

μPG2163T5N

R09DS0019EJ0300 Rev.3.00 May 19, 2011

DESCRIPTION

The μ PG2163T5N is GaAs MMIC SPDT (Single Pole Double Throw) switch which was developed for 2.4 GHz and 6 GHz dual-band wireless LAN. This device can operate at frequencies from 0.5 to 2.5 GHz, 4.9 to 6.0 GHz and 8.0 GHz, with low insertion loss and high isolation.

This device is housed in a 6-pin plastic TSON (<u>Thin Small Out-line Non-leaded</u>) package. And this package is able to high-density surface mounting.

<R> FEATURES

•	Operating frequency	: f = 0.5 to 2.5 GHz, 4.9 to 6.0 GHz and 8.0 GHz
•	Switch control voltage	: V _{cont (H)} = 2.8 to 5.0 V (3.0 V TYP.)
		: $V_{\text{cont}(L)} = -0.3 \text{ to } 0.3 \text{ V} (0 \text{ V TYP.})$
•	Low insertion loss	: Lins1 = 0.40 dB TYP. @ f = 2.4 to 2.5 GHz
		: Lins2 = 0.50 dB TYP. @ f = 4.9 to 6.0 GHz
		: Lins3 = 0.90 dB TYP. @ f = 8.0 GHz
		: Lins4 = 0.50 dB TYP. @ f = 0.5 to 2.5 GHz
•	High isolation	: ISL1 = 38 dB TYP. @ f = 2.4 to 2.5 GHz
		: ISL2 = 30 dB TYP. @ f = 4.9 to 6.0 GHz
		: ISL3 = 23 dB TYP. @ f = 8.0 GHz
		: ISL4 = 43 dB TYP. @ f = 0.5 to 1.0 GHz
		: ISL5 = 38 dB TYP. @ f = 1.0 to 2.5 GHz
•	Handling power	: $P_{in (1 dB)} = +31.0 dBm TYP$. @ f = 2.5 GHz, $V_{cont (H)} = 3.0 V$, $V_{cont (L)} = 0 V$
		: Pin (1 dB) = +29.0 dBm TYP. @ f = 6.0 GHz, V cont (H) = 3.0 V, V cont (L) = 0 V
•	High-density surface mounting	: 6-pin plastic TSON package ($1.5 \times 1.5 \times 0.37$ mm)

<R> APPLICATIONS

• Dual-band wireless LAN (IEEE802.11a/b/g/n), etc.

ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Supplying Form
μPG2163T5N-E2	μPG2163T5N-E2-A	6-pin plastic TSON (Pb-Free)	G4X	 Embossed tape 8 mm wide Pin 1, 6 face the perforation side of the tape Qty 3 kpcs/reel

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

Part number for sample order: μ PG2163T5N

CAUTION

Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions must be employed at all times.

The mark <R> shows major revised points.

The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.



PIN CONNECTIONS AND INTERNAL BLOCK DIAGRAM



Pin No.	Pin Name
1	GND
2	V _{cont} 2
3	OUT2 (RX)
4	OUT1 (TX)
5	V _{cont} 1
6	IN (ANT)

Remark Exposed pad : GND

TRUTH TABLE

V _{cont} 1	V _{cont} 2	IN (ANT)–OUT1 (TX)	IN (ANT)-OUT2 (RX)
High	Low	OFF	ON
Low	High	ON	OFF

ABSOLUTE MAXIMUM RATINGS (TA = +25°C, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Switch Control Voltage	Vcont	-6.0 to +6.0	V
Input Power	Pin	+32	dBm
Operating Ambient Temperature	TA	-45 to +85	°C
Storage Temperature	Tstg	-55 to +135	°C

<R> RECOMMENDED OPERATING RANGE (TA = +25°C, unless otherwise specified)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Switch Control Voltage (H)	Vcont (H)	2.8	3.0	5.0	V
Switch Control Voltage (L)	Vcont (L)	-0.3	0	0.3	V
Operating Frequency 1 Note 1	f1	2.4	-	2.5	GHz
Operating Frequency 2 ^{Note 1}	f2	4.9	-	6.0	GHz
Operating Frequency 3 ^{Note 2}	f3	-	8.0	-	GHz
Operating Frequency 4 ^{Note 3}	f4	0.5	-	1.0	GHz
Operating Frequency 5 ^{Note 3}	f5	1.0	_	2.4	GHz

