DATA SHEET

CEL

GaAs INTEGRATED CIRCUIT

μPG2157T5F

NON-REFLECTIVE HIGH POWER SPDT SWITCH FOR WiMAX

DESCRIPTION

The UPG2157T5F is a non-reflective (50 Ω termination) GaAs MMIC high power SPDT (Single Pole Double Throw) switch 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, and is suitable for high-density surface mounting.

FEATURES

- Control voltage : $V_{cont\ (H)}$ = 2.5 to 3.3 V (3.0 V TYP.)
  : $V_{cont\ (L)}$ = 0 to 0.4 V (0 V TYP.)
- Low insertion loss : $L_{ins}1$ = 0.60 dB TYP. @ f = 2.3 to 2.7 GHz, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V
  : $L_{ins}2$ = 0.60 dB TYP. @ f = 3.3 to 3.8 GHz, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V
  : $L_{ins}3$ = 0.80 dB TYP. @ f = 5.15 to 5.85 GHz, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V
- High isolation : ISL1 = 28 dB TYP. @ f = 2.3 to 2.7 GHz, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V
  : ISL2 = 25 dB TYP. @ f = 3.3 to 3.8 GHz, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V
  : ISL3 = 22 dB TYP. @ f = 5.15 to 5.85 GHz, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V
- Power Handling : $P_{in\ (1\ dB)} \geq$ +37.0 dBm TYP. @ f = 2.5 GHz, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V
  : $P_{in\ (1\ dB)} \geq$ +37.0 dBm TYP. @ f = 5.85 GHz, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V
- High-density surface mounting : 12-pin plastic QFN package (3.0 × 3.0 × 0.75 mm)

APPLICATIONS

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

ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Supplying Form
μPG2157T5F-E2	μPG2157T5F-E2-A	12-pin plastic QFN (Pb-Free)	2157	• 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: μPG2157T5F-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.

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The mark <R> shows major revised points.

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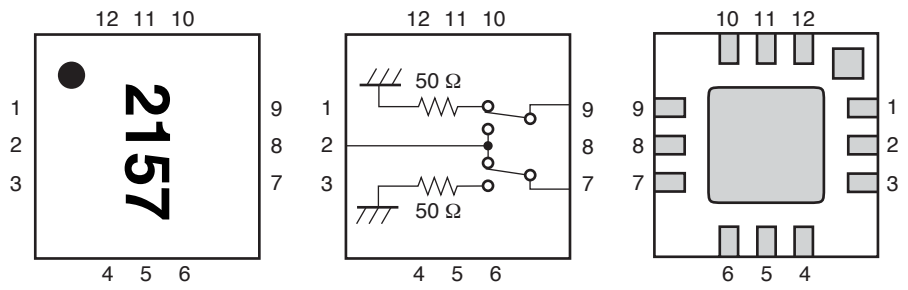
The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

PIN CONNECTIONS AND INTERNAL BLOCK DIAGRAM

(Top View) (Top View) (Bottom View)



Pin No.	Pin Name
1	GND
2	INPUT
3	GND
4	GND
5	$V_{cont}2$
6	GND
7	OUTPUT2
8	GND
9	OUTPUT1
10	GND
11	$V_{cont}1$
12	GND

Remark Exposed pad : GND

TRUTH TABLE

$V_{cont}1$	$V_{cont}2$	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
<R>	Input Power (ON Port, peak)	P_{in}	+38	dBm
<R>	Input Power (ON Port, average)	P_{in}	+28	dBm
<R>	Input Power (OFF Port)	$P_{in\ (OFF)}$	+20	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	$f_{opt}1$	2.3	–	2.7	GHz
	$f_{opt}2$	3.3	–	3.8	GHz
	$f_{opt}3$	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

