



## ■ ABSOLUTE MAXIMUM RATINGS

$T_a=+25^{\circ}\text{C}$ ,  $Z_s=Z_i=50\ \text{ohm}$

PARAMETER	SYMBOL	CONDITIONS	CONDITIONS	UNITS
RF Input Power	$P_{IN}$	$V_{DD}=2.85\text{V}$ , $V_{CTL}=0/2.6\text{V}$	36	dBm
Supply Voltage	$V_{DD}$	VDD terminal	5.0	V
Control Voltage	$V_{CTL}$	CTL1, CTL2 terminal	5.0	V
Power Dissipation	$P_D$	4-layer FR4 PCB with through-hole (74.2x74.2mm), $T_j=150^{\circ}\text{C}$	1300	mW
Operating Temp.	$T_{opr}$		-40~+95	$^{\circ}\text{C}$
Storage Temp.	$T_{stg}$		-55~+150	$^{\circ}\text{C}$

## ■ ELECTRICAL CHARACTERISTICS<sup>1</sup> (DC CHARACTERISTICS)

General conditions:  $V_{DD}=2.85\text{V}$ ,  $V_{CTL(L)}=0\text{V}$ ,  $V_{CTL(H)}=2.6\text{V}$ ,  $T_a=+25^{\circ}\text{C}$ ,  $Z_s=Z_i=50\ \text{ohm}$ , with application circuit

PARAMETERS	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Operating Voltage	$V_{DD}$		2.5	2.85	4.5	V
Operating Current	$I_{DD}$	$P_{IN}=30\text{dBm}$	-	50	100	$\mu\text{A}$
Control Voltage (LOW)	$V_{CTL(L)}$		0	-	0.5	V
Control Voltage (HIGH)	$V_{CTL(H)}$		1.7	2.6	4.5	V
Control Current	$I_{CTL}$		-	5	10	$\mu\text{A}$

## ■ ELECTRICAL CHARACTERISTICS2 (RF CHARACTERISTICS)

General conditions:  $V_{DD}=2.85V$ ,  $V_{CTL(L)}=0V$ ,  $V_{CTL(H)}=2.6V$ ,  $T_a=+25^{\circ}C$ ,  $Z_S=Z_L=50\text{ ohm}$ , with application circuit

PARAMETERS	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Insertion Loss 1	LOSS1	f=0.9GHz, $P_{IN}=30\text{dBm}$	-	0.30	0.45	dB
Insertion Loss 2	LOSS2	f=1.9GHz, $P_{IN}=30\text{dBm}$	-	0.40	0.55	dB
Isolation 1	ISL1	f=0.9GHz, $P_{IN}=30\text{dBm}$	30	32	-	dB
Isolation 2	ISL2	f=1.9GHz, $P_{IN}=30\text{dBm}$	24	26	-	dB
0.1dB Compression input power	$P_{-0.1\text{dB}}$	f=0.9GHz	33	35	-	dBm
2nd Harmonic Suppression	2fo	f=0.9GHz, $P_{IN}=30\text{dBm}$	-	-75	-60	dBc
3rd Harmonic Suppression	3fo	f=0.9GHz, $P_{IN}=30\text{dBm}$	-	-75	-60	dBc
VSWR (PC, P1, P2)	VSWR	f=0.9GHz, ON State	-	1.2	1.4	
Switching time	$T_{SW}$		-	2	5	$\mu\text{s}$

