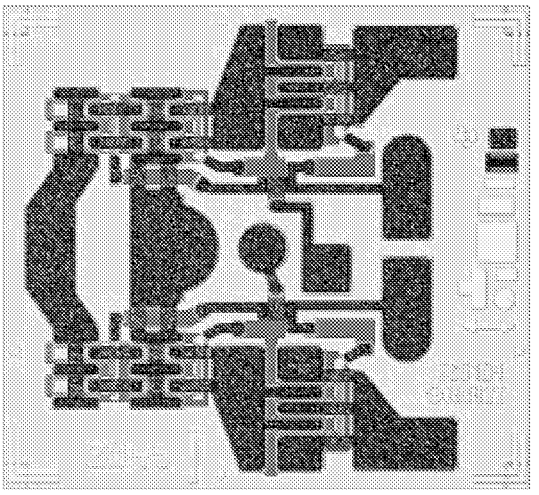
TGS8704-SCC

SPDT FET Switch

8704

- **DC to 6-GHz Frequency Range**
- **Absorptive Topology**
- **1.2-dB Insertion Loss and 45-dB Isolation at Midband**
- **1.3:1 Input SWR and 1.2:1 Output SWR at Midband**
- **Greater Than 0.5-W Input Power at 1-dB Compression**
- **1,092 x 0,990 x 0,152 mm (0.043 x 0.039 x 0.006 in.)**

PHOTO ENLARGEMENT

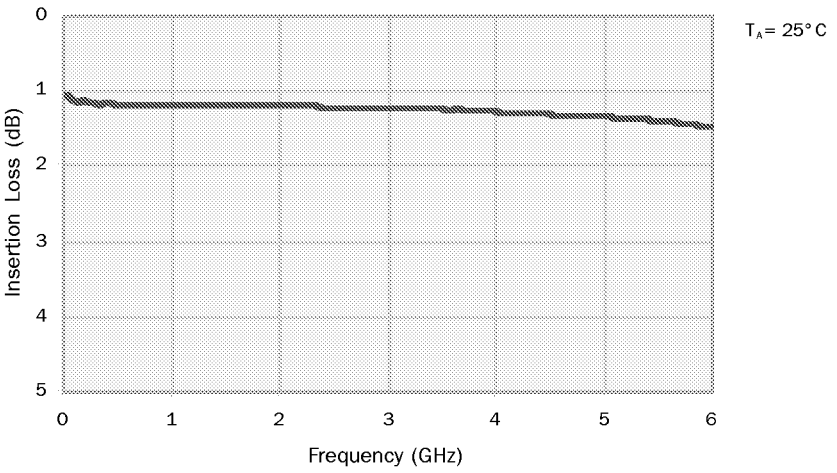


DESCRIPTION

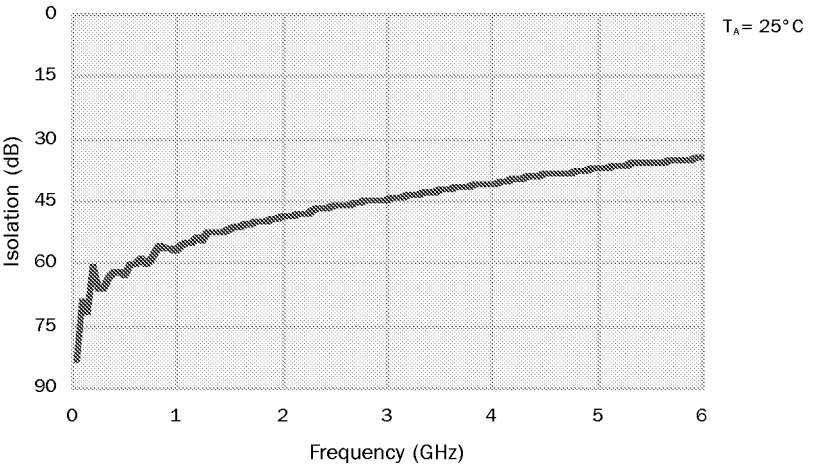
The Texas Instruments TGS8704-SCC is one of a family of low-frequency single-pole double-throw FET switches. The TGS8704-SCC is an absorptive switch with 15-dB output return loss in the isolated state. Input power at 1-dB compression is greater than 27-dBm over most of the band. The TGS8704-SCC can be easily configured for single-pole multi-throw operation. The low current consumption and small size of the TGS8704-SCC make it ideal for applications in multi-channel narrowband and wideband receivers, telecommunication systems, and electronic countermeasures equipment.

