

MBT35200MT1

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

Features

- AEC-Q101 Qualified and PPAP Capable
- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

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

Rating	Symbol	Max	Unit
Collector-Emitter Voltage	V_{CEO}	-35	Vdc
Collector-Base Voltage	V_{CBO}	-55	Vdc
Emitter-Base Voltage	V_{EBO}	-5.0	Vdc
Collector Current – Continuous	I_C	-2.0	Adc
Collector Current – Peak	I_{CM}	-5.0	A
Electrostatic Discharge	ESD	HBM Class 3 MM Class C	

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D (Note 1)	625 5.0	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$ (Note 1)	200	$^\circ\text{C}/\text{W}$
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D (Note 2)	1.0 8.0	W mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$ (Note 2)	120	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Lead #1	$R_{\theta JL}$	80	$^\circ\text{C}/\text{W}$
Total Device Dissipation (Single Pulse < 10 sec.)	$P_{D\text{single}}$ (Notes 2 & 3)	1.75	W
Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

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.

1. FR-4 @ Minimum Pad
2. FR-4 @ 1.0 X 1.0 inch Pad
3. ref: Figure 9

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



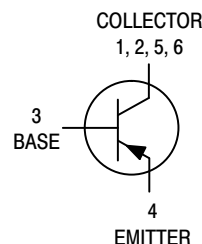
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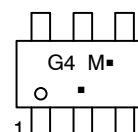
35 VOLTS
2.0 AMPS
PNP TRANSISTOR



CASE 318G
TSOP-6
STYLE 6



MARKING DIAGRAM



G4 = Specific Device Code
M = Date Code
▪ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
MBT35200MT1G	TSOP-6 (Pb-Free)	3,000 / Tape & Reel
SMBT35200MT1G	TSOP-6 (Pb-Free)	3,000 / 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
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OFF CHARACTERISTICS

Collector – Emitter Breakdown Voltage ($I_C = -10\text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	-35	-45	–	Vdc
Collector – Base Breakdown Voltage ($I_C = -0.1\text{ mAdc}$, $I_E = 0$)	$V_{(BR)CBO}$	-55	-65	–	Vdc
Emitter – Base Breakdown Voltage ($I_E = -0.1\text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	-5.0	-7.0	–	Vdc
Collector Cutoff Current ($V_{CB} = -35\text{ Vdc}$, $I_E = 0$)	I_{CBO}	–	-0.03	-0.1	μAdc
Collector – Emitter Cutoff Current ($V_{CES} = -35\text{ Vdc}$)	I_{CES}	–	-0.03	-0.1	μAdc
Emitter Cutoff Current ($V_{EB} = -4.0\text{ Vdc}$)	I_{EBO}	–	-0.01	-0.1	μAdc

ON CHARACTERISTICS

DC Current Gain (Note 1) ($I_C = -1.0\text{ A}$, $V_{CE} = -1.5\text{ V}$) ($I_C = -1.5\text{ A}$, $V_{CE} = -1.5\text{ V}$) ($I_C = -2.0\text{ A}$, $V_{CE} = -3.0\text{ V}$)	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 μsec , Duty Cycle $\leq 2\%$

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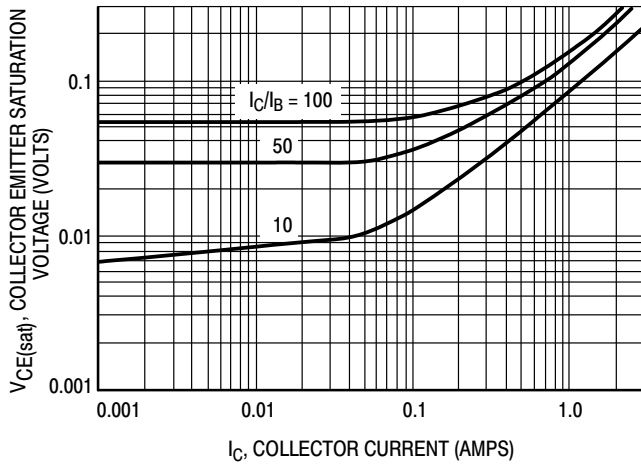