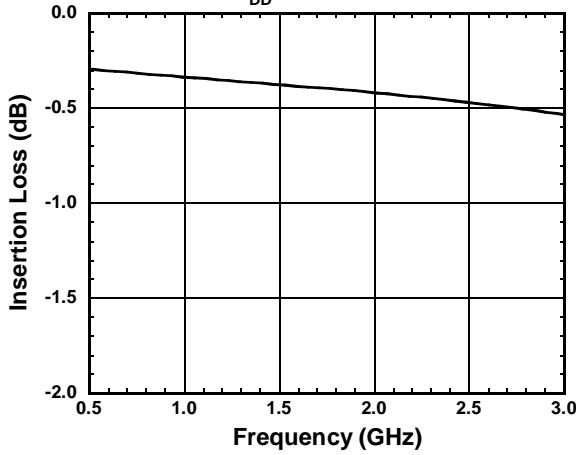
## ■ TERMINAL INFORMATION

No.	SYMBOL	DESCRIPTION
1,2,4,6,8, 10,11	GND	Ground terminal. Please connect this terminal with ground plane as close as possible for excellent RF performance.
3	P1	RF input / output port. External capacitor is required to block the DC bias voltage of internal circuit.
5	P3	RF input / output port. External capacitor is required to block the DC bias voltage of internal circuit.
7	P4	RF input / output port. External capacitor is required to block the DC bias voltage of internal circuit.
9	P2	RF input / output port. External capacitor is required to block the DC bias voltage of internal circuit.
12	VDD	A supply voltage terminal (+2.5~+4.5V). Please place a bypass capacitor between this and GND for avoiding RF noise from outside.
13	CTL1	Control port. "High level" is DC +1.7V~4.5V, "Low level" is DC 0~+0.5V.
14	CTL2	

## ■ ELECTRICAL CHARACTERISTICS (With Application circuit, Loss of external circuit are excluded)

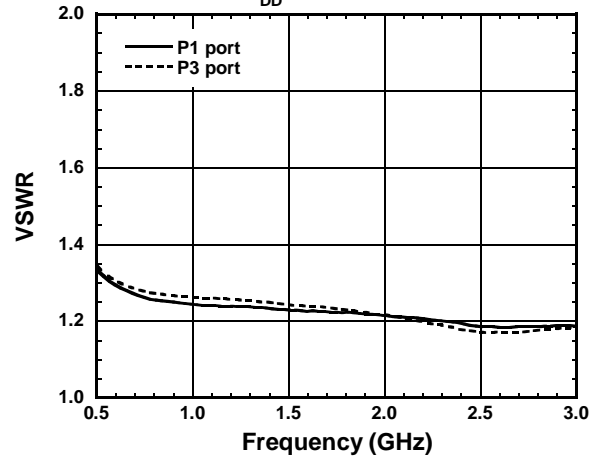
### Insertion Loss vs. Frequency

( P1-P3 ON,  $V_{DD}=2.85V$ , CTL1=CTL2=0V )



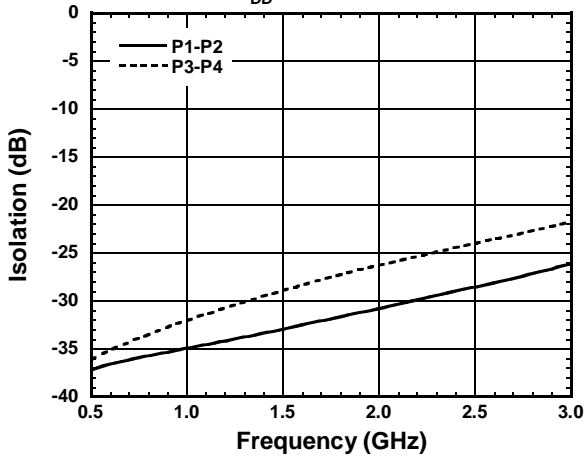
### VSWR vs. Frequency

( P1-P3 ON,  $V_{DD}=2.85V$ , CTL1=CTL2=0V )



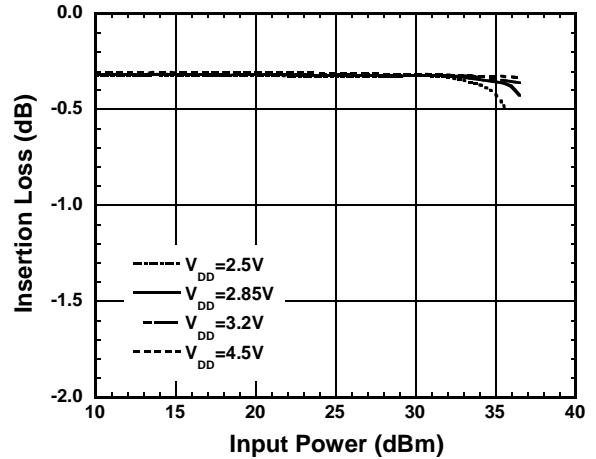
### Isolation vs. Frequency

( P1-P3 ON,  $V_{DD}=2.85V$ , CTL1=CTL2=0V )



