

# Dual Hot Carrier Mixer Diodes

**MMBD352LT1G,  
MMBD353LT1G,  
NSVMMBD353LT1G,  
MMBD354LT1G,  
NSVMMBD354LT1G,  
MMBD355LT1G**

These devices are designed primarily for UHF mixer applications but are suitable also for use in detector and ultra-fast switching circuits.

## Features

- Very Low Capacitance – Less Than 1.0 pF @ Zero V
- Low Forward Voltage – 0.5 V (Typ) @  $I_F = 10$  mA
- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

## MAXIMUM RATINGS (EACH DIODE)

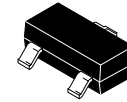
| Rating                     | Symbol | Value | Unit     |
|----------------------------|--------|-------|----------|
| Continuous Reverse Voltage | $V_R$  | 7.0   | $V_{CC}$ |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

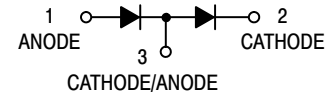
## THERMAL CHARACTERISTICS

| 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<br>1.8  | mW<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient                                                                             | $R_{\theta JA}$ | 556         | $^\circ\text{C/W}$         |
| Total Device Dissipation Alumina Substrate, (Note 2)<br>$T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$           | 300<br>2.4  | mW<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient                                                                             | $R_{\theta JA}$ | 417         | $^\circ\text{C/W}$         |
| Junction and Storage Temperature                                                                                    | $T_J, T_{stg}$  | -55 to +150 | $^\circ\text{C}$           |

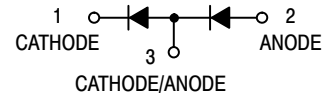
- FR-5 = 1.0 x 0.75 x 0.062 in.
- Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.



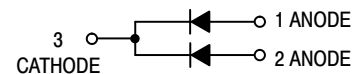
SOT-23 (TO-236)  
CASE 318



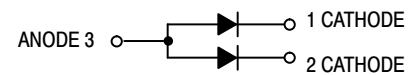
**MMBD352LT1G**  
**STYLE 11**



**MMBD353LT1G**  
**NSVMMBD353LT1G**  
**STYLE 19**

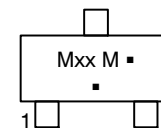


**MMBD354LT1G**  
**NSVMMBD354LT1G**  
**STYLE 9**



**MMBD355LT1G**  
**STYLE 12**

## MARKING DIAGRAM



Mxx = Device Code  
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, marking, and shipping information in the package dimensions section on page 2 of this data sheet.

NOTE: Some of the device on this data sheet have been **DISCONTINUED**. Please refer to the table on page 2

# MMBD352LT1G, MMBD353LT1G, NSVMMBD353LT1G, MMBD354LT1G, NSVMMBD354LT1G, MMBD355LT1G

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

| Rating                                                                                   | Symbol         | Min    | Max        | Unit |
|------------------------------------------------------------------------------------------|----------------|--------|------------|------|
| Forward Voltage<br>(I <sub>F</sub> = 10 mAdc)                                            | V <sub>F</sub> | –      | 0.60       | V    |
| Reverse Leakage Current (Note 3)<br>(V <sub>R</sub> = 3.0 V)<br>(V <sub>R</sub> = 7.0 V) | I <sub>R</sub> | –<br>– | 0.25<br>10 | μA   |
| Capacitance<br>(V <sub>R</sub> = 0 V, f = 1.0 MHz)                                       | C              | –      | 1.0        | pF   |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

3. For each individual diode while the second diode is unbiased.

## ORDERING INFORMATION

| Device         | Marking | Package             | Shipping <sup>†</sup>     |
|----------------|---------|---------------------|---------------------------|
| MMBD352LT1G    | M5G     | SOT-23<br>(Pb-Free) | 3,000 Units / Tape & Reel |
| MMBD353LT1G    | M4F     | SOT-23<br>(Pb-Free) | 3,000 Units / Tape & Reel |
| NSVMMBD353LT1G | M4F     | SOT-23<br>(Pb-Free) | 3,000 Units / Tape & Reel |
| NSVMMBD354LT1G | M6H     | SOT-23<br>(Pb-Free) | 3,000 Units / Tape & Reel |
| MMBD355LT1G    | MJ1     | SOT-23<br>(Pb-Free) | 3,000 Units / Tape & Reel |