Figure 1. Collector Emitter Saturation Voltage versus Collector Current

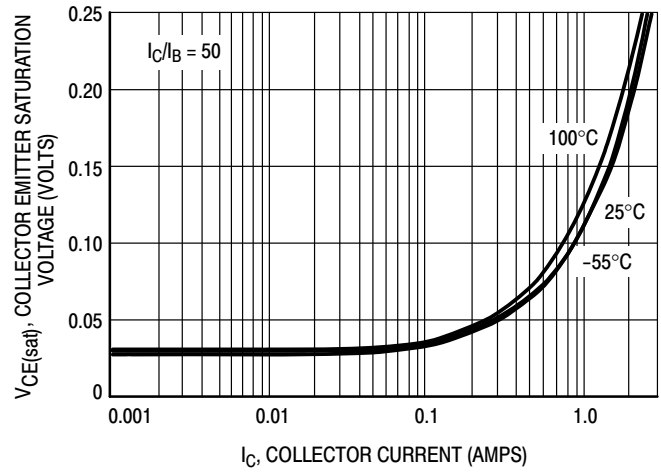


Figure 2. Collector Emitter Saturation Voltage versus Collector Current

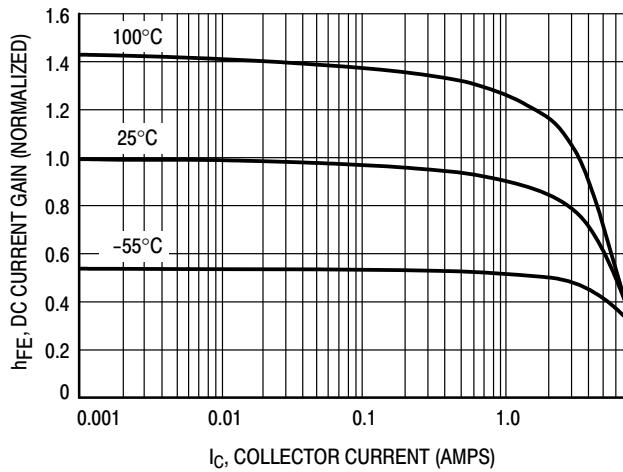


Figure 3. DC Current Gain versus Collector Current

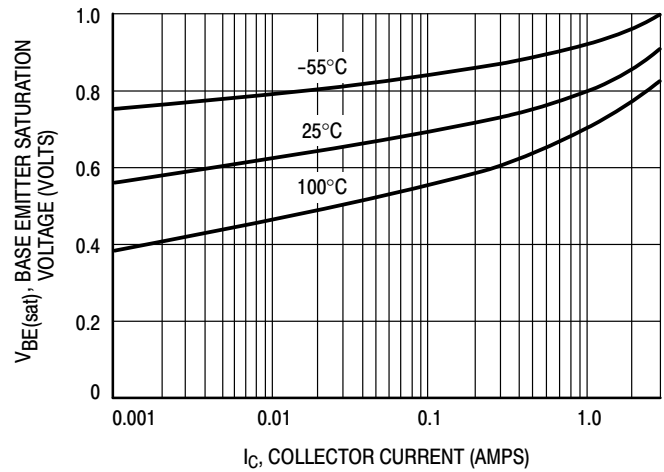


Figure 4. Base Emitter Saturation Voltage versus Collector Current

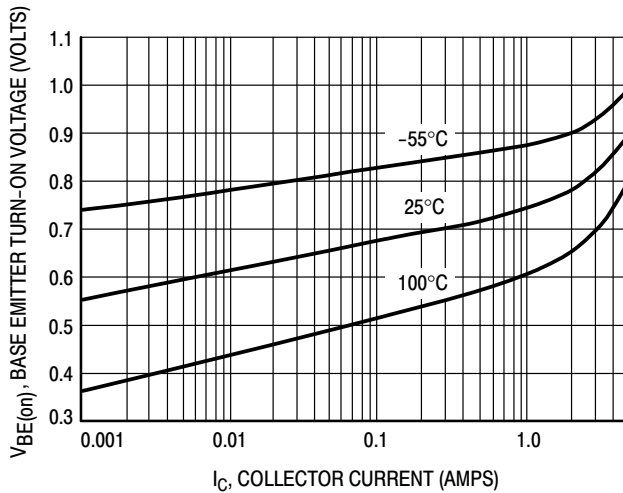


Figure 5. Base Emitter Turn-On Voltage versus Collector Current

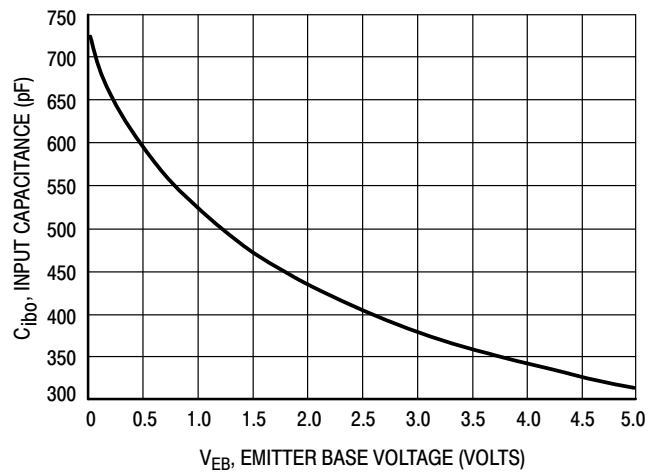


Figure 6. Input Capacitance

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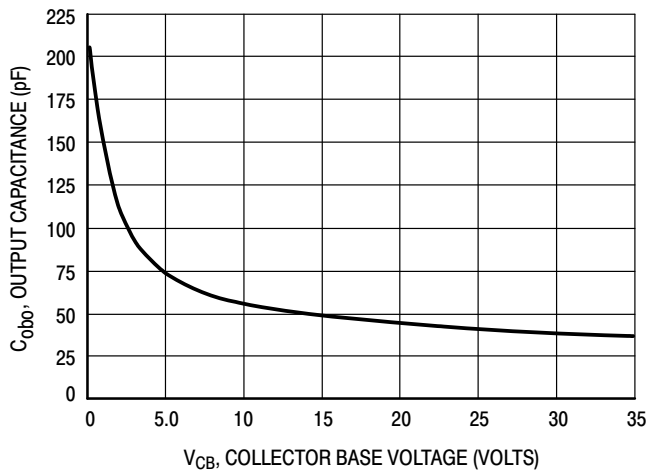


