

# MMBTA42LT1, MMBTA43LT1

MMBTA42LT1 is a Preferred Device

## High Voltage Transistors NPN Silicon

### Features

- Pb-Free Package May be Available. The G-Suffix Denotes a Pb-Free Lead Finish

### MAXIMUM RATINGS

| Rating                       | Symbol    | MMBTA42 | MMBTA43 | Unit |
|------------------------------|-----------|---------|---------|------|
| Collector-Emitter Voltage    | $V_{CEO}$ | 300     | 200     | Vdc  |
| Collector-Base Voltage       | $V_{CBO}$ | 300     | 200     | Vdc  |
| Emitter-Base Voltage         | $V_{EBO}$ | 6.0     | 6.0     | Vdc  |
| Collector Current-Continuous | $I_C$     | 500     |         | mAdc |

### THERMAL CHARACTERISTICS

| Characteristic  | Symbol          | Max         | Unit                      |
|---|-----------------|-------------|---------------------------|
| Total Device Dissipation FR-5 Board (Note 1)<br>$T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$           | $P_D$           | 225         | mW                        |
|   |                 | 1.8         | mW/ $^\circ\text{C}$      |
| Thermal Resistance, Junction-to-Ambient   | $R_{\theta JA}$ | 556         | $^\circ\text{C}/\text{W}$ |
| Total Device Dissipation<br>Alumina Substrate (Note 2)<br>$T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$           | 300         | mW                        |
|   |                 | 2.4         | 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 | $^\circ\text{C}$          |

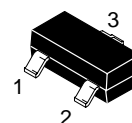
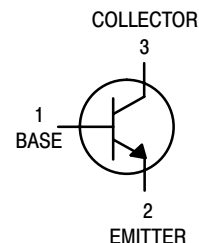
1. FR-5 = 1.0 x 0.75 x 0.062 in.

2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.



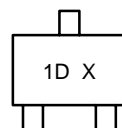
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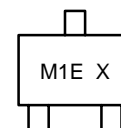


SOT-23 (TO-236)  
CASE 318  
STYLE 6

### MARKING DIAGRAMS



MMBTA42LT1



MMBTA43LT1

1D, M1E = Specific Device Code  
X = Date Code

### ORDERING INFORMATION

| Device      | Package | Shipping†         |
|-------------|---------|-------------------|
| MMBTA42LT1  | SOT-23  | 3000/Tape & Reel  |
| MMBTA42LT1G | SOT-23  | 3000/Tape & Reel  |
| MMBTA43LT1  | SOT-23  | 3000/Tape & Reel  |
| MMBTA43LT3  | SOT-23  | 10000/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.

