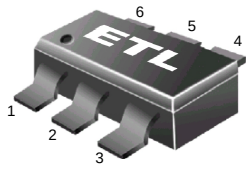
ETL SEMICONDUCTOR

# Dual SCHOTTKY Barrier Diodes

**MBD110DWT1**
**MBD330DWT1**
**MBD770DWT1**

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.



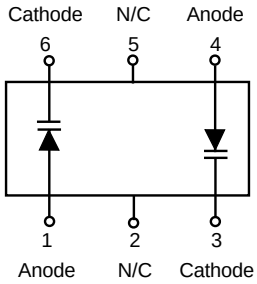

**SOT–363**
**CASE 419B–01, STYLE 6**

**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 × SOT–23 | 2 × SOT–23 |
|---|---|---|
| SOT–363 | 40% | 70% |




The MBD110DW, MBD330DW, and MBD770DW devices are spin–offs of our popular MMBD101LT1, MMBD301LT1, and MMBD701LT1 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.

- Extremely Low Minority Carrier Lifetime
- Very Low Capacitance
- Low Reverse Leakage

**MAXIMUM RATINGS**

| Rating | | Symbol | Value | Unit |
|---|---|---|---|---|
| Reverse Voltage | MBD110DWT1 | $V_R$ | 7.0 | Vdc |
| | MBD330DWT1 | | 30 | |
| | MBD770DWT1 | | 70 | |
| 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 |

**DEVICE MARKING**

MBD110DWT1 = M4 MBD330DWT1 = T4 MBD770DWT1 = H5

Thermal Clad is a trademark of the Bergquist Company.

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

| Characteristic | | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Reverse Breakdown Voltage | | $V_{(BR)R}$ | | | | Volts |
| ($I_R$ = 10 μA) | MBD110DWT1 | | 7.0 | 10 | — | |
| | MBD330DWT1 | | 30 | — | — | |
| | MBD770DWT1 | | 70 | — | — | |
| Diode Capacitance | | $C_T$ | | | | pF |
| ($V_R$ = 0, f = 1.0 MHz, Note 1) | MBD110DWT1 | | — | 0.88 | 1.0 | |
| Total Capacitance | | $C_T$ | | | | pF |
| ($V_R$ = 15 Volts, f = 1.0 MHz) | MBD330DWT1 | | — | 0.9 | 1.5 | |
| ($V_R$ = 20 Volts, f = 1.0 MHz) | MBD770DWT1 | | — | 0.5 | 1.0 | |
| Reverse Leakage | | $I_R$ | | | | |
| ($V_R$ = 3.0 V) | MBD110DWT1 | | — | 0.02 | 0.25 | μA |
| ($V_R$ = 25 V) | MBD330DWT1 | | — | 13 | 200 | nAdc |
| ($V_R$ = 35 V) | MBD770DWT1 | | — | 9.0 | 200 | nAdc |
| Noise Figure | | NF | | | | dB |
| (f = 1.0 GHz, Note 2) | MBD110DWT1 | | — | 6.0 | — | |
| Forward Voltage | | $V_F$ | | | | Vdc |
| ($I_F$ = 10 mA) | MBD110DWT1 | | — | 0.5 | 0.6 | |
| ($I_F$ = 1.0 mAdc) | MBD330DWT1 | | — | 0.38 | 0.45 | |
| ($I_F$ = 10 mA) | | | — | 0.52 | 0.6 | |
| ($I_F$ = 1.0 mAdc) | MBD770DWT1 | | — | 0.42 | 0.5 | |
| ($I_F$ = 10 mA) | | | — | 0.7 | 1.0 | |

