HEWLETT PACKARD

Surface Mount RF Schottky Barrier Diodes

Technical Data

HSMS-28XX Series

Features

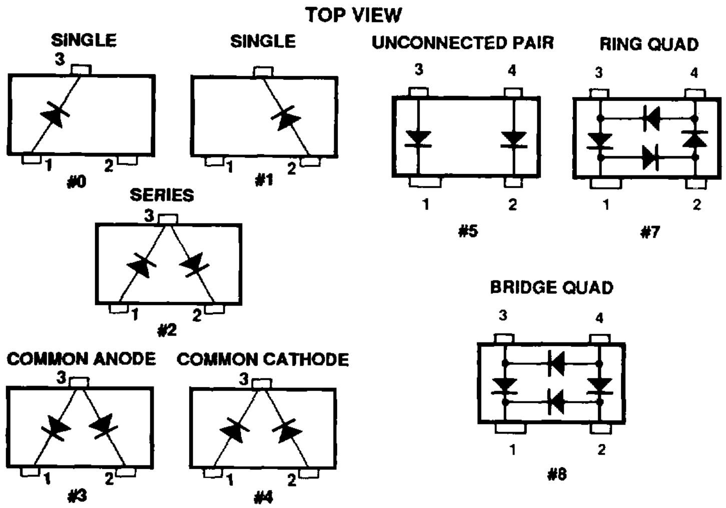
- **Surface Mount SOT-23/ SOT-143 Package**
- **Low Turn-On Voltage** (As Low as 0.34 V at 1 mA)
- **Low FIT (Failure in Time) Rate***
- **Six-sigma Quality Level**
- **Single, Dual and Quad Versions**
- **High and Low Profile Versions**
- **Tape and Reel Options Available**

*For more information see the Surface Mount Schottky Reliability Data Sheet.

Description/ Applications

These Schottky diodes are specifically designed for analog and digital applications requiring devices in the SOT-23 and SOT-143 surface mount packages. This series offers a wide range of specifications and package configurations to give the designer wide flexibility. Typical applications of these Schottky diodes are mixing, detecting, switching, sampling, clamping, and wave shaping.

Package Lead Code Identification



Absolute Maximum Ratings* $T_A = 25°C$

Symbol	Parameter	Value
I_f	Forward Current (1 μs Pulse)	1 Amp
P_t	Total Device Dissipation	250 mW[1]
PIV	Peak Inverse Voltage	Same as V_{BR}
T_j	Junction Temperature	150°C
T_{stg}	Storage Temperature	-65 to 150°C

*Operation in excess of any one of these conditions may result in permanent damage to this device.

Note:
1. CW Power Dissipation at $T_{LEAD} = 25°C$. Derate to zero at maximum rated temperature.

Ordering Information

See page 14-14.

Electrical Specifications $T_A = 25°C$, Single Diode[4]

Part Number HSMS[5]	Package Marking Code[3]	Lead Code	Configuration	Nearest Equivalent Axial Lead Part No. 5082-	Minimum Breakdown Voltage V_{BR} (V)	Maximum Forward Voltage V_F (mV)	Maximum Forward Voltage V_F (V) @ I_F (mA)	Maximum Reverse Leakage I_R (nA) @ V_R (V)	Maximum Capacitance C_T (pF)	Typical Dynamic Resistance R_D (Ω)
2800	A0	0	Single	2800 (1N5711)	70	410	1.0 15	200 50	2.0	35
2801	A1	1	Single							
2802	A2	2	Series							
2803	A3	3	Common Anode							
2804	A4	4	Common Cathode							
2805	A5	5	Unconnected Pair							
2807	A7	7	Ring Quad[6]							
2808	A8	8	Bridge Quad[6]							
2810	B0	0	Single	2810 (1N5712)	20	410	1.0 35	200 15	1.2	15
2811	B1	1	Single							
2812	B2	2	Series							
2813	B3	3	Common Anode							
2814	B4	4	Common Cathode							
2815	B5	5	Unconnected Pair							
2817	B7	7	Ring Quad[6]							
2818	B8	8	Bridge Quad[6]							
2820	C0	0	Single	2835	8*	340	0.5 1.0	100 1	1.0	10
2821	C1	1	Single							
2822	C2	2	Series							
2823	C3	3	Common Anode							
2824	C4	4	Common Cathode							
2825	C5	5	Unconnected Pair							
2827	C7	7	Ring Quad[6]							
2828	C8	8	Bridge Quad[6]							
2840	J0	0	Single		50	410	1.2 10	200 40	2.2	
2841	J1	1	Single							
Test Conditions					$I_R = 10\ \mu A$ $^*I_R = 100\ \mu A$	$I_F = 1$ mA[1]			$V_F = 0$ V f = 1.0 MHz[2]	$I_F = 5$ mA