Bond pad and backside metallization is gold plated for compatibility with eutectic alloy attachment methods as well as the thermocompression and thermosonic wire-bonding processes. Ground is provided to the circuit through vias to the backside metallization.

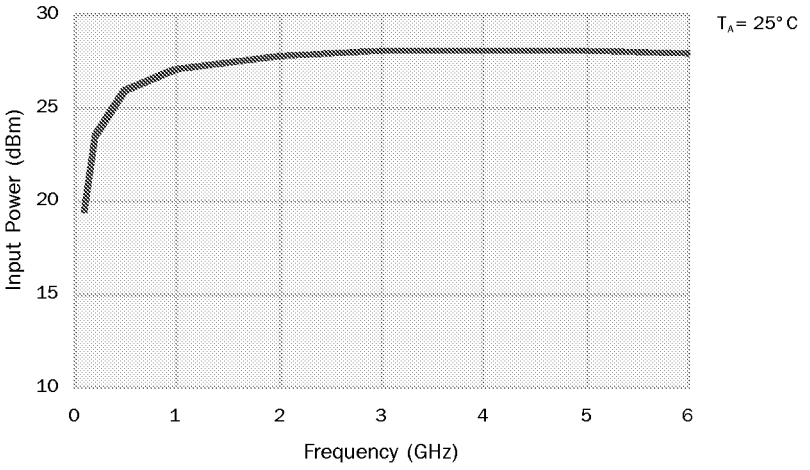
TYPICAL INSERTION LOSS



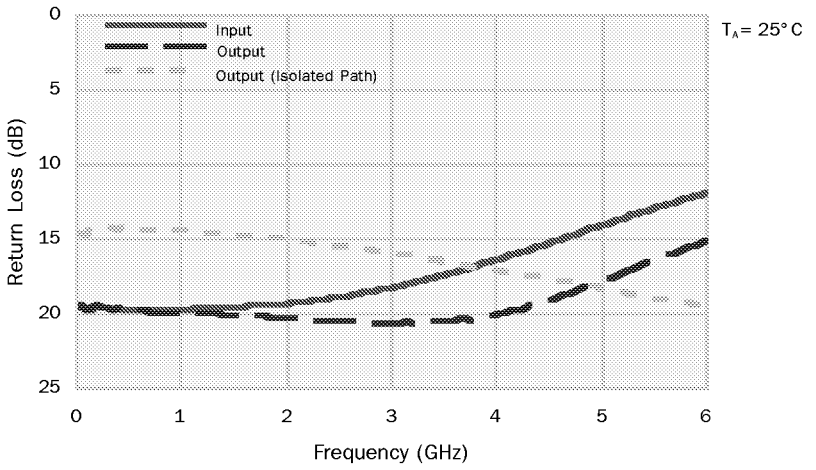
TYPICAL ISOLATION



TYPICAL INPUT POWER
P_{1dB}



TYPICAL RETURN LOSS



ABSOLUTE MAXIMUM RATINGS

Input continuous wave power, P_{IN}* ..... 2 W

Control voltage range, V_1, V_2, V_3, and V_4 ..... -10 V to 0 V

Operating channel temperature, T_{CH}** ..... 150°C

Mounting temperature (30 sec), T_M ..... 320°C

Storage temperature range, T_{STG} ..... -65 to 150°C

Ratings over channel temperature range, T_{CH} (unless otherwise noted)

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "RF Characteristics" is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

* DC blocks are not provided at RF ports.

** Operating channel temperature will directly affect the device MTTF. For maximum life, it is recommended that channel temperature be maintained at the lowest possible level.

TEXAS INSTRUMENTS Microwave GaAs Products Phone: 972 995 8465 Fax: 972 995 4288 Email: GaAs@ti.com Web: http://www.ti.com/mgp

