NEC

GaAs INTEGRATED CIRCUIT
μPG186TQ

GaAs MMIC DBS SPDT IF SWITCH

DESCRIPTION

The μPG186TQ is intended for use in Direct Broadcast Satellite (DBS) applications within the Low Noise Block (LNB) down-converter for systems where at least multi LNB are required.

FEATURES

- High isolation : ISL = 45 dB TYP. (D/U-ratio)
- Control voltage : V_{cont} = 0 V/+5 V
- Insertion loss : L_{INS} = 1.5 dB TYP. (Z_O = 50 Ω)
- 10-pin plastic TSON package (2.4 × 2.55 × 0.6 mm)

ORDERING INFORMATION

Part Number	Package	Marking	Supplying Form
★ μPG186TQ-E1	10-pin plastic TSON	186	• Embossed tape 12 mm wide • Pin 5, 6 face the perforation side of the tape • Qty 3 kpcs/reel

Remark To order evaluation samples, contact your nearby sales office.
Part number for sample order: μPG186TQ

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

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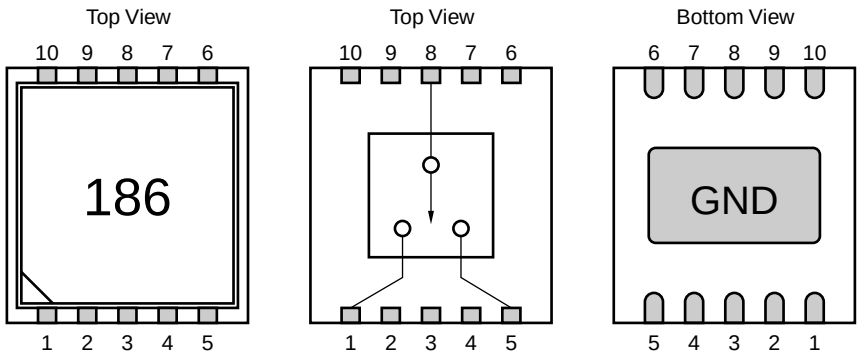
The mark ★ shows major revised points.

★ PIN CONNECTIONS AND INTERNAL BLOCK DIAGRAM



Pin No.	Pin Name
1	IN-A
2	GND
3	GND
4	GND
5	IN-B
6	V_{cont2}
7	GND
8	OUT
9	GND
10	V_{cont1}

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

Parameter	Symbol	Ratings	Unit
Control Voltage	V_{cont}	–1.0 to +6.0	V
Total Power Dissipation	P_{tot}	2 Note	W
Input Power	P_{in}	+10	dBm
Operating Ambient Temperature	T_A	–40 to +85	°C
Storage Temperature	T_{stg}	–65 to +150	°C

Note Mounted on double-sided copper-clad 50 × 50 × 1.6 mm epoxy glass PWB, T_A = +85°C

RECOMMENDED OPERATING RENGE (T_A = +25°C)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Control Voltage (High)	$V_{cont(H)}$	+4.5	+5.0	+5.5	V
Control Voltage (Low)	$V_{cont(L)}$	–0.5	0	+0.5	V

ELECTRICAL CHARACTERISTICS

(T_A = +25°C, V_{cont} = 0 V/+5 V, P_{in} = 0 dBm, Z_O = 50 Ω, Each Port, unless otherwise specified)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Insertion Loss	L_{INS}	f = 0.95 to 2.15 GHz	–	1.5	2.5	dB
Insertion Loss Flatness 1	ΔL_{INS1}	f = 0.95 to 1.5 GHz	–	0.4	1.0	dB
Insertion Loss Flatness 2	ΔL_{INS2}	f = 1.5 to 2.15 GHz	–	0.5	1.2	dB
Isolation D/U-ratio 1 Note1	ISL1	f = 0.95 to 1.5 GHz	45	48	–	dB
Isolation D/U-ratio 2 Note1	ISL2	f = 1.5 to 2.15 GHz	42	45	–	dB
Output Return Loss	RL_{OUT}	f = 0.95 to 2.15 GHz	10	15	–	dB
Control Current Note2	I_{cont}	V_{cont} = +5 V/0 V, RF OFF	–	–	200	μA

