CEL

NEC's L-BAND SP3T SWITCH | UPG2227T5F

FEATURES

- **LOW INSERTION LOSS:**
  0.45 dB TYP. @ 1.0 GHz
  0.50 dB TYP. @ 2.0 GHz
- **HIGH ISOLATION:**
  21 dB TYP. @ 1.0 GHz
- **HIGH POWER:**
  $P_{in\ (0.1\ dB)}$ = 33.0 dBm TYP. @ +2.7 V, 1.0 GHz
- **PACKAGE:**
  12-pin plastic QFN package (3.0 × 3.0 × 0.75 mm)
- **Pb FREE**

DESCRIPTION

NEC's UPG2227T5F is a L-band SP3T GaAs FET switch for CDMA/PCS/GPS triple mode digital cellular telephone application. The device can operate from 500 MHz to 2.5 GHz with low insertion loss and high linearity.

APPLICATIONS

- **CDMA/PCS/GPS triple mode digital cellular telephone**
- **Short Range Wireless**

ORDERING INFORMATION

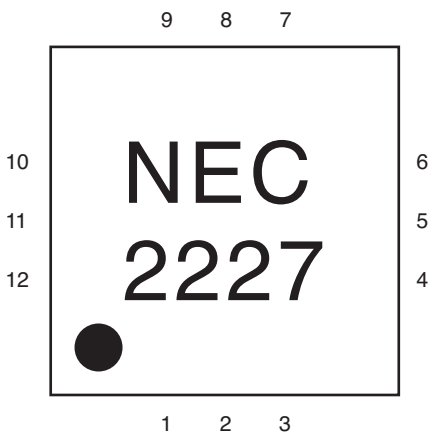
PART NUMBER	PACKAGE	MARKING	SUPPLYING FORM
UPG2227T5F-E2-A	12-pin plastic QFN	2227	• Embossed tape 8 mm wide • Pin 1 indicates roll-in direction of tape • Qty 3 kpcs/reel • Pb Free

Remark To order evaluation samples, contact your nearby sales office.
Part number for sample order: UPG2227T5F-A

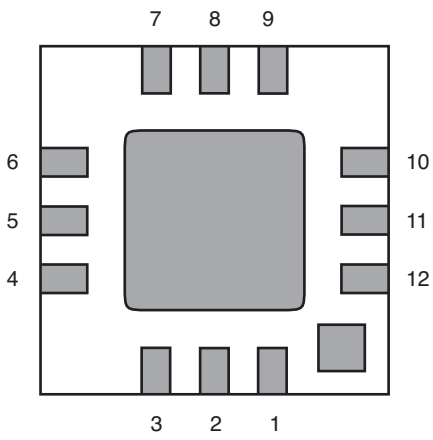
Caution Observe precautions when handling because these devices are sensitive to electrostatic discharge.

PIN CONNECTIONS

(Top View)

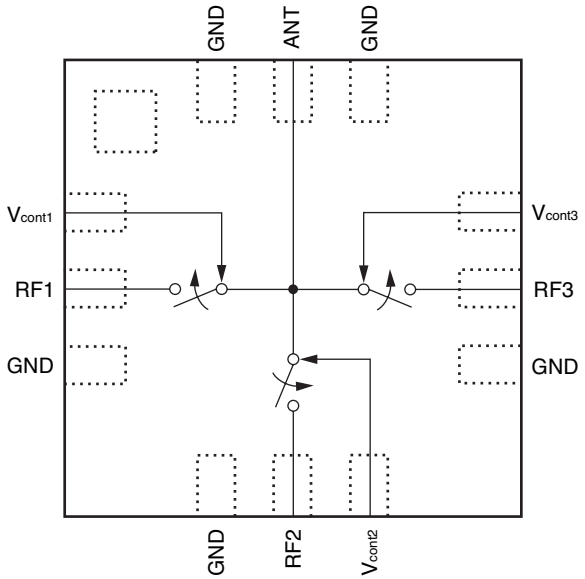


(Bottom View)



PIN NO.	PIN NAME
1	V_{cont1}
2	RF1
3	GND
4	GND
5	RF2
6	V_{cont2}
7	GND
8	RF3
9	V_{cont3}
10	GND
11	ANT
12	GND

TRUTH TABLE



V_{cont1}	V_{cont2}	V_{cont3}	ANT-RF1	ANT-RF2	ANT-RF3
H	L	L	ON	OFF	OFF
L	H	L	OFF	ON	OFF
L	L	H	OFF	OFF	ON

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Switch Control Voltage	V_{cont}	–8.0 to +8.0	V
Input Power	P_{in}	+36	dBm
Operating Ambient Temperature	T_A	–45 to +85	°C
Storage Temperature	T_{stg}	–55 to +150	°C

RECOMMENDED OPERATING RANGE (T_A = 25°C)