TYPICAL S-PARAMETERS
Low Loss Path

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		Insertion Loss
(GHz)	MAG	ANG(°)	MAG	ANG(°)	MAG	ANG(°)	MAG	ANG(°)	(dB)
0.05	0.10	0	0.88	-2	0.88	-1	0.11	3	1.1
0.5	0.10	-8	0.87	-5	0.87	-4	0.10	-7	1.2
1.0	0.10	-14	0.87	-8	0.87	-8	0.10	-13	1.2
1.5	0.10	-22	0.87	-13	0.87	-12	0.10	-20	1.2
2.0	0.11	-30	0.87	-17	0.87	-17	0.10	-29	1.2
2.5	0.11	-40	0.87	-21	0.87	-21	0.09	-41	1.2
3.0	0.12	-51	0.87	-25	0.87	-25	0.09	-53	1.2
3.5	0.13	-63	0.87	-29	0.86	-29	0.09	-68	1.3
4.0	0.15	-74	0.86	-34	0.86	-34	0.10	-83	1.3
4.5	0.17	-84	0.86	-38	0.86	-38	0.11	-97	1.3
5.0	0.20	-93	0.86	-42	0.86	-42	0.13	-110	1.4
5.5	0.22	-101	0.85	-47	0.85	-47	0.15	-123	1.4
6.0	0.25	-109	0.84	-51	0.84	-51	0.17	-132	1.5
6.5	0.28	-116	0.83	-56	0.83	-56	0.20	-140	1.6
7.0	0.31	-123	0.81	-60	0.81	-60	0.22	-148	1.8
7.5	0.33	-129	0.80	-64	0.80	-64	0.24	-156	1.9
8.0	0.36	-133	0.80	-68	0.80	-68	0.25	-157	2.0
8.5	0.39	-138	0.79	-72	0.79	-72	0.27	-163	2.1
9.0	0.40	-141	0.78	-76	0.78	-76	0.29	-170	2.2
9.5	0.43	-144	0.77	-81	0.77	-81	0.30	-176	2.2
10.0	0.43	-148	0.76	-85	0.76	-85	0.31	-178	2.4

T_A = 25°C

Reference planes for S-parameter data include bond wires as specified in the “Recommended Assembly Diagram”. The S-parameters are also available on floppy disk and the world wide web.

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TYPICAL S-PARAMETERS
Isolated Path

Frequency	S_{11}		S_{21}		S_{12}		S_{22}		Isolation
(GHz)	MAG	ANG(°)	MAG	ANG(°)	MAG	ANG(°)	MAG	ANG(°)	(dB)
0.05	0.12	17	0.0001	57	0.0000	54	0.18	17	83.8
0.5	0.12	-3	0.0007	84	0.0008	88	0.19	-1	63.2
1.0	0.12	-9	0.0014	98	0.0015	100	0.19	-5	57.0
1.5	0.12	-14	0.0024	109	0.0025	108	0.18	-8	52.4
2.0	0.12	-19	0.0036	112	0.0034	110	0.18	-12	48.9
2.5	0.12	-26	0.0047	117	0.0047	113	0.17	-16	46.6
3.0	0.12	-36	0.0058	119	0.0059	119	0.16	-19	44.7
3.5	0.13	-47	0.0073	121	0.0073	122	0.15	-22	42.7
4.0	0.13	-59	0.0088	124	0.0086	125	0.14	-24	41.1
4.5	0.15	-69	0.0115	127	0.0115	127	0.13	-28	38.8
5.0	0.17	-78	0.0136	127	0.0135	127	0.12	-34	37.4
5.5	0.19	-86	0.0157	125	0.0157	125	0.11	-42	36.1
6.0	0.21	-93	0.0179	125	0.0180	125	0.11	-51	34.9
6.5	0.23	-100	0.0200	123	0.0199	124	0.10	-61	34.0
7.0	0.26	-106	0.0220	123	0.0219	123	0.10	-69	33.2
7.5	0.30	-112	0.0233	130	0.0233	131	0.09	-77	32.7
8.0	0.34	-118	0.0336	126	0.0338	125	0.09	-75	29.5
8.5	0.38	-125	0.0362	113	0.0361	114	0.10	-79	28.8
9.0	0.40	-129	0.0354	111	0.0352	111	0.10	-86	29.0
9.5	0.44	-132	0.0347	103	0.0350	103	0.10	-95	29.2
10.0	0.45	-137	0.0327	103	0.0325	104	0.09	-103	29.7

