



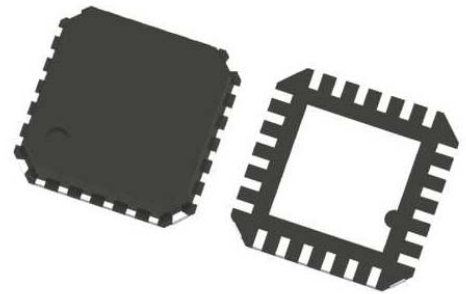
Eudyna Devices Inc.

# FMM5321ZV

**Quad-band Antenna Switch Module**  
**GSM850 / GSM900 / DCS1800 / PCS1900 / GPRS Applications**

## Features

- Quad-band, true SP6T PHEMT switch with integrated decoder and low pass filter
- Low insertion loss solution over the frequencies from 824 to 960 MHz and 1710 to 1990 MHz with no diplexer required
- Low cost, plastic mold package
- Small, low profile package: 4 x 4 x 0.85 mm<sup>3</sup>



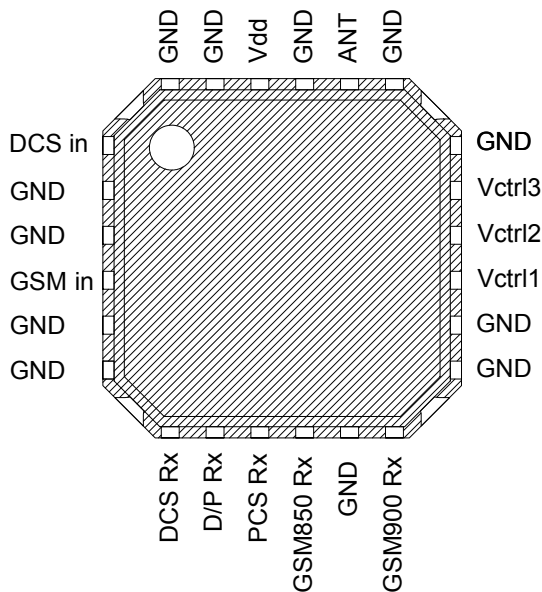
## Applications

- Quad-band handset for GSM850/900 and DCS1800/PCS1900

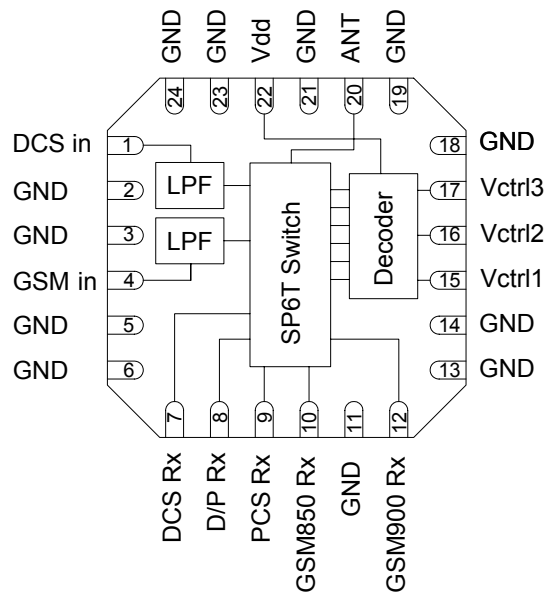
**Lead Free**  
**4 mm x 4 mm x 0.85 mm**  
**Module Package**

## Description

The **FMM5321ZV** is a miniature **4 mm x 4 mm quad-band GSM850/900, DCS1800, PCS1900** antenna switch module that utilizes Eudyna's highly reliable **PHEMT** technology for Europe/US **GSM and GPRS** handsets and wireless communication systems. The true SP6T PHEMT switch does not require a diplexer, the component that causes additional insertion loss and yield degradation. The frequency response is determined by built-in low pass filters, which simplify impedance matching with a power amplifier.



