

DATA SHEET

NEC

GaAs INTEGRATED CIRCUIT

μ PG2227T5F

L-BAND SP3T SWITCH

DESCRIPTION

The μ PG2227T5F is a L-band SP3T GaAs FET switch which was developed for CDMA/PCS/GPS triple mode digital cellular telephone application. The device can operate from 500 MHz to 2.5 GHz, having the low insertion loss and high linearity.

FEATURES

- Low insertion loss : $L_{INS} = 0.45$ dB TYP. @ $V_{cont} = +2.7$ V/0 V, $f = 1.0$ GHz
: $L_{INS} = 0.50$ dB TYP. @ $V_{cont} = +2.7$ V/0 V, $f = 2.0$ GHz
- High isolation : $ISL = 21$ dB TYP. @ $V_{cont} = +2.7$ V/0 V, $f = 1.0$ GHz
- High power : $P_{in(0.1\text{ dB})} = 33.0$ dBm TYP. @ $V_{cont} = +2.7$ V/0 V, $f = 1.0$ GHz
- Package : 12-pin plastic QFN package (3.0 × 3.0 × 0.75 mm)

APPLICATION

- CDMA/PCS/GPS triple mode digital cellular telephone

ORDERING INFORMATION

Part Number	Package	Marking	Supplying Form
μ PG2227T5F-E2	12-pin plastic QFN	2227	<ul style="list-style-type: none">• Embossed tape 8 mm wide• Pin 1 indicates roll-in direction of tape• Qty 3 kpcs/reel

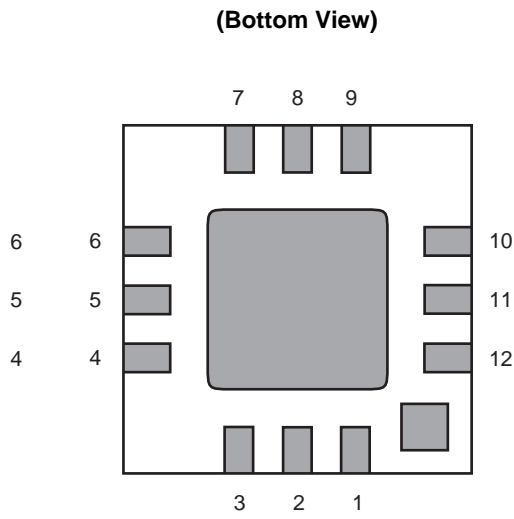
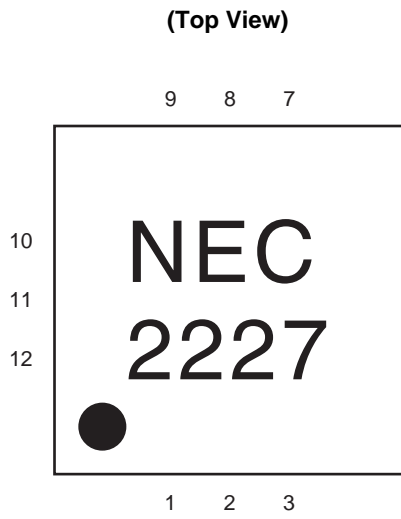
Remark To order evaluation samples, contact your nearby sales office.

Part number for sample order: μ PG2227T5F

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

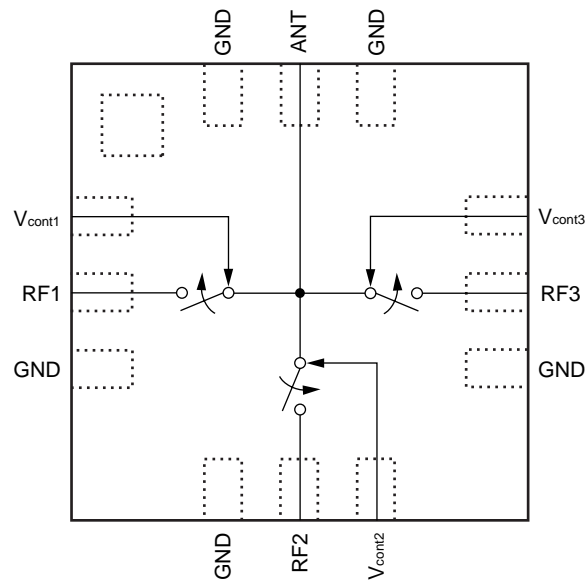
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Not all devices/types available in every country. Please check with local NEC Compound Semiconductor Devices representative for availability and additional information.

