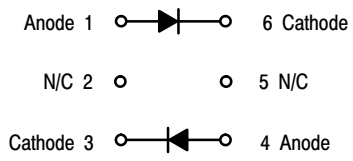
# Dual Schottky Barrier Diodes

# MBD110DWT1G, MBD330DWT1G







**SC−88 / SOT−363**
**CASE 419B**
**STYLE 6**

Application circuit designs are moving toward the consolidation of device count and into smaller packages. The new SOT−363 package is a solution which simplifies circuit design, reduces device count, and reduces board space by putting two discrete devices in one small six−leaded package. The SOT−363 is ideal for low−power surface mount applications where board space is at a premium, such as portable products.

**Surface Mount Comparisons:**

| | SOT−363 | SOT−23 |
|---|---|---|
| Area ($mm^2$) | 4.6 | 7.6 |
| Max Package $P_D$ (mW) | 120 | 225 |
| Device Count | 2 | 1 |

**Space Savings:**

| Package | 1 x SOT−23 | 2 x SOT−23 |
|---|---|---|
| SOT−363 | 40% | 70% |

The MBD110DW and MBD330DW devices are spin−offs of our popular MMBD101LT1 and MMBD301LT1 SOT−23 devices. They are designed for high−efficiency UHF and VHF detector applications. Readily available to many other fast switching RF and digital applications.

**Features**

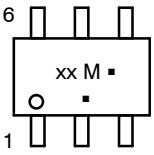
- Extremely Low Minority Carrier Lifetime
- Very Low Capacitance
- Low Reverse Leakage
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

**MAXIMUM RATINGS**

| Rating | | Symbol | Value | Unit |
|---|---|---|---|---|
| Reverse Voltage | MBD110DWT1G<br>MBD330DWT1G | $V_R$ | 7.0<br>30 | V |
| Forward Current (DC) | MBD330DWT1G | $I_F$ | 200 Max | mA |
| Forward Power Dissipation $T_A$ = 25°C | | $P_F$ | 120 | mW |
| Junction Temperature | | $T_J$ | −55 to +125 | °C |
| Storage Temperature Range | | $T_{stg}$ | −55 to +150 | °C |

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.

**MARKING DIAGRAM**




xx = Device Code
Refer to Ordering Table, page 2
M = Date Code
▪ = Pb−Free Package
(Note: Microdot may be in either location)

**ORDERING INFORMATION**

See detailed ordering and shipping information on page 2 of this data sheet.

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**ELECTRICAL CHARACTERISTICS** ($T_A$ = 25°C unless otherwise noted)

| Characteristic | | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Reverse Breakdown Voltage<br>($I_R$ = 10 μA) | <br>MBD110DWT1G<br>MBD330DWT1G | $V_{(BR)R}$ | <br>7.0<br>30 | <br>10<br>– | <br>–<br>– | V |
| Diode Capacitance<br>($V_R$ = 0, f = 1.0 MHz, Note 1) | <br>MBD110DWT1G | $C_D$ | <br>– | <br>0.88 | <br>1.0 | pF |
| Total Capacitance<br>($V_R$ = 15 V, f = 1.0 MHz) | <br>MBD330DWT1G | $C_T$ | <br>– | <br>0.9 | <br>1.5 | pF |
| Reverse Leakage<br>($V_R$ = 3.0 V)<br>($V_R$ = 25 V) | <br>MBD110DWT1G<br>MBD330DWT1G | $I_R$ | <br>–<br>– | <br>0.02<br>13 | <br>0.25<br>200 | <br>μA<br>nA |
| Noise Figure<br>(f = 1.0 GHz, Note 2) | <br>MBD110DWT1G | NF | <br>– | <br>6.0 | <br>– | dB |
| Forward Voltage<br>($I_F$ = 10 mA)<br>($I_F$ = 1.0 mA)<br>($I_F$ = 10 mA) | <br>MBD110DWT1G<br>MBD330DWT1G | $V_F$ | <br>–<br>–<br>– | <br>0.5<br>0.38<br>0.52 | <br>0.6<br>0.45<br>0.6 | V |

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.

**ORDERING INFORMATION**

| Device | Marking | Package | Shipping† |
|---|---|---|---|
| MBD110DWT1G | M4 | SC−88 / SOT−363<br>(Pb−Free) | 3000 Units / Tape & Reel |
| MBD330DWT1G | T4 | | |

†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.

