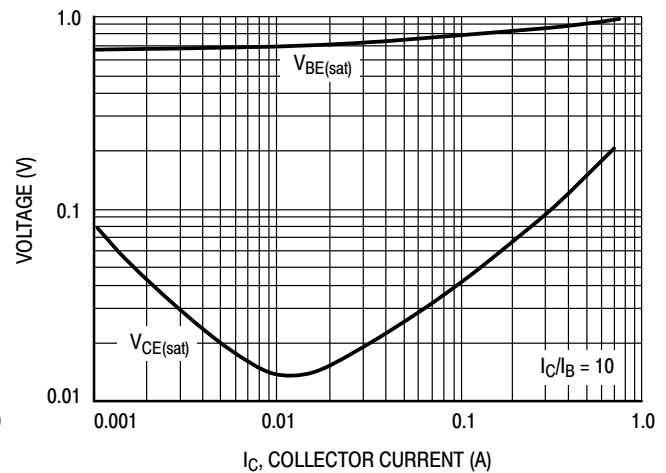


Figure 4. "ON" Voltages

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## TYPICAL CHARACTERISTICS

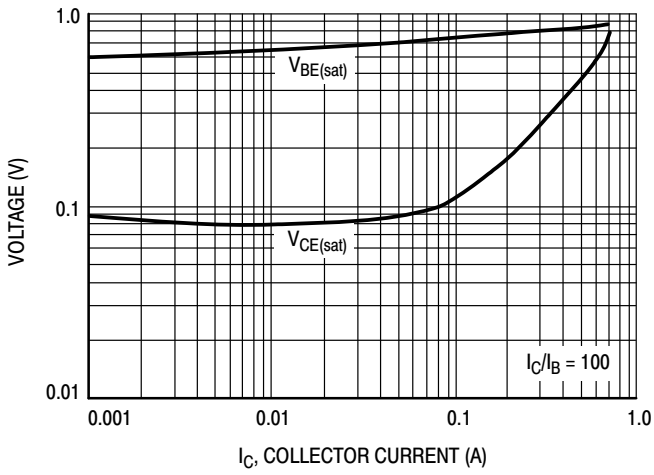


Figure 5. "ON" Voltages

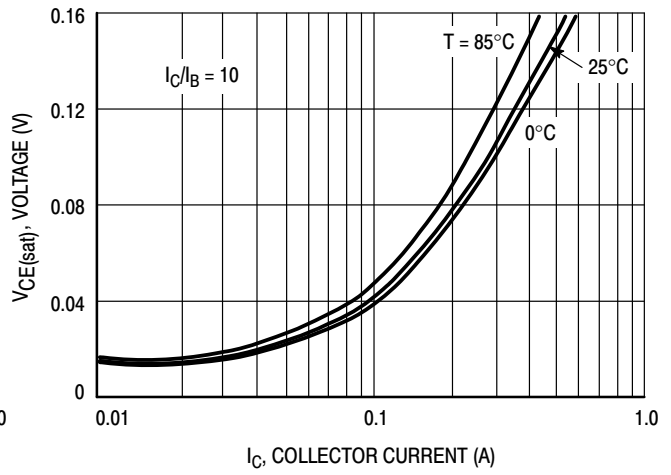


Figure 6. Collector-Emitter Saturation Voltage

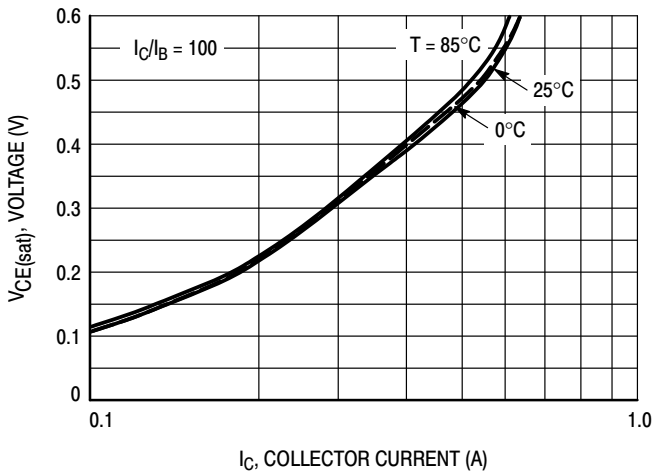


Figure 7. Collector-Emitter Saturation Voltage

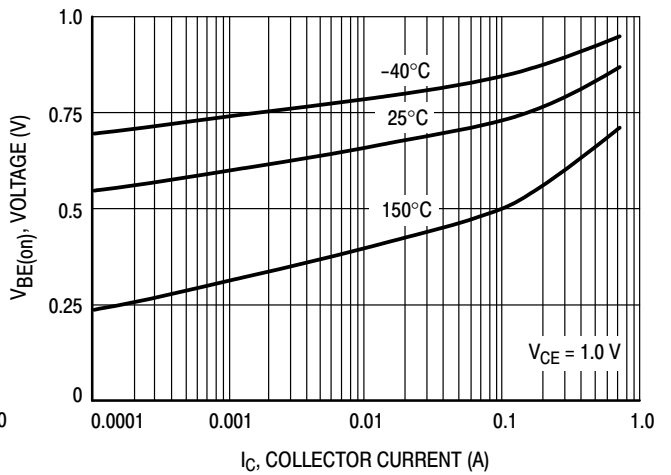


Figure 8.  $V_{BE(on)}$  Voltage

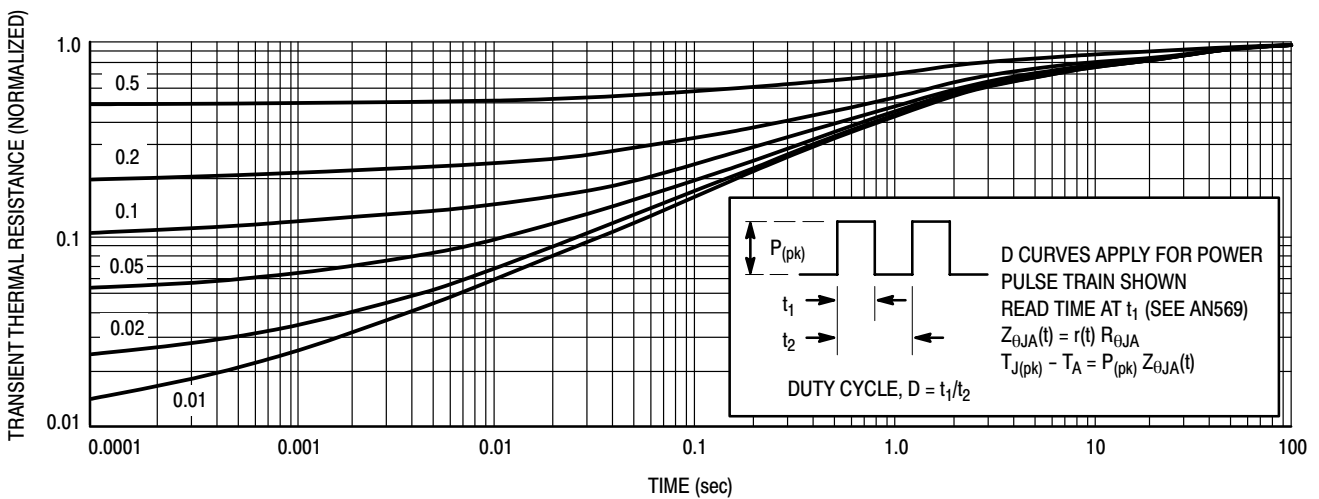
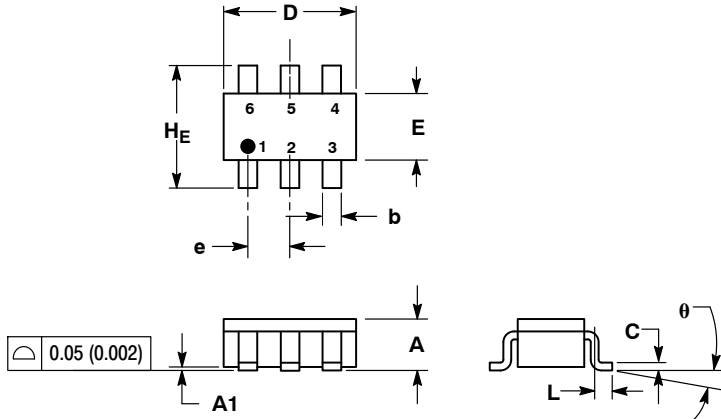


Figure 9. Thermal Response Curve

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## PACKAGE DIMENSIONS

SC-74  
CASE 318F-05  
ISSUE N



NOTES:

