

# MBT35200MT1

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

### MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

Rating	Symbol	Max	Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	-35	Vdc
Collector-Base Voltage	V <sub>CBO</sub>	-55	Vdc
Emitter-Base Voltage	V <sub>EBO</sub>	-5.0	Vdc
Collector Current – Continuous	I <sub>C</sub>	-2.0	Adc
Collector Current – Peak	I <sub>CM</sub>	-5.0	A
Electrostatic Discharge	ESD	HBM Class 3 MM Class C	

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub> (Note 1)	625 5.0	mW mW/°C
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub> (Note 1)	200	°C/W
Total Device Dissipation T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub> (Note 2)	1.0 8.0	W mW/°C
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub> (Note 2)	120	°C/W
Thermal Resistance, Junction-to-Lead #1	R <sub>θJL</sub>	80	°C/W
Total Device Dissipation (Single Pulse < 10 sec.)	P <sub>Dsingle</sub> (Notes 2 & 3)	1.75	W
Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to +150	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

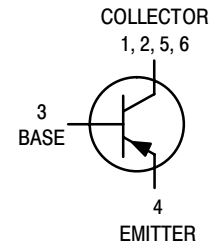
- FR-4 @ Minimum Pad
- FR-4 @ 1.0 X 1.0 inch Pad
- ref: Figure 9



ON Semiconductor®

http://onsemi.com

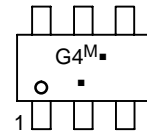
**35 VOLTS  
2.0 AMPS  
PNP TRANSISTOR**



www.BDTIC.com/ON MARKING DIAGRAM



**CASE 318G  
TSOP-6  
STYLE 6**



M = Date Code  
■ = Pb-Free Package  
(Note: Microdot may be in either location)

### ORDERING INFORMATION

Device	Package	Shipping†
MBT35200MT1	TSOP-6	3000/Tape & Reel
MBT35200MT1G	TSOP-6 (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 Specifications Brochure, BRD8011/D.

# MBT35200MT1

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

Characteristic	Symbol	Min	Typical	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector–Emitter Breakdown Voltage ( $I_C = -10\text{ mA}$ , $I_B = 0$ )	$V_{(BR)CEO}$	-35	-45	-	Vdc
Collector–Base Breakdown Voltage ( $I_C = -0.1\text{ mA}$ , $I_E = 0$ )	$V_{(BR)CBO}$	-55	-65	-	Vdc
Emitter–Base Breakdown Voltage ( $I_E = -0.1\text{ mA}$ , $I_C = 0$ )	$V_{(BR)EBO}$	-5.0	-7.0	-	Vdc
Collector Cutoff Current ( $V_{CB} = -35\text{ Vdc}$ , $I_E = 0$ )	$I_{CBO}$	-	-0.03	-0.1	$\mu\text{Adc}$
Collector–Emitter Cutoff Current ( $V_{CES} = -35\text{ Vdc}$ )	$I_{CES}$	-	-0.03	-0.1	$\mu\text{Adc}$
Emitter Cutoff Current ( $V_{EB} = -4.0\text{ Vdc}$ )	$I_{EBO}$	-	-0.01	-0.1	$\mu\text{Adc}$
<b>ON CHARACTERISTICS</b>					
DC Current Gain <sup>(1)</sup> ( $I_C = -1.0\text{ A}$ , $V_{CE} = -1.5\text{ V}$ ) ( $I_C = -1.5\text{ A}$ , $V_{CE} = -1.5\text{ V}$ ) ( $I_C = -2.0\text{ A}$ , $V_{CE} = -3.0\text{ V}$ )	$h_{FE}$	100 100 100	200 200 200	- 400 -	
Collector–Emitter Saturation Voltage (Note 1.) ( $I_C = -0.8\text{ A}$ , $I_B = -0.008\text{ A}$ ) ( $I_C = -1.2\text{ A}$ , $I_B = -0.012\text{ A}$ ) ( $I_C = -2.0\text{ A}$ , $I_B = -0.02\text{ A}$ )	$V_{CE(sat)}$	- - -	-0.125 -0.175 -0.260	-0.15 -0.20 -0.31	V
Base–Emitter Saturation Voltage (Note 1.) ( $I_C = -1.2\text{ A}$ , $I_B = -0.012\text{ A}$ )	$V_{BE(sat)}$	-	-0.68	-0.85	V
Base–Emitter Turn-on Voltage (Note 1.) ( $I_C = -2.0\text{ A}$ , $V_{CE} = -3.0\text{ V}$ )	$V_{BE(on)}$	-	-0.81	-0.875	V
Cutoff Frequency ( $I_C = -100\text{ mA}$ , $V_{CE} = -5.0\text{ V}$ , $f = 100\text{ MHz}$ )	$f_T$	100	-	-	MHz
Input Capacitance ( $V_{EB} = -0.5\text{ V}$ , $f = 1.0\text{ MHz}$ )	$C_{ibo}$	-	600	650	pF
Output Capacitance ( $V_{CB} = -3.0\text{ V}$ , $f = 1.0\text{ MHz}$ )	$C_{obo}$	-	85	100	pF
Turn-on Time ( $V_{CC} = -10\text{ V}$ , $I_{B1} = -100\text{ mA}$ , $I_C = -1\text{ A}$ , $R_L = 3\ \Omega$ )	$t_{on}$	-	35	-	nS
Turn-off Time ( $V_{CC} = -10\text{ V}$ , $I_{B1} = I_{B2} = -100\text{ mA}$ , $I_C = 1\text{ A}$ , $R_L = 3\ \Omega$ )	$t_{off}$	-	225	-	nS

