HEWLETT PACKARD

HIGH RELIABILITY SCHOTTKY BARRIER DIODES FOR MIXERS AND DETECTORS

(Generic 5082-2301, -2306, -2400, -2401)

HSCH-0813
HSCH-0814
HSCH-0815
HSCH-0816

Features

LOW 1/F NOISE

LOW AND STABLE NOISE FIGURE

HIGH UNIFORMITY

HIGH BREAKDOWN VOLTAGE: 30 VOLTS

MATCHED CHARACTERISTICS AVAILABLE

QUALITY PERFORMANCE TESTED
Test Program Patterned after MIL-S-19500

Description

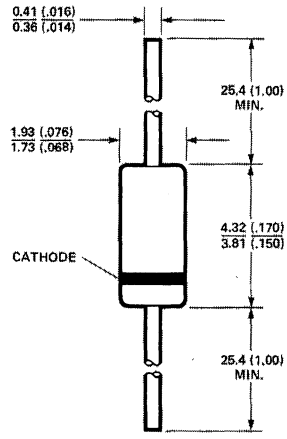
The HSCH-0813, -0814, -0815, -0816 devices are unpassivated Schottky diodes in a glass package. These diodes have extremely low 1/f noise and are ideal for low noise mixing, and high sensitivity detecting. They are particularly well suited for use in Doppler or narrow band video receivers.

Maximum Ratings

Junction Operating and Storage Temperature Range ..... -60° C to +100° C

Operation of these devices within the above temperature ratings will assure a device Mean Time To Failure (MTTF) of approximately 1 x 10^7 hours.

Power Dissipation at T_{CASE} = 25° C ..... 100 mW
Derate linearly at 1.33 mW/° C to zero at 100° C



DIMENSIONS IN MILLIMETERS (INCHES).

Outline 15

TABLE I. ELECTRICAL SPECIFICATIONS FOR RF TESTED DIODE AT T_A = 25° C

(Similar to 5082-2400)

Part Number HSCH-	Matched Pair* HSCH-	Barrier	LO Test Frequency (GHz)	Maximum SSB Noise Figure NF (dB)	IF Impedance Z_{IF} (Ω) Min.	Max.	Maximum SWR	Maximum Capacitance C_T (pF)	Minimum Breakdown Voltage V_{BR} (V)
0814	0813	Medium	2.0	6.0	150	350	1.3:1	1.0	30
Test Conditions	$\Delta NF \leq 0.3$ dB $\Delta Z_{IF} \leq 25\Omega$		LO Power = 1 mW IF = 30 MHz, 1.5 dB NF Zero DC Load Resistance		Same as for NF except IF = 10 KHz		Same as for NF	V_R = 0V f = 1.0 MHz	I_R = 10 μA

*Match performed after 100% screening.

ELECTRICAL SPECIFICATIONS FOR DC TESTED DIODE AT T_A = 25° C

(Similar to 5082-2301)

Part Number HSCH-	Matched Pair* HSCH-	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 I_R (nA) at	V_R (V)	Maximum Capacitance C_T (pF)
0816	0815	30	400	50	300	15	1.0
Test Conditions	$\Delta V_F \leq 10$ mV $\Delta C_O \leq 0.2$ pF	I_R = 10 μA	I_F = 1 mA				V_R = 0 V f = 1.0 MHz

*Match performed after 100% screening.

High Reliability Conditioning and Lot Acceptance

(All test methods are per MIL-STD-750 unless otherwise specified)

100% SCREENING PROGRAM

Screening Test/Inspection	MIL-STD-750 Method	Conditions/Comments
1. Internal Visual Inspection	—	Per H.P. Method A-5956-0562-72
2. High Temperature Storage (Stabilization Bake)	1032	t = 48 hours., T_A = 100° C
3. Thermal Shock (Temperature Cycling)	1051	Condition B, −55° C to +100° C
4. Constant Acceleration	2006	200 KG. Y_1 axis.
5. Hermeticity Tests Fine Leak Gross Leak	1071	Condition H. Condition E.
6. Interim Electrical Tests (V_{BR}, I_R, V_F)		Per Table I. T_A = 25° C.
7. Burn-in	1038	P_{FM} = 75 mW, V_R = 15 V (pk) T_A = 25° C f = 60 Hz., t = 168 hours
8. Final Electrical Tests (V_{BR}, I_R, V_F)		Per Table I. T_A = 25° C
9. Drift Evaluation PDA = 10%[1]		ΔI_R = 200 nA or 100% whichever is greater. ΔV_F = ±50 mV.
10. Electrical Tests (NF, SWR) HSCH-0813 and HSCH-0814 only		

Note:
1. If rejects are greater than 10% but less than 20%, one more burn-in may be performed with a new 10% PDA.

GROUP A INSPECTION

Screening Test/Inspection	MIL-STD-750 Method	Conditions/Comments	LTPD
Subgroup 1 External Visual and Mechanical	2071		5
Subgroup 2 Electrical Test (C_T)		Per Table I.	10
Subgroup 3 D.C. and RF Parameters at 25° C		Satisfied by 100% measurements at post burn-in.	

GROUP B INSPECTION

Test/Inspection	MIL-STD-750 Method	Conditions/Comments	LTPD
Subgroup 1 Moisture Resistance End Points (V_{BR}, I_R, V_F)	1021	Omit initial conditioning Per Table I.	10
Subgroup 2 High Temperature Non Operating Life End Points (V_{BR}, I_R, V_F)	1031	T_A = 100° C, t = 1000 hours Per Table I.	10
Subgroup 3 Operating Life End Points (V_{BR}, I_R, V_F)	1038	P_{FM} = 75 mW, V_R = 15 V (peak), f = 60 Hz, T_A = 25° C, t = 1000 hours.	10