## DISCONTINUED (Note 4)

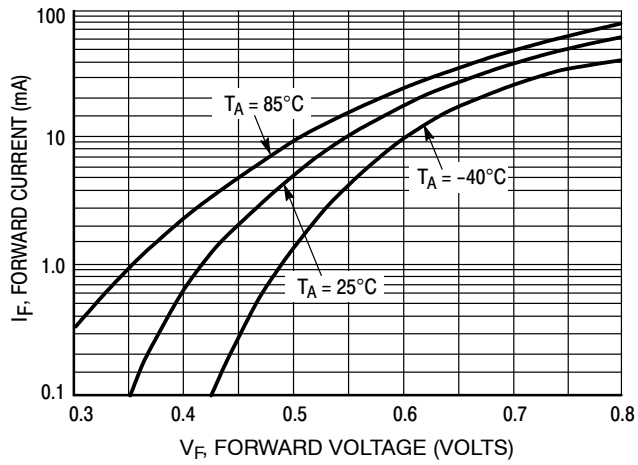
| Device      | Package Type | Package             | Shipping <sup>†</sup>      |
|-------------|--------------|---------------------|----------------------------|
| MMBD352LT3G | M5G          | SOT-23<br>(Pb-Free) | 10,000 Units / Tape & Reel |
| MMBD353LT3G | M4F          | SOT-23<br>(Pb-Free) | 10,000 Units / Tape & Reel |
| MMBD354LT1G | M6H          | SOT-23<br>(Pb-Free) | 3,000 Units / Tape & Reel  |

<sup>†</sup>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](#).

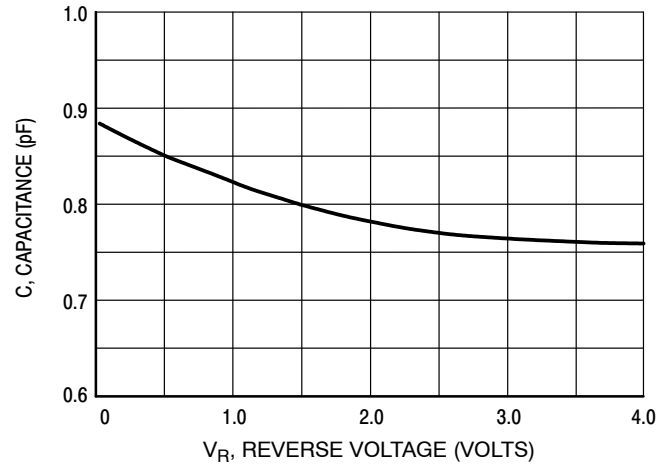
4. **DISCONTINUED:** This device is not recommended for new design. Please contact your **onsemi** representative for information. The most current information on this device may be available on [www.onsemi.com](http://www.onsemi.com).

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NSVMMBD354LT1G, MMBD355LT1G**

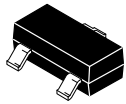
**TYPICAL CHARACTERISTICS**



**Figure 1. Forward Voltage**



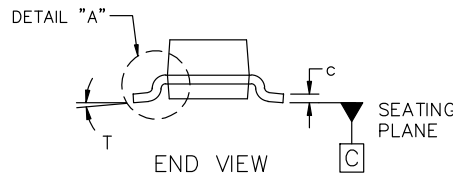
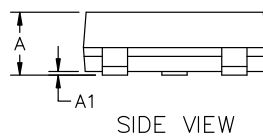
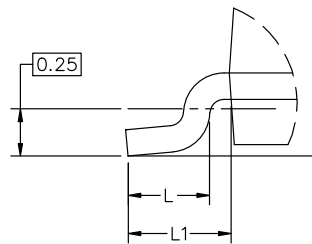
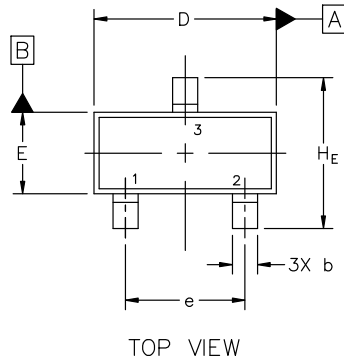
**Figure 2. Capacitance**