Figure 7. Output Capacitance

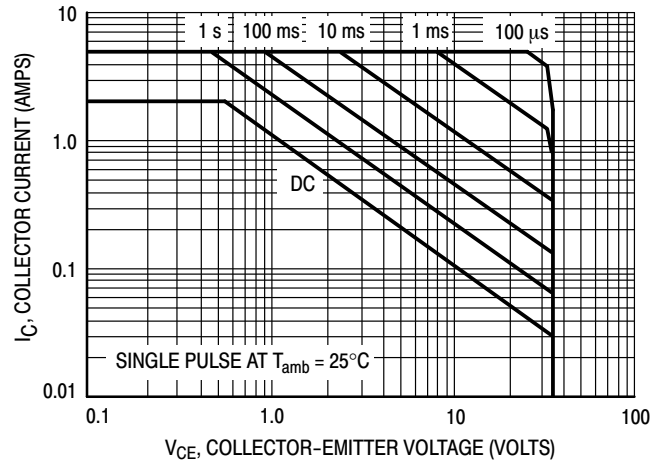


Figure 8. Safe Operating Area

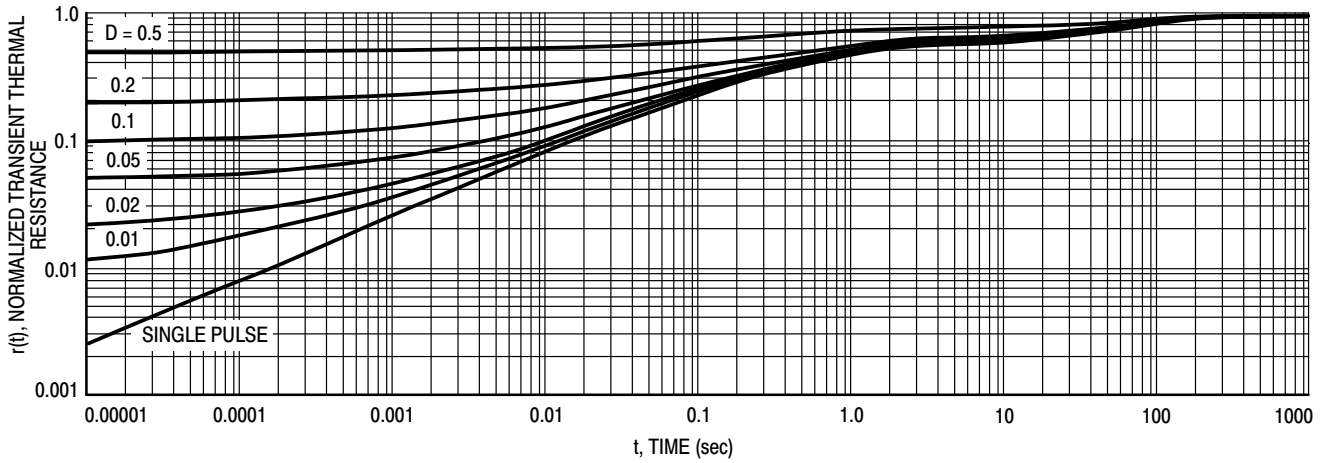


Figure 9. Normalized Thermal Response

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

ON Semiconductor®



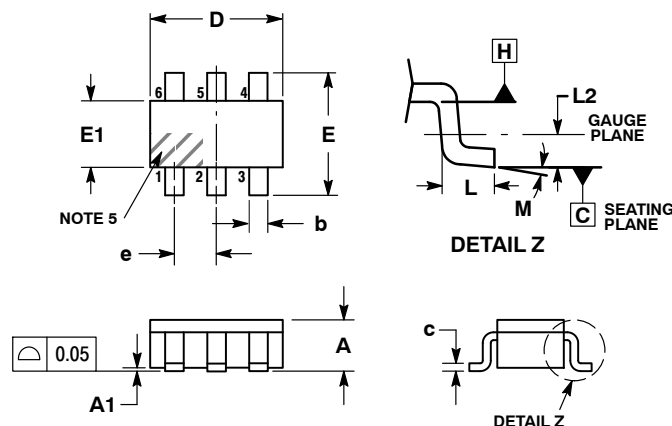
SCALE 2:1

TSOP-6

CASE 318G-02

ISSUE V

DATE 12 JUN 2012



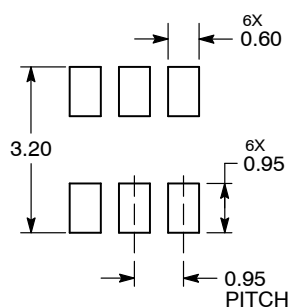
NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.15 PER SIDE. DIMENSIONS D AND E1 ARE DETERMINED AT DATUM H.
5. PIN ONE INDICATOR MUST BE LOCATED IN THE INDICATED ZONE.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.01	0.06	0.10
b	0.25	0.38	0.50
c	0.10	0.18	0.26
D	2.90	3.00	3.10
E	2.50	2.75	3.00
E1	1.30	1.50	1.70
e	0.85	0.95	1.05
L	0.20	0.40	0.60
L2	0.25 BSC		
M	0°	—	10°

STYLE 1: PIN 1. DRAIN 2. DRAIN 3. GATE 4. SOURCE 5. DRAIN 6. DRAIN	STYLE 2: PIN 1. EMITTER 2 2. BASE 1 3. COLLECTOR 1 4. EMITTER 1 5. BASE 2 6. COLLECTOR 2	STYLE 3: PIN 1. ENABLE 2. N/C 3. R BOOST 4. Vz 5. V in 6. V out	STYLE 4: PIN 1. N/C 2. V in 3. NOT USED 4. GROUND 5. ENABLE 6. LOAD	STYLE 5: PIN 1. EMITTER 2 2. BASE 2 3. COLLECTOR 1 4. EMITTER 1 5. BASE 1 6. COLLECTOR 2	STYLE 6: PIN 1. COLLECTOR 2. COLLECTOR 3. BASE 4. EMITTER 5. COLLECTOR 6. COLLECTOR
