BGA7127

400 MHz to 2700 MHz 0.5 W high linearity silicon amplifier

Rev. 3 — 3 December 2010 Product data sheet

1. Product profile

1.1 General description

The MMIC is a one-stage amplifier, offered in a low-cost leadless surface-mount package. It delivers 28 dBm output power at 1 dB gain compression and a superior performance up to 2700 MHz. Its power saving features include simple quiescent current adjustment, which allows class-AB operation and logic-level shutdown control to reduce the supply current to 4 μA.

1.2 Features and benefits

- 400 MHz to 2700 MHz frequency operating range
- 12 dB small signal gain at 2 GHz
- 28 dBm output power at 1 dB gain compression
- Integrated active biasing
- External matching allows broad application optimization of the electrical performance
- 5 V single supply operation
- All pins ESD protected

1.3 Applications

- Broadband CPE/MoCA
- WLAN/ISM/RFID
- Wireless infrastructure (base station, repeater, backhaul systems)
- Industrial applications
- E-metering
- Satellite Master Antenna TV (SMATV)

1.4 Quick reference data

Table 1. Quick reference data

Input and output impedances matched to 50 Ω, $\overline{SHDN}$ = HIGH (shutdown disabled). Typical values at V_{CC} = 5 V; I_{CC} = 180 mA; T_{case} = 25 °C; unless otherwise specified.

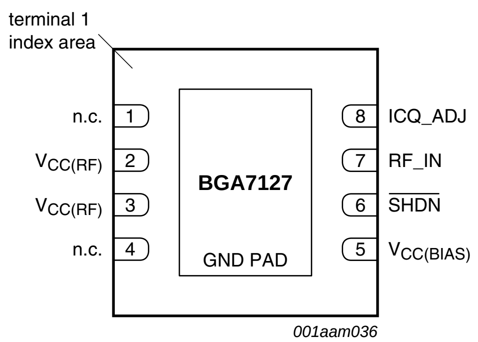
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
f	frequency		[1]	400	-	2700	MHz
G_p	power gain	f = 2140 MHz		10.5	12.0	13.5	dB
$P_{L(1dB)}$	output power at 1 dB gain compression	f = 2140 MHz		26.5	28.0	-	dBm
$IP3_O$	output third-order intercept point	f = 2140 MHz	[2]	39.0	42.0	-	dBm

[1] Operation outside this range is possible but not guaranteed.

[2] P_L = 17 dBm per tone; spacing = 1 MHz.

2. Pinning information

2.1 Pinning



Transparent top view

Fig 1. Pin configuration

2.2 Pin description

Table 2. Pin description

Symbol	Pin	Description
n.c.	1, 4	not connected
$V_{CC(RF)}$	2, 3	RF output for the power amplifier and DC supply input for the RF transistor collector [1]
$V_{CC(BIAS)}$	5	bias supply voltage [2]
$\overline{SHDN}$	6	shutdown control function enabled / disabled
RF_IN	7	RF input for the power amplifier [1]
ICQ_ADJ	8	quiescent collector current adjustment by an external resistor
GND	GND pad	RF ground and DC ground [3]

[1] This pin is DC-coupled and requires an external DC-blocking capacitor.

[2] RF decoupled.

[3] The center metal base of the SOT908-1 also functions as heatsink for the power amplifier.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BGA7127	HVSON8	plastic thermal enhanced very thin small outline package; no leads; 8 terminals; body 3 × 3 × 0.85 mm	SOT908-1

4. Functional diagram

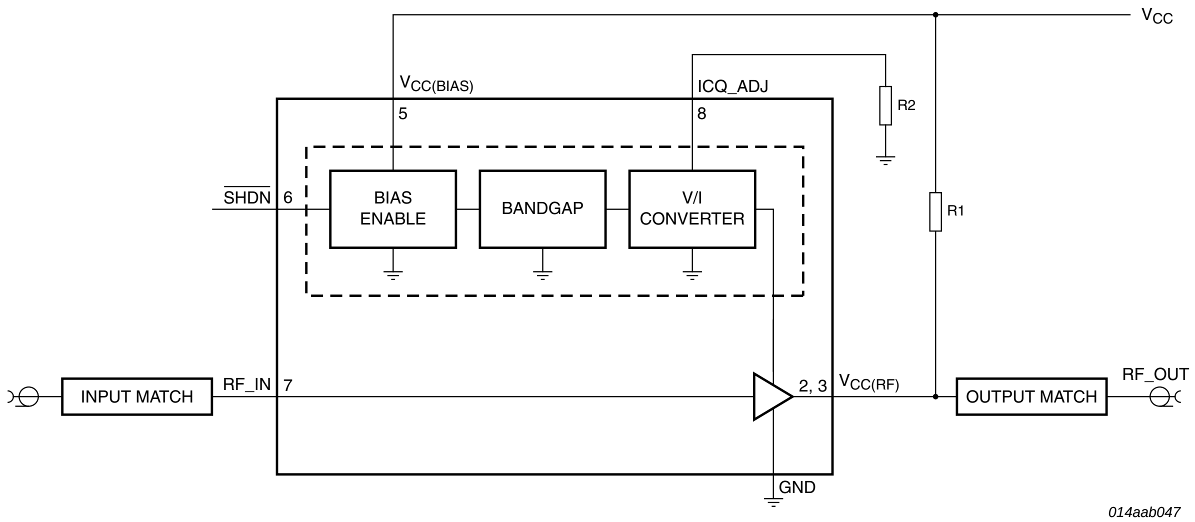


Fig 2. Functional diagram

5. Shutdown control

Table 4. Shutdown control settings

Mode	Mode description	Function description	$\overline{SHDN}$	$V_{ctrl(sd)}$ (V)		$I_{ctrl(sd)}$ (μA)	
				Min	Max	Min	Max
Idle	medium power MMIC fully off; minimal supply current	shutdown control enabled	0	0	0.7	-	2
TX	medium power MMIC transmit mode	shutdown control disabled	1	2.5	$V_{CC(BIAS)}$	-	3

6. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

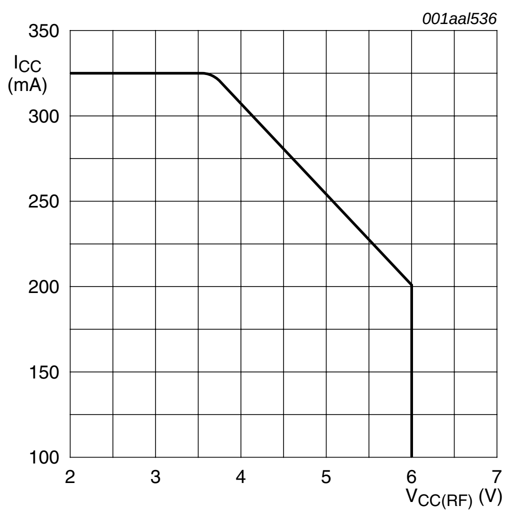
Symbol	Parameter	Conditions		Min	Max	Unit
$V_{CC(RF)}$	RF supply voltage		[1]	-	6.0	V
$V_{CC(BIAS)}$	bias supply voltage		[1]	-	6.0	V
I_{CC}	supply current		[1][2]	-	325	mA
$V_{ctrl(sd)}$	shutdown control voltage		[3]	0.0	$V_{CC(BIAS)}$	V
$P_{i(RF)}$	RF input power	f = 2140 MHz; switched	[4]	-	25	dBm
T_{case}	case temperature			–40	+85	°C
T_j	junction temperature			-	150	°C
V_{ESD}	electrostatic discharge voltage	Human Body Model (HBM); According JEDEC standard 22-A114E		-	2000	V
		Charged Device Model (CDM); According JEDEC standard 22-C101B		-	500	V

[1] See Figure 3 for safe operating area.

[2] The supply current is adjustable. See Section 8.1 “Supply current adjustment” and Section 12 “Application information”.

[3] If $V_{ctrl(sd)}$ exceeds $V_{CC(BIAS)}$, the internal ESD circuit can be damaged.
The recommended preventive measure is to limit the $I_{ctrl(sd)}$ to 20 mA.
If the SHDN function is not used, the $\overline{SHDN}$ pin should be connected to $V_{CC(BIAS)}$.

[4] Withstands switching between zero and maximum $P_{i(RF)}$.



Exceeding the safe operating area limits may cause serious damage to the product.
The impact on I_{CC} due to the spread of the external ICQ resistor (R2) should be taken into account.
The product-spread on I_{CC} should be taken into account (See Section 8 “Static characteristics”).

Fig 3. BGA7127 DC safe operating area

7. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	T_{case} = 85 °C; V_{CC} = 5 V; I_{CC} = 180 mA	[1]	28	-	K/W

[1] Defined as thermal resistance from junction to GND pad.