Notes 1. 'Isolation D/U-ratio' = |'signal leakage (off-state)' – 'insertion loss (on-state)'|

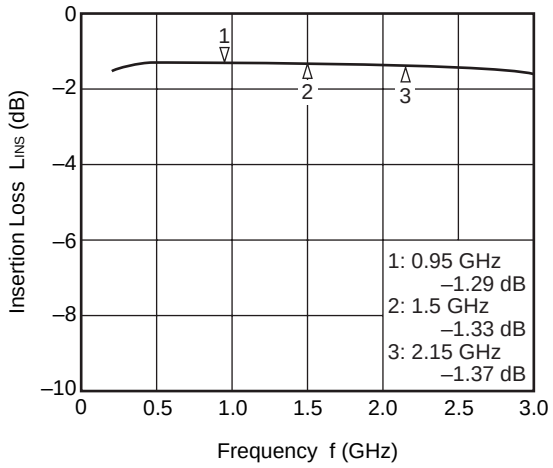
2. per 1 control pin

TRUTH TABLE OF SWITCHING BY CONDITION OF CONTROL VOLTAGE

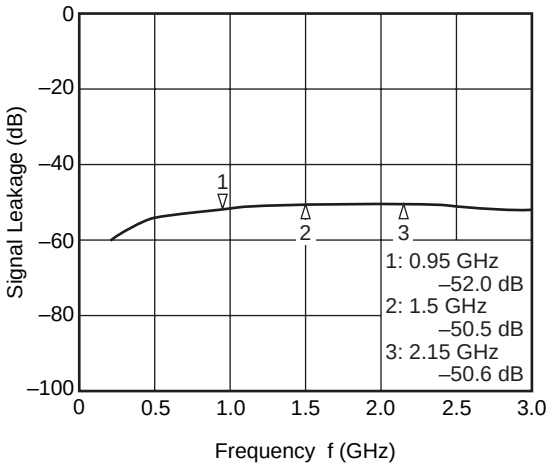
V_{cont1}	V_{cont2}	IN-A–OUT	IN-B–OUT
High	Low	ON	OFF
Low	High	OFF	ON

TYPICAL CHARACTERISTICS (T_A = +25°C, V_{cont} = 0 V/+5 V, P_{in} = 0 dBm, Z_O = 50 Ω, Each Port)

