

L, S-BAND 1.8 V CONTROL VOLTAGE SPDT SWITCH**DESCRIPTION**

The μ PG2006TB is an L, S-band SPDT (Single Pole Double Throw) GaAs FET switch which was developed for digital cellular or cordless telephone application. The device can operate from 500 MHz to 2.5 GHz, having the low insertion loss and high isolation by 1.8 V control voltage.

FEATURES

- Low insertion loss : $L_{INS} = 0.3$ dB TYP. @ $V_{cont} = 1.8$ V/0 V, $f = 1$ GHz
 $L_{INS} = 0.45$ dB TYP. @ $V_{cont} = 1.8$ V/0 V, $f = 2.5$ GHz
- High isolation : $ISL = 29$ dB TYP. @ $V_{cont} = 1.8$ V/0 V, $f = 2$ GHz
 $ISL = 25$ dB TYP. @ $V_{cont} = 1.8$ V/0 V, $f = 2.5$ GHz
- 6-pin super minimold package ($2.0 \times 1.25 \times 0.9$ mm)

APPLICATION

- L, S-band digital cellular or cordless telephone
- Bluetooth™, W-LAN and WLL applications

ORDERING INFORMATION

Part Number	Package	Marking	Supplying Form
μ PG2006TB-E3	6-pin super minimold	G2J	<ul style="list-style-type: none"> • Embossed tape 8 mm wide • Pin 1, 2, 3 face the perforation side of the tape • Qty 3 kpcs/reel

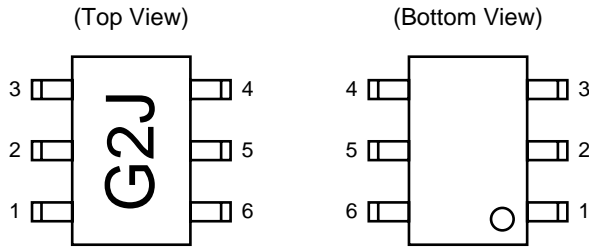
Remark To order evaluation samples, contact your nearby sales office.

Part number for sample order: μ PG2006TB

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

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 Not all devices/types available in every country. Please check with local NEC Compound Semiconductor Devices representative for availability and additional information.

PIN CONNECTIONS



Pin No.	Pin Name
1	OUT1
2	GND
3	OUT2
4	V _{cont2}
5	IN
6	V _{cont1}

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

Parameter	Symbol	Ratings	Unit
Control Voltage 1, 2	V _{cont1, 2}	-6.0 to +6.0 ^{Note}	V
Input Power (V _{cont} = 1.8 V)	P _{in}	+23	dBm
Total Power Dissipation	P _{tot}	0.15	W
Operating Ambient Temperature	T _A	-45 to +85	°C
Storage Temperature	T _{stg}	-55 to +150	°C

Note |V_{cont1}-V_{cont2}| ≤ 6.0 V

RECOMMENDED OPERATING RANGE (T_A = +25°C)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Control Voltage (High)	V _{cont(H)}	+1.6	+1.8	+5.3	V
Control Voltage (Low)	V _{cont(L)}	-0.2	0	+0.2	V

ELECTRICAL CHARACTERISTICS

($T_A = +25^{\circ}\text{C}$, $V_{\text{cont}1} = 1.8\text{ V}$, $V_{\text{cont}2} = 0\text{ V}$ or $V_{\text{cont}1} = 0\text{ V}$, $V_{\text{cont}2} = 1.8\text{ V}$, $Z_o = 50\ \Omega$, Off chip DC blocking capacitors value; 51 pF, unless otherwise specified)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Insertion Loss	L_{INS}	$f = 0.1\text{ to }1.0\text{ GHz}$ ^{Note1}	–	0.30	0.55	dB
		$f = \text{to }2.0\text{ GHz}$	–	0.40	0.60	dB
		$f = \text{to }2.5\text{ GHz}$	–	0.45	0.65	dB
Isolation	ISL	$f = 0.1\text{ to }2.0\text{ GHz}$ ^{Note1}	25	29	–	dB
		$f = \text{to }2.5\text{ GHz}$	20	25	–	dB
Input Return Loss	RL_{in}	$f = 0.1\text{ to }1.0\text{ GHz}$ ^{Note1}	13	–	–	dB
		$f = \text{to }2.5\text{ GHz}$	16	21	–	dB
Output Return Loss	RL_{out}	$f = 0.1\text{ to }1.0\text{ GHz}$ ^{Note1}	13	–	–	dB
		$f = \text{to }2.5\text{ GHz}$	16	21	–	dB
Input Power at 1 dB Compression Point ^{Note2}	$P_{\text{in}(1\text{ dB})}$	$f = 2.0\text{ GHz}$, $V_{\text{cont}} = 1.8\text{ V}/0\text{ V}$	17	20	–	dBm
		$f = 2.0\text{ GHz}$, $V_{\text{cont}} = 2.8\text{ V}/0\text{ V}$	22	25	–	dBm
Input Power at 0.1 dB Compression Point ^{Note2}	$P_{\text{in}(0.1\text{ dB})}$	$f = 2.0\text{ GHz}$, $V_{\text{cont}} = 1.8\text{ V}/0\text{ V}$	–	18	–	dBm
		$f = 2.0\text{ GHz}$, $V_{\text{cont}} = 2.8\text{ V}/0\text{ V}$	–	23	–	dBm
Switching Speed	t_{SW}		–	50	200	ns
Control Current	I_{cont}	$V_{\text{cont}} = 1.8\text{ V}/0\text{ V}$, RF Non	–	0.5	10	μA

