



# SCHOTTKY BARRIER DIODES FOR GENERAL PURPOSE APPLICATIONS

1N5711\*  
1N5712\*  
5082-2301  
5082-2302  
5082-2303  
5082-2305  
5082-2800/10/11/35\*  
5082-2900\*  
HSCH-1001 (1N6263)\*

## Features

**LOW TURN-ON VOLTAGE: AS LOW AS  
0.34V AT 1mA**  
**PICO-SECOND SWITCHING SPEED**  
**HIGH BREAKDOWN VOLTAGE: UP TO 70V**  
**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 and 2900 Series devices are unpassivated 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.

The HSCH-1001 is a Hybrid Schottky diode sealed in a rugged double stud Outline 12 glass package suitable for automatic insertion. The low turn-on voltage, fast switching speed, and low cost of these diodes make them ideal for general purpose switching.

Application Bulletins 13, 14, 15, and 16 describe applications in which these diodes are used for speed up of a transistor, clipping, clamping, and sampling, respectively. Other digital and RF applications are described in Application Bulletins 26, 27, 28, 30, 31 and 36.

## Maximum Ratings

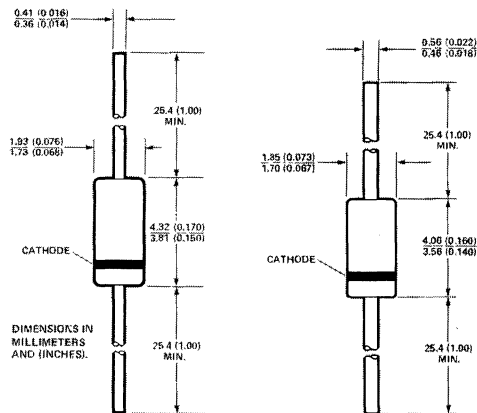
Junction Operating and Storage Temperature Range  
5082-2305, 2301, 2302, 2303, 2900 ..... -60°C to +100°C  
1N5711, 1N5712, 5082-2800/10/11,  
HSCH-1001 ..... -65°C to +200°C  
5082-2835 ..... -60°C to +150°C

*Operation of these devices within the above temperature ratings will assure a device Median Time To Failure (MTTF) of approximately  $1 \times 10^7$  hours.*

DC Power Dissipation (Measured in an infinite heat sink at  $T_{CASE} = 25^\circ C$ )

Derate linearly to zero at maximum rated temperature  
5082-2305, 2301, 2302, 2303, 2900 ..... 100 mW  
1N5711, 1N5712, 5082-2800/10/11 ..... 250 mW  
5082-2835 ..... 150 mW  
HSCH-1001 ..... 400 mW

Peak Inverse Voltage .....  $V_{BR}$



OUTLINE 15

OUTLINE 12

Schottky Barrier Diodes

## Package Characteristics

	Outline 15	Outline 12
Lead Material:	Dumet	Dumet
Lead Finish:	1N5711, 1N5712: Tin 2800 Series: Tin 2300, 2900 Series: Gold	Tin
Maximum Soldering Temperature:	230°C for 5 sec.	260°C for 10 sec.
Minimum Lead Strength:	4 lb. Pull	10 lb. Pull
Typical Package Inductance:	1N5711, 1N5712: 2.0 nH 2800 Series: 2.0 nH 2300, 2900 Series: 3.0 nH	1.8 nH
Typical Package Capacitance:	1N5711, 1N5712: 0.2 pF 2800 Series: 0.2 pF 2300, 2900 Series: 0.07 pF	0.25 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.

\*Also available in Tape and Reel. Please contact local HP Sales Office for further information.

