



MGS-70018
MGS-71018
SPDT GaAs Switches

Features

- **Broad Bandwidth:** DC to 4.6 GHz
- **High Isolation:** >45 dB typ @ 1 GHz
- **Fast Switching Speed:** 2 ns Typical
- **Surface Mount Package**
- **Reflective and Absorptive Versions**

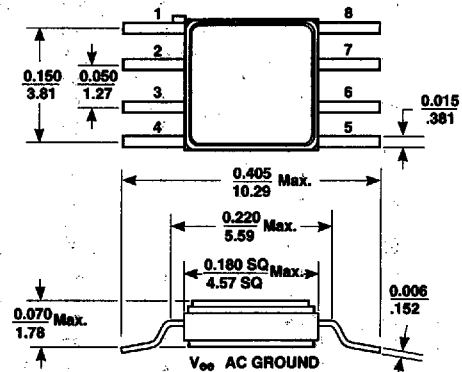
Description

The MGS-70018 is a broadband, single-pole, double-throw monolithic reflective GaAs switch which terminates "off" signals to ground. The MGS-71018 is an absorptive version which terminates "off" signals to a 50 Ω load. These devices come packaged in a small 8-leaded glass/metal hermetically sealed package designed for surface mounting. Switching is actuated by a -5 V control voltage per the truth table below. Current draw for the ON port is less than 100 μ A.

These products are designed for cost effective, fast switching speed applications where low insertion loss and high isolation are desired. Their wide bandwidth and isolated control ports make them suitable for a broad variety of uses. Typical applications include instrumentation, communications circuits, radar circuits, and ECM systems.

The die is fabricated using HP's nominal 0.7 μ m Schottky-barrier gate, gold metallization, and silicon nitride passivation to achieve excellent performance, uniformity, and reliability.

180 mil Package



PIN DESCRIPTION	
1 Control-2	8 RF Out-2
2 RF IN	7 Ground
3 Control-1	6 Ground
4 Ground	5 RF Out-1
Bottom of Package is Ground	

Notes:
 (unless otherwise specified)

1. Dimensions are in mm
2. Tolerances in .xxx = ± 0.005 mm .xx = ± 0.13

Truth Table

Control 1	-5 V	0 V
Control 2	0 V	-5 V
RF Out 1	ON	OFF
RF Out 2	OFF	ON

Electrical Specifications, $T_A = 25^\circ\text{C}$

Symbol	Parameters and Test Conditions ² :	Unit	MGS-70018 Reflective			MGS-71018 Absorptive		
			Min.	Typ.	Max.	Min.	Typ.	Max.
BW	Bandwidth	GHz	DC		4.6	DC		4.6
IL	Insertion Loss	200 MHz		0.7	0.9		0.9	1.1
		1.0 GHz		0.9	1.2		1.3	1.4
		4.6 GHz		1.7	2.0		1.9	2.4
ISO	Isolation	200 MHz	47	55		50	55	
		1.0 GHz	37	40		42	45	
		4.6 GHz	30	33		30	35	
VSWR	On			1.4			1.4	
	Off			N/A			1.4	
t_{sw}	Switching Speed	ns		2			3	
P_{OUT}	Output Power	dBm	+16	+17		+16	+17	
	@ 1 dB Compression	dBm	+23	+25		+23	+25	
IP_3	3rd Order Intercept	dBm	+40	+45		+40	+45	

Note: 1. Measured in a 50 Ω system at 1 GHz, unless otherwise specified, at -5 V control voltage, except P_{OUT} and IP_3 at -7 V control voltage.

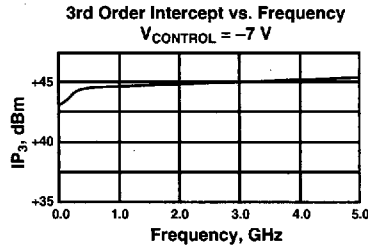
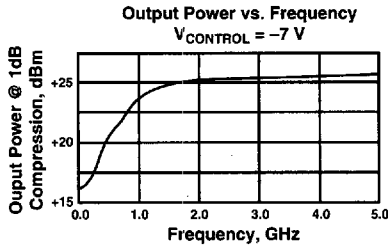
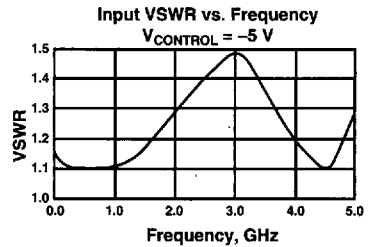
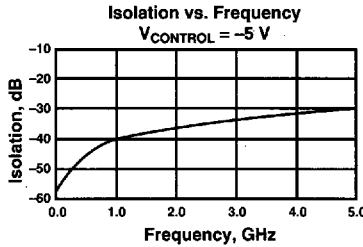
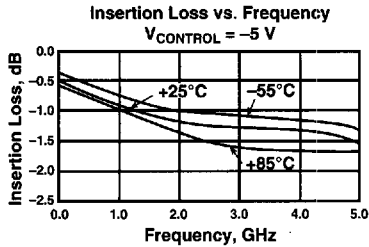
Absolute Maximum Ratings¹