Notes 1. Off chip DC blocking capacitors at frequency range of 0.1 to 0.5 GHz 1 000 pF

2. $P_{\text{in}(1\text{ dB})}$ or $P_{\text{in}(0.1\text{ dB})}$ are measured the input power level when the insertion loss increase more 1 dB or 0.1 than that of linear range. All other characteristics are measured in linear range.

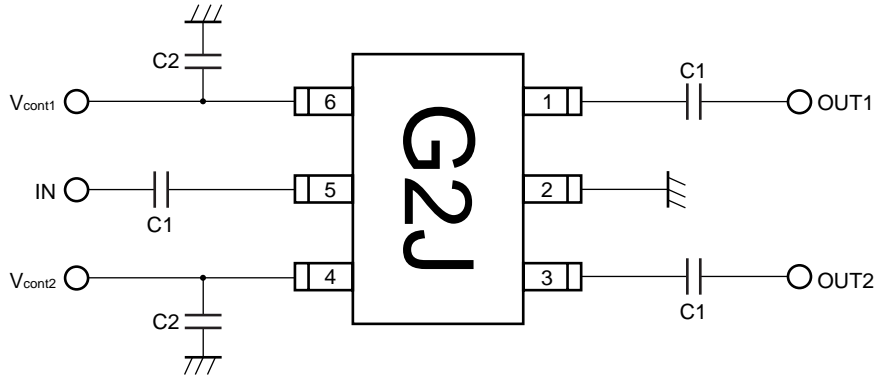
Cautions 1. When the μPG2006TB is used it is necessary to use DC blocking capacitors for No.1 (OUT1), No.3 (OUT2) and No.5 (IN). The value of DC blocking capacitors should be chosen to accommodate the frequency of operation, bandwidth, switching speed and the condition with actual board of your system.

The range of recommended DC blocking capacitor value is less than 100 pF.

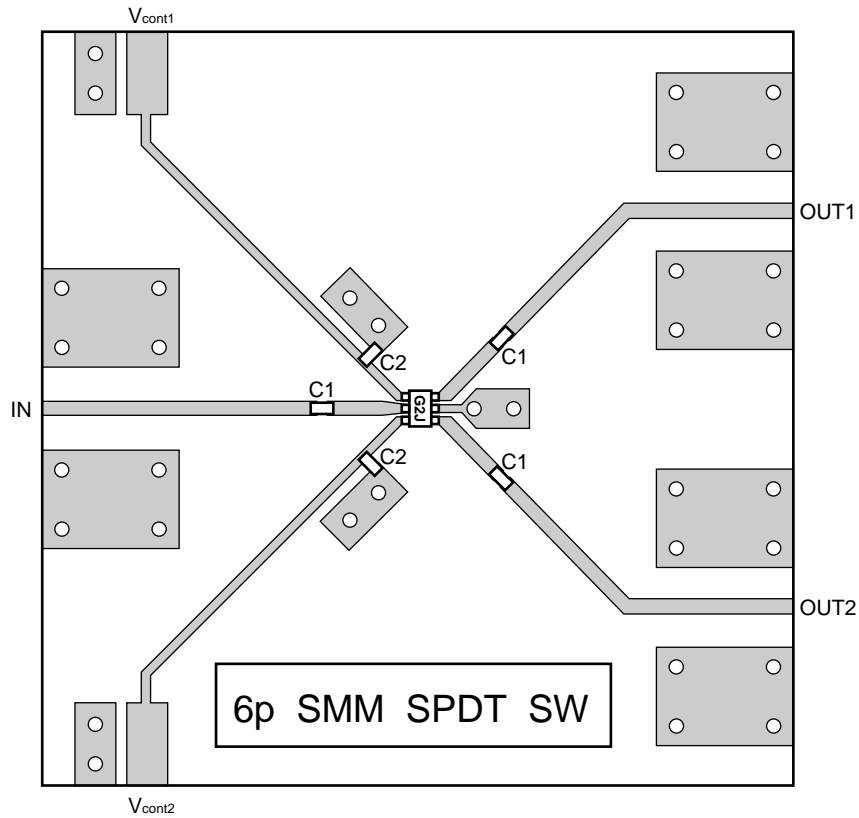
2. The distance between IC's GND pin and ground pattern of substrate should be as shorter as possible to avoid parasitic parameters.