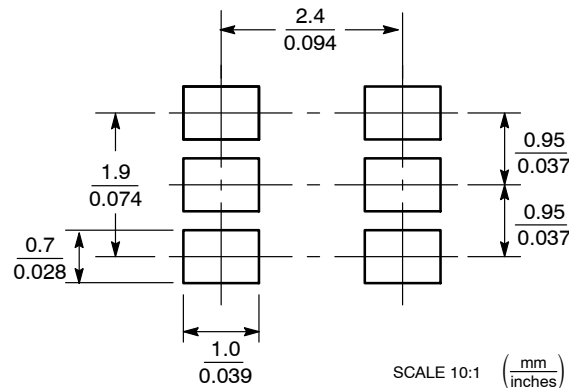
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318F-01, -02, -03, -04 OBSOLETE. NEW STANDARD 318F-05.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.25	0.37	0.50	0.010	0.015	0.020
c	0.10	0.18	0.26	0.004	0.007	0.010
D	2.90	3.00	3.10	0.114	0.118	0.122
E	1.30	1.50	1.70	0.051	0.059	0.067
e	0.85	0.95	1.05	0.034	0.037	0.041
L	0.20	0.40	0.60	0.008	0.016	0.024
HE	2.50	2.75	3.00	0.099	0.108	0.118
θ	0°	-	10°	0°	-	10°

STYLE 2:

1. NO CONNECTION
2. COLLECTOR
3. EMITTER
4. NO CONNECTION
5. COLLECTOR
6. BASE

### SOLDERING FOOTPRINT\*



SCALE 10:1 (mm/inches)

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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