DATA SHEET

NEC

BIPOLAR ANALOG INTEGRATED CIRCUITS

μPC8128TB, μPC8151TB, μPC8152TB

SILICON MMIC LOW CURRENT AMPLIFIERS FOR CELLULAR/CORDLESS TELEPHONES

DESCRIPTION

The μPC8128TB, μPC8151TB and μPC8152TB are silicon monolithic integrated circuits designed as buffer amplifiers for cellular or cordless telephones. These amplifiers can realize low current consumption with external chip inductor (eg 1005 size) which can not be realized on internal 50 Ω wideband matched IC. These low current amplifiers operate on 3.0 V.

These ICs are manufactured using NEC's 20 GHz f_T NESAT™ III silicon bipolar process. This process uses silicon nitride passivation film and gold electrodes. These materials can protect chip surface from external pollution and prevent corrosion/migration. Thus, these ICs have excellent performance, uniformity and reliability.

FEATURES

• Supply voltage	:	V_{CC} = 2.4 to 3.3 V	
• Low current consumption	:	μPC8128TB	; I_{CC} = 2.8 mA TYP. @V_{CC} = 3.0 V
		μPC8151TB	; I_{CC} = 4.2 mA TYP. @V_{CC} = 3.0 V
		μPC8152TB	; I_{CC} = 5.6 mA TYP. @V_{CC} = 3.0 V
• High efficiency	:	μPC8128TB	; $P_{O(1\ dB)}$ = –4.0 dBm TYP. @f = 1 GHz
		μPC8151TB	; $P_{O(1\ dB)}$ = +2.5 dBm TYP. @f = 1 GHz
		μPC8152TB	; $P_{O(1\ dB)}$ = –4.5 dBm TYP. @f = 1 GHz
• Power gain	:	μPC8128TB, 8151TB	; G_P = 12.5 dB TYP. @f = 1 GHz
		μPC8152TB	; G_P = 23 dB TYP. @f = 1 GHz
• Excellent isolation	:	μPC8128TB	; ISL = 39 dB TYP. @f = 1 GHz
	:	μPC8151TB	; ISL = 38 dB TYP. @f = 1 GHz
	:	μPC8152TB	; ISL = 40 dB TYP. @f = 1 GHz
• Operating frequency	:	100 to 1 900 MHz (Output port LC matching)	
• High-density surface mounting	:	6-pin super minimold package (2.0 × 1.25 × 0.9 mm)	
• Light weight	:	7 mg (Standard value)	

APPLICATION

- Buffer Amplifiers on 800 to 1 900 MHz cellular or cordless telephones

Caution Electro-static sensitive devices

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Printed in Japan

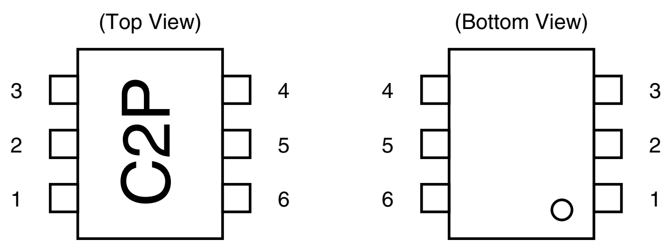
The mark ★ shows major revised points.

ORDERING INFORMATION

Part Number	Package	Marking	Supplying Form
μPC8128TB-E3	6-pin super minimold	C2P	• Embossed tape 8 mm wide • 1, 2, 3 pins face the perforation side of the tape • Qty 3 kpcs/reel
μPC8151TB-E3		C2U	
μPC8152TB-E3		C2V	

Remark To order evaluation samples, please contact your local NEC sales office.
Part number for sample order: μPC8128TB, μPC8151TB, μPC8152TB

PIN CONNECTIONS



Marking is an example of μPC8128TB

Pin No.	Pin Name
1	INPUT
2	GND
3	GND
4	OUTPUT
5	GND
6	V_{CC}

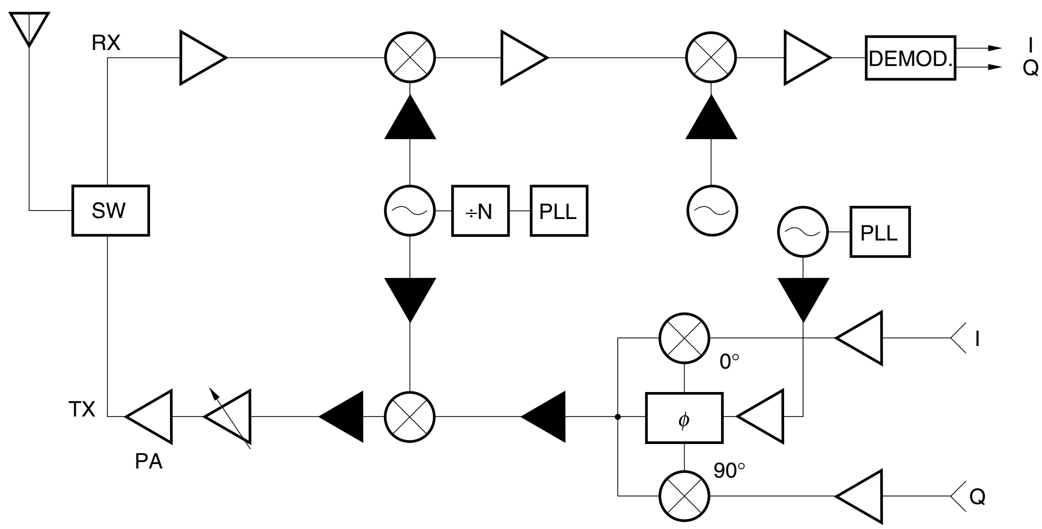
★ PRODUCT LINE-UP (T_A = +25°C, V_{CC} = V_{out} = 3.0 V, Z_S = Z_L = 50 Ω)

Parameter / Part No.		1.0 GHz output port matching frequency			1.66 GHz output port matching frequency			1.9 GHz output port matching frequency			2.4 GHz output port matching frequency			Marking
	I_{CC} (mA)	G_P (dB)	ISL (dB)	$P_{O(1\,dB)}$ (dBm)	G_P (dB)	ISL (dB)	$P_{O(1\,dB)}$ (dBm)	G_P (dB)	ISL (dB)	$P_{O(1\,dB)}$ (dBm)	G_P (dB)	ISL (dB)	$P_{O(1\,dB)}$ (dBm)	
μPC8128TB	2.8	12.5	39	–4.0	13	39	–4.0	13	37	–4.0	–	–	–	C2P
μPC8151TB	4.2	12.5	38	+2.5	15	36	+1.5	15	34	+0.5	–	–	–	C2U
μPC8152TB	5.6	23	40	–4.5	19.5	38	–8.5	17.5	35	–8.5	–	–	–	C2V
μPC8178TB	1.9	11	39	–4.0	–	–	–	11.5	40	–7.0	11.5	38	–7.5	C3B
μPC8179TB	4.0	13.5	44	+3.0	–	–	–	15.5	42	+1.5	15.5	41	+1.0	C3C

Remarks Typical performance. Please refer to ELECTRICAL CHARACTERISTICS in detail.

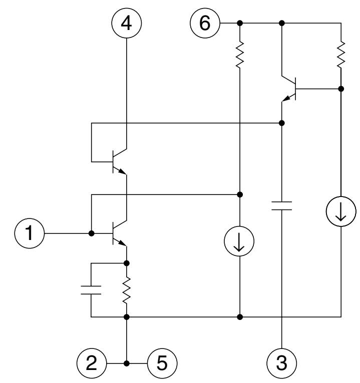
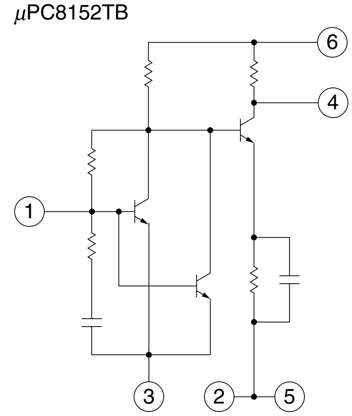
SYSTEM APPLICATION EXAMPLE

EXAMPLE OF DIGITAL CELLULER TELEPHONE



These ICs can be added to your system around ▲ parts, when you need more isolation or gain. The application herein, however, shows only examples, therefore the application can depend on your kit evaluation.

PIN EXPLANATION

Pin No.	Pin Name	Applied Voltage (V)	Pin Voltage (V)[Note]	Function and Applications	Internal Equivalent Circuit
1	INPUT	–	0.90 1.06 0.80	Signal input pin. A internal matching circuit, configured with resistors, enables 50 Ω connection over a wide band. This pin must be coupled to signal source with capacitor for DC cut.	μPC8128TB, μPC8151TB  μPC8152TB 
2 3 5	GND	0	–	Ground pin. This pin should be connected to system ground with minimum inductance. Ground pattern on the board should be formed as wide as possible. All the ground pins must be connected together with wide ground pattern to decrease impedance defference.	
4	OUTPUT	voltage as same as V_{CC} through external inductor	–	Signal output pin. This pin is designed as collector output. Due to the high impedance output, this pin should be externally equipped with LC matching circuit to next stage. For L, a size 1005 chip in-ductor can be chosen.	
6	V_{CC}	2.4 to 3.3	–	Power supply pin. This pin should be externally equipped with bypass capacitor to minimize its inpedance.	

Note Pin voltage is measured at V_{CC} = 3.0 V. Above: μPC8128TB, Center: μPC8151TB, Below: μPC8152TB

ABSOLUTE MAXIMUM RATINGS

	Parameter	Symbol	Conditions	Ratings	Unit
	Supply Voltage	V_{CC}	T_A = +25°C, Pin 4, Pin 6	3.6	V
	Circuit Current	I_{CC}	T_A = +25°C	15	mA
★	Power Dissipation	P_D	Mounted on double-sided copper clad 50 × 50 × 1.6 mm epoxy glass PWB, T_A = +85°C	270	mW
	Operating Ambient Temperature	T_A		–40 to +85	°C
	Storage Temperature	T_{stg}		–55 to +150	°C
	Input Power	P_{in}	T_A = +25 °C	+5	dBm

RECOMMENDED OPERATING RANGE

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Remark
Supply Voltage	V_{CC}	2.4	3.0	3.3	V	The same voltage should be applied to pin 4 and pin 6.
Operating Frequency	f_{opt}	0.1	–	1.9	GHz	Matched output port with external LC

ELECTRICAL CHARACTERISTICS
(Unless otherwise specified, T_A = +25°C, V_{CC} = V_{out} = 3.0 V, Z_S = Z_L = 50 Ω, at LC matched frequency)

Parameter	Symbol	Conditions	μPC8128TB			μPC8151TB			μPC8152TB			Unit
			MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Circuit Current	I_{CC}	No signal	1.8	2.8	3.8	2.8	4.2	5.8	4.2	5.6	7.1	mA
Power Gain	G_P	f = 1.00 GHz f = 1.66 GHz f = 1.90 GHz	9.5 10 10	12.5 13 13	14.5 15 15	9.5 12 12	12.5 15 15	14.5 17 17	20 16.5 14.5	23 19.5 17.5	25 21.5 19.5	dB
Isolation	ISL	f = 1.00 GHz f = 1.66 GHz f = 1.90 GHz	34 34 32	39 39 37	– – –	33 31 29	38 36 34	– – –	35 32 30	40 36 35	– – –	dB
Gain 1 dB Compression Output Power	$P_{O(1\ dB)}$	f = 1.00 GHz f = 1.66 GHz f = 1.90 GHz	–7.5 –8.5 –8.5	–4.0 –4.0 –4.0	– – –	–1.0 –2.5 –3.0	+2.5 +1.5 +0.5	– – –	–7.5 –11.5 –11.5	–4.5 –8.5 –8.5	– – –	dBm
Saturated Output Power[Note] (P_{in} = –6 dBm)	$P_{O(sat)}$	f = 1.00 GHz f = 1.66 GHz f = 1.90 GHz	– – –	– – –	– – –	– – –	– – –	– – –	–2.5 –5.5 –7.0	+0.5 –2.5 –3.0	– – –	dB
Noise Figure	NF	f = 1.00 GHz f = 1.66 GHz f = 1.90 GHz	– – –	6.0 6.0 6.0	7.5 7.5 7.5	– – –	6.0 6.0 6.0	7.5 7.5 7.5	– – –	3.5 4.0 4.5	5.0 5.5 6.0	dB
Input Return Loss (without matching circuit)	RL_{in}	f = 1.00 GHz f = 1.66 GHz f = 1.90 GHz	2 2 2.5	5 5 5.5	– – –	2 1 1	5 4 4	– – –	8.5 7.5 8.5	11.5 10.5 11.5	– – –	dB

Note Saturated output power is specified only in μPC8152TB which has flat saturated region.

STANDARD CHARACTERISTICS
(Unless otherwise specified, T_A = +25°C, V_{CC} = V_{out} = 3.0 V, Z_S = Z_L = 50 Ω, at LC matched frequency)

Parameter	Symbol	Conditions	Reference Value			Unit
			μPC8128TB	μPC8151TB	μPC8152TB	
Output Return Loss (with external matching circuit)	RL_{out}	f = 1.00 GHz f = 1.66 GHz f = 1.90 GHz	10 25 14	10 18 12	15 7.5 7	dB
3rd Order Intermodulation Distortion	IM_3	f_1 = 1.000 GHz, f_2 = 1.001 GHz, $P_{O(each)}$ = –20 dBm f_1 = 1.660 GHz, f_2 = 1.661 GHz, $P_{O(each)}$ = –20 dBm f_1 = 1.900 GHz, f_2 = 1.901 GHz, $P_{O(each)}$ = –20 dBm	–50 –46 –46	–62 –56 –54	–51 –43 –42	dBc

TEST CIRCUIT

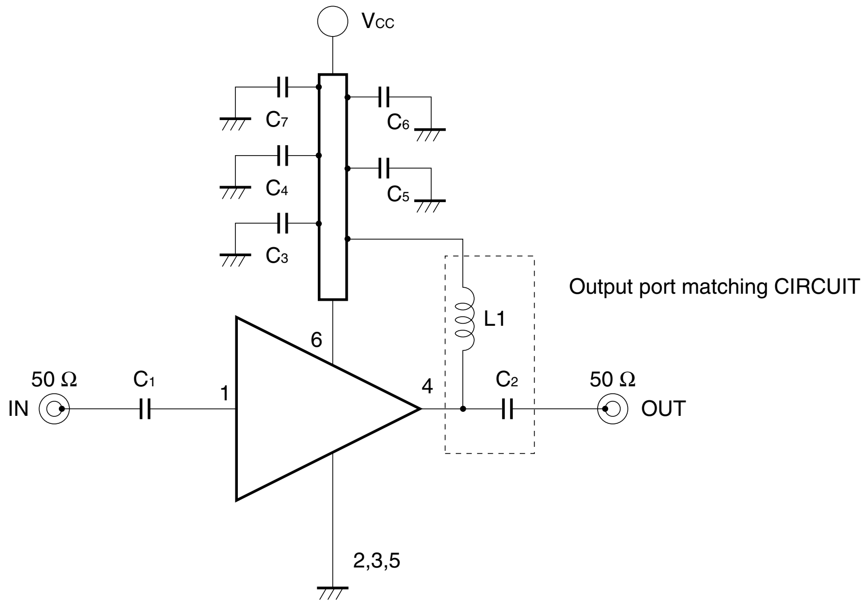
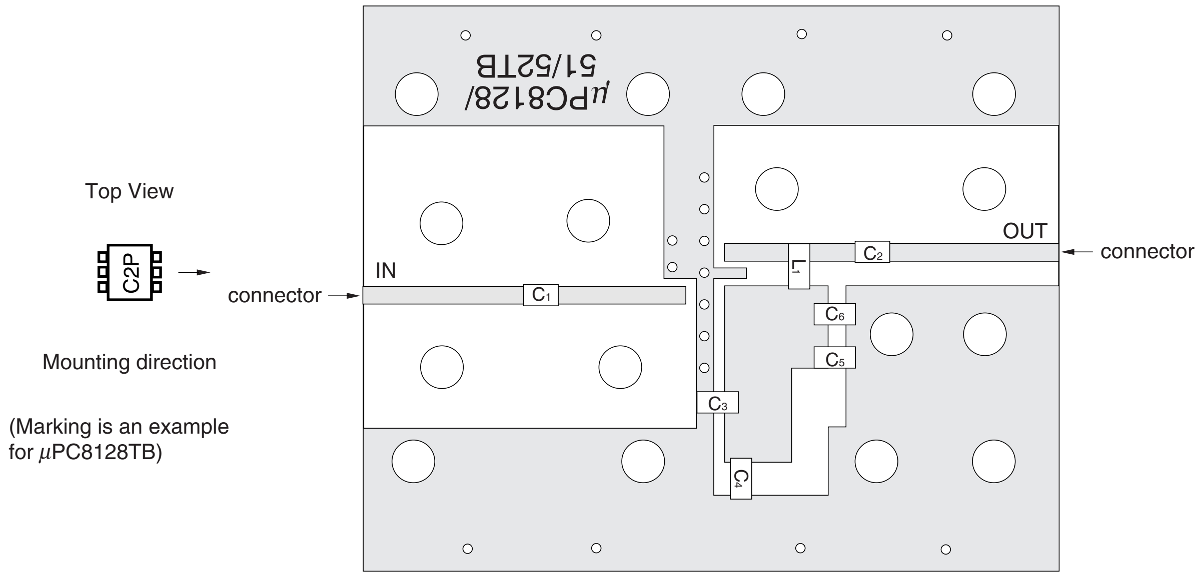


ILLUSTRATION OF THE TEST CIRCUIT ASSEMBLED ON EVALUATION BOARD

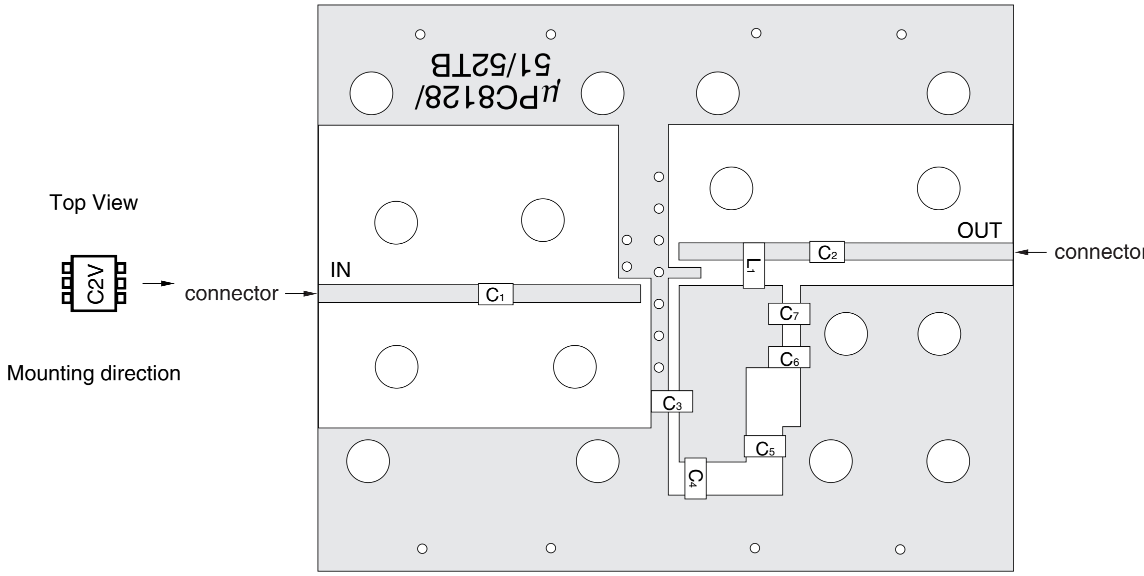
μPC8128TB/μPC8151TB



COMPONENT LIST

	1.0 GHz output port matching	1.66 GHz output port matching	1.9 GHz output port matching
C_1, C_3 to C_6	1 000 pF	1 000 pF	1 000 pF
C_2	1.0 pF	0.75 pF	0.75 pF
L_1	8.2 nH	3.3 nH	2.2 nH