Parameter	Absolute Maximum
Maximum Input Power below 500 MHz	+27 dBm
above 500 MHz	+30 dBm
Control Voltage	-8.0 V
Storage Temperature	-65 to 150°C

Note: 1. Operation of this device above any one of these parameters may cause permanent damage.

**MGS-70018
SPDT GaAs FET Switch (Reflective)**

Typical Performance, T_A = -55°C to +85°C
(Unless otherwise noted)



Typical MGS-70018 Scattering Parameters: Z₀ = 50 Ω
Test Ports: Input to RF Out 1 (ON)

T_A = 25°C, V_{control 1} = -5 V, V_{control 2} = 0 V

Freq. GHz	S ₁₁			S ₂₁			S ₁₂			S ₂₂		
	SWR	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	SWR	Mag	Ang
0.1	1.1	.04	-21	-0.5	.94	20	-0.5	.94	20	1.1	.04	-22
0.5	1.1	.04	-54	-0.7	.92	101	-0.7	.92	101	1.1	.04	-44
1.0	1.1	.05	-22	-0.8	.91	-156	-0.8	.91	-156	1.1	.06	-17
1.5	1.2	.10	17	-0.9	.90	-55	-0.9	.90	-54	1.3	.11	5
2.0	1.3	.13	16	-1.2	.88	47	-1.2	.88	47	1.4	.15	27
2.5	1.4	.16	19	-1.2	.87	151	-1.3	.86	151	1.4	.18	52
3.0	1.5	.20	24	-1.3	.86	-102	-1.3	.87	-103	1.6	.24	61
3.5	1.3	.15	15	-1.3	.85	-1	-1.3	.86	1	1.5	.19	57
4.0	1.2	.07	-26	-1.3	.86	98	-1.3	.87	98	1.1	.06	-19
4.5	1.1	.05	38	-1.4	.84	-159	-1.4	.85	-160	1.3	.13	-98
5.0	1.3	.15	75	-1.6	.83	-60	-1.4	.85	-61	1.1	.06	-83

Typical MGS-70018 Scattering Parameters: Z₀ = 50 Ω
Test Ports: Input to RF Out 2 (OFF)

T_A = 25°C, V_{control 1} = -5 V, V_{control 2} = 0 V

Freq. GHz	S ₁₁			S ₃₁			S ₁₃			S ₃₃		
	SWR	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	SWR	Mag	Ang
0.1	1.1	.06	-15	-56	.00	-60	-63	.00	-78	9.6	.81	177
0.5	1.1	.05	-55	-43	.01	-15	-43	.00	-25	8.5	.79	167
1.0	1.1	.04	-34	-39	.01	55	-39	.01	51	7.4	.76	147
1.5	1.2	.08	26	-36	.01	134	-36	.01	138	6.7	.74	130
2.0	1.3	.13	28	-36	.02	-140	-36	.02	-134	7.2	.76	106
2.5	1.5	.20	23	-35	.02	-35	-35	.02	-33	7.8	.77	106
3.0	1.6	.25	19	-35	.02	77	-35	.02	68	8.2	.78	98
3.5	1.5	.19	11	-34	.02	168	-34	.02	170	8.1	.78	96
4.0	1.3	.13	-8	-32	.02	-96	-32	.02	-95	7.1	.75	90
4.5	1.3	.13	15	-32	.02	-7	-32	.02	20	6.3	.73	68
5.0	1.4	.15	47	-30	.03	88	-31	.03	90	7.1	.75	39

