



GaAs INTEGRATED CIRCUIT

μ PG2157T5F

50 Ω TERMINATION TYPE HIGH POWER SPDT SWITCH FOR WiMAX

DESCRIPTION

The μ PG2157T5F is a GaAs MMIC 50 Ω termination type high power SPDT (Single Pole Double Throw) switch which was developed for WiMAX. This device can operate from frequency 2.3 to 5.85 GHz, with low insertion loss and high isolation.

This device is housed in a 12-pin plastic QFN (Quad Flat Non-leaded) package. This package is suitable for high-density surface mounting.

FEATURES

- Control voltage : $V_{\text{cont (H)}} = 2.5$ to 3.3 V (3.0 V TYP.)
: $V_{\text{cont (L)}} = 0$ to 0.4 V (0 V TYP.)
- Low insertion loss : $L_{\text{ins1}} = 0.60$ dB TYP. @ $f = 2.3$ to 2.7 GHz, $V_{\text{cont (H)}} = 3.0$ V, $V_{\text{cont (L)}} = 0$ V
: $L_{\text{ins2}} = 0.60$ dB TYP. @ $f = 3.3$ to 3.8 GHz, $V_{\text{cont (H)}} = 3.0$ V, $V_{\text{cont (L)}} = 0$ V
: $L_{\text{ins3}} = 0.80$ dB TYP. @ $f = 5.15$ to 5.85 GHz, $V_{\text{cont (H)}} = 3.0$ V, $V_{\text{cont (L)}} = 0$ V
- High isolation : $ISL1 = 28$ dB TYP. @ $f = 2.3$ to 2.7 GHz, $V_{\text{cont (H)}} = 3.0$ V, $V_{\text{cont (L)}} = 0$ V
: $ISL2 = 25$ dB TYP. @ $f = 3.3$ to 3.8 GHz, $V_{\text{cont (H)}} = 3.0$ V, $V_{\text{cont (L)}} = 0$ V
: $ISL3 = 22$ dB TYP. @ $f = 5.15$ to 5.85 GHz, $V_{\text{cont (H)}} = 3.0$ V, $V_{\text{cont (L)}} = 0$ V
- Handling power : $P_{\text{in (1 dB)}} \geq +37.0$ dBm TYP. @ $f = 2.5$ GHz, $V_{\text{cont (H)}} = 3.0$ V, $V_{\text{cont (L)}} = 0$ V
: $P_{\text{in (1 dB)}} \geq +37.0$ dBm TYP. @ $f = 5.85$ GHz, $V_{\text{cont (H)}} = 3.0$ V, $V_{\text{cont (L)}} = 0$ V
- High-density surface mounting : 12-pin plastic QFN package (3.0 \times 3.0 \times 0.75 mm)

APPLICATIONS

- Antenna switch for WiMAX, 802.11a/b/g access point

ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Supplying Form
μ PG2157T5F-E2	μ PG2157T5F-E2-A	12-pin plastic QFN (Pb-Free)	2157	<ul style="list-style-type: none"> • Embossed tape 8 mm wide • Pin 1 indicates roll-in direction of tape • Qty 3 kpcs/reel

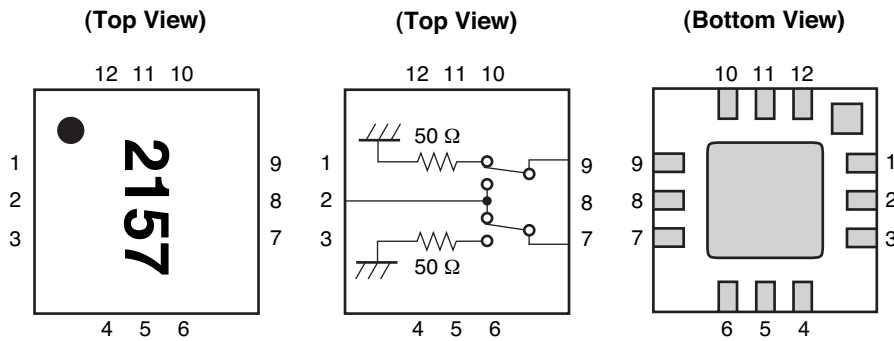
Remark To order evaluation samples, contact your nearby sales office.