μPC8152TB



COMPONENT LIST

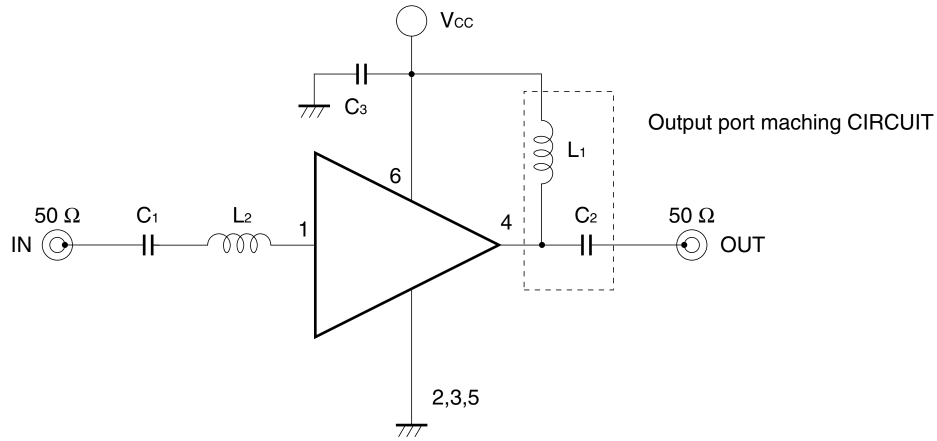
	1.0 GHz output port matching	1.66 GHz output port matching	1.9 GHz output port matching
C_1, C_3 to C_7	1 000 pF	1 000 pF	1 000 pF
C_2	1.5 pF	1.0 pF	1.5 pF
L_1	8.2 nH	1.8 nH	1.2 nH

Notes

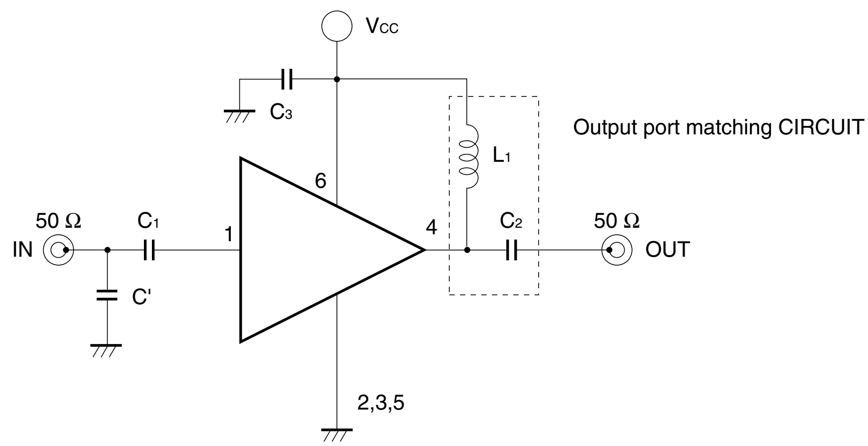
1. 42 × 35 × 0.4 mm double-sided copper clad polyimide board.
2. Back side: GND pattern
3. Solder plated on pattern
4. ○ ◯: Through holes

EXAMPLE OF APPLICATION CIRCUIT (μPC8128TB, μPC8151TB)

In improving RL_{in} of μPC8128TB and μPC8151TB at 1.0 GHz, L_2 should be attached.



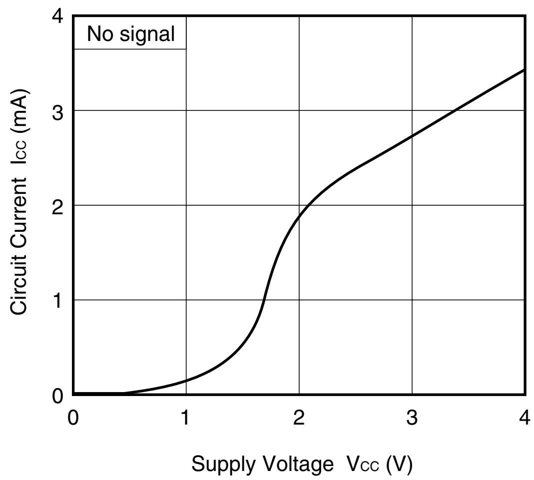
In improving RL_{in} of μPC8128TB and μPC8151TB at 1.66 GHz to 1.9 GHz, C' should be attached.



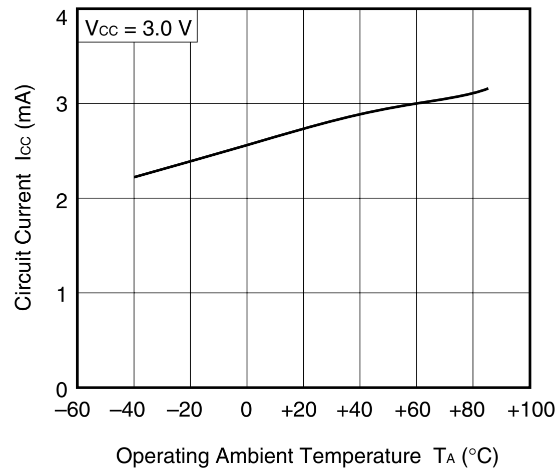
TYPICAL CHARACTERISTICS (Unless otherwise specified, T_A = +25°C)

– μPC8128TB –

CIRCUIT CURRENT vs. SUPPLY VOLTAGE



CIRCUIT CURRENT vs. OPERATING AMBIENT TEMPERATURE

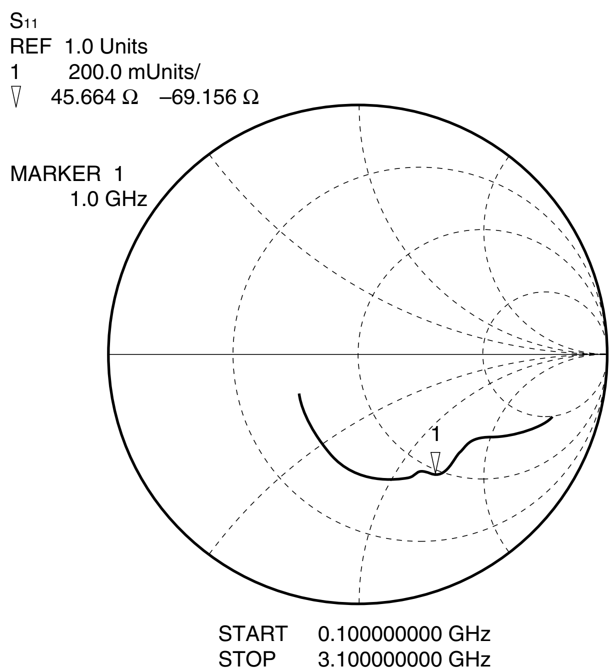


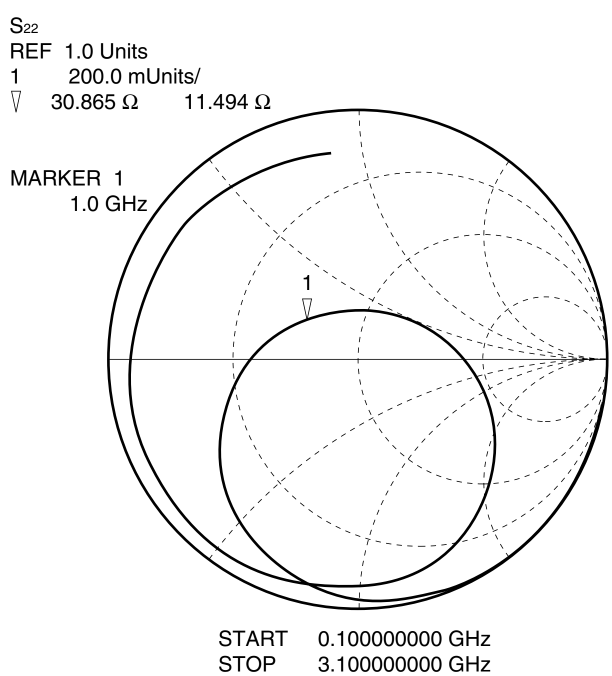
– μPC8128TB –

1.0 GHz output port matching

S-PARAMETERS (monitored at connector on board)

T_A = +25°C, V_{CC} = V_{out} = 3.0 V

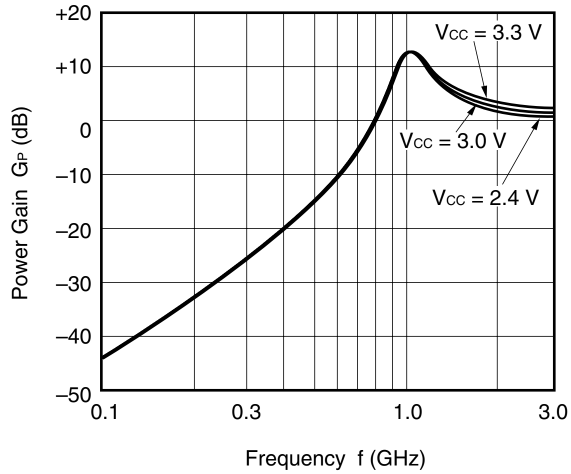




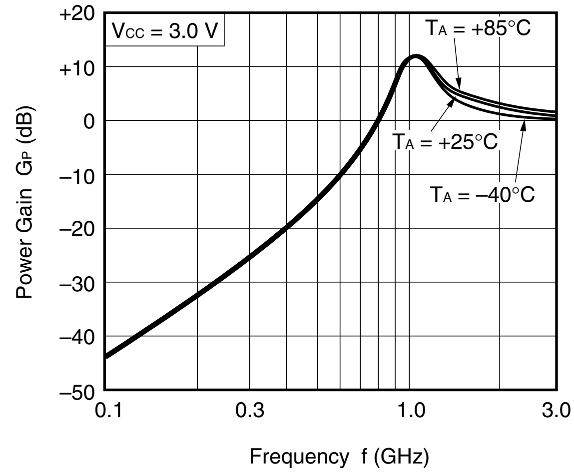
– μPC8128TB –

1.0 GHz output port matching

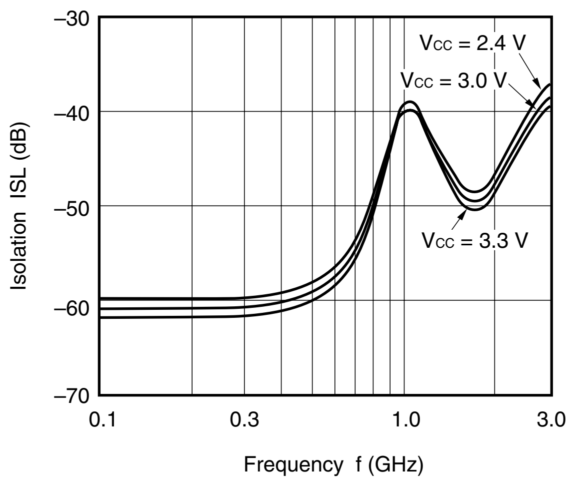
POWER GAIN vs. FREQUENCY



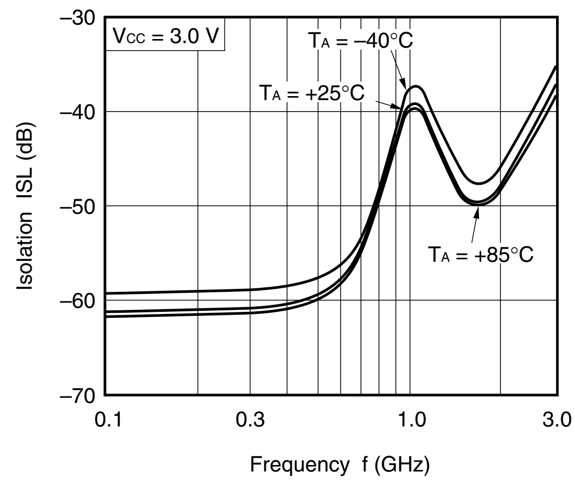
POWER GAIN vs. FREQUENCY



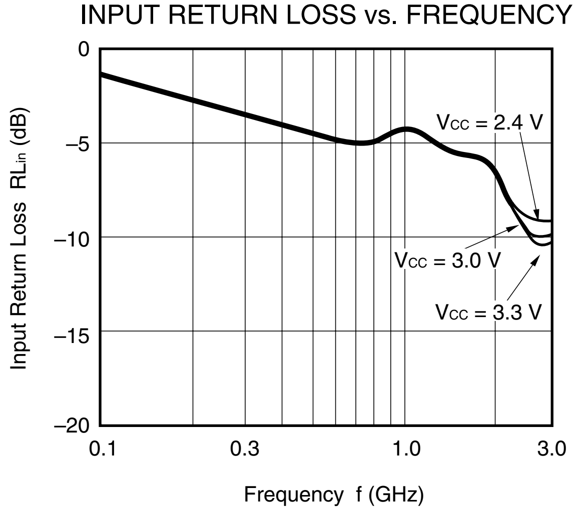
ISOLATION vs. FREQUENCY



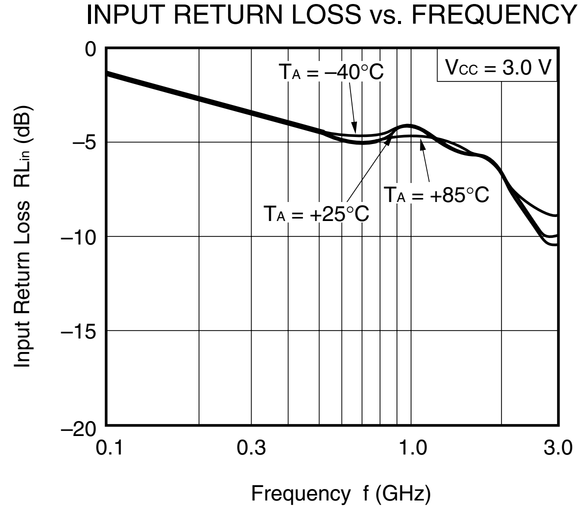
ISOLATION vs. FREQUENCY



INPUT RETURN LOSS vs. FREQUENCY

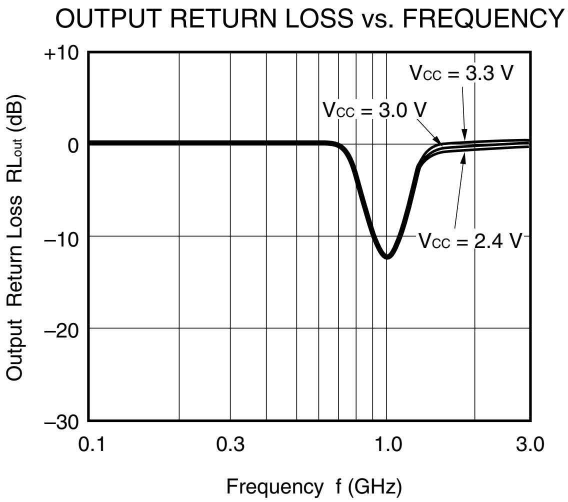


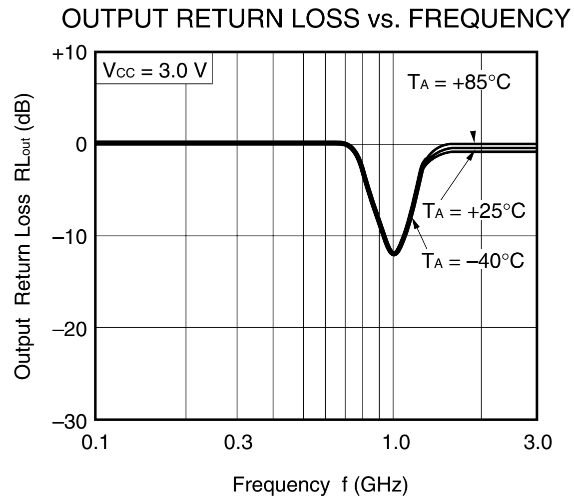
INPUT RETURN LOSS vs. FREQUENCY

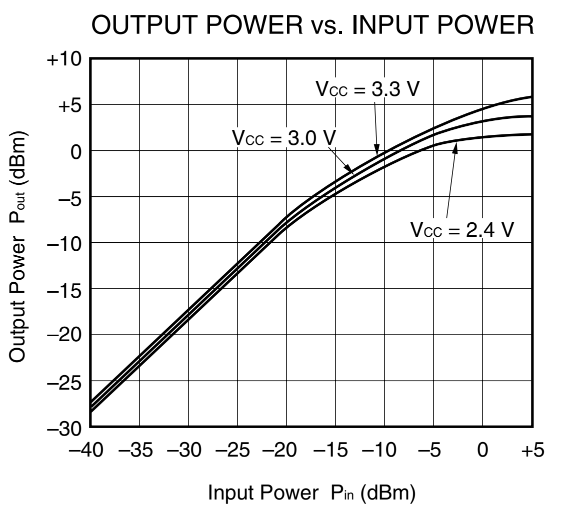


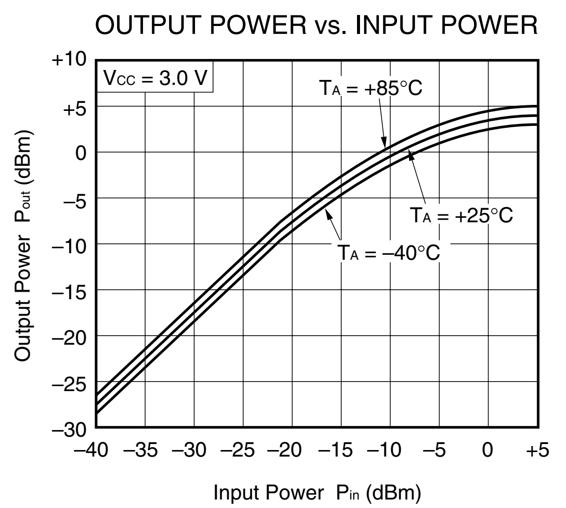
– μPC8128TB –

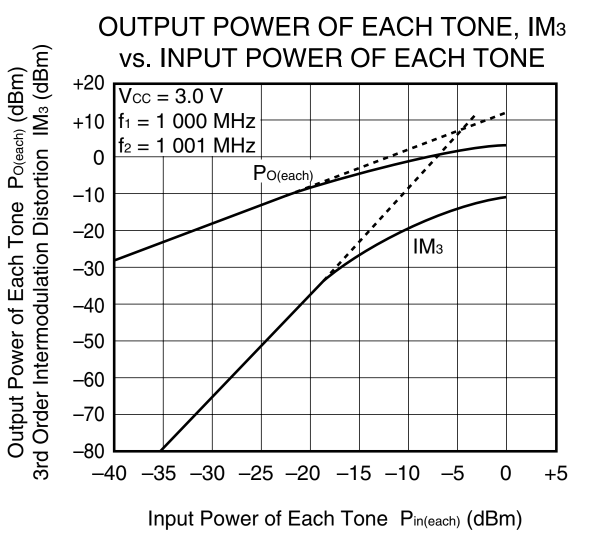
1.0 GHz output port matching

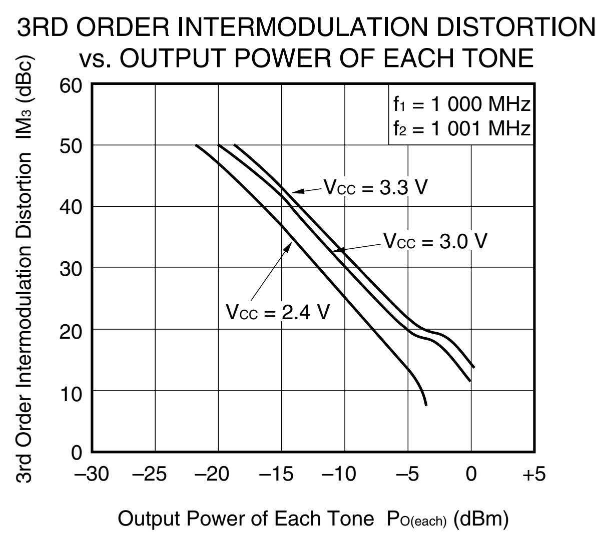






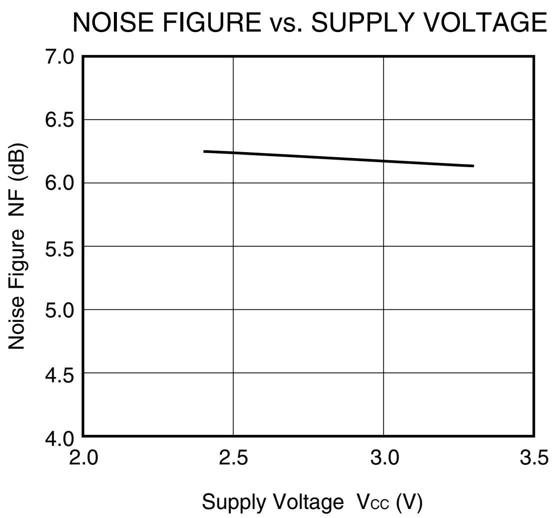






– μPC8128TB –

1.0 GHz output port matching



– μPC8128TB –

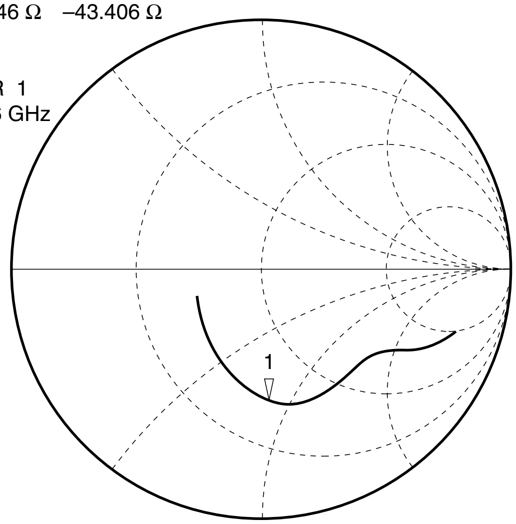
1.66 GHz output port matching

S-PARAMETERS (monitored at connector on board)

