μPG2419T6R

GaAs Integrated Circuit
SPDT Switch for 4.0 GHz to 5.0 GHz

R09DS0006EJ0100
Rev.1.00
Sep 07, 2010

FEATURES

- Integrated DC blocking capacitors for ANT and TX ports.
- Smaller and Thin Package : 6-pin plastic TSSON (T6R) package (1.0 × 1.0 × 0.37 mm)

APPLICATIONS

- This SPDT switch is developed for and used for conjunction with the CXD3267AGG and CXD3268AGW that are designed for the TransferJet™ specifications.
  These ICs are developed and released by Sony Corporation.

ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Supplying Form
μPG2419T6R-E2	μPG2419T6R-E2-A	6-pin plastic TSSON (T6R) (Pb-Free)	GA	• Embossed tape 8 mm wide • Pin 1, 6 face the perforation side of the tape • Qty 5 kpcs/reel

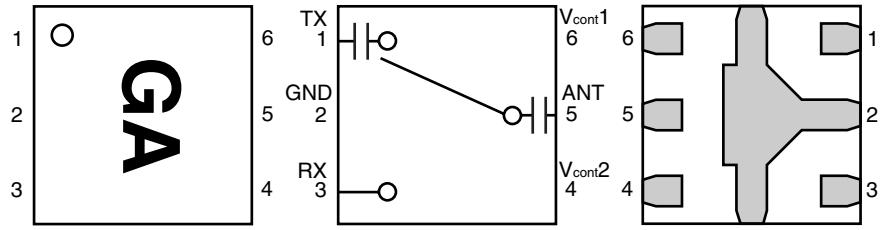
Remark To order evaluation samples, please contact your nearby sales office.
Part number for sample order: μPG2419T6R

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.

PIN CONNECTIONS AND INTERNAL BLOCK DIAGRAM

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



Pin No.	Pin Name
1	TX
2	GND
3	RX
4	$V_{cont}2$
5	ANT
6	$V_{cont}1$

SW TRUTH TABLE

ON Path	$V_{cont}1$	$V_{cont}2$
ANT-TX	High	Low
ANT-RX	Low	High

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

Parameter	Symbol	Ratings	Unit
Switch Control Voltage	V_{cont}	+6.0 Note	V
Input Power	P_{in}	+26.0	dBm
Power Dissipation	P_D	150	mW
Operating Ambient Temperature	T_A	–45 to +105	°C
Storage Temperature	T_{stg}	–55 to +150	°C

Note: $|V_{cont}1 - V_{cont}2| \leq 6.0$ V

RECOMMENDED OPERATING RANGE (T_A = +25°C, unless otherwise specified)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating Frequency	f	2.4	–	6.0	GHz
Switch Control Voltage (H)	$V_{cont\ (H)}$	2.65	3.0	3.6	V
Switch Control Voltage (L)	$V_{cont\ (L)}$	–0.2	0	0.2	V

ELECTRICAL CHARACTERISTICS
(T_A = +25°C, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V, Z_O = 50 Ω, RX port DC blocking capacitors = 8 pF, unless otherwise specified)

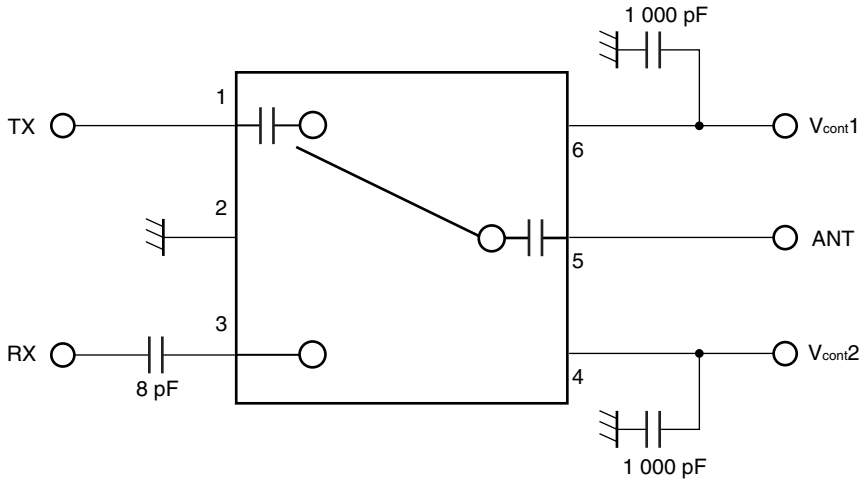
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
ANT-RX Insertion Loss 1	$L_{ins}1$	f = 4.0 to 5.0 GHz	–	0.45	0.80	dB
ANT-TX Insertion Loss 2	$L_{ins}2$	f = 4.0 to 5.0 GHz	–	0.55	0.80	dB
ANT-RX Insertion Loss 3	$L_{ins}3$	f = 2.4 to 6.0 GHz	–	0.50	–	dB
ANT-TX Insertion Loss 4	$L_{ins}4$	f = 2.4 to 6.0 GHz	–	0.80	–	dB
ANT-RX Isolation 1 (ANT-TX: ON)	ISL1	f = 4.0 to 5.0 GHz	12	17	–	dB
ANT-TX Isolation 2 (ANT-RX: ON)	ISL2	f = 4.0 to 5.0 GHz	21	26	–	dB
ANT-RX Isolation 3 (ANT-TX: ON)	ISL3	f = 2.4 to 6.0 GHz	–	15	–	dB
ANT-TX Isolation 4 (ANT-RX: ON)	ISL4	f = 2.4 to 6.0 GHz	–	25	–	dB
Return Loss 1 (ANT)	$RL_{in}1$	f = 4.0 to 5.0 GHz	12	20	–	dB
Return Loss 2 (TX/RX)	$RL_{in}2$	f = 4.0 to 5.0 GHz	12	20	–	dB
Return Loss 3 (ANT-RX: ON)	$RL_{in}3$	f = 2.4 to 6.0 GHz	–	18	–	dB
Return Loss 4 (ANT-TX: ON)	$RL_{in}4$	f = 2.4 to 6.0 GHz	–	11	–	dB
0.1 dB Loss Compression Input Power **Note**	$P_{in\ (0.1\ dB)}$	f = 4.0 to 5.0 GHz	21	24	–	dBm
Switch Control Current	I_{cont}	No RF input	–	0.1	1.0	μA
Switch Control Speed	t_{SW}	50% CTL to 90/10% RF	–	20	100	ns

