## Schottky Barrier Diodes for General Purpose Applications

### Technical Data

#### Features
- **Low Turn-On Voltage**
  - As Low as 0.34 V at 1 mA
- **Pico Second Switching Speed**
- **High Breakdown Voltage**
  - Up to 70 V
- **Matched Characteristics Available**

#### Description/Applications
The 1N5711, 1N5712, 5082-2800/10/11 are passivated Schottky barrier diodes which use a patented “guard ring” design to achieve a high breakdown voltage. Packaged in a low cost glass package, they are well suited for high level detecting, mixing, switching, gating, log or A-D converting, video detecting, frequency discriminating, sampling, and wave shaping.

The 5082-2835 is a passivated Schottky diode in a low cost glass package. It is optimized for low turn-on voltage. The 5082-2835 is particularly well suited for the UHF mixing needs of the CATV marketplace.

The 5082-2300 Series and 5082-2900 devices are unpas-sivated Schottky diodes in a glass package. These diodes have extremely low 1/f noise and are ideal for low noise mixing, and high sensitivity detecting. They are particularly well suited for use in Doppler or narrow band video receivers.

### Maximum Ratings

#### Junction Operating and Storage Temperature Range
- **5082-2303, -2900** ................................................................. -60°C to +100°C
- **1N5711, 1N5712, 5082-2800/10/11** .................................... -65°C to +200°C
- **5082-2835** ............................................................................. -60°C to +150°C

#### DC Power Dissipation
(Measured in an infinite heat sink at $T_{CASE} = 25^°C$)
- **5082-2303, -2900** ................................................................. 100 mW
- **1N5711, 1N5712, 5082-2800/10/11** .................................... 250 mW
- **5082-2835** ............................................................................. 150 mW

#### Peak Inverse Voltage
- **$V_{BR}$**
Package Characteristics

Outline 15

Lead Material ........................................................................................................... Dumet
Lead Finish .............................................................................................................. 95-5% Tin-Lead
Max. Soldering Temperature .................................................................................... 260°C for 5 sec
Min. Lead Strength ................................................................................................... 4 pounds pull

Typical Package Inductance
1N5711, 1N5712: ....................................................................................................... 2.0 nH
2800 Series: ............................................................................................................... 2.0 nH
2300 Series, 2900: ................................................................................................. 3.0 nH

Typical Package Capacitance
1N5711, 1N5712: ....................................................................................................... 0.2 pF
2800 Series: ............................................................................................................... 0.2 pF
2300 Series, 2900: ................................................................................................. 0.07 pF

The leads on the Outline 15 package should be restricted so that the bend starts at least 1/16 inch from the glass body.

Outline 15 diodes are available on tape and reel. The tape and reel specification is patterned after RS-296-D.

Electrical Specifications at $T_A = 25^\circ C$

General Purpose Diodes

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package Outline</th>
<th>Min. Breakdown Voltage $V_{BR}$ (V)</th>
<th>Max. Forward Voltage $V_F$ (mV)</th>
<th>$V_F = 1$ V Max. at Forward Current $I_F$ (mA)</th>
<th>Max. Reverse Leakage Current $I_R$ (nA) at $V_R$ (V)</th>
<th>Max. Capacitance $C_T$ (pF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5082-2800</td>
<td>15</td>
<td>70</td>
<td>410</td>
<td>15</td>
<td>200</td>
<td>50</td>
</tr>
<tr>
<td>1N5711</td>
<td>15</td>
<td>70</td>
<td>410</td>
<td>15</td>
<td>200</td>
<td>50</td>
</tr>
<tr>
<td>5082-2810</td>
<td>15</td>
<td>20</td>
<td>410</td>
<td>35</td>
<td>100</td>
<td>15</td>
</tr>
<tr>
<td>1N5712</td>
<td>15</td>
<td>20</td>
<td>550</td>
<td>35</td>
<td>150</td>
<td>16</td>
</tr>
<tr>
<td>5082-2811</td>
<td>15</td>
<td>15</td>
<td>410</td>
<td>20</td>
<td>100</td>
<td>8</td>
</tr>
<tr>
<td>5082-2835</td>
<td>15</td>
<td>8*</td>
<td>340</td>
<td>10*</td>
<td>100</td>
<td>1</td>
</tr>
</tbody>
</table>