**Packaging and Configuration (Top View)**



**Function Block Diagram (Top View)**



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## Absolute Maximum Ratings

Parameter	Condition/comments	Rating	Unit
Supply Voltage		5	V
Low Band Tx Input power		+36	dBm
High Band Tx Input power		+34	dBm
All Rx Input power		+12	dBm
Control Voltage Logic		Vdd+0.1	V
Storage case temperature		-35 to +85	°C
Operating case temperature		-20 to +70	°C

## Recommended Operating Conditions (Ambient temperature 25°C)

Parameter	Condition/Comments	Min	Typ	Max	Unit
Supply Voltage	Decoder supply	2.5	2.8	3.2	V
High Control Voltage		2.5	2.8	3.2	V
Low Control Voltage		-0.2	0	0.2	V
Low Band Tx Input power				35	dBm
High Band Tx Input power				33	dBm
All Rx Input power				10	dBm

## Electrical Specifications (Vdd=2.8 V, Vctrl=2.8 V, Tc=25°C)

Parameter	Condition/Comments	Min	Typ	Max	Unit
<b>TX Operation</b>					
<b>GSM850 and GSM900 Tx @Pin=35 dBm</b>					
Insertion Loss	824 – 915 MHz		1.05	1.2	dB
	-20 to 70 °C			1.4	
VSWR Tx	824 – 915 MHz			1.5	
	-20 to 70 °C			1.7	
Attenuation	1648 – 1830 MHz	24	29		dB
	-20 to 70 °C	23			
	2472 – 2745 MHz	22	24		
	-20 to 70 °C	17			
	3296 – 3660 MHz	22	28		
	-20 to 70 °C	17			
Harmonics	1648 – 1830 MHz	70			dBc
	-20 to 70 °C	65			
	2472 – 2745 MHz	68			
	-20 to 70 °C	63			
	3296 – 3660 MHz	70			
	-20 to 70 °C	65			
Port Isolation	GSM Tx to any Rx port				dB
	-20 to 70 °C	25			



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<b>DCS1800 Tx @Pin=32 dBm</b>					
Insertion Loss	1710 – 1785 MHz -20 to 70 °C		1.4	1.6 1.7	dB
VSWR Tx	1710 – 1785 MHz -20 to 70 °C			1.5 1.7	
Attenuation	3420 – 3570 MHz -20 to 70 °C	25 22	30		dB
	5130 – 5355 MHz -20 to 70 °C	16 16	18		
Harmonics	3420 – 3570 MHz -20 to 70 °C	67 63			dBc
	5130 – 5355 MHz -20 to 70 °C	70 65			
Port Isolation	DCS1800 Tx to any Rx port -20 to 70 °C	25			dB
<b>PCS1900 Tx @Pin=32 dBm</b>					
Insertion Loss	1850 – 1910 MHz -20 to 70 °C		1.5	1.7 1.9	dB
VSWR Tx	1850 – 1910 MHz -20 to 70 °C			1.5 1.7	
Attenuation	3700 – 3820 MHz -20 to 70 °C	25 22	30		dB
	5550 – 5730 MHz -20 to 70 °C	19 17	22		
Harmonics	3700 – 3820 MHz -20 to 70 °C	70 63			dBc
	5550 – 5730 MHz -20 to 70 °C	70 65			
Port Isolation	PCS1900 Tx to any Rx port -20 to 70 °C	25			dB
Current consumption	Tx mode -20 to 70 °C		500	950	uA
<b>Rx Operation</b>					
<b>GSM850 Rx</b>					
Insertion Loss	869 - 894 MHz, Pin=10 dBm -20 to 70 °C		0.9	1.25 1.45	dB
VSWR Rx	869 - 894 MHz, Pin=10 dBm -20 to 70 °C			1.5	
<b>GSM900 Rx</b>					
Insertion Loss	925 – 960 MHz, Pin=10 dBm -20 to 70 °C		1.0	1.35 1.55	dB



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VSWR Rx	925 – 960 MHz, Pin=10 dBm -20 to 70 °C			1.5	
<b>DCS1800 Rx</b>					
Insertion Loss	1805 – 1880 MHz, Pin=10 dBm -20 to 70 °C		1.2	1.5 1.7	dB
VSWR Rx	1805 – 1880 MHz, Pin=10 dBm -20 to 70 °C			1.5	
<b>PCS1900 Rx</b>					
Insertion Loss	1930 - 1990 MHz, Pin=10 dBm -20 to 70 °C		1.3	1.5 1.7	dB
VSWR Rx	1930 - 1990 MHz, Pin=10 dBm -20 to 70 °C			1.5	
Current consumption	Rx mode -20 to 70 °C		600	1060	uA