Part number for sample order: μ PG2157T5F-A

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

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.

PIN CONNECTIONS AND INTERNAL BLOCK DIAGRAM



Pin No.	Pin Name
1	GND
2	INPUT
3	GND
4	GND
5	V _{cont2}
6	GND
7	OUTPUT2
8	GND
9	OUTPUT1
10	GND
11	V _{cont1}
12	GND

Remark Exposed pad : GND

TRUTH TABLE

V _{cont1}	V _{cont2}	INPUT-OUTPUT1	INPUT-OUTPUT2
High	Low	ON	OFF
Low	High	OFF	ON

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

Parameter	Symbol	Ratings	Unit
Switch Control Voltage	V _{cont}	+6.0	V
Input Power	P _{in}	+38	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, unless otherwise specified)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating Frequency	f _{opt1}	2.3	-	2.7	GHz
	f _{opt2}	3.3	-	3.8	GHz
	f _{opt3}	5.15	-	5.85	GHz
Switch Control Voltage (H)	V _{cont (H)}	2.5	3.0	3.3	V
Switch Control Voltage (L)	V _{cont (L)}	0	0	0.4	V

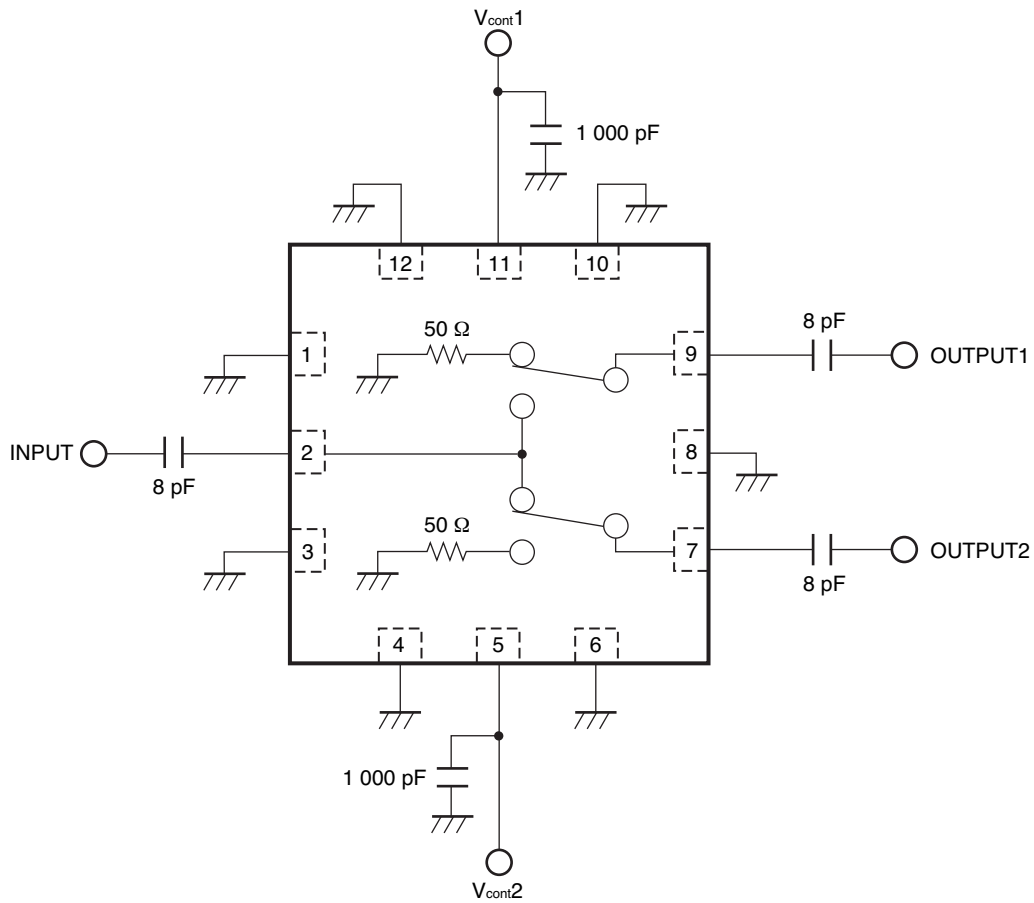
ELECTRICAL CHARACTERISTICS

($T_A = +25^\circ\text{C}$, $V_{\text{cont (H)}} = 3.0\text{ V}$, $V_{\text{cont (L)}} = 0\text{ V}$, DC blocking capacitors = 8 pF, unless otherwise specified)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Insertion Loss 1	L_{ins1}	$f = 2.3\text{ to }2.7\text{ GHz}$	-	0.60	0.85	dB
Insertion Loss 2	L_{ins2}	$f = 3.3\text{ to }3.8\text{ GHz}$	-	0.60	0.85	dB
Insertion Loss 3	L_{ins3}	$f = 5.15\text{ to }5.85\text{ GHz}$	-	0.80	1.05	dB
