



# TQP4M4003

(Preliminary data sheet Rev0.2)

## SPDT High Power 2.5V GSM Antenna Switch

### Features:

- SLIM-7 Packaged PHEMT GaAs MMIC Die
- Smallest Available GSM SPDT Switch
- 1.3 x 2.0 mm Footprint
- Thin Package: 0.4mm for LTCC Modules
- Excellent Harmonic Performance
  - -74dBc 2<sup>nd</sup> Harmonic at GSM 850/900, +35dBm
  - -81dBc 2<sup>nd</sup> Harmonic at DCS/PCS, +33 dBm
  - -77dBc 3<sup>rd</sup> Harmonic at GSM 850/900, +35dBm
  - -78dBc 3<sup>rd</sup> Harmonic at DCS/PCS, +33 dBm
- Highly Linear Control Voltage, to +2.0V
- High Isolation: -27dB typ 0.5 to 2 GHz
- Low Insertion Loss: 0.39 dB typ at GSM850/900  
0.51 dB typ at DCS/PCS
- Very Low Control Current

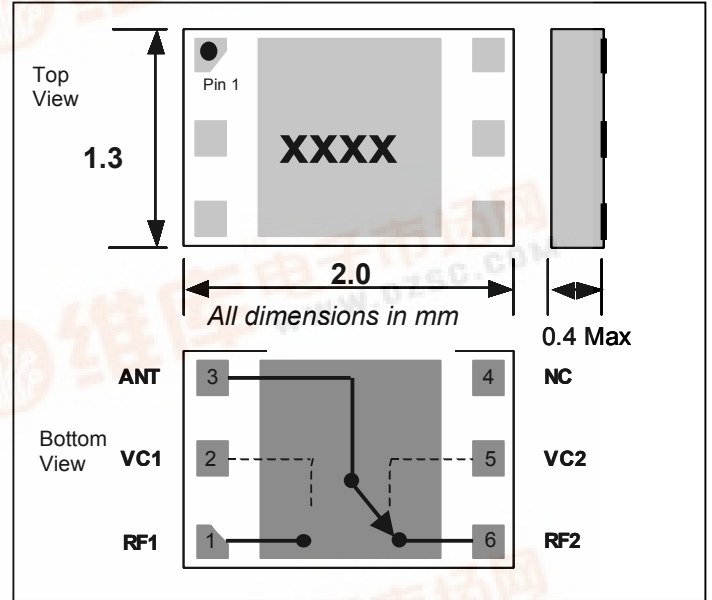
### Application:

- GSM Handset Antenna Switch Modules (ASM) and Front End Modules (FEM)

### Description:

TriQuint's TQP4M4003 is a high power antenna switch in a single pole double throw (SPDT) configuration. The die utilizes TriQuint's PHEMT MMIC switch process to provide optimized performance for use in GSM applications. The SLIM-7 package is 0.4mm thick with a 1.3 x 2.0 mm footprint, which is ideally suited to replace package PIN diodes on height critical LTCC modules. PHEMT Switches are a very low DC current replacement for classic PIN diode based switches.

### SLIM-7 Package Outline:



### Electrical Performance: Ta = 25°C, Zo=50 Ohms, Vcontrol = 0V / 2.5V<sup>1</sup>

Parameter	Test Conditions	Units	Min	Typ	Max
Insertion Loss	GSM850/900	dB		0.40	
Insertion Loss	DCS/PCS	dB		0.50	
Isolation RF1 to RF2	One port on.	dB		-27	
2 <sup>nd</sup> Harmonic	GSM850/900, Pin = +35 dBm	dBc		-74	
2 <sup>nd</sup> Harmonic	DCS/PCS, Pin = +33 dBm	dBc		-81	
3 <sup>rd</sup> Harmonic	GSM850/900, Pin = +35 dBm	dBc		-77	
3 <sup>rd</sup> Harmonic	DCS/PCS, Pin = +33 dBm	dBc		-78	
Return Loss	0.5 to 2.0GHz	dB		-20	
Leakage Current	-	µA			100
Trise, Tfall	10% to 90% RF, 90% to 10% RF	µS			1
Ton, Toff	50% control to 90% RF, and 50% control to 10% RF	µS			1

### Truth Table: 2, 3

VC1	VC2	ANT-RF1	ANT-RF2
0	1	Off	On
1	0	On	Off

### Notes:

1. External DC blocking capacitors are required at all RF ports
2. State 1 = +2.0V to +5.0V, State 0 = 0V to +0.2V
3. Differential voltage from State 1 to State 2 must be a minimum of 2.0V
4. Exceeding any parameter either individually or in combination may cause permanent damage.