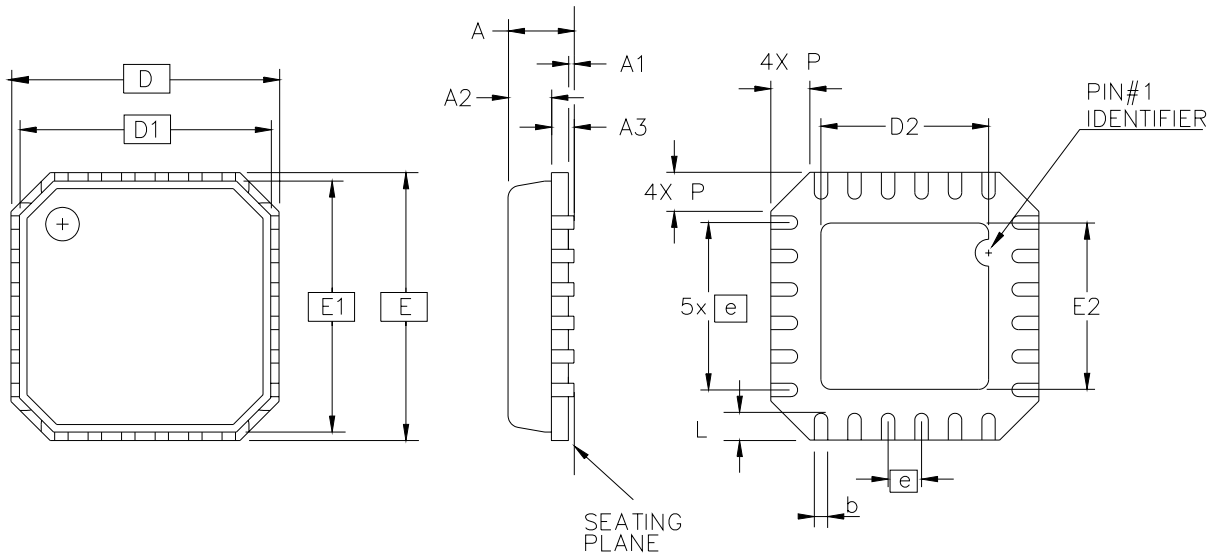
## Truth Table

Operation Mode	Vctrl1	Vctrl2	Vctrl3
GSM850 / GSM900 Tx	1	0	1/0
DCS1800 / PCS1900 Tx	1	1	1/0
GSM850 Rx	0	1	0
GSM900 Rx	0	0	1
DCS1800 Rx	0	0	0
PCS1900 Rx	0	1	1

## Pin Configuration

Pin No.	Pin Name	Description	Pin No.	Pin Name	Description
1	DCS in	DCS/PCS Tx Port	13	GND	Ground
2	GND	Ground	14	GND	Ground
3	GND	Ground	15	Vctrl1	Control 1
4	GSM in	GSM850/GSM900 Tx Port	16	Vctrl2	Control 2
5	GND	Ground	17	Vctrl3	Control 3
6	GND	Ground	18	GND	Ground
7	DCS Rx	DCS Rx Port	19	GND	Ground
8	D/P Rxs	DCS/PCS Rx Shunt	20	ANT	Antenna Port
9	PCS Rx	PCS Rx Port	21	GND	Ground
10	GSM850 Rx	GSM850 Rx Port	22	Vdd	Decoder Vdd
11	GND	Ground	23	GND	Ground
12	GSM900 Rx	GSM900 Rx Port	24	GND	Ground

## Package Dimensions



Dimension Symbol	Measurement (mm)		
	Min	Nom	Max
A	-	0.85	0.90
A1	0.00	0.01	0.05
A2	-	0.65	0.70
A3	0.20 REF		
B	0.18	0.23	0.30
D	4.00 BSC		
D1	3.75 BSC		
D2	2.35	2.50	2.65
E	4.00 BSC		
E1	3.75 BSC		
E2	2.35	2.50	2.65
e	0.50 BSC		
L	0.30	0.40	0.50
P	0.24	0.42	0.60

### NOTE

This document is subject to change without notice.