

MMBT489LT1

High Current Surface Mount NPN Silicon Switching Transistor for Load Management in Portable Applications

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Rating	Symbol	Max	Unit
Collector-Emitter Voltage	V_{CEO}	30	Vdc
Collector-Base Voltage	V_{CBO}	50	Vdc
Emitter-Base Voltage	V_{EBO}	5.0	Vdc
Collector Current – Continuous	I_C	1.0	A
Collector Current – Peak	I_{CM}	2.0	A

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D (Note 1)	310	mW
		2.5	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$ (Note 1)	403	$^\circ\text{C/W}$
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D (Note 2)	710	mW
		5.7	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$ (Note 2)	176	$^\circ\text{C/W}$
Total Device Dissipation (Single Pulse < 10 sec.)	$P_{D\text{single}}$	575	mW
Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

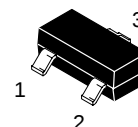
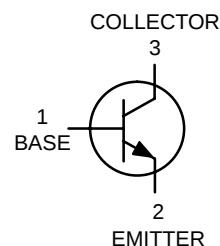
1. FR-4 @ Minimum Pad
2. FR-4 @ 1.0 X 1.0 inch Pad



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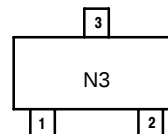
<http://onsemi.com>

30 VOLTS
2.0 AMPS
NPN TRANSISTOR



SOT-23 (TO-236)
CASE 318-08
STYLE 6

DEVICE MARKING



N3 = Specific Device Code

ORDERING INFORMATION

Device	Package	Shipping
MMBT489LT1	SOT-23	3000/Tape & Reel

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ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Breakdown Voltage ($I_C = 10\text{ mA}$, $I_B = 0$)	$V_{(BR)CEO}$	30	–	Vdc
Collector–Base Breakdown Voltage ($I_C = 0.1\text{ mA}$, $I_E = 0$)	$V_{(BR)CBO}$	50	–	Vdc
Emitter–Base Breakdown Voltage ($I_E = 0.1\text{ mA}$, $I_C = 0$)	$V_{(BR)EBO}$	5.0	–	Vdc
Collector Cutoff Current ($V_{CB} = 30\text{ Vdc}$, $I_E = 0$)	I_{CBO}	–	0.1	μAdc
Collector–Emitter Cutoff Current ($V_{CES} = 30\text{ Vdc}$)	I_{CES}	–	0.1	μAdc
Emitter Cutoff Current ($V_{EB} = 4.0\text{ Vdc}$)	I_{EBO}	–	0.1	μAdc

ON CHARACTERISTICS

DC Current Gain (Note 1) ($I_C = 50\text{ mA}$, $V_{CE} = 5.0\text{ V}$) ($I_C = 0.5\text{ A}$, $V_{CE} = 5.0\text{ V}$) ($I_C = 1.0\text{ A}$, $V_{CE} = 5.0\text{ V}$)	h_{FE}	300 300 200	– 900 –	
Collector–Emitter Saturation Voltage (Note 1) ($I_C = 1.0\text{ A}$, $I_B = 100\text{ mA}$) ($I_C = 0.5\text{ A}$, $I_B = 50\text{ mA}$) ($I_C = 0.1\text{ A}$, $I_B = 1.0\text{ mA}$)	$V_{CE(sat)}$	– – –	0.200 0.125 0.075	V
Base–Emitter Saturation Voltage (Note 1) ($I_C = 1.0\text{ A}$, $I_B = 0.1\text{ A}$)	$V_{BE(sat)}$	–	1.1	V
Base–Emitter Turn–on Voltage (Note 1) ($I_C = 1.0\text{ mA}$, $V_{CE} = 2.0\text{ V}$)	$V_{BE(on)}$	–	1.1	V
Cutoff Frequency ($I_C = 100\text{ mA}$, $V_{CE} = 5.0\text{ V}$, $f = 100\text{ MHz}$)	f_T	100	–	MHz
Output Capacitance ($f = 1.0\text{ MHz}$)	C_{obo}	–	15	pF