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## Absolute Maximum Ratings<sup>4</sup>:

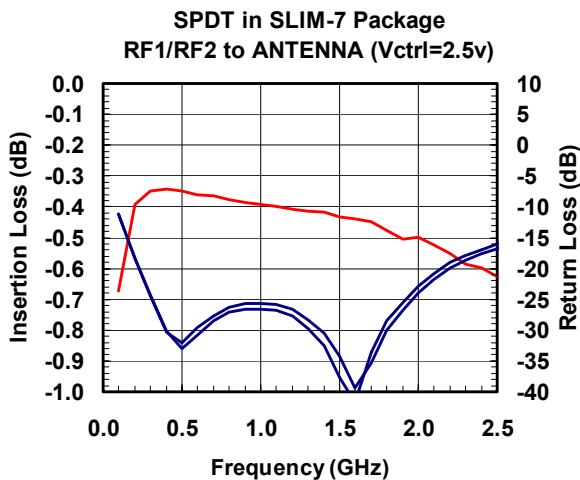
Parameter	Absolute Maximum
Max Input Power	+37dBm
Control Voltage	+/-5V
Operating Temp	-40°C to +85°C
Storage Temp	-65°C to +150°C

## Pin Descriptions:

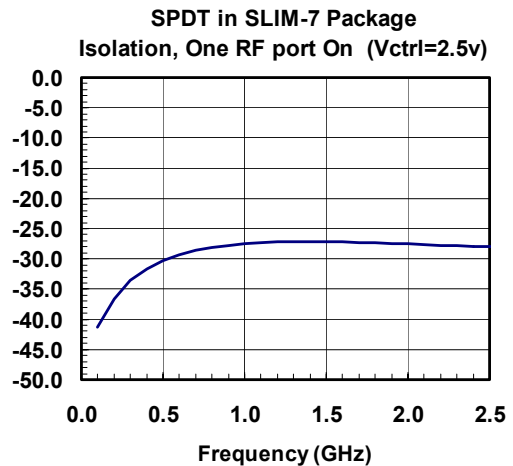
Pad Number	Pin Name	Description
1	RF1	RF Port 1
2	VC1	Control RF Port 1
3	ANT	ANTENNA Port
4	NC	No Connection
5	VC2	Control RF Port 2
6	RF2	RF Port 2

