

Surface Mount RF Schottky Barrier Diodes

Technical Data

HSMS-28XX Series

Features

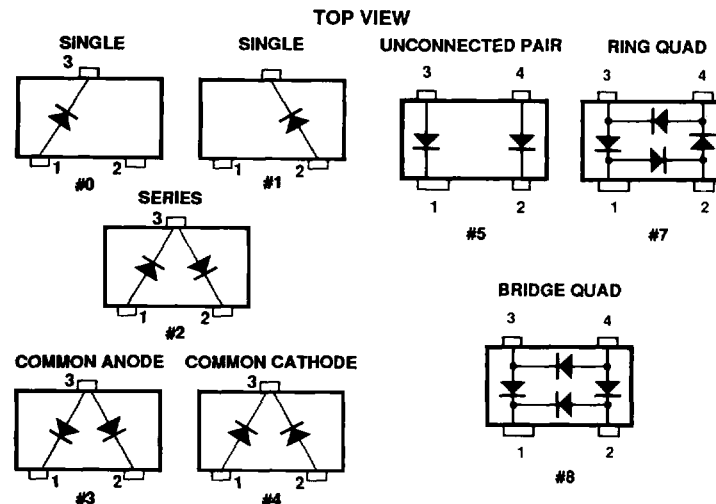
- Surface Mount SOT-23/
SOT-143 Package
- Low Turn-On Voltage
(As Low as 0.34 V at 1 mA)
- Low FIT (Failure in Time)
Rate*
- Six-sigma Quality Level
- Single, Dual and Quad
Versions
- High and Low Profile
Versions
- Tape and Reel Options
Available

*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* $T_A = 25^\circ\text{C}$

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 $T_{LEAD} = 25^\circ\text{C}$. Derate to zero at maximum rated temperature.

Ordering Information

See page 14-14.

Electrical Specifications $T_A = 25^\circ\text{C}$, Single Diode^[4]

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

Notes:

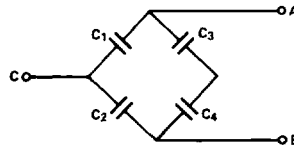
1. ΔV_F for diodes in pairs and quads in 15 mV maximum at 1 mA.
2. ΔC_{TO} for diodes in pairs and quads is 0.2 pF maximum.
3. Package marking code is in white. Package marking codes for low profile are designated by a suffix "L".
4. Effective Carrier Lifetime (τ) for all these diodes is 100 ps maximum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

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



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

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

Typical Parameters at $T_A = 25^\circ\text{C}$ (unless otherwise noted), Single Diode

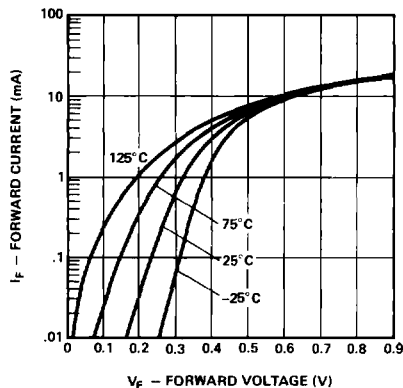


Figure 1. Forward Current vs. Forward Voltage at Temperatures - HSMS-2800 Series.

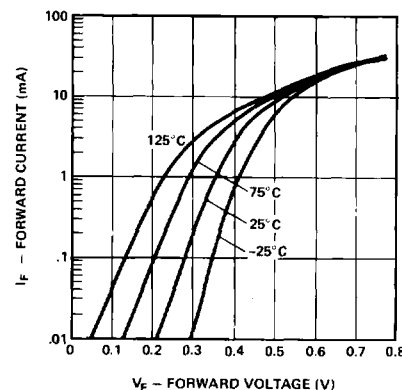


Figure 2. Forward Current vs. Forward Voltage at Temperatures - HSMS-2810 Series.

Typical Parameters (cont'd.)

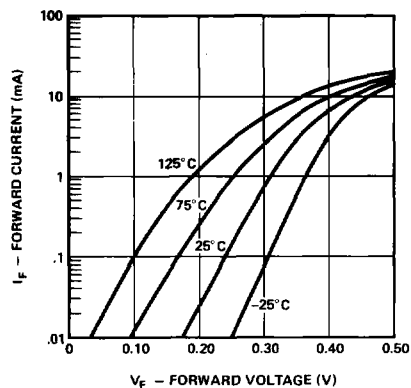


Figure 3. Forward Current vs. Forward Voltage at Temperatures - HSMS-2820 Series.