Note: $P_{in\ (0.1\ dB)}$ is the measured input power level when the insertion loss increases 0.1 dB more than that of the linear range.

CAUTION

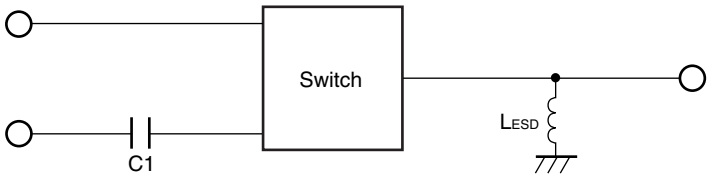
It is necessary to use DC blocking capacitor for RX port only.

EVALUATION CIRCUIT



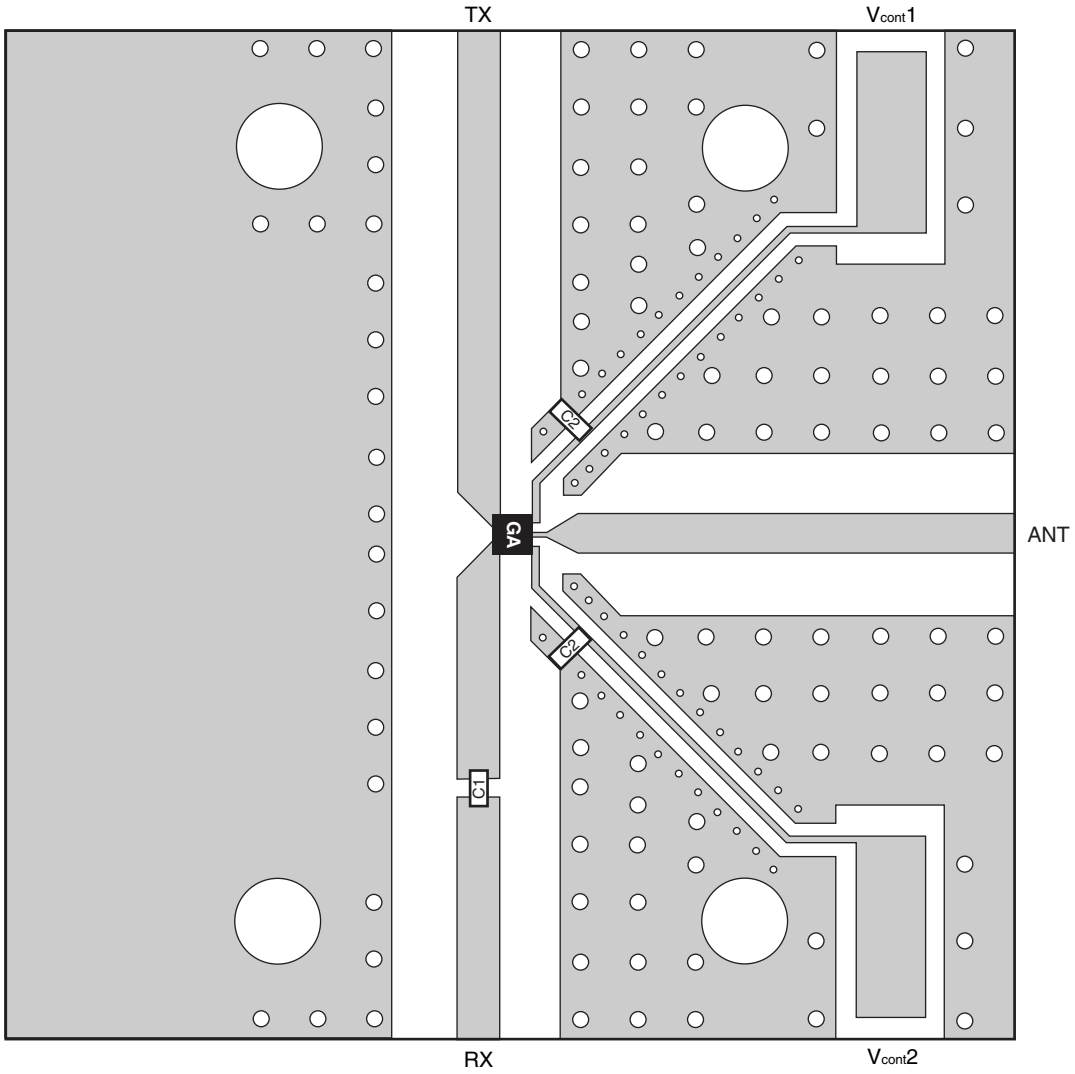
The application circuits and their parameters are for reference only and are not intended for use in actual design-ins.