1. Pulsed Condition: Pulse Width = 300 μsec , Duty Cycle $\leq 2\%$

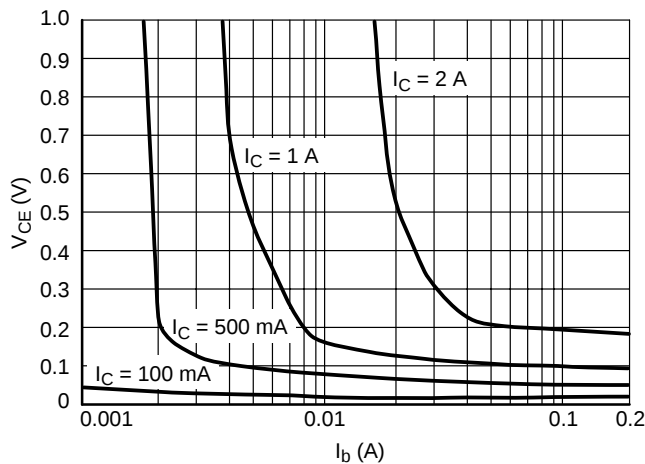


Figure 1. V_{CE} versus I_B

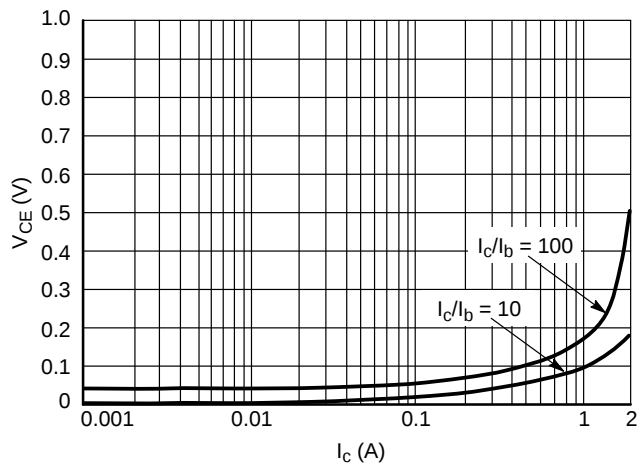


Figure 2. V_{CE} versus I_C

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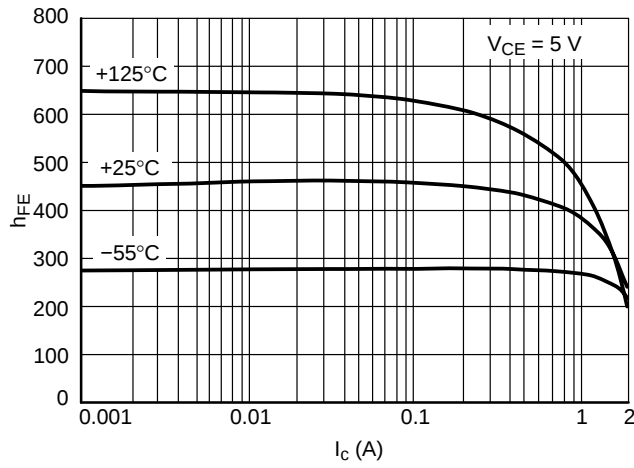