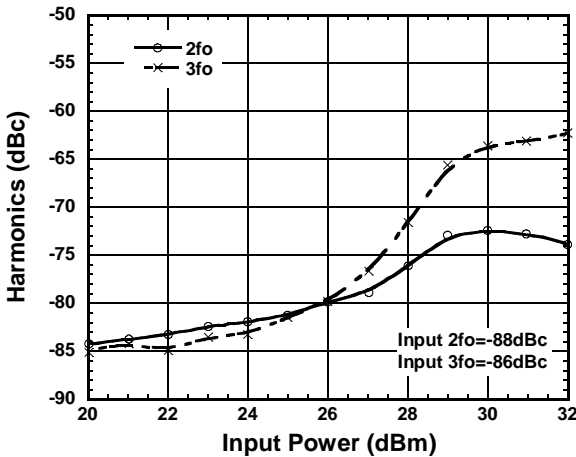
### Insertion Loss vs. Input Power

( f=0.9GHz, P1-P3 ON, CTL1=CTL2=0V )



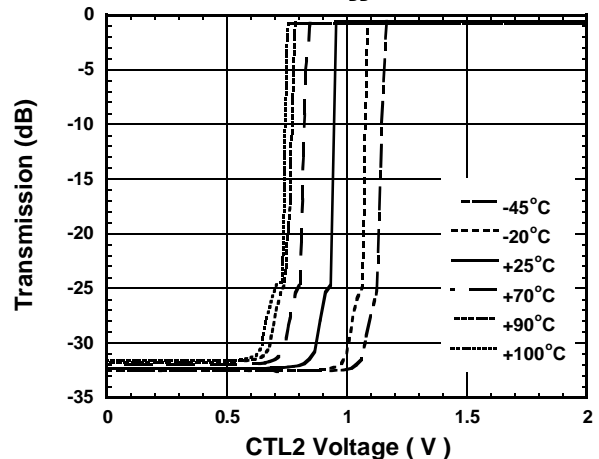
### Harmonics vs. Input Power

( f=900MHz, P1-P3 ON, CTL1=CTL2=0V )



### Transmission vs. Control Voltage

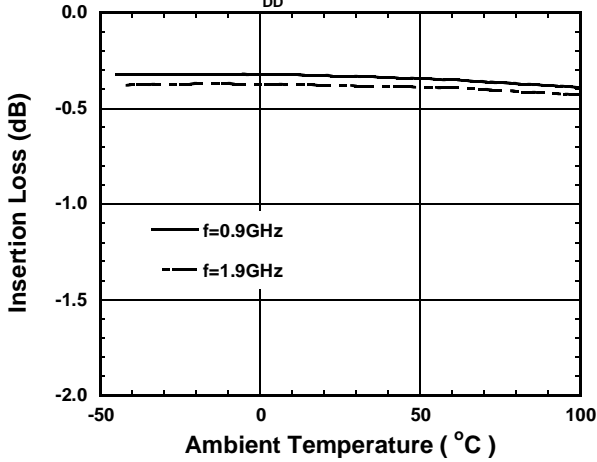
( P2-P4 ON, f=900MHz,  $V_{DD}=2.85V$ , CTL1=2.6V )