APPLICATION INFORMATION



- L_{ESD} provides a means to increase the ESD protection on a specific RF port, typically the port attached to the antenna.
- The value may be tailored to provide specific electrical responses.
- The RF ground connections should be kept as short as possible and connected to directly to a good RF ground for best performance.

ILLUSTRATION OF THE TEST CIRCUIT ASSEMBLED ON EVALUATION BOARD

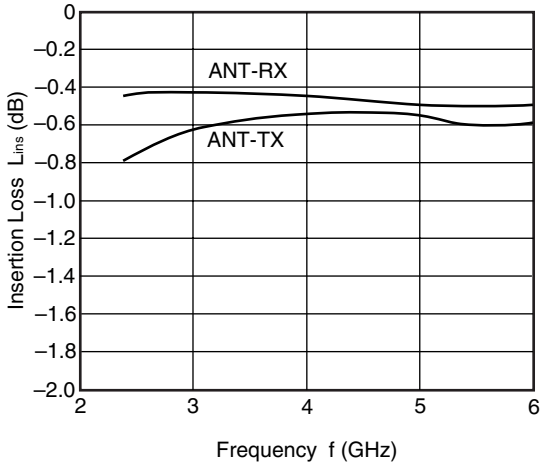


USING THE RENESAS EVALUATION BOARD

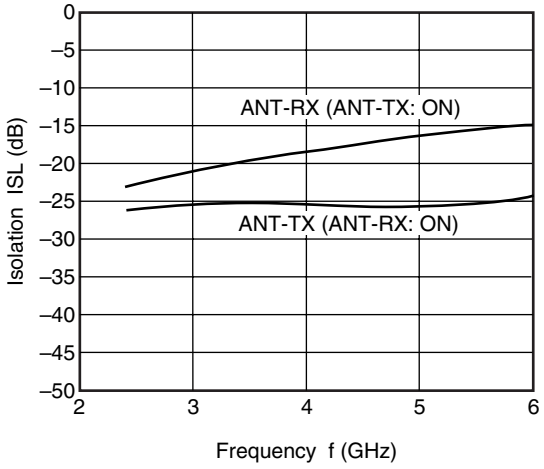
Symbol	Test Conditions	Values
C1	f = 4.0 to 5.0 GHz	8 pF
C2		1 000 pF

TYPICAL CHARACTERISTICS
(T_A = +25°C, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V, Z_O = 50 Ω, RX port DC blocking capacitors = 8 pF, unless otherwise specified)

