

MMBT489LT1

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



ON Semiconductor®

<http://onsemi.com>

**30 VOLTS
2.0 AMPS
NPN TRANSISTOR**

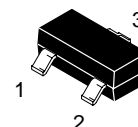
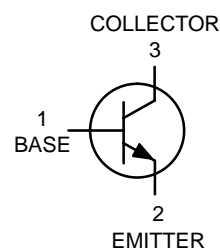
MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

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

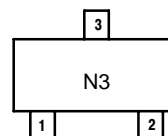
Characteristic	Symbol	Max	Unit
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D (Note 1)	310	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$ (Note 1)	403	$^\circ\text{C}/\text{W}$
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D (Note 2)	710	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$ (Note 2)	176	$^\circ\text{C}/\text{W}$
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	$^\circ\text{C}$

- FR-4 @ Minimum Pad
- FR-4 @ 1.0 X 1.0 inch Pad



**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

MMBT489LT1

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Breakdown Voltage (I _C = 10 mAdc, I _B = 0)	V _{(BR)CEO}	30	–	Vdc
Collector–Base Breakdown Voltage (I _C = 0.1 mAdc, I _E = 0)	V _{(BR)CBO}	50	–	Vdc
Emitter–Base Breakdown Voltage (I _E = 0.1 mAdc, I _C = 0)	V _{(BR)EBO}	5.0	–	Vdc
Collector Cutoff Current (V _{CB} = 30 Vdc, I _E = 0)	I _{CBO}	–	0.1	μAdc
Collector–Emitter Cutoff Current (V _{CES} = 30 Vdc)	I _{CES}	–	0.1	μAdc
Emitter Cutoff Current (V _{EB} = 4.0 Vdc)	I _{EBO}	–	0.1	μAdc

ON CHARACTERISTICS

DC Current Gain (Note 1) (I _C = 50 mA, V _{CE} = 5.0 V) (I _C = 0.5 A, V _{CE} = 5.0 V) (I _C = 1.0 A, V _{CE} = 5.0 V)	h _{FE}	300 300 200	– 900 –	
Collector–Emitter Saturation Voltage (Note 1) (I _C = 1.0 A, I _B = 100 mA) (I _C = 0.5 A, I _B = 50 mA) (I _C = 0.1 A, I _B = 1.0 mA)	V _{CE(sat)}	– – –	0.200 0.125 0.075	V
Base–Emitter Saturation Voltage (Note 1) (I _C = 1.0 A, I _B = 0.1 A)	V _{BE(sat)}	–	1.1	V
Base–Emitter Turn–on Voltage (Note 1) (I _C = 1.0 mA, V _{CE} = 2.0 V)	V _{BE(on)}	–	1.1	V
Cutoff Frequency (I _C = 100 mA, V _{CE} = 5.0 V, f = 100 MHz)	f _T	100	–	MHz
Output Capacitance (f = 1.0 MHz)	C _{obo}	–	15	pF