8. Static characteristics

Table 7. Static characteristics

Input and output impedances matched to 50 Ω, $\overline{SHDN}$ = HIGH (shutdown disabled). Typical values at V_{CC} = 5.0 V; T_{case} = 25 °C; unless otherwise specified.

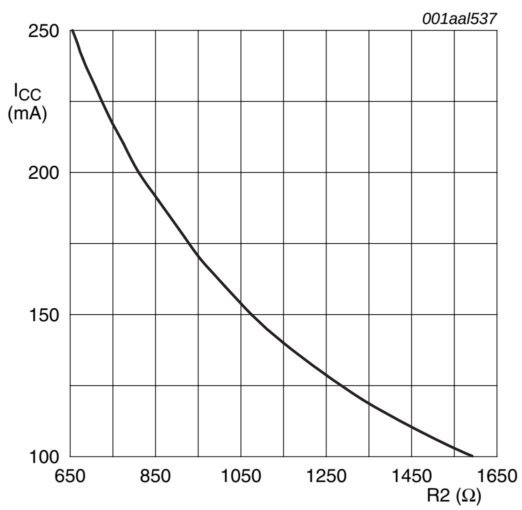
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_{CC}	supply current		[1]	100	-	250	mA
		R1 = 1 Ω; R2 = 909 Ω, E96	[2]	160	180	200	mA
		R1 = 1.8 Ω; R2 = 909 Ω, E96	[2]	160	180	200	mA
		during shutdown; pin $\overline{SHDN}$ = LOW (shutdown enabled)		-	4	6	μA

[1] The supply current is adjustable. See Section 8.1 "Supply current adjustment" and Section 12 "Application information".

[2] See Section 12 "Application information".

8.1 Supply current adjustment

The supply current can be adjusted by changing the value of external ICQ resistor (R2).



R1 = 1 Ω.

Fig 4. Supply current as a function of the value of R2 at a supply voltage of 5 V.

9. Dynamic characteristics

Table 8. Dynamic characteristics

Input and output impedances matched to 50 Ω, $\overline{SHDN}$ = HIGH (shutdown disabled). Typical values at V_{CC} = 5 V; I_{CC} = 180 mA; T_{case} = 25 °C; see Section 12 "Application information"; unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
f	frequency		[1]	400	-	2700	MHz
G_p	power gain	f = 940 MHz	[2]	-	20.0	-	dB
		f = 1960 MHz	[2]	-	13.0	-	dB
		f = 2140 MHz	[2]	10.5	12.0	13.5	dB
		f = 2445 MHz	[2]	-	10.5	-	dB
$P_{L(1dB)}$	output power at 1 dB gain compression	f = 940 MHz		-	27.5	-	dBm
		f = 1960 MHz		-	28.5	-	dBm
		f = 2140 MHz		26.5	28.0	-	dBm
		f = 2445 MHz		-	27.5	-	dBm
$IP3_O$	output third-order intercept point	f = 940 MHz	[3]	-	41.5	-	dBm
		f = 1960 MHz	[3]	-	42.5	-	dBm
		f = 2140 MHz	[3]	39.0	42.0	-	dBm
		f = 2445 MHz	[3]	-	41.5	-	dBm
NF	noise figure	f = 940 MHz		-	3.1	-	dB
		f = 1960 MHz		-	4.5	-	dB
		f = 2140 MHz		-	4.6	-	dB
		f = 2445 MHz		-	4.7	-	dB
RL_{in}	input return loss	f = 940 MHz	[2]	-	–25	-	dB
		f = 1960 MHz	[2]	-	–9	-	dB
		f = 2140 MHz	[2]	-	–9	-	dB
		f = 2445 MHz	[2]	-	–11	-	dB
RL_{out}	output return loss	f = 940 MHz	[2]	-	–12	-	dB
		f = 1960 MHz	[2]	-	–14	-	dB
		f = 2140 MHz	[2]	-	–10	-	dB
		f = 2445 MHz	[2]	-	–17	-	dB

[1] Operation outside this range is possible but not guaranteed.

[2] Defined at P_i = –40 dBm; small signal conditions.

[3] P_L = 17 dBm; tone spacing = 1 MHz.

9.1 Scattering parameters

Table 9. Scattering parameters, MMIC only

V_{CC} = 5 V; I_{CC} = 180 mA; T_{case} = 25 °C.

f (MHz)	s_{11}		s_{21}		s_{12}		s_{22}	
	Magnitude (ratio)	Angle (degree)	Magnitude (ratio)	Angle (degree)	Magnitude (ratio)	Angle (degree)	Magnitude (ratio)	Angle (degree)
400	0.92	178	8.64	91	0.01	45	0.75	–173
500	0.91	176	6.95	88	0.01	49	0.76	–175
600	0.91	174	5.88	86	0.01	51	0.75	–176
700	0.91	172	5.05	83	0.02	53	0.75	–178
800	0.91	170	4.47	81	0.02	55	0.74	–180
900	0.91	167	4.01	79	0.02	55	0.74	179
1000	0.90	165	3.64	76	0.02	54	0.75	177
1100	0.90	163	3.30	74	0.02	52	0.76	175
1200	0.90	161	3.0	71	0.02	51	0.75	173
1300	0.91	159	2.75	69	0.03	50	0.76	172
1400	0.91	156	2.53	67	0.03	51	0.76	171
1500	0.92	155	2.33	65	0.03	52	0.77	170
1600	0.92	153	2.16	64	0.03	52	0.77	169
1700	0.92	152	2.01	62	0.03	51	0.78	168
1800	0.92	152	1.86	61	0.03	48	0.78	168
1900	0.93	151	1.75	60	0.03	49	0.79	168
2000	0.93	152	1.64	60	0.03	51	0.80	168
2100	0.93	151	1.56	59	0.04	52	0.80	169
2200	0.93	151	1.48	58	0.04	52	0.80	169
2300	0.92	151	1.43	57	0.04	52	0.80	170
2400	0.92	151	1.38	57	0.04	52	0.79	171
2500	0.90	152	1.33	57	0.04	51	0.80	172
2600	0.90	152	1.29	56	0.04	50	0.79	173
2700	0.89	152	1.27	55	0.05	50	0.78	173

10. Reliability information

Table 10. Reliability

Life test	Conditions	Intrinsic failure rate
HTOL	according to JESD85; confidence level 60 %; T_j = 55 °C; activation energy = 0.7 eV; acceleration factor determined according to the Arrhenius equation.	4

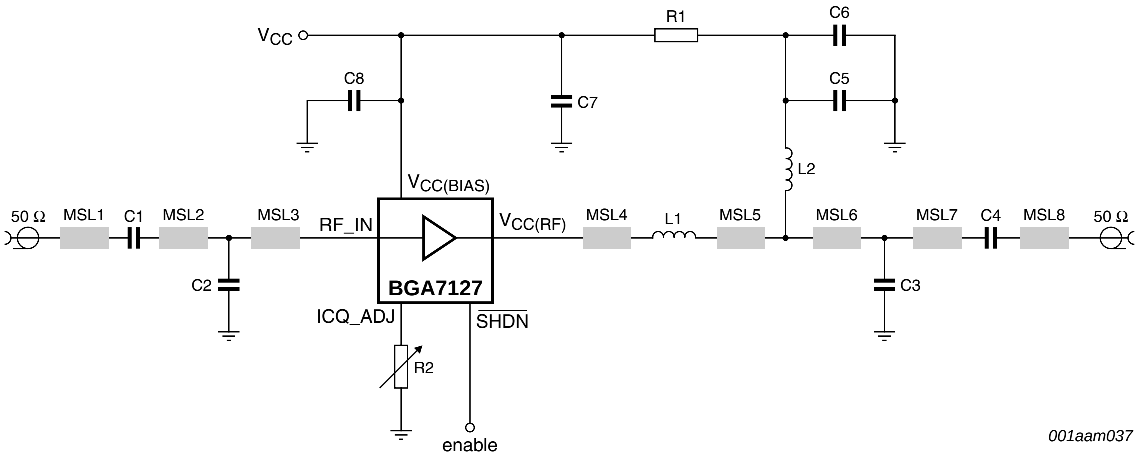
11. Moisture sensitivity

Table 11. Moisture sensitivity level

Test methodology	Class
JESD-22-A113	1

12. Application information

12.1 920 MHz to 960 MHz at 5 V; 180 mA

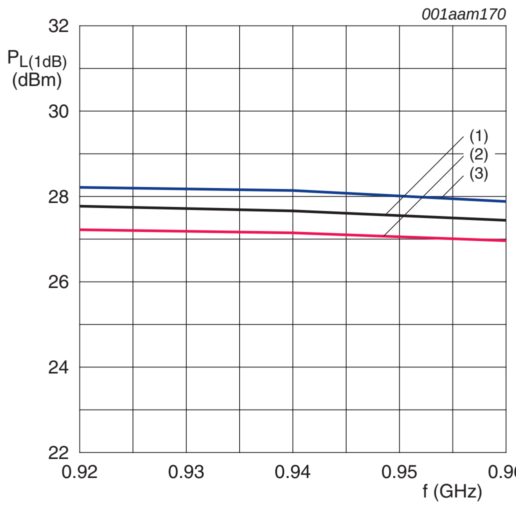


See Table 12 for a list of components.

