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[Intersil](#)
[CA3039](#)

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**OBSOLETE PRODUCT
 NO RECOMMENDED REPLACEMENT**
 Call Central Applications 1-888-INTERSIL
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Features

- Six Matched Diodes on a Common Substrate
- Excellent Reverse Recovery Time 1ns (Typ)
- V_F Match 5mV (Max)
- Low Capacitance $C_D = 0.65\text{pF}$ (Typ) at $V_R = -2\text{V}$

Applications

- Ultra-Fast Low Capacitance Matched Diodes for Applications in Communications and Switching Systems
- Balanced Modulators or Demodulators
- Ring Modulators
- High Speed Diode Gates
- Analog Switches

Description

The CA3039 consists of six ultra-fast, low capacitance diodes on a common monolithic substrate. Integrated circuit construction assures excellent static and dynamic matching of the diodes, making the array extremely useful for a wide variety of applications in communication and switching systems.

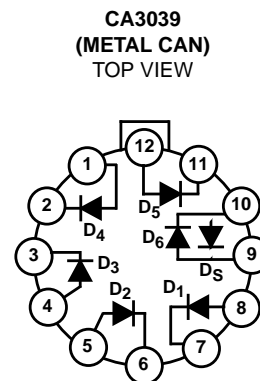
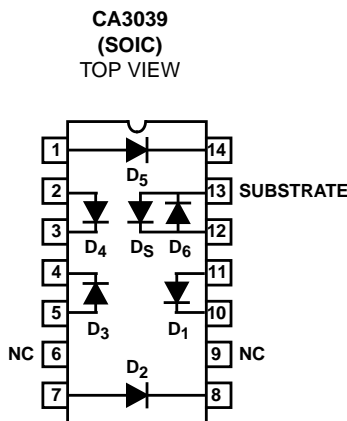
Five of the diodes are independently accessible, the sixth shares a common terminal with the substrate.

For applications such as balanced modulators or ring modulators where capacitive balance is important, the substrate should be returned to a DC potential which is significantly more negative (with respect to the active diodes) than the peak signal applied.

Part Number Information

PART NUMBER	TEMP. RANGE (°C)	PACKAGE	PKG. NO.
CA3039	-55 to 125	12 Pin Metal Can	T12.B
CA3039M	-55 to 125	14 Ld SOIC	M14.15
CA3039M96	-55 to 125	14 Ld SOIC Tape and Reel	M14.15

Pinouts



CA3039

Absolute Maximum Ratings

Inverse Voltage (PIV) for: D ₁ - D ₅	5V
D ₆	0.5V
Diode-to-Substrate Voltage (V _{DI}) for D ₁ - D ₅	20V, -1V (Terminal 1, 4, 5, 8 or 12 to Terminal 10)
DC Forward Current (I _F)	25mA
Recurrent Forward Current (I _F)	100mA
Forward Surge Current (I _{F(SURGE)})	100mA

Thermal Information

Thermal Resistance (Typical, Note 1)	θ_{JA} (°C/W)	θ_{JC} (°C/W)
Metal Can Package	200	120
SOIC Package	220	N/A
Maximum Power Dissipation (Any One Diode)	100mW	
Maximum Junction Temperature (Metal Can Package)	175°C	
Maximum Junction Temperature (Plastic Package)	150°C	
Maximum Storage Temperature Range	-65°C to 150°C	
Maximum Lead Temperature (Soldering 10s)	300°C (SOIC - Lead Tips Only)	

Operating Conditions

Temperature Range

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTE:

- θ_{JA} is measured with the component mounted on an evaluation PC board in free air.

Electrical Specifications $T_A = 25^\circ\text{C}$; Characteristics apply for each diode unit, Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
DC Forward Voltage Drop (Figure 1)	V_F	$I_F = 50\mu\text{A}$	-	0.65	0.69	V
		$I_F = 1\text{mA}$	-	0.73	0.78	V
		$I_F = 3\text{mA}$	-	0.76	0.80	V
		$I_F = 10\text{mA}$	-	0.81	0.90	V
DC Reverse Breakdown Voltage	$V_{(BR)R}$	$I_R = -10\mu\text{A}$	5	7	-	V
DC Reverse Breakdown Voltage Between Any Diode Unit and Substrate	$V_{(BR)R}$	$I_R = -10\mu\text{A}$	20	-	-	V
DC Reverse (Leakage) Current (Figure 2)	I_R	$V_R = -4\text{V}$	-	0.016	100	nA
DC Reverse (Leakage) Current Between Any Diode Unit and Substrate (Figure 3)	I_R	$V_R = -10\text{V}$	-	0.022	100	nA
Magnitude of Diode Offset Voltage (Note 2) (Figure 1)	$ V_{F1} - V_{F2} $	$I_F = 1\text{mA}$	-	0.5	5.0	mV
Temperature Coefficient of $ V_{F1} - V_{F2} $ (Figure 4)	$\frac{\Delta V_{F1} - V_{F2} }{\Delta T}$	$I_F = 1\text{mA}$	-	1.0	-	$\mu\text{V}/^\circ\text{C}$
Temperature Coefficient of Forward Drop (Figure 5)	$\frac{\Delta V_F}{\Delta T}$	$I_F = 1\text{mA}$	-	-1.9	-	$\text{mV}/^\circ\text{C}$
DC Forward Voltage Drop for Anode-to-Substrate Diode (D ₅)	V_F	$I_F = 1\text{mA}$	-	0.65	-	V
Reverse Recovery Time	t_{RR}	$I_F = 10\text{mA}, I_R = -10\text{mA}$	-	1.0	-	ns
Diode Resistance (Figure 6)	R_D	$f = 1\text{kHz}, I_F = 1\text{mA}$	25	30	45	Ω
Diode Capacitance (Figure 7)	C_D	$V_R = -2\text{V}, I_F = 0$	-	0.65	-	pF
Diode-to-Substrate Capacitance (Figure 8)	C_{DI}	$V_{DI} = 4\text{V}, I_F = 0$	-	3.2	-	pF