## Electrical Specifications at $T_A=25^\circ\text{C}$

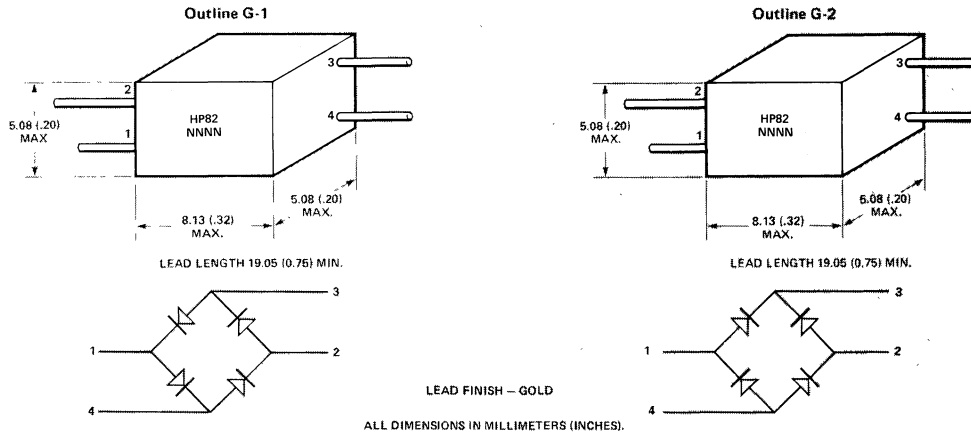
Part Number 5082-	Package Outline	Minimum Breakdown Voltage $V_{BR}$ (V)	Maximum Forward Voltage $V_F$ (mV)	$V_F=1V$ Max at Forward Current $I_F$ (mA)	Maximum Reverse Leakage Current		Maximum Capacitance $C_T$ (pF)
					$I_R$ (nA)	at $V_R$ (V)	
2800	15	70	410	15	200	50	2.0
1N5711	15	70	410	15	200	50	2.0
2305	15	30	400	75	300	15	1.0
2301	15	30	400	50	300	15	1.0
2302	15	30	400	35	300	15	1.0
2303	15	20	400	35	500	15	1.0
2810	15	20	410	35	100	15	1.2
1N5712	15	20	550	35	150	16	1.2
2811	15	15	410	20	100	8	1.2
2900	15	10	400	20	100	5	1.2
2835	15	8*	340	10†	100	1	1.0
HSCH-1001 (1N6263)	12	60	410	15	200	50	2.2
Test Conditions		$I_R = 10 \mu\text{A}$ * $I_R = 100 \mu\text{A}$	$I_F = 1 \text{ mA}$	† $V_F = .45V$			$V_R = 0 \text{ V}$ $f = 1.0 \text{ MHz}$

Note:

Effective Carrier Lifetime ( $\tau$ ) for all these diodes is 100 ps maximum measured with Krakauer method at 20 mA except for HSCH-1001 (1N6263), 1N5711, and 1N5712 which are measured at 5 mA.

## Matched Pairs and Quads

Basic Part Number 5082-	Matched Pair Unconnected	Matched Quad Unconnected	Matched Ring Quad Encapsulated G-1 Outline	Matched Bridge Quad Encapsulated G-2 Outline	Batch Matched	Test Conditions
2301	5082-2306 $\Delta V_F = 20 \text{ mV}$ $\Delta C_O = 0.2 \text{ pF}$					$\Delta V_F$ at $I_F = 0.75, 20 \text{ mA}$ $\Delta C_O$ at $f = 1.0 \text{ MHz}$
2303	5082-2308 $\Delta V_F = 20 \text{ mV}$ $\Delta C_O = 0.2 \text{ pF}$	5082-2370 $\Delta V_F = 20 \text{ mV}$ $\Delta C_O = 0.2 \text{ pF}$	5082-2396 $\Delta V_F = 20 \text{ mV}$ $\Delta C_O = 0.2 \text{ pF}$	5082-2356 $\Delta V_F = 20 \text{ mV}$ $\Delta C_O = 0.2 \text{ pF}$		$\Delta V_F$ at $I_F = 0.75, 20 \text{ mA}$ $\Delta C_O$ at $f = 1.0 \text{ MHz}$
2900	5082-2912 $\Delta V_F = 30 \text{ mV}$	5082-2970 $\Delta V_F = 30 \text{ mV}$		5082-2997 $\Delta V_F = 30 \text{ mV}$		$\Delta V_F$ at $I_F = 1.0, 10 \text{ mA}$
2800	5082-2804 $\Delta V_F = 20 \text{ mV}$	5082-2805 $\Delta V_F = 20 \text{ mV}$			5082-2836* $\Delta V_F = 20 \text{ mV}$ $\Delta C_O = 0.1 \text{ pF}$	$\Delta V_F$ at $I_F = 0.5, 5 \text{ mA}$ * $I_F = 10 \text{ mA}$ $\Delta C_O$ at $f = 1.0 \text{ MHz}$
2811		5082-2815 $\Delta V_F = 20 \text{ mV}$ $\Delta C_O = 0.20 \text{ pF}$	5082-2814 $\Delta V_F = 20 \text{ mV}$ $\Delta C_O = 0.20 \text{ pF}$	5082-2813 $\Delta V_F = 20 \text{ mV}$ $\Delta C_O = 0.20 \text{ pF}$	5082-2826 $\Delta V_F = 10 \text{ mV}$ $\Delta C_O = 0.1 \text{ pF}$	$\Delta V_F$ at $I_F = 10 \text{ mA}$ $\Delta C_O$ at $f = 1.0 \text{ MHz}$
2835					5082-2080 $\Delta V_F = 10 \text{ mV}$ $\Delta C_O = 0.1 \text{ pF}$	$\Delta V_F$ at $I_F = 10 \text{ mA}$ $\Delta C_O$ at $f = 1.0 \text{ MHz}$