T_A = +25°C, V_{CC} = V_{out} = 3.0 V

S_{11}
REF 1.0 Units
1 200.0 mUnits/
▽ 27.846 Ω –43.406 Ω

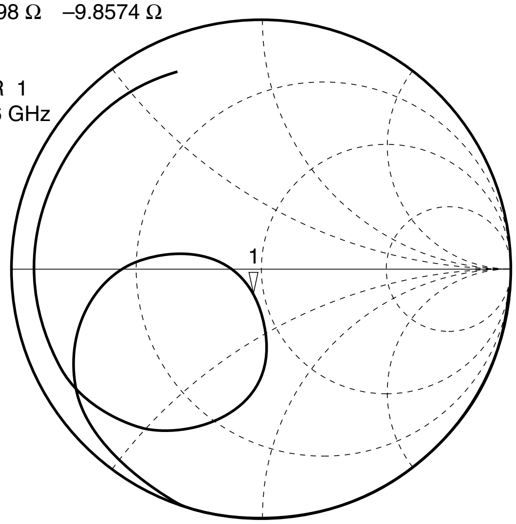
MARKER 1
1.66 GHz



START 0.100000000 GHz
STOP 3.100000000 GHz

S_{22}
REF 1.0 Units
1 200.0 mUnits/
▽ 46.598 Ω –9.8574 Ω

MARKER 1
1.66 GHz

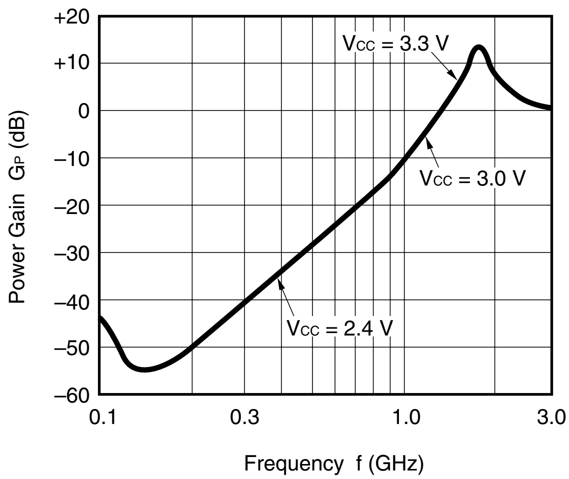


START 0.100000000 GHz
STOP 3.100000000 GHz

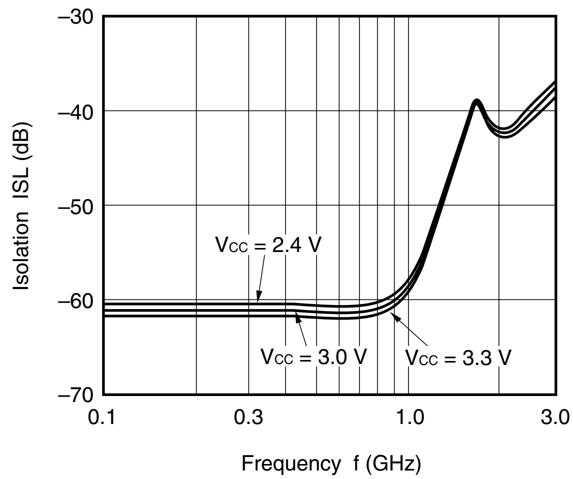
– μPC8128TB –

1.66 GHz output port matching

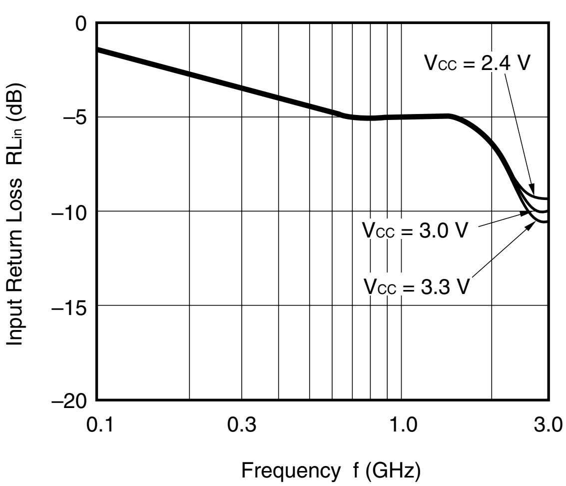
POWER GAIN vs. FREQUENCY



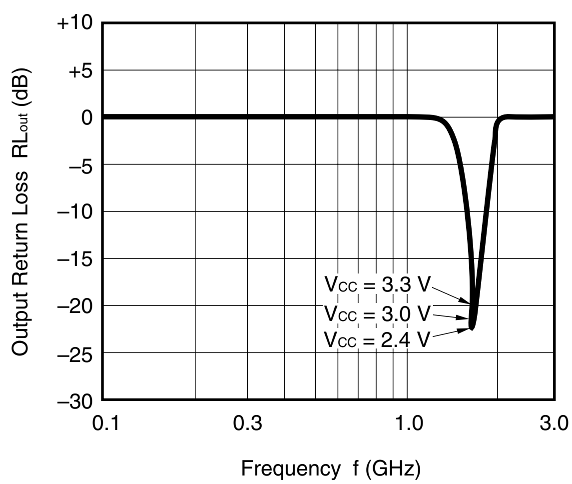
ISOLATION vs. FREQUENCY



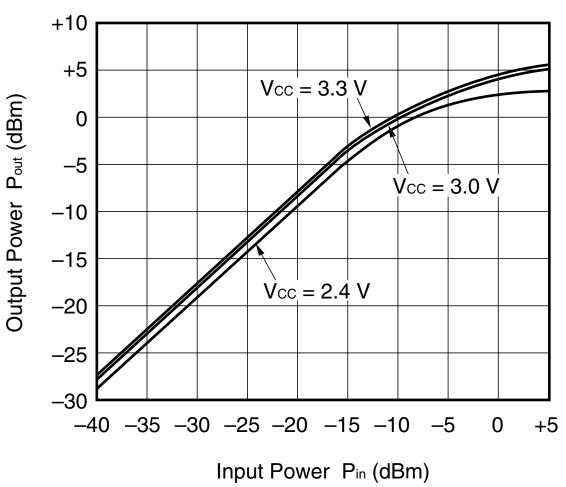
INPUT RETURN LOSS vs. FREQUENCY



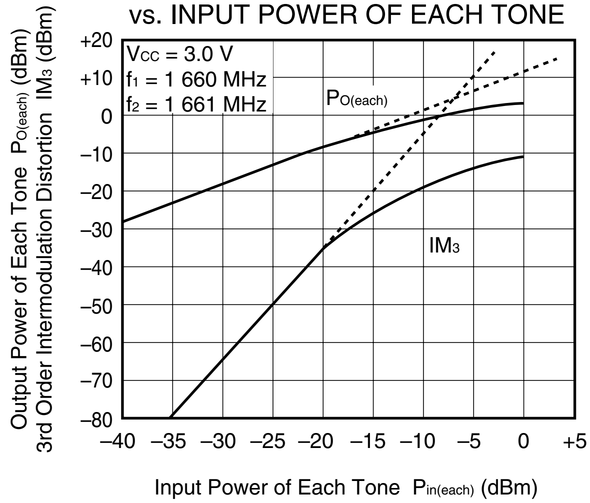
OUTPUT RETURN LOSS vs. FREQUENCY



OUTPUT POWER vs. INPUT POWER

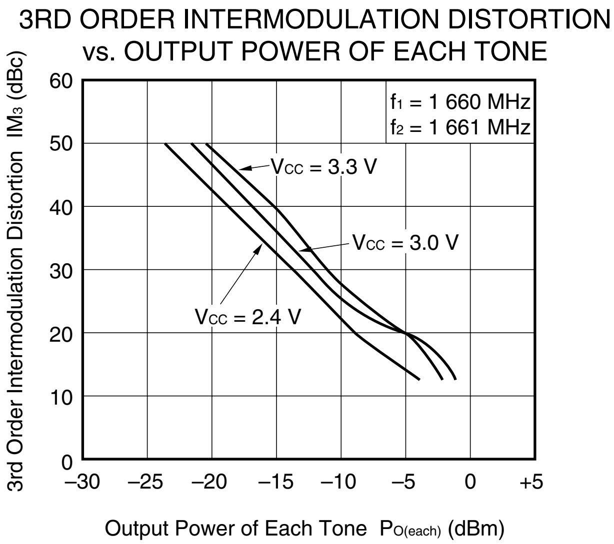


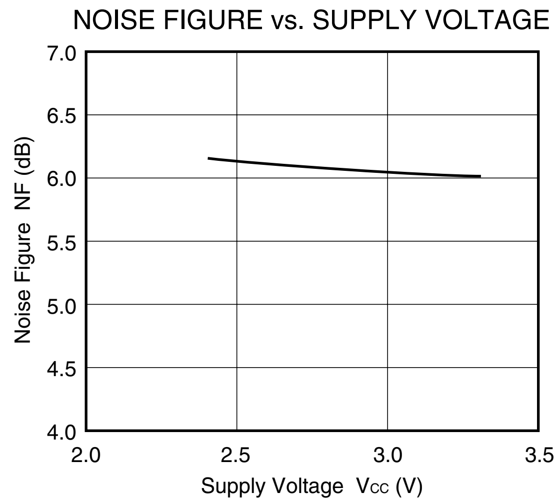
OUTPUT POWER OF EACH TONE, IM3 vs. INPUT POWER OF EACH TONE



– μPC8128TB –

1.66 GHz output port matching





– μPC8128TB –

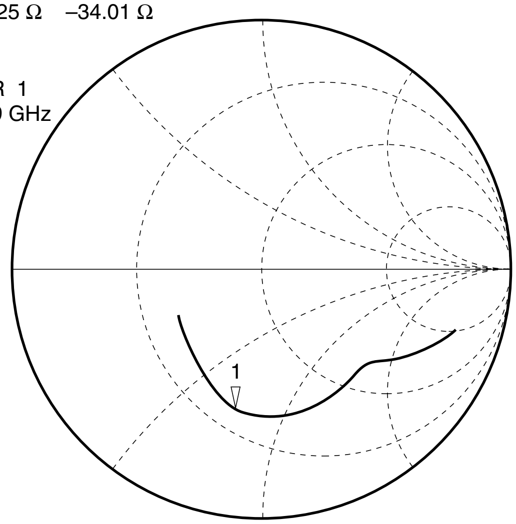
1.9 GHz output port matching

S-PARAMETERS (monitored at connector on board)

T_A = +25°C, V_{CC} = V_{out} = 3.0 V

S_{11}
REF 1.0 Units
1 200.0 mUnits/
▽ 24.725 Ω –34.01 Ω

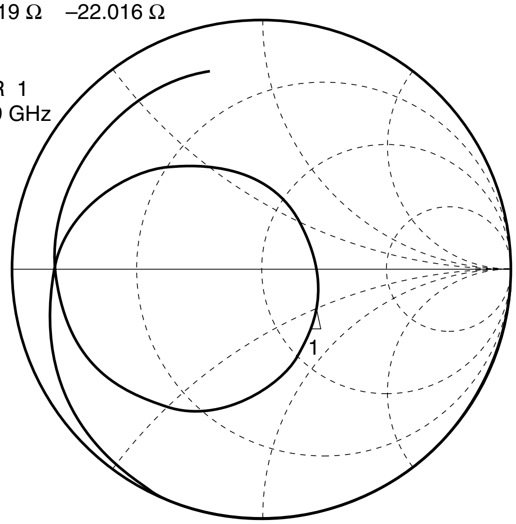
MARKER 1
1.9 GHz



START 0.100000000 GHz
STOP 3.100000000 GHz

S_{22}
REF 1.0 Units
1 200.0 mUnits/
▽ 74.719 Ω –22.016 Ω

MARKER 1
1.9 GHz

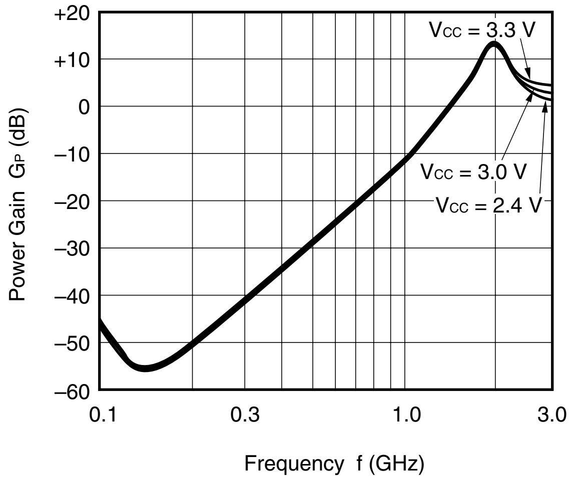


START 0.100000000 GHz
STOP 3.100000000 GHz

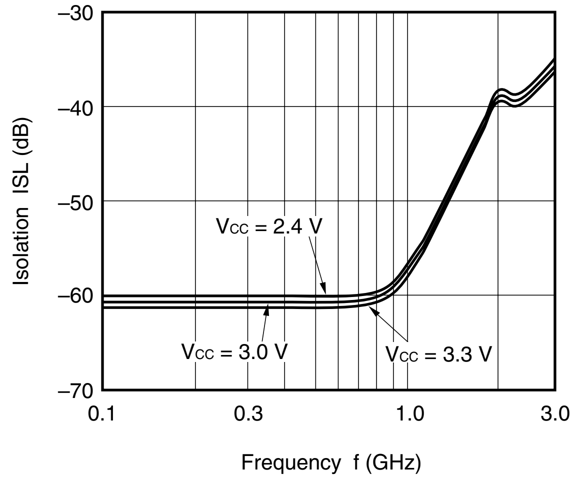
– μPC8128TB –

1.9 GHz output port matching

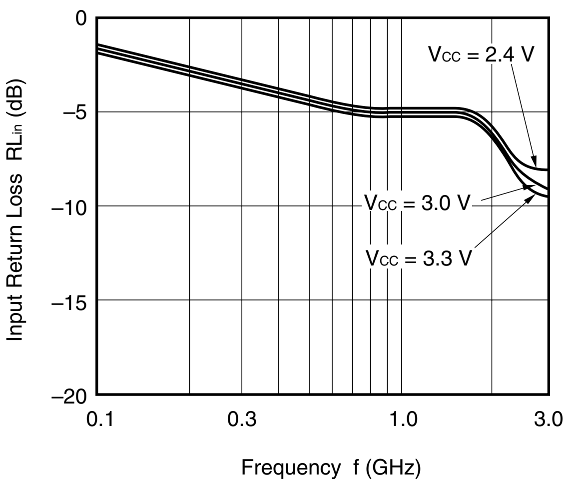
POWER GAIN vs. FREQUENCY



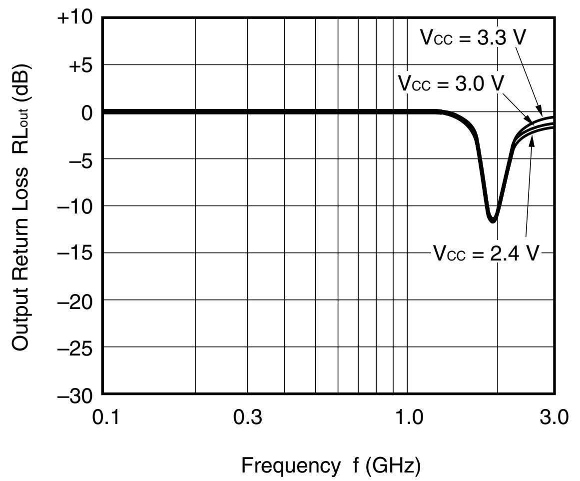
ISOLATION vs. FREQUENCY



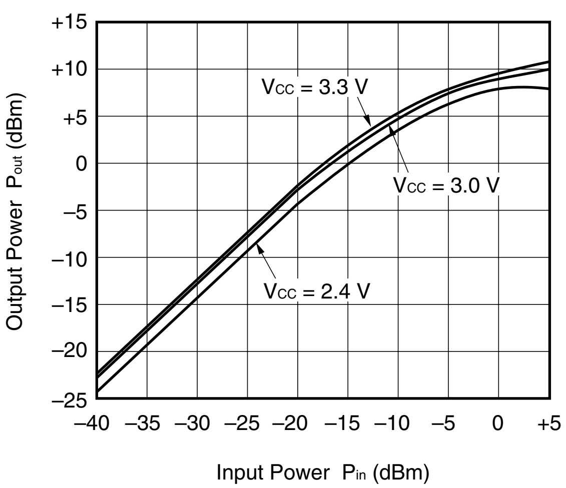
INPUT RETURN LOSS vs. FREQUENCY



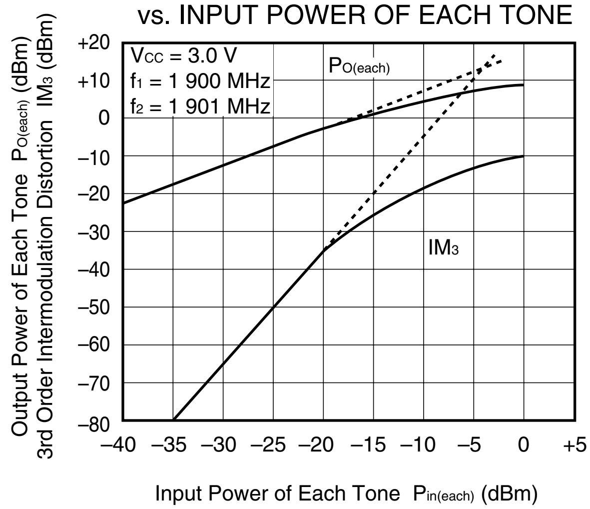
OUTPUT RETURN LOSS vs. FREQUENCY



OUTPUT POWER vs. INPUT POWER

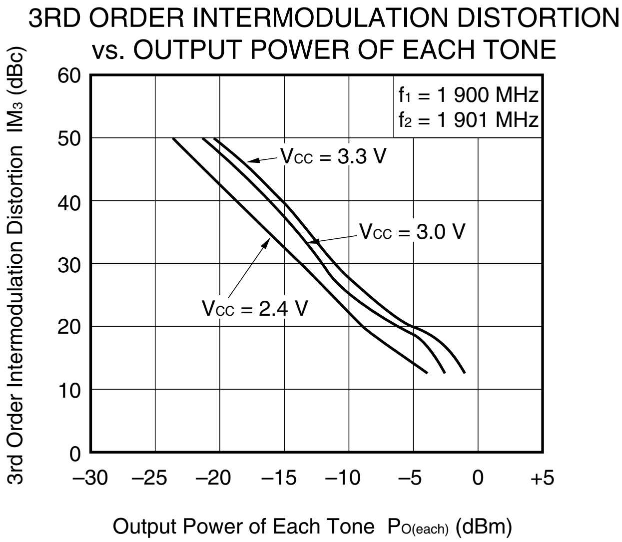


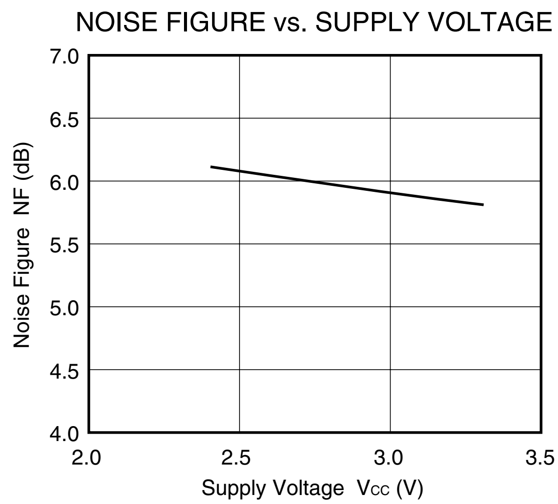
OUTPUT POWER OF EACH TONE, IM3 vs. INPUT POWER OF EACH TONE