## TYPICAL CHARACTERISTICS
## MBD110DWT1G

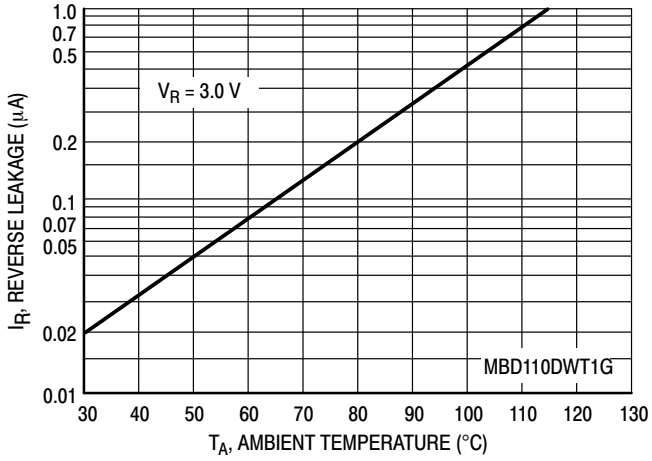



**Figure 1. Reverse Leakage**

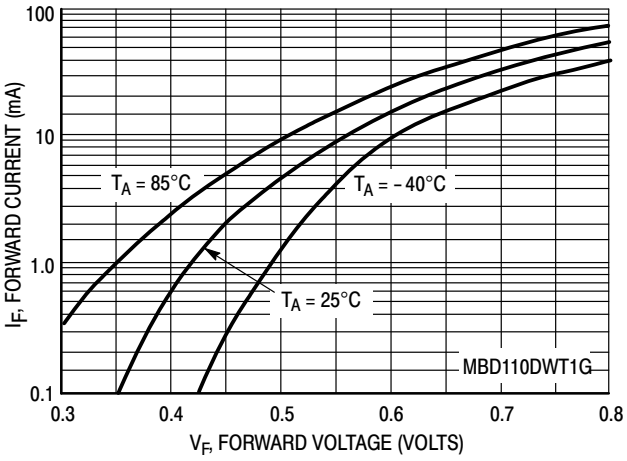



**Figure 2. Forward Voltage**

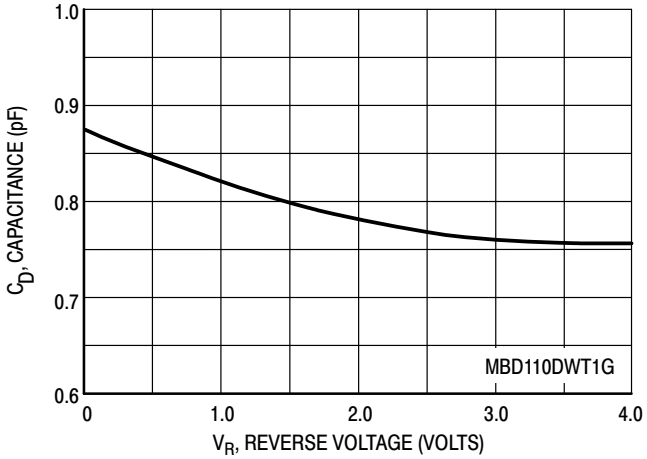



**Figure 3. Capacitance**

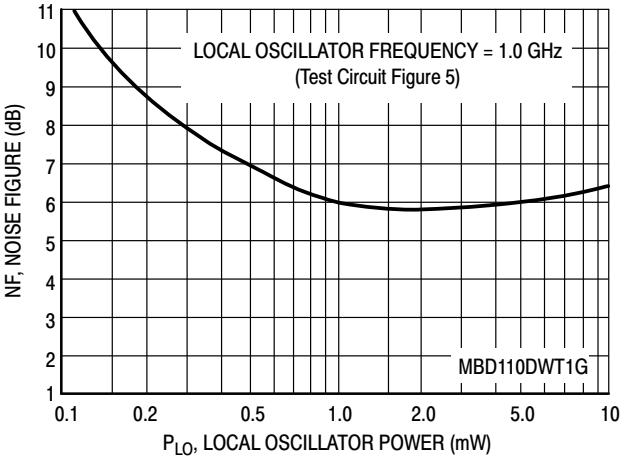



**Figure 4. Noise Figure**

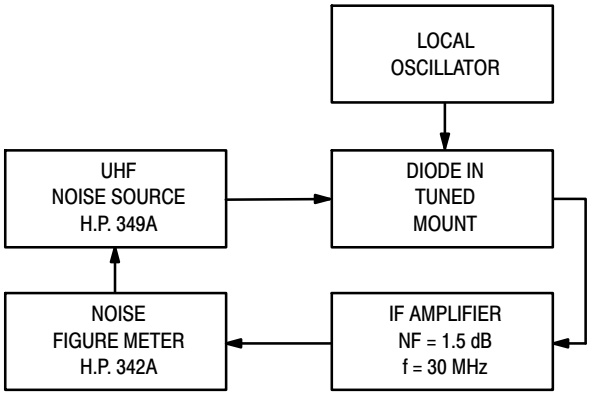



**Figure 5. Noise Figure Test Circuit**

### NOTES ON TESTING AND SPECIFICATIONS

Note 1 – $C_D$ and $C_T$ are measured using a capacitance bridge (Boonton Electronics Model 75A or equivalent).

Note 2 – Noise figure measured with diode under test in tuned diode mount using UHF noise source and local oscillator (LO) frequency of 1.0 GHz. The LO power is adjusted for 1.0 mW. IF amplifier NF = 1.5 dB, f = 30 MHz, see Figure 5.

Note 3 – $L_S$ is measured on a package having a short instead of a die, using an impedance bridge (Boonton Radio Model 250A RX Meter).