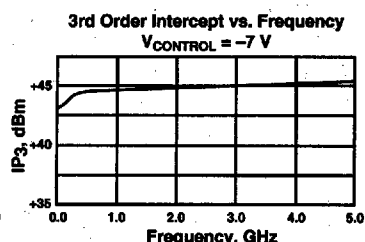
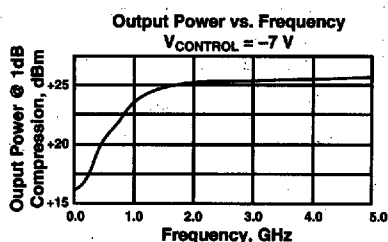
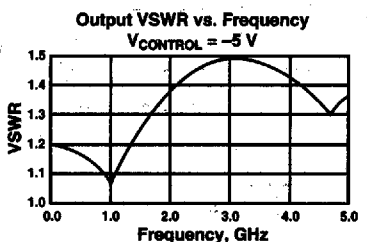
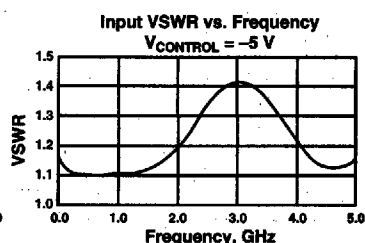
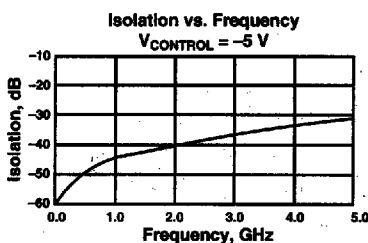
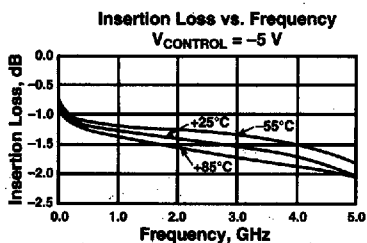
**MGS-70018, MGS-71018
SPDT GaAs Switches**

MGS-71018

SPDT GaAs FET Switch (Absorptive)

Typical Performance, $T_A = -55^\circ\text{C}$ to $+85^\circ\text{C}$

(Unless otherwise noted)



Typical MGS-71018 Scattering Parameters: $Z_0 = 50 \Omega$

$T_A = 25^\circ\text{C}$, $V_{\text{control}1} = -5 \text{ V}$, $V_{\text{control}2} = 0 \text{ V}$

Test Ports: Input to RF Out 1 (ON)

Freq. GHz	S ₁₁			S ₂₁			S ₁₂			S ₂₂		
	SWR	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	SWR	Mag	Ang
0.1	1.1	.06	-22	-0.87	.91	19	-0.87	.91	19	1.1	.06	-24
0.5	1.1	.06	-57	-1.0	.88	100	-1.0	.88	100	1.1	.06	-52
1.0	1.2	.07	-54	-1.2	.87	-158	-1.2	.87	-159	1.2	.09	-42
1.5	1.2	.07	-17	-1.3	.86	-57	-1.3	.86	-57	1.3	.11	-26
2.0	1.2	.08	-14	-1.5	.85	44	-1.5	.85	44	1.2	.11	1
2.5	1.2	.09	-2	-1.5	.84	147	-1.5	.84	147	1.2	.10	41
3.0	1.3	.12	19	-1.6	.83	-108	-1.6	.84	-108	1.4	.16	66
3.5	1.1	.04	14	-1.6	.82	-10	-1.6	.84	-9	1.2	.09	67
4.0	1.1	.05	-156	-1.7	.82	90	-1.7	.83	90	1.2	.08	-133
4.5	1.2	.09	129	-1.7	.82	-168	-1.7	.82	-170	1.4	.17	-137
5.0	1.4	.17	107	-2.0	.79	-70	-1.9	.81	-71	1.1	.05	178

Typical MGS-71018 Scattering Parameters: $Z_0 = 50 \Omega$

$T_A = 25^\circ\text{C}$, $V_{\text{control}1} = -5 \text{ V}$, $V_{\text{control}2} = 0 \text{ V}$

Test Ports: Input to RF Out 2 (OFF)

Freq. GHz	S ₁₁			S ₃₁			S ₁₃			S ₃₃		
	SWR	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	SWR	Mag	Ang
0.1	1.2	.08	-18	-65	.00	-45	-65	.00	-101	1.0	.02	-154
0.5	1.2	.07	-62	-50	.00	6	-51	.00	-7	1.0	.02	-115
1.0	1.1	.07	-56	-45	.01	90	-45	.01	88	1.1	.04	-43
1.5	1.1	.06	-13	-42	.01	178	-42	.01	180	1.2	.07	-0
2.0	1.2	.08	0	-39	.01	-77	-40	.01	-80	1.2	.11	26
2.5	1.3	.14	3	-40	.01	16	-39	.01	22	1.3	.14	51
3.0	1.4	.17	5	-38	.01	140	-37	.01	142	1.4	.16	70
3.5	1.2	.09	-14	-35	.02	-130	-35	.02	-132	1.3	.14	90
4.0	1.1	.05	-91	-35	.02	-26	-35	.02	-21	1.2	.08	113
4.5	1.1	.03	90	-33	.02	83	-32	.03	82	1.1	.06	-37
5.0	1.3	.12	102	-32	.02	-173	-30	.03	-174	1.3	.14	-21