PCB board specification:

Rogers RO4003C; height = 0.508 mm; ε_r = 3.38; copper thickness = 35 μm.

Fig 5. 920 MHz to 960 MHz application schematic

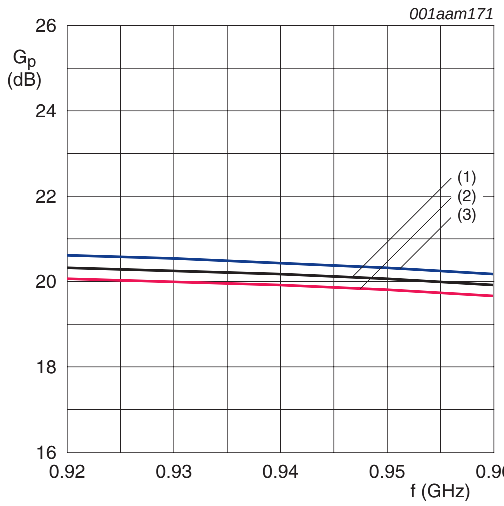


(1) T_{case} = 25 °C

(2) T_{case} = 85 °C

(3) T_{case} = −40 °C

Fig 6. Output power at 1 dB gain compression as a function of frequency

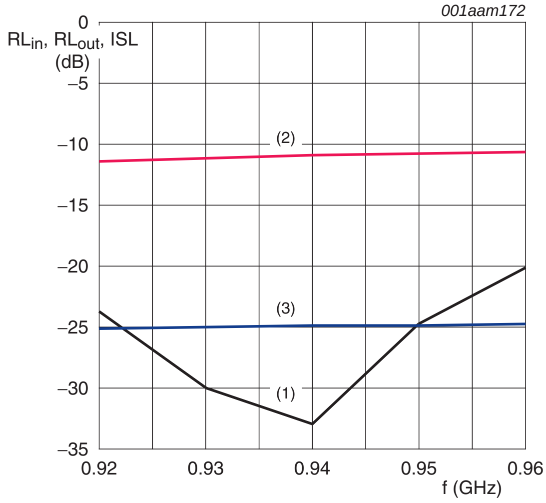


(1) T_{case} = 25 °C

(2) T_{case} = 85 °C

(3) T_{case} = −40 °C

Fig 7. Power gain as a function of frequency



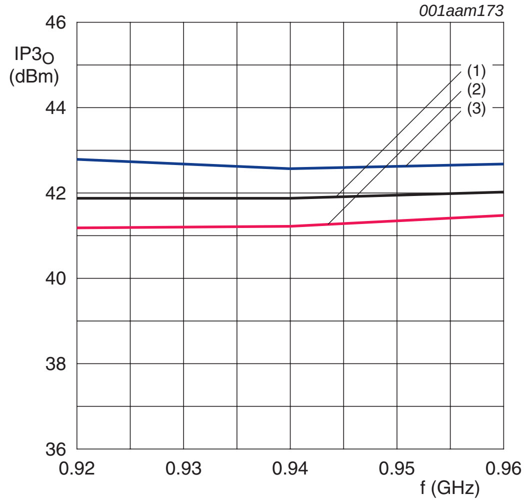
T_{case} = 25 °C.

(1) RL_{in}

(2) RL_{out}

(3) ISL

Fig 8. Input return loss, output return loss and isolation as a function of frequency



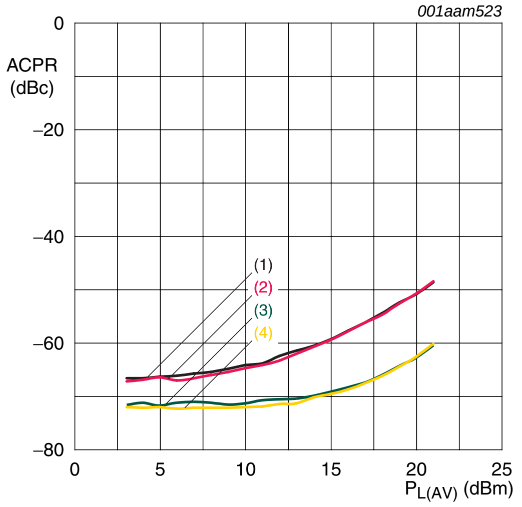
P_L = 17 dBm; tone spacing = 1 MHz.

(1) T_{case} = 25 °C

(2) T_{case} = 85 °C

(3) T_{case} = −40 °C

Fig 9. Output third-order intercept point as a function of frequency



2-carrier W-CDMA; each carrier according to 3GPP test model 1; 64 DPCH; PAR for composite signal = 7.5 dB; 5 MHz carrier spacing.

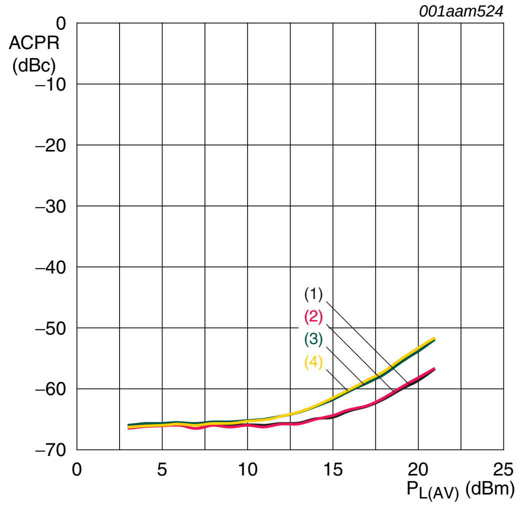
(1) f = 920 MHz; ACPR measured at f ± 5 MHz

(2) f = 960 MHz; ACPR measured at f ± 5 MHz

(3) f = 920 MHz; ACPR measured at f ± 10 MHz

(4) f = 960 MHz; ACPR measured at f ± 10 MHz

Fig 10. Adjacent channel power ratio as a function of average output power



2-carrier W-CDMA; each carrier according to 3GPP test model 1; 64 DPCH; PAR for composite signal = 9 dB; 10 MHz carrier spacing.

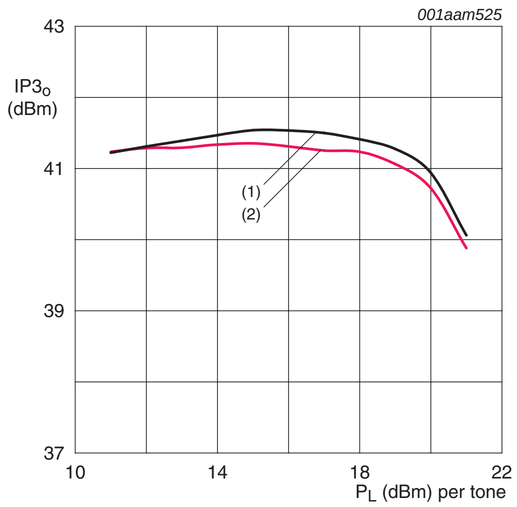
(1) f = 920 MHz; ACPR measured at f ± 5 MHz

