

NJG1657MD7

■ 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 CHARACTERISTICS¹ (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	μA
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	μA

■ ELECTRICAL CHARACTERISTICS2 (RF CHARACTERISTICS)

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

NJG1657MD7

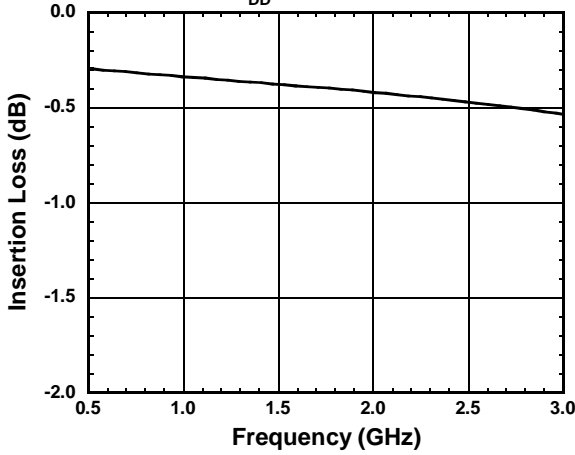
■ TERMINAL INFORMATION

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)

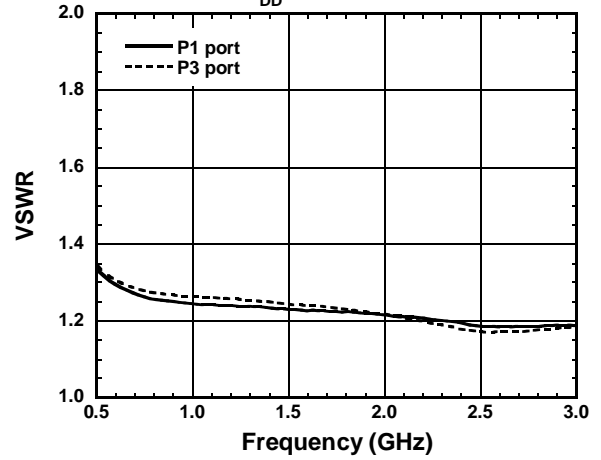
Insertion Loss vs. Frequency

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



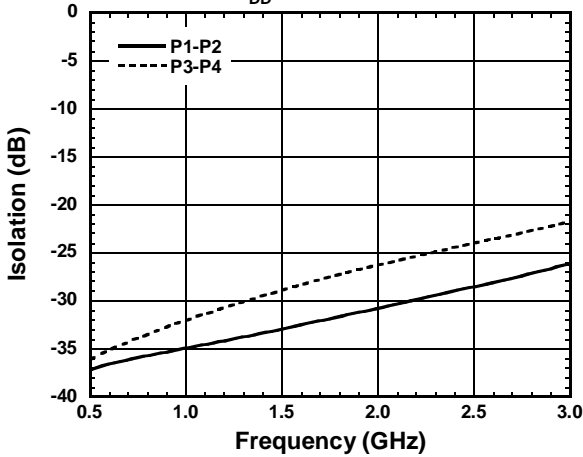
VSWR vs. Frequency

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



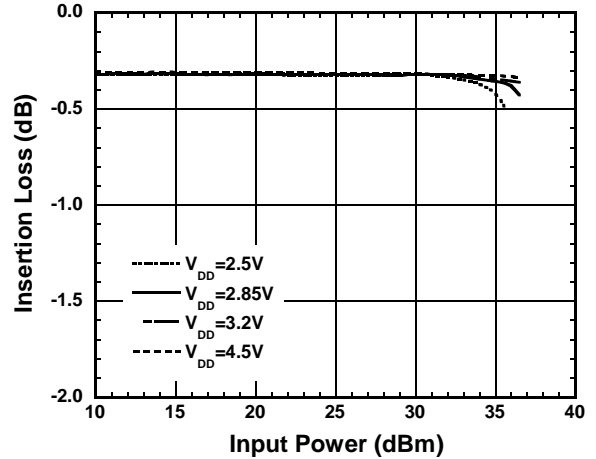
Isolation vs. Frequency