EVALUATION CIRCUIT

$V_{cont1} = 1.8\text{ V}$, $V_{cont2} = 0\text{ V}$ or $V_{cont2} = 0\text{ V}$, $V_{cont1} = 1.8\text{ V}$, off chip DC blocking capacitors value $C1 = 51\text{ pF}$, $C2 = 1\text{ 000 pF}$ (Bypass), using NEC standard evaluation board.



EVALUATION BOARD



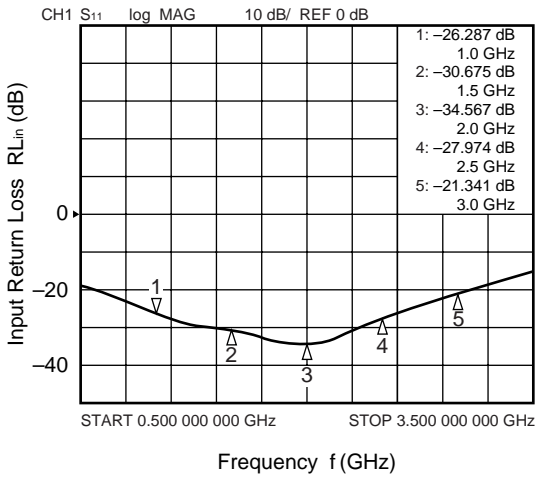
TRUTH TABLE

V_{cont1}	V_{cont2}	IN-OUT1	IN-OUT2
Low	High	ON	OFF
High	Low	OFF	ON

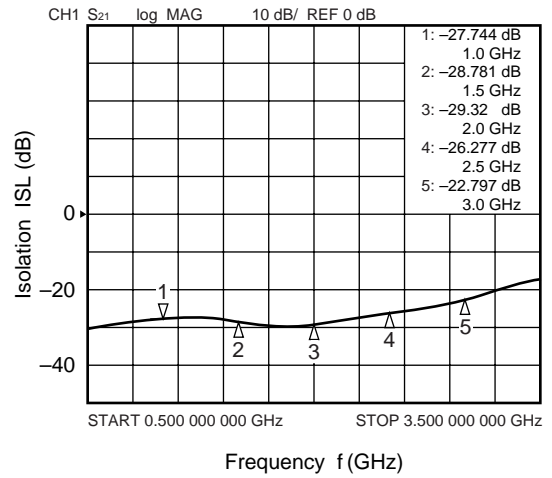
TYPICAL CHARACTERISTICS

TEST CONDITION: $V_{cont1/2} = 0\text{ V}$, $P_{in} = 0\text{ dBm}$, OUT2 side is $50\ \Omega$ termination