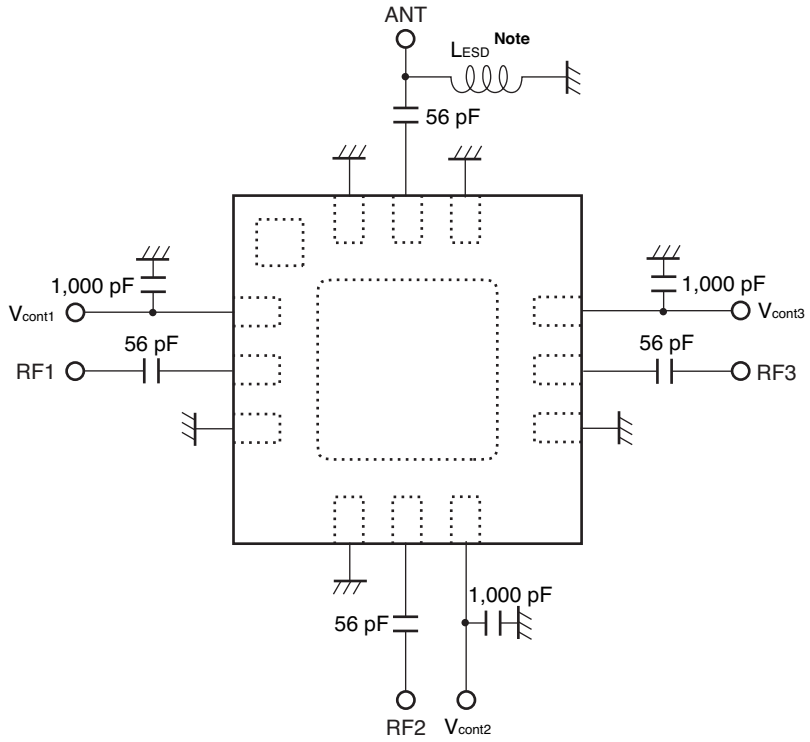
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Switch Control Voltage (H)	$V_{cont(H)}$	+2.4	+2.7	+5.0	V
Switch Control Voltage (L)	$V_{cont(L)}$	–0.2	0	+0.2	V

ELECTRICAL CHARACTERISTICS

(T_A = +25°C, V_{cont} = +2.7 V/0 V, Z_O = 50 Ω, Off chip DC blocking capacitors value = 56 pF, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Insertion Loss	L_{INS}	f = 0.5 to 1.0 GHz	–	0.45	0.60	dB
		f = 1.0 to 2.0 GHz	–	0.50	0.70	dB
		f = 2.0 to 2.5 GHz	–	0.55	–	dB
Isolation	ISL	f = 0.5 to 1.0 GHz	22	26	–	dB
		f = 1.0 to 2.0 GHz	17	21	–	dB
		f = 2.0 to 2.5 GHz	–	20	–	dB
Input Return Loss	RL_{in}	f = 0.5 to 2.0 GHz	15	20	–	dB
		f = 2.0 to 2.5 GHz	–	20	–	dB
Output Return Loss	RL_{out}	f = 0.5 to 2.0 GHz	15	20	–	dB
		f = 2.0 to 2.5 GHz	–	20	–	dB
0.1 dB Gain Compression Input Power	$P_{in\ (0.1\ dB)}$	f = 1.0 GHz	31.0	33.0	–	dBm
1 dB Gain Compression Input Power	$P_{in\ (1\ dB)}$	f = 1.0 GHz	–	34	–	dBm
2nd Harmonics	2f0	f = 1.0 GHz @ P_{in} = +27 dBm	65	75	–	dBc
		f = 2.0 GHz @ P_{in} = +24 dBm	–	75	–	dBc
3rd Harmonics	3f0	f = 1.0 GHz @ P_{in} = +27 dBm	65	75	–	dBc
		f = 2.0 GHz @ P_{in} = +24 dBm	–	75	–	dBc
3rd Order Distortion Input Intercept Point	IIP_3	f = 837 MHz/838 MHz @ 1 MHz Spacing P_{in} = +22 dBm each @ 2 Tone	–	64	–	dBm
		f = 1 880 MHz/1 881 MHz @ 1 MHz Spacing P_{in} = +21 dBm each @ 2 Tone	–	63	–	dBm
Cross Modulation	X-Mod	f = 837 MHz/838 MHz @ 1 MHz Spacing P_{in} = +22 dBm each @ 2 Tone f = 880 MHz P_{in} = –27 dBm	–	–108	–	dBm
		f = 1 880 MHz/1 881 MHz @ 1 MHz Spacing P_{in} = +21 dBm each @ 2 Tone f = 1 960 MHz P_{in} = –27 dBm	–	–110	–	dBm
Switch Control Speed	t_{SW}		–	150	–	ns
Switch Control Current	I_{cont}	RF Non	–	1	20	μA

