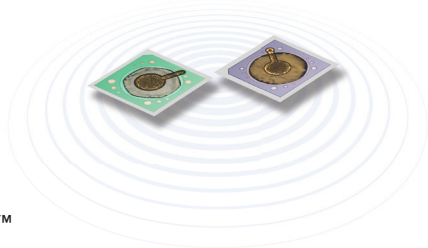
Silicon Schottky Diode Chips for Mixer and Detector Applications

Features



- For detector and mixer applications
- Low capacitance for usage beyond 40 GHz
- ZBD and low-barrier designs
- P-type and N-type junctions
- Large bond pad chip design
- Available lead (Pb)-free, RoHS-compliant, and Green™

Description

Skyworks silicon Schottky diode chips are intended for use as detector and mixer devices in hybrid integrated circuits at frequencies from below 100 MHz to higher than 40 GHz. Skyworks "Universal Chip" design features a 4-mil-diameter bond pad that is offset from the semiconductor junction preventing damage to the active junction as a result of wire bonding. As power-sensing detectors, these Schottky diode chips all have the same voltage sensitivity so long as the output video impedance is much higher than the video resistance of the diode. Figure 1 shows the expected detected voltage sensitivity as a function of RF source impedance in an untuned circuit. Note that sensitivity is substantially increased by transforming the source impedance from 50 Ω to higher values. Maximum sensitivity occurs when the source impedance equals the video resistance.

In a detector circuit operating at zero bias, depending on the video load impedance, a ZBD device with RV less than 10 kΩ may be more sensitive than a low-barrier diode with RV greater than 100 kΩ. Applying forward bias reduces the diode video resistance as shown in Figure 2. Lower video resistance also increases the video bandwidth but does not increase voltage sensitivity, as shown in Figure 3. Biased Schottky diodes have better temperature stability and also may be used in temperature compensated detector circuits. P-type Schottky diodes generate lower 1/F noise and are preferred for Doppler mixers and biased detector applications. The bond pad for the P-type Schottky diode is the cathode. N-type Schottky diodes have lower parasitic resistance, R_s, and will perform with lower conversion loss in mixer circuits. The bond pad for the N-type Schottky diode is the anode.

Silicon Schottky Diode Chips

Part Number	Barrier	Junction Type	Max. C_J (pF)	Max. R_T (Ω)	Min.–Max. V_F @ 1 mA (mV)	Min. V_B (V)	Typ. R_V @ 0 Bias (Ω)
CDB7619-000	Low	P	0.10	40	275–375	2	735
CDB7620-000	Low	P	0.15	30	250–350	2	537
CDC7630-000	ZBD	P	0.25	30	135–240	1	5.5
CDC7631-000	ZBD	P	0.15	80	150–300	2	7.2
CDF7621-000	Low	N	0.10	20	270–350	2	680
CDF7623-000	Low	N	0.30	10	240–300	2	245

Skyworks Green™ products are lead (Pb)-free, Restriction of Hazardous Substances (RoHS)-compliant, conform to the EIA/EICTA/JEITA Joint Industry Guide (JIG) Level A guidelines, and are free from antimony trioxide, and brominated flame retardants.