PIN CONNECTIONS



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

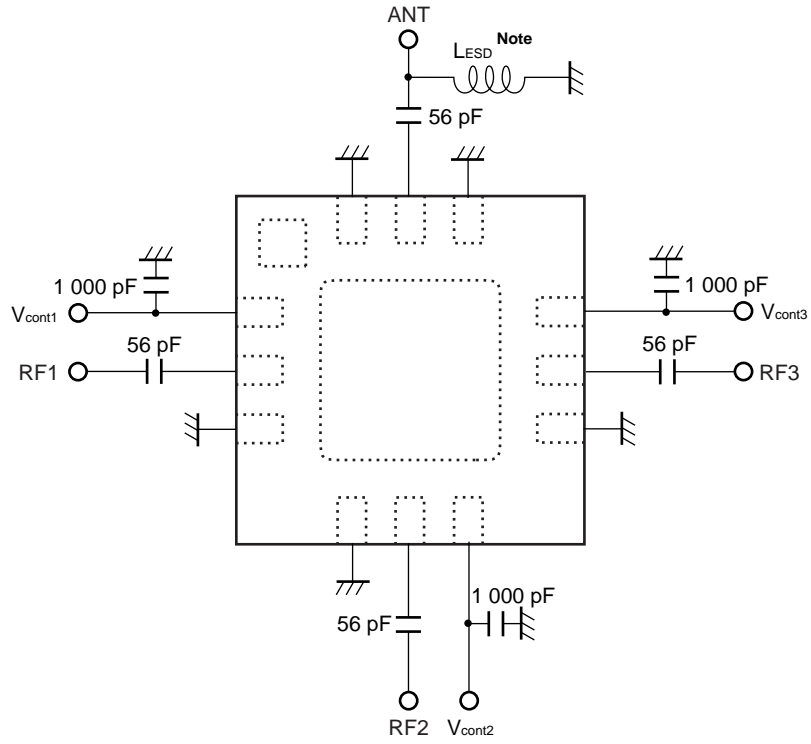
RECOMMENDED OPERATING RANGE (T_A = +25°C)

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	2f ₀	f = 1.0 GHz @ P _{in} = +27 dBm	65	75	–	dBc
		f = 2.0 GHz @ P _{in} = +24 dBm	–	75	–	dBc
3rd Harmonics	3f ₀	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

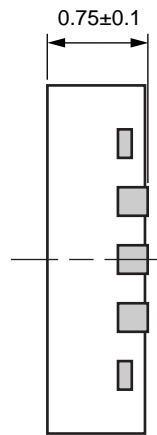
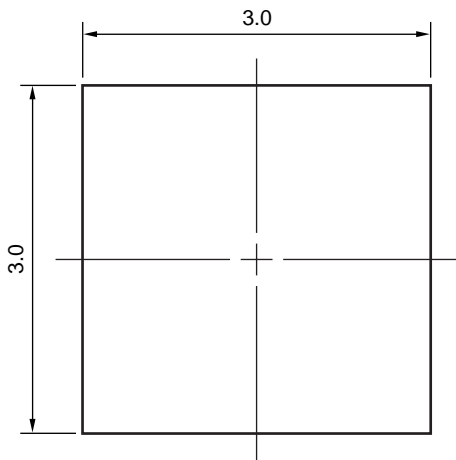


Note Recommend attached L_{ESD} to antenna port for ESD protection.

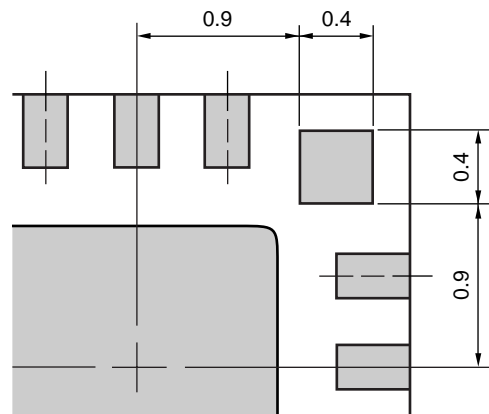
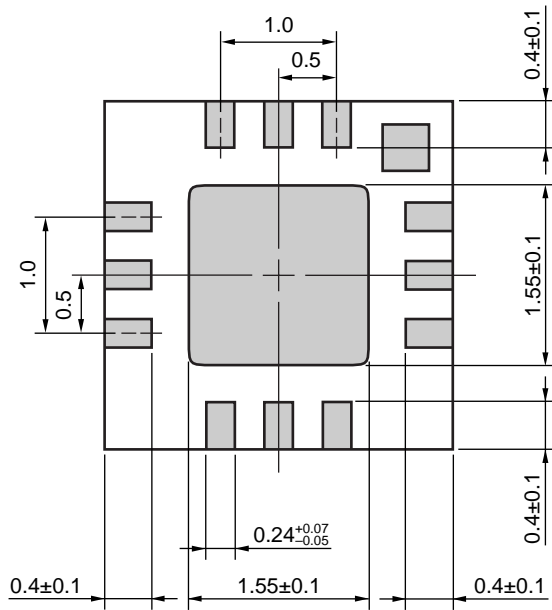
The application circuits and their parameters are for reference only and are not intended for use in actual design-ins.

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 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	IR260
VPS	Peak temperature (package surface temperature) : 215°C or below 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	VP215
Wave Soldering	Peak temperature (molten solder temperature) : 260°C or below 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	WS260
Partial Heating	Peak temperature (pin temperature) : 350°C or below Soldering time (per side of device) : 3 seconds or less Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	HS350

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

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M8E 00.4-0110

<p>Caution</p>	<p>GaAs Products</p>	<p>This product uses gallium arsenide (GaAs). GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points.</p> <ul style="list-style-type: none"> • Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below. <ol style="list-style-type: none"> 1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials. 2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal. • Do not burn, destroy, cut, crush, or chemically dissolve the product. • Do not lick the product or in any way allow it to enter the mouth.
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► For further information, please contact

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