(2) f = 960 MHz; ACPR measured at f ± 5 MHz

(3) f = 920 MHz; ACPR measured at f ± 10 MHz

(4) f = 960 MHz; ACPR measured at f ± 10 MHz

Fig 11. Adjacent channel power ratio as a function of average output power

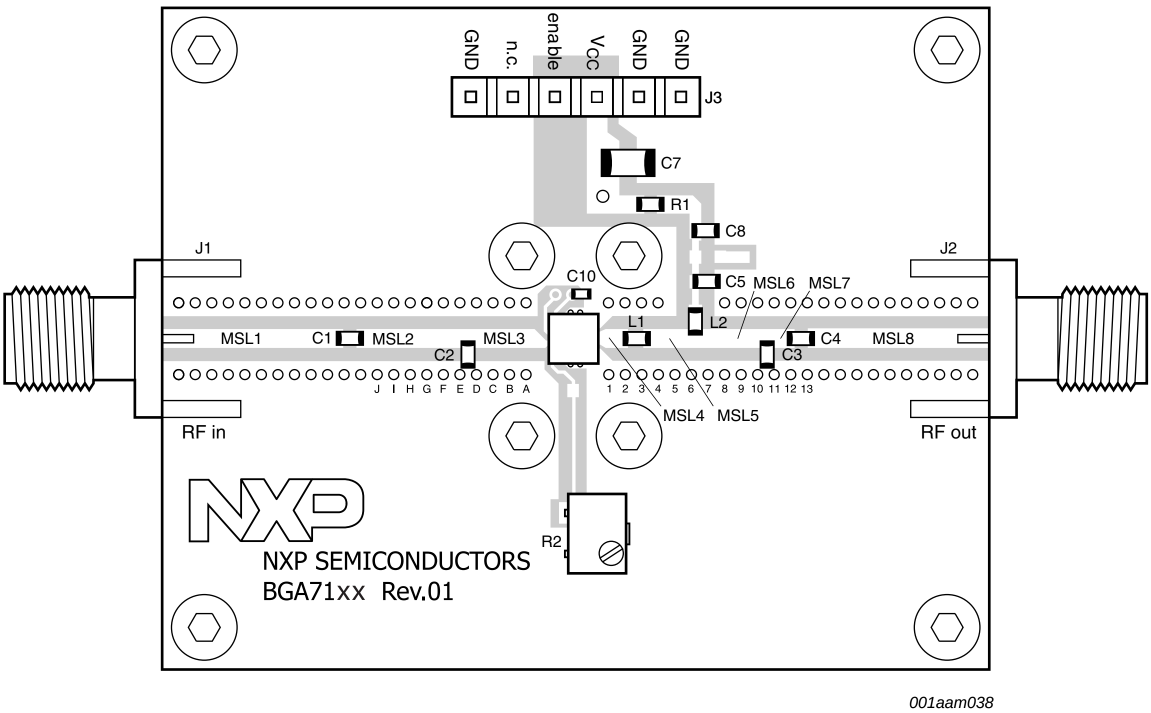


f = 940 MHz; tone spacing = 1 MHz.

(1) Upper sideband

(2) Lower sideband

Fig 12. Output third-order intercept point as a function of output power per tone



See Table 12 for a list of components.

Fig 13. 920 MHz to 960 MHz application reference board

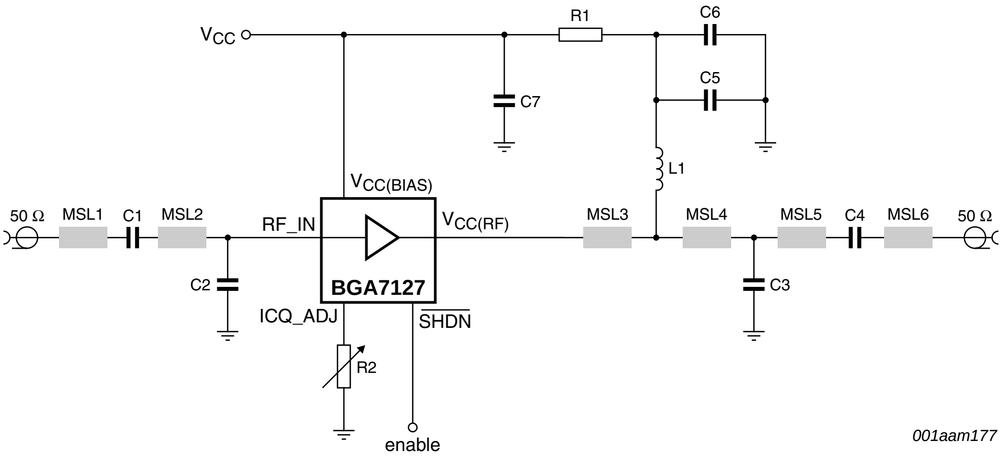
Table 12. 920 MHz to 960 MHz list of components

See Figure 5 and Figure 13 for component layout.

Printed-Circuit Board (PCB): Rogers RO4003C stack; height = 0.508 mm; copper plating thickness = 35 μm.

Component	Description	Value	Function	Remarks
C1, C4	capacitor	68 pF	DC blocking	GRM1885C1H680JA01D
C2	capacitor	9.1 pF	input match	Murata GRM1885C1H9R1CZ01D
C3	capacitor	5.1 pF	output match	Murata GRM1885C1H5R1CZ01D
C5	capacitor	10 nF	RF decoupling	Murata GRM1885C1H1R0CZ01D
C6	capacitor	1 μF	LF decoupling	AVX 06033D105KAT2A
C7	capacitor	10 μF	LF decoupling	AVX 1206ZG106ZAT2A
C8	capacitor	12 pF	noise decoupling	Murata GRM1555C1H120JZ01D
J1, J2	RF connector	SMA		Emerson Network Power 142-0701-841
J3	DC connector	6 pins		MOLEX
L1	inductor	2.2 nH	output match	Tyco Electronics 36501J2N2JTDG
L2	inductor	22 nH	DC Feed	Tyco Electronics 36501J022JTDG
	PCB	RO4003C stack		KOVO
MSL1	micro stripline	1.14 mm × 0.8 mm × 10.95 mm	input match	Width (W) × Spacing (S) × Length (L)
MSL2	micro stripline	1.14 mm × 0.8 mm × 6.8 mm	input match	Width (W) × Spacing (S) × Length (L)
MSL3	micro stripline	1.14 mm × 0.8 mm × 4.4 mm	input match	Width (W) × Spacing (S) × Length (L)
MSL4	micro stripline	1.14 mm × 0.8 mm × 2.0 mm	output match	Width (W) × Spacing (S) × Length (L)
MSL5	micro stripline	1.14 mm × 0.8 mm × 3.2 mm	output match	Width (W) × Spacing (S) × Length (L)
MSL6	micro stripline	1.14 mm × 0.8 mm × 4.2 mm	output match	Width (W) × Spacing (S) × Length (L)
MSL7	micro stripline	1.14 mm × 0.8 mm × 1.8 mm	output match	Width (W) × Spacing (S) × Length (L)
MSL8	micro stripline	1.14 mm × 0.8 mm × 10.95 mm	output match	Width (W) × Spacing (S) × Length (L)
R1	resistor	1.8 Ω		Yageo RC0603FR-071R8L
R2	resistor	2 kΩ trimmer	bias adjustment	Bourns 3214W-1-202E

12.2 1930 MHz to 1990 MHz at 5 V; 180 mA

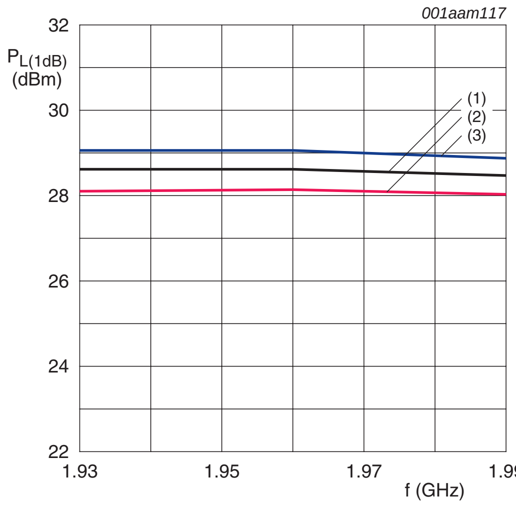


See Table 13 for a list of components.

PCB board specification:

Rogers RO4003C; height = 0.508 mm; ε_r = 3.38; copper thickness = 35 μm.

