

# MMBTA42LT1, MMBTA43LT1

MMBTA42LT1 is a Preferred Device

## High Voltage Transistors

### NPN Silicon

#### Features

- Pb-Free Packages are Available

#### MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Collector-Emitter Voltage MMBTA42 MMBTA43	$V_{CEO}$	300 200	Vdc
Collector-Base Voltage MMBTA42 MMBTA43	$V_{CBO}$	300 200	Vdc
Emitter-Base Voltage MMBTA42 MMBTA43	$V_{EBO}$	6.0 6.0	Vdc
Collector Current - Continuous	$I_C$	50	mAdc

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board (Note 1) $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	225 1.8	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	556	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate (Note 2) $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	300 2.4	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	417	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

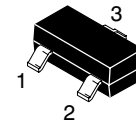
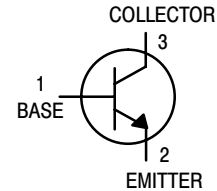
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

- FR-5 = 1.0 x 0.75 x 0.062 in.
- Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.



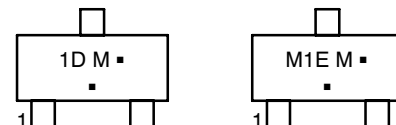
ON Semiconductor®

<http://onsemi.com>



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

#### MARKING DIAGRAM



1D = MMBTA42LT  
M1E = MMBTA43LT  
M = Date Code\*  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation and/or overbar may vary depending upon manufacturing location.

#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

**Preferred** devices are recommended choices for future use and best overall value.

# MMBTA42LT1, MMBTA43LT1

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

Characteristic	Symbol	Min	Max	Unit	
<b>OFF CHARACTERISTICS</b>					
Collector-Emitter Breakdown Voltage (Note 3) (I <sub>C</sub> = 1.0 mA, I <sub>B</sub> = 0)	MMBTA42 MMBTA43	V <sub>(BR)CEO</sub>	300 200	- -	Vdc
Collector-Base Breakdown Voltage (I <sub>C</sub> = 100 μA, I <sub>E</sub> = 0)	MMBTA42 MMBTA43	V <sub>(BR)CBO</sub>	300 200	- -	Vdc
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 100 μA, I <sub>C</sub> = 0)		V <sub>(BR)EBO</sub>	6.0	-	Vdc
Collector Cutoff Current (V <sub>CB</sub> = 200 Vdc, I <sub>E</sub> = 0) (V <sub>CB</sub> = 160 Vdc, I <sub>E</sub> = 0)	MMBTA42 MMBTA43	I <sub>CBO</sub>	- -	0.1 0.1	μAdc
Emitter Cutoff Current (V <sub>EB</sub> = 6.0 Vdc, I <sub>C</sub> = 0) (V <sub>EB</sub> = 4.0 Vdc, I <sub>C</sub> = 0)	MMBTA42 MMBTA43	I <sub>EBO</sub>	- -	0.1 0.1	μAdc

## ON CHARACTERISTICS (Note 3)

DC Current Gain (I <sub>C</sub> = 1.0 mA, V <sub>CE</sub> = 10 Vdc) (I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 10 Vdc)  (I <sub>C</sub> = 30 mA, V <sub>CE</sub> = 10 Vdc)	Both Types Both Types MMBTA42 MMBTA43	h <sub>FE</sub>	25 40 40 40	- - - -	-
Collector-Emitter Saturation Voltage (I <sub>C</sub> = 20 mA, I <sub>B</sub> = 2.0 mA)	MMBTA42 MMBTA43	V <sub>CE(sat)</sub>	- -	0.5 0.5	Vdc
Base-Emitter Saturation Voltage (I <sub>C</sub> = 20 mA, I <sub>B</sub> = 2.0 mA)		V <sub>BE(sat)</sub>	-	0.9	Vdc

## SMALL-SIGNAL CHARACTERISTICS

Current-Gain - Bandwidth Product (I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 20 Vdc, f = 100 MHz)		f <sub>T</sub>	50	-	MHz
Collector-Base Capacitance (V <sub>CB</sub> = 20 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)	MMBTA42 MMBTA43	C <sub>cb</sub>	- -	3.0 4.0	pF