## TYPICAL CHARACTERISTICS
## MBD330DWT1G

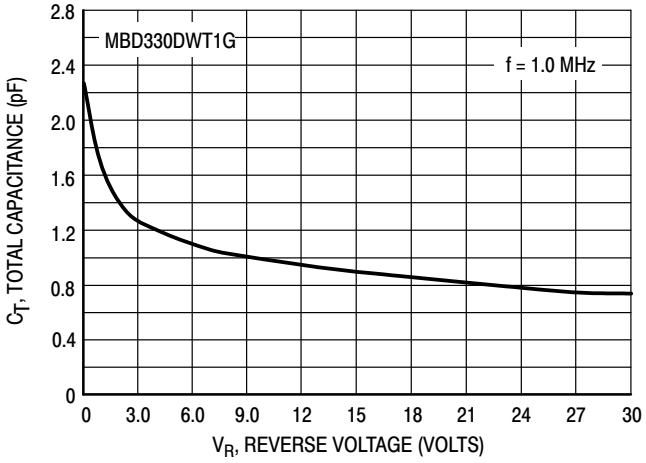



**Figure 6. Total Capacitance**

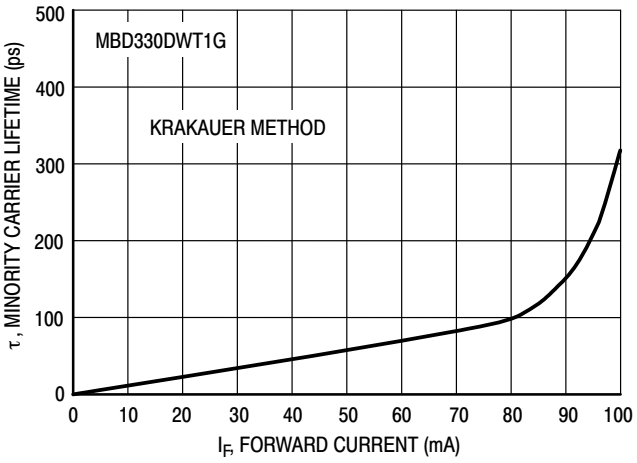



**Figure 7. Minority Carrier Lifetime**

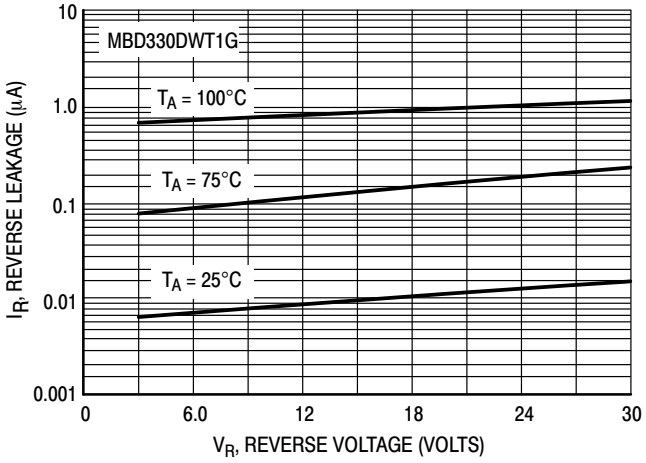



**Figure 8. Reverse Leakage**

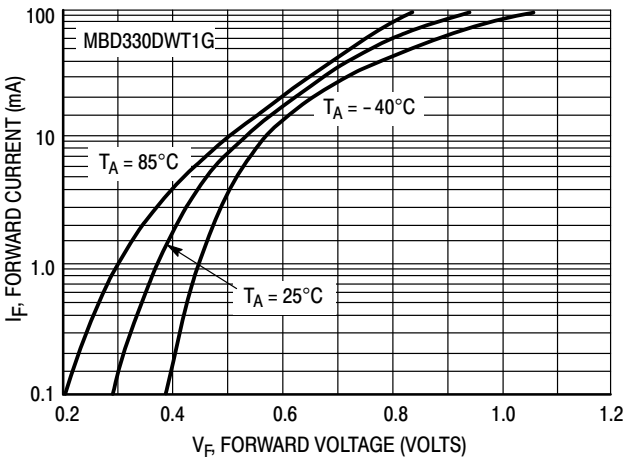
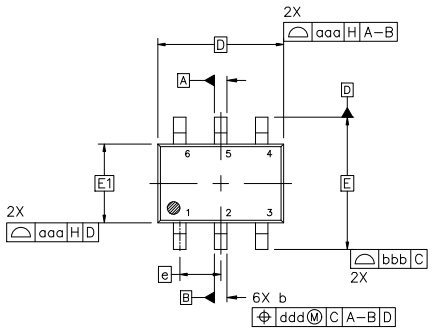



**Figure 9. Forward Voltage**

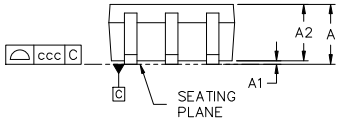


**SC−88 2.00x1.25x0.90, 0.65P**
CASE 419B−02
ISSUE Z

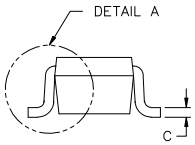
DATE 18 APR 2024



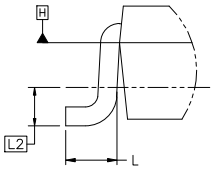

TOP VIEW




SIDE VIEW




END VIEW

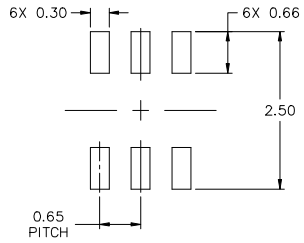



DETAIL A
SCALE 2:1

NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5−2018.
2. ALL DIMENSION ARE IN MILLIMETERS.
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.20 PER END.
4. DIMENSIONS D AND E1 AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY AND DATUM H.
5. DATUMS A AND B ARE DETERMINED AT DATUM H.
6. DIMENSIONS b AND c APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.08 AND 0.15 FROM THE TIP.
7. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 TOTAL IN EXCESS OF DIMENSION b AT MAXIMUM MATERIAL CONDITION. THE DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.

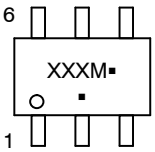
| | MILLIMETERS | | |
|---|---|---|---|
| DIM | MIN. | NOM. | MAX. |
| A | −−− | −−− | 1.10 |
| A1 | 0.00 | −−− | 0.10 |
| A2 | 0.70 | 0.90 | 1.00 |
| b | 0.15 | 0.20 | 0.25 |
| c | 0.08 | 0.15 | 0.22 |
| D | 2.00 BSC | | |
| E | 2.10 BSC | | |
| E1 | 1.25 BSC | | |
| e | 0.65 BSC | | |
| L | 0.26 | 0.36 | 0.46 |
| L2 | 0.15 BSC | | |
| aaa | 0.15 | | |
| bbb | 0.30 | | |
| ccc | 0.10 | | |
| ddd | 0.10 | | |




RECOMMENDED MOUNTING FOOTPRINT*

* FOR ADDITIONAL INFORMATION ON OUR Pb−FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ONSEMI SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

**GENERIC MARKING DIAGRAM***




XXX = Specific Device Code
M = Date Code*
▪ = Pb−Free Package

(Note: Microdot may be in either location)

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

*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.