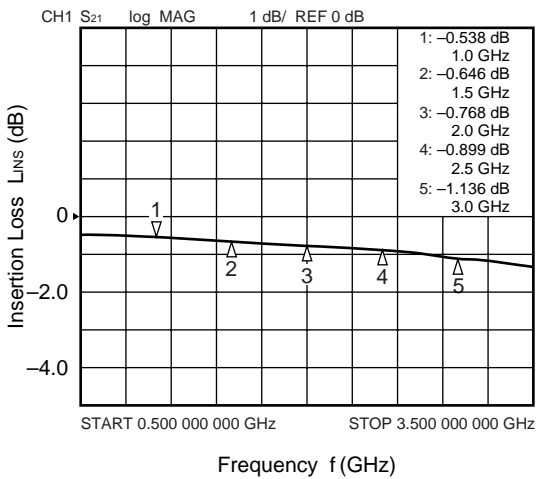
INPUT RETURN LOSS vs. FREQUENCY



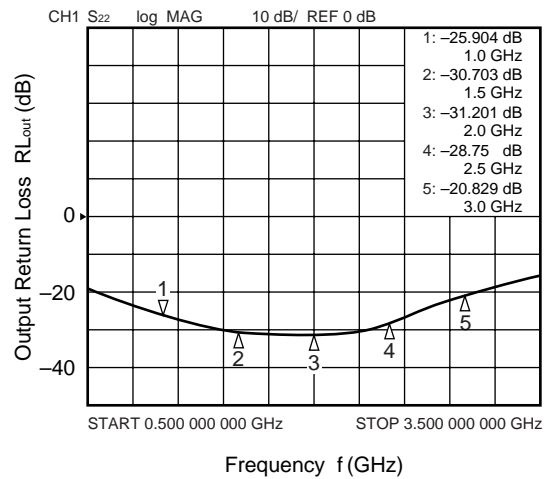
ISOLATION vs. FREQUENCY



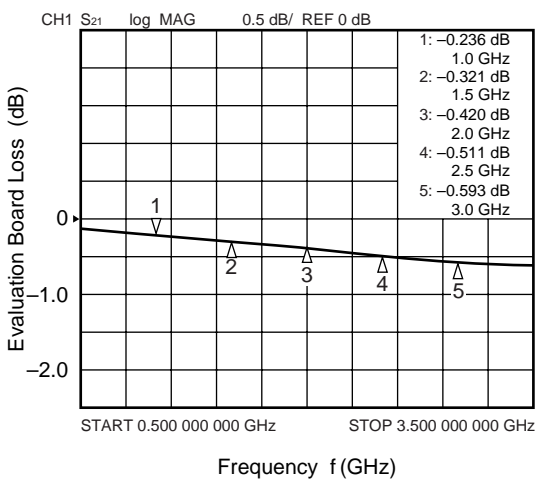
INSERTION LOSS vs. FREQUENCY



OUTPUT RETURN LOSS vs. FREQUENCY



EVALUATION BOARD LOSS vs. FREQUENCY

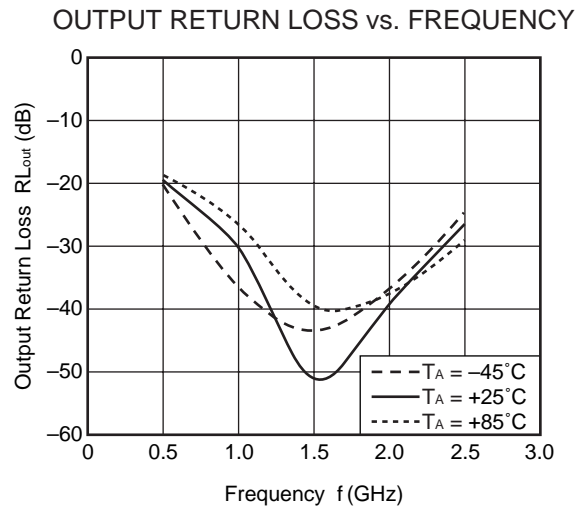
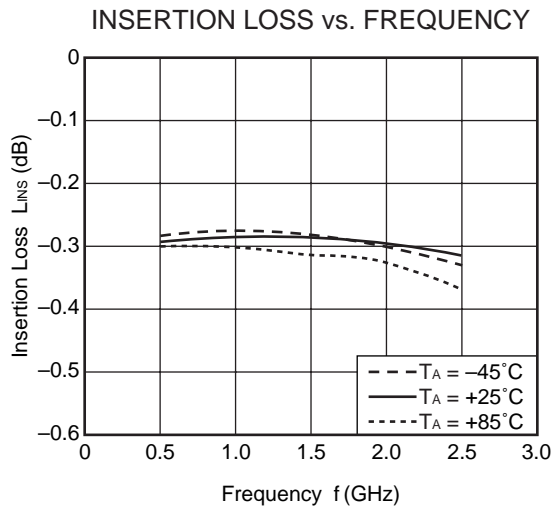
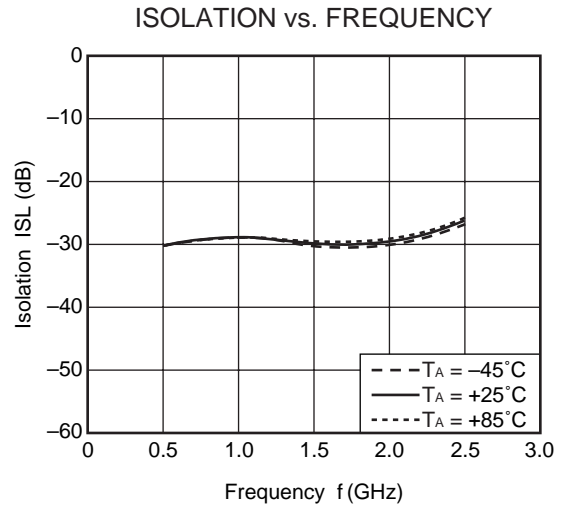
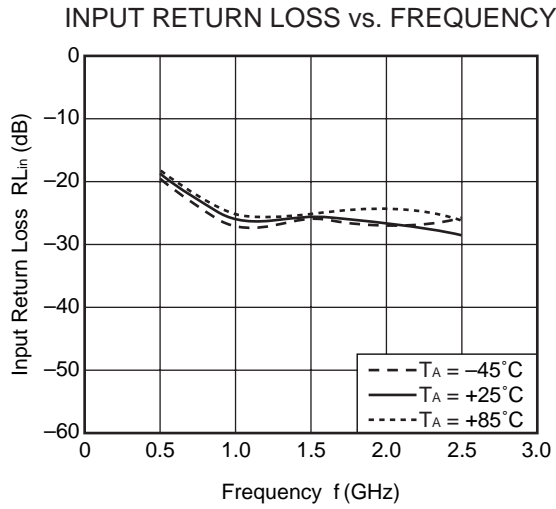