## TYPICAL CHARACTERISTICS — MBD110DWT1

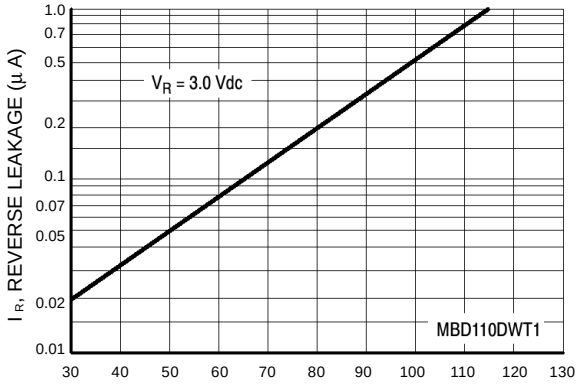



**Figure 1. Reverse Leakage**

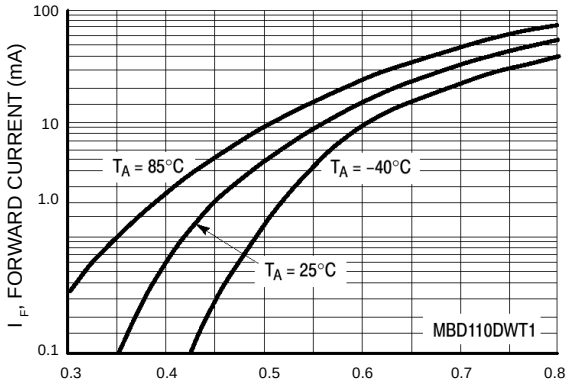



**Figure 2. Forward Voltage**

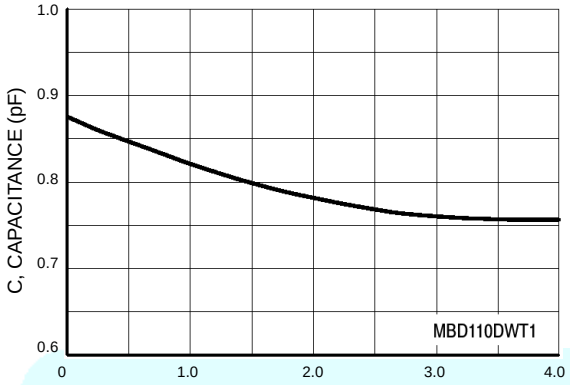



**Figure 3. Capacitance**

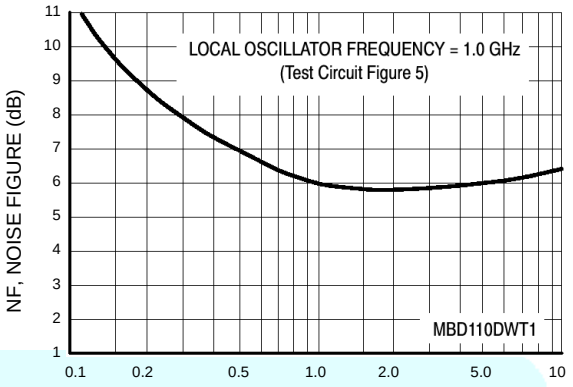



**Figure 4. Noise Figure**

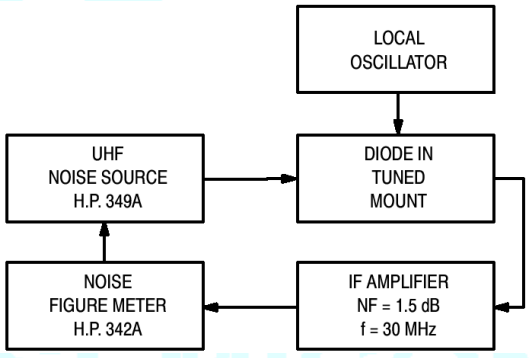



**Figure 5. Noise Figure Test Circuit**

### NOTES ON TESTING AND SPECIFICATIONS

Note 1 – $C_C$ 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. $I_F$ 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 MBD330DWT1