**ELECTRICAL CHARACTERISTICS** (With Application circuit, Loss of external circuit are excluded)

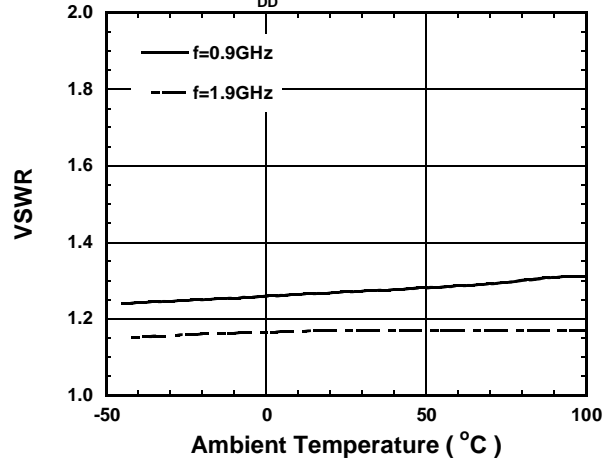
**Insertion Loss vs. Ambient Temperature**

( P1-P3 ON,  $V_{DD}=2.85V$ , CTL1=CTL2=0V )



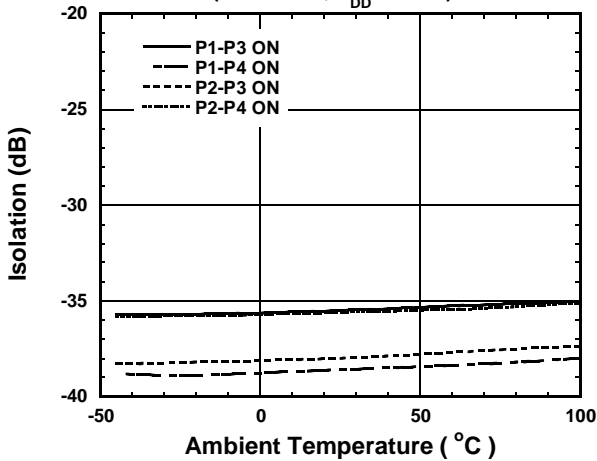
**VSWR vs. Ambient Temperature**

( P1 port,  $V_{DD}=2.85V$ , CTL1=CTL2=0V )



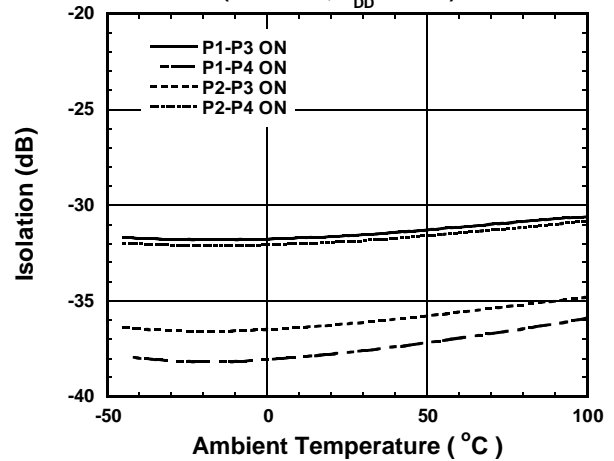
**P1-P2 Isolation vs. Ambient Temperature**

( f=900MHz,  $V_{DD}=2.85V$  )



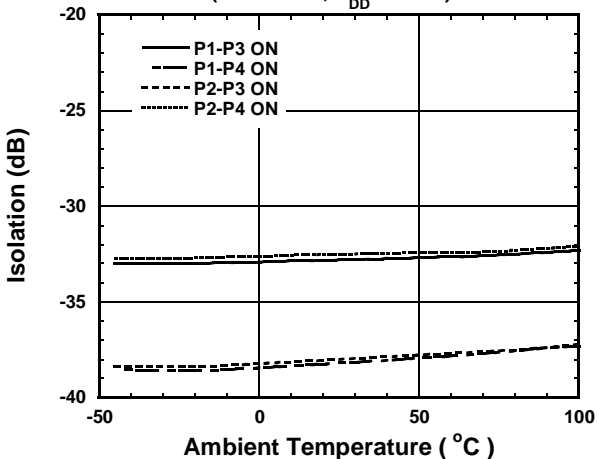
**P1-P2 Isolation vs. Ambient Temperature**