## Typical Parameters

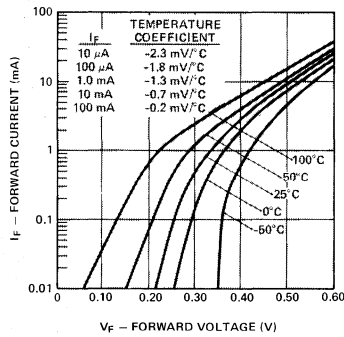


Figure 1. I-V Curve Showing Typical Temperature Variation for 5082-2300 and 5082-2900 Series Schottky Diodes.

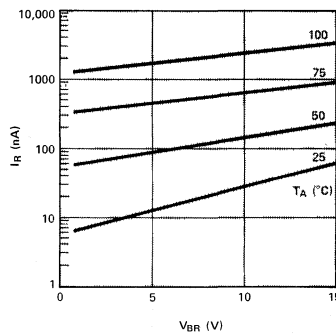


Figure 2. 5082-2300 Series Typical Reverse Current vs. Reverse Voltage at Various Temperatures.

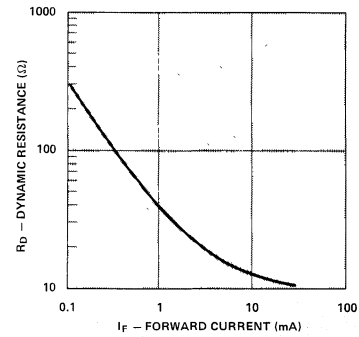


Figure 3. 5082-2300 Series and 5082-2900 Series Typical Dynamic Resistance ( $R_D$ ) vs. Forward Current ( $I_F$ ).

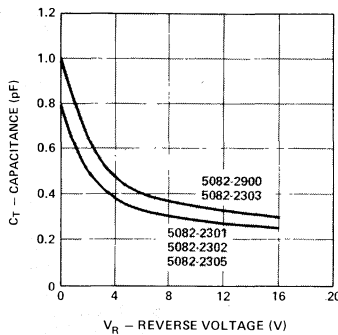


Figure 4. 5082-2300 and 5082-2900 Series Typical Capacitance vs. Reverse Voltage.

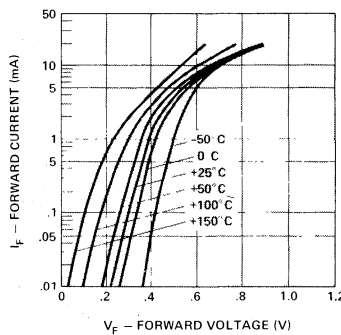


Figure 5. I-V Curve Showing Typical Temperature Variation for 5082-2800 or 1N5711 Schottky Diodes.