T_A = 25°C

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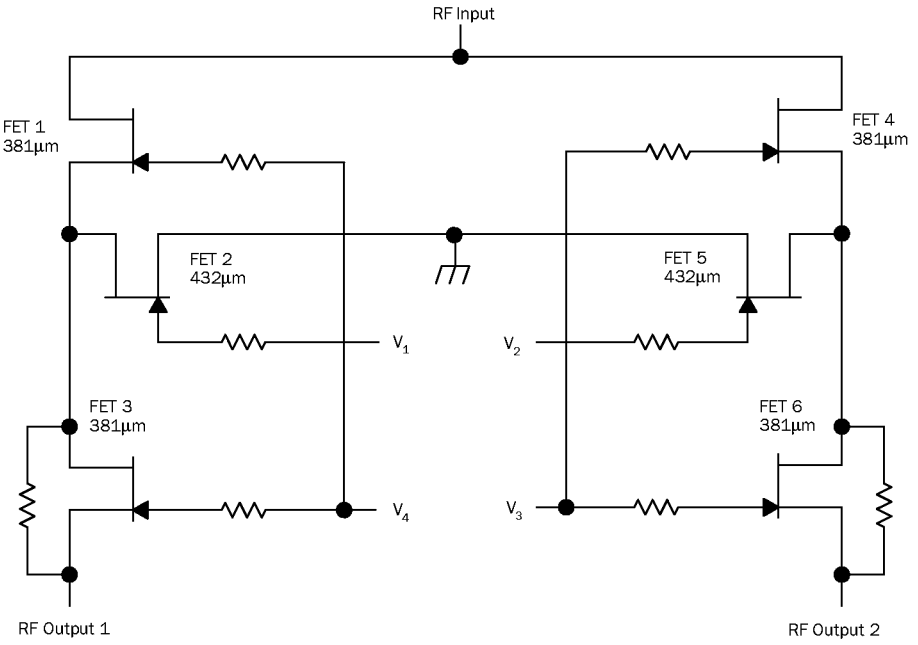
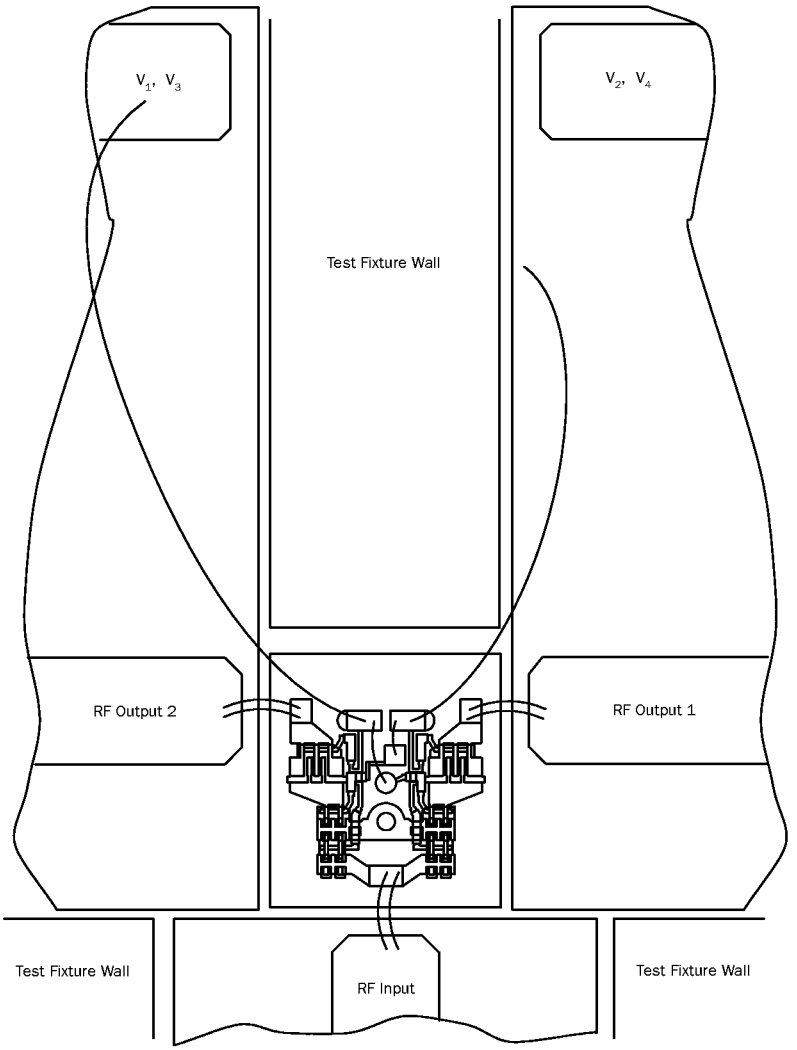
EQUIVALENT SCHEMATIC