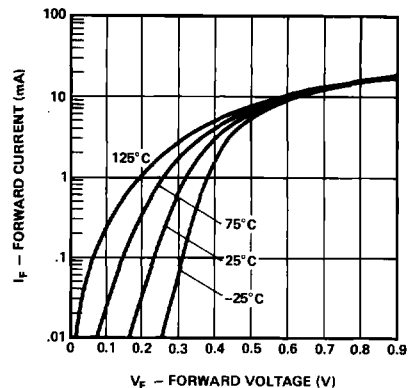


Figure 4. Forward Current vs. Forward Voltage at Temperatures - HSMS-2840 Series.

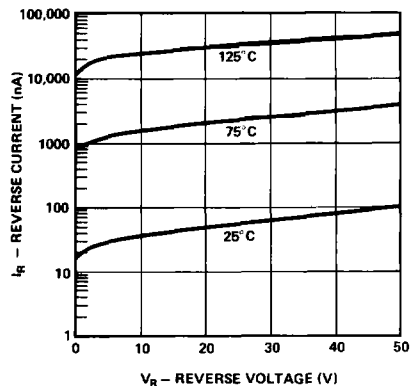


Figure 5. Reverse Current vs. Reverse Voltage at Temperatures - HSMS-2800 Series.

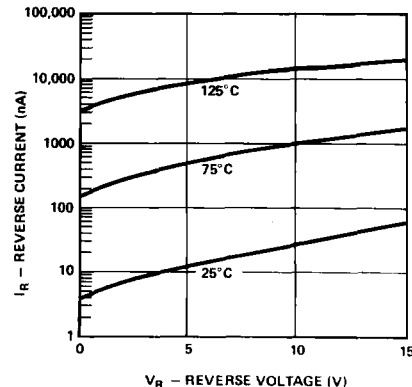


Figure 6. Reverse Current vs. Reverse Voltage at Temperatures - HSMS-2810 Series.

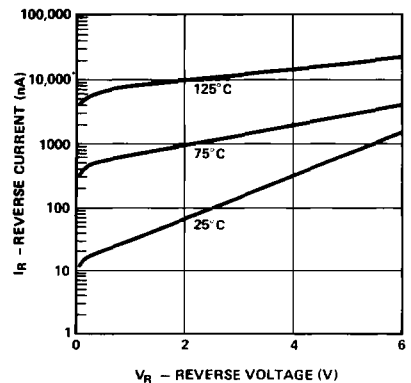


Figure 7. Reverse Current vs. Reverse Voltage at Temperatures - HSMS-2820 Series.

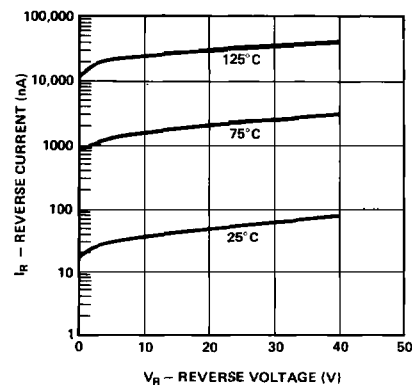


Figure 8. Reverse Current vs. Reverse Voltage at Temperatures - HSMS-2840 Series.

Typical Parameters (cont'd.)

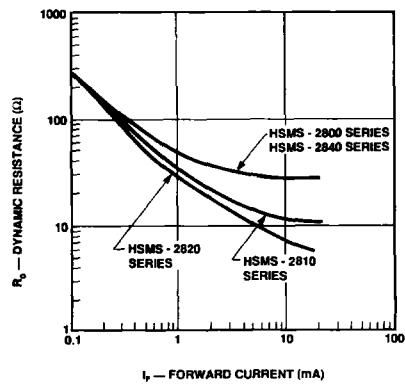


Figure 9. Dynamic Resistance vs. Forward Current - HSMS-2800 Series.

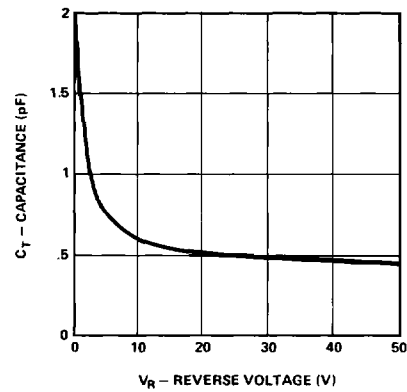


Figure 10. Total Capacitance vs. Reverse Voltage - HSMS-2800 Series.