Fig 14. 1930 MHz to 1990 MHz application schematic

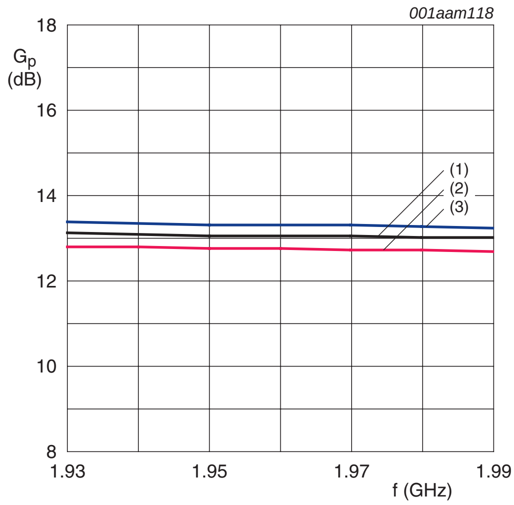


(1) T_{case} = 25 °C

(2) T_{case} = 85 °C

(3) T_{case} = −40 °C

Fig 15. Output power at 1 dB gain compression as a function of frequency

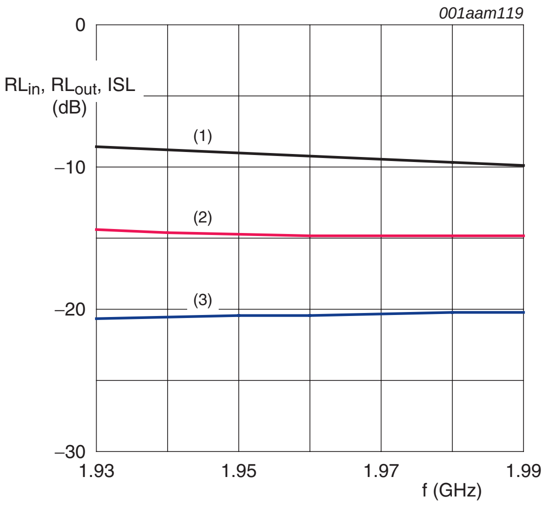


(1) T_{case} = 25 °C

(2) T_{case} = 85 °C

(3) T_{case} = −40 °C

Fig 16. Power gain as a function of frequency



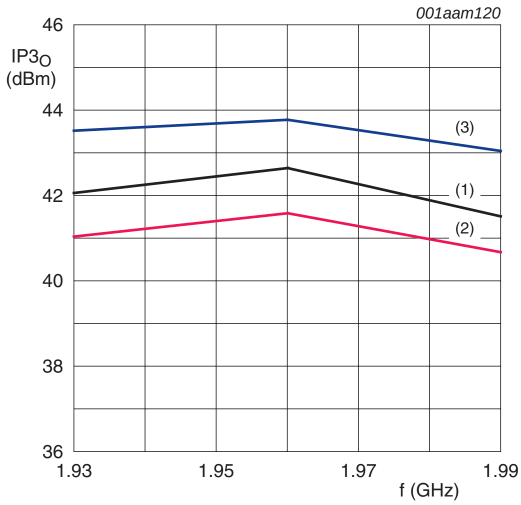
T_{case} = 25 °C.

(1) RL_{in}

(2) RL_{out}

(3) ISL

Fig 17. Input return loss, output return loss and isolation as a function of frequency



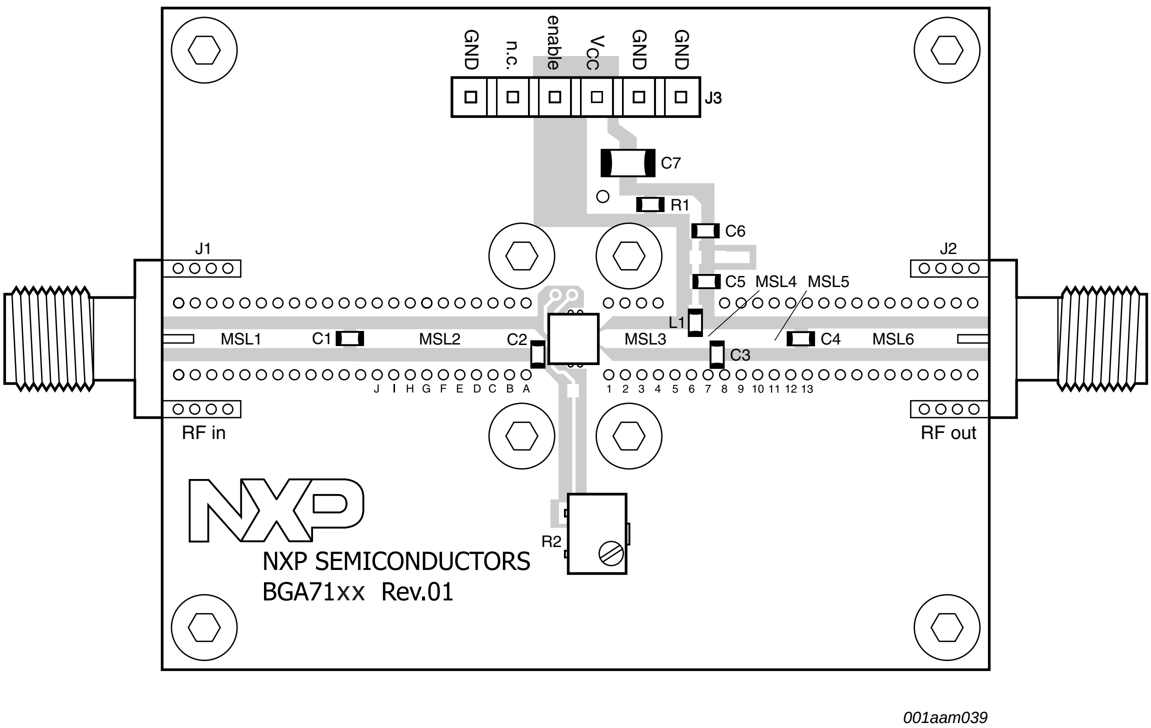
P_L = 17 dBm; tone spacing = 1 MHz.

(1) T_{case} = 25 °C

(2) T_{case} = 85 °C

(3) T_{case} = −40 °C

Fig 18. Output third-order intercept point as a function of frequency



See Table 13 for a list of components.

Fig 19. 1930 MHz to 1990 MHz application reference board

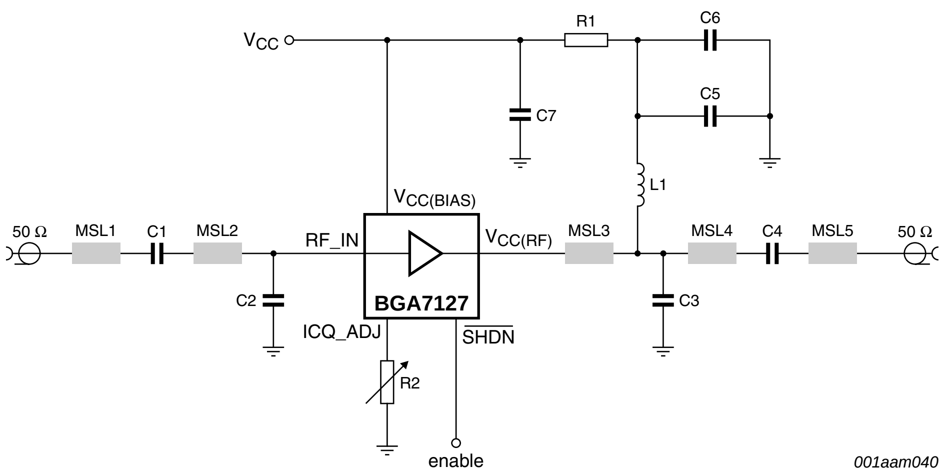
Table 13. 1930 MHz to 1990 MHz list of components

See Figure 14 and Figure 19 for component layout.

Printed-Circuit Board (PCB): Rogers RO4003C stack; height = 0.508 mm; copper plating thickness = 35 μm.

Component	Description	Value	Function	Remarks
C1,C4	capacitor	15 pF	DC blocking	GRM1885C1H150JA01D
C2	capacitor	2.7 pF	input match	Murata, GRM1885C1H2R7CZ01D
C3	capacitor	1.8 pF	output match	Murata, GRM1885C1H1R8CZ01D
C5	capacitor	15 pF	RF decoupling	Murata, GRM1885C1H150JA01D
C6	capacitor	100 nF	LF decoupling	AVX, 0603YC104KAT2A
C7	capacitor	10 μF	LF decoupling	AVX, 1206ZG106ZAT2A
J1,J2	RF connector	SMA		Emerson Network Power, 142-0701-841
J3	DC connector	6 pins		MOLEX
L1	inductor	22 nH	DC Feed	Tyco Electronics, 36501J022JTDG
MSL1	micro stripline	1.14 mm × 0.8 mm × 10.95 mm	input match	Width (W) × Spacing (S) × Length (L)
MSL2	micro stripline	1.14 mm × 0.8 mm × 11.4 mm	input match	Width (W) × Spacing (S) × Length (L)
MSL3	micro stripline	1.14 mm × 0.8 mm × 5.9 mm	output match	Width (W) × Spacing (S) × Length (L)
MSL4	micro stripline	1.14 mm × 0.8 mm × 1.4 mm	output match	Width (W) × Spacing (S) × Length (L)
MSL5	micro stripline	1.14 mm × 0.8 mm × 4.6 mm	output match	Width (W) × Spacing (S) × Length (L)
MSL6	micro stripline	1.14 mm × 0.8 mm × 10.95 mm	output match	Width (W) × Spacing (S) × Length (L)
R1	resistor	1 Ω		Yageo, RC0603FR-071RL
R2	resistor	2 kΩ trimmer	bias adjustment	Bourns, 3214W-1-202E

12.3 2110 MHz to 2170 MHz at 5 V; 180 mA

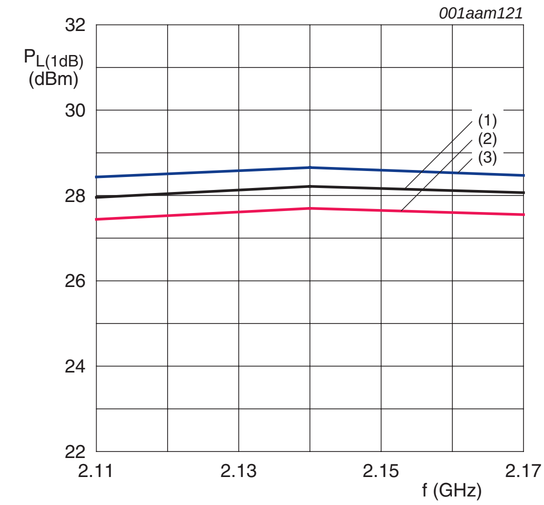


See Table 14 for a list of components.