## Typical Performance Curves:

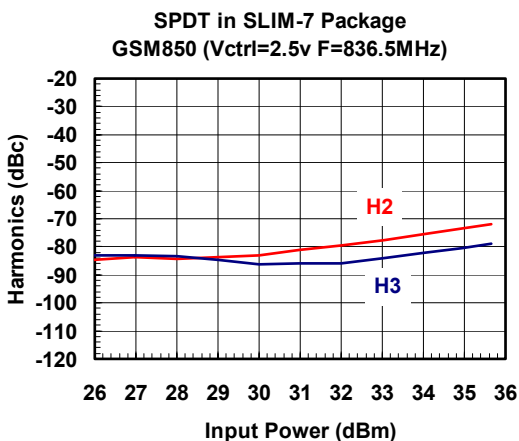
### Insertion Loss and Match



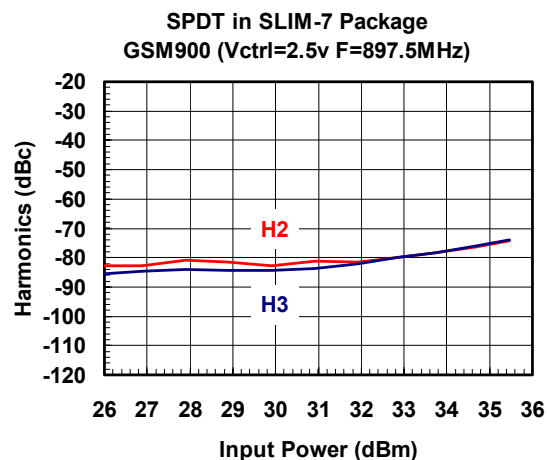
### Isolation



### Harmonics GSM850



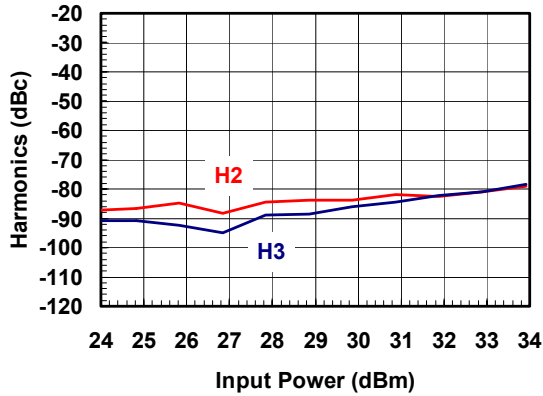
### Harmonics GSM900



# SPDT High Power 2.5V GSM Antenna Switch

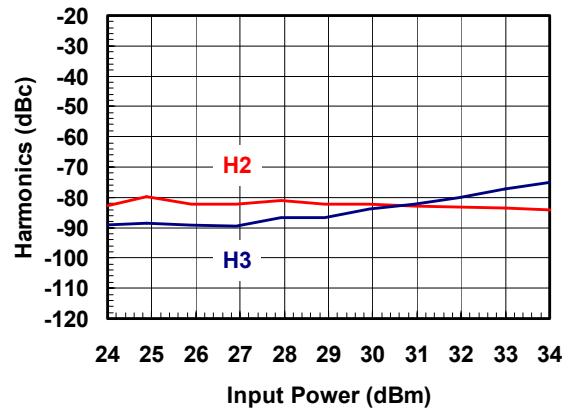
## Harmonics DCS

SPDT in SLIM-7 Package  
DCS (Vctrl=2.5v F=1747.5MHz)



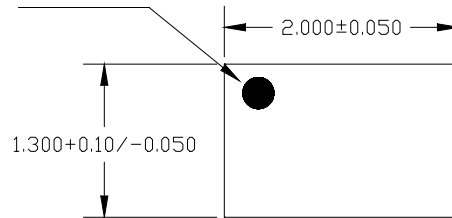
## Harmonics PCS

SPDT in SLIM-7 Package  
PCS (Vctrl=2.5v F=1880MHz)