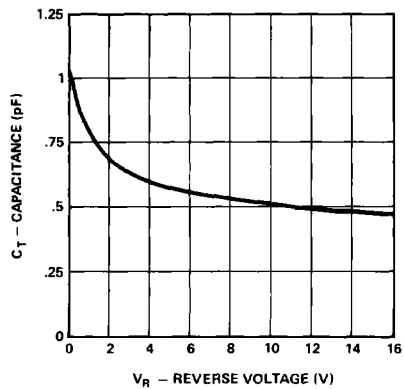


Figure 11. Total Capacitance vs. Reverse Voltage - HSMS-2810 Series.

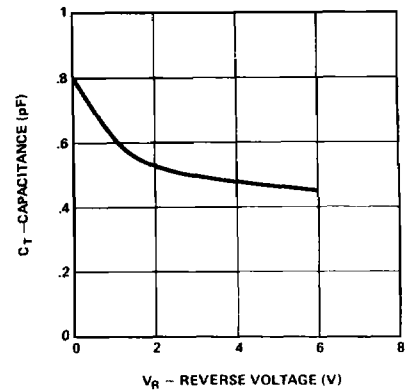


Figure 12. Total Capacitance vs. Reverse Voltage - HSMS-2820 Series.

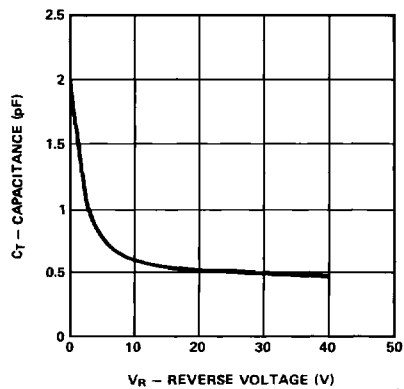


Figure 13. Total Capacitance vs. Reverse Voltage - HSMS-2840 Series.

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

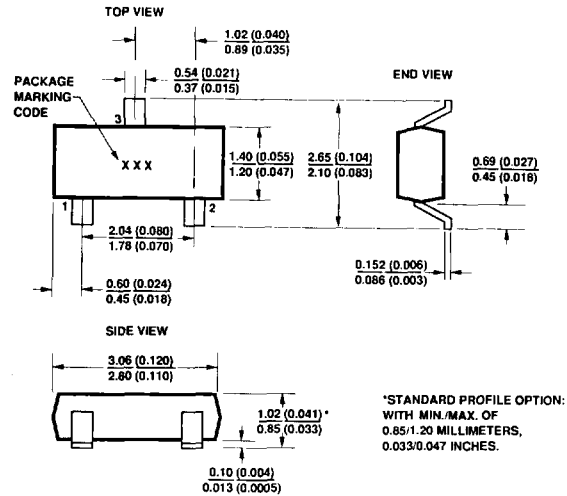
Typical Package

Inductance 2 nH (opposite leads)

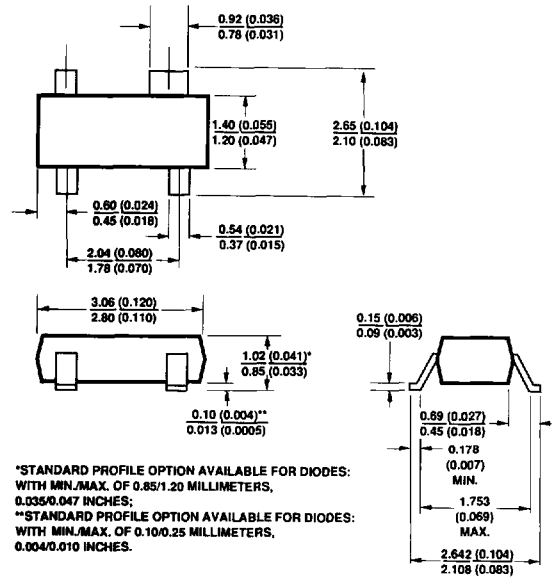
Typical Package

Capacitance 0.08 pF (opposite leads)

Package Dimensions



Outline 23 (SOT-23)



Outline 143 (SOT-143)