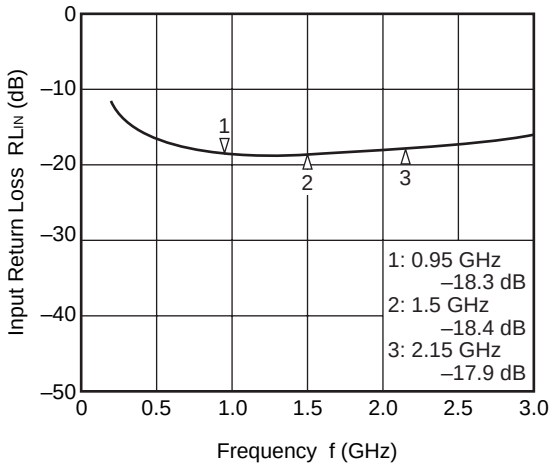
INSERTION LOSS vs. FREQUENCY



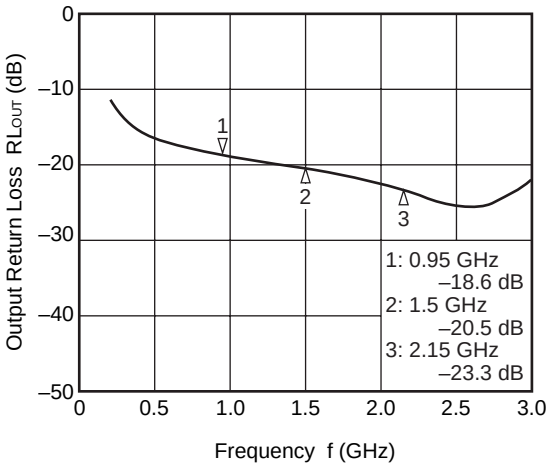
SIGNAL LEAKAGE vs. FREQUENCY



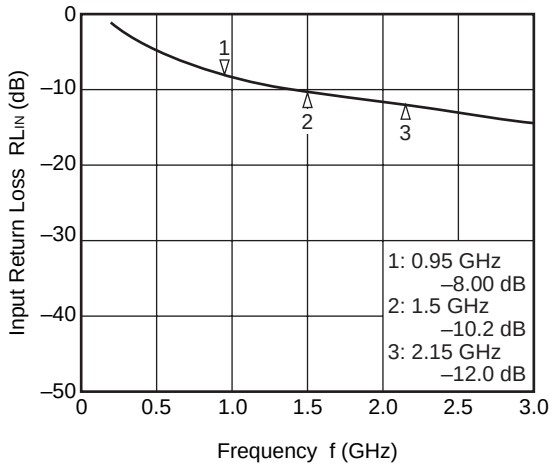
INPUT RETURN LOSS (ON ROUTE) vs. FREQUENCY



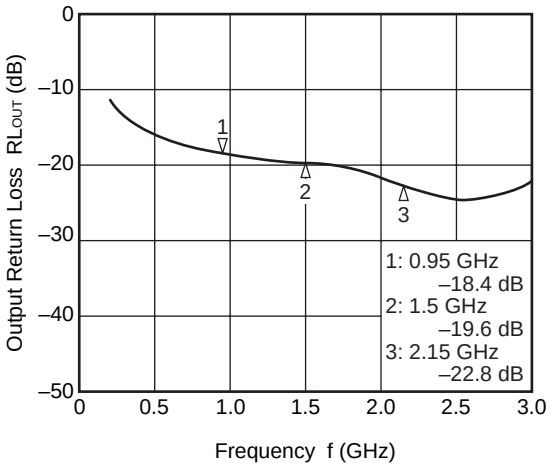
OUTPUT RETURN LOSS (ON ROUTE) vs. FREQUENCY



INPUT RETURN LOSS (OFF ROUTE) vs. FREQUENCY



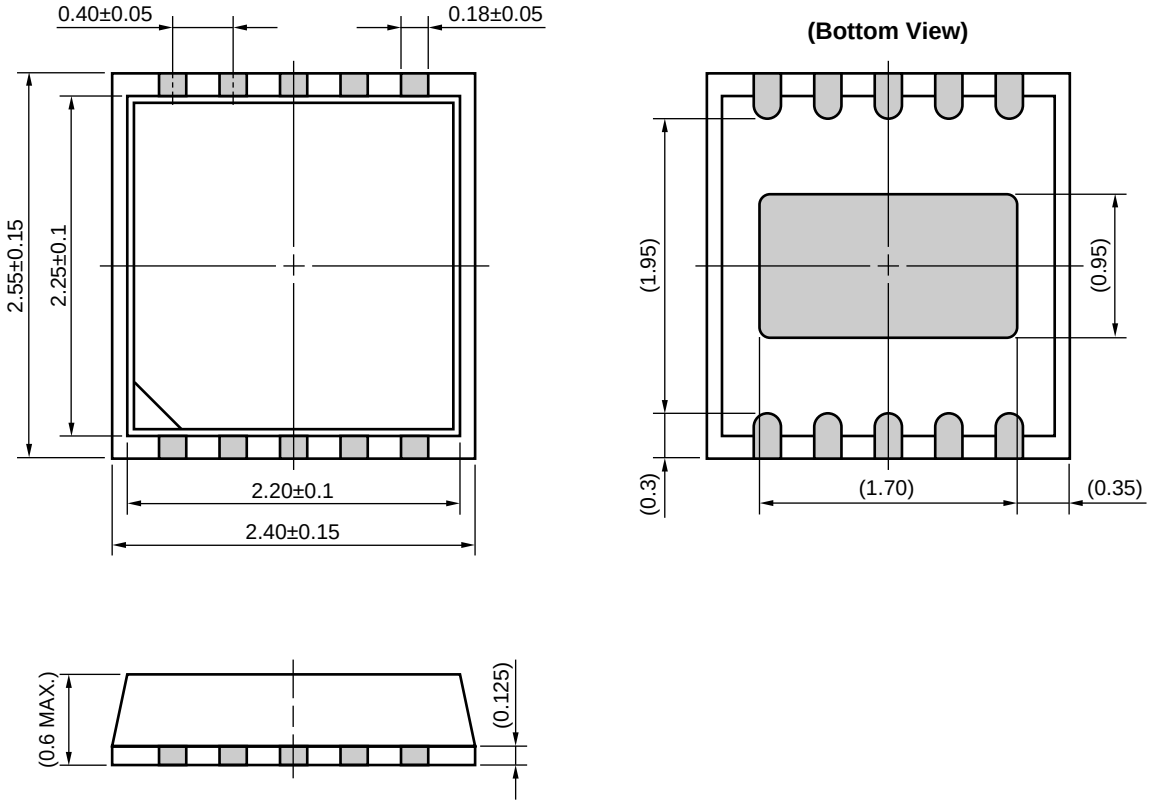
OUTPUT RETURN LOSS (OFF ROUTE) vs. FREQUENCY



