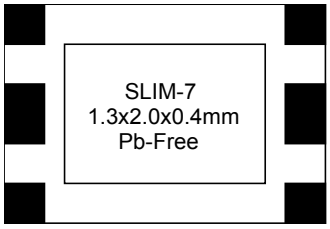
TQS5200

802.11a/b/g Single/Dual-band SPDT Switch

Applications

- 802.11a WLAN
- 802.11b WLAN
- 802.11g WLAN
- WiMAX
- TX-RX Switching
- Antenna Diversity Switching

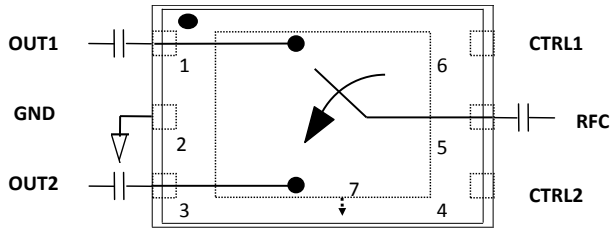


6-pin 1.3 x 2.0 x 0.4 mm SLP Package

Product Features

- Integrated SPDT Switch for Single-band and Dual-band 802.11a/b/g WLAN Systems
- Broadband: 1 – 6 GHz
- Low Insertion Loss: 0.6 dB at 2.5 GHz
- High Isolation: +28 dB at 2.5 GHz
- CMOS Compatible Dual Voltage Control
- GaAs PHEMT Technology
- Lead Free, RoHS Compliant SMT Package

Functional Block Diagram



General Description

The TQS5200 is a high power, single-pole double-throw switch configured for TX-RX or Antenna Diversity switching applications for the WLAN market. The device exhibits industry-leading insertion loss, isolation and power handling.

The TQS5200 requires no fixed supply voltage and operates with a positive control voltage. The switch is manufactured using TriQuint's GaAs pHEMT process and is packaged in an ultra-small, low-profile 1.3 mm x 2 mm x 0.4 mm SLIM-7 Pb-free package.

Pin Configuration

Pin No.	Symbol
1	OUT1
2	GND
3	OUT2
4	V_{CTRL2}
5	RFC
6	V_{CTRL1}
Backside Pad	RF/DC GND

Ordering Information

Part No.	Description
TQS5200	SPDT Reflective Switch
TQS5200-PCB	1 – 6 GHz Evaluation Board

Standard T/R size = 2500 pieces on a 7" reel

Absolute Maximum Ratings

Parameter	Rating
Control Voltage (V_{CTRL1}, V_{CTRL2})	−5.0 to +5.0 V
RF Input Power, CW, 50 Ω, T = 25 °C	3 W
Junction Temperature, T_J Pin=+30 dBm, Baseplate Temp.=+25 °C	50 °C
Storage Temperature	−40 to 150 °C

Operation of this device outside the parameter ranges given above may cause permanent damage.

Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
V1, V2 High State	+2.5		+5.0	V
Operating Temp. Range	−40		+85	°C

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

Electrical Specifications

Test conditions unless otherwise noted: V_{CTRL1}, V_{CTRL2} = +3 V / 0 V, Temp=25°C, 50 Ω system

Parameter	Conditions	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range		2400		2500	4900		6000	MHz
Insertion Loss			0.6	0.8		0.8	1.0	dB
Isolation		23	28		23	28		dB
Return Loss		12.5	15		12.5	15		dB
Input P1dB			+31.5			+29		dBm
Harmonics	2fo, Pin=+20dBm		+85			+80		dBc
	3fo, Pin=+20dBm		+70			+70		dBc
Gate Leakage			1	50		1	50	uA