( f=1.9GHz,  $V_{DD}=2.85V$  )



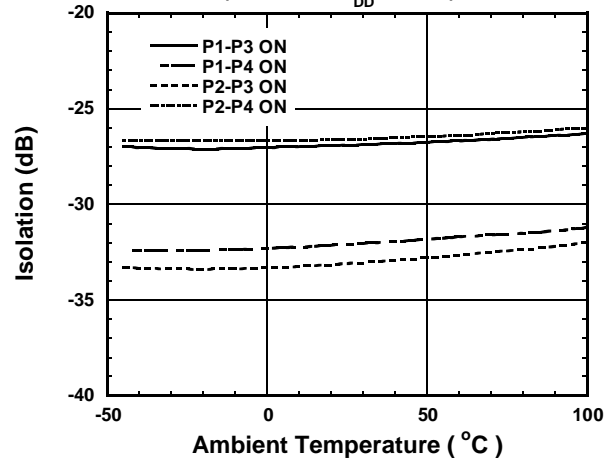
**P3-P4 Isolation vs. Ambient Temperature**

( f=900MHz,  $V_{DD}=2.85V$  )



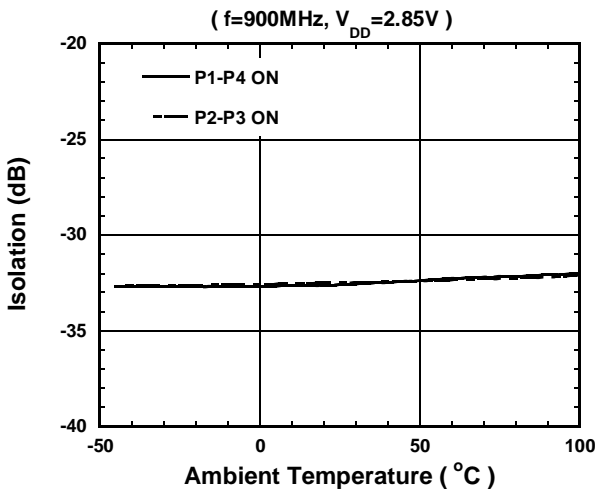
**P3-P4 Isolation vs. Ambient Temperature**

( f=1.9GHz,  $V_{DD}=2.85V$  )

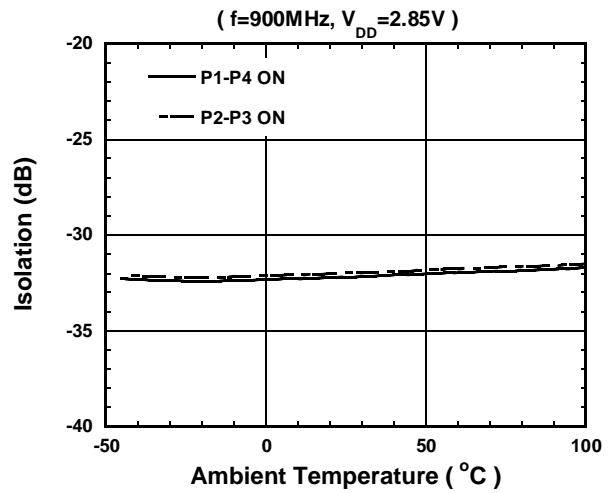


**ELECTRICAL CHARACTERISTICS** (With Application circuit, Loss of external circuit are excluded)

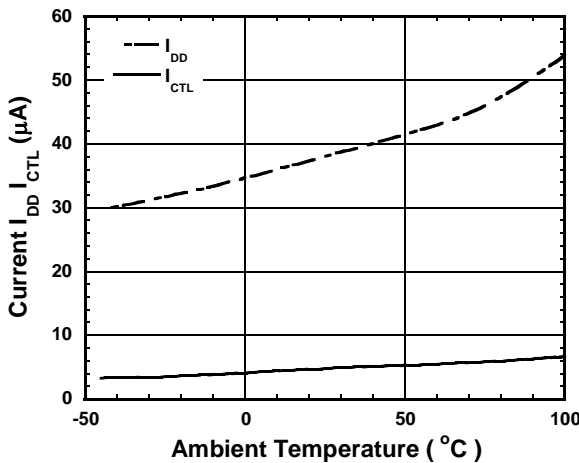
**P1-P3 Isolation vs. Ambient Temperature**