Notes 1. DC blocking capacitors = 4 pF

- 2. DC blocking capacitors = 2 pF
- **3.** DC blocking capacitors = 100 pF



<R> ELECTRICAL CHARACTERISTICS

(T_A = +25°C, V_{cont (H)} = 3.0 V, V_{cont (L)} = 0 V, Z₀ = 50 Ω , DC blocking capacitors = 4 pF, unless otherwise specified)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Insertion Loss 1	Lins1	f = 2.4 to 2.5 GHz	-	0.40	0.60	dB
Insertion Loss 2	Lins2	f = 4.9 to 6.0 GHz	_	0.50	0.80	dB
Insertion Loss 3	Lins3	f = 8.0 GHz Note 1	_	0.90	-	dB
Insertion Loss 4	Lins4	f = 0.5 to 2.5 GHz ^{Note 2}	_	0.50	-	dB
Isolation 1	ISL1	f = 2.4 to 2.5 GHz	35	38	-	dB
Isolation 2	ISL2	f = 4.9 to 6.0 GHz	27	30	-	dB
Isolation 3	ISL3	f = 8.0 GHz Note 1	_	23	-	dB
Isolation 4	ISL4	f = 0.5 to 1.0 GHz ^{Note 2}	40	43	_	dB
Isolation 5	ISL5	f = 1.0 to 2.5 GHz ^{Note 2}	35	38	_	dB
Input Return Loss 1	RLin1	f = 2.4 to 2.5 GHz	-	15	_	dB
Input Return Loss 2	RLin2	f = 4.9 to 6.0 GHz	_	15	-	dB
Input Return Loss 3	RLin3	f = 8.0 GHz ^{Note 1}	_	15	-	dB
Input Return Loss 4	RLin4	$f = 0.5 \text{ to } 2.5 \text{ GHz}^{Note 2}$	_	20	_	dB
Output Return Loss 1	RLout1	f = 2.4 to 2.5 GHz	-	15	_	dB
Output Return Loss 2	RLout2	f = 4.9 to 6.0 GHz	_	15	_	dB
Output Return Loss 3	RLout3	f = 8.0 GHz Note 1	_	15	_	dB
Output Return Loss 4	RLout4	$f = 0.5 \text{ to } 2.5 \text{ GHz}^{Note 2}$	_	20	_	dB
1 dB Loss Compression Input Power 1 ^{№ te 3}	Pin (1 dB) 1	f = 2.4 to 2.5 GHz	_	+31.0	Ι	dBm
1 dB Loss Compression Input Power 2 ^{№ee 3}	Pin (1 dB) 2	f = 4.9 to 6.0 GHz	-	+29.0	Ι	dBm
Input 3rd Order Intercept Point	IIP₃		-	+55	-	dBm
Switch Control Current	Icont		-	0.1	1.0	μA
Switch Control Speed	tsw	50% CTL to 90/10%	-	50	-	ns

Notes 1. DC blocking capacitors = 2 pF

- 2. DC blocking capacitors = 100 pF
- **3.** Pin (1 dB) is measured the input power level when the insertion loss increases more 1 dB than that of linear range.

Caution This device is used it is necessary to use DC blocking capacitors.



<R> EVALUATION CIRCUIT



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



MOUNTING PAD AND SOLDER MASK LAYOUT DIMENSIONS

6-PIN PLASTIC TSON (UNIT: mm)



MOUNTING PAD

SOLDER MASK



Solder thickness : 0.08 mm

Remark The mounting pad and solder mask layouts in this document are for reference only. When designing PCB, please consider workability of mounting, solder joint reliability, prevention of solder bridge and so on, in order to optimize the design.

.



PACKAGE DIMENSIONS

6-PIN PLASTIC TSON (UNIT: mm)





<R> 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) Time at peak temperature Time at temperature of 220°C or higher Preheating time at 120 to 180°C Maximum number of reflow processes Maximum chlorine content of rosin flux (% mass)	: 260°C or below : 10 seconds or less : 60 seconds or less : 120±30 seconds : 3 times : 0.2%(Wt.) or below	IR260
Partial Heating	Peak temperature (terminal temperature) Soldering time (per side of device) Maximum chlorine content of rosin flux (% mass)	: 350°C or below : 3 seconds or less : 0.2%(Wt.) or below	HS350

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



Caution GaAs Products	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.
	• 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.
	 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.