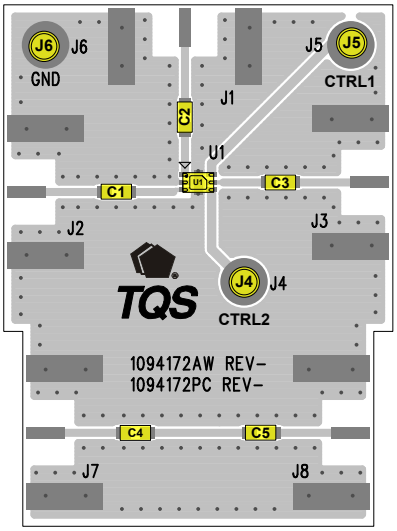
Digital Control Voltages

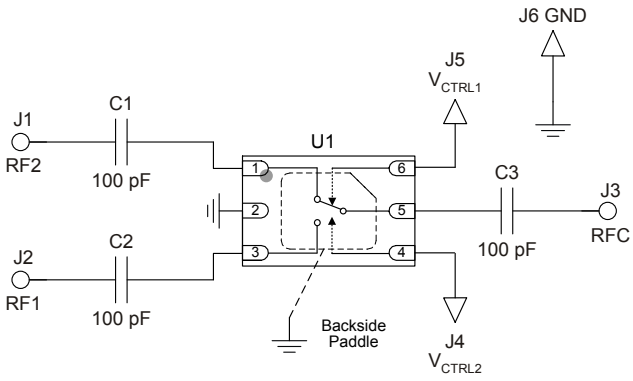
State	Bias Condition
Low	≤ +0.2 V
High	≥ +2.5 V

Switch Control Truth Table

Control Voltages		Signal Path State	
V_{CTRL1}	V_{CTRL2}	RFC to RF1	RFC to RF2
High	Low	On (Insertion Loss)	Off (isolation)
Low	High	Off (isolation)	On (Insertion Loss)

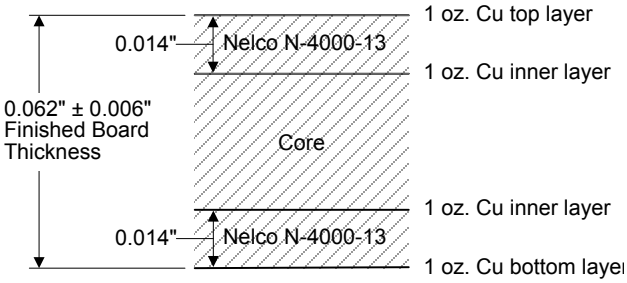
TQS5200-PCB Evaluation Board





PCB Loss Calibration Line

TriQuint PCB 1094172 Material and Stack-up



50 ohm line dimensions: Width = .021”
Spacing = .006”

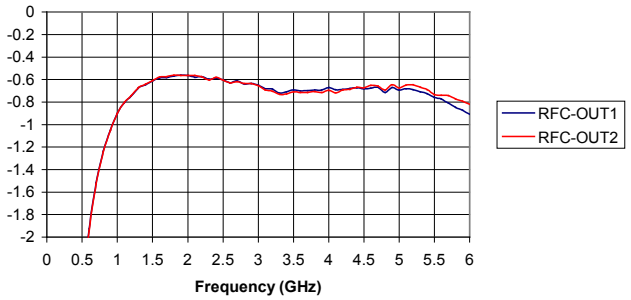
Notes:

1. J7 to J8 thru line may be used to de-embed PCB losses to device.

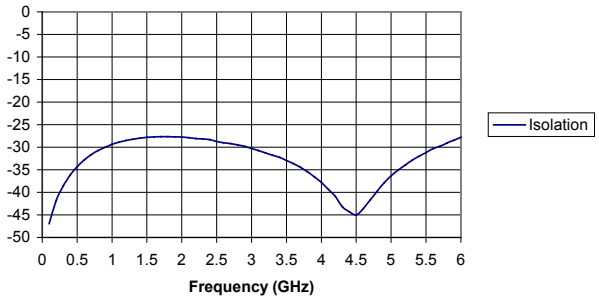
Performance Plots

Test conditions unless otherwise noted: V_{CTRL1}=+3 V, V_{CTRL2}=0 V, Freq.=2.5 GHz, Temp=+25 °C, 50 Ω system