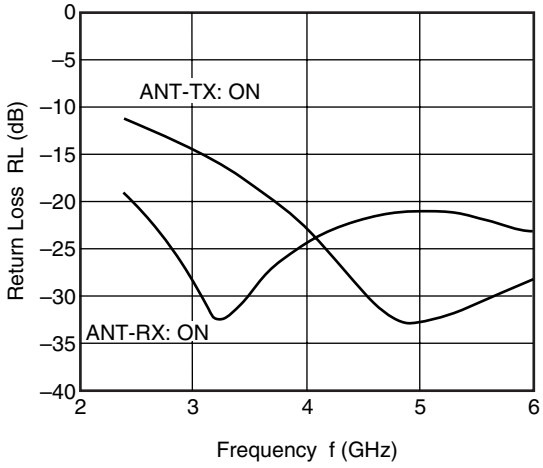
ANT-RX/TX
INSERTION LOSS vs. FREQUENCY



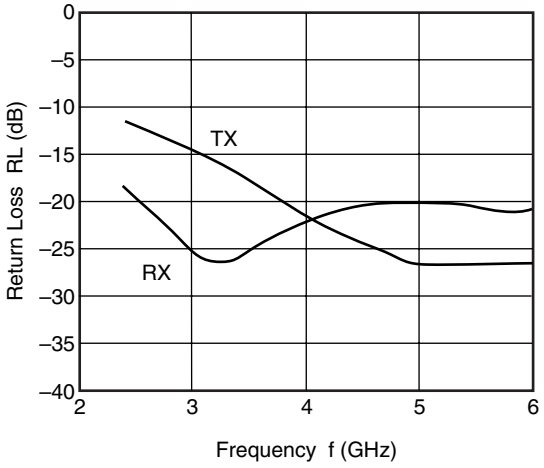
ANT-RX/TX
ISOLATION vs. FREQUENCY



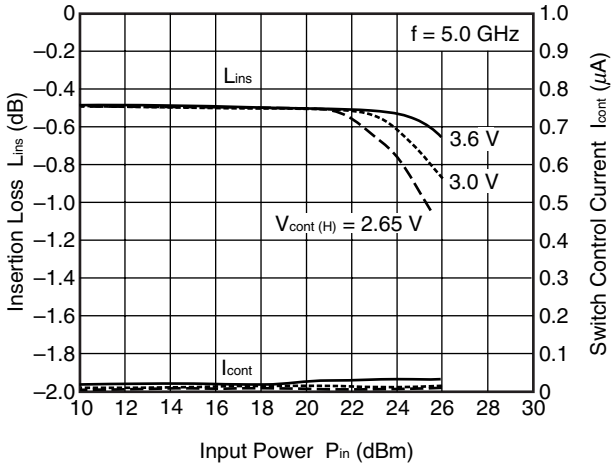
ANT RETURN LOSS vs. FREQUENCY



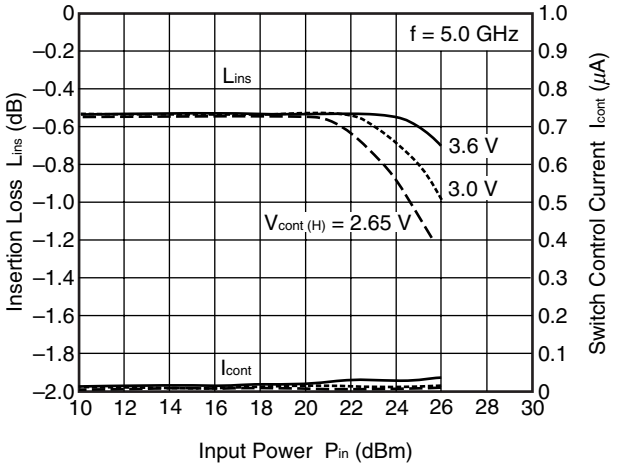
RX/TX RETURN LOSS vs. FREQUENCY



ANT-RX
INSERTION LOSS, Icont vs. INPUT POWER

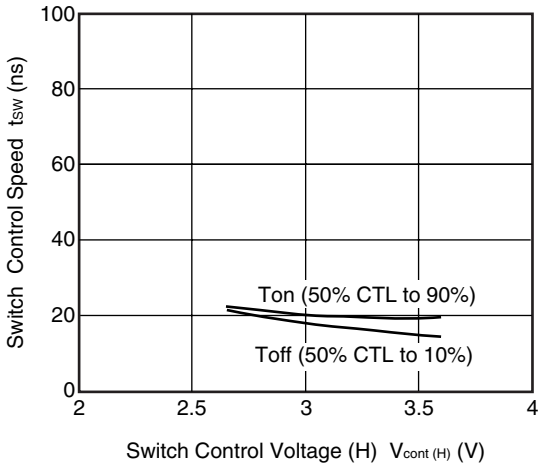


ANT-TX
INSERTION LOSS, Icont vs. INPUT POWER

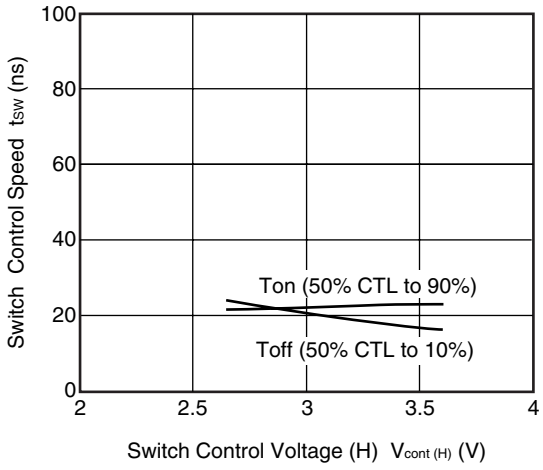


Remark The graphs indicate nominal characteristics.

ANT-TX SWITCH CONTROL SPEED
vs. SWITCH CONTROL VOLTAGE



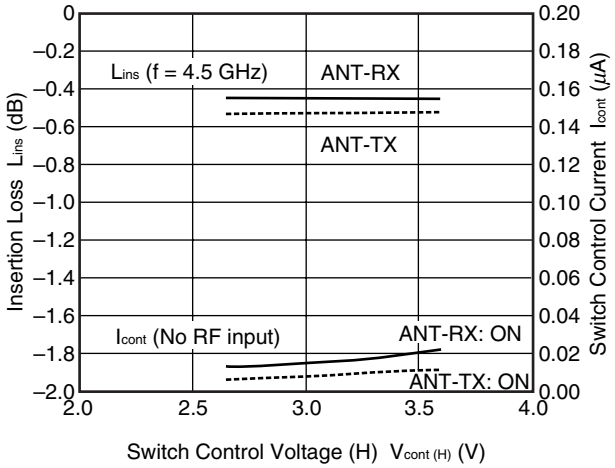
ANT-RX SWITCH CONTROL SPEED
vs. SWITCH CONTROL VOLTAGE



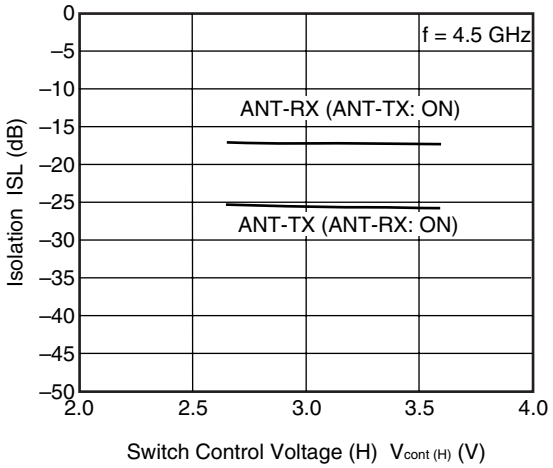
Remark The graphs indicate nominal characteristics.