Test Conditions
- $I_R = 10$ µA
- $I_R = 100$ µA
- $I_F = 1$ mA
- $V_F = 0.45$ V
- $V_R = 0$ V
- $f = 1.0$ MHz

Note: Effective Carrier Lifetime ($\tau$) for all these diodes is 100 ps maximum measured with Krakauer method at 5 mA except for 5082-2835 which is measured at 20 mA.
Low 1/f (Flicker) Noise Diodes

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package Outline</th>
<th>Min. Breakdown Voltage $V_{BR}$ (V)</th>
<th>Max. Forward Voltage $V_F$ (mV)</th>
<th>$V_F = 1$ V Max. at Forward Current $I_F$ (mA)</th>
<th>Max. Reverse Leakage Current $I_R$ (nA) at $V_R$ (V)</th>
<th>Max. Capacitance $C_T$ (pF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2303</td>
<td>15</td>
<td>20</td>
<td>400</td>
<td>35</td>
<td>500</td>
<td>15</td>
</tr>
<tr>
<td>2900</td>
<td>15</td>
<td>10</td>
<td>400</td>
<td>20</td>
<td>100</td>
<td>5</td>
</tr>
</tbody>
</table>

Test Conditions
- $I_R = 10 \mu$A
- $I_F = 1$ mA
- $V_R = 0$ V
- $f = 1.0$ MHz

Note: Effective Carrier Lifetime ($\tau$) for all these diodes is 100 ps maximum measured with Krakauer method at 20 mA.

Matched Pairs and Quads

<table>
<thead>
<tr>
<th>Basic Part Number 5082-</th>
<th>Matched Pair Unconnected</th>
<th>Matched Quad Unconnected</th>
<th>Batch Matched</th>
<th>Test Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2900</td>
<td></td>
<td></td>
<td></td>
<td>$\Delta V_F$ at $I_F = 1.0, 10$ mA</td>
</tr>
<tr>
<td>2800</td>
<td>5082-2804 $\Delta V_F = 20$ mV</td>
<td>5082-2805 $\Delta V_F = 20$ mV</td>
<td></td>
<td>$\Delta V_F$ at $I_F = 0.5, 5$ mA $\times I_F = 10$ mA $\Delta C_O$ at $f = 1.0$ MHz</td>
</tr>
<tr>
<td>2811</td>
<td></td>
<td></td>
<td>5082-2826 $\Delta V_F = 10$ mV $\Delta C_O = 0.1$ pF</td>
<td>$\Delta V_F$ at $I_F = 10$ mA $\Delta C_O$ at $f = 1.0$ MHz</td>
</tr>
<tr>
<td>2835</td>
<td></td>
<td></td>
<td>5082-2080 $\Delta V_F = 10$ mV $\Delta C_O = 0.1$ pF</td>
<td>$\Delta V_F$ at $I_F = 10$ mA $\Delta C_O$ at $f = 1.0$ MHz</td>
</tr>
</tbody>
</table>

Note:
1. Batch matched devices have a minimum batch size of 50 devices.

