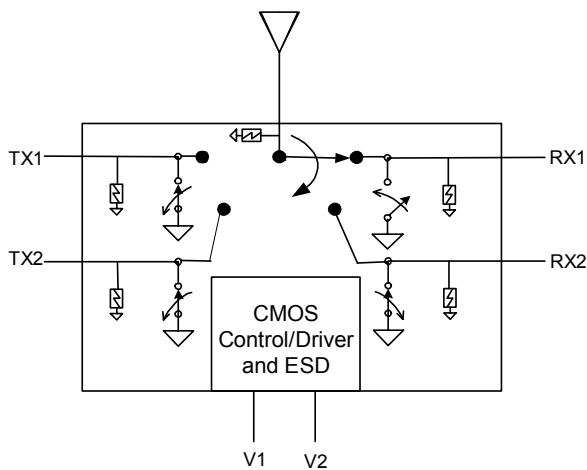


**SP4T UltraCMOS™ 2.6 V Switch**  
**100 – 3000 MHz**

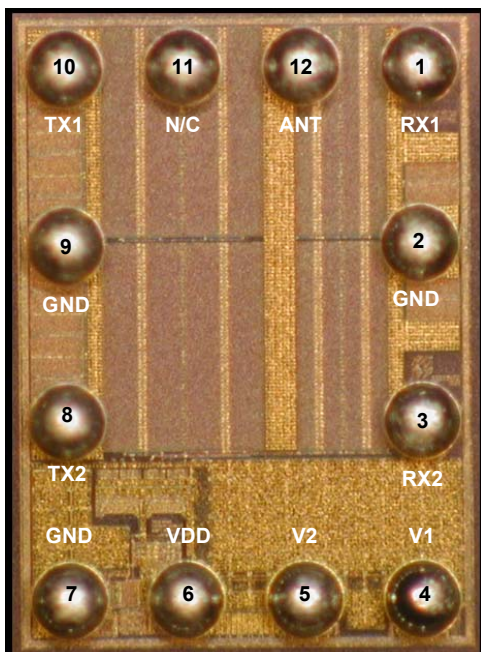
**Figure 1. Functional Diagram**



**Features**

- Two pin CMOS logic control inputs
- Supports 1.8 V Control Logic
- Low TX insertion loss: 0.55 dB at 900 MHz, 0.70 dB at 1900 MHz
- Isolation of 39 dB at 900 MHz, 31 dB at 1900 MHz
- Low harmonics  $2f_o = -82$  dBc and  $3f_o = -74$  dBc at 35 dBm input power
- 1500 V HBM ESD tolerance
- Built in CMOS decoder/driver
- RX SAW over voltage protection circuit
- No blocking capacitors required

**Figure 2. Die Top View**



**Product Description**

*The PE42612 SP4T RF UltraCMOS™ Flip Chip Switch is designed specifically to address the needs of the antenna switch module market for GSM Handsets. On-chip CMOS decode logic is used to facilitate two-pin, low voltage CMOS control inputs. High ESD tolerance of 1500 V at all ports, no blocking capacitor requirements and on-chip SAW filter over-voltage protection devices make this the ultimate in integration and ease of use.*

*The PE42612 is manufactured on Peregrine's UltraCMOS™ process, a patented variation of silicon-on-insulator (SOI) technology on a sapphire substrate, offering the performance of GaAs with the economy and integration of conventional CMOS.*