TYPICAL CHARACTERISTICS
(T_A = +25°C, $V_{cont\ (H)}$ = 2.65 to 3.6 V, $V_{cont\ (L)}$ = 0 V, Z_O = 50 Ω, RX port DC blocking capacitors = 8 pF, unless otherwise specified)

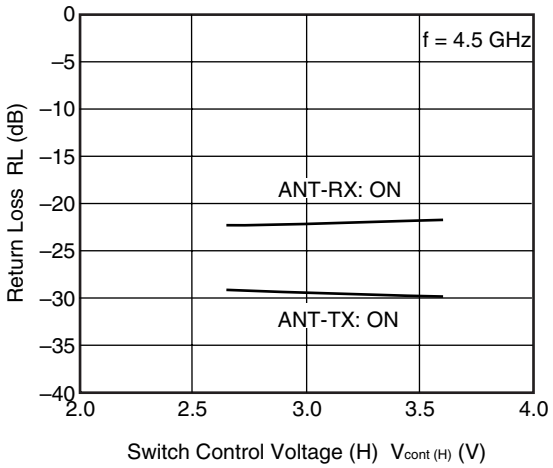
ANT-RX/TX INSERTION LOSS, I_{cont} vs. SWITCH CONTROL VOLTAGE (H)



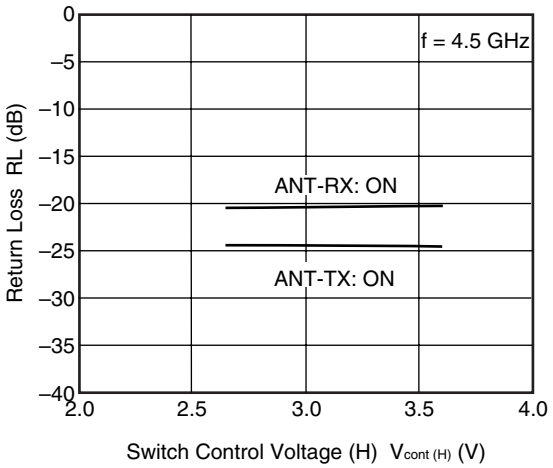
ANT-RX/TX ISOLATION vs. SWITCH CONTROL VOLTAGE (H)



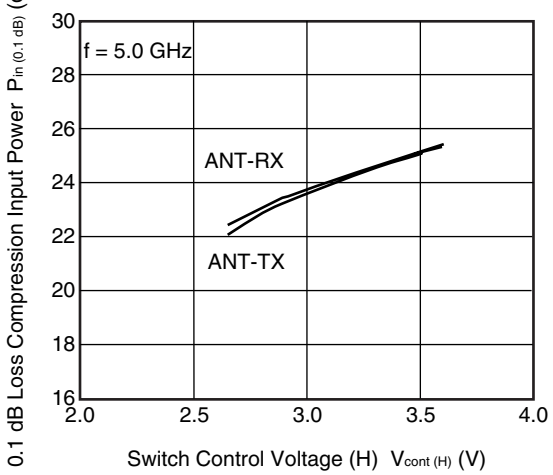
ANT RETURN LOSS vs. SWITCH CONTROL VOLTAGE (H)



RX/TX RETURN LOSS vs. SWITCH CONTROL VOLTAGE (H)



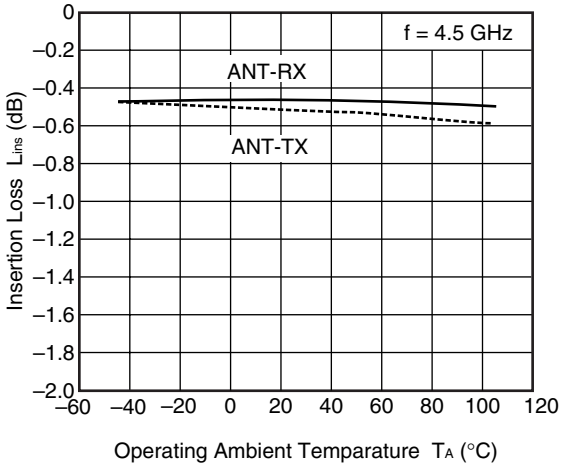
ANT-RX/TX $P_{in\ (0.1\ dB)}$ vs. SWITCH CONTROL VOLTAGE (H)



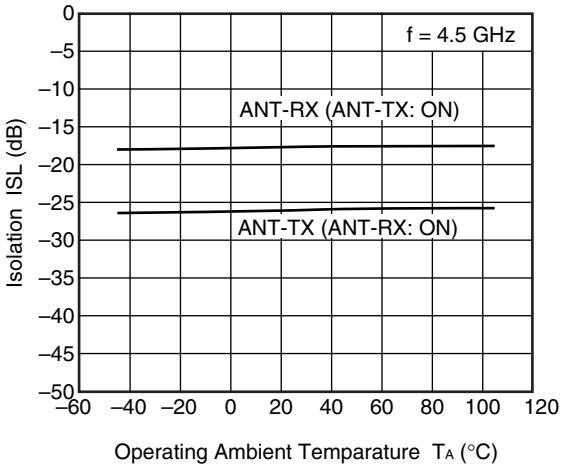
Remark The graphs indicate nominal characteristics.

TYPICAL CHARACTERISTICS
(T_A = –45°C to +105°C, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V, Z_O = 50 Ω, RX port DC blocking capacitors = 8 pF, unless otherwise specified)