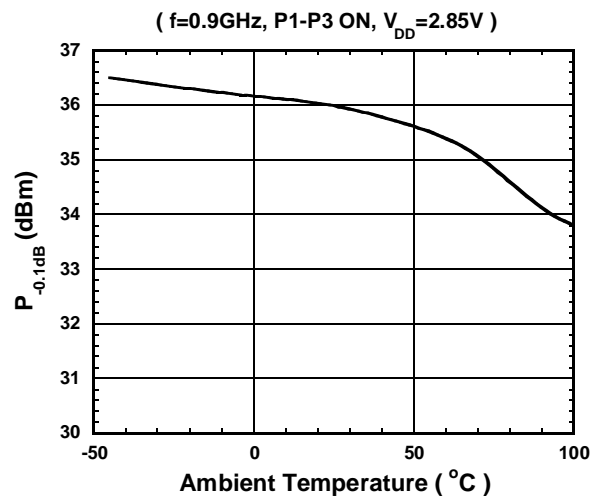
**P2-P4 Isolation vs. Ambient Temperature**



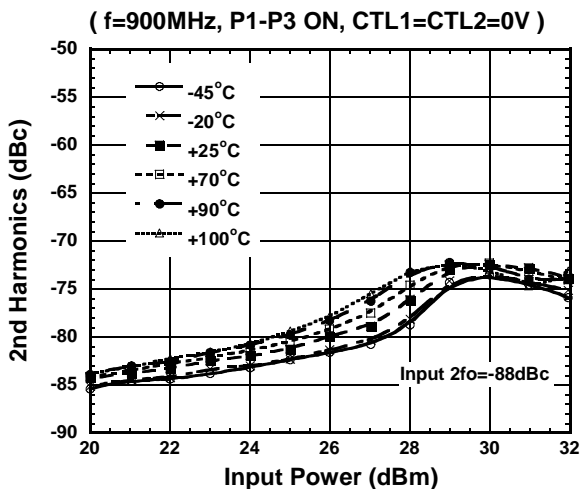
**$I_{DD}$ ,  $I_{CTL}$  vs. Ambient Temperature**



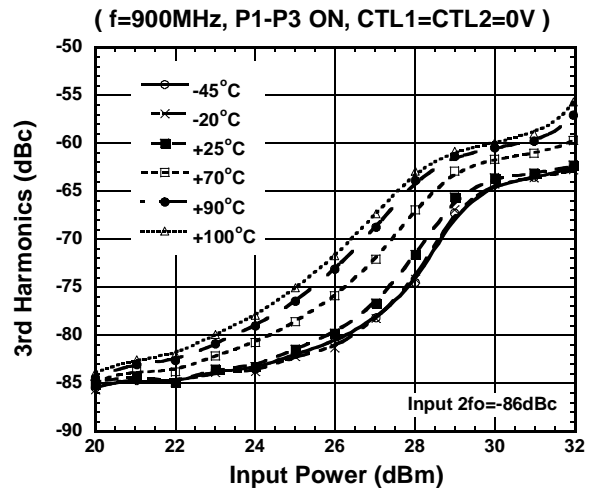
**$P_{-0.1\text{dB}}$  vs. Ambient Temperature**