**Table 1. PE42612 Electrical Specifications: Temp = 25°C, V<sub>DD</sub> = 2.6 V**

Parameter	Condition	Min	Typ	Max	Unit
Operational Frequency		100		3000	MHz
Insertion Loss	ANT - TX - 850 / 900 MHz		0.55	0.65	dB
	ANT - TX - 1800 / 1900 MHz		0.7	0.8	dB
	ANT - RX - 850 / 900 MHz		0.85	1.0	dB
	ANT - RX - 1800 / 1900 MHz		1.05	1.2	dB
Isolation	TX - RX - 850 / 900 MHz (TX ON)	37	39		dB
	TX - RX - 1800 / 1900 MHz (TX ON)	29	31		dB
	TX1 - TX2 - 850 / 900 MHz (TX1 ON)	33	35		dB
	TX1 - TX2 - 1800 / 1900 MHz (TX1 ON)	26	28		dB
Return Loss	850 / 900 MHz	18	20		dB
	1800 / 1900 MHz	14	16		dB
2nd Harmonic <sup>1,2</sup>	35 dBm TX Input Power - 850 / 900 MHz		-82	-78	dBc
	33 dBm TX Input Power - 1800 / 1900 MHz		-89	-82	dBc
3rd Harmonic <sup>1,2</sup>	35 dBm TX Input Power - 850 / 900 MHz		-74	-69	dBc
	33 dBm TX Input Power - 1800 / 1900 MHz		-68	-65	dBc
Switching time	(10-90%) (90-10%) RF		2	3	µs

Notes: 1. Measured in Pulsed Wave Mode.  
 2. Assumes RF input duty cycle of 50% and 4620 µs, measured per 3GPP TS 45.005

**Table 2. Operating Ranges**

Parameter	Symbol	Min	Typ	Max	Units
Temperature range	T <sub>OP</sub>	-40		+85	°C
V <sub>DD</sub> Supply Voltage	V <sub>DD</sub>	2.4	2.6	2.95	V
I <sub>DD</sub> Power Supply Current (V <sub>DD</sub> = 2.6 V)	I <sub>DD</sub>		11	25	µA
TX input power (VSWR ≤ 3:1) 824-915 MHz	P <sub>IN</sub>			+35	dBm
TX input power (VSWR ≤ 3:1) 1710-1910 MHz				+33	
RX input power (VSWR ≤ 1:1)	P <sub>IN</sub>			+20	dBm
Control Voltage High	V <sub>IH</sub>	1.40			V
Control Voltage Low	V <sub>IL</sub>			0.40	V
Control Line Current				1	µA

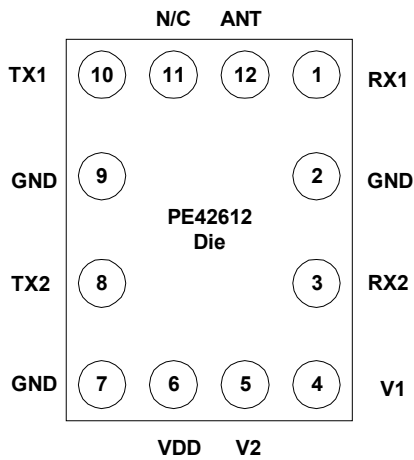
**Table 3. Absolute Maximum Ratings**

Symbol	Parameter/Conditions	Min	Max	Units
V <sub>DD</sub>	Power supply voltage	-0.3	4.0	V
V <sub>I</sub>	Voltage on any DC input	-0.3	V <sub>DD</sub> +0.3	V
T <sub>ST</sub>	Storage temperature range	-65	+150	°C
T <sub>OP</sub>	Operating temperature range	-40	+85	°C
P <sub>IN</sub>	TX input power (50 Ω) <sup>3,4</sup> 824-915 MHz		+38	dBm
	TX input power (50 Ω) <sup>3,4</sup> 1710-1910 MHz		+36	
	RX input power (50 Ω)		+23	
P <sub>IN</sub> (∞:1)	TX input power (VSWR = (∞:1) <sup>3,4</sup> 824-915 MHz		+35	dBm
	TX input power (VSWR = (∞:1) <sup>3,4</sup> 1710-1910 MHz		+33	
V <sub>ESD</sub>	ESD Voltage (HBM, MIL_STD 883 Method 3015.7)		1500	V
	ESD Voltage (MM, JEDEC, JESD22-A114-B)		100	V

Note: 3. Assumes RF input duty cycle of 50% and 4620 µs.  
 4. V<sub>DD</sub> within operating range specified in Table 4.

Absolute Maximum Ratings are those values listed in the above table. Exceeding these values may cause permanent device damage. Functional operation should be restricted to the limits in the DC Electrical Specifications table. Exposure to absolute maximum ratings for extended periods may affect device reliability.