3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

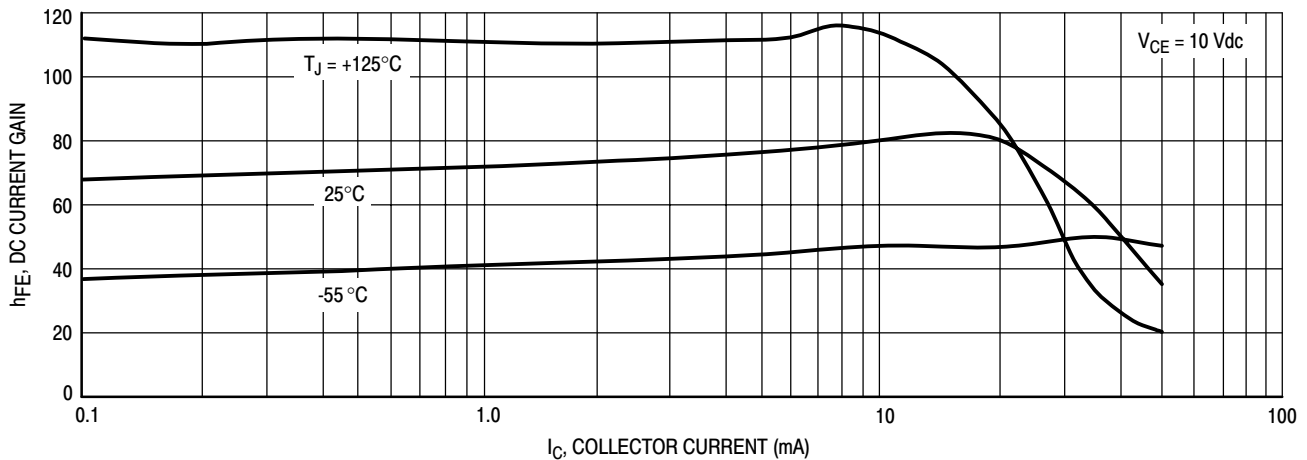


Figure 1. DC Current Gain

# MMBTA42LT1, MMBTA43LT1

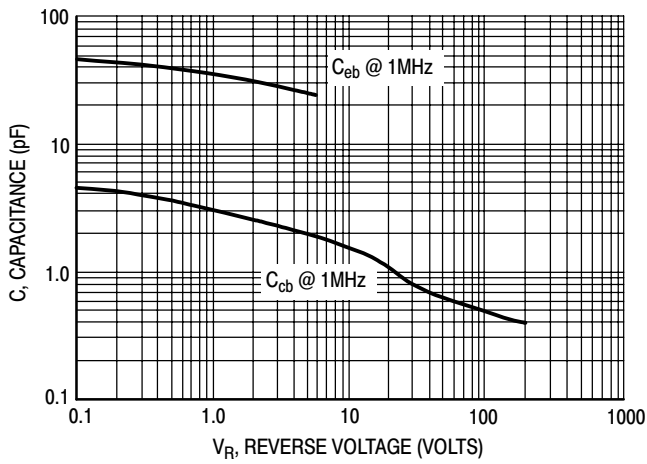


Figure 2. Capacitance

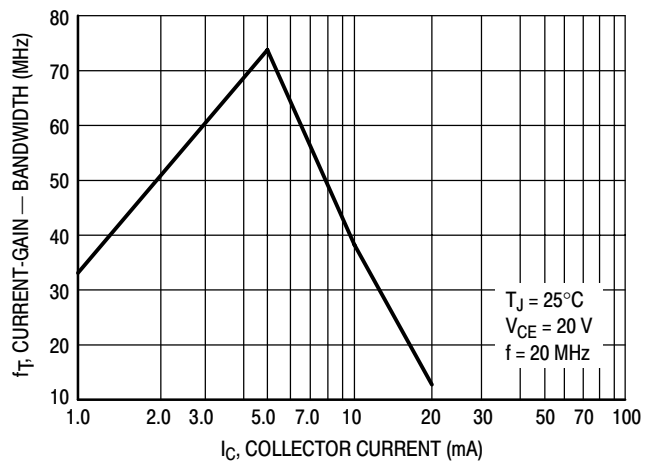


Figure 3. Current-Gain - Bandwidth

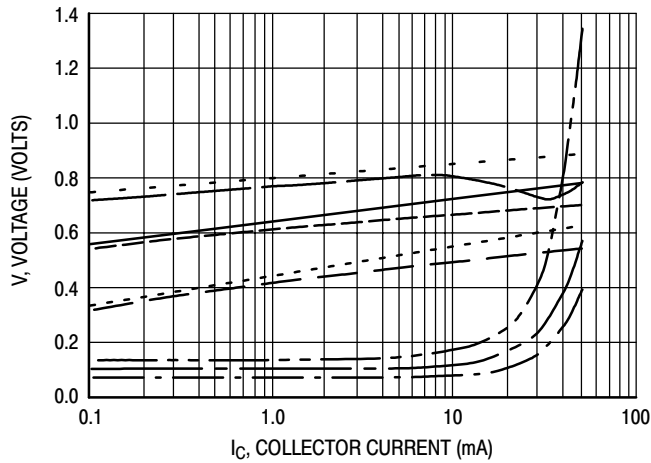


Figure 4. "ON" Voltages

- $V_{CE(sat)}$  @ 25°C,  $I_C/I_B = 10$
- $V_{CE(sat)}$  @ 125°C,  $I_C/I_B = 10$
- $V_{CE(sat)}$  @ -55°C,  $I_C/I_B = 10$
- $V_{BE(sat)}$  @ 25°C,  $I_C/I_B = 10$
- $V_{BE(sat)}$  @ 125°C,  $I_C/I_B = 10$
- $V_{BE(sat)}$  @ -55°C,  $I_C/I_B = 10$
- $V_{BE(on)}$  @ 25°C,  $V_{CE} = 10 V$
- $V_{BE(on)}$  @ 125°C,  $V_{CE} = 10 V$
- $V_{BE(on)}$  @ -55°C,  $V_{CE} = 10 V$

## ORDERING INFORMATION

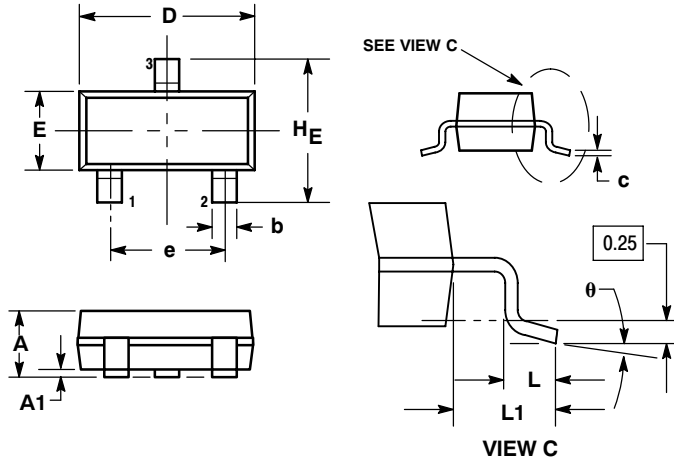
Device Order Number	Package Type	Shipping†
