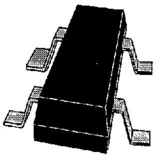
GaAs MMIC Control FET in SOT 143
DC–2.5 GHz

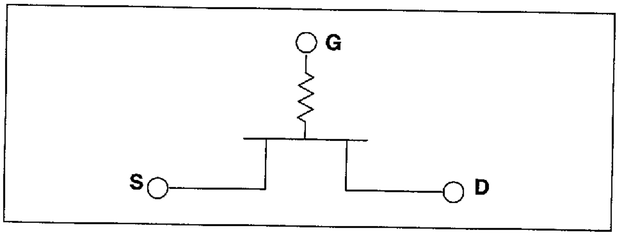
Alpha

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

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

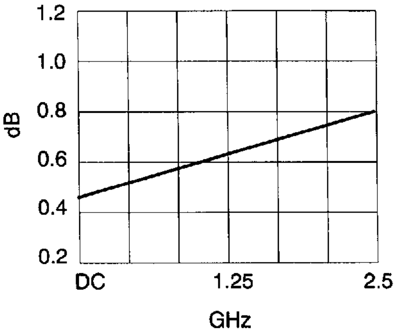
1. R_{ON} – Resistance in ohms in low impedance state when '0' Volts is applied on Gate (G).
2. C_{OFF} – Capacitance (FET) in pF in high impedance state when –5V is applied on Gate (G).
3. Package inductance is 3 nH, package capacitance is 0.17 pf.
4. Insertion loss changes by 0.003 dB/°C.

Operating Characteristics at 25°C

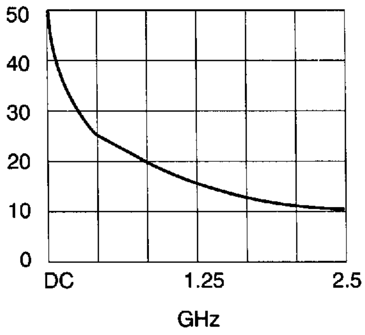
Switching Characteristics				
RISE, FALL (10/90% or 90/10% RF)		3	ns	Typ
ON, OFF (50% CTL to 90/10% RF)		6	ns	Typ
Input Power for 1 dB Compression				
Control Voltages (Vdc)	**0/–5**	**0/–8**		
0.5–2.0 GHz	+20	24	dBm	Typ
Control Voltages				
V_0 (Low)	0 to –0.2V @ 20 µA Max			
V_0 (High)	–5V @ 50 µA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

Typical Performance Data

Series Configuration (Not Tuned)

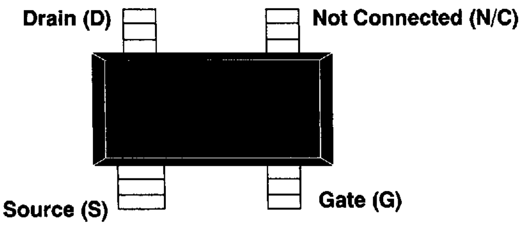


Insertion Loss vs. Frequency



Isolation vs. Frequency

Pin Out



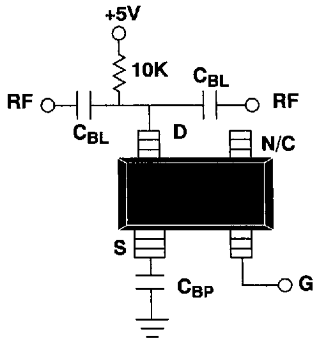
Source and drain on control FETs are interchangeable.

Truth Table (Negative Voltage Operation)

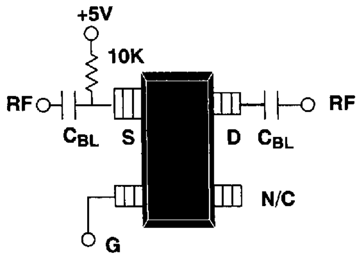
S	D	G	State
Shunt			
GND	RF	–5	Insertion Loss
		0	Isolation
Series			
RF	RF	–5	Isolation
		0	Insertion Loss

Positive Voltage Operation

Shunt



Series



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

Truth Table (Positive Voltage Operation)

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

RF GaAs MMIC Products in Metal Packages

Numerical Index

Part Number	Page	Part Number	Page	Part Number	Page
AD004T2–00	2–44	AK006R2–01	2–30	AS006M1–01	2–8
AD004T2–11	2–44	AK006R2–10	2–30	AS006M1–10	2–8
AE002M2–29	2–74	AK006R2–00	2–28	AS006M2–00	2–16
AE002M4–05	2–42	AK402D4–11	2–64	AS006M2–01	2–22
AH002R2–11	2–26	AK402D4–31	2–68	AS006M2–10	2–22
AK002D2–11	2–70	AN002M2–29	2–72	AS006R1–00	2–4
AK002D4–11	2–62	AN002M4–31	2–38	AS006R2–00	2–16
AK002D4–31	2–66	AN002M4–05	2–40	AS006R2–01	2–20
AK002M4–00	2–36	AS002M4–00	2–34	AS006R2–10	2–20
AK002M4–31	2–38	AS004L1–08	2–6	AS406M2–01	2–24
AK004L1–11	2–12	AS004L1–11	2–6	AS406R2–01	2–24
AK004M1–11	2–14	AS004L2–11	2–18	AT001D3–11	2–60
AK004M2–11	2–32	AS004M1–08	2–8	AT001D4–31	2–56
AK004R2–11	2–30	AS004M1–11	2–8	AT001D6–31	2–58
AK006L1–00	2–10	AS004M2–08	2–22	AT002D8–31	2–54
AK006L1–01	2–12	AS004M2–11	2–22	AT002N5–00	2–49
AK006L1–10	2–12	AS004R2–08	2–20	AT002N5–01	2–49
AK006M1–00	2–10	AS004R2–11	2–20	AT002N5–10	2–49
AK006M1–01	2–14	AS006L1–00	2–4	AT002N5–11	2–49
AK006M1–10	2–14	AS006L1–01	2–6	AT002S3–11	2–52
AK006M2–01	2–32	AS006L1–10	2–6	AT004N3–11	2–46
AK006M2–10	2–32	AS006L2–00	2–18	AT006N3–00	2–46
AK006M2–00	2–28	AS006L2–01	2–18	AT006N3–10	2–46
AK006R1–00	2–10	AS006M1–00	2–4	AT006N3–01	2–46