**Figure 3. Pin Configuration (Ball-Side Up)**



**Table 4. Pin Descriptions**

Pin No.	Pin Name	Description
1 <sup>s</sup>	RX1	RF I/O – RX1
2	GND	Ground
3 <sup>s</sup>	RX2	RF I/O – RX2
4	V1	Switch control input, CMOS logic level
5	V2	Switch control input, CMOS logic level
6	VDD	Supply
7	GND	Ground
8 <sup>s</sup>	TX2	RF I/O - TX2
9	GND	Ground
10 <sup>s</sup>	TX1	RF I/O - TX1
11	N/C	No Connect – Pin to be connected to an electrically isolated low capacitance pad
12 <sup>s</sup>	ANT	RF Common – Antenna Input

Note: 5. Blocking capacitors needed only when non-zero DC voltage present.

**Table 5. Truth Table**

Path	V2	V1
ANT - RX1	0	0
ANT - RX2	0	1
ANT - TX1	1	0
ANT - TX2	1	1

### Electrostatic Discharge (ESD) Precautions

When handling this UltraCMOS™ device, observe the same precautions that you would use with other ESD-sensitive devices. Although this device contains circuitry to protect it from damage due to ESD, precautions should be taken to avoid exceeding the specified rating.

### Latch-Up Avoidance

Unlike conventional CMOS devices, UltraCMOS™ devices are immune to latch-up.

**Table 6. Ordering Information**

Order Code	Die ID	Description	Package	Shipping Method
PE42612-90 (Unitive)	C9817_1	PE42612-DIE-D	Film Frame	Wafer (Gross Die / Wafer Quantity)
PE42612-91 (FCI)	C9817_1	PE42612-DIE-D	Film Frame	Wafer (Gross Die / Wafer Quantity)
PE42612-00	C9817_1	PE42612-DIE-1H	Evaluation Kit	1 / Box

## Sales Offices

### *The Americas*

#### **Peregrine Semiconductor Corporation**

9450 Carroll Park Drive  
San Diego, CA 92121  
Tel: 858-731-9400  
Fax: 858-731-9499

### *Europe*

#### **Peregrine Semiconductor Europe**

Bâtiment Maine  
13-15 rue des Quatre Vents  
F-92380 Garches, France  
Tel: +33-1-4741-9173  
Fax : +33-1-4741-9173

#### **Space and Defense Products**

##### **Americas:**

Tel: 858-731-9453

##### **Europe, Asia Pacific:**

180 Rue Jean de Guiramand  
13852 Aix-En-Provence Cedex 3, France  
Tel: +33-4-4239-3361  
Fax: +33-4-4239-7227

#### **Peregrine Semiconductor, Asia Pacific (APAC)**

Shanghai, 200040, P.R. China  
Tel: +86-21-5836-8276  
Fax: +86-21-5836-7652

#### **Peregrine Semiconductor, Korea**

#B-2607, Kolon Tripolis, 210  
Geumgok-dong, Bundang-gu, Seongnam-si  
Gyeonggi-do, 463-943 South Korea  
Tel: +82-31-728-3939  
Fax: +82-31-728-3940

#### **Peregrine Semiconductor K.K., Japan**

Teikoku Hotel Tower 10B-6  
1-1-1 Uchisaiwai-cho, Chiyoda-ku  
Tokyo 100-0011 Japan  
Tel: +81-3-3502-5211  
Fax: +81-3-3502-5213

For a list of representatives in your area, please refer to our Web site at: [www.psemi.com](http://www.psemi.com)

## Data Sheet Identification

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The product is in a formative or design stage. The data sheet contains design target specifications for product development. Specifications and features may change in any manner without notice.

### **Preliminary Specification**

The data sheet contains preliminary data. Additional data may be added at a later date. Peregrine reserves the right to change specifications at any time without notice in order to supply the best possible product.

### **Product Specification**

The data sheet contains final data. In the event Peregrine decides to change the specifications, Peregrine will notify customers of the intended changes by issuing a DCN (Document Change Notice).

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