SPICE Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>5082-2800</th>
<th>5082-2810</th>
<th>5082-2811</th>
<th>5082-2835</th>
<th>5082-2303</th>
<th>5082-2900</th>
</tr>
</thead>
<tbody>
<tr>
<td>$B_V$</td>
<td>V</td>
<td>75</td>
<td>25</td>
<td>18</td>
<td>9</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>$C_{j0}$</td>
<td>pF</td>
<td>1.6</td>
<td>0.8</td>
<td>1.0</td>
<td>0.7</td>
<td>0.7</td>
<td>1.1</td>
</tr>
<tr>
<td>$E_G$</td>
<td>eV</td>
<td>0.69</td>
<td>0.69</td>
<td>0.69</td>
<td>0.69</td>
<td>0.69</td>
<td>0.69</td>
</tr>
<tr>
<td>$I_{BV}$</td>
<td>A</td>
<td>$10E-5$</td>
<td>$10E-5$</td>
<td>$10E-5$</td>
<td>$10E-5$</td>
<td>$10E-5$</td>
<td>$10E-5$</td>
</tr>
<tr>
<td>$I_S$</td>
<td>A</td>
<td>$2.2 \times 10E-9$</td>
<td>$1.1 \times 10E-9$</td>
<td>$0.3 \times 10E-8$</td>
<td>$2.2 \times 10E-8$</td>
<td>$7 \times 1.0E-9$</td>
<td>$10E-8$</td>
</tr>
<tr>
<td>$N$</td>
<td></td>
<td>1.08</td>
<td>1.08</td>
<td>1.08</td>
<td>1.08</td>
<td>1.08</td>
<td>1.08</td>
</tr>
<tr>
<td>$R_S$</td>
<td>$\Omega$</td>
<td>25</td>
<td>10</td>
<td>10</td>
<td>5</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>$P_B$</td>
<td>V</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.56</td>
<td>0.64</td>
<td>0.64</td>
</tr>
<tr>
<td>$P_T$</td>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>$M$</td>
<td></td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Typical Parameters

Figure 1. I-V Curve Showing Typical Temperature Variation for 5082-2300 Series and 5082-2900 Schottky Diodes.

Figure 2. 5082-2300 Series Typical Reverse Current vs. Reverse Voltage at Various Temperatures.

Figure 3. 5082-2300 Series and 5082-2900 Typical Dynamic Resistance ($R_D$) vs. Forward Current ($I_F$).

Figure 4. 5082-2300 and 5082-2900 Typical Capacitance vs. Reverse Voltage.

Figure 5. I-V Curve Showing Typical Temperature Variation for 5082-2800 or 1N5711 Schottky Diodes.

Figure 6. (5082-2800 or 1N5711) Typical Variation of Reverse Current ($I_R$) vs. Reverse Voltage ($V_R$) at Various Temperatures.

Figure 7. (5082-2800 or 1N5711) Typical Capacitance ($C_T$) vs. Reverse Voltage ($V_R$).

Figure 8. I-V Curve Showing Typical Temperature Variation for the 5082-2810 or 1N5712 Schottky Diode.

Figure 9. (5082-2810 or 1N5712) Typical Variation of Reverse Current ($I_R$) vs. Reverse Voltage ($V_R$) at Various Temperatures.
Typical Parameters, continued

Figure 10. I-V Curve Showing Typical Temperature Variation for the 5082-2811 Schottky Diode.

Figure 11. (5082-2811) Typical Variation of Reverse Current (IR) vs. Reverse Voltage (VR) at Various Temperatures.

Figure 12. I-V Curve Showing Typical Temperature Variations for 5082-2835 Schottky Diode.

Figure 13. (5082-2835) Typical Variation of Reverse Current (IR) vs. Reverse Voltage (VR) at Various Temperatures.

Figure 14. Typical Capacitance (CT) vs. Reverse Voltage (VR).

Figure 15. Typical Dynamic Resistance (RD) vs. Forward Current (IF).
Diode Package Marking

1N5xxx  5082-xxxx

would be marked:

1Nx  xx
xxx  xx
YWW  YWW

where xxxx are the last four digits of the 1Nxxxx or the 5082-xxxx part number. Y is the last digit of the calendar year. WW is the work week of manufacture.

Examples of diodes manufactured during workweek 45 of 1999:

1N5712  5082-3080

would be marked:

1N5  30
712  80
945  945