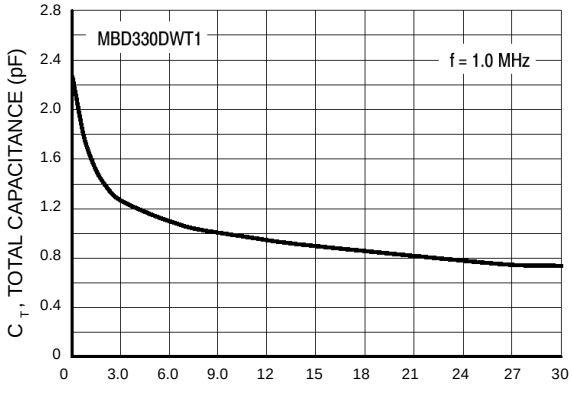



**Figure 6. Total Capacitance**

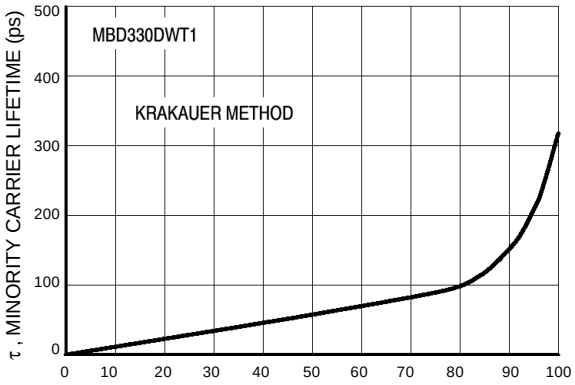



**Figure 7. Minority Carrier Lifetime**

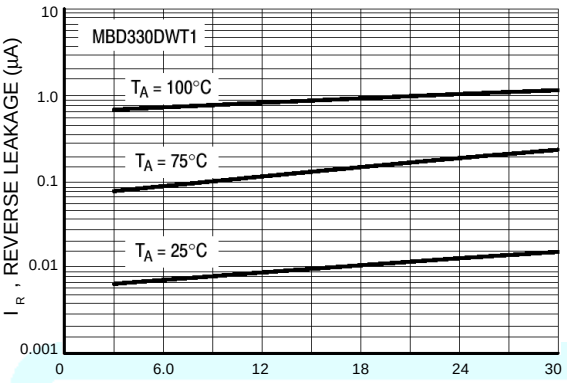



**Figure 8. Reverse Leakage**

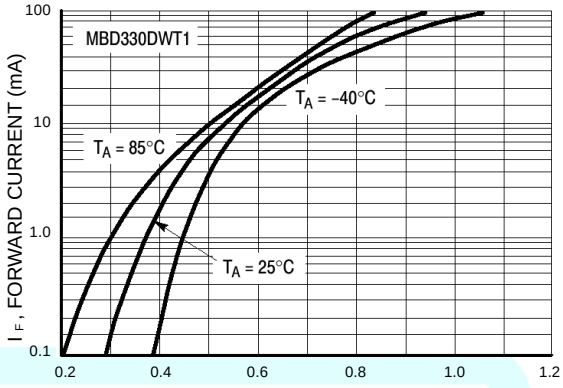



**Figure 9. Forward Voltage**

## TYPICAL CHARACTERISTICS MBD770DWT1

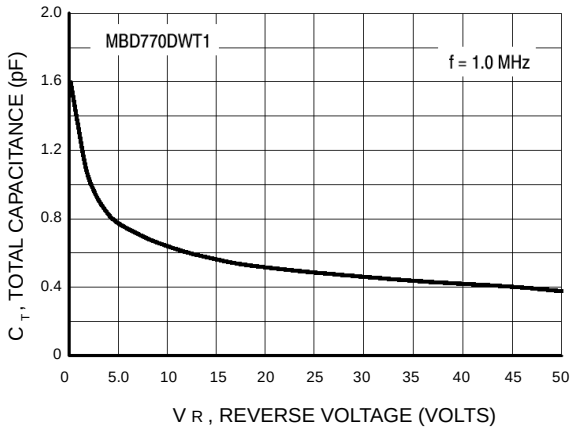



**Figure 10 . Total Capacitance**

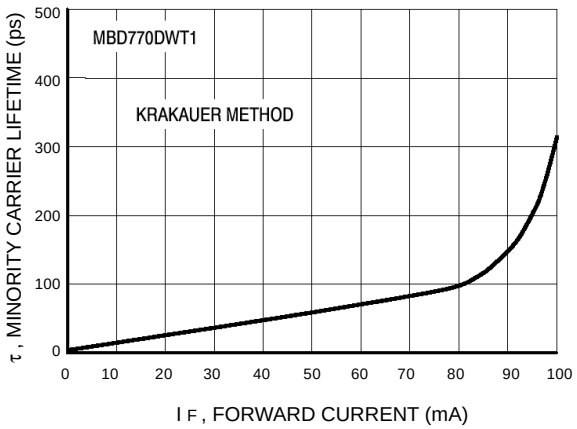



**Figure 11. Minority Carrier Lifetime**

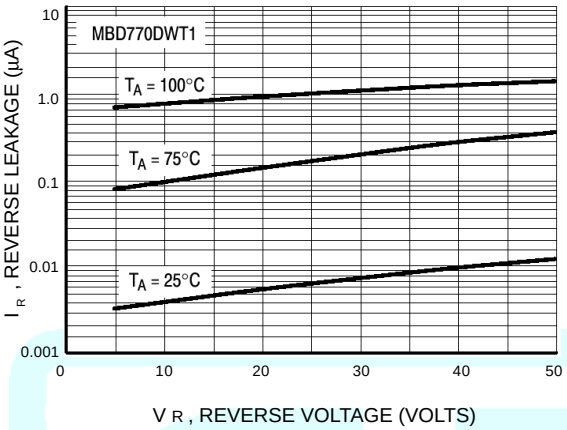



**Figure 12. Reverse Leakage**

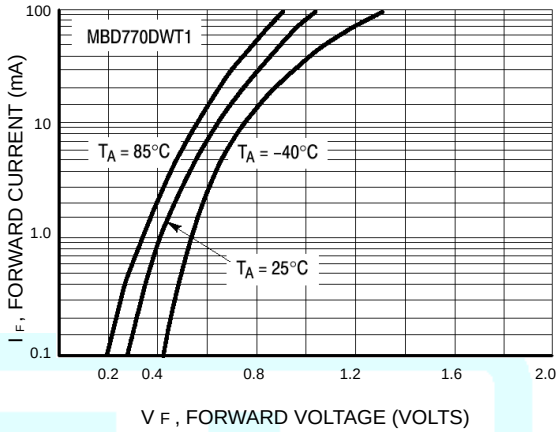



**Figure 13. Forward Voltage**