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



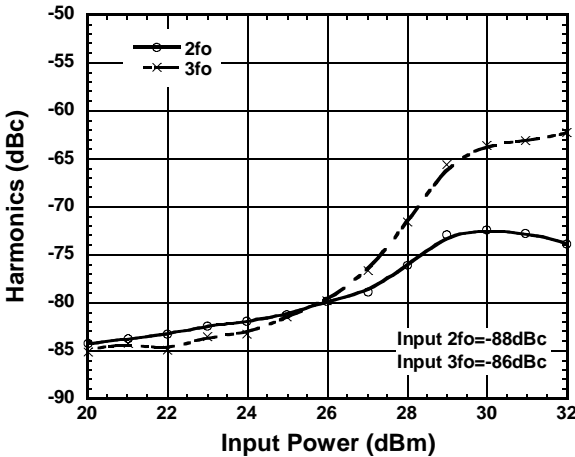
Insertion Loss vs. Input Power

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



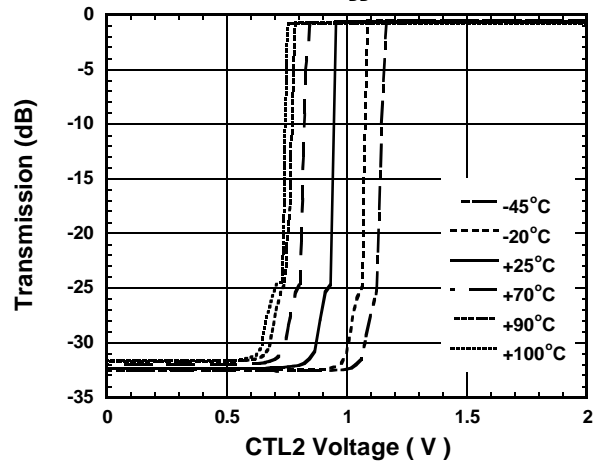
Harmonics vs. Input Power

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



Transmission vs. Control Voltage

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

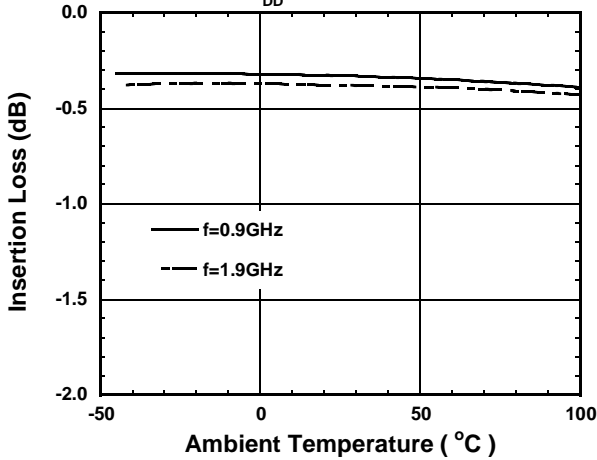


NJG1657MD7

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

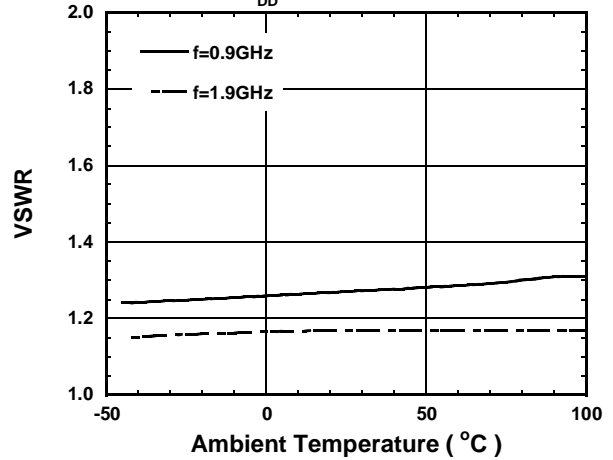
Insertion Loss vs. Ambient Temperature

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



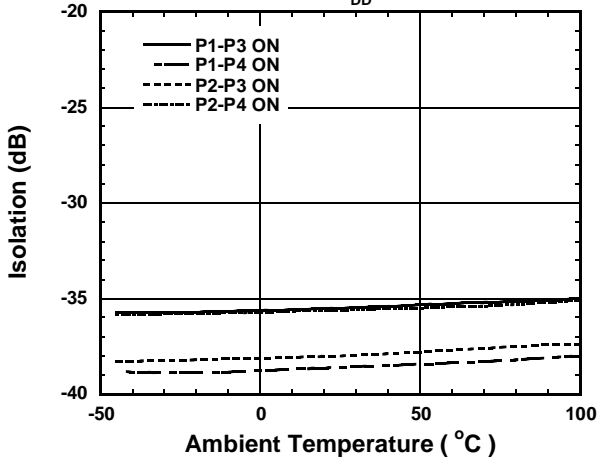
VSWR vs. Ambient Temperature