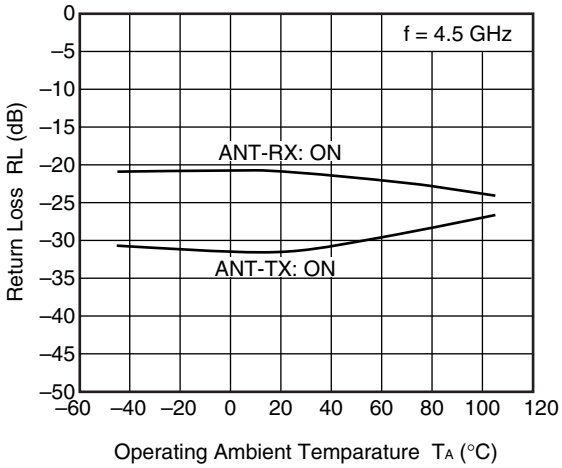
ANT-RX/TX INSERTION LOSS
vs. OPERATING AMBIENT TEMPERATURE



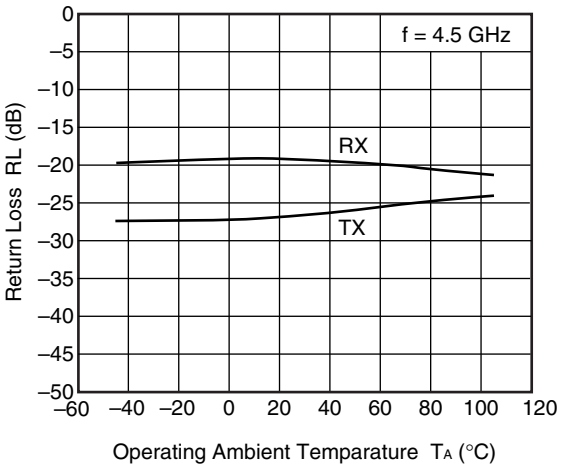
ANT-RX/TX ISOLATION
vs. OPERATING AMBIENT TEMPERATURE



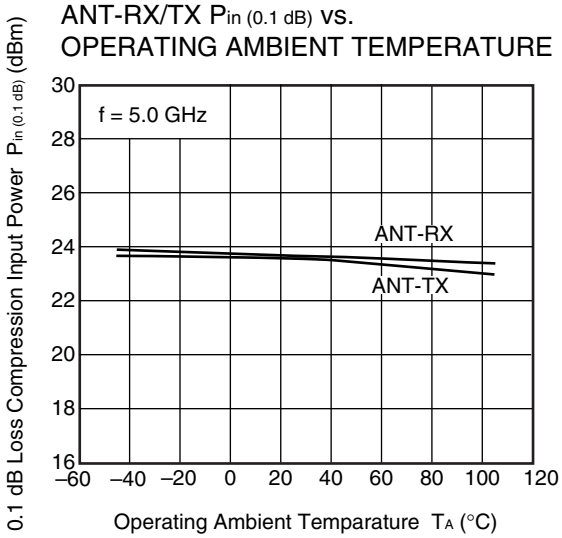
ANT RETURN LOSS vs.
OPERATING AMBIENT TEMPERATURE



RX/TX RETURN LOSS vs.
OPERATING AMBIENT TEMPERATURE



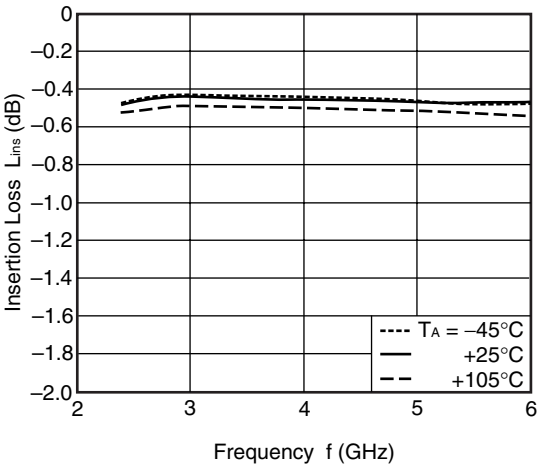
ANT-RX/TX $P_{in\ (0.1\ dB)}$ vs.
OPERATING AMBIENT TEMPERATURE



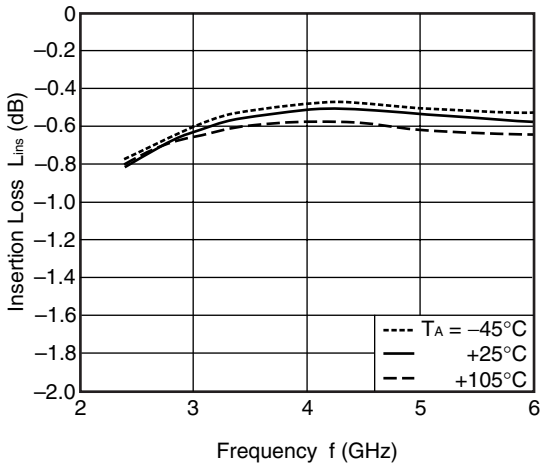
Remark The graphs indicate nominal characteristics.

TYPICAL CHARACTERISTICS
($V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V, Z_O = 50 Ω, RX port DC blocking capacitors = 8 pF, unless otherwise specified)