Remark The graphs indicate nominal characteristics.

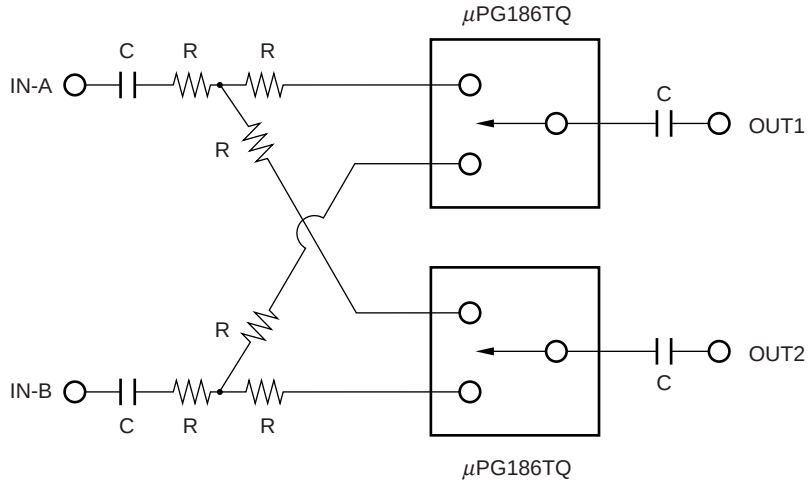
PACKAGE DIMENSIONS

10-PIN PLASTIC TSON (UNIT: mm)



Remark ( ): Reference value

CIRCUIT DIAGRAM AS 2×2 SWITCH MATRIX (REFERENCE ONLY)



C: 56 pF
R: 20 Ω

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
VPS	Peak temperature (package surface temperature) Time at temperature of 200°C or higher Preheating time at 120 to 150°C Maximum number of reflow processes Maximum chlorine content of rosin flux (% mass)	: 215°C or below : 25 to 40 seconds : 30 to 60 seconds : 3 times : 0.2%(Wt.) or below	VP215
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 (pin 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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  (2) "NEC semiconductor products" means any semiconductor product developed or manufactured by or for NEC (as defined above).

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SAFETY INFORMATION ON THIS PRODUCT

Caution GaAs Products	The product contains gallium arsenide, GaAs. GaAs vapor and powder are hazardous to human health if inhaled or ingested. • Do not destroy or burn the product. • Do not cut or cleave off any part of the product. • Do not crush or chemically dissolve the product. • Do not put the product in the mouth. Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.

▶Business issue

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▶Technical issue

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