**2nd Harmonics vs. Input Power**



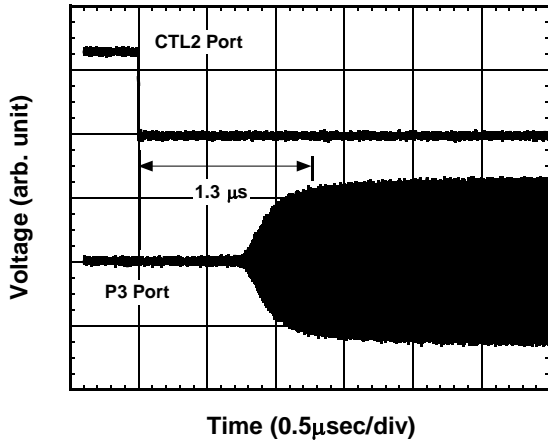
**3rd Harmonics vs. Input Power**



## ■ ELECTRICAL CHARACTERISTICS (With Application circuit, Loss of external circuit are excluded)

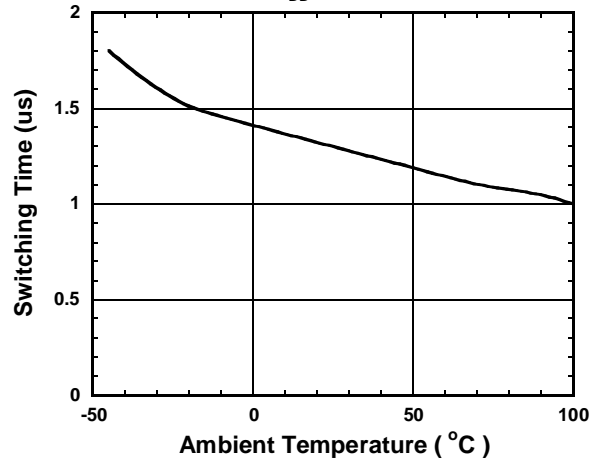
### Switching Time

( $V_{DD}=2.85V$ ,  $CTL1=0V$ )



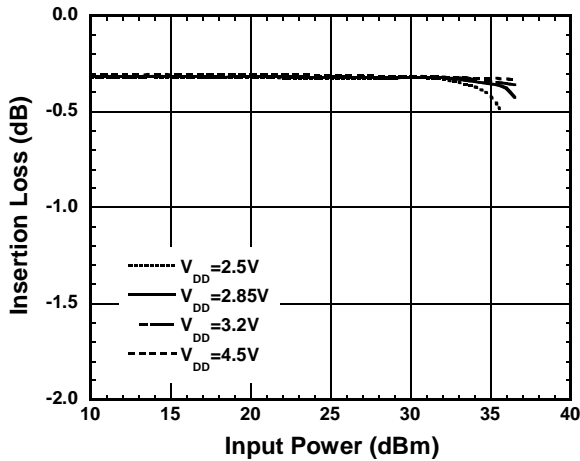
### Switching Time vs. Ambient Temperature

( $V_{DD}=2.85V$ )



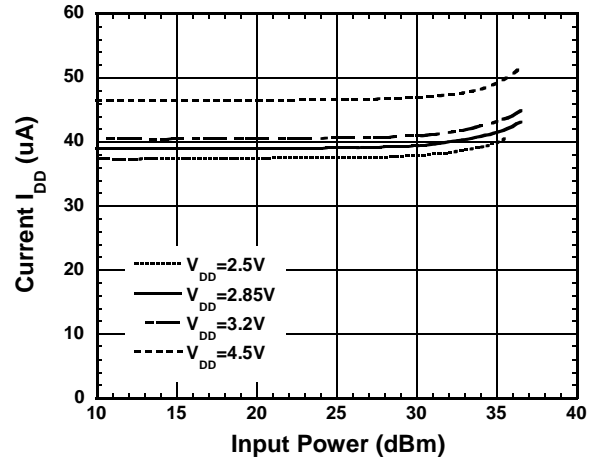
### Insertion Loss vs. Input Power

( $f=0.9GHz$ , P1-P3 ON,  $CTL1=CTL2=0V$ )