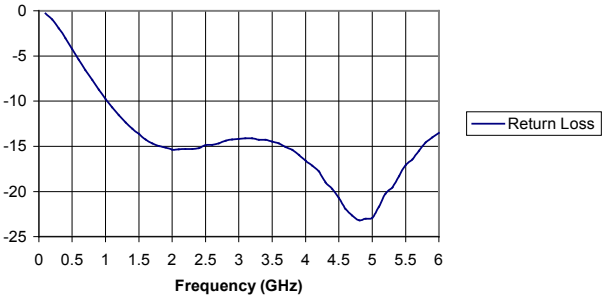
Insertion Loss



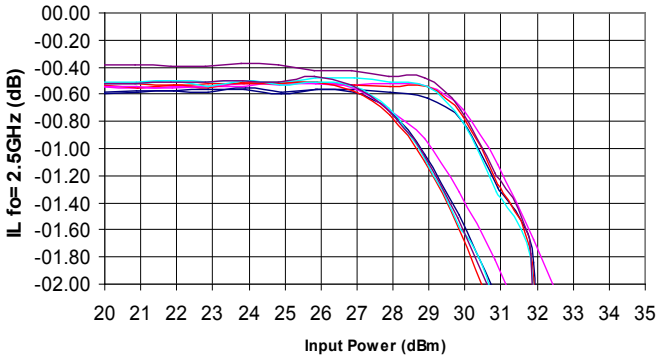
Isolation



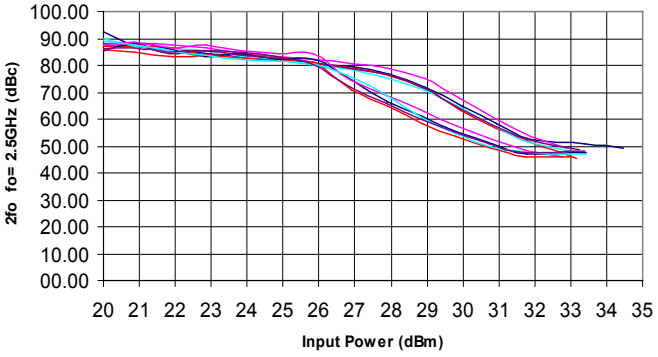
Return Loss



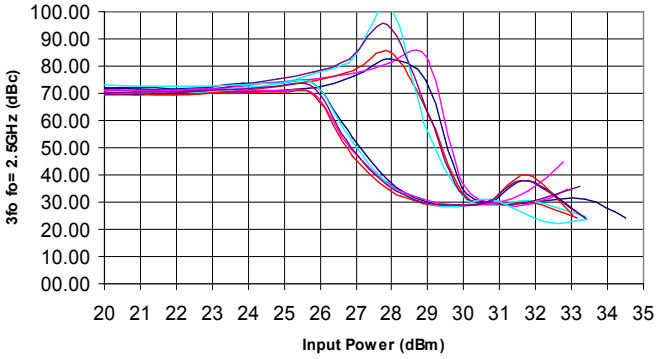
Insertion Loss Over Input Power



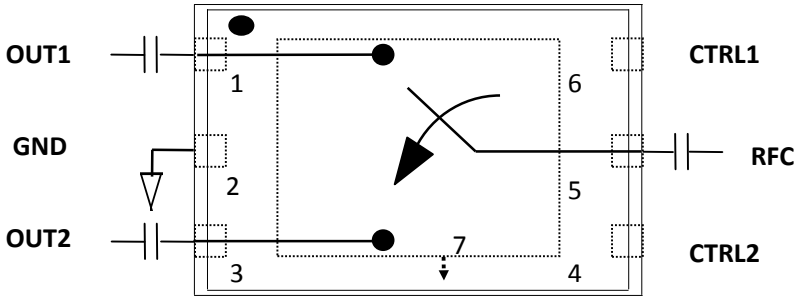
2nd Harmonic over Input Power



3rd Harmonic over Input Power



Pin Configuration and Description

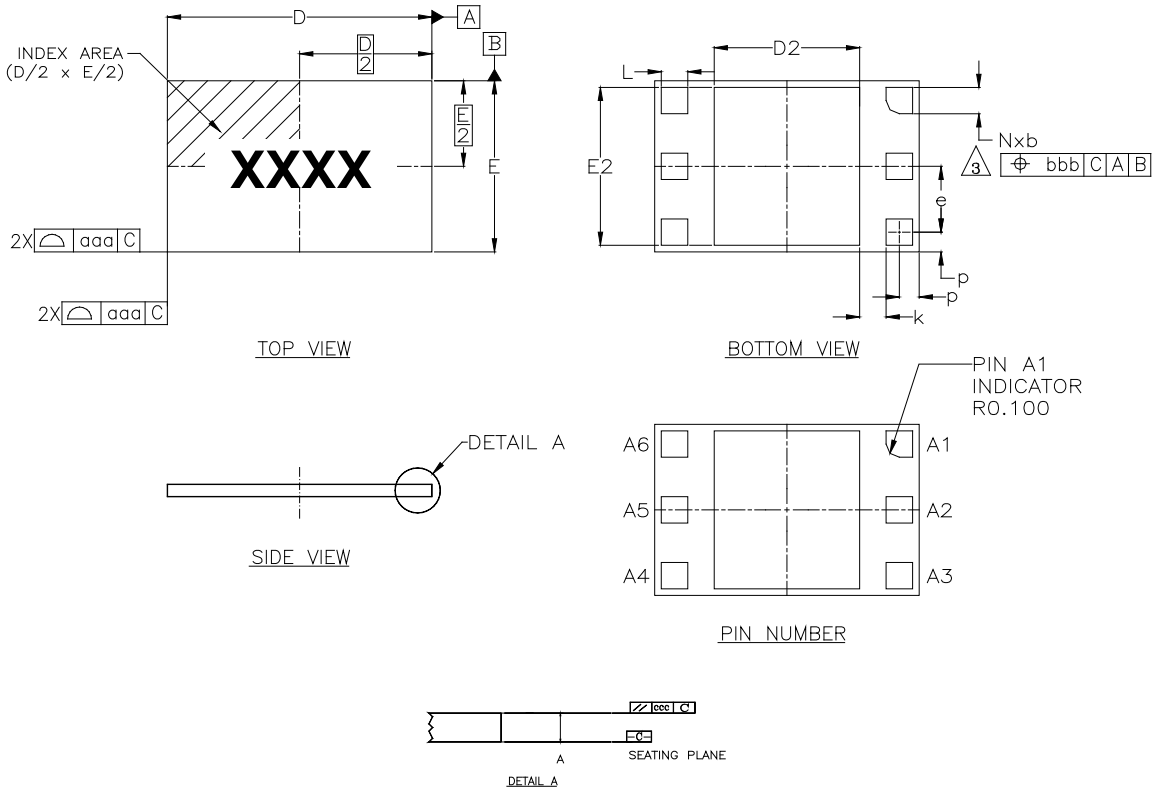


Pin No.	Symbol	Description
1	OUT1	RF output 1, DC voltage present, DC block required.
2	GND	RF/DC Ground
3	OUT2	RF output 2, DC voltage present, DC block required.
4	V_{CTRL2}	Control Voltage 2
5	RFC	Antenna Input, DC voltage present, DC block required.
6	V_{CTRL1}	Control Voltage 1
Backside Pad	RF/DC GND	RF/DC Ground. Use recommended via pattern and ensure good solder attach for best thermal and electrical performance.

Mechanical Information

Package Marking and Dimensions

Marking: Assembly Code - XXXXX



DIMENSIONAL REFERENCES			
REF.	MIN.	NOM.	MAX.
A	–	–	0.40
D	1.95	2.00	2.10
E	1.25	1.30	1.40
k	0.15	–	0.25
D2		1.10	
E2		1.20	
p	0.125	0.15	0.200
e		0.50 BSC	
b	0.15	0.20	0.25
L	0.15	0.20	0.25
aaa		0.15	
bbb		0.10	
ccc		0.10	
N		6	

Notes:

1. All dimensions are in millimeters. Angles are in degrees.
2. Dimension and tolerance formats conform to ASME Y14.4M-1994.
3. The terminal #1 identifier and terminal numbering conform to JESD 95-1 SPP-012

Product Compliance Information

ESD Sensitivity Ratings

Caution! ESD-Sensitive Device

ESD Rating: Class 1A
Value: ≥ 250 V to < 500 V
Test: Human Body Model (HBM)
Standard: ESDA/JEDEC Standard JS-001-2012

ESD Rating: Class C3
Value: ≥ 1000 V
Test: Charged Device Model (CDM)
Standard: JEDEC Standard JESD22-C101F

Solderability

Compatible with both lead-free (260°C max. reflow temperature) and tin/lead (245°C max. reflow temperature) soldering processes.

RoHs Compliance

This part is compliant with EU 2002/95/EC RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).

This product also has the following attributes:

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A ($C_{15}H_{12}Br_4O_2$) Free
- PFOS Free
- SVHC Free

Important Notice

For the latest specifications, additional product information, worldwide sales and distribution locations, and information about TriQuint:

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