Isolation 1 (INPUT-OFF Port)	ISL1	$f = 2.3\text{ to }2.7\text{ GHz}$	25	28	-	dB
Isolation 2 (INPUT-OFF Port)	ISL2	$f = 3.3\text{ to }3.8\text{ GHz}$	22	25	-	dB
Isolation 3 (INPUT-OFF Port)	ISL3	$f = 5.15\text{ to }5.85\text{ GHz}$	19	22	-	dB
Isolation 4 (OUTPUT1-OUTPUT2)	ISL4	$f = 2.3\text{ to }2.7\text{ GHz}$	23	26	-	dB
Isolation 5 (OUTPUT1-OUTPUT2)	ISL5	$f = 3.3\text{ to }3.8\text{ GHz}$	20	23	-	dB
Isolation 6 (OUTPUT1-OUTPUT2)	ISL6	$f = 5.15\text{ to }5.85\text{ GHz}$	18	21	-	dB
Input Return Loss 1	RL_{in1}	$f = 2.3\text{ to }2.7\text{ GHz}$	-	20	-	dB
Input Return Loss 2	RL_{in2}	$f = 3.3\text{ to }3.8\text{ GHz}$	-	20	-	dB
Input Return Loss 3	RL_{in3}	$f = 5.15\text{ to }5.85\text{ GHz}$	-	20	-	dB
Output Return Loss 1	RL_{out1}	$f = 2.3\text{ to }2.7\text{ GHz}$	-	20	-	dB
Output Return Loss 2	RL_{out2}	$f = 3.3\text{ to }3.8\text{ GHz}$	-	20	-	dB
Output Return Loss 3	RL_{out3}	$f = 5.15\text{ to }5.85\text{ GHz}$	-	20	-	dB
Return Loss (OFF Port)	RL	$f = 2.3\text{ to }2.7\text{ GHz}$	-	15	-	dB
		$f = 3.3\text{ to }3.8\text{ GHz}$	-	15	-	dB
		$f = 5.15\text{ to }5.85\text{ GHz}$	-	15	-	dB
1 dB Loss Compression Input Power ^{Note}	$P_{\text{in (1 dB)}}$	$f = 2.5\text{ GHz}$	-	$\geq +37.0$	-	dBm
		$f = 5.85\text{ GHz}$	-	$\geq +37.0$	-	dBm
Switch Control Current	I_{cont}		-	20	30	μA
Switch Control Speed	t_{sw}	50% CTL to 90/10% RF	-	100	-	ns

Note $P_{\text{in (1 dB)}}$ is measured the input power level when the insertion loss increases more 1 dB than that of linear range.