– μPC8128TB –

1.9 GHz output port matching

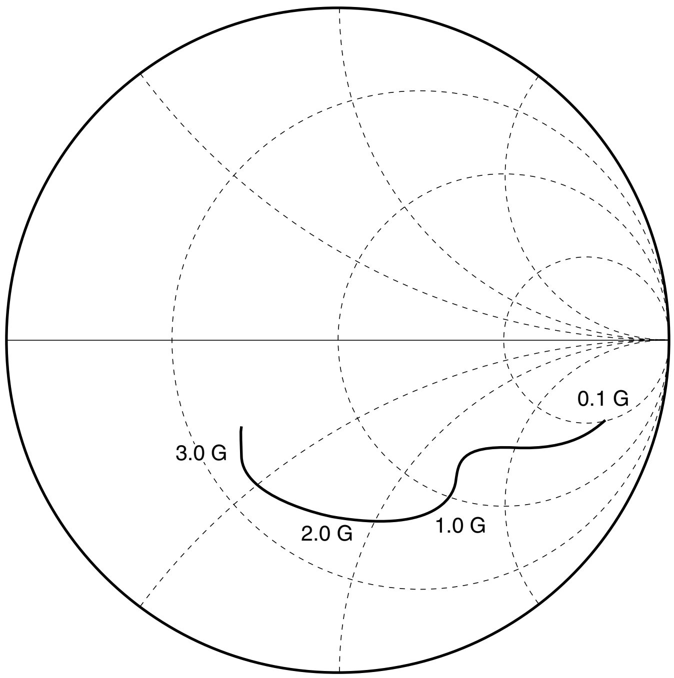




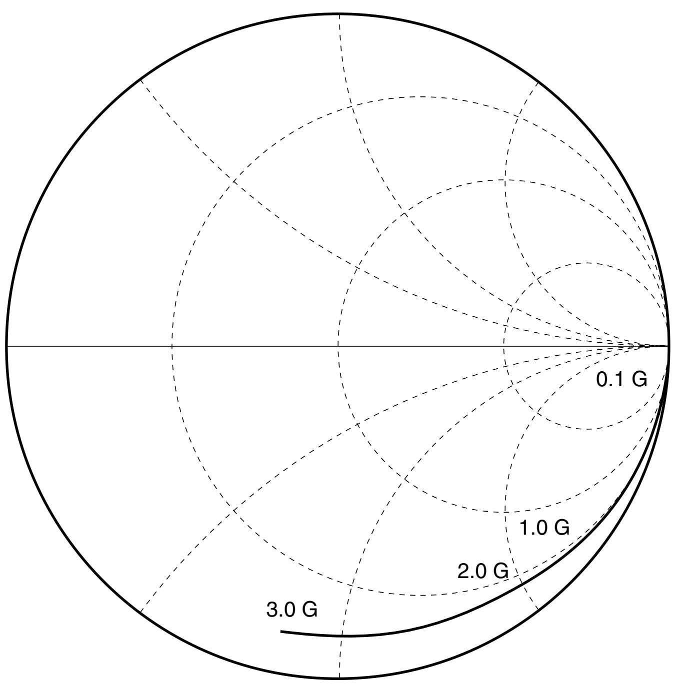
S-PARAMETERS (TA = +25°C, VCC = Vout = 3.0 V)

– μPC8128TB –

S11–Frequency



S22–Frequency



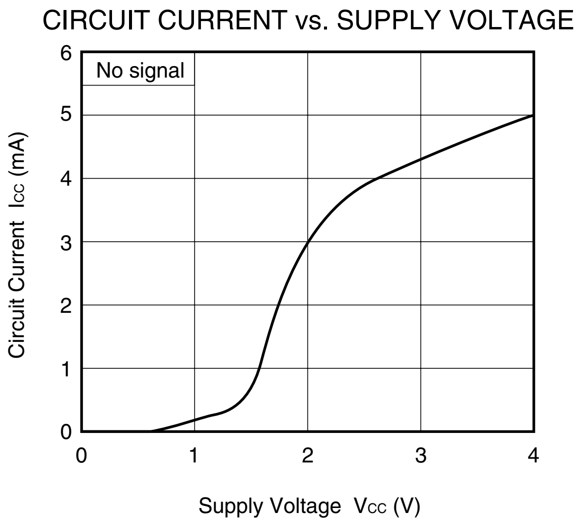
TYPICAL S-PARAMETER VALUES (T_A = +25°C)

μPC8128TB

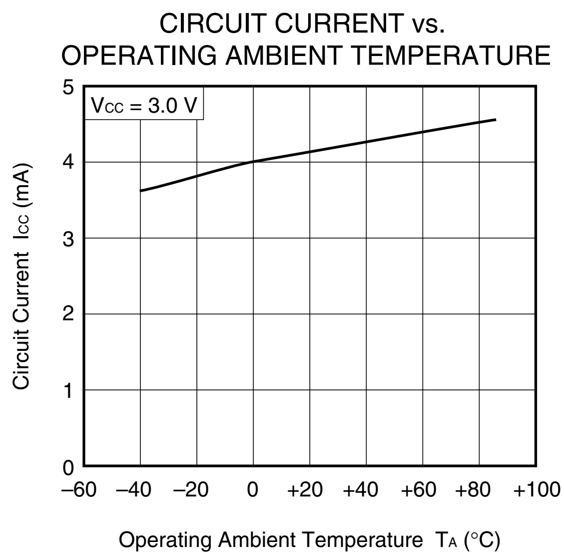
$V_{CC} = V_{out}$ = 3.0 V, I_{CC} = 2.8 mA

FREQUENCY	S11		S21		S12		S22	
MHz	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100.0000	0.859	–14.5	1.089	–176.0	0.001	176.7	1.005	–1.7
200.0000	0.769	–23.8	1.138	–173.2	0.001	142.6	1.019	–4.2
300.0000	0.694	–27.1	1.208	–171.0	0.003	112.3	1.015	–5.8
400.0000	0.637	–30.1	1.336	–171.7	0.005	88.8	0.996	–8.7
500.0000	0.595	–32.4	1.478	–172.8	0.005	77.7	0.976	–10.9
600.0000	0.568	–35.9	1.623	–175.6	0.005	64.1	0.976	–12.8
700.0000	0.555	–40.7	1.822	–179.0	0.006	73.7	0.983	–14.1
800.0000	0.569	–45.0	1.955	176.9	0.007	64.2	0.988	–15.5
900.0000	0.597	–49.4	2.147	172.5	0.007	72.5	0.973	–17.4
1000.0000	0.633	–52.6	2.307	166.8	0.008	49.9	0.945	–19.9
1100.0000	0.643	–56.3	2.468	160.6	0.008	66.8	0.928	–22.0
1200.0000	0.644	–59.7	2.572	153.6	0.007	48.8	0.934	–24.1
1300.0000	0.611	–64.3	2.677	144.2	0.007	45.3	0.950	–24.8
1400.0000	0.585	–69.5	2.704	137.3	0.005	64.5	0.938	–26.6
1500.0000	0.562	–75.1	2.693	128.8	0.005	66.0	0.913	–28.2
1600.0000	0.559	–80.5	2.712	122.7	0.005	93.6	0.898	–30.1
1700.0000	0.547	–85.4	2.640	116.3	0.006	83.5	0.892	–32.0
1800.0000	0.540	–89.5	2.665	110.4	0.005	101.6	0.893	–33.6
1900.0000	0.524	–93.2	2.599	104.5	0.005	115.4	0.896	–34.7
2000.0000	0.503	–97.8	2.582	98.5	0.006	110.9	0.895	–36.5
2100.0000	0.474	–103.5	2.500	93.1	0.007	129.4	0.877	–38.6
2200.0000	0.461	–110.0	2.472	86.7	0.008	130.5	0.873	–40.4
2300.0000	0.465	–116.2	2.453	80.9	0.009	137.8	0.878	–41.9
2400.0000	0.475	–121.0	2.426	74.8	0.010	133.3	0.877	–43.5
2500.0000	0.488	–123.1	2.364	70.4	0.012	139.0	0.871	–45.4
2600.0000	0.491	–125.0	2.310	63.9	0.011	140.8	0.864	–47.9
2700.0000	0.480	–125.1	2.282	61.1	0.014	142.6	0.855	–51.1
2800.0000	0.460	–127.0	2.159	56.3	0.014	140.7	0.851	–53.0
2900.0000	0.437	–129.4	2.205	51.4	0.016	141.5	0.867	–55.1
3000.0000	0.410	–133.4	2.085	48.8	0.018	143.2	0.861	–57.0
3100.0000	0.401	–137.8	2.038	42.4	0.019	142.1	0.855	–60.0

– μPC8151TB –



CIRCUIT CURRENT vs. SUPPLY VOLTAGE
No signal
Circuit Current ICC (mA)
6
5
4
3
2
1
0
0
1
2
3
4
Supply Voltage VCC (V)



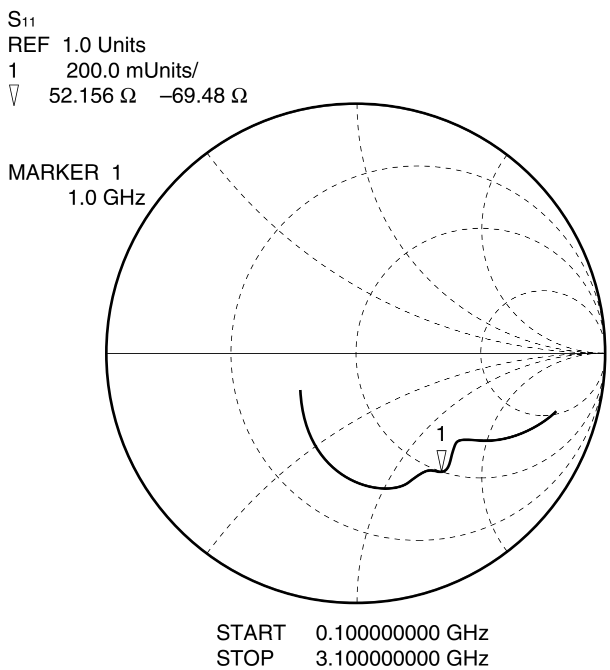
CIRCUIT CURRENT vs.
OPERATING AMBIENT TEMPERATURE
VCC = 3.0 V
Circuit Current ICC (mA)
5
4
3
2
1
0
–60
–40
–20
0
+20
+40
+60
+80
+100
Operating Ambient Temperature TA (°C)

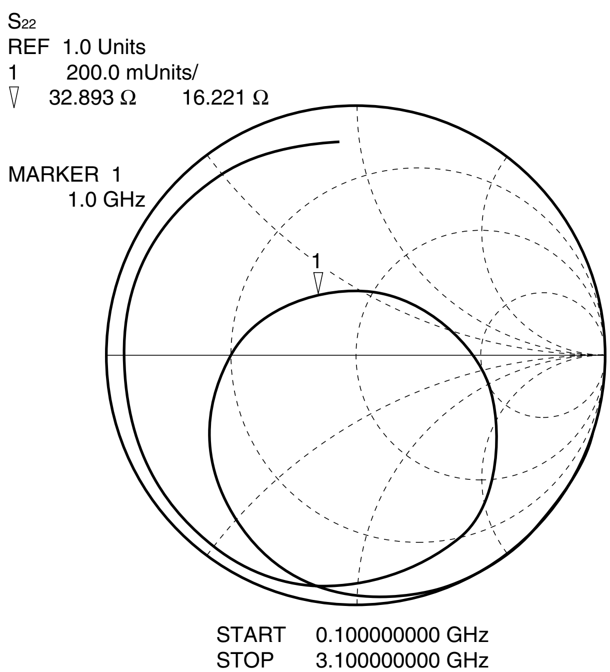
– μPC8151TB –

1.0 GHz output port matching

S-PARAMETERS (monitored at connector on board)