Caution These characteristics values include the loss of the NEC evaluation board.

Remark The graphs indicate nominal characteristics.

TYPICAL CHARACTERISTICS (Temperature dependency of each frequency characteristics)

TEST CONDITION: $V_{cont1/2} = 0$ V/1.8 V, $P_{in} = 0$ dBm, OUT2 side is 50 Ω termination



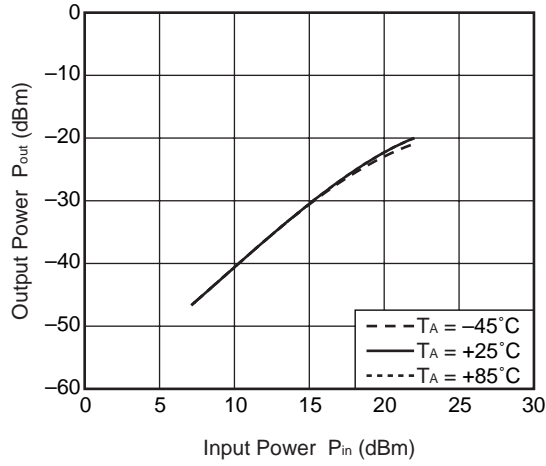
Caution These characteristics values do not include the loss of the NEC evaluation board.

Remark The graphs indicate nominal characteristics.

TYPICAL CHARACTERISTICS

TEST CONDITION: $f = 2 \text{ GHz}$, $V_{\text{cont}1/2} = 0 \text{ V}/1.8 \text{ V}$, OUT2 side is 50Ω termination

TEMPERATURE CHARACTERISTICS OF INPUT/OUTPUT

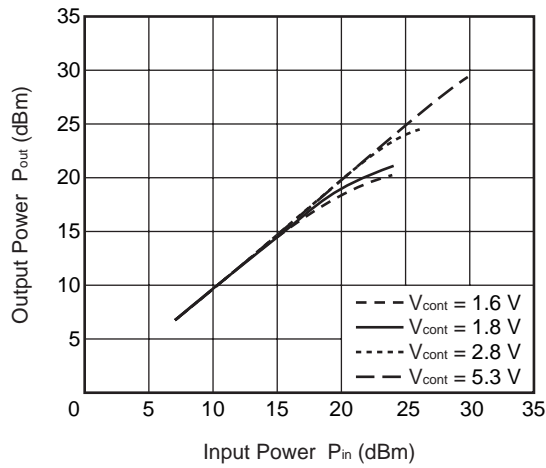


Remark The graphs indicate nominal characteristics.