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)<br>(I <sub>C</sub> = 1.0 mA, I <sub>B</sub> = 0)  | MMBTA42<br>MMBTA43                             | V <sub>(BR)CEO</sub> | 300<br>200           | –<br>–           | Vdc  |
| Collector–Base Breakdown Voltage<br>(I <sub>C</sub> = 100 μA, I <sub>E</sub> = 0)  | MMBTA42<br>MMBTA43                             | V <sub>(BR)CBO</sub> | 300<br>200           | –<br>–           | Vdc  |
| Emitter–Base Breakdown Voltage<br>(I <sub>E</sub> = 100 μA, I <sub>C</sub> = 0)  |  | V <sub>(BR)EBO</sub> | 6.0                  | –                | Vdc  |
| Collector Cutoff Current<br>(V <sub>CB</sub> = 200 Vdc, I <sub>E</sub> = 0)<br>(V <sub>CB</sub> = 160 Vdc, I <sub>E</sub> = 0)   | MMBTA42<br>MMBTA43                             | I <sub>CBO</sub>     | –<br>–               | 0.1<br>0.1       | μA   |
| Emitter Cutoff Current<br>(V <sub>EB</sub> = 6.0 Vdc, I <sub>C</sub> = 0)<br>(V <sub>EB</sub> = 4.0 Vdc, I <sub>C</sub> = 0)   | MMBTA42<br>MMBTA43                             | I <sub>EBO</sub>     | –<br>–               | 0.1<br>0.1       | μA   |
| <b>ON CHARACTERISTICS (Note 3)</b>   |  |                      |                      |                  |      |
| DC Current Gain<br>(I <sub>C</sub> = 1.0 mA, V <sub>CE</sub> = 10 Vdc)<br>(I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 10 Vdc)<br><br>(I <sub>C</sub> = 30 mA, V <sub>CE</sub> = 10 Vdc) | Both Types<br>Both Types<br>MMBTA42<br>MMBTA43 | h <sub>FE</sub>      | 25<br>40<br>40<br>40 | –<br>–<br>–<br>– | –    |
| Collector–Emitter Saturation Voltage<br>(I <sub>C</sub> = 20 mA, I <sub>B</sub> = 2.0 mA)  | MMBTA42<br>MMBTA43                             | V <sub>CE(sat)</sub> | –<br>–               | 0.5<br>0.5       | Vdc  |
| Base–Emitter Saturation Voltage<br>(I <sub>C</sub> = 20 mA, I <sub>B</sub> = 2.0 mA)   |  | V <sub>BE(sat)</sub> | –                    | 0.9              | Vdc  |
| <b>SMALL–SIGNAL CHARACTERISTICS</b>  |  |                      |                      |                  |      |
| Current–Gain – Bandwidth Product<br>(I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 20 Vdc, f = 100 MHz)  |  | f <sub>T</sub>       | 50                   | –                | MHz  |
| Collector–Base Capacitance<br>(V <sub>CB</sub> = 20 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)  | MMBTA42<br>MMBTA43                             | C <sub>cb</sub>      | –<br>–               | 3.0<br>4.0       | pF   |

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

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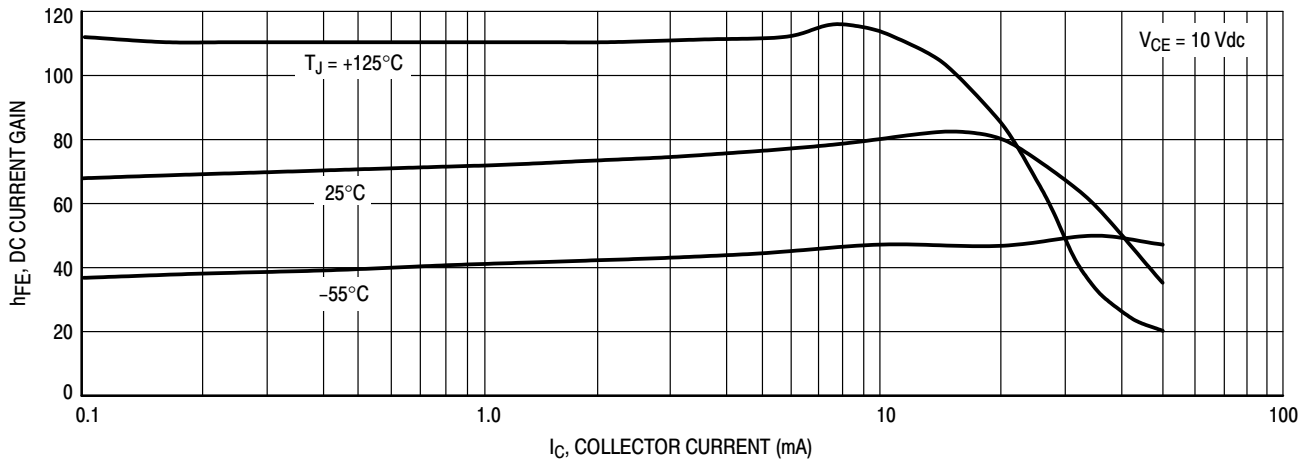