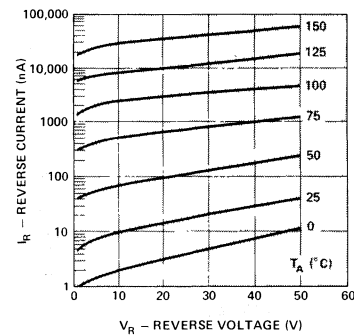


Figure 6. (5082-2800 or 1N5711) Typical Variation of Reverse Current ( $I_R$ ) vs. Reverse Voltage ( $V_R$ ) at Various Temperatures.

Schottky Barrier Diodes

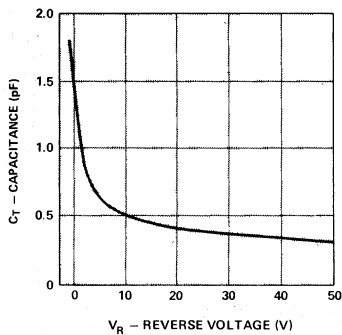


Figure 7. (5082-2800 or 1N5711) Typical Capacitance ( $C_T$ ) vs. Reverse Voltage ( $V_R$ ).

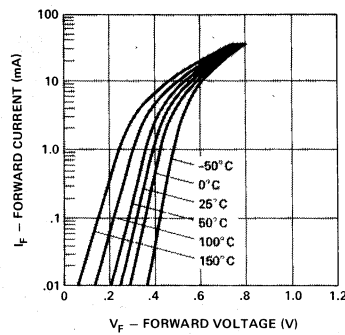


Figure 8. I-V Curve Showing Typical Temperature Variation for the 5082-2810 or 1N5712 Schottky Diode.

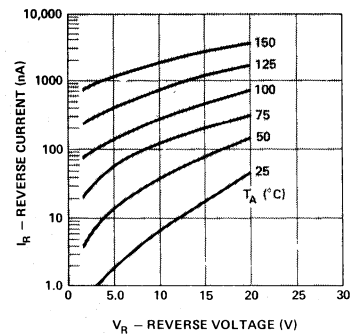


Figure 9. (5082-2810 or 1N5712) Typical Variation of Reverse Current ( $I_R$ ) vs. Reverse Voltage ( $V_R$ ) at Various Temperatures.

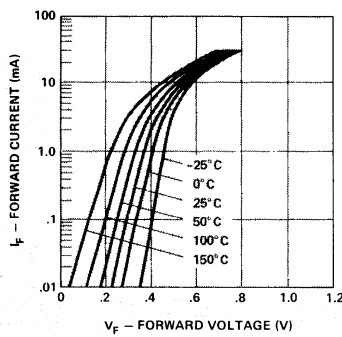


Figure 10. I-V Curve Showing Typical Temperature Variation for the 5082-2811 Schottky Diode.

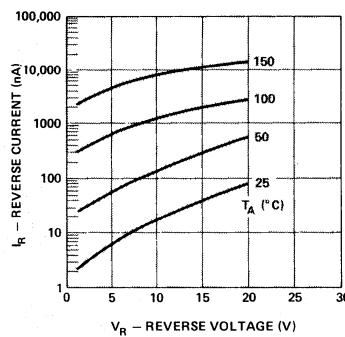


Figure 11. (5082-2811) Typical Variation of Reverse Current ( $I_R$ ) vs. Reverse Voltage ( $V_R$ ) at Various Temperatures.

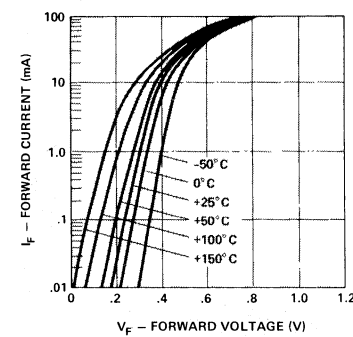


Figure 12. I-V Curve Showing Typical Temperature Variations for 5082-2835 Schottky Diode.