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



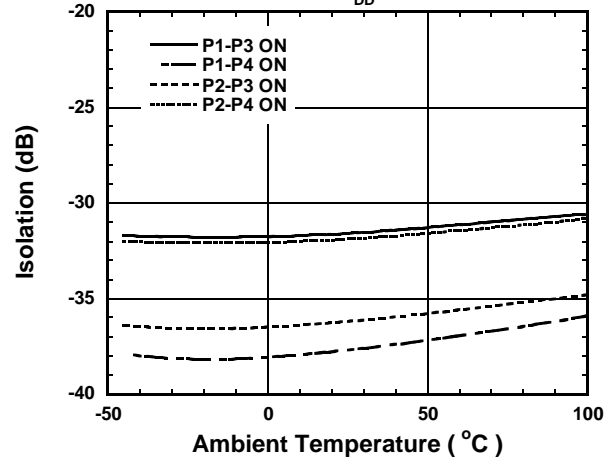
P1-P2 Isolation vs. Ambient Temperature

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



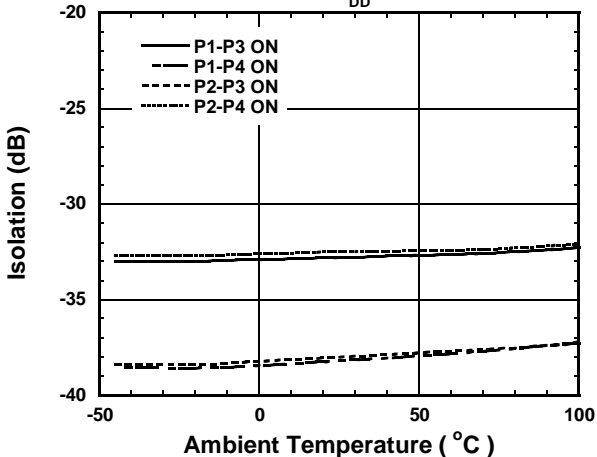
P1-P2 Isolation vs. Ambient Temperature

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



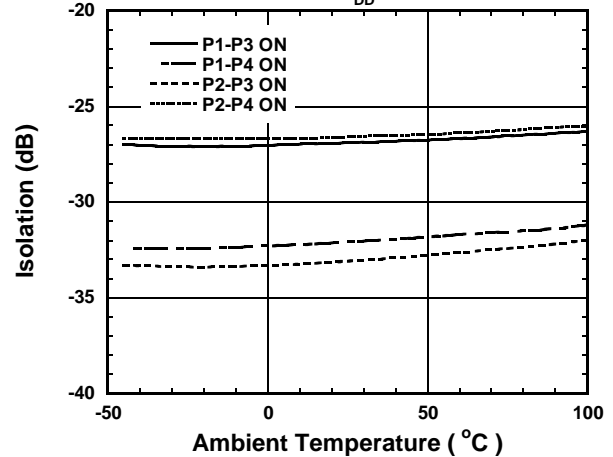
P3-P4 Isolation vs. Ambient Temperature

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



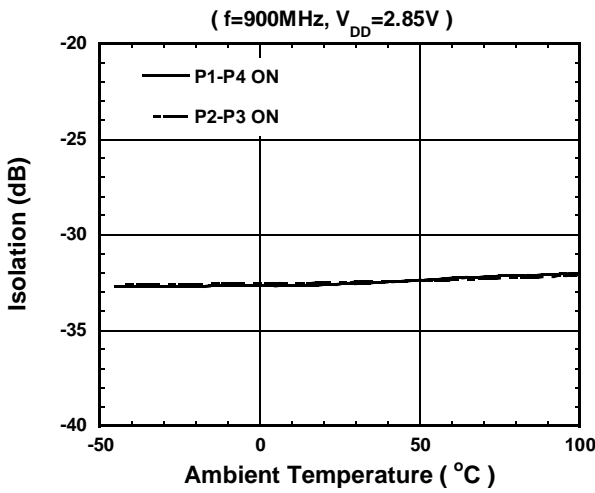
P3-P4 Isolation vs. Ambient Temperature

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

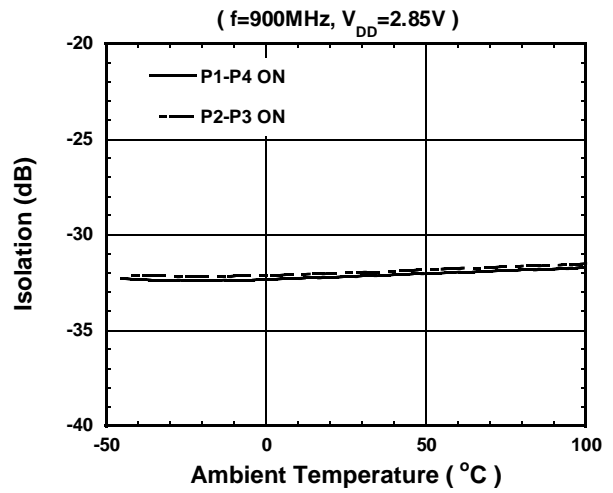


■ **ELECTRICAL CHARACTERISTICS** (With Application circuit, Loss of external circuit are excluded)