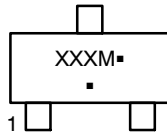
SCALE 4:1

**SOT-23 (TO-236) 2.90x1.30x1.00 1.90P**  
**CASE 318**  
**ISSUE AU**

DATE 14 AUG 2024

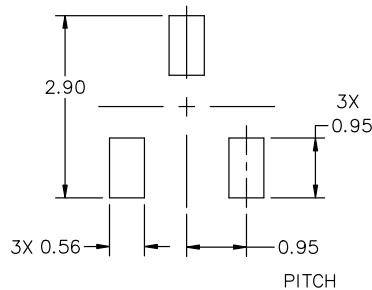


**GENERIC  
MARKING DIAGRAM\***



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

\*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. Some products may not follow the Generic Marking.



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

| MILLIMETERS |      |      |      |
|-------------|------|------|------|
| DIM         | MIN  | NOM  | MAX  |
| A           | 0.89 | 1.00 | 1.11 |
| A1          | 0.01 | 0.06 | 0.10 |
| b           | 0.37 | 0.44 | 0.50 |
| c           | 0.08 | 0.14 | 0.20 |
| D           | 2.80 | 2.90 | 3.04 |
| E           | 1.20 | 1.30 | 1.40 |
| e           | 1.78 | 1.90 | 2.04 |
| L           | 0.30 | 0.43 | 0.55 |
| L1          | 0.35 | 0.54 | 0.69 |
| HE          | 2.10 | 2.40 | 2.64 |
| T           | 0°   | ---  | 10°  |

**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

**STYLES ON PAGE 2**

|                         |                                             |                                                                                                                                                                                     |
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**CASE 318**  
**ISSUE AU**

DATE 14 AUG 2024

|                                                         |                                                       |                                                             |                                                             |                                                             |                                                             |
|---------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|
| STYLE 1 THRU 5:<br>CANCELLED                            | STYLE 6:<br>PIN 1. BASE<br>2. EMITTER<br>3. COLLECTOR | STYLE 7:<br>PIN 1. EMITTER<br>2. BASE<br>3. COLLECTOR       | STYLE 8:<br>PIN 1. ANODE<br>2. NO CONNECTION<br>3. CATHODE  |                                                             |                                                             |
| STYLE 9:<br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE      | STYLE 10:<br>PIN 1. DRAIN<br>2. SOURCE<br>3. GATE     | STYLE 11:<br>PIN 1. ANODE<br>2. CATHODE<br>3. CATHODE-ANODE | STYLE 12:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. ANODE       | STYLE 13:<br>PIN 1. SOURCE<br>2. DRAIN<br>3. GATE           | STYLE 14:<br>PIN 1. CATHODE<br>2. GATE<br>3. ANODE          |
| STYLE 15:<br>PIN 1. GATE<br>2. CATHODE<br>3. ANODE      | STYLE 16:<br>PIN 1. ANODE<br>2. CATHODE<br>3. CATHODE | STYLE 17:<br>PIN 1. NO CONNECTION<br>2. ANODE<br>3. CATHODE | STYLE 18:<br>PIN 1. NO CONNECTION<br>2. CATHODE<br>3. ANODE | STYLE 19:<br>PIN 1. CATHODE<br>2. ANODE<br>3. CATHODE-ANODE | STYLE 20:<br>PIN 1. CATHODE<br>2. ANODE<br>3. GATE          |
| STYLE 21:<br>PIN 1. GATE<br>2. SOURCE<br>3. DRAIN       | STYLE 22:<br>PIN 1. RETURN<br>2. OUTPUT<br>3. INPUT   | STYLE 23:<br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE         | STYLE 24:<br>PIN 1. GATE<br>2. DRAIN<br>3. SOURCE           | STYLE 25:<br>PIN 1. ANODE<br>2. CATHODE<br>3. GATE          | STYLE 26:<br>PIN 1. CATHODE<br>2. ANODE<br>3. NO CONNECTION |
| STYLE 27:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. CATHODE | STYLE 28:<br>PIN 1. ANODE<br>2. ANODE<br>3. ANODE     |                                                             |                                                             |                                                             |                                                             |

|                  |                                      |                                                                                                                                                                                     |
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