T-43-24

CA3019

Ultra-Fast Low-Capacitance Matched Diodes

For Applications in Communications and Switching Systems

Features:

- *Excellent diode match*
- *Low leakage current*
- *Low pedestal voltage when gating*
- *Companion Application Note, ICAN-5299: "Application of the RCA-CA3019 Integrated-Circuit Diode Array"*

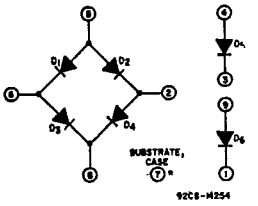
The RCA-CA3019 consists of six ultra-fast, low capacitance diodes on a common monolithic substrate. Integrated circuit construction assures excellent static and dynamic matching of the diodes, making the array extremely useful for a wide variety of applications in communication and switching systems.

Four of the diodes are internally connected as a "quad" and two are independently accessible. The substrate is internally connected to the 10-lead TO-5-style case.

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.

Applications:

- *Modulator*
- *Mixer*
- *Balanced modulator*
- *Analog switch*
- *Diode gate for chopper-modulator applications*



*Connect to most negative circuit potential.

Fig. 1 — Schematic Diagram.

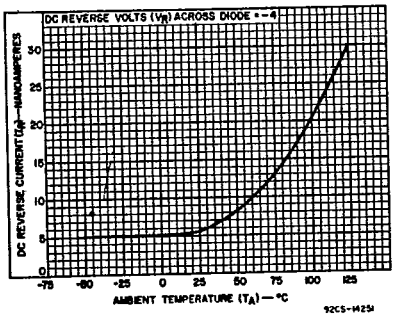


Fig. 3 – Reverse (leakage) current (any diode) as a function of temperature.

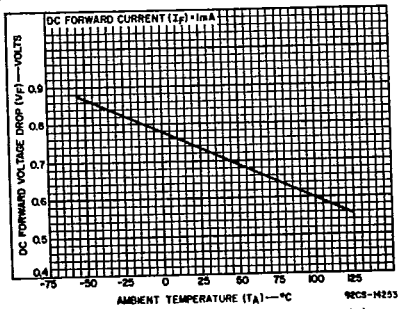


Fig. 2 – DC forward voltage drop (any diode) as a function of temperature.

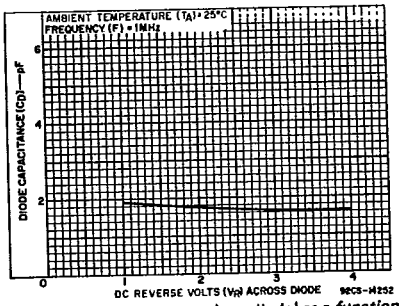


Fig. 4 – Diode capacitance (any diode) as a function of reverse voltage.

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Absolute-Maximum Ratings:

DISSIPATION:
- Any one diode unit . . . 20 max. mW
- Total for device . . . . 120 max. mW

TEMPERATURE RANGE:
- Storage . . . . . −65 to +200 °C
- Operating . . . . . −55 to +125 °C

DC Forward Current, I_F . . 25 mA

Peak Recurrent Forward Current, I_f . . . . . 100 mA

Peak Forward Surge Current, I_f (surge) . . . 100 mA

VOLTAGE: See Table

Absolute-Maximum Voltage Limits:

TERM.	VOLTAGE LIMITS		CONDITIONS	
	NEG.	POS.	TERM.	VOLT.
1	−3	+12	7	−6
2	−3	+12	7	−6
3	−3	+12	7	−6
4	−3	+12	7	−6
5	−3	+12	7	−6
6	−3	+12	7	−6
7	−18	0	1,2, 3,6, 8	0
8	−3	+12	7	−6
9	−3	+12	7	−6
10	NO CONNECTION			
CASE	INTERNALLY CONNECTED TO TERMINAL 7 **DO NOT GROUND**			

ELECTRICAL CHARACTERISTICS, at $T_A = 25°C$

Characteristics Apply for Each Diode Unit, Unless Otherwise Specified

CHARACTERISTICS	SPECIAL TEST CONDITIONS	LIMITS TYPE CA3019			Units
		Min.	Typ.	Max.	
DC Forward Voltage Drop	DC Forward Current (I_F) = 1 mA	–	0.73	0.78	V
DC Reverse Breakdown Voltage	DC Reverse Current (I_R) = −10 μA	4	6	–	V
DC Reverse Breakdown Voltage Between any Diode Unit and Substrate	DC Reverse Current (I_R) = −10 μA	25	80	–	V
DC Reverse (Leakage) Current	DC Reverse Voltage (V_R) = −4 V	–	0.0055	10	μA
DC Reverse (Leakage) Current Between any Diode Unit and Substrate	DC Reverse Voltage (V_R) = −4 V	–	0.010	10	μA
Magnitude of Diode Offset Voltage (Difference in DC Forward Voltage Drops of any Two Diode Units)	DC Forward Current (I_F) = 1 mA	–	1	5	mV
Single Diode Capacitance	Frequency (f) = 1 MHz DC Reverse Voltage (V_R) = −2V	–	1.8	–	pF
Diode Quad-to-Substrate Capacitance	Frequency (f) = 1 MHz DC Reverse Voltage (V_R) between Terminal 2,5,6, or 8 of Diode Quad and Terminal 7 (Substrate) = −2 V				
	Terminal 2 or 6 to Terminal 7	–	4.4	–	pF
	Terminal 5 or 8 to Terminal 7	–	2.7	–	pF
Series Gate Switching Pedestal Voltage		–	10	–	mV