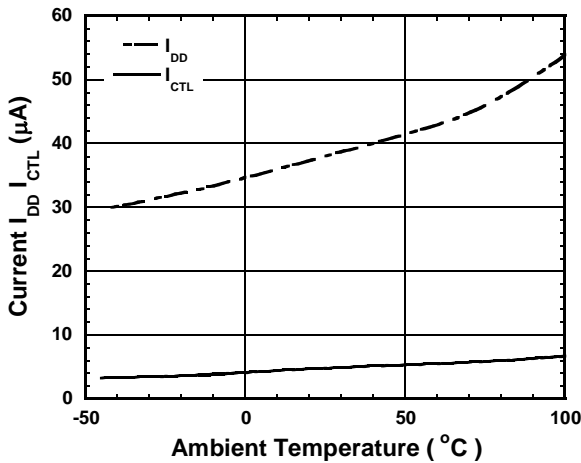
P1-P3 Isolation vs. Ambient Temperature



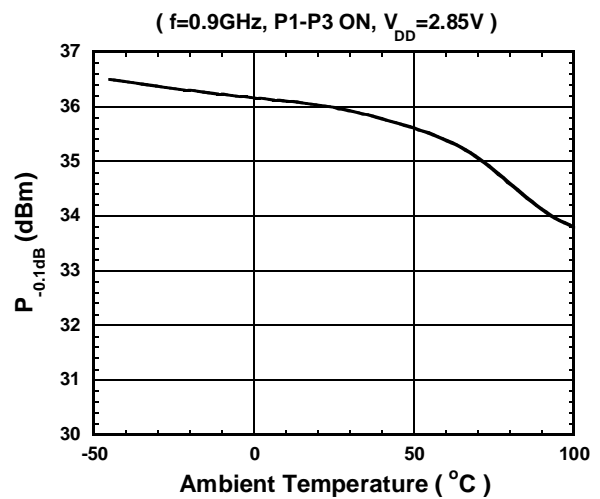
P2-P4 Isolation vs. Ambient Temperature



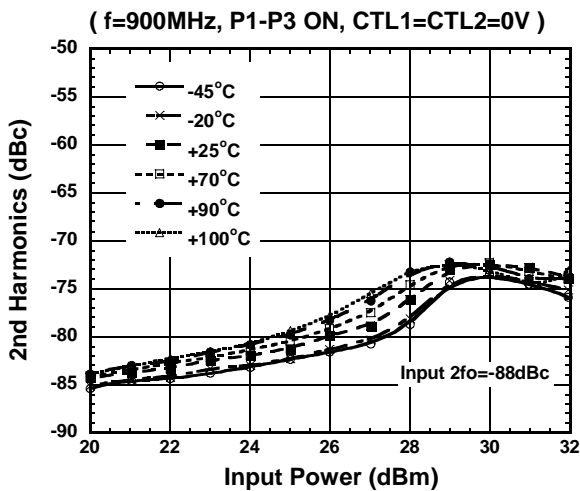
I_{DD}, I_{CTL} vs. Ambient Temperature



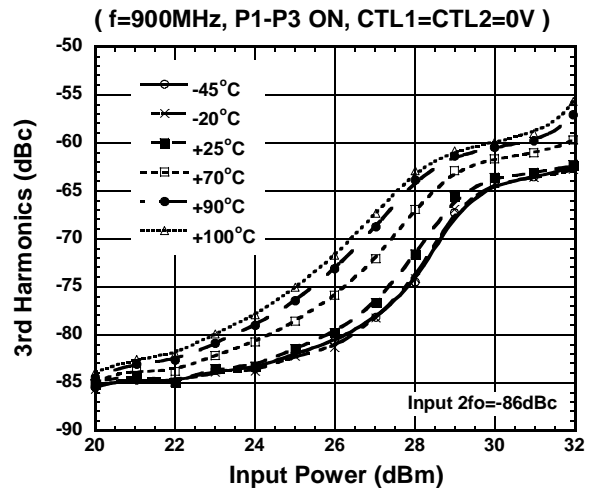
P_{-0.1dB} vs. Ambient Temperature



2nd Harmonics vs. Input Power