T_A = +25°C, V_{CC} = V_{out} = 3.0 V

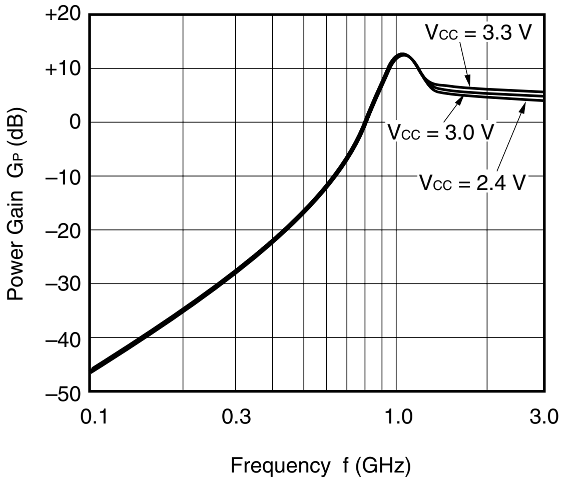




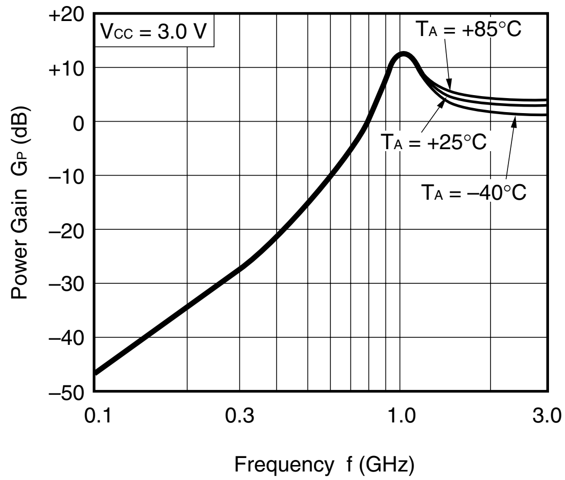
– μPC8151TB –

1.0 GHz output port matching

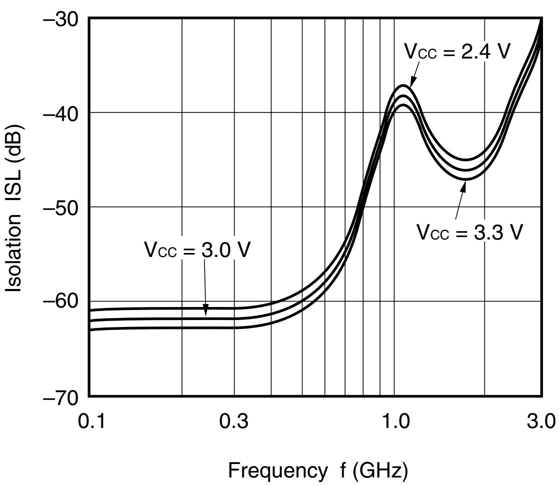
POWER GAIN vs. FREQUENCY



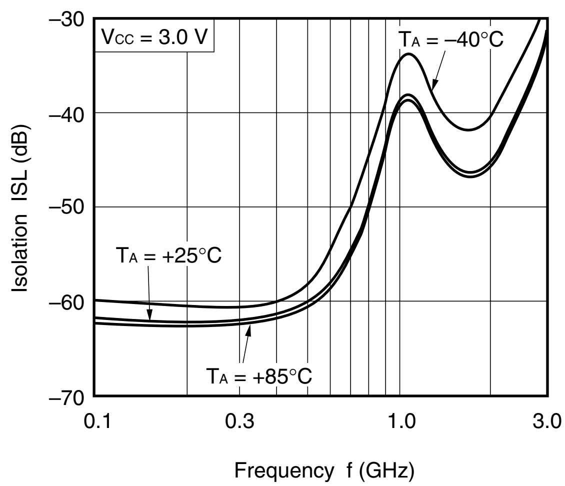
POWER GAIN vs. FREQUENCY



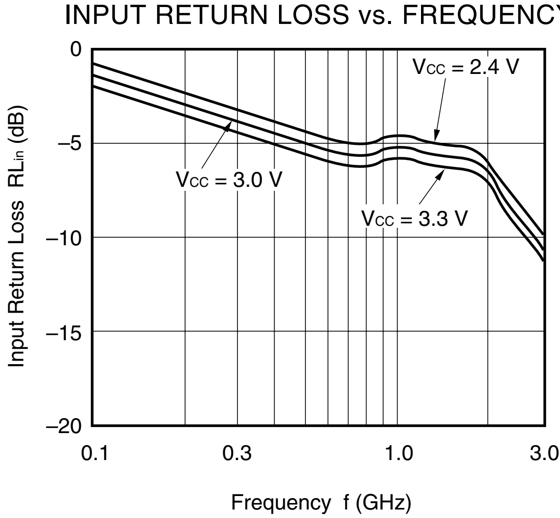
ISOLATION vs. FREQUENCY



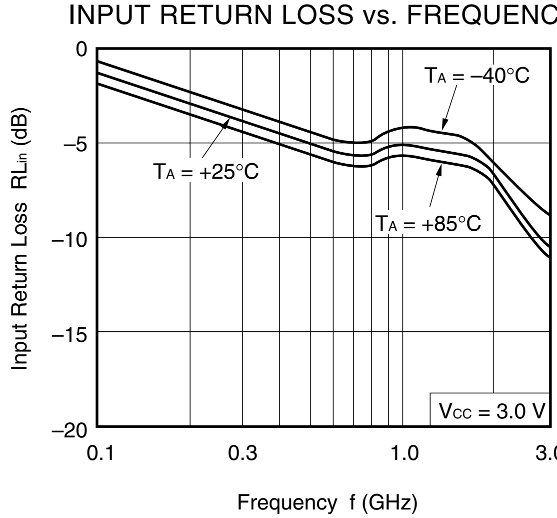
ISOLATION vs. FREQUENCY



INPUT RETURN LOSS vs. FREQUENCY

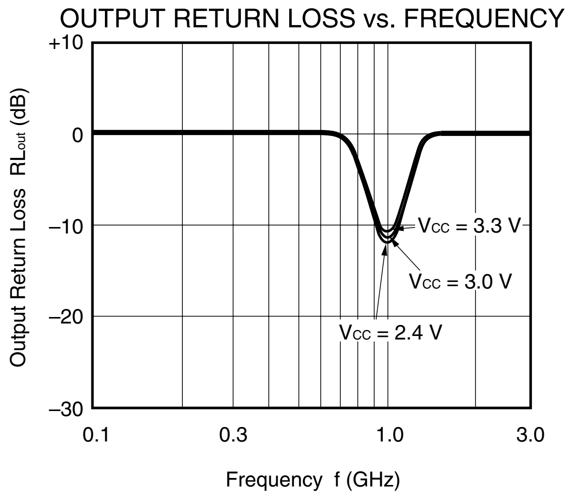


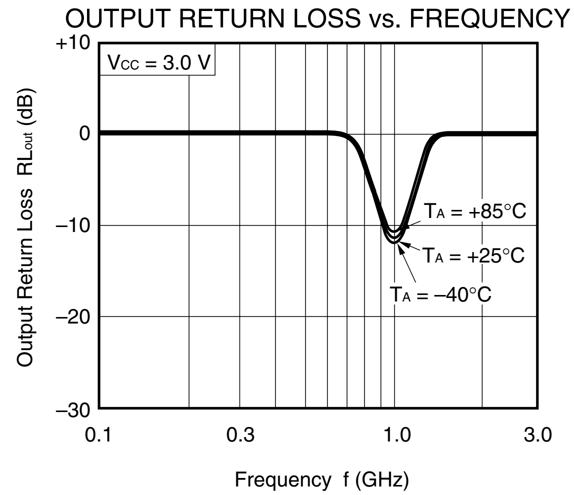
INPUT RETURN LOSS vs. FREQUENCY

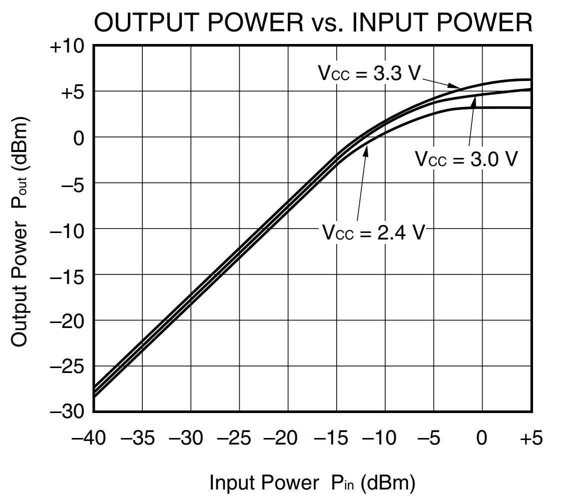


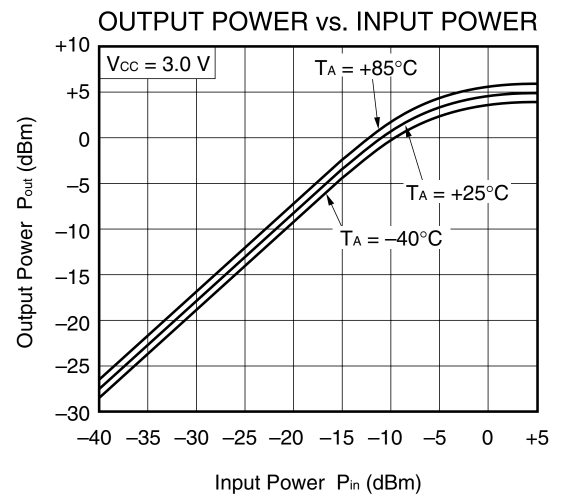
– μPC8151TB –

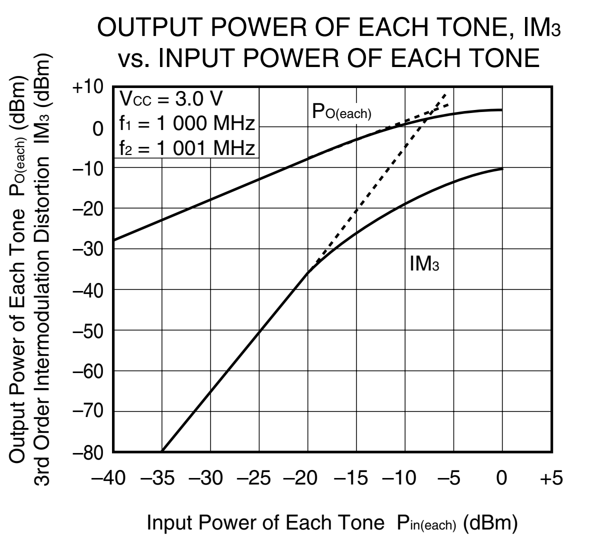
1.0 GHz output port matching

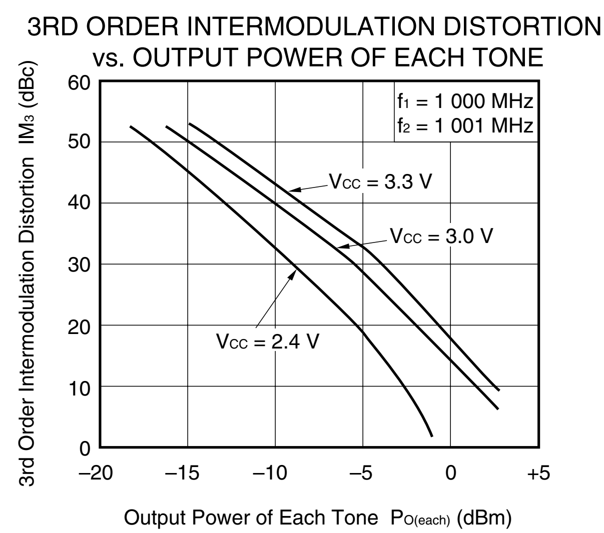






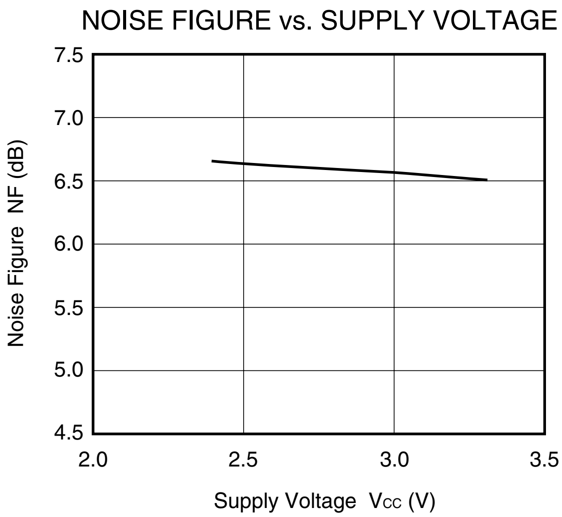






– μPC8151TB –

1.0 GHz output port matching

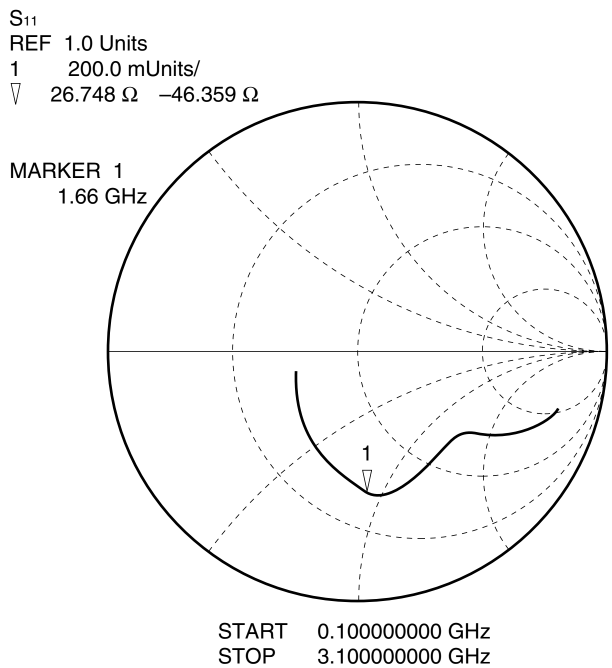


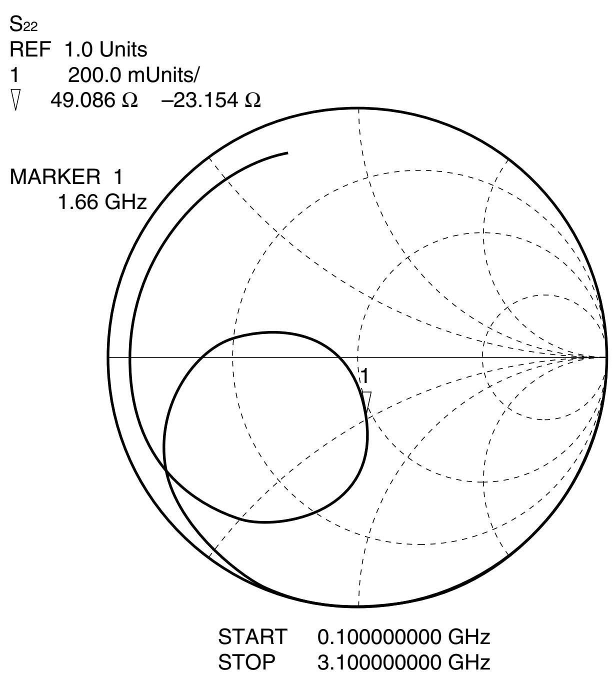
– μPC8151TB –

1.66 GHz output port matching

S-PARAMETERS (monitored at connector on board)

T_A = +25°C, V_{CC} = V_{out} = 3.0 V

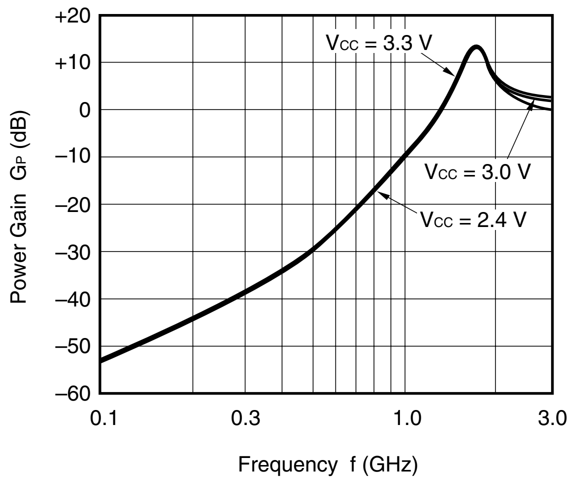




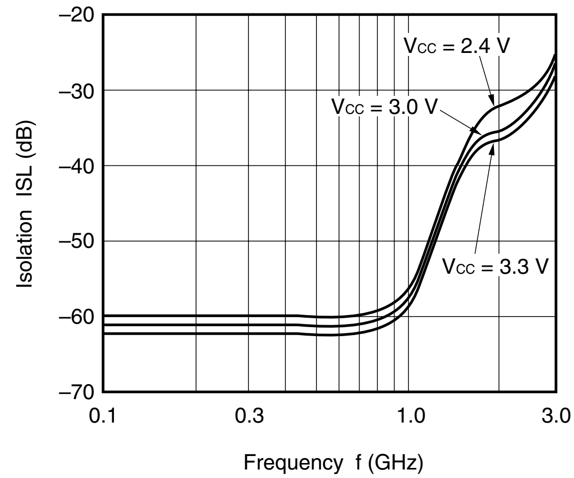
– μPC8151TB –

1.66 GHz output port matching

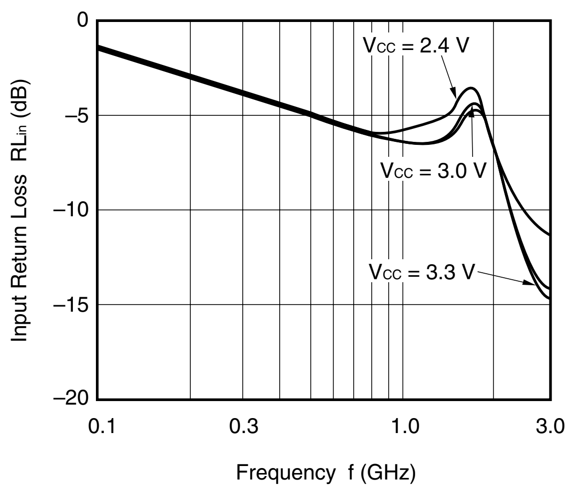
POWER GAIN vs. FREQUENCY



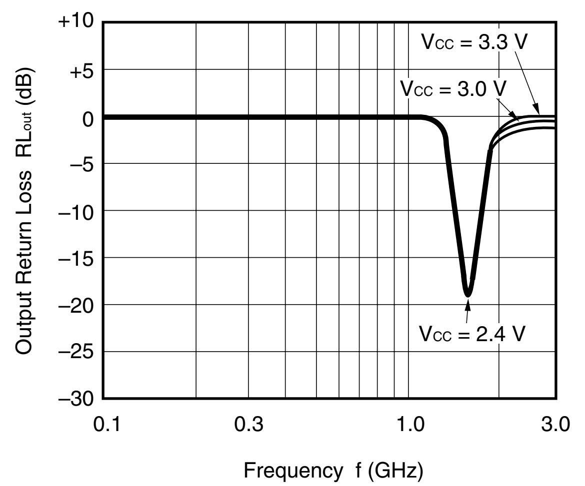
ISOLATION vs. FREQUENCY



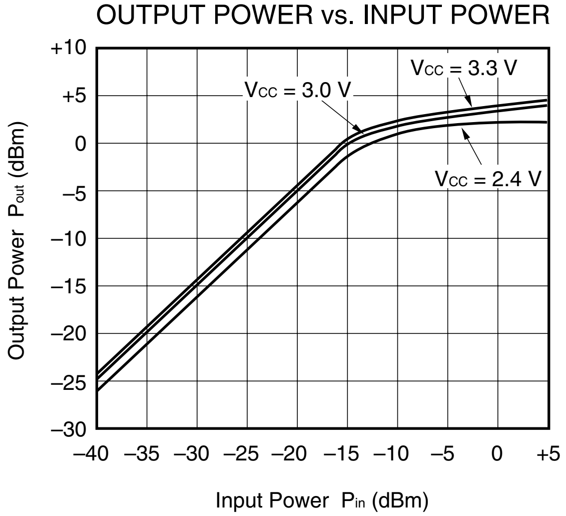
INPUT RETURN LOSS vs. FREQUENCY



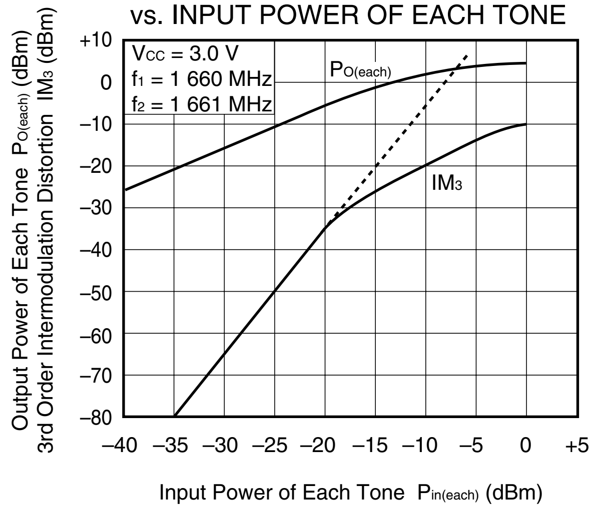
OUTPUT RETURN LOSS vs. FREQUENCY



OUTPUT POWER vs. INPUT POWER

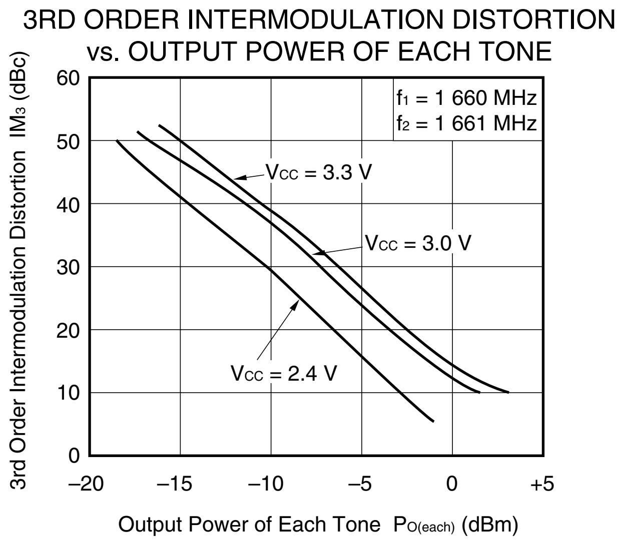


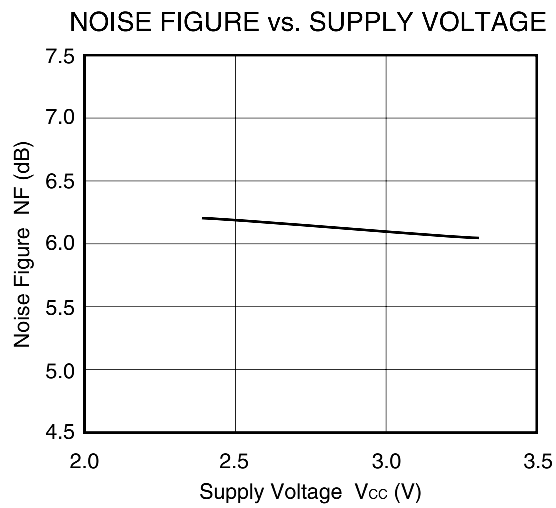
OUTPUT POWER OF EACH TONE, IM3 vs. INPUT POWER OF EACH TONE



– μPC8151TB –

1.66 GHz output port matching





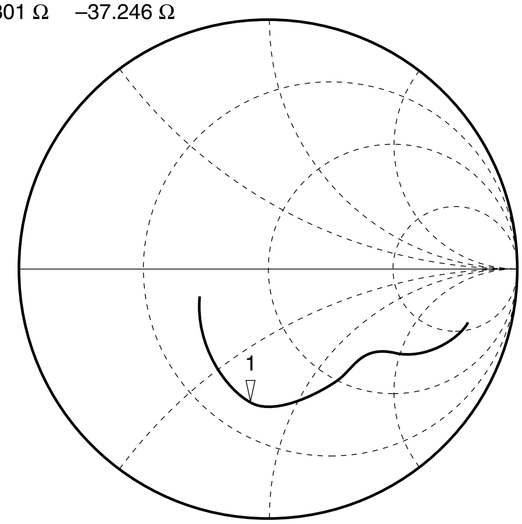
– μPC8151TB –

1.9 GHz output port matching

S-PARAMETERS (monitored at connector on board)