NOTE:

- Magnitude of Diode Offset Voltage is the difference in DC Forward Voltage Drops of any two diode units.

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Typical Performance Curves

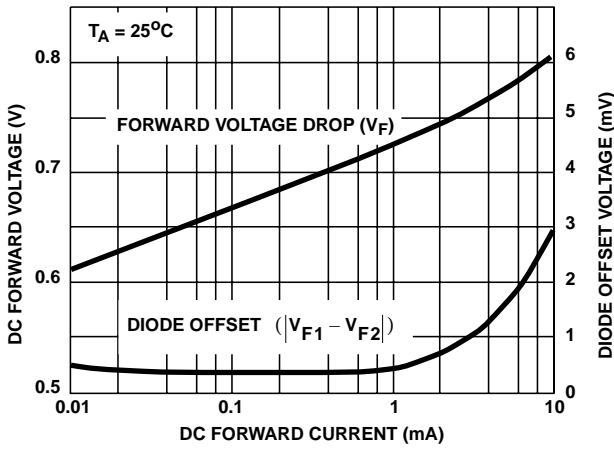


FIGURE 1. DC FORWARD VOLTAGE DROP (ANY DIODE) AND DIODE OFFSET VOLTAGE vs DC FORWARD CURRENT

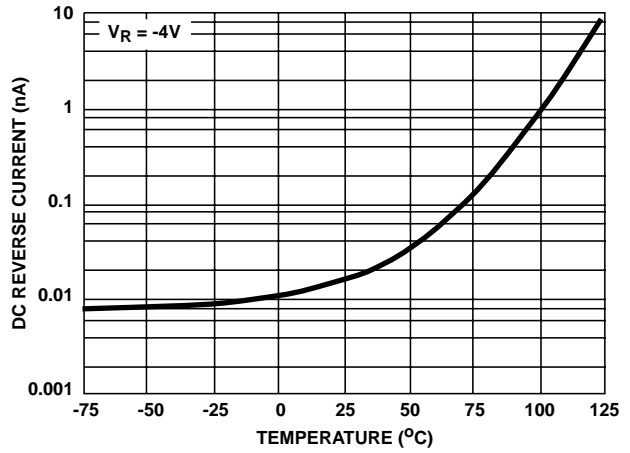


FIGURE 2. DC REVERSE (LEAKAGE) CURRENT (D₁ - D₅) vs TEMPERATURE

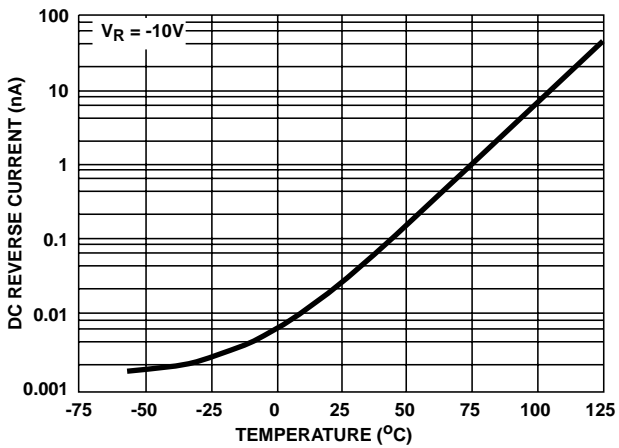


FIGURE 3. DC REVERSE (LEAKAGE) CURRENT BETWEEN D₁, D₂, D₃, D₄, D₅ AND SUBSTRATE vs TEMPERATURE

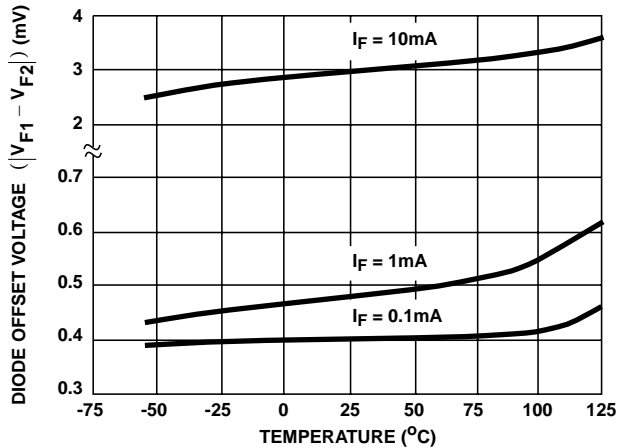