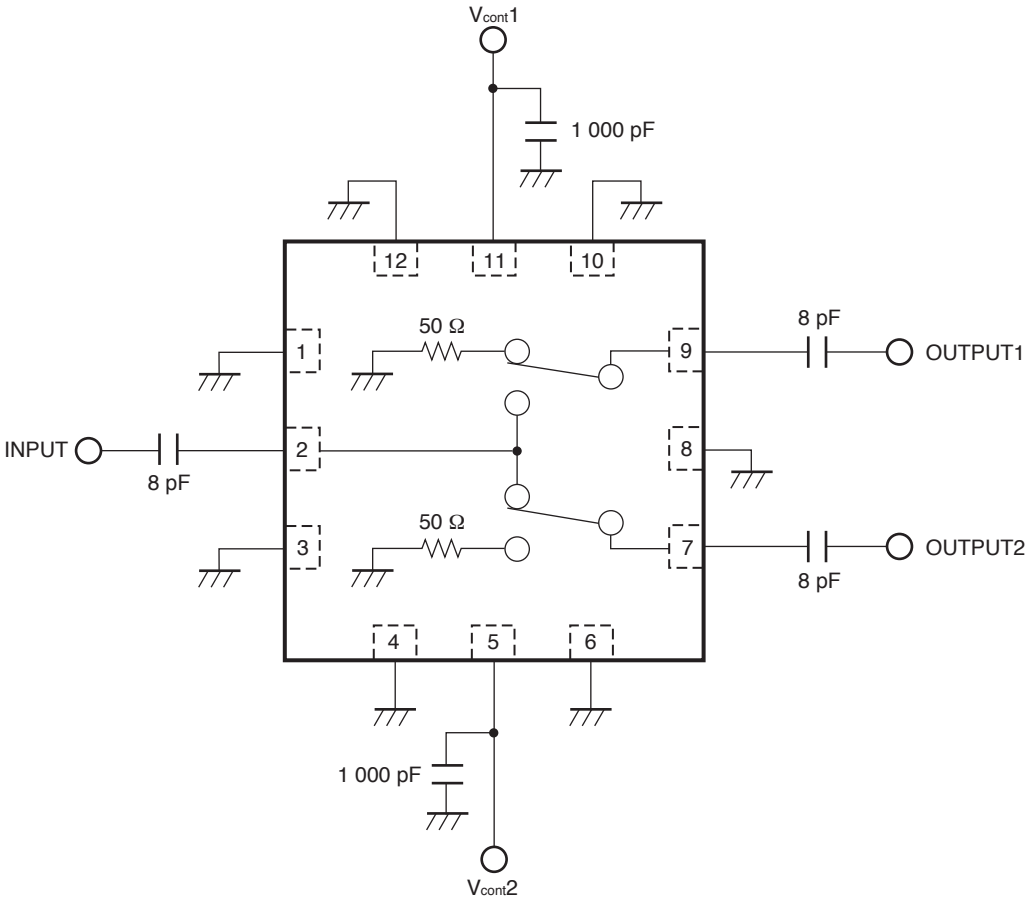
ELECTRICAL CHARACTERISTICS

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

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Insertion Loss 1	$L_{ins}1$	f = 2.3 to 2.7 GHz	–	0.60	0.85	dB
Insertion Loss 2	$L_{ins}2$	f = 3.3 to 3.8 GHz	–	0.60	0.85	dB
Insertion Loss 3	$L_{ins}3$	f = 5.15 to 5.85 GHz	–	0.80	1.05	dB
Isolation 1 (INPUT–OFF Port)	ISL1	f = 2.3 to 2.7 GHz	25	28	–	dB
Isolation 2 (INPUT–OFF Port)	ISL2	f = 3.3 to 3.8 GHz	22	25	–	dB
Isolation 3 (INPUT–OFF Port)	ISL3	f = 5.15 to 5.85 GHz	19	22	–	dB
Isolation 4 (OUTPUT1–OUTPUT2)	ISL4	f = 2.3 to 2.7 GHz	23	26	–	dB
Isolation 5 (OUTPUT1–OUTPUT2)	ISL5	f = 3.3 to 3.8 GHz	20	23	–	dB
Isolation 6 (OUTPUT1–OUTPUT2)	ISL6	f = 5.15 to 5.85 GHz	18	21	–	dB
Input Return Loss 1	$RL_{in}1$	f = 2.3 to 2.7 GHz	–	20	–	dB
Input Return Loss 2	$RL_{in}2$	f = 3.3 to 3.8 GHz	–	20	–	dB
Input Return Loss 3	$RL_{in}3$	f = 5.15 to 5.85 GHz	–	20	–	dB
Output Return Loss 1	$RL_{out}1$	f = 2.3 to 2.7 GHz	–	20	–	dB
Output Return Loss 2	$RL_{out}2$	f = 3.3 to 3.8 GHz	–	20	–	dB
Output Return Loss 3	$RL_{out}3$	f = 5.15 to 5.85 GHz	–	20	–	dB
Return Loss (OFF Port)	RL	f = 2.3 to 2.7 GHz	–	15	–	dB
		f = 3.3 to 3.8 GHz	–	15	–	dB
		f = 5.15 to 5.85 GHz	–	15	–	dB
1 dB Loss Compression Input Power [Note]	$P_{in\ (1\ dB)}$	f = 2.5 GHz	–	≥ +37.0	–	dBm
		f = 5.85 GHz	–	≥ +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 $P_{in\ (1\ dB)}$ is the measured input power level when the insertion loss increases 1dB more than that of the linear range.