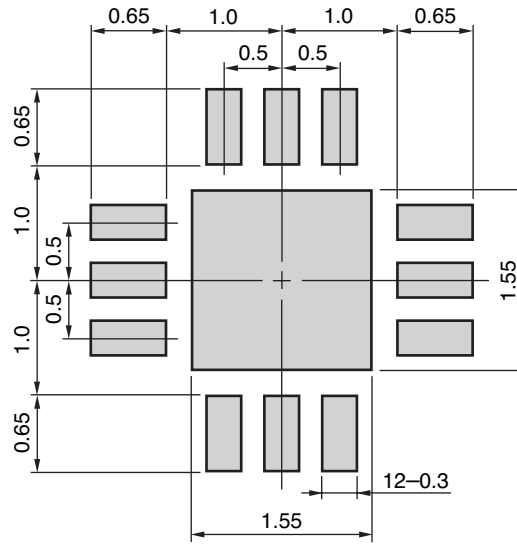
EVALUATION CIRCUIT



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

MOUNTING PAD LAYOUT DIMENSIONS

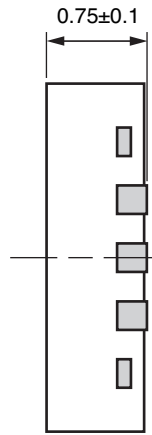
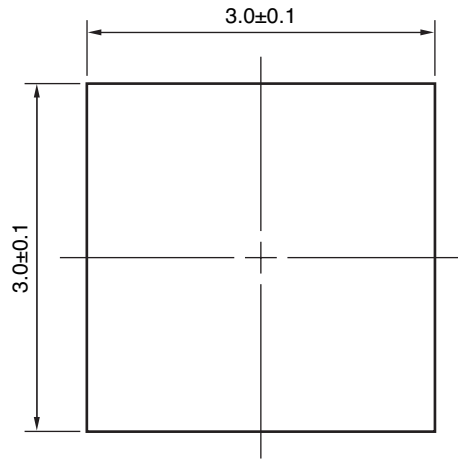
12-PIN PLASTIC QFN (UNIT: mm)



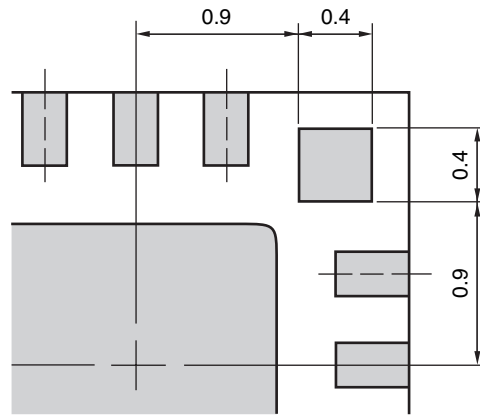
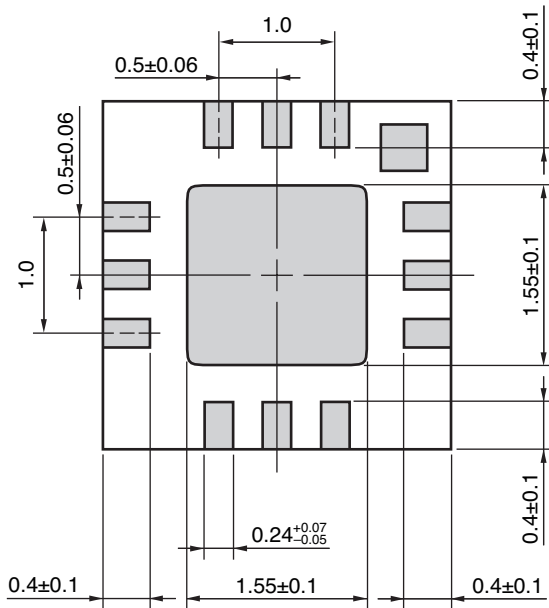
Remark The mounting pad layouts in this document are for reference only.

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
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 (terminal 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).

Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL’s understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration contained in CEL devices	
		-A	-AZ
Lead (Pb)	< 1000 PPM	Not Detected	(*)
Mercury	< 1000 PPM	Not Detected	
Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
PBB	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.

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