Figure 1. DC Current Gain

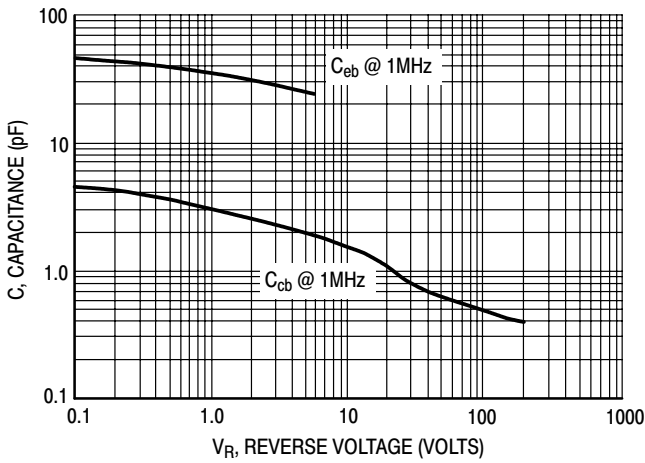


Figure 2. Capacitance

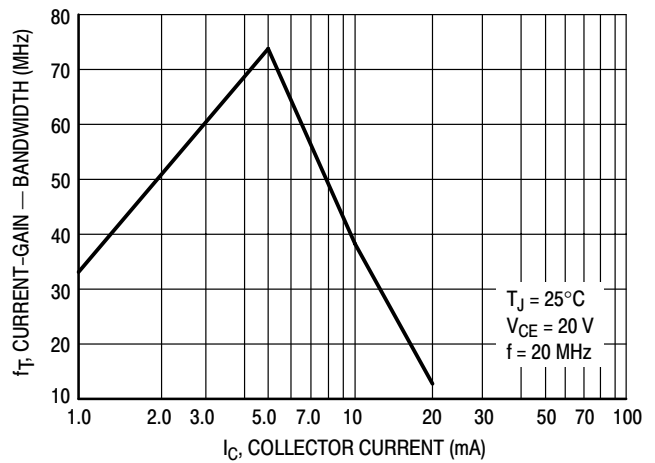


Figure 3. Current-Gain - Bandwidth

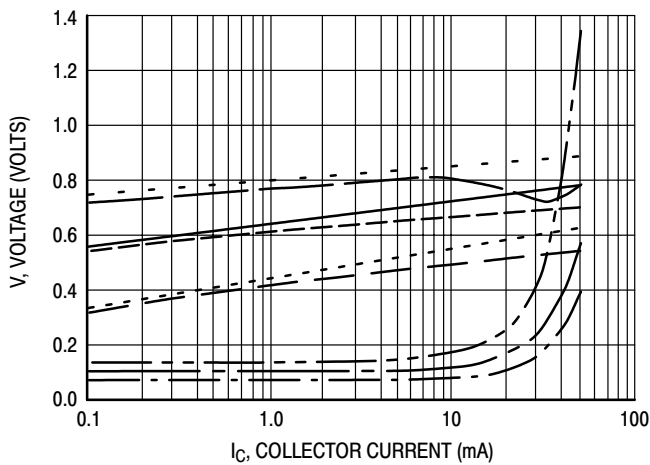


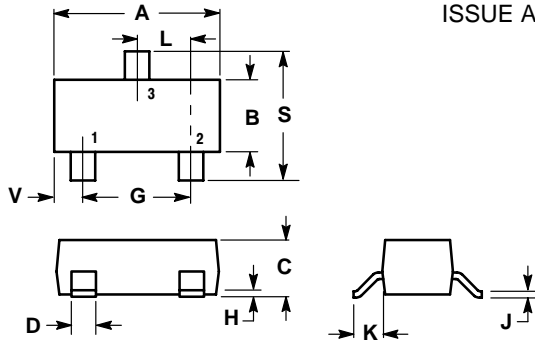
Figure 4. "ON" Voltages

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

# MMBTA42LT1, MMBTA43LT1

## 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

### SOLDERING FOOTPRINT\*

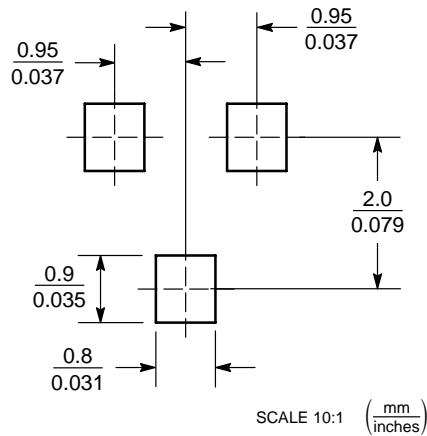



Figure 5. SOT-23

\*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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