Figure 3. h_{FE} versus I_C

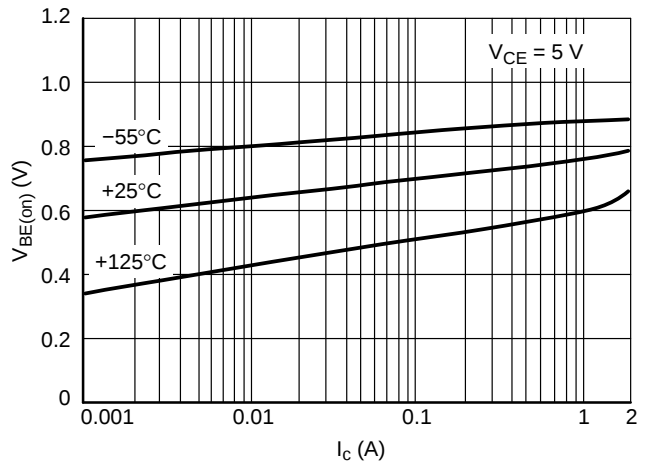


Figure 4. $V_{BE(on)}$ versus I_C

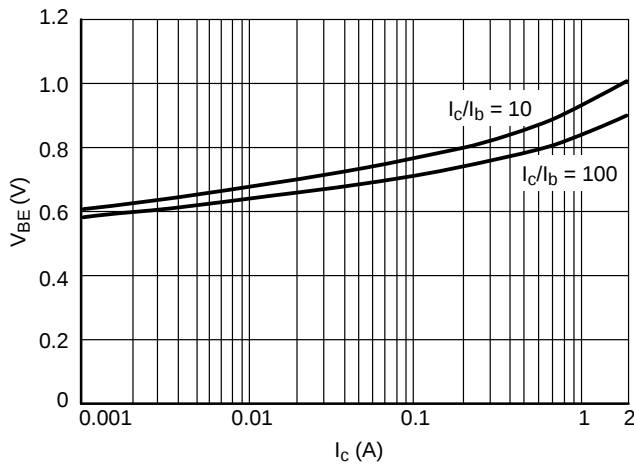


Figure 5. $V_{BE(sat)}$ versus I_C

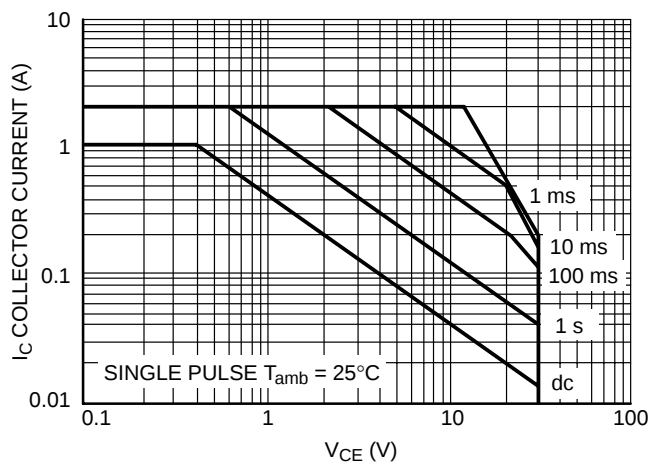


Figure 6. Safe Operating Area

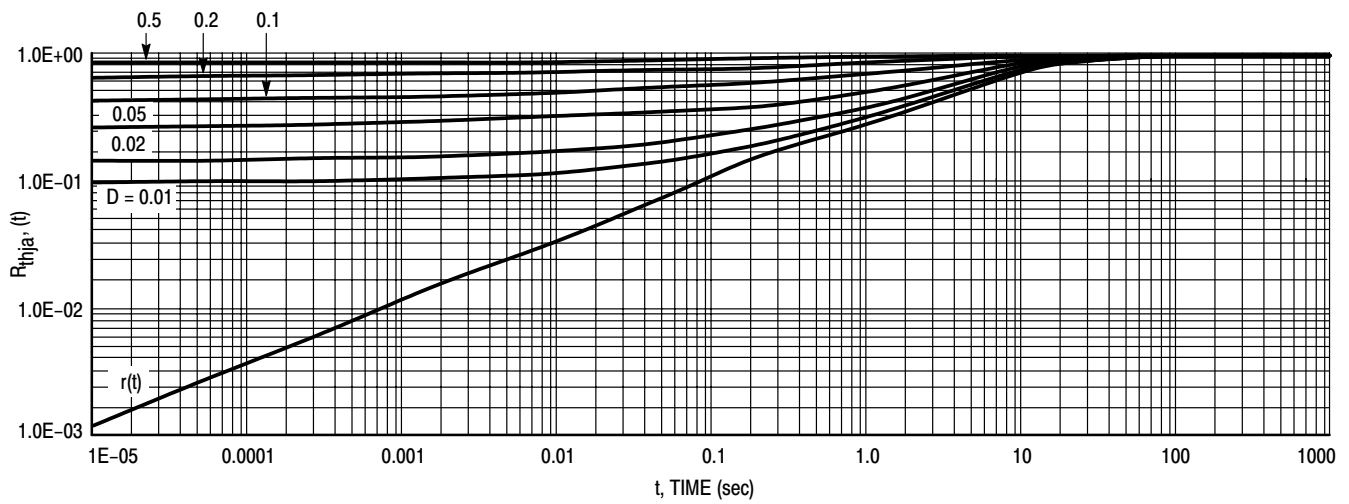
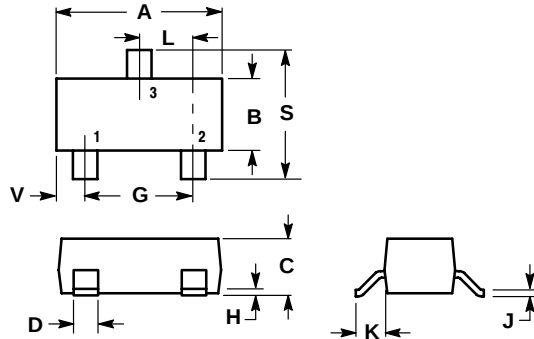


Figure 7. Normalized Thermal Response

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PACKAGE DIMENSIONS

SOT-23 (TO-236)
CASE 318-08
ISSUE AH



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. 318-03 AND -07 OBSOLETE, NEW STANDARD 318-08.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

STYLE 6:

- PIN 1. BASE
2. EMITTER
3. COLLECTOR

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