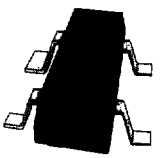
GaAs MMIC Control FET in SOT 143
DC–2.5 GHz

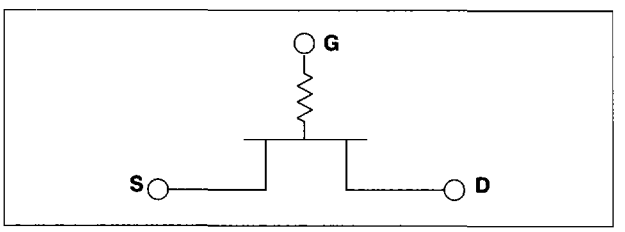
Alpha

AF002C1–32

Features

- Low Cost
- Small SOT 143 Package
- Series or Shunt Configuration
- Low DC Current Drain
- Ideal Switch Building Block





Description

The AF002C1–32 consists of a single GaAs switching FET that can be used in both series and shunt configurations. A positive control voltage may be used by simply adding 3 DC blocking capacitors.

Isolation performance degrades at higher frequencies due to package parasitics. These parasitics can be tuned out in narrow band applications as shown in a AF002C1–39 data sheet.

Absolute Maximum Ratings

RF Input Power:	2W > 500 MHz 0/–8V
	0.5W @ 50 MHz 0/–8V
Control Voltage:	+0.2V, –10V
Operating Temperature:	–40°C to 85°C
Storage Temperature:	–65°C to 150°C
Θ_{JC}:	25°C/W

Note: Exceeding these parameters may cause irreversible damage.

Electrical Specifications at 25°C

R_{ON}[1]	C_{OFF}[2]	Insertion Loss 1 GHz[3,4]	
		Series	Shunt
6.4	0.13	0.7 dB	0.2

1. R_{ON} – Resistance in ohms in low impedance state when '0' Volts is applied on Gate (G).
2. C_{OFF} – Capacitance (FET) in pF in high impedance state when –5V is applied on Gate (G).
3. Package inductance is 3 nH, package capacitance is 0.17 pf.
4. Insertion loss changes by 0.003 dB/°C.

Operating Characteristics at 25°C

Switching Characteristics				
RISE, FALL (10/90% or 90/10% RF)		3	ns	Typ
ON, OFF (50% CTL to 90/10% RF)		6	ns	Typ
Input Power for 1 dB Compression				
Control Voltages (Vdc)	**0/–5**	**0/–8**		
0.5–2.0 GHz	+20	24	dBm	Typ
Control Voltages				
V_0 (Low)	0 to –0.2V @ 20 µA Max			
V_0 (High)	–5V @ 50 µA to –9V @ 200 µA Max			

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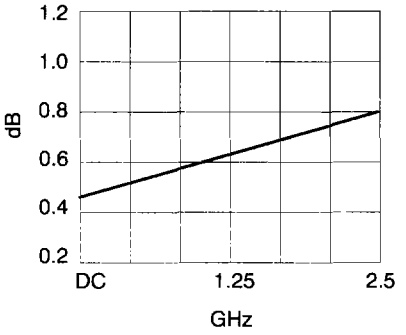
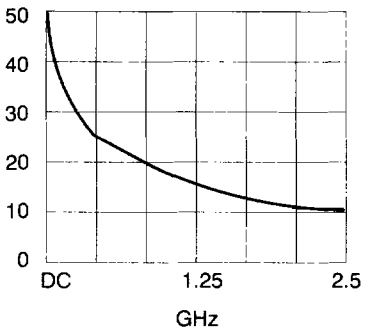
Typical Performance Data

Series Configuration (Not Tuned)

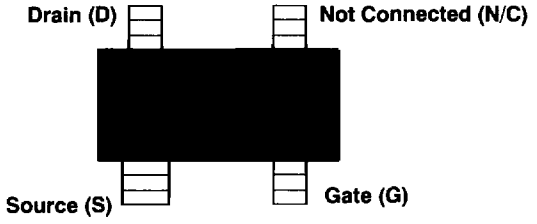


Insertion Loss vs. Frequency



Isolation vs. Frequency

Pin Out



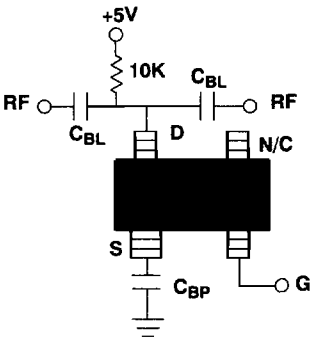
Source and drain on control FETs are interchangeable.

Truth Table (Negative Voltage Operation)

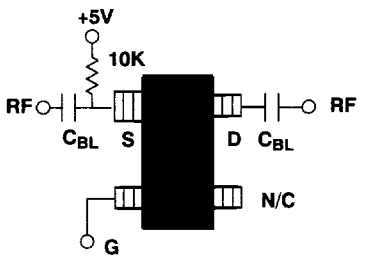
Shunt			
S	**D**	**G**	**State**
GND	RF	–5	Insertion Loss
		0	Isolation
Series			
RF	RF	–5	Isolation
		0	Insertion Loss

Positive Voltage Operation

Shunt



Series



C_{BL}, C_{BP} – Choose value for low impedance at desired operating frequency.

Truth Table (Positive Voltage Operation)

Shunt			
S	**D**	**G**	**State**
GND	RF	0	Insertion Loss
		+5	Isolation
Series			
RF	RF	0	Isolation
		+5	Insertion Loss