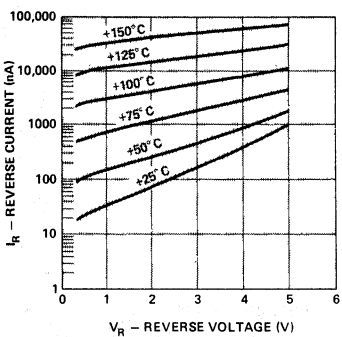


Figure 13. (5082-2835) Typical Variation of Reverse Current ( $I_R$ ) vs. Reverse Voltage ( $V_R$ ) at Various Temperatures.

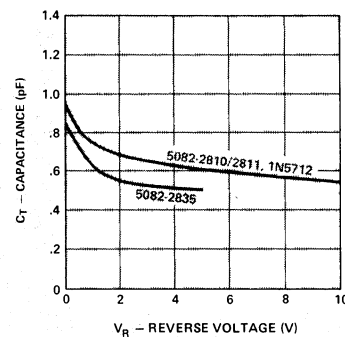


Figure 14. Typical Capacitance ( $C_T$ ) vs. Reverse Voltage ( $V_R$ ).

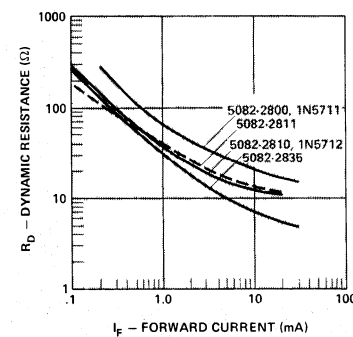


Figure 15. Typical Dynamic Resistance ( $R_D$ ) vs. Forward Current ( $I_F$ ).

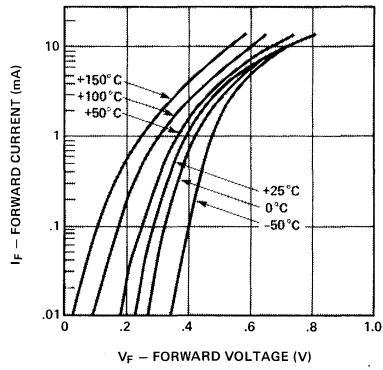


Figure 16. Typical Variation of Forward Current ( $I_F$ ) vs. Forward Voltage ( $V_F$ ) at Various Temperatures for the HSCH-1001.

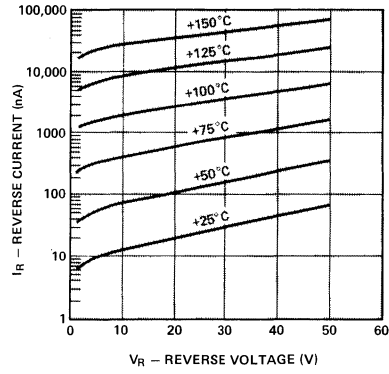


Figure 17. Typical Variation of Reverse Current ( $I_R$ ) vs. Reverse Voltage ( $V_R$ ) at Various Temperatures for the HSCH-1001.

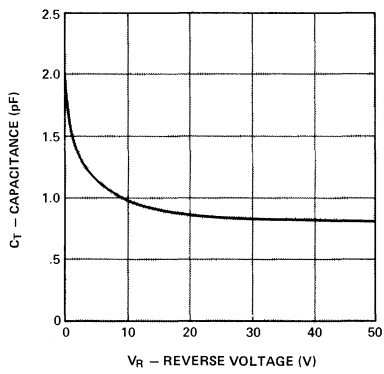


Figure 18. Typical Capacitance ( $C_T$ ) vs. Reverse Voltage ( $V_R$ ) for the HSCH-1001.

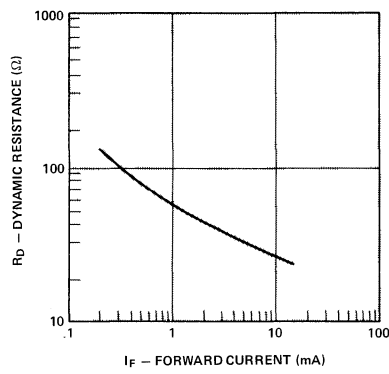


Figure 19. Typical Dynamic Resistance ( $R_D$ ) vs. Forward Current ( $I_F$ ) at  $T_A = 25^\circ\text{C}$  for the HSCH-1001.

Schottky Barrier Diodes