**STYLES ON PAGE 2**



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**SC−88 2.00x1.25x0.90, 0.65P**
CASE 419B−02
ISSUE Z

DATE 18 APR 2024

STYLE 1:
PIN 1. EMITTER 2
2. BASE 2
3. COLLECTOR 1
4. EMITTER 1
5. BASE 1
6. COLLECTOR 2

STYLE 2:
CANCELLED

STYLE 3:
CANCELLED

STYLE 4:
PIN 1. CATHODE
2. CATHODE
3. COLLECTOR
4. EMITTER
5. BASE
6. ANODE

STYLE 5:
PIN 1. ANODE
2. ANODE
3. COLLECTOR
4. EMITTER
5. BASE
6. CATHODE

STYLE 6:
PIN 1. ANODE 2
2. N/C
3. CATHODE 1
4. ANODE 1
5. N/C
6. CATHODE 2

STYLE 7:
PIN 1. SOURCE 2
2. DRAIN 2
3. GATE 1
4. SOURCE 1
5. DRAIN 1
6. GATE 2

STYLE 8:
CANCELLED

STYLE 9:
PIN 1. EMITTER 2
2. EMITTER 1
3. COLLECTOR 1
4. BASE 1
5. BASE 2
6. COLLECTOR 2

STYLE 10:
PIN 1. SOURCE 2
2. SOURCE 1
3. GATE 1
4. DRAIN 1
5. DRAIN 2
6. GATE 2

STYLE 11:
PIN 1. CATHODE 2
2. CATHODE 2
3. ANODE 1
4. CATHODE 1
5. CATHODE 1
6. ANODE 2

STYLE 12:
PIN 1. ANODE 2
2. ANODE 2
3. CATHODE 1
4. ANODE 1
5. ANODE 1
6. CATHODE 2

STYLE 13:
PIN 1. ANODE
2. N/C
3. COLLECTOR
4. EMITTER
5. BASE
6. CATHODE

STYLE 14:
PIN 1. VREF
2. GND
3. GND
4. IOUT
5. VEN
6. VCC

STYLE 15:
PIN 1. ANODE 1
2. ANODE 2
3. ANODE 3
4. CATHODE 3
5. CATHODE 2
6. CATHODE 1

STYLE 16:
PIN 1. BASE 1
2. EMITTER 2
3. COLLECTOR 2
4. BASE 2
5. EMITTER 1
6. COLLECTOR 1

STYLE 17:
PIN 1. BASE 1
2. EMITTER 1
3. COLLECTOR 2
4. BASE 2
5. EMITTER 2
6. COLLECTOR 1

STYLE 18:
PIN 1. VIN1
2. VCC
3. VOUT2
4. VIN2
5. GND
6. VOUT1

STYLE 19:
PIN 1. I OUT
2. GND
3. GND
4. V CC
5. V EN
6. V REF

STYLE 20:
PIN 1. COLLECTOR
2. COLLECTOR
3. BASE
4. EMITTER
5. COLLECTOR
6. COLLECTOR

STYLE 21:
PIN 1. ANODE 1
2. N/C
3. ANODE 2
4. CATHODE 2
5. N/C
6. CATHODE 1

STYLE 22:
PIN 1. D1 (i)
2. GND
3. D2 (i)
4. D2 (c)
5. VBUS
6. D1 (c)

STYLE 23:
PIN 1. Vn
2. CH1
3. Vp
4. N/C
5. CH2
6. N/C

STYLE 24:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. CATHODE
6. CATHODE

STYLE 25:
PIN 1. BASE 1
2. CATHODE
3. COLLECTOR 2
4. BASE 2
5. EMITTER
6. COLLECTOR 1

STYLE 26:
PIN 1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

STYLE 27:
PIN 1. BASE 2
2. BASE 1
3. COLLECTOR 1
4. EMITTER 1
5. EMITTER 2
6. COLLECTOR 2

STYLE 28:
PIN 1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN

STYLE 29:
PIN 1. ANODE
2. ANODE
3. COLLECTOR
4. EMITTER
5. BASE/ANODE
6. CATHODE

STYLE 30:
PIN 1. SOURCE 1
2. DRAIN 2
3. DRAIN 2
4. SOURCE 2
5. GATE 1
6. DRAIN 1

Note: Please refer to datasheet for style callout. If style type is not called out in the datasheet refer to the device datasheet pinout or pin assignment.




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