Rev	visior	n Histor	rv
I VC	13101	111310	y

μ PG2163T5N Data Sheet

		Description		
Rev.	Date	Page Summary		
-	Feb 2008	-	Previous No. :PG10626EJ02V0DS	
3.00	May 19, 2011	Throughout Modification of operating frequencies		
		f = 2.4 to 2.5 GHz and 4.9 to 6.0 GHz -> f = 0.5 to 2.5 GHz, 4.9 to 6.0 GHz and		
		p.1 Modification of APPLICATIONS		
		p.7	Modification of RECOMMENDED SOLDERING CONDITIONS	

Notice

- All information included in this document is current as of the date this document is issued. Such information, however, is subject to change without any prior notice. Before purchasing or using any Renesas Electronics products listed herein, please confirm the latest product information with a Renesas Electronics sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas Electronics such as that disclosed through our website.
- Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
- 3. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part.
- 4. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
- 5. When exporting the products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. You should not use Renease Electronics products or the technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. Renease Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations.
- 6. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
- 7. Renesas Electronics products are classified according to the following three quality grades: "Standard", "High Quality", and "Specific". The recommended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below. You must check the quality grade of each Renesas Electronics product for any application categorized as "Specific" without the prior written consent of Renesas Electronics. Further, you may not use any Renesas Electronics product for any application categorized as "Specific" without the prior written consent of Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product is not intended where you have failed to obtain the prior written consent of Renesas Electronics. The recommended where you have failed to obtain the prior written consent of Renesas Electronics and the prior written consent of Renesas Electronics and the prior written consent of Renesas Electronics. The recommended where you have failed to obtain the prior written consent of Renesas Electronics. The recommended where you have failed to obtain the prior written consent of Renesas Electronics. The quality grade of each Renesas Electronics product is "Standard" unless otherwise expressly specified in a Renesas Electronics data sheets or data books, etc.
- "Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools
- personal electronic equipment; and industrial robots. "High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; safety equipment; and medical equipment not specifically designed for life support.
- "Specific": Aircraft; aerospace equipment; submersible repeaters; nuclear reactor control systems; medical equipment or systems for life support (e.g. artificial life support devices or systems), surgical implantations, or healthcare intervention (e.g. excision, etc.), and any other applications or purposes that pose a direct threat to human life.
- 8. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
- 9. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and mafunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and mafunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.
- 10. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
- 11. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics.
- 12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.
- (Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries
- (Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

Refer to "http://www.renesas.com/" for the latest and detailed information



SALES OFFICES

Renesas Electronics Corporation

http://www.renesas.com

Renesas Electronics America Inc. 2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A. Tel: +1-408-588-4000, Fax: +1-408-588-6130 Renesas Electronics Canada Limited 1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada Tel: +1-905-898-5441, Fax: +1-905-898-3220 Renesas Electronics Europe Limited Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K Tel: +44-1628-585-100, Fax: +44-1628-585-900 Renesas Electronics Europe GmbH Arcadiastrasse 10, 40472 Düsseldorf, Germany Tel: +49-211-65030, Fax: +44-1628-585-900 Renesas Electronics (Shanghai) Co., Ltd. 7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China Tel: +480-12453-1155, Tax: +480-21823-F679 Renesas Electronics (Shanghai) Co., Ltd. 7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China Tel: +480-12453-1155, Tax: +480-2485-7679 Renesas Electronics (Shanghai) Co., Ltd. Unit 204, 205, A2LA Center, No.1233 Lujiazul Ring Rd., Pudong District, Shanghai 200120, China Tel: +480-12457-17518, Fax: +480-2487-7858 Renesas Electronics Hong Kong Limited Unit 1001.161, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong Tel: +480-2487-1558, Fax: +480-2487-7580 Renesas Electronics Taiwan Co., Ltd. 7F, No. 363 Fu Shing North Road Taipel, Taiwan Tel: +480-24175-9800, Fax: +480-24175-9870 Renesas Electronics Taiwan Co., Ltd. 1 harbourFront Avenue, #06-10, keppel Bay Tower, Singapore 098632 Tel: +656-2175-9800, Fax: +480-24175-9870 Renesas Electronics Kong Co., Ltd. 1 harbourFront Avenue, #06-10, keppel Bay Tower, Singapore 098632 Tel: +606-37955-9300, Fax: +480-24175-9870 Renesas Electronics Konge Co., Ltd. 11F, Samik Lavied or Bildya, 720-2 Veoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea Tel: +605-7755-930, Fax: +480-2-555-511



ООО "ЛайфЭлектроникс"

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 3010181090000000703 БИК 044030703

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный) Email: org@lifeelectronics.ru

www.lifeelectronics.ru