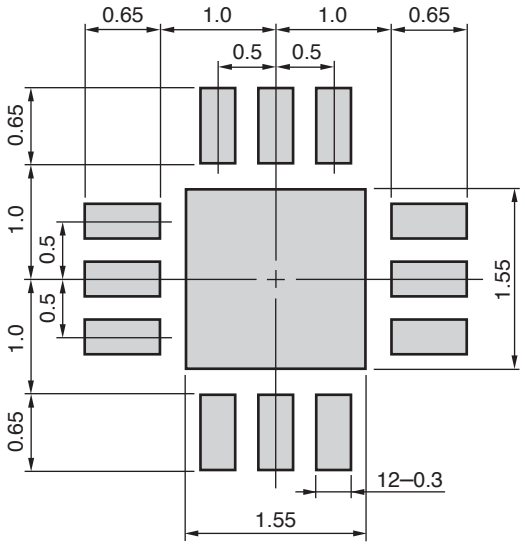
EVALUATION CIRCUIT



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

MOUNTING PAD LAYOUT DIMENSIONS

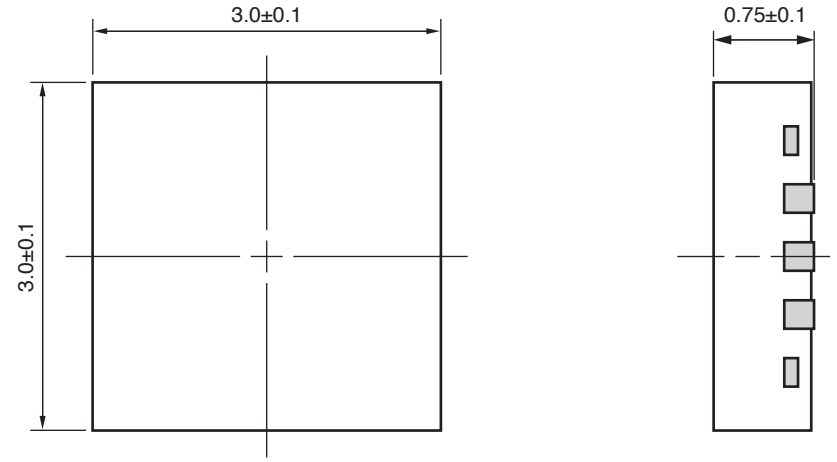
12-PIN PLASTIC QFN (UNIT: mm)



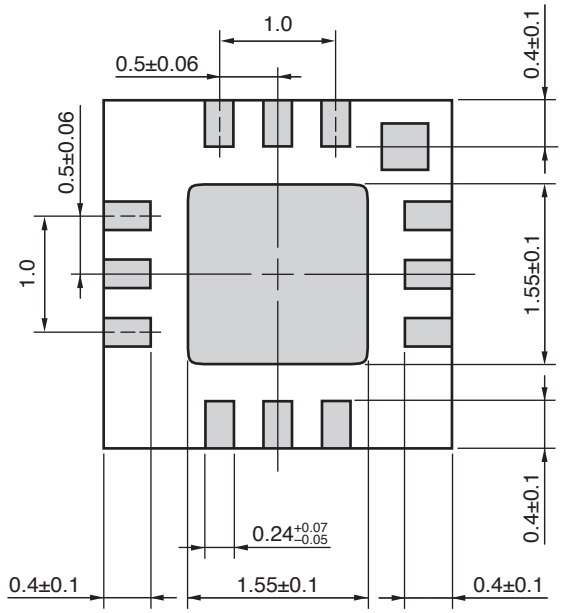
Remark The mounting pad layouts in this document are for reference only.

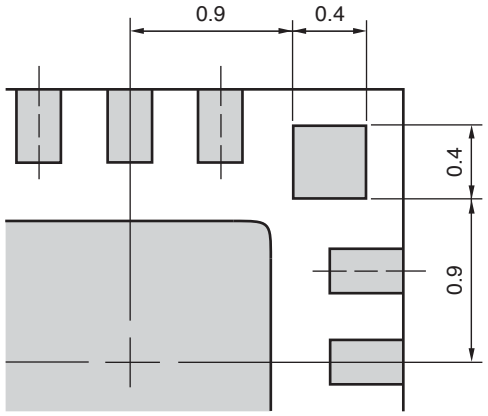
PACKAGE DIMENSIONS

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) 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
Wave Soldering	Peak temperature (molten solder temperature) Time at peak temperature Preheating temperature (package surface temperature) Maximum number of flow processes Maximum chlorine content of rosin flux (% mass)	: 260°C or below : 10 seconds or less : 120°C or below : 1 time : 0.2%(Wt.) or below	WS260
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).

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M8E 02. 11-1

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		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	

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