MMBTA42LT1	SOT-23	3,000 / Tape & Reel
MMBTA42LT1G	SOT-23 (Pb-Free)	3,000 / Tape & Reel
MMBTA42LT3	SOT-23	10,000 / Tape & Reel
MMBTA42LT3G	SOT-23 (Pb-Free)	10,000 / Tape & Reel
MMBTA43LT1	SOT-23	3,000 / Tape & Reel
MMBTA43LT1G	SOT-23 (Pb-Free)	3,000 / Tape & 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.

# MMBTA42LT1, MMBTA43LT1

## PACKAGE DIMENSIONS

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



### NOTES:

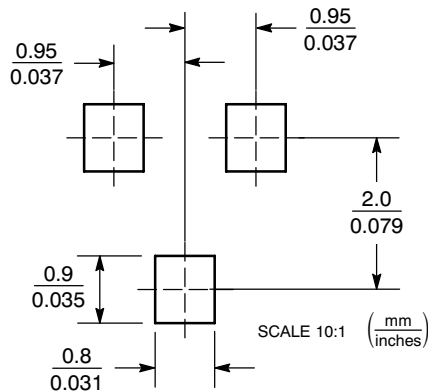
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.081
L	0.10	0.20	0.30	0.004	0.008	0.012
L1	0.35	0.54	0.69	0.014	0.021	0.029
HE	2.10	2.40	2.64	0.083	0.094	0.104

### STYLE 6:

1. BASE
2. EMITTER
3. COLLECTOR

### SOLDERING FOOTPRINT\*



\*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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