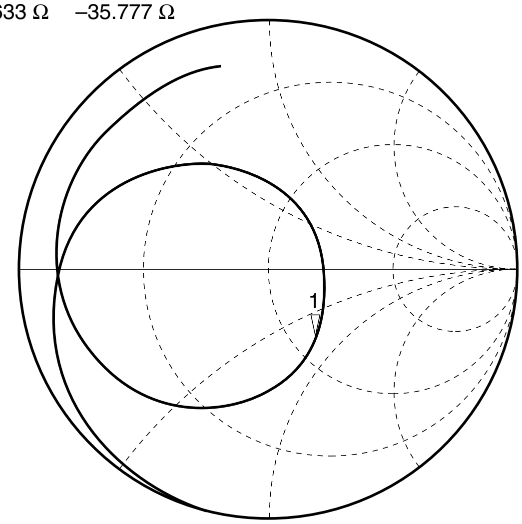
T_A = +25°C, V_{CC} = V_{out} = 3.0 V

S_{11}
REF 1.0 Units
1 200.0 mUnits/
▽ 24.301 Ω –37.246 Ω



START 0.100000000 GHz
STOP 3.100000000 GHz

S_{22}
REF 1.0 Units
1 200.0 mUnits/
▽ 64.633 Ω –35.777 Ω

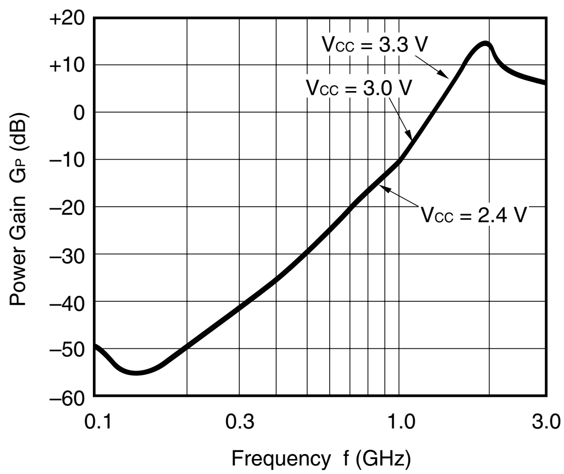


START 0.100000000 GHz
STOP 3.100000000 GHz

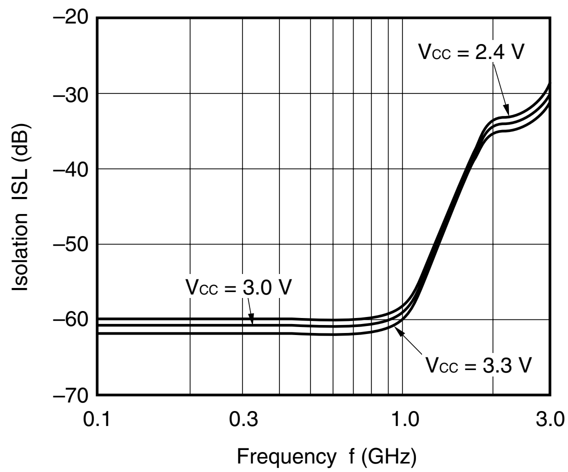
– μPC8151TB –

1.9 GHz output port matching

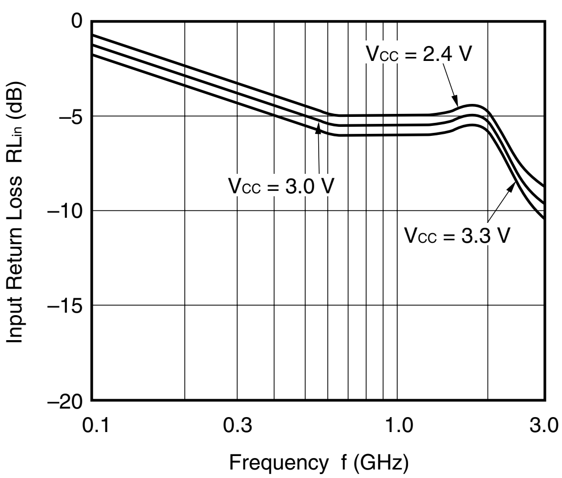
POWER GAIN vs. FREQUENCY



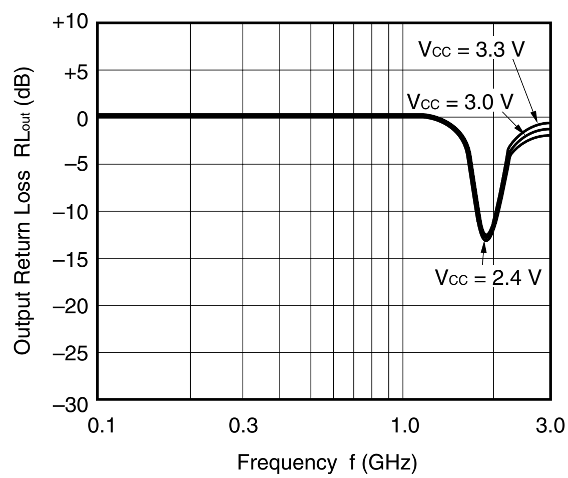
ISOLATION vs. FREQUENCY



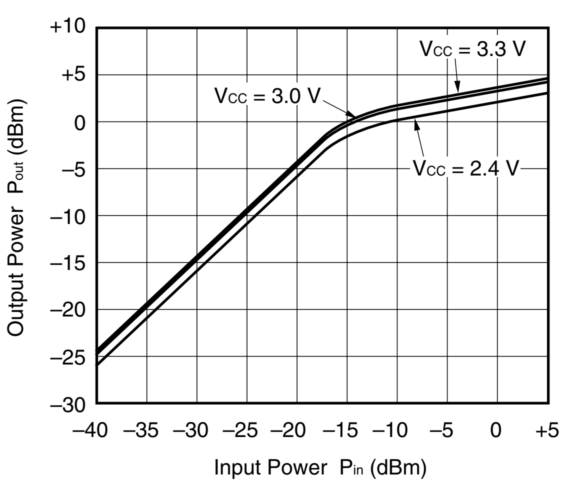
INPUT RETURN LOSS vs. FREQUENCY



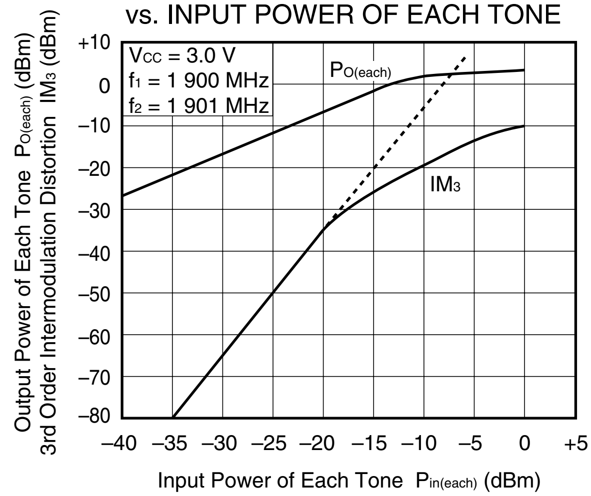
OUTPUT RETURN LOSS vs. FREQUENCY



OUTPUT POWER vs. INPUT POWER

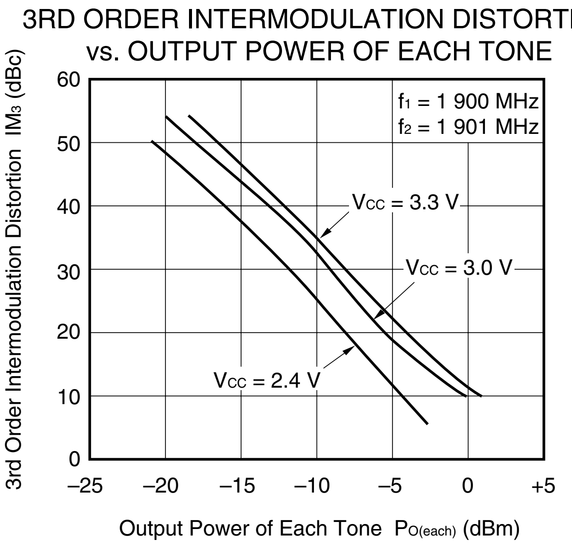


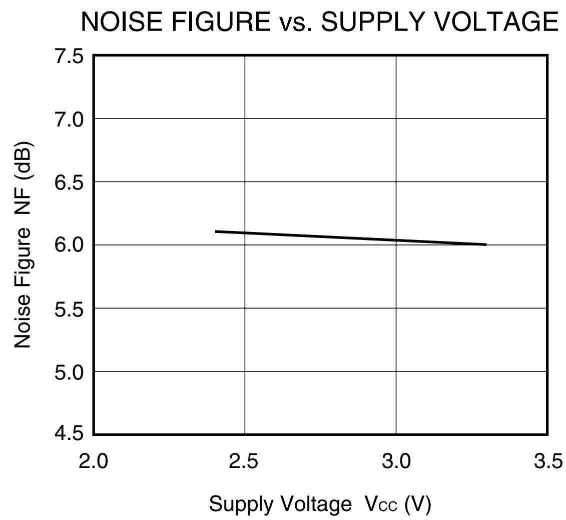
OUTPUT POWER OF EACH TONE, IM3 vs. INPUT POWER OF EACH TONE



– μPC8151TB –

1.9 GHz output port matching

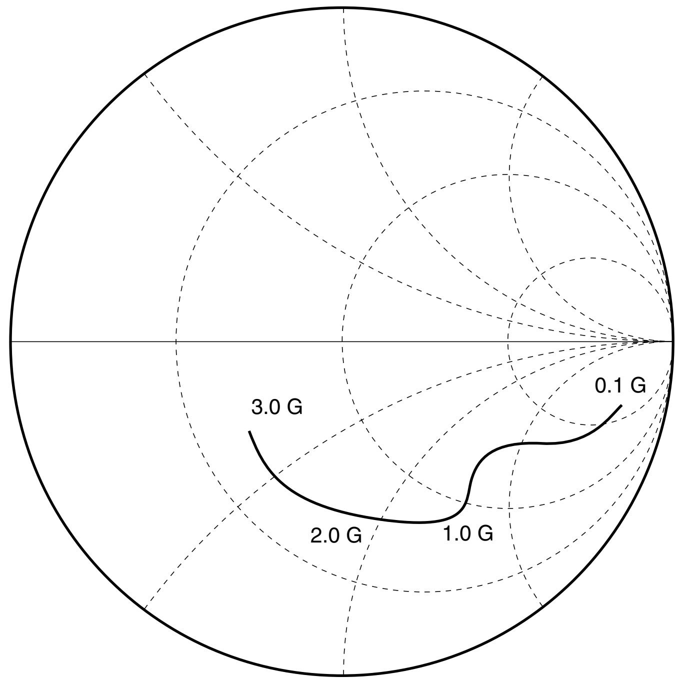




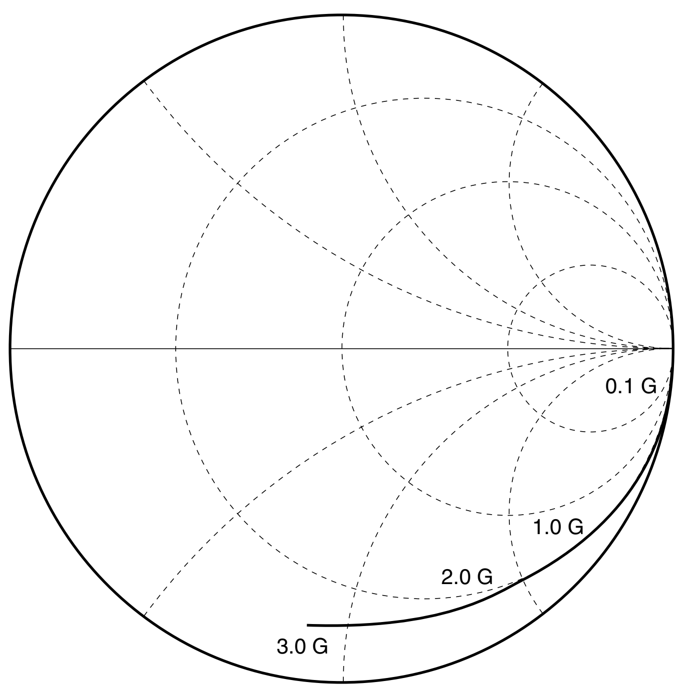
S-PARAMETERS (T$_A$ = +25°C, V$_{CC}$ = V$_{out}$ = 3.0 V)

– μPC8151TB –

S$_{11}$–Frequency



S$_{22}$–Frequency



TYPICAL S-PARAMETER VALUES (T_A = +25°C)

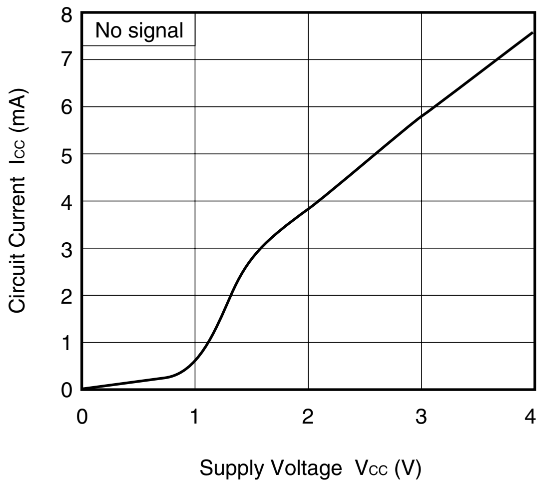
μPC8151TB

$V_{CC} = V_{out}$ = 3.0 V, I_{CC} = 4.2 mA

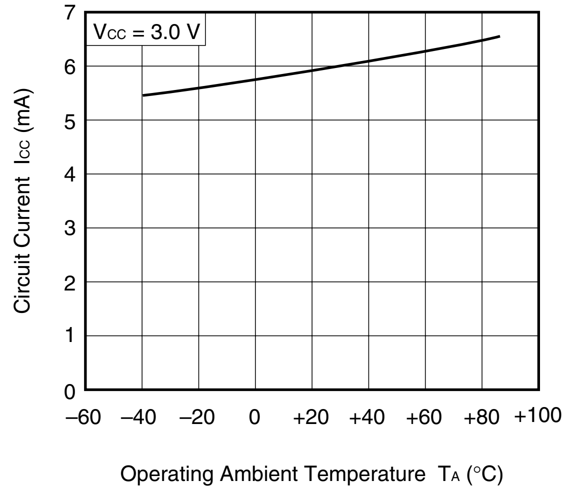
FREQUENCY	S11		S21		S12		S22	
MHz	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100.0000	0.843	–16.0	1.202	–178.9	0.000	69.5	0.996	–3.3
200.0000	0.752	–27.1	1.197	–177.5	0.003	120.2	1.009	–6.9
300.0000	0.666	–32.4	1.221	–175.4	0.003	103.2	0.998	–9.9
400.0000	0.603	–36.8	1.299	–174.5	0.004	92.8	0.986	–13.8
500.0000	0.555	–40.5	1.398	–174.0	0.005	88.8	0.968	–17.3
600.0000	0.528	–44.8	1.513	–174.9	0.005	95.2	0.968	–20.4
700.0000	0.517	–49.9	1.691	–176.2	0.007	67.5	0.971	–23.1
800.0000	0.525	–54.4	1.815	–178.2	0.007	72.4	0.972	–25.8
900.0000	0.545	–58.9	2.008	179.5	0.006	84.5	0.960	–29.3
1000.0000	0.571	–62.8	2.189	175.7	0.009	78.3	0.936	–32.8
1100.0000	0.580	–67.3	2.399	171.2	0.007	60.0	0.926	–36.3
1200.0000	0.588	–71.3	2.560	165.9	0.007	89.5	0.933	–39.5
1300.0000	0.571	–76.4	2.736	157.5	0.008	67.2	0.941	–42.0
1400.0000	0.563	–82.3	2.865	151.3	0.008	79.6	0.930	–45.0
1500.0000	0.553	–88.8	2.946	143.3	0.006	79.9	0.906	–48.1
1600.0000	0.552	–95.2	3.077	137.0	0.006	91.4	0.895	–51.5
1700.0000	0.551	–101.5	3.083	130.1	0.009	102.3	0.888	–54.8
1800.0000	0.550	–107.5	3.174	123.9	0.009	100.5	0.884	–57.3
1900.0000	0.536	–113.3	3.164	117.4	0.006	109.5	0.885	–60.2
2000.0000	0.517	–119.8	3.193	110.7	0.009	115.9	0.881	–63.4
2100.0000	0.495	–127.1	3.149	104.4	0.010	124.2	0.870	–66.6
2200.0000	0.484	–135.3	3.143	97.3	0.011	122.4	0.867	–69.8
2300.0000	0.484	–142.6	3.135	90.5	0.012	131.7	0.866	–72.3
2400.0000	0.490	–148.5	3.120	83.5	0.015	138.1	0.868	–75.5
2500.0000	0.499	–152.5	3.053	78.4	0.016	136.3	0.866	–78.7
2600.0000	0.499	–155.8	2.991	71.4	0.018	142.9	0.864	–82.5
2700.0000	0.485	–157.4	2.958	68.0	0.018	143.9	0.858	–86.6
2800.0000	0.464	–160.6	2.810	62.9	0.021	142.5	0.852	–89.7
2900.0000	0.439	–164.1	2.866	57.5	0.022	149.3	0.872	–93.4
3000.0000	0.416	–168.6	2.713	54.5	0.025	148.4	0.864	–96.6
3100.0000	0.403	–173.6	2.635	48.0	0.030	143.6	0.867	–101.0

– μPC8152TB –

CIRCUIT CURRENT vs. SUPPLY VOLTAGE



CIRCUIT CURRENT vs. OPERATING AMBIENT TEMPERATURE



– μPC8152TB –

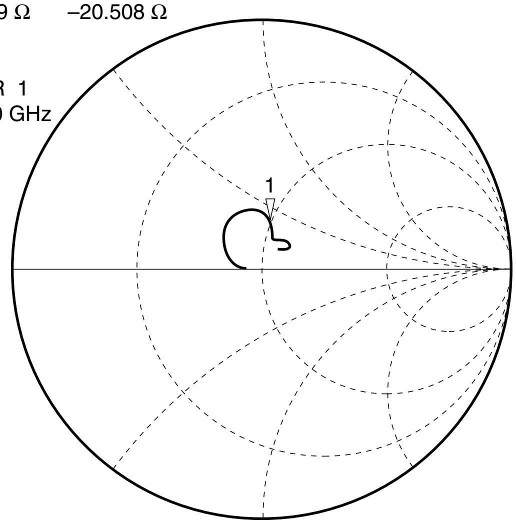
1.0 GHz output port matching

S-PARAMETERS (monitored at connector on board)