Notes:

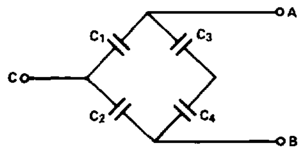
1. ΔV_F for diodes in pairs and quads in 15 mV maximum at 1 mA.
2. ΔC_{TO} for diodes in pairs and quads is 0.2 pF maximum.
3. Package marking code is in white. Package marking codes for low profile are designated by a suffix "L".
4. Effective Carrier Lifetime (τ) for all these diodes is 100 ps maximum measured with Krakauer method at 5 mA, except HSMS-282X which is measured at 20 mA.
5. Batch Matching available upon request.
   $\Delta V_F = 10$ mV at 10 mA;
   $\Delta C_T = 0.1$ pF at 0 V.
   Minimum batch size = 100.
6. See section titled "Quad Capacitance."

Quad Capacitance

Capacitance of Schottky diode quads is measured using an HP4271 LCR meter. This instrument effectively isolates individual diode branches form the others, allowing accurate capacitance measurement of each branch or each diode. The conditions are: 20 mV R.M.S. voltage at 1 MHz. HP defines this measurement as "CM", and it is equivalent to the capacitance of the diode by itself. The equivalent diagonal and adjacent capacitances can then be calculated by the formulas given below.

In a quad, the diagonal capacitance is the capacitance between points A and B as shown in figure below. The diagonal capacitance is calculated using the following formula

$$C_{DIAGONAL} = \frac{C_1 \times C_2}{C_1 + C_2} + \frac{C_3 \times C_4}{C_3 + C_4}$$



The equivalent adjacent capacitance is the capacitance between points A and C in figure below. This capacitance is calculated using the following formula

$$C_{ADJACENT} = C_1 + \frac{1}{\frac{1}{C_2} + \frac{1}{C_3} + \frac{1}{C_4}}$$

Typical Parameters at T_A = 25°C (unless otherwise noted), Single Diode

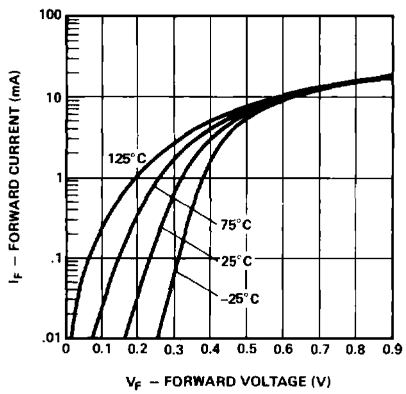


Figure 1. Forward Current vs. Forward Voltage at Temperatures - HSMS-2800 Series.

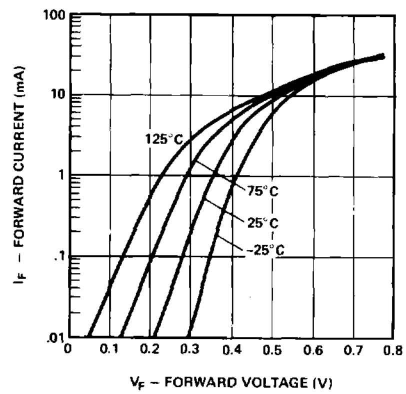


Figure 2. Forward Current vs. Forward Voltage at Temperatures - HSMS-2810 Series.

Typical Parameters (cont'd.)

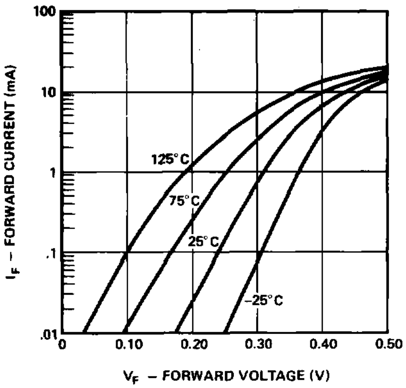


Figure 3. Forward Current vs. Forward Voltage at Temperatures – HSMS-2820 Series.