EVALUATION CIRCUIT

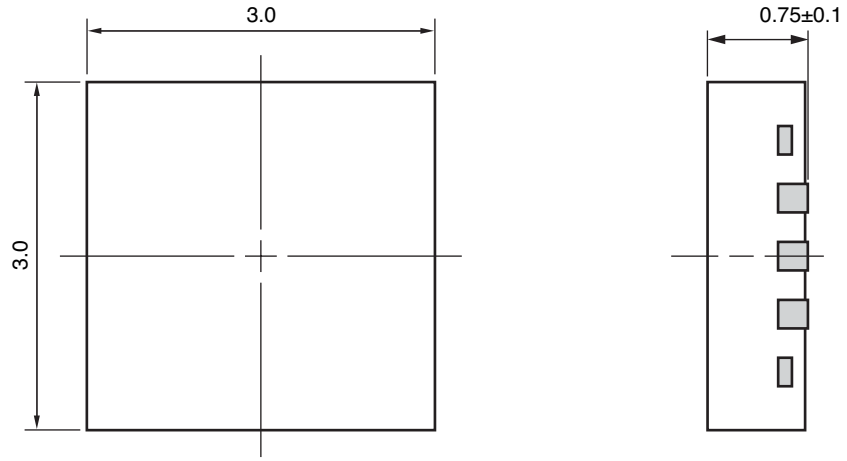


Note Recommend attached L_{ESD} to antenna port for ESD protection.

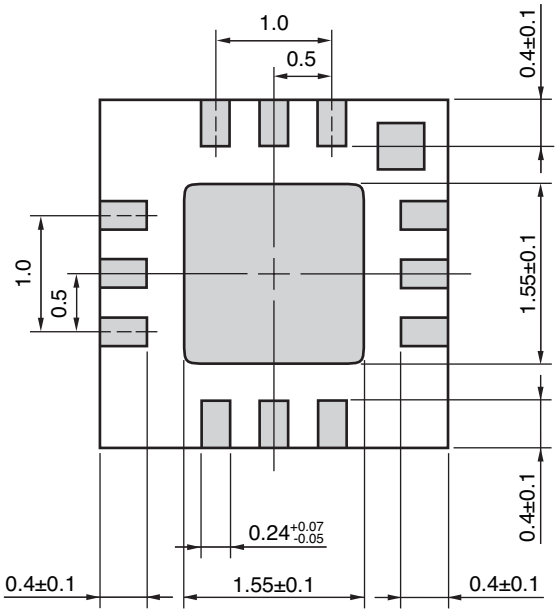
The application circuits and their parameters are for reference only and are not intended for actual design-ins.

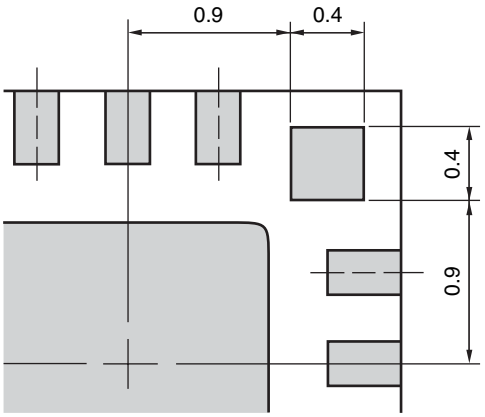
PACKAGE DIMENSIONS

12-PIN PLASTIC QFN (UNIT: mm)



(Bottom View)





Dimensions of pin No.1 indication

RECOMMENDED SOLDERING CONDITIONS

This product should be soldered and mounted under the following recommended conditions. For soldering methods and conditions other than those recommended below, contact your nearby sales office.

Soldering Method	Soldering Conditions		Condition Symbol
Infrared Reflow	Peak temperature (package surface temperature)	: 260°C or below	IR260
	Time at peak temperature	: 10 seconds or less	
	Time at temperature of 220°C or higher	: 60 seconds or less	
	Preheating time at 120 to 180°C	: 120±30 seconds	
	Maximum number of reflow processes	: 3 times	
	Maximum chlorine content of rosin flux (% mass)	: 0.2%(Wt.) or below	
VPS	Peak temperature (package surface temperature)	: 215°C or below	VP215
	Time at temperature of 200°C or higher	: 25 to 40 seconds	
	Preheating time at 120 to 150°C	: 30 to 60 seconds	
	Maximum number of reflow processes	: 3 times	
	Maximum chlorine content of rosin flux (% mass)	: 0.2%(Wt.) or below	
Wave Soldering	Peak temperature (molten solder temperature)	: 260°C or below	WS260
	Time at peak temperature	: 10 seconds or less	
	Preheating temperature (package surface temperature)	: 120°C or below	
	Maximum number of flow processes	: 1 time	
	Maximum chlorine content of rosin flux (% mass)	: 0.2%(Wt.) or below	
Partial Heating	Peak temperature (pin temperature)	: 350°C or below	HS350
	Soldering time (per side of device)	: 3 seconds or less	
	Maximum chlorine content of rosin flux (% mass)	: 0.2%(Wt.) or below	

Caution **Do not use different soldering methods together (except for partial heating).**