1. Pulsed Condition: Pulse Width = 300 μsec, Duty Cycle ≤ 2%

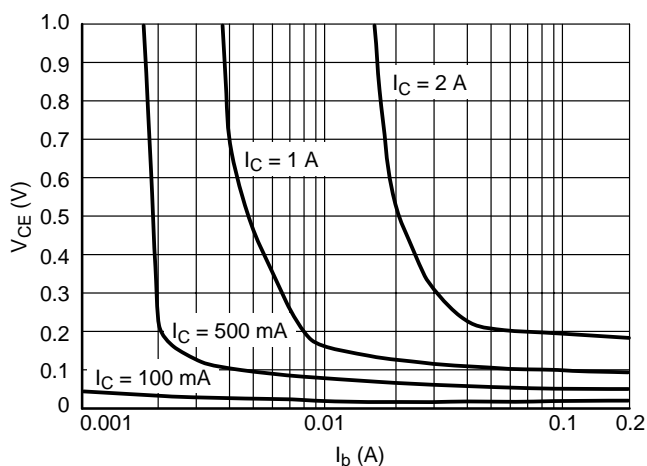


Figure 1. V_{CE} versus I_b

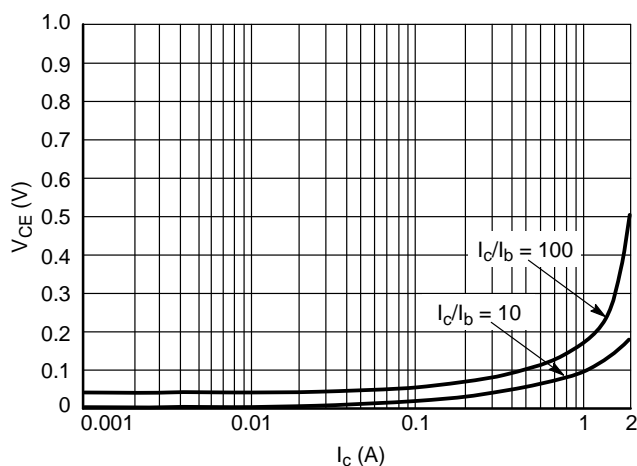


Figure 2. V_{CE} versus I_c

MMBT489LT1

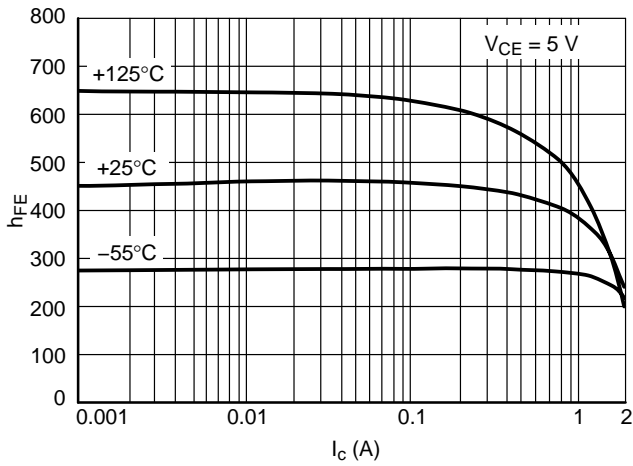


Figure 3. h_{FE} versus I_c

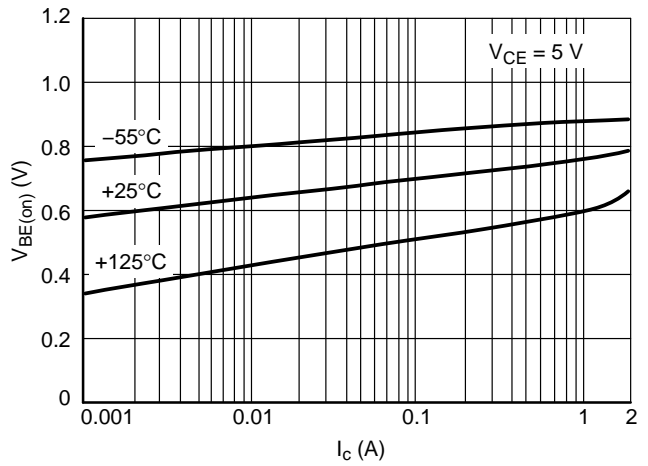


Figure 4. $V_{BE(on)}$ versus I_c

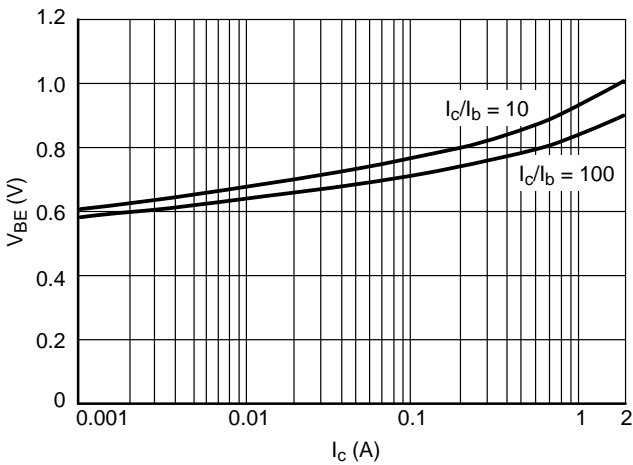


Figure 5. $V_{BE(sat)}$ versus I_c

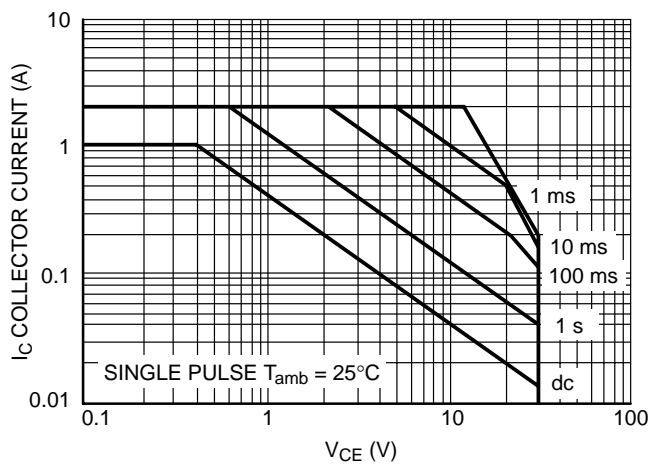


Figure 6. Safe Operating Area

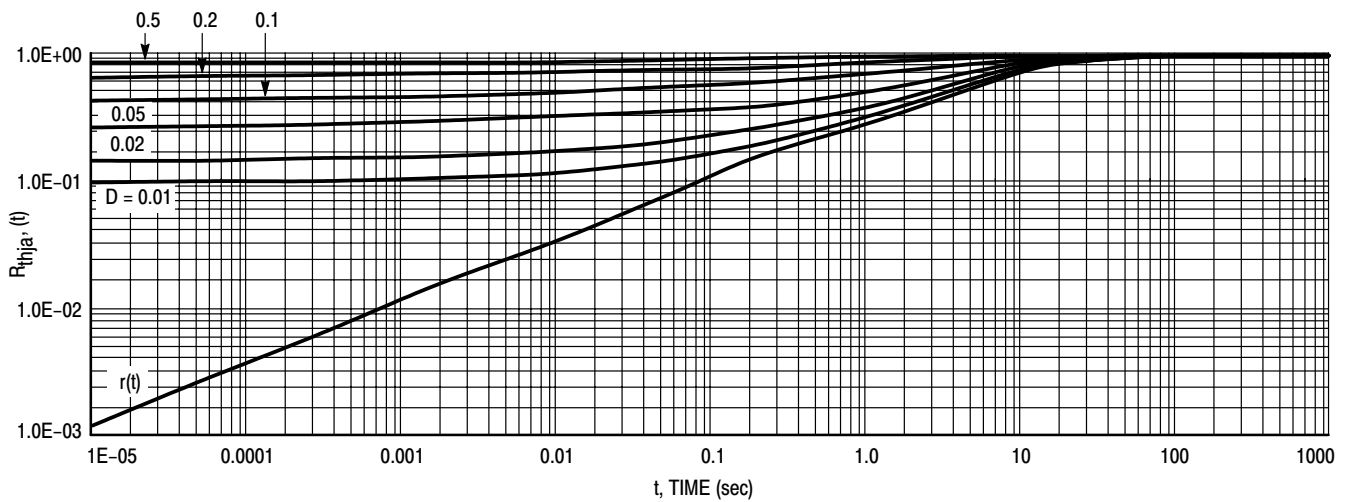
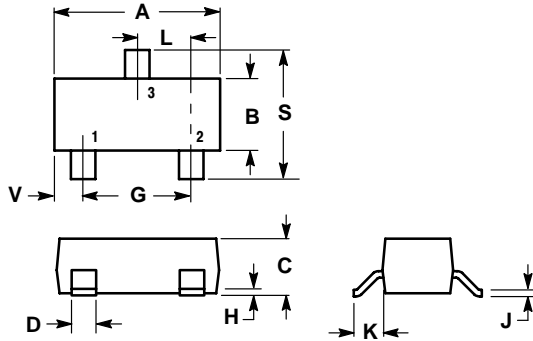


Figure 7. Normalized Thermal Response

MMBT489LT1

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:

1. BASE
2. EMITTER
3. COLLECTOR

ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer.

PUBLICATION ORDERING INFORMATION

Literature Fulfillment:

Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free USA/Canada

JAPAN: ON Semiconductor, Japan Customer Focus Center
2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051
Phone: 81-3-5773-3850

ON Semiconductor Website: <http://onsemi.com>

For additional information, please contact your local Sales Representative.