RECOMMENDED TEST ASSEMBLY DIAGRAM

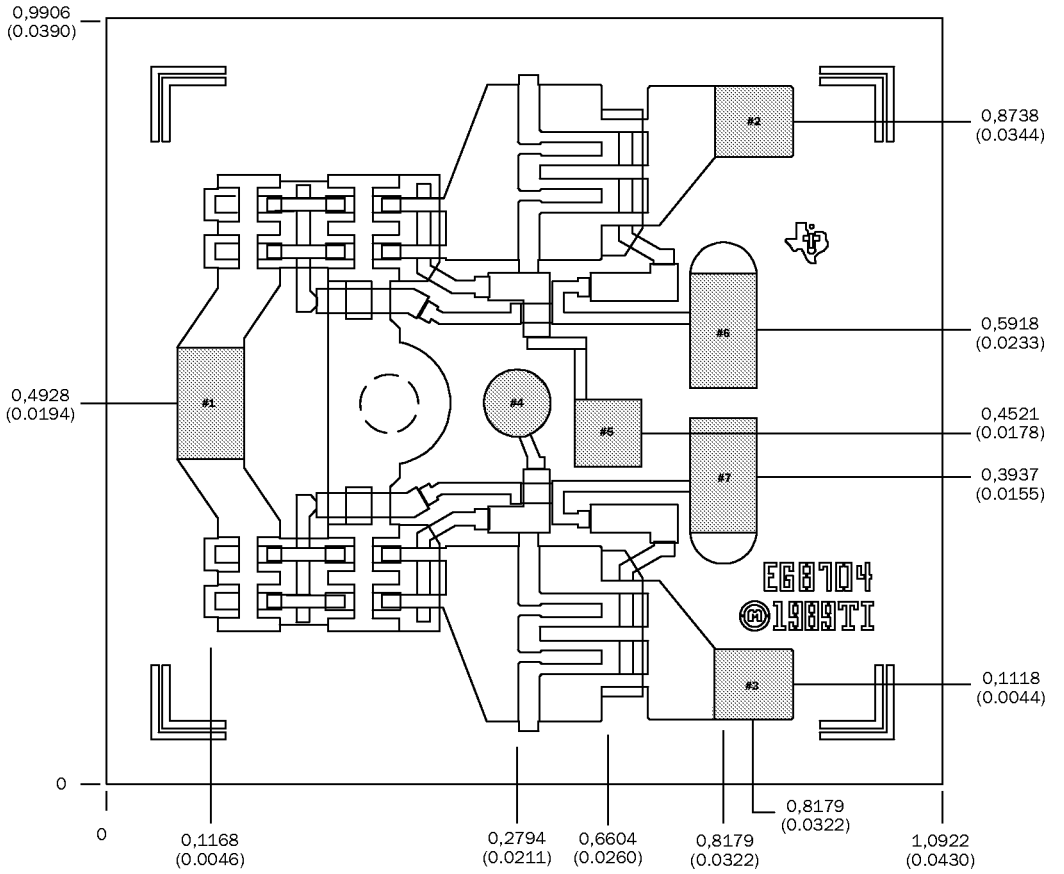


RF connection: Bond using two 1-mil diameter, 35-mil maximum length gold wire at both RF Input and RF Output ports for optimum RF performance.

Low-loss path is RF Input to RF Output 1 for V_1 and V_3 = -5 V, V_2 and V_4 = 0. Low-loss path is RF Input to RF Output 2 for V_1 and V_3 = 0, V_2 and V_4 = -5 V.

RF isolation will be limited by the chip operating environment.

MECHANICAL DRAWING



Units: Millimeters (inches)
Thickness: 0,1524 (0.006)
Chip-edge-to-bond-pad dimensions are shown to center of bond pad.
Chip size ± 0,0508 (0.002)

Bond pad #1 (RF Input):	0,0914 x 0,1524 (0.0036 x 0.0060)
Bond pad #2 (RF Output 2):	0,1067 x 0,0965 (0.0042 x 0.0038)
Bond pad #3 (RF Output 1):	0,1067 x 0,0965 (0.0042 x 0.0038)
Bond pad #4 (V_1):	0,0457 (0.0018) radius
Bond pad #5 (V_2):	0,0914 x 0,1914 (0.0036 x 0.0036)
Bond pad #6 (V_3):	0,0914 x 0,1600 (0.0036 x 0.0063)
Bond pad #7 (V_4):	0,0914 x 0,1600 (0.0036 x 0.0063)

This device is susceptible to damage from electric discharge. Handling and packaging of this device and/or assembly should be accomplished only with adequate provisions to prevent electrostatic discharge damage.