1. Pulsed Condition: Pulse Width = 300  $\mu\text{sec}$ , Duty Cycle  $\leq 2\%$

# MBT35200MT1

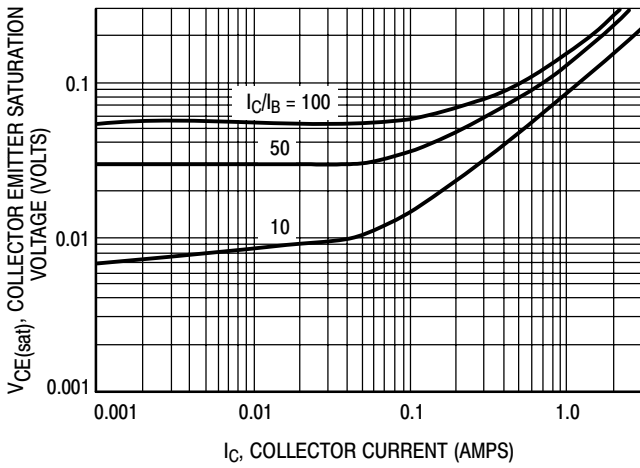


Figure 1. Collector Emitter Saturation Voltage versus Collector Current

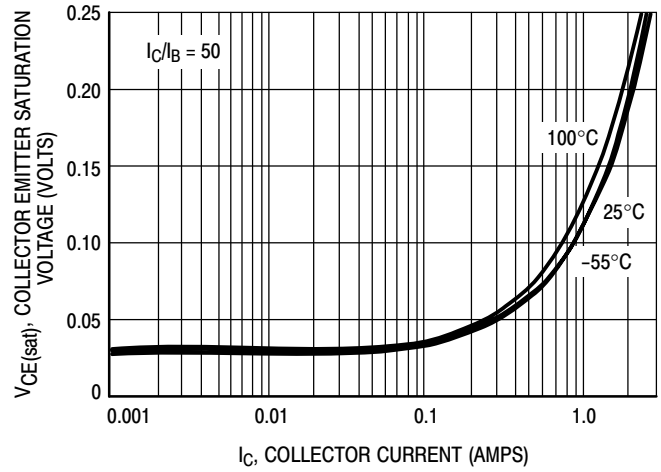


Figure 2. Collector Emitter Saturation Voltage versus Collector Current

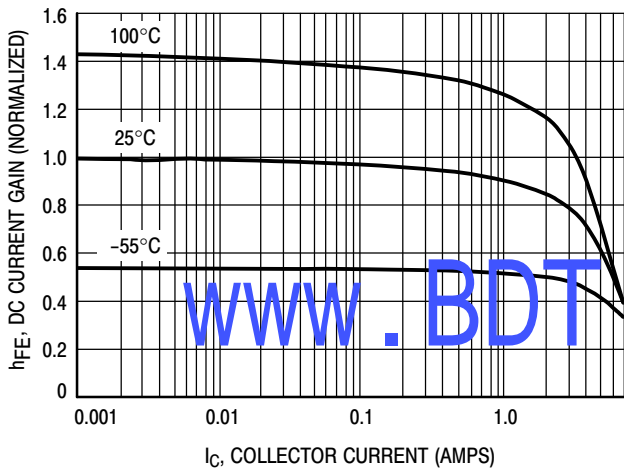


Figure 3. DC Current Gain versus Collector Current

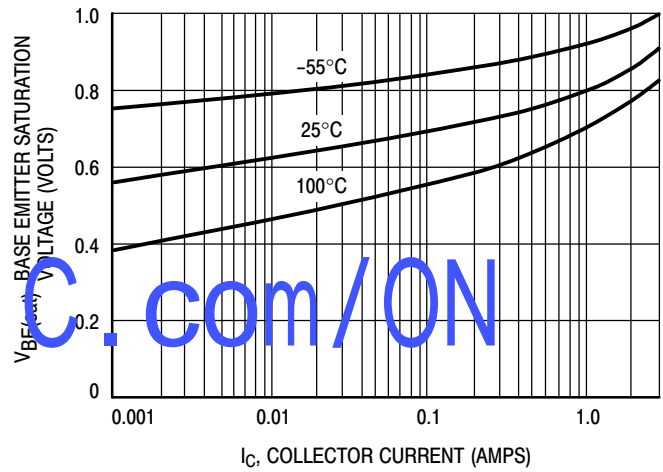


Figure 4. Base Emitter Saturation Voltage versus Collector Current

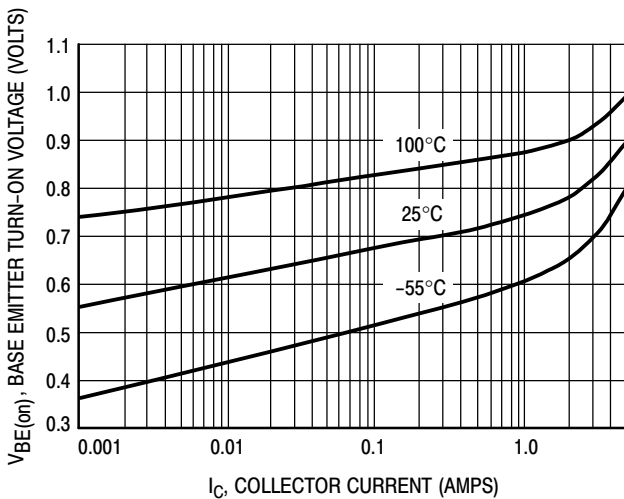