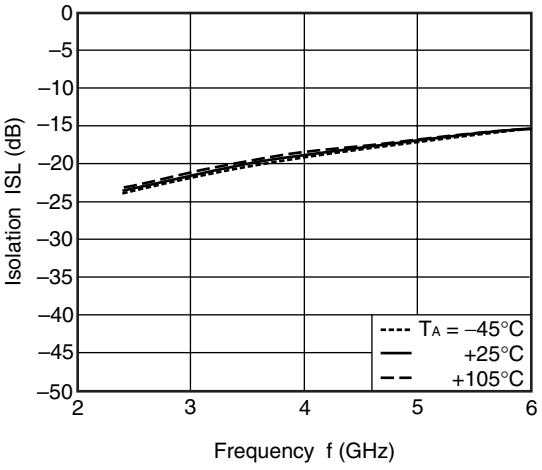
ANT-RX
INSERTION LOSS vs. FREQUENCY



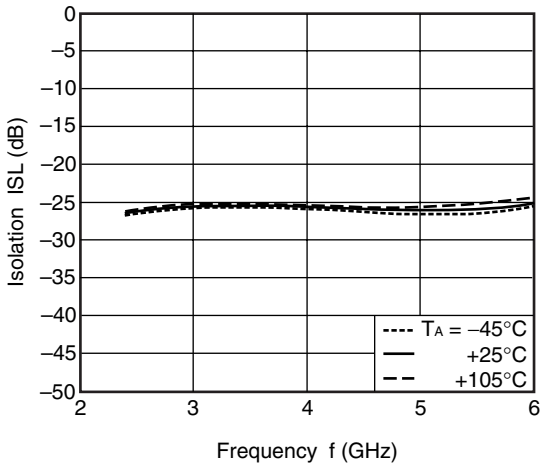
ANT-TX
INSERTION LOSS vs. FREQUENCY



ANT-RX (ANT-TX: ON)
ISOLATION vs. FREQUENCY

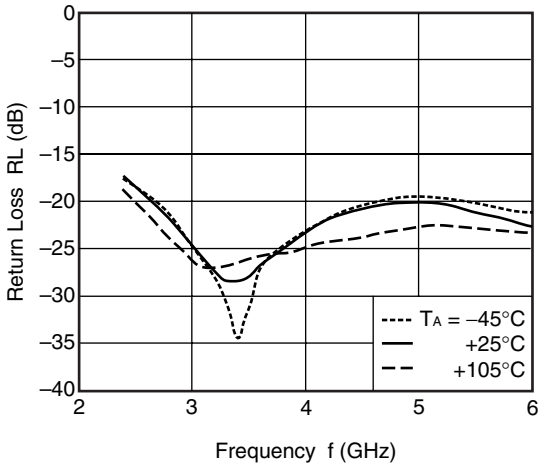


ANT-TX (ANT-RX: ON)
ISOLATION vs. FREQUENCY

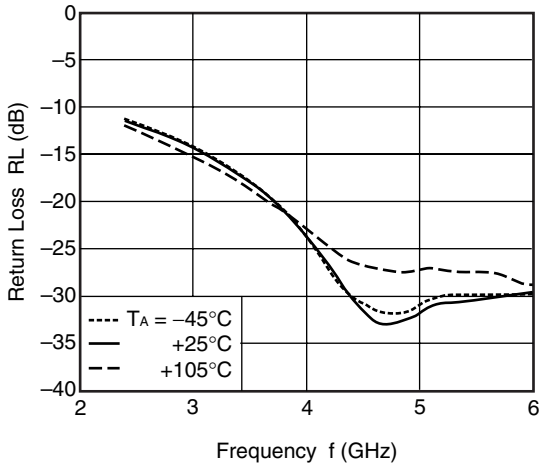


Remark The graphs indicate nominal characteristics.

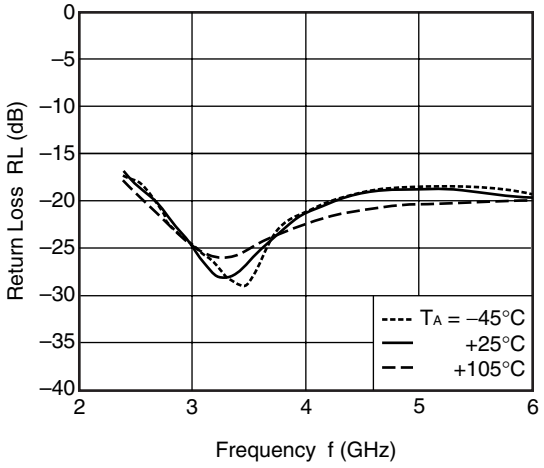
ANT (ANT-RX: ON)
RETURN LOSS vs. FREQUENCY



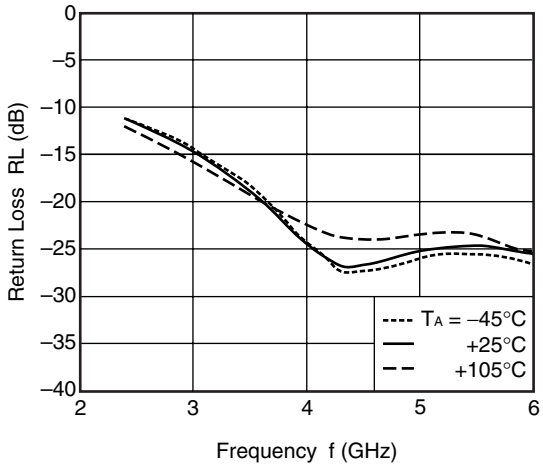
ANT (ANT-TX: ON)
RETURN LOSS vs. FREQUENCY



RX (ANT-RX: ON)
RETURN LOSS vs. FREQUENCY



TX (ANT-TX: ON)
RETURN LOSS vs. FREQUENCY

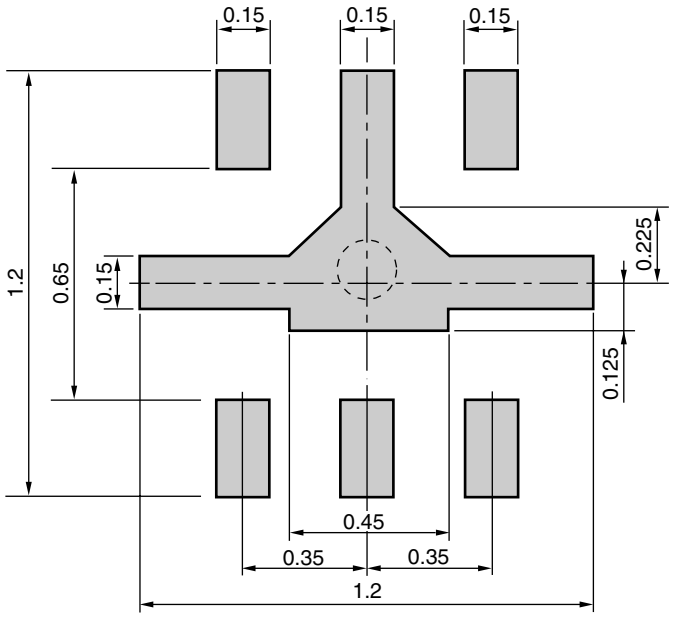


Remark The graphs indicate nominal characteristics.