PCB board specification:

Rogers RO4003C; height = 0.508 mm; ε_r = 3.38; copper thickness = 35 μm.

Fig 20. 2110 MHz to 2170 MHz application schematic

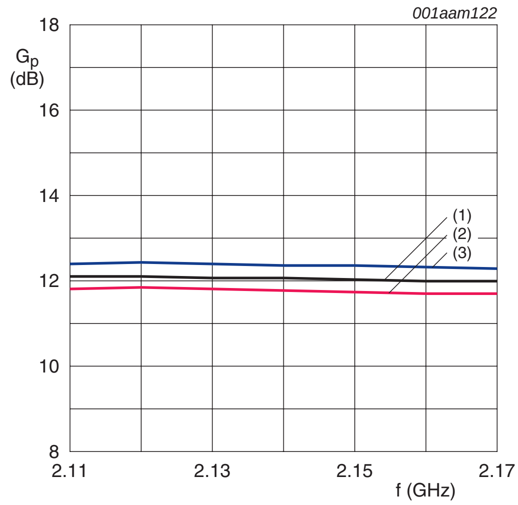


(1) T_{case} = 25 °C

(2) T_{case} = 85 °C

(3) T_{case} = −40 °C

Fig 21. Output power at 1 dB gain compression as a function of frequency

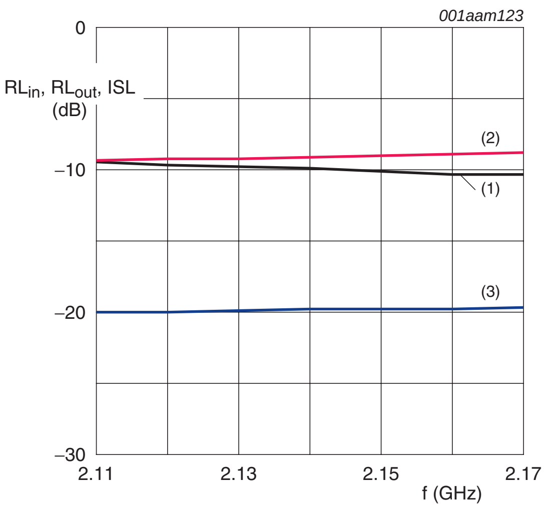


(1) T_{case} = 25 °C

(2) T_{case} = 85 °C

(3) T_{case} = −40 °C

Fig 22. Power gain as a function of frequency



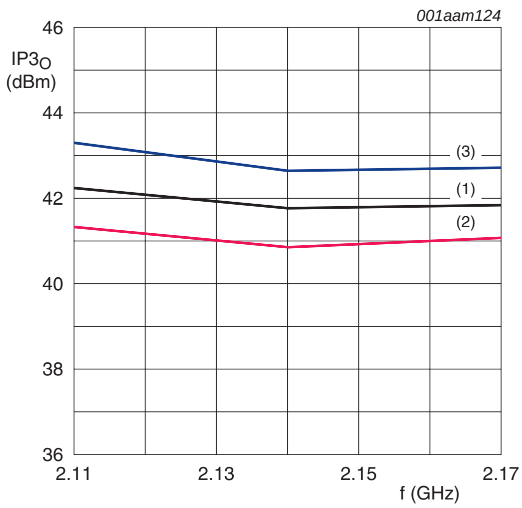
T_{case} = 25 °C.

(1) RL_{in}

(2) RL_{out}

(3) ISL

Fig 23. Input return loss, output return loss and isolation as a function of frequency



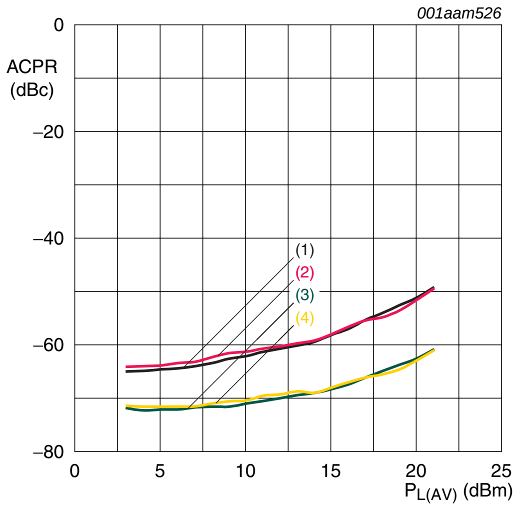
P_L = 17 dBm; tone spacing = 1 MHz.

(1) T_{case} = 25 °C

(2) T_{case} = 85 °C

(3) T_{case} = −40 °C

Fig 24. Output third-order intercept point as a function of frequency



2-carrier W-CDMA; each carrier according to 3GPP test model 1; 64 DPCH; PAR for composite signal = 7.5 dB; 5 MHz carrier spacing.

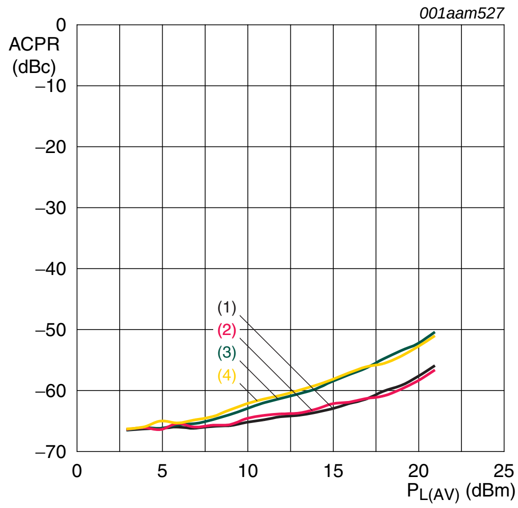
(1) f = 2110 MHz; ACPR measured at f ± 5 MHz

(2) f = 2170 MHz; ACPR measured at f ± 5 MHz

(3) f = 2110 MHz; ACPR measured at f ± 10 MHz

(4) f = 2170 MHz; ACPR measured at f ± 10 MHz

Fig 25. Adjacent channel power ratio as a function of average output power



2-carrier W-CDMA; each carrier according to 3GPP test model 1; 64 DPCH; PAR for composite signal = 9 dB; 10 MHz carrier spacing.

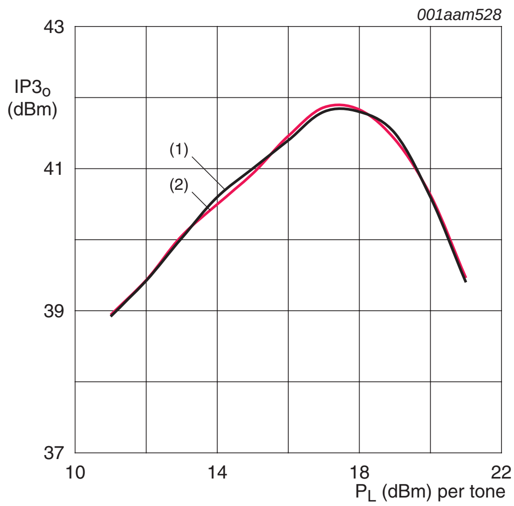
(1) f = 2110 MHz; ACPR measured at f ± 5 MHz