TYPICAL CHARACTERISTICS

TEST CONDITION: $f = 2 \text{ GHz}$, $T_A = +25^\circ\text{C}$, OUT2 side is 50Ω termination

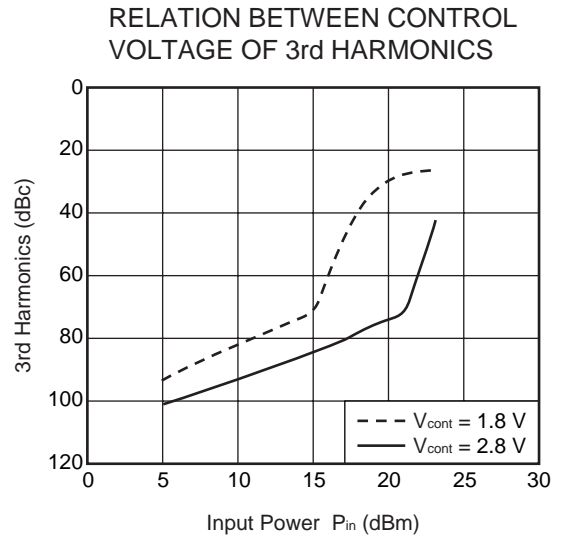
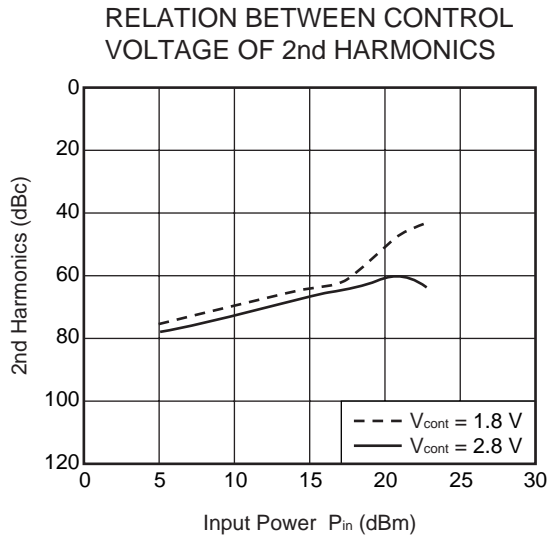
RELATION BETWEEN CONTROL VOLTAGE OF INPUT/OUTPUT



Remark The graphs indicate nominal characteristics.

TYPICAL CHARACTERISTICS

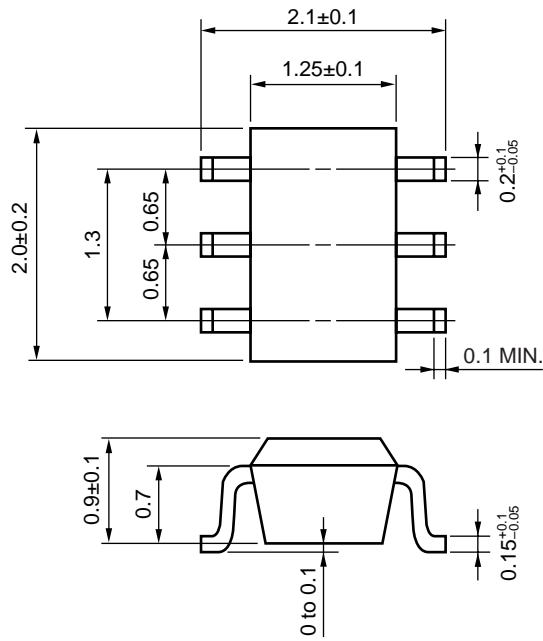
TEST CONDITION: $f = 2 \text{ GHz}$, $T_A = +25^\circ\text{C}$, $V_{\text{cont}1/2} = 0 \text{ V}/1.8 \text{ V}$, OUT2 side is 50Ω termination



Remark The graphs indicate nominal characteristics.

PACKAGE DIMENSIONS

6-PIN SUPER MINIMOLD (UNIT: mm)



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
VPS	Peak temperature (package surface temperature) : 215°C or below Time at temperature of 200°C or higher : 25 to 40 seconds Preheating time at 120 to 150°C : 30 to 60 seconds Maximum number of reflow processes : 3 times Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	VP215
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 (pin 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).

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M8E 00.4-0110

SAFETY INFORMATION ON THIS PRODUCT

<p>Caution</p>	<p>GaAs Products</p>	<p>The product contains gallium arsenide, GaAs. GaAs vapor and powder are hazardous to human health if inhaled or ingested.</p> <ul style="list-style-type: none"> • 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. <p>Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.</p>
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► **Business issue**

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► **Technical issue**

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