T_A = +25°C, V_{CC} = V_{out} = 3.0 V

S_{11}
REF 1.0 Units
1 200.0 mUnits/
▽ 51.59 Ω –20.508 Ω

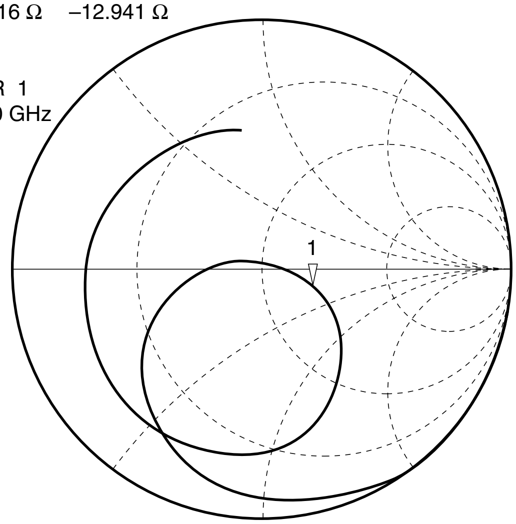
MARKER 1
1.0 GHz



START 0.100000000 GHz
STOP 3.100000000 GHz

S_{22}
REF 1.0 Units
1 200.0 mUnits/
▽ 75.816 Ω –12.941 Ω

MARKER 1
1.0 GHz

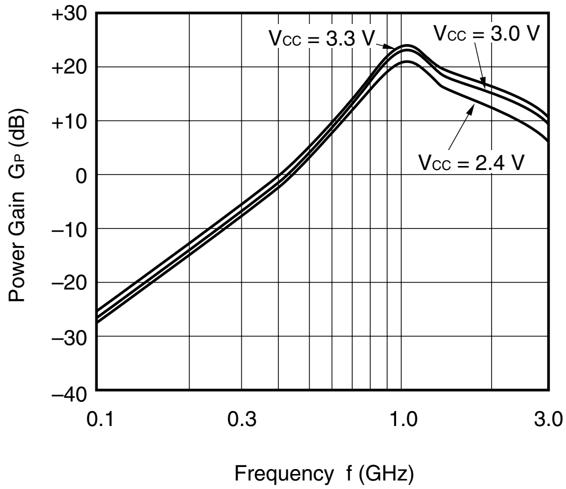


START 0.100000000 GHz
STOP 3.100000000 GHz

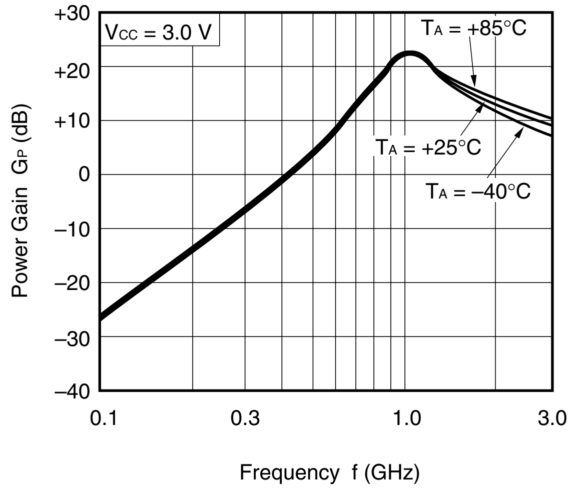
– μPC8152TB –

1.0 GHz output port matching

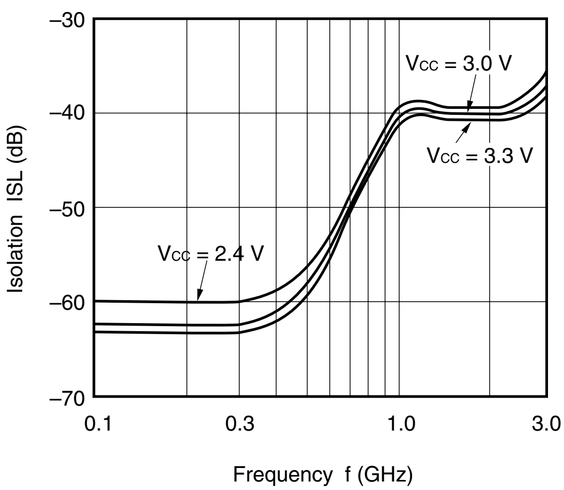
POWER GAIN vs. FREQUENCY



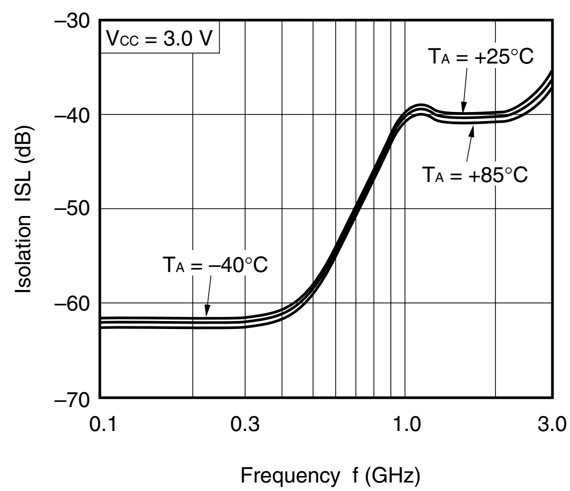
POWER GAIN vs. FREQUENCY



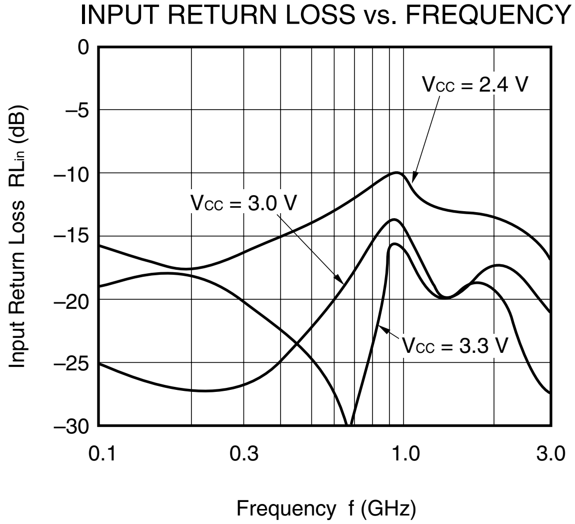
ISOLATION vs. FREQUENCY



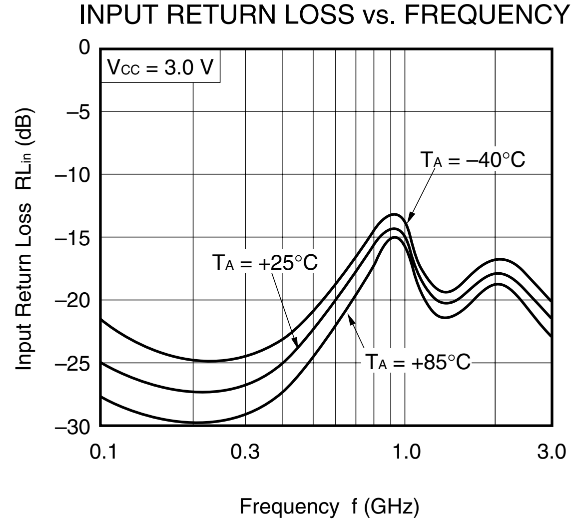
ISOLATION vs. FREQUENCY



INPUT RETURN LOSS vs. FREQUENCY



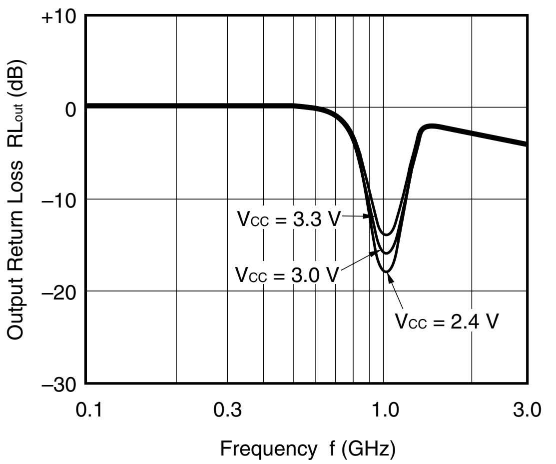
INPUT RETURN LOSS vs. FREQUENCY



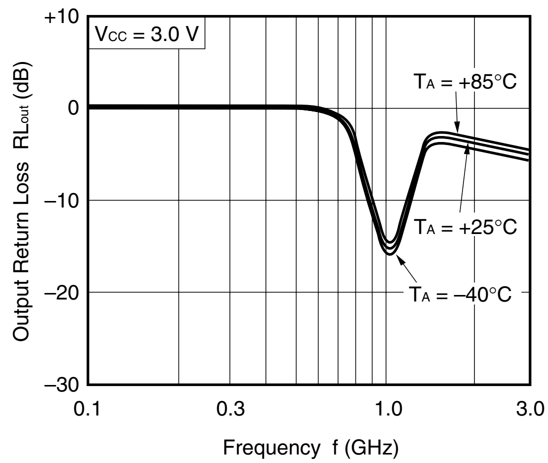
– μPC8152TB –

1.0 GHz output port matching

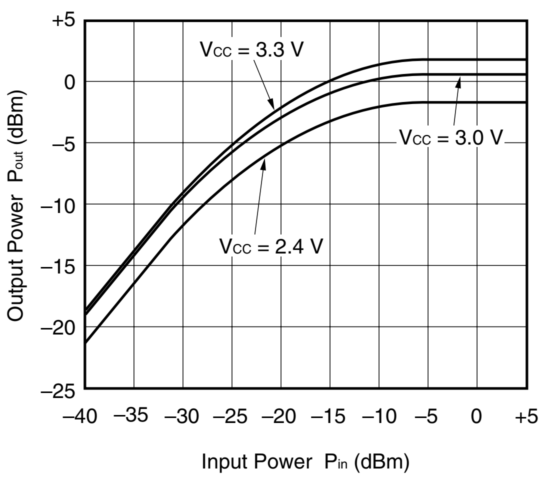
OUTPUT RETURN LOSS vs. FREQUENCY



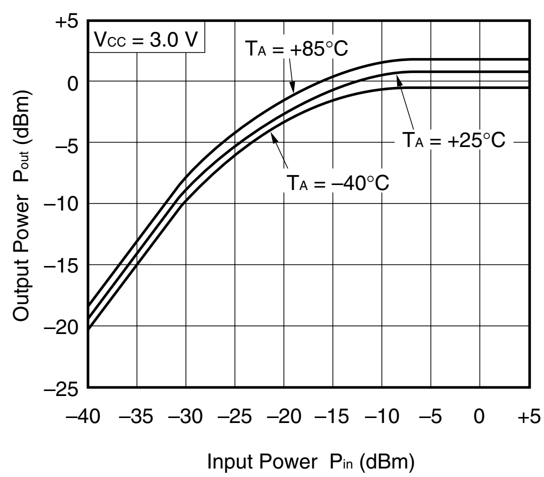
OUTPUT RETURN LOSS vs. FREQUENCY



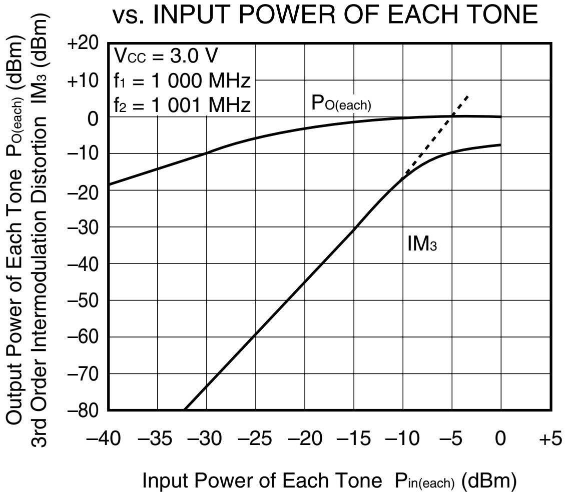
OUTPUT POWER vs. INPUT POWER



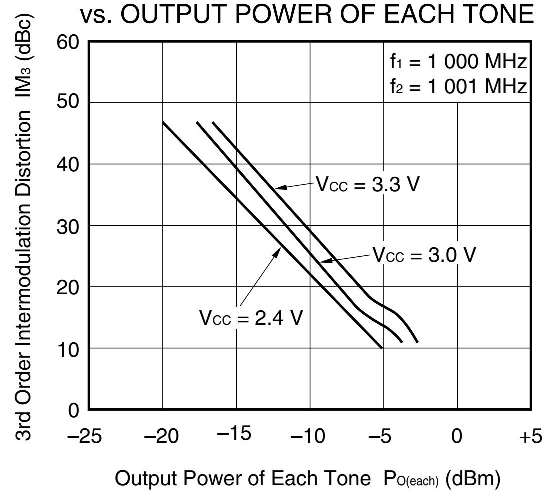
OUTPUT POWER vs. INPUT POWER



OUTPUT POWER OF EACH TONE, IM3 vs. INPUT POWER OF EACH TONE

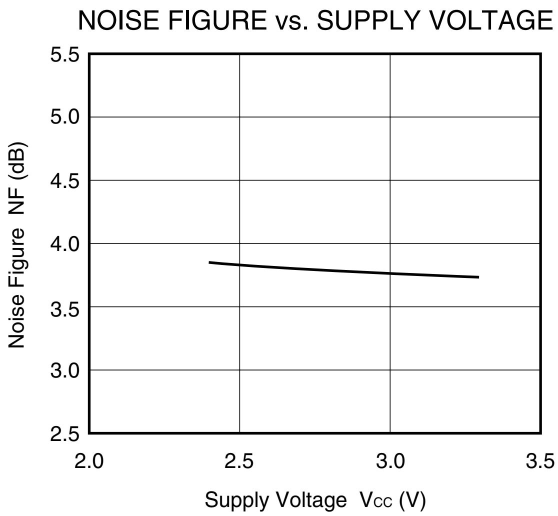


3RD ORDER INTERMODULATION DISTORTION vs. OUTPUT POWER OF EACH TONE



– μPC8152TB –

1.0 GHz output port matching



– μPC8152TB –

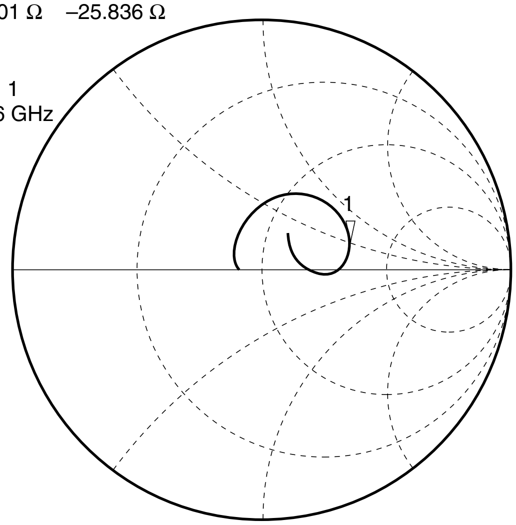
1.66 GHz output port matching

S-PARAMETERS (monitored at connector on board)

T_A = +25°C, V_{CC} = V_{out} = 3.0 V

S_{11}
REF 1.0 Units
1 200.0 mUnits/
▽ 98.301 Ω –25.836 Ω

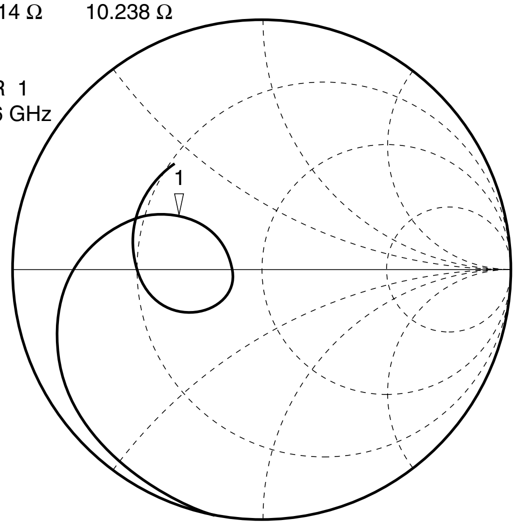
MARKER 1
1.66 GHz



START 0.100000000 GHz
STOP 3.100000000 GHz

S_{22}
REF 1.0 Units
1 200.0 mUnits/
▽ 22.714 Ω 10.238 Ω

MARKER 1
1.66 GHz

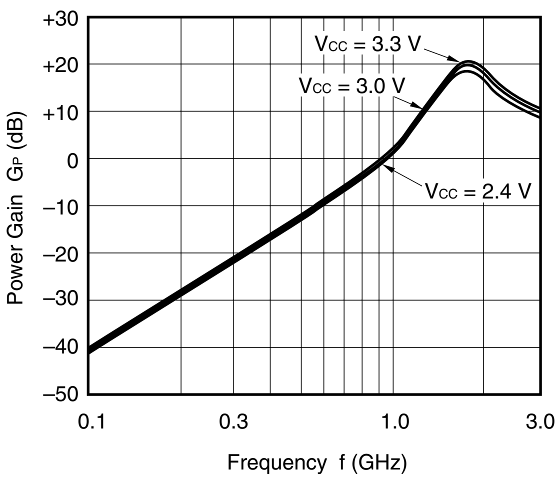


START 0.100000000 GHz
STOP 3.100000000 GHz

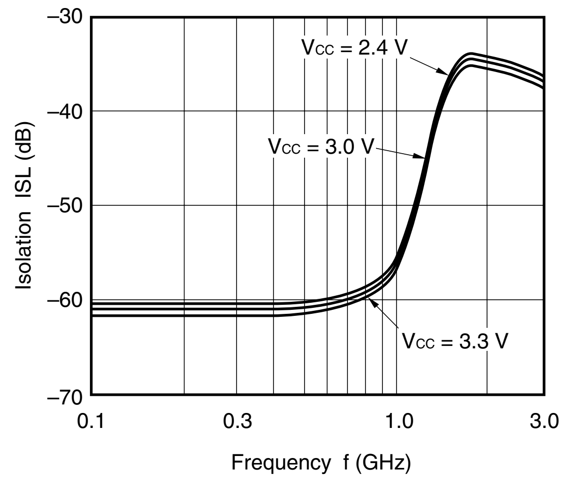
– μPC8152TB –

1.66 GHz output port matching

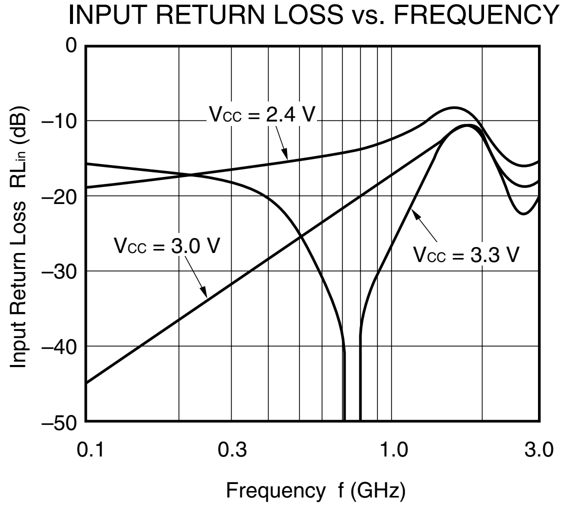
POWER GAIN vs. FREQUENCY



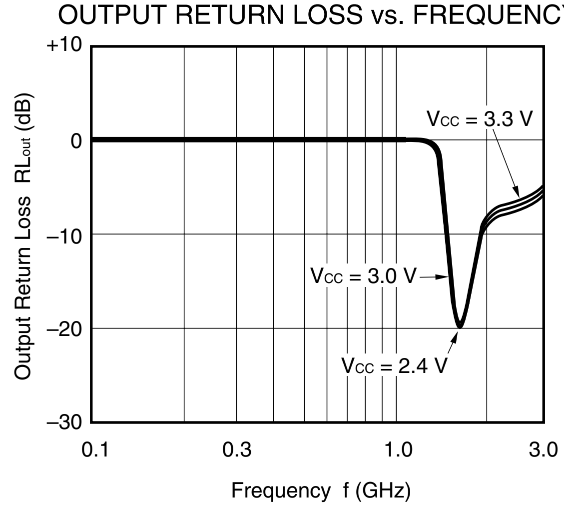
ISOLATION vs. FREQUENCY



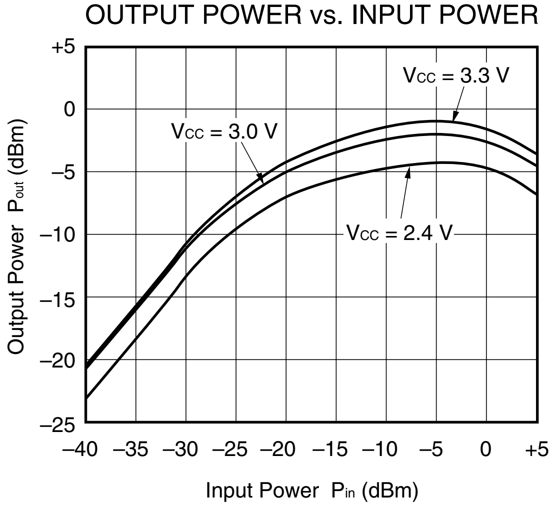
INPUT RETURN LOSS vs. FREQUENCY



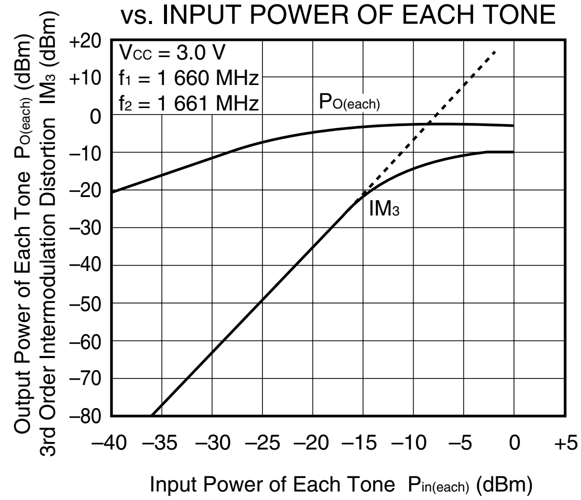
OUTPUT RETURN LOSS vs. FREQUENCY



OUTPUT POWER vs. INPUT POWER

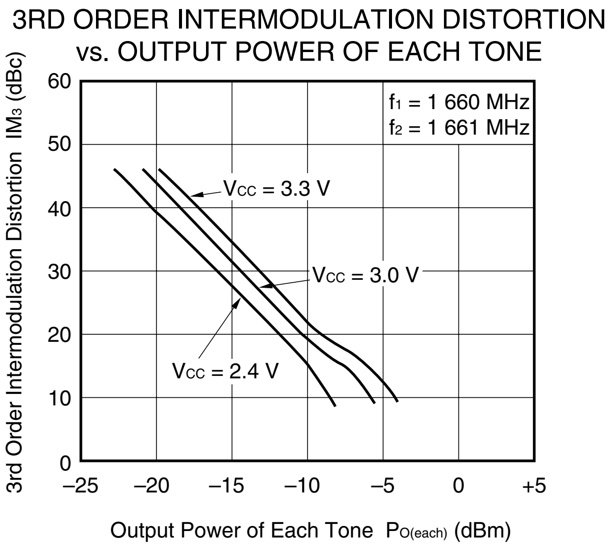


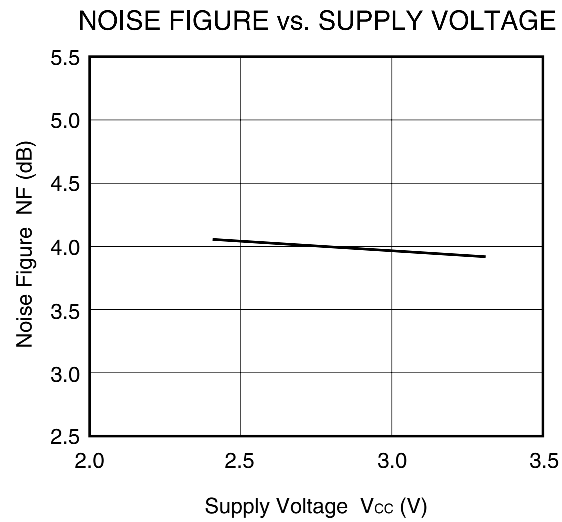
OUTPUT POWER OF EACH TONE, IM3 vs. INPUT POWER OF EACH TONE



– μPC8152TB –

1.66 GHz output port matching



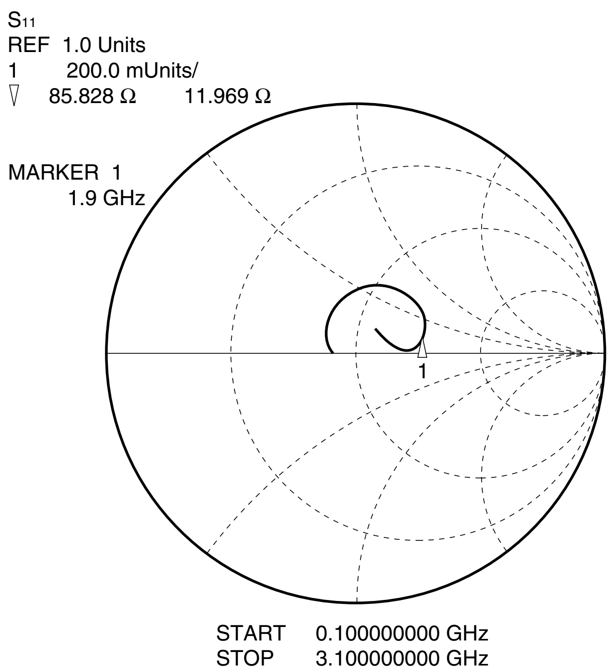


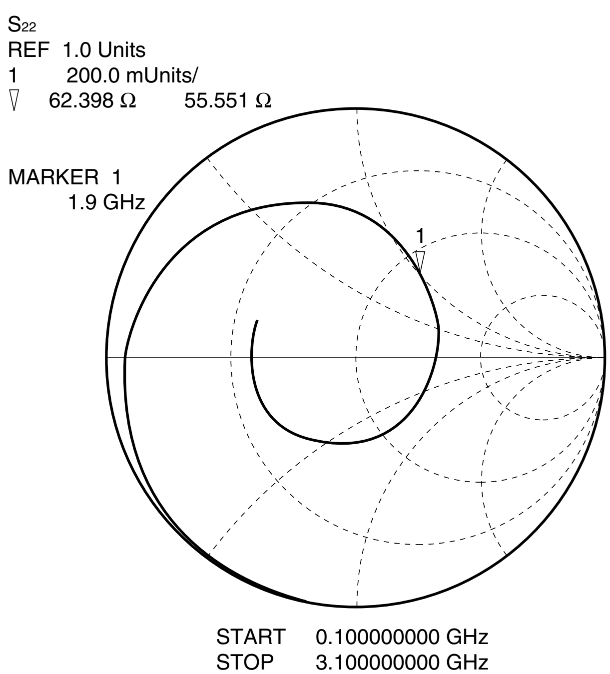
– μPC8152TB –

1.9 GHz output port matching

S-PARAMETERS (monitored at connector on board)