(2) f = 2170 MHz; ACPR measured at f ± 5 MHz

(3) f = 2110 MHz; ACPR measured at f ± 10 MHz

(4) f = 2170 MHz; ACPR measured at f ± 10 MHz

Fig 26. Adjacent channel power ratio as a function of average output power

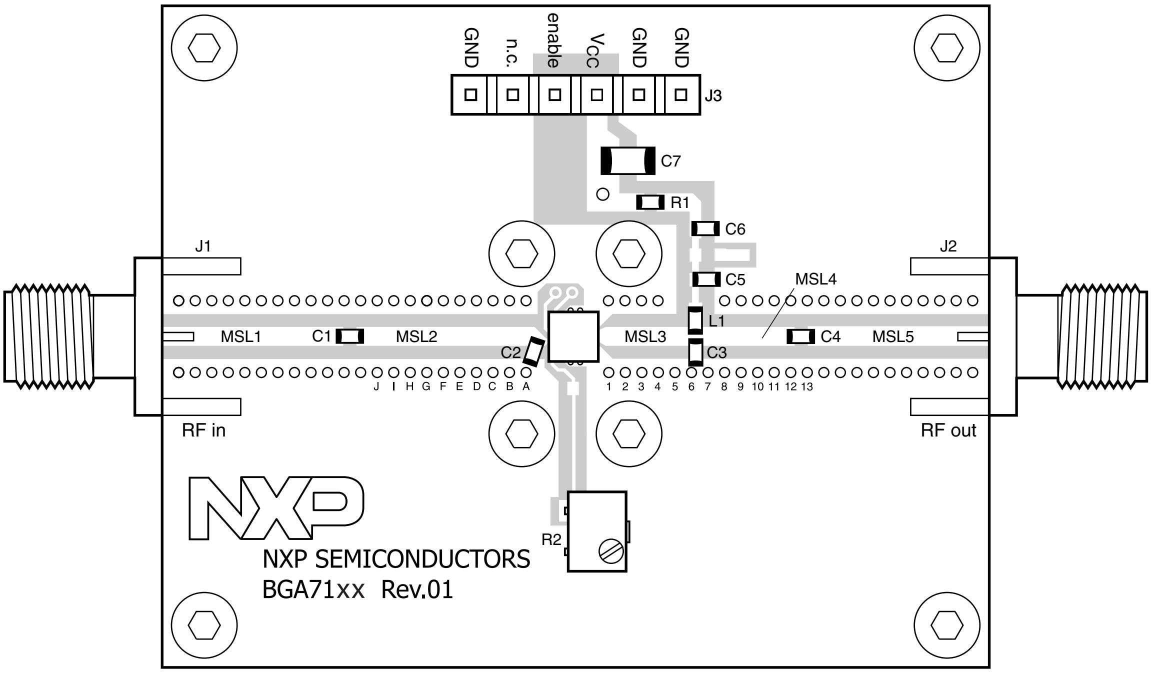


f = 2140 MHz; tone spacing = 1 MHz.

(1) Upper sideband

(2) Lower sideband

Fig 27. Output third-order intercept point as a function of output power per tone



See Table 14 for a list of components.

Fig 28. 2110 MHz to 2170 MHz application reference board

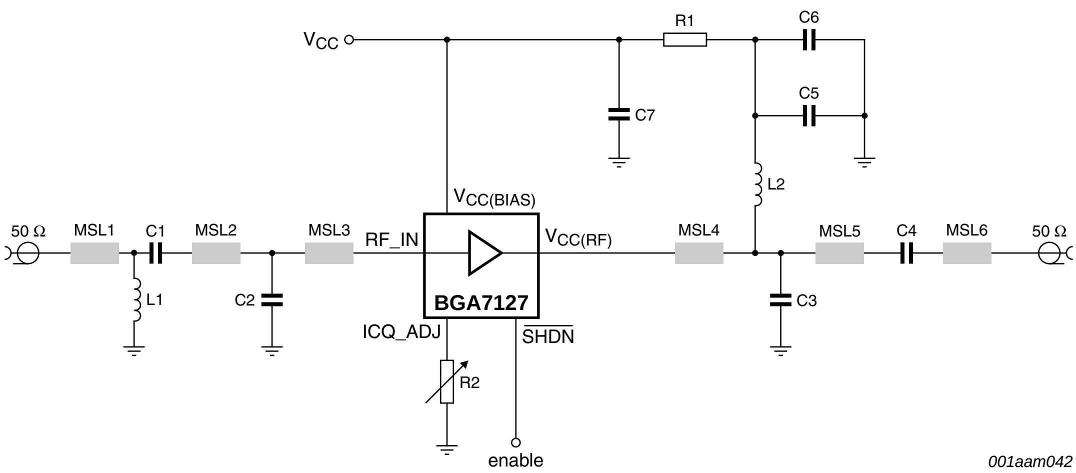
Table 14. 2110 MHz to 2170 MHz list of components

See Figure 20 and Figure 28 for component layout.

Printed-Circuit Board (PCB): Rogers RO4003C stack; height = 0.508 mm; copper plating thickness = 35 μm.

Component	Description	Value	Function	Remarks
C1,C4	capacitor	15 pF	DC blocking	Murata, GRM1885C1H150JA01D
C2	capacitor	2.4 pF	input match	Murata, GRM1885C1H2R4CZ01D
C3	capacitor	1.5 pF	output match	Murata, GRM1885C1H1R5CZ01D
C5	capacitor	15 pF	RF decoupling	Murata, GRM1885C1H150JA01D
C6	capacitor	100 nF	LF decoupling	AVX, 0603YC104KAT2A
C7	capacitor	10 μF	LF decoupling	AVX, 1206ZG106ZAT2A
J1,J2	RF connector	SMA		Emerson Network Power, 142-0701-841
J3	DC connector	6 pins		MOLEX
L1	inductor	22 nH	DC Feed	Tyco Electronics, 36501J022JTDG
MSL1	micro stripline	1.14 mm × 0.8 mm × 10.95 mm	input match	Width (W) × Spacing (S) × Length (L)
MSL2	micro stripline	1.14 mm × 0.8 mm × 11.2 mm	input match	Width (W) × Spacing (S) × Length (L)
MSL3	micro stripline	1.14 mm × 0.8 mm × 5.9 mm	output match	Width (W) × Spacing (S) × Length (L)
MSL4	micro stripline	1.14 mm × 0.8 mm × 6.0 mm	output match	Width (W) × Spacing (S) × Length (L)
MSL5	micro stripline	1.14 mm × 0.8 mm × 10.95 mm	output match	Width (W) × Spacing (S) × Length (L)
R1	resistor	1 Ω		Yageo, RC0603FR-071RL
R2	resistor	2 kΩ trimmer	bias adjustment	Bourns, 3214W-1-202E

12.4 2405 MHz to 2485 MHz at 5 V; 180 mA

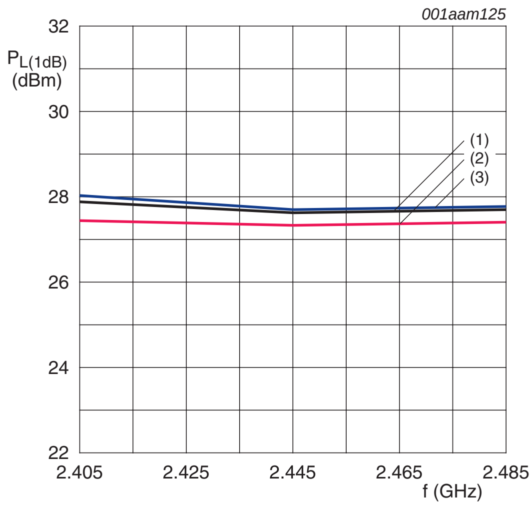


See Table 15 for a list of components.

PCB board specification:

Rogers RO4003C; height = 0.508 mm; ε_r = 3.38; copper thickness = 35 μm.