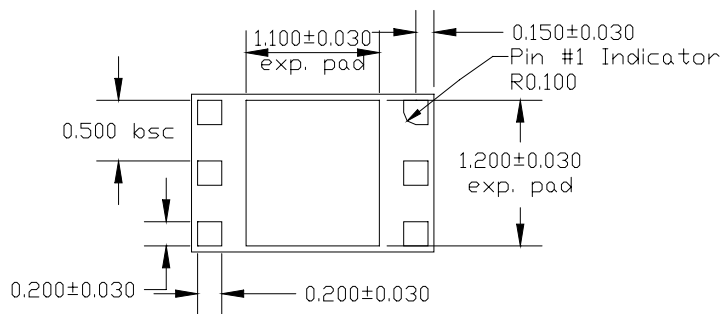


## SLIM-7 Package

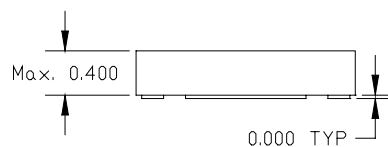
Pin 1 Dot  
By marking



Top View



Bottom View



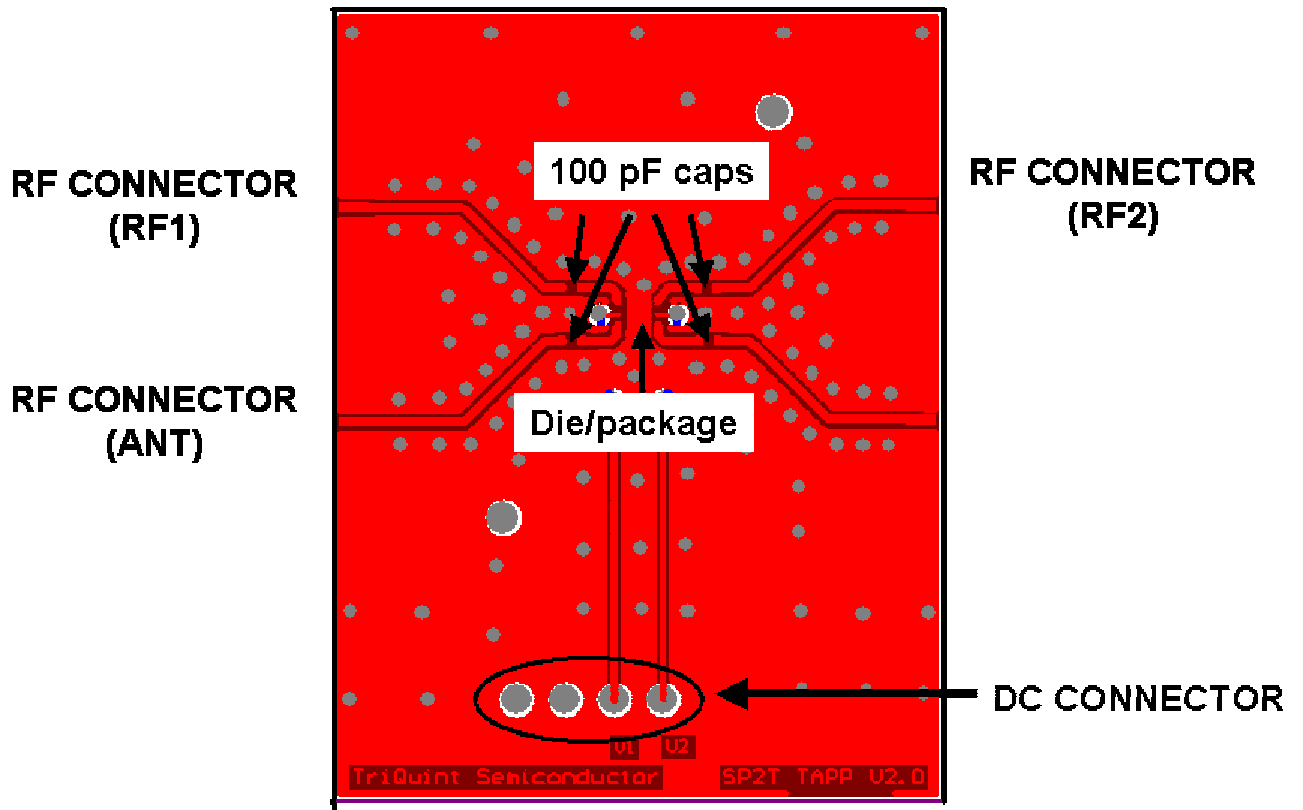
Side View

### NOTES

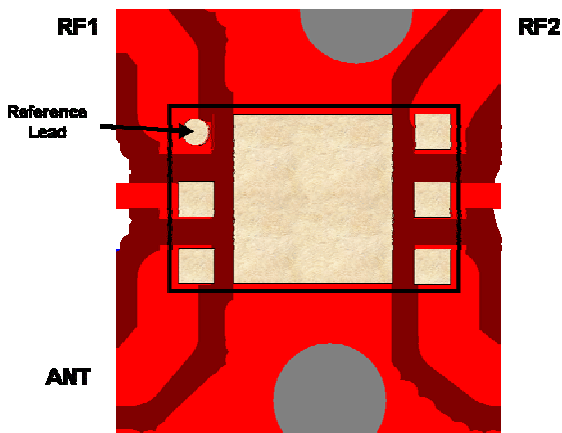
- 1.1 All dimensions are in Millimeter (mm)
- 1.2 Package surface is mirror finish.
- 1.3 Dimensions are exclusive of mold flash and gate burr.
- 1.4 Lead finish is gold.

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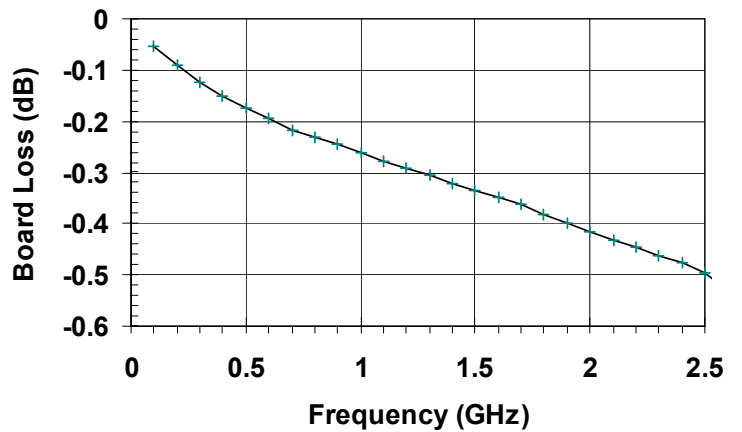
Application Board:



Package Configuration On Board:

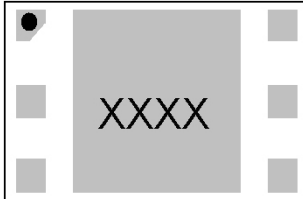


Application Board Loss De-Embedding Curve: FR4



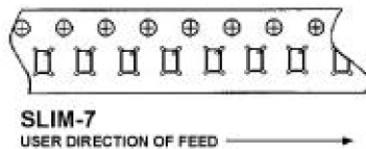
# SPDT High Power 2.5V GSM Antenna Switch

## Part Marking:



where XXXX = last four digits of batch

## Part Orientation on Reel:



## Ordering Information:

Type	Marking	Package
<b>TQP4M4003</b>	<b>XXXX</b>	<b>SLIM-7</b>

**ESD:** Electrostatic Discharge Sensitive Device: Observe Handling Precautions!

## Additional Information

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

**Web:** [www.triquint.com](http://www.triquint.com)

**Tel:** (503) 615-9000

**Email:** [info\\_wireless@tqs.com](mailto:info_wireless@tqs.com)

**Fax:** (503) 615-8902

For technical questions and additional information on specific applications:

**Email:** [info\\_wireless@tqs.com](mailto:info_wireless@tqs.com)

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