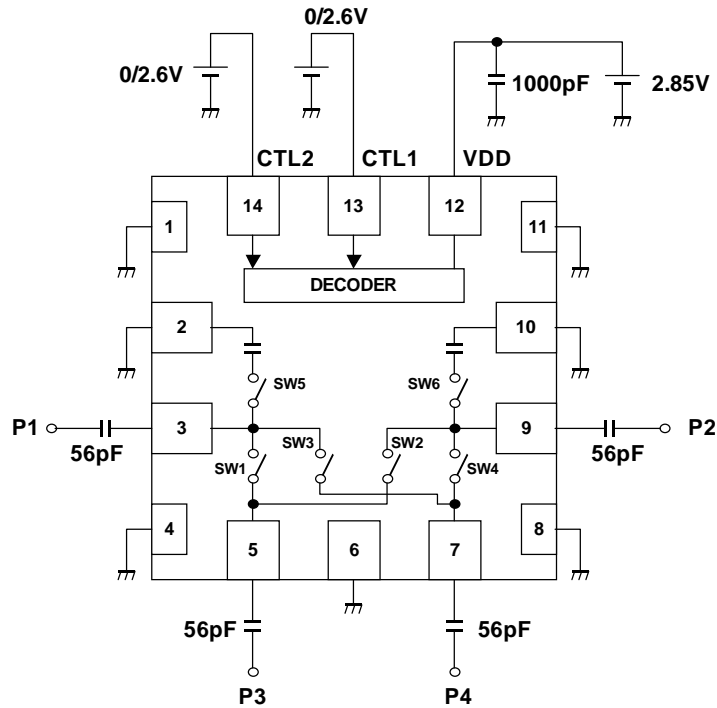
### Current $I_{DD}$ vs. Input Power

( $f=0.9GHz$ , P1-P3 ON,  $CTL1=CTL2=0V$ )

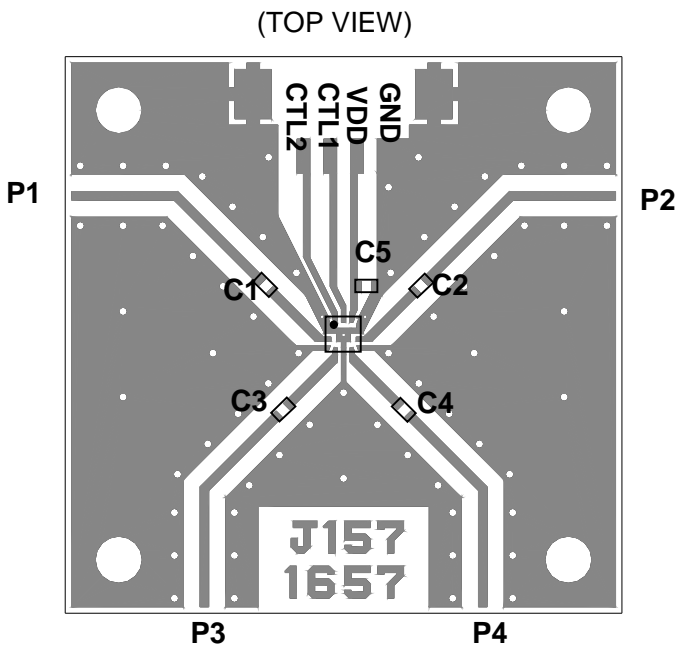




## APPLICATION CIRCUIT



## TEST PCB LAYOUT



PCB: FR-4, t=0.2mm

Capacitor size: 1005

Strip Line Width: 0.4mm

PCB size: 26 x 26mm

Losses of PCB, capacitors and connectors

Frequency (GHz)	Loss (dB)
0.9	0.30
1.9	0.49

### PARTS LIST

PART ID	Value	COMMENT
C1~C4	56pF	MURATA (GRM15)
C5	1000pF	

## PRECAUTIONS

[1]The DC blocking capacitors have to be placed at RF terminal of P1, P2, P3, P4 and PC.

Please choose appropriate capacitance values to the application frequency.

[2]To reduce strip line influence on RF characteristics, please locate bypass capacitors(C5) as close as possible to each terminals.

[3]For good isolation, the GND terminal must be connected to the ground plane of substrate, and through-holes for GND should be placed near by the pin connection.



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