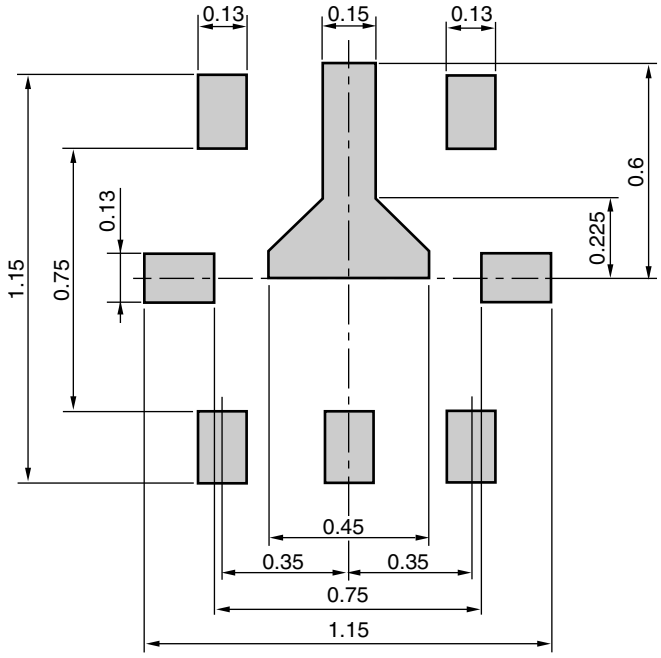
MOUNTING PAD AND SOLDER MASK LAYOUT DIMENSIONS

6-PIN PLASTIC TSSON (T6R) (UNIT: mm)

MOUNTING PAD



SOLDER MASK



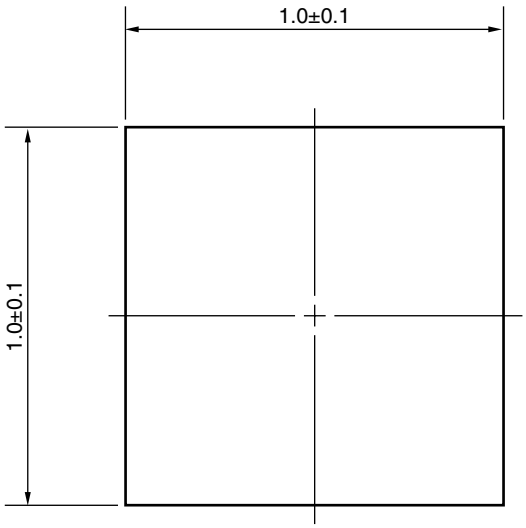
Solder thickness : 0.08 mm

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.

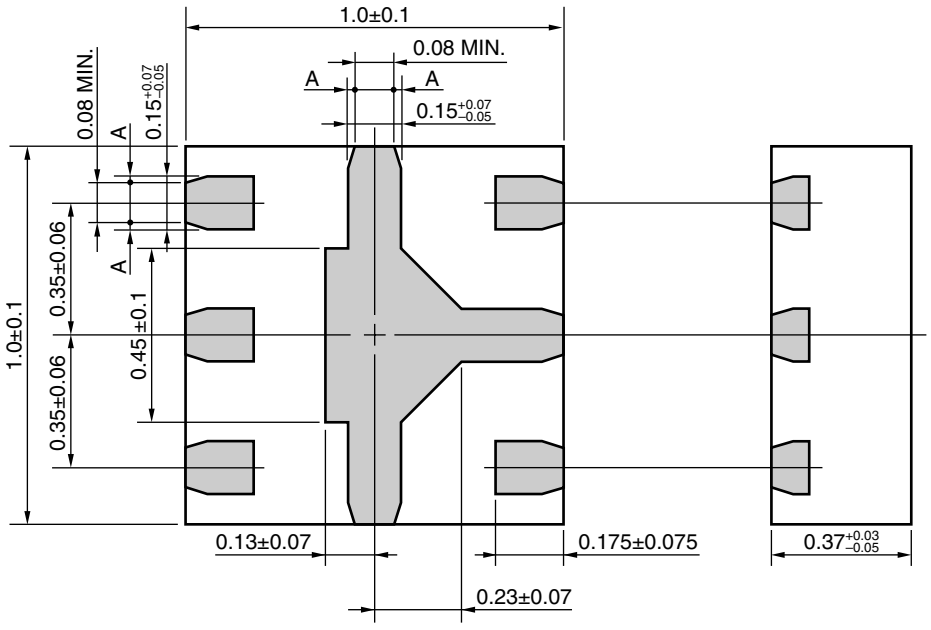
PACKAGE DIMENSIONS

6-PIN PLASTIC TSSON (T6R) (UNIT: mm)

(Top View)



(Bottom View)



Remark A>0

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. 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.

Revision History	μPG2419T6R Data Sheet

Rev.	Date	Description	
		Page	Summary
1.00	Sep 07, 2010	–	First edition issued

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