FIGURE 4. DIODE OFFSET VOLTAGE (ANY DIODE) vs TEMPERATURE

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Typical Performance Curves (Continued)

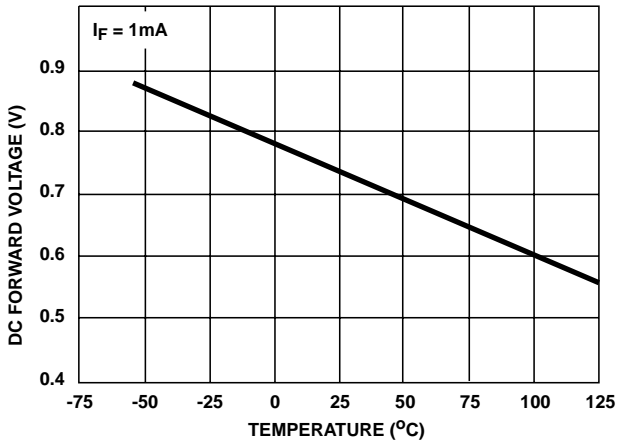


FIGURE 5. DC FORWARD VOLTAGE DROP (ANY DIODE) vs TEMPERATURE

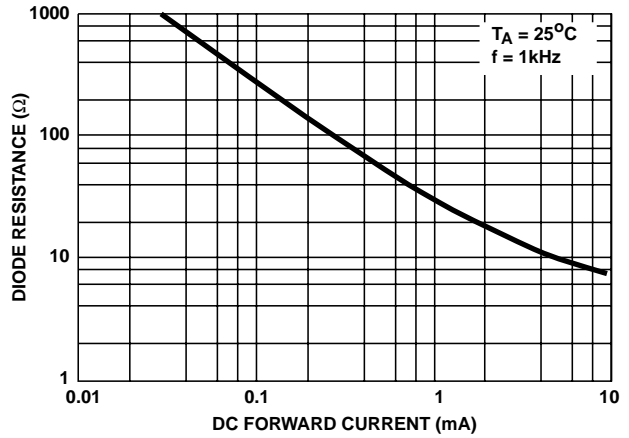


FIGURE 6. DIODE RESISTANCE (ANY DIODE) vs DC FORWARD CURRENT

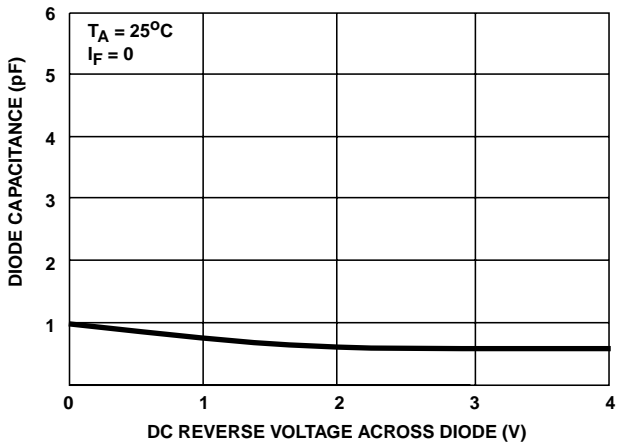


FIGURE 7. DIODE CAPACITANCE (D₁ - D₅) vs REVERSE VOLTAGE

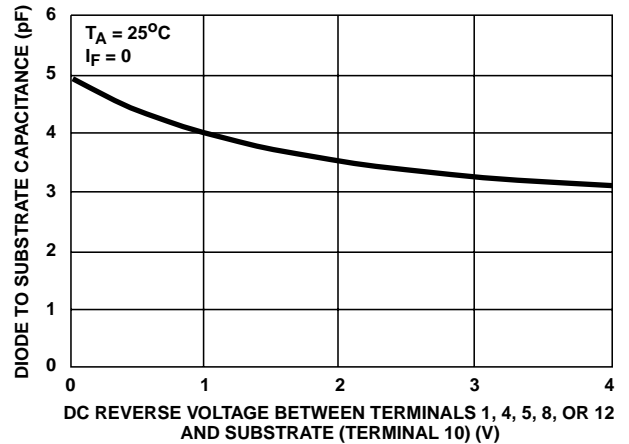


FIGURE 8. DIODE-TO-SUBSTRATE CAPACITANCE vs REVERSE VOLTAGE

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