3rd Harmonics vs. Input Power

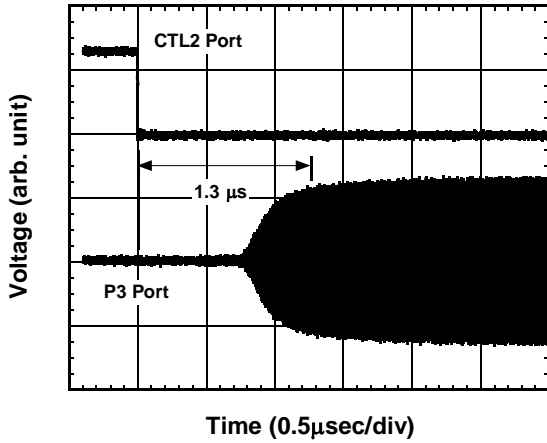


NJG1657MD7

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

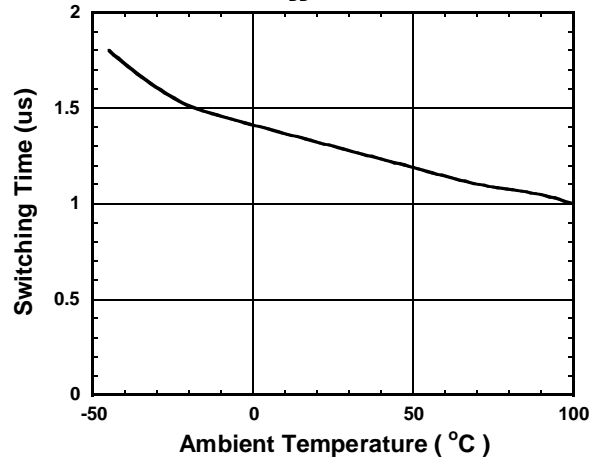
Switching Time

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



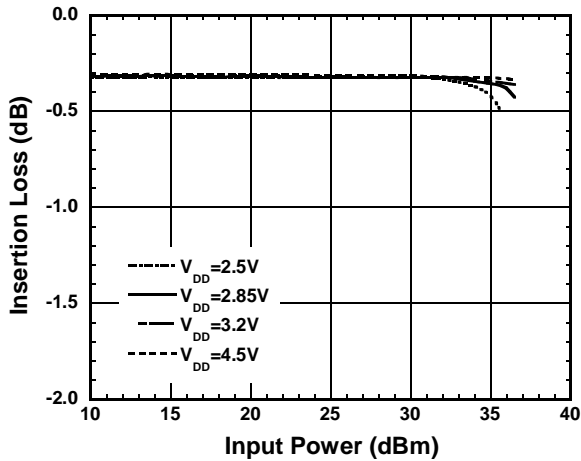
Switching Time vs. Ambient Temperature

($V_{DD}=2.85V$)



