SKYWORKS

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Silicon Driver Chips for the GaAs IC Switch and Digital Attenuator

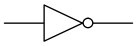
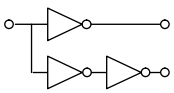
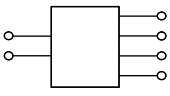
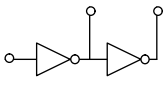
A very important feature of the GaAs IC switch is the low current flow during either the "on" or "off" state. The current that flows when a FET is reversed biased at -5 V (series FET in the "off" state and shunt FET in the "on" state) is the leakage across the FET (gate to source and gate to drain). This current is typically < 25 µA.

Therefore, taking advantage of this feature, it is desirable to use drivers that are primarily voltage devices with very little current consumption for their operation. Consequently CMOS logic devices are ideal for this application.

In the table below are listed a few of the many CMOS chips that may be utilized with the GaAs IC switches and digital attenuators. These chips are moderately fast, 15–100 ns switching time and can satisfy a large percent of the control device applications. To fully obtain the very fast FET response, 3–10 ns, discrete hybrid silicon or GaAs drivers are required.

Skywork Solution Inc. offers a limited number of special CMOS silicon decoder chips to simplify control of our multithrow switches. Contact factory for availability for large volume applications.

Commercial GaAs IC Driver Chips

Driver Chips	Transition Time 10/90% or 90/10% RF	Switching Speed 50% CTL to 90/10% RF	Current Draw (Static)	TTL Compatibility	Power Supply[1]	Logic Function
	Typ.	Typ.	Typ.			
Hex Inverters[2]						
54S04	5 ns	15 ns	25 mA	Yes	+5 V	
54LS04	10 ns	30 ns	8 mA	Yes	+5 V	
54F04	5 ns	15 ns	10 mA	Yes	+5 V	
54HCT04	10 ns	25 ns	50 µA	Yes (CMOS)	+5 V	
54ACT11004	8 ns	20 ns	100 µA	Yes (CMOS)	+5 V	
Quad Complementary Inverter[2]						
CD4041UB	10 ns	50 ns	50 µA	No (CMOS)	+5 V	
Two to Four Line Decoder						
54HCT139	10 ns	25 ns	25 µA	Yes	+5 V	
Zener/Hex[3]	5 ns	20 ns	2 mA	Yes	±5 V or +5 V, -12 V	
DG403 Analog Switch	10 ns	100 ns	4 mA	Yes	+5 to +15, -5 to -15	

1. Refer to the "Positive Voltage Operation" application note.
2. Both the 54 series inverters and the quad complementary inverter can be driven by -5 V by tying V_{CC} to GND and GND to -5 V; however, the input pulse must be negative going. Single chip is capable of driving an SP4T switch or 4 bit digital attenuator.
3. Refer to the "A Fast TTL Input Compatible Driver Circuit for Commercial IC Switches" application note.