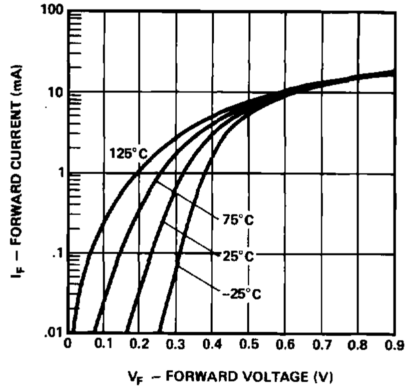


Figure 4. Forward Current vs. Forward Voltage at Temperatures – HSMS-2840 Series.

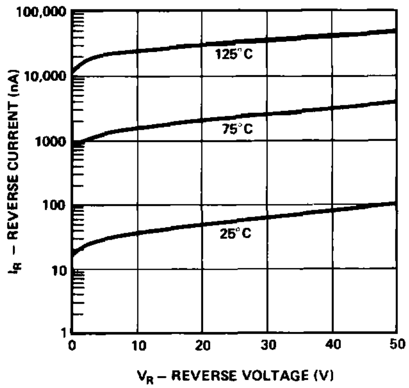


Figure 5. Reverse Current vs. Reverse Voltage at Temperatures – HSMS-2800 Series.

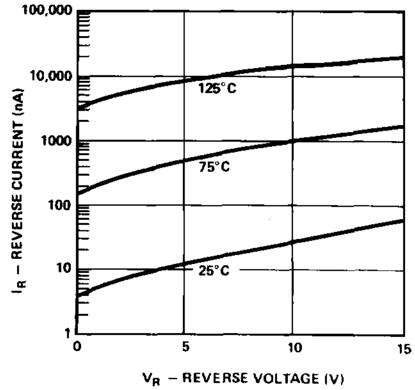


Figure 6. Reverse Current vs. Reverse Voltage at Temperatures – HSMS-2810 Series.

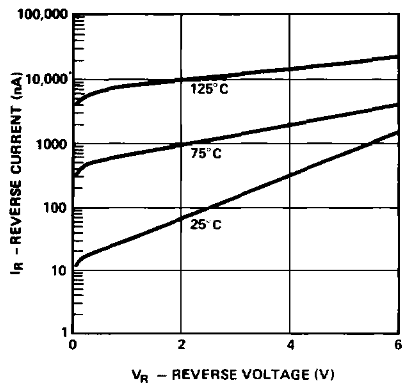


Figure 7. Reverse Current vs. Reverse Voltage at Temperatures – HSMS-2820 Series.

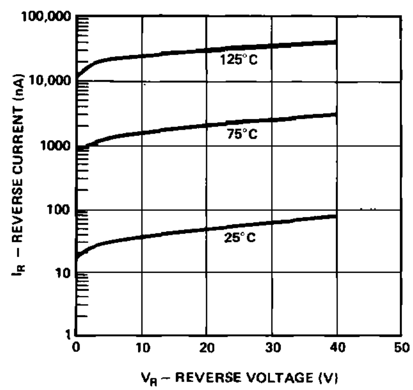


Figure 8. Reverse Current vs. Reverse Voltage at Temperatures – HSMS-2840 Series.

Typical Parameters (cont'd.)

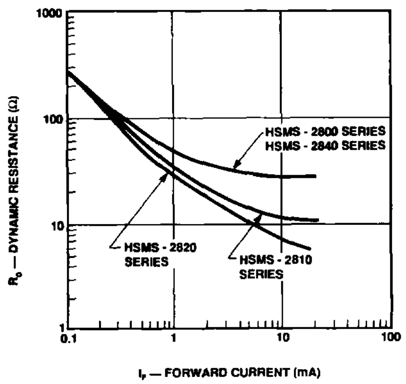


Figure 9. Dynamic Resistance vs. Forward Current – HSMS-2800 Series.

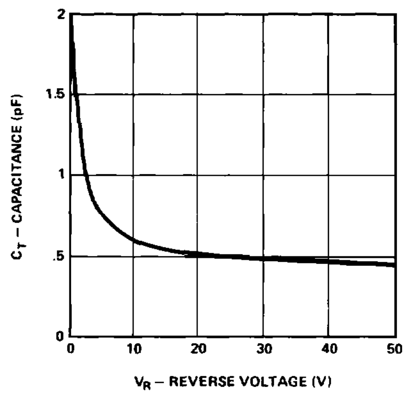


Figure 10. Total Capacitance vs. Reverse Voltage – HSMS-2800 Series.