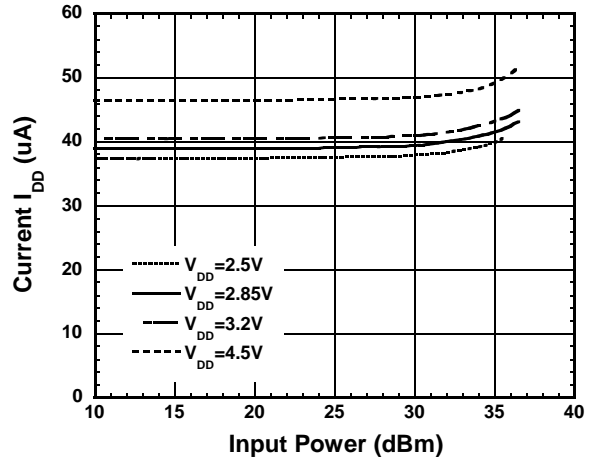
Insertion Loss vs. Input Power

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

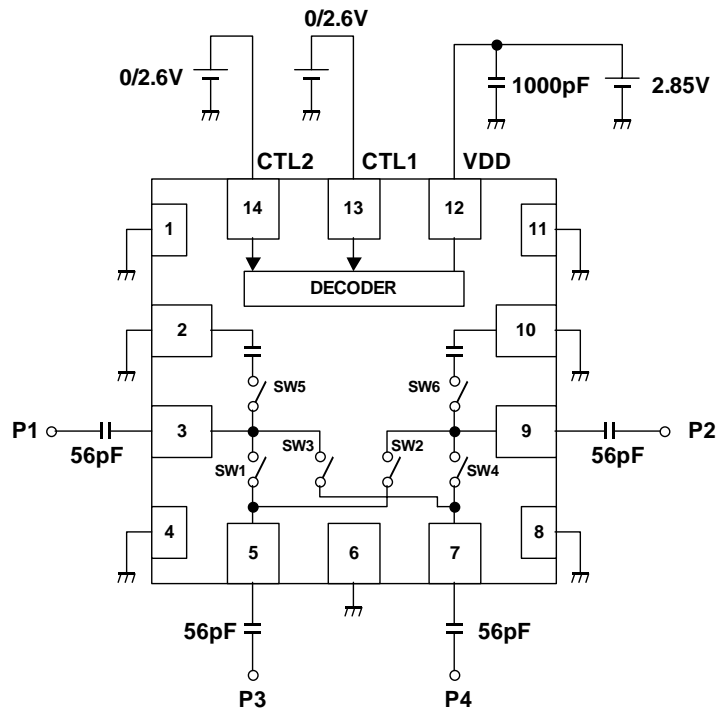


Current I_{DD} vs. Input Power

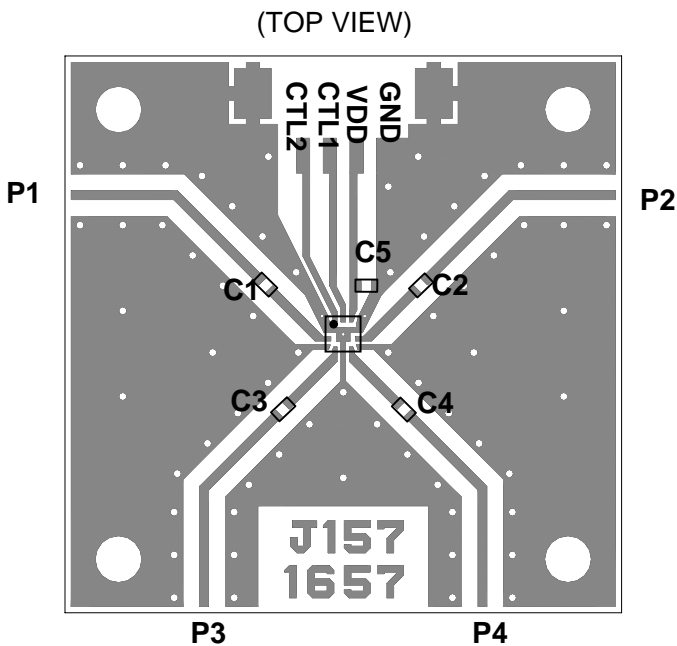
($f=0.9GHz$, P1-P3 ON, CTL1=CTL2=0V)



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.