Figure 5. Base Emitter Turn-On Voltage versus Collector Current

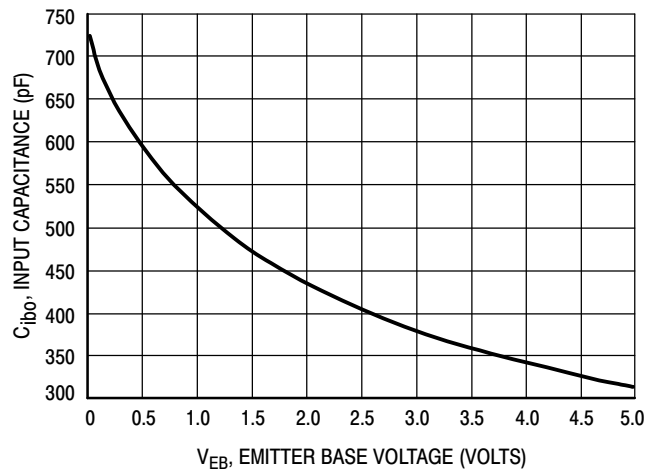


Figure 6. Input Capacitance

# MBT35200MT1

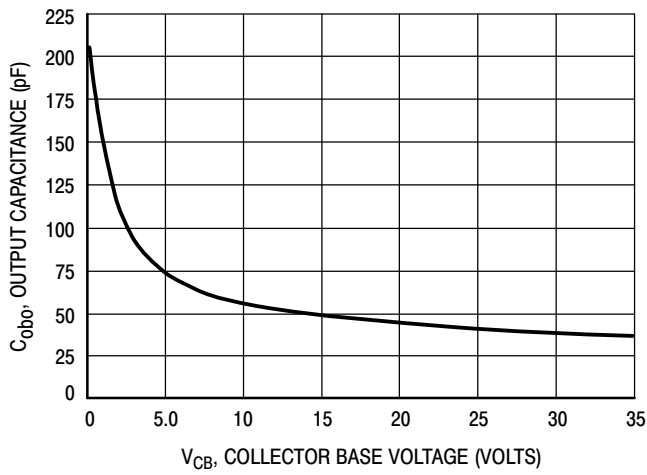


Figure 7. Output Capacitance

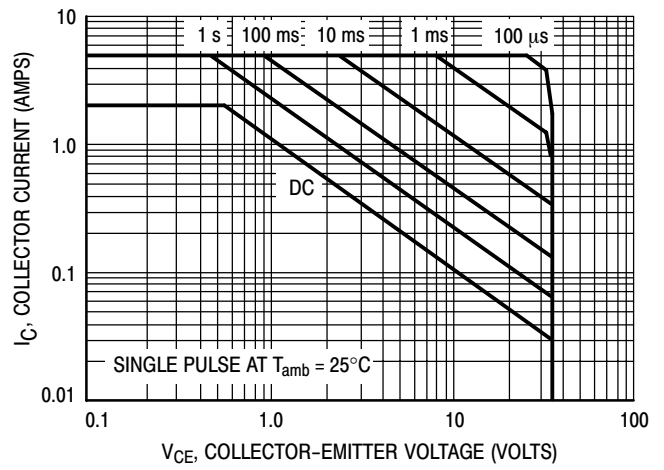


Figure 8. Safe Operating Area

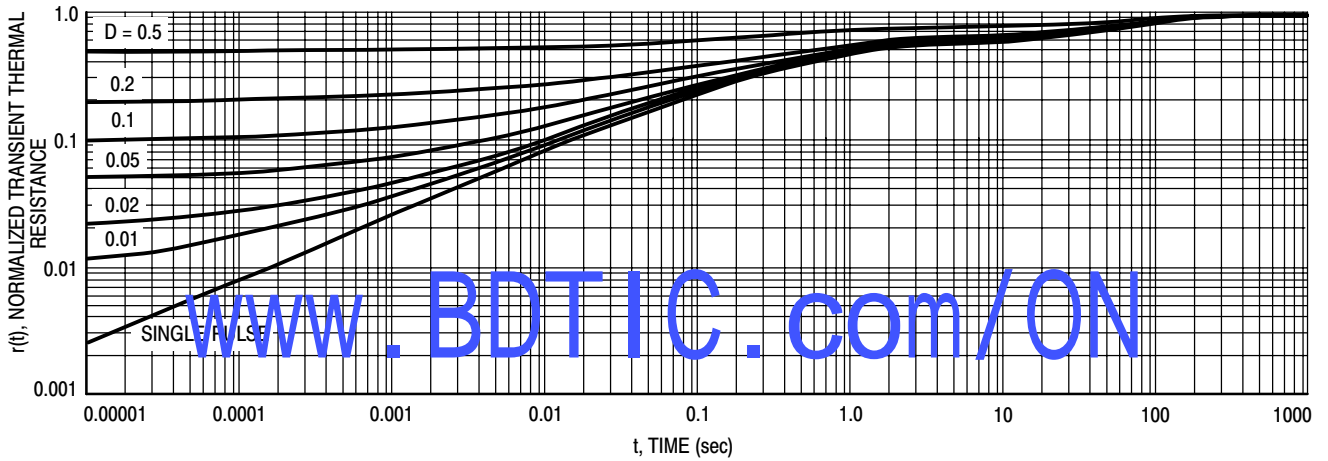
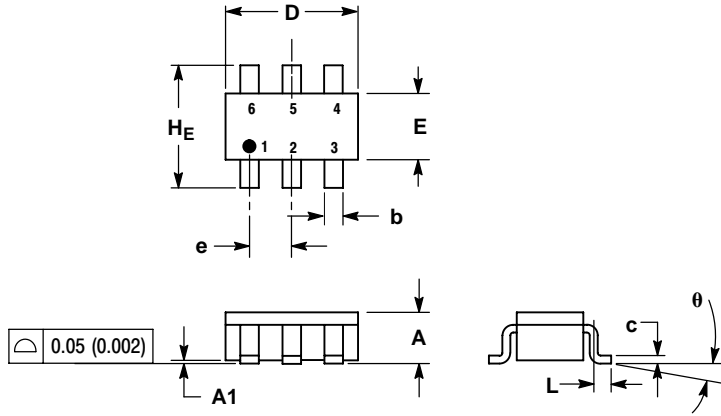


Figure 9. Normalized Thermal Response

# MBT35200MT1

## PACKAGE DIMENSIONS

TSOP-6  
CASE 318G-02  
ISSUE P



NOTES:

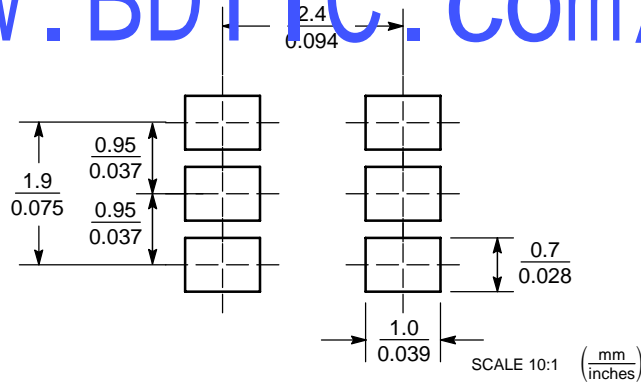
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

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	0.38	0.50	0.010	0.014	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 6:

1. COLLECTOR
2. COLLECTOR
3. BASE
4. EMITTER
5. COLLECTOR
6. COLLECTOR

[www.BDTIC.com/ON](http://www.BDTIC.com/ON)



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

[www.BDTIC.com/ON](http://www.BDTIC.com/ON)

**ON Semiconductor** and **ON** 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. This literature is subject to all applicable copyright laws and is not for resale in any manner.

**PUBLICATION ORDERING INFORMATION**

**LITERATURE FULFILLMENT:**

Literature Distribution Center for ON Semiconductor  
P.O. Box 61312, Phoenix, Arizona 85082-1312 USA  
**Phone:** 480-829-7710 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 480-829-7709 or 800-344-3867 Toll Free USA/Canada  
**Email:** [orderlit@onsemi.com](mailto: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>

**Order Literature:** <http://www.onsemi.com/litorder>

For additional information, please contact your local Sales Representative.

[www.BDTIC.com/ON/MBT35200MT1/D](http://www.BDTIC.com/ON/MBT35200MT1/D)