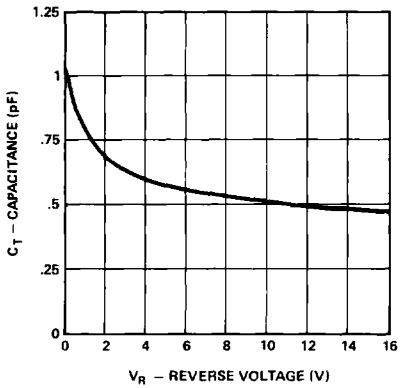


Figure 11. Total Capacitance vs. Reverse Voltage – HSMS-2810 Series.

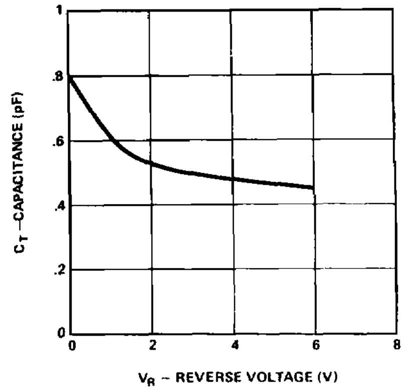


Figure 12. Total Capacitance vs. Reverse Voltage – HSMS-2820 Series.

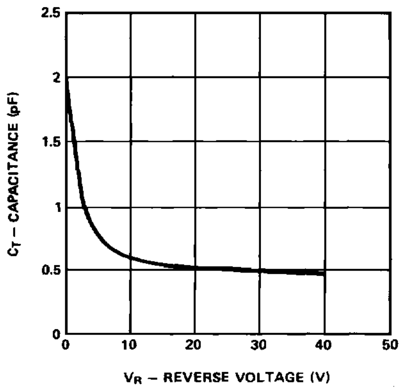
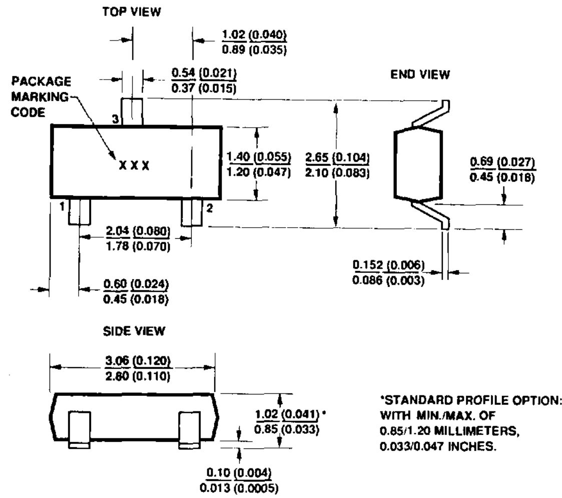


Figure 13. Total Capacitance vs. Reverse Voltage – HSMS-2840 Series.

Package Characteristics

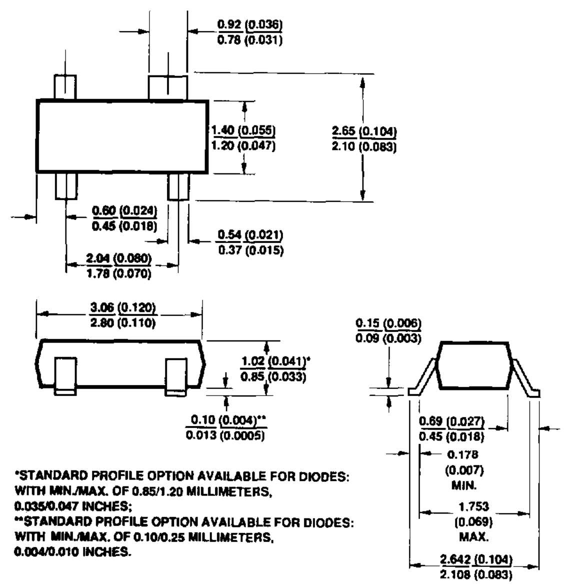
Lead Material .... Alloy 42
Lead Finish .... Tin-Lead, 60-40%
Max. Soldering Temperature ... 260°C for 5 sec
Min. Lead Strength .... 2 pounds pull
Typical Package
  Inductance .... 2 nH (opposite leads)
Typical Package
  Capacitance .... 0.08 pF (opposite leads)

Package Dimensions



DIMENSIONS ARE IN MILLIMETERS (INCHES)

Outline 23 (SOT-23)



DIMENSIONS ARE IN MILLIMETERS (INCHES)

Outline 143 (SOT-143)