STYLE 7: PIN 1. COLLECTOR 2. COLLECTOR 3. BASE 4. N/C 5. COLLECTOR 6. EMITTER	STYLE 8: PIN 1. Vbus 2. D(in) 3. D(in)+ 4. D(out)+ 5. D(out) 6. GND	STYLE 9: PIN 1. LOW VOLTAGE GATE 2. DRAIN 3. SOURCE 4. DRAIN 5. DRAIN 6. HIGH VOLTAGE GATE	STYLE 10: PIN 1. D(OUT)+ 2. GND 3. D(OUT)- 4. D(IN)- 5. VBUS 6. D(IN)+	STYLE 11: PIN 1. SOURCE 1 2. DRAIN 2 3. DRAIN 2 4. SOURCE 2 5. GATE 1 6. DRAIN 1/GATE 2	STYLE 12: PIN 1. I/O 2. GROUND 3. I/O 4. I/O 5. VCC 6. I/O
STYLE 13: PIN 1. GATE 1 2. SOURCE 2 3. GATE 2 4. DRAIN 2 5. SOURCE 1 6. DRAIN 1	STYLE 14: PIN 1. ANODE 2. SOURCE 3. GATE 4. CATHODE/DRAIN 5. CATHODE/DRAIN 6. CATHODE/DRAIN	STYLE 15: PIN 1. ANODE 2. SOURCE 3. GATE 4. DRAIN 5. N/C 6. CATHODE	STYLE 16: PIN 1. ANODE/CATHODE 2. BASE 3. EMITTER 4. COLLECTOR 5. ANODE 6. CATHODE	STYLE 17: PIN 1. EMITTER 2. BASE 3. ANODE/CATHODE 4. ANODE 5. CATHODE 6. COLLECTOR	

RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

GENERIC MARKING DIAGRAM*



XXX = Specific Device Code
 A = Assembly Location
 Y = Year
 W = Work Week
 ■ = Pb-Free Package

XXX = Specific Device Code
 M = Date Code
 ■ = Pb-Free Package

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

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present.

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