T_A = +25°C, V_{CC} = V_{out} = 3.0 V

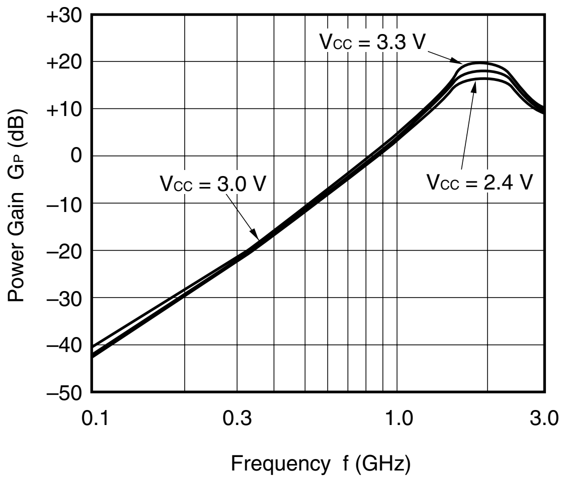




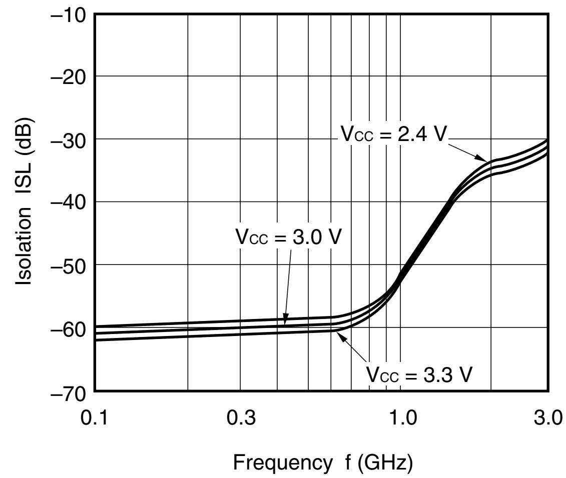
– μPC8152TB –

1.9 GHz output port matching

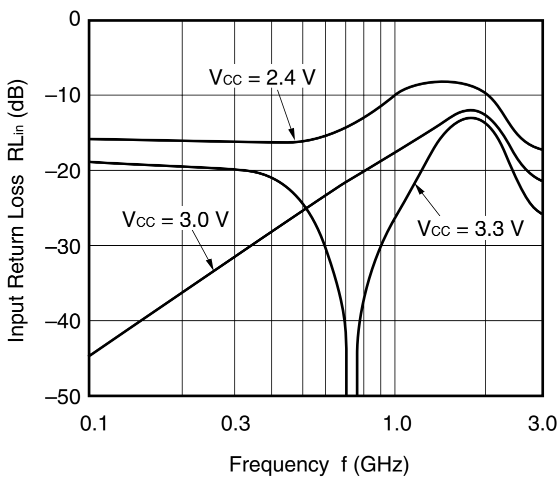
POWER GAIN vs. FREQUENCY



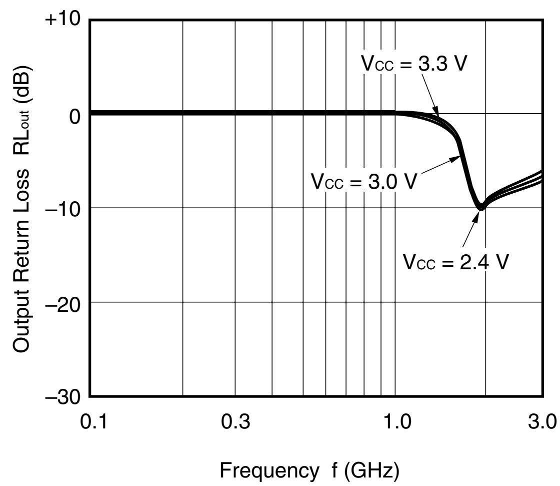
ISOLATION vs. FREQUENCY



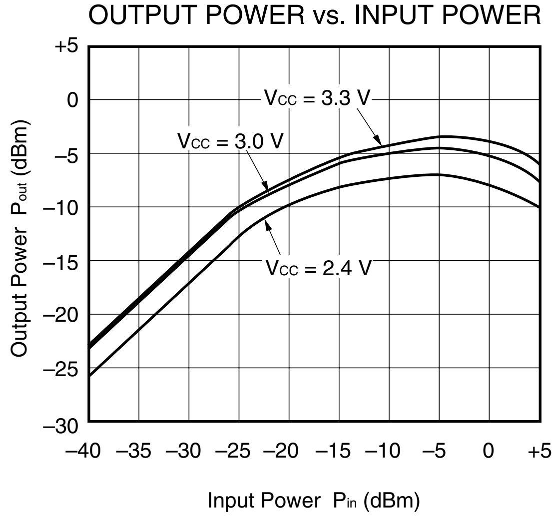
INPUT RETURN LOSS vs. FREQUENCY



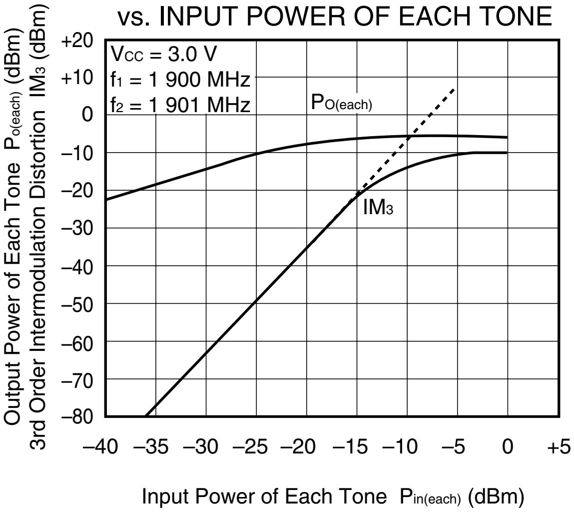
OUTPUT RETURN LOSS vs. FREQUENCY



OUTPUT POWER vs. INPUT POWER

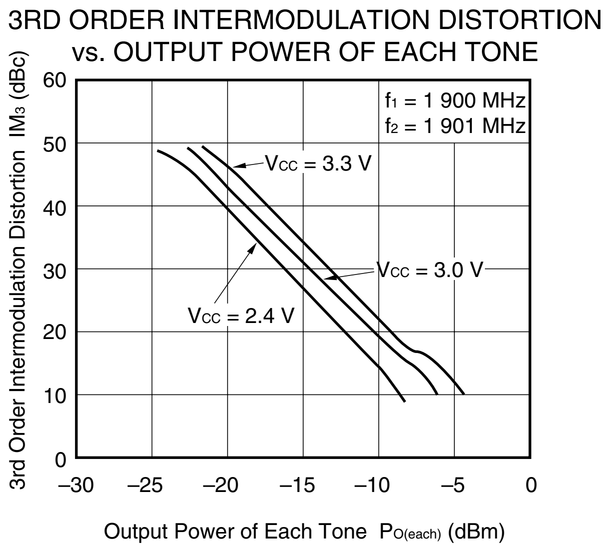


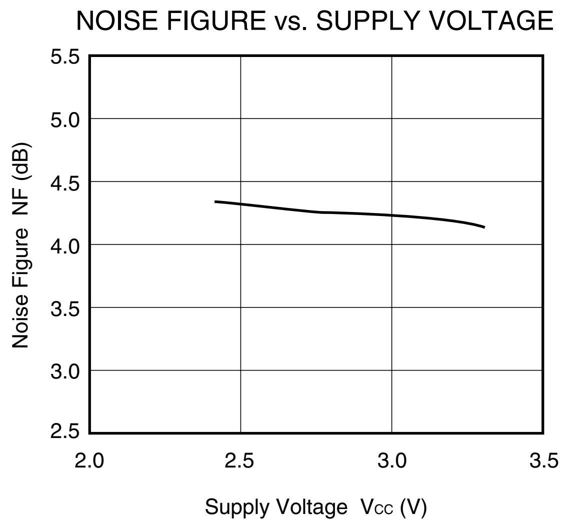
OUTPUT POWER OF EACH TONE, IM3 vs. INPUT POWER OF EACH TONE



– μPC8152TB –

1.9 GHz output port matching



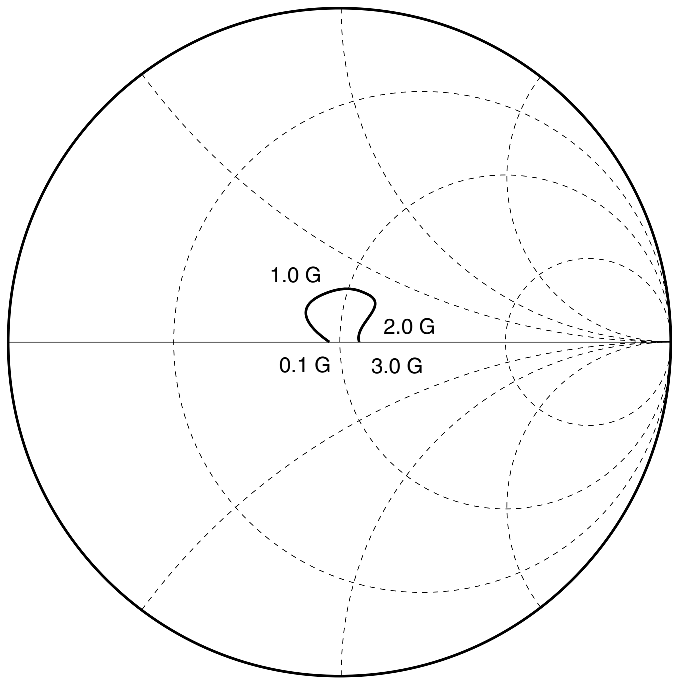


Remark The graphs indicate nominal characteristics.

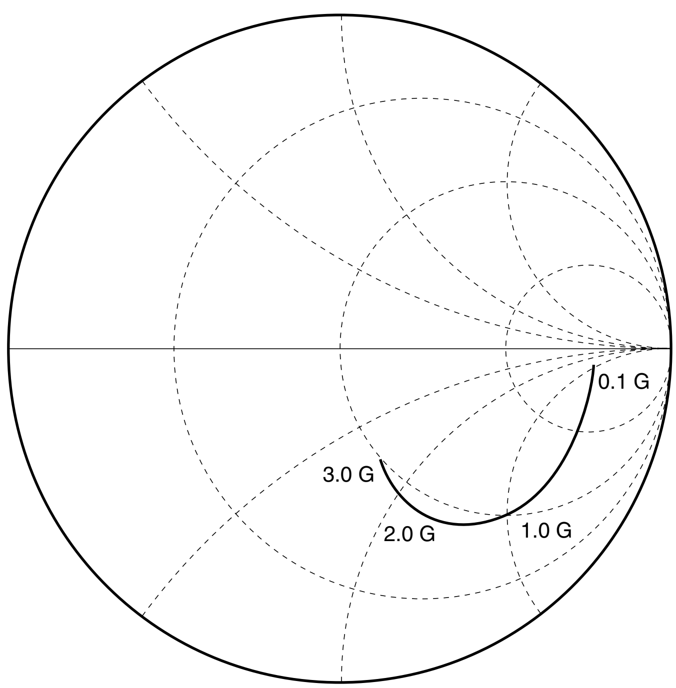
S-PARAMETERS (TA = +25°C, VCC = Vout = 3.0 V)

– μPC8152TB –

S11–Frequency



S22–Frequency



TYPICAL S-PARAMETER VALUES (T_A = +25°C)

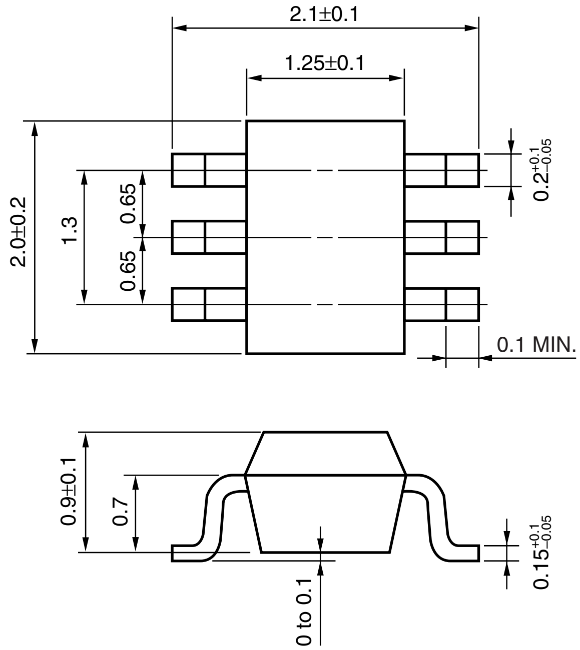
μPC8152TB

$V_{CC} = V_{out}$ = 3.0 V, I_{CC} = 5.6 mA

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100.0000	0.062	168.0	6.691	–0.3	0.002	40.8	0.775	–3.3
200.0000	0.047	169.1	7.049	–3.7	0.001	101.6	0.773	–6.6
300.0000	0.055	166.9	7.418	–9.3	0.003	97.3	0.761	–9.1
400.0000	0.078	162.1	7.883	–16.0	0.003	70.7	0.759	–12.0
500.0000	0.101	155.6	8.311	–22.1	0.005	76.7	0.754	–15.3
600.0000	0.121	147.4	8.583	–29.7	0.004	80.5	0.754	–18.3
700.0000	0.135	141.2	9.093	–37.3	0.006	79.8	0.756	–21.3
800.0000	0.143	133.2	9.276	–45.4	0.005	85.9	0.755	–24.7
900.0000	0.146	122.4	9.572	–53.6	0.009	89.6	0.752	–28.1
1000.0000	0.146	108.9	9.763	–62.6	0.009	70.3	0.745	–32.0
1100.0000	0.153	97.4	9.851	–71.9	0.007	90.8	0.733	–36.3
1200.0000	0.157	82.7	9.926	–80.5	0.011	84.9	0.723	–40.3
1300.0000	0.164	73.3	9.816	–91.2	0.010	81.9	0.710	–44.3
1400.0000	0.168	63.4	9.586	–99.6	0.011	81.4	0.679	–48.5
1500.0000	0.171	56.1	9.332	–109.4	0.011	82.3	0.649	–52.0
1600.0000	0.165	47.2	9.128	–117.9	0.009	79.0	0.624	–56.3
1700.0000	0.164	38.7	8.544	–126.1	0.011	77.5	0.591	–59.2
1800.0000	0.156	30.2	8.152	–133.5	0.011	76.8	0.557	–61.4
1900.0000	0.158	25.1	7.607	–140.6	0.011	75.9	0.527	–63.4
2000.0000	0.148	21.5	7.264	–147.5	0.012	75.8	0.498	–65.6
2100.0000	0.140	19.1	6.759	–153.7	0.013	82.6	0.476	–66.8
2200.0000	0.124	21.6	6.366	–159.7	0.012	92.4	0.455	–67.1
2300.0000	0.104	19.3	6.028	–165.7	0.014	88.9	0.438	–68.1
2400.0000	0.085	17.8	5.642	–171.5	0.015	89.8	0.418	–68.1
2500.0000	0.068	10.9	5.200	–176.0	0.015	87.2	0.399	–69.5
2600.0000	0.059	9.9	4.874	179.1	0.016	94.2	0.390	–69.2
2700.0000	0.055	–0.1	4.527	175.9	0.017	93.5	0.380	–70.2
2800.0000	0.054	0.2	4.202	171.3	0.022	88.2	0.372	–70.3
2900.0000	0.054	1.9	4.005	167.7	0.021	91.4	0.369	–69.5
3000.0000	0.055	12.0	3.697	164.4	0.021	86.8	0.360	–69.6
3100.0000	0.057	22.3	3.502	160.4	0.023	83.9	0.352	–71.0

★ PACKAGE DIMENSIONS

6-PIN SUPER MINIMOLD (UNIT: mm)



NOTES ON CORRECT USE

(1) Observe precautions for handling because of electro-static sensitive devices.
(2) Form a ground pattern as widely as possible to minimize ground impedance (to prevent undesired oscillation). All the ground pins must be connected together with wide ground pattern to decrease impedance difference.
(3) The bypass capacitor should be attached to V_{CC} line.
(4) The inductor (L) should be attached between output and V_{CC} pins. The L and series capacitor (C2) values should be adjusted for applied frequency to match impedance to next stage.
(5) The DC capacitor must be attached to input pin.

RECOMMENDED SOLDERING CONDITIONS

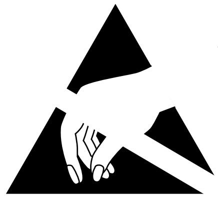
This product should be soldered under the following recommended conditions. For soldering methods and conditions other than those recommended below, contact your NEC sales representative.

Soldering Method	Soldering Conditions	Recommended Condition Symbol
Infrared Reflow	Package peak temperature: 235°C or below Time: 30 seconds or less (at 210°C) Count: 3, Exposure limit: None[Note]	IR35-00-3
VPS	Package peak temperature: 215°C or below Time: 40 seconds or less (at 200°C) Count: 3, Exposure limit: None[Note]	VP15-00-3
Wave Soldering	Soldering bath temperature: 260°C or below Time: 10 seconds or less Count: 1, Exposure limit: None[Note]	WS60-00-1
Partial Heating	Pin temperature: 300°C or below Time: 3 seconds or less (per side of device) Exposure limit: None[Note]	–

Note After opening the dry pack, keep it in a place below 25°C and 65% RH for the allowable storage period.

Caution Do not use different soldering methods together (except for partial heating).

For details of recommended soldering conditions for surface mounting, refer to information document **SEMICONDUCTOR DEVICE MOUNTING TECHNOLOGY MANUAL (C10535E)**.



ATTENTION

OBSERVE PRECAUTIONS
FOR HANDLING
ELECTROSTATIC
SENSITIVE
DEVICES