Fig 29. 2405 MHz to 2485 MHz application schematic

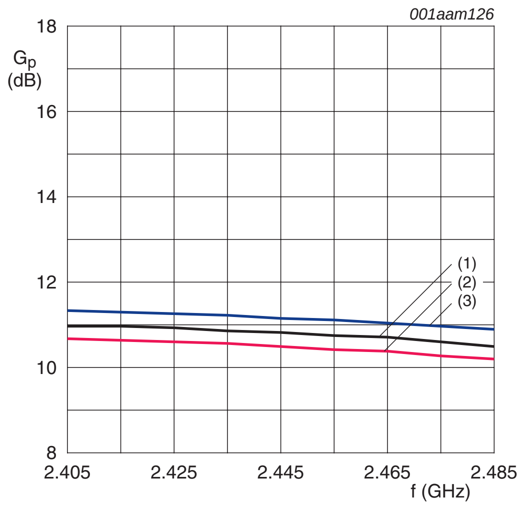


(1) T_{case} = 25 °C

(2) T_{case} = 85 °C

(3) T_{case} = −40 °C

Fig 30. Output power at 1 dB gain compression as a function of frequency

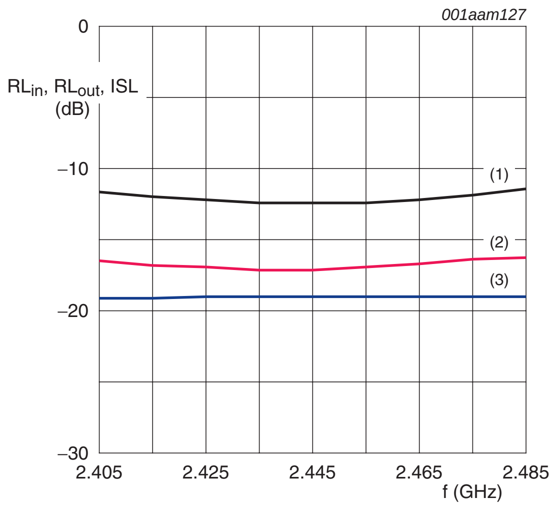


(1) T_{case} = 25 °C

(2) T_{case} = 85 °C

(3) T_{case} = −40 °C

Fig 31. Power gain as a function of frequency



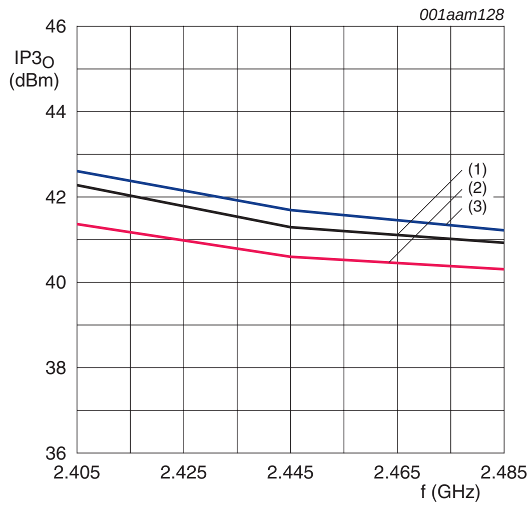
T_{case} = 25 °C.

(1) RL_{in}

(2) RL_{out}

(3) ISL

Fig 32. Input return loss, output return loss and isolation as a function of frequency



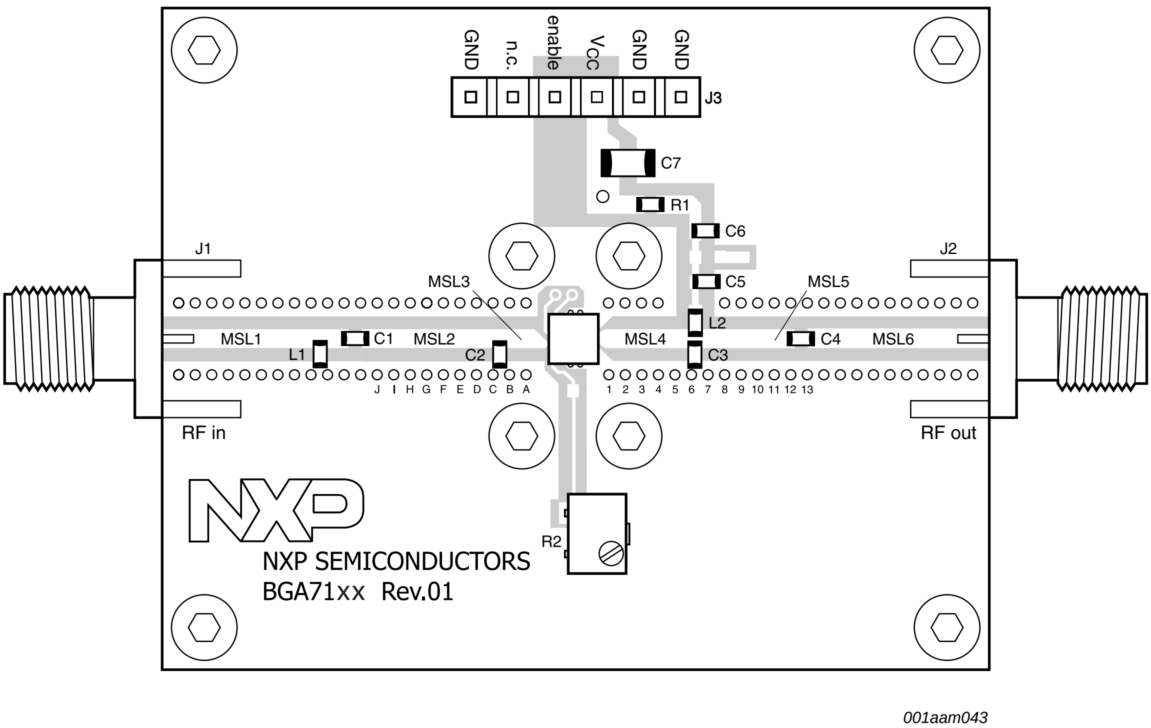
P_L = 17 dBm; tone spacing = 1 MHz.

(1) T_{case} = 25 °C

(2) T_{case} = 85 °C

(3) T_{case} = −40 °C

Fig 33. Output third-order intercept point as a function of frequency



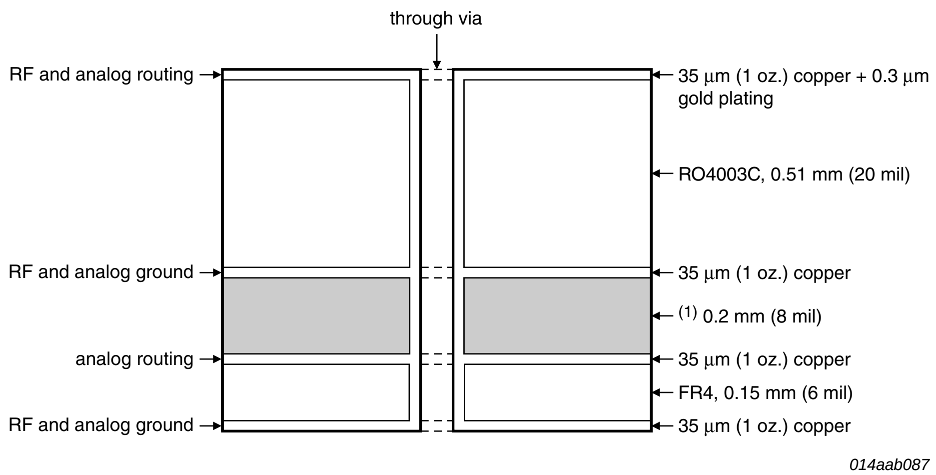
See Table 15 for a list of components.

Fig 34. 2405 MHz to 2485 MHz application reference board

Table 15. 2405 MHz to 2485 MHz list of components
See Figure 29 and Figure 34 for component layout.
Printed-Circuit Board (PCB): Rogers RO4003C stack; height = 0.508 mm; copper plating thickness = 35 μm.

Component	Description	Value	Function	Remarks
C1,C4	capacitor	15 pF	DC blocking	GRM1885C1H150JA01D
C2	capacitor	1.5 pF	input match	Murata, GRM1885C1H1R5CZ01D
C3	capacitor	1.5 pF	output match	Murata, GRM1885C1H1R5CZ01D
C5	capacitor	15 pF	RF decoupling	Murata, GRM1885C1H150JA01D
C6	capacitor	100 nF	LF decoupling	AVX, 0603YC104KAT2A
C7	capacitor	10 μF	LF decoupling	AVX, 1206ZG106ZAT2A
L1	inductor	3.3 nH	input match	Tyco Electronics, 36501J3N3JTDG
L2	inductor	22 nH	DC Feed	Tyco Electronics, 36501J022JTDG
MSL1	micro stripline	1.14 mm × 0.8 mm × 10.95 mm	input match	Width (W) × Spacing (S) × Length (L)
MSL2	micro stripline	1.14 mm × 0.8 mm × 8.6 mm	input match	Width (W) × Spacing (S) × Length (L)
MSL3	micro stripline	1.14 mm × 0.8 mm × 2.8 mm	input match	Width (W) × Spacing (S) × Length (L)
MSL4	micro stripline	1.14 mm × 0.8 mm × 6.0 mm	output match	Width (W) × Spacing (S) × Length (L)
MSL5	micro stripline	1.14 mm × 0.8 mm × 5.9 mm	output match	Width (W) × Spacing (S) × Length (L)
MSL6	micro stripline	1.14 mm × 0.8 mm × 10.95 mm	output match	Width (W) × Spacing (S) × Length (L)
R1	resistor	1 Ω		Yageo, RC0603FR-071RL
R2	resistor	2 kΩ trimmer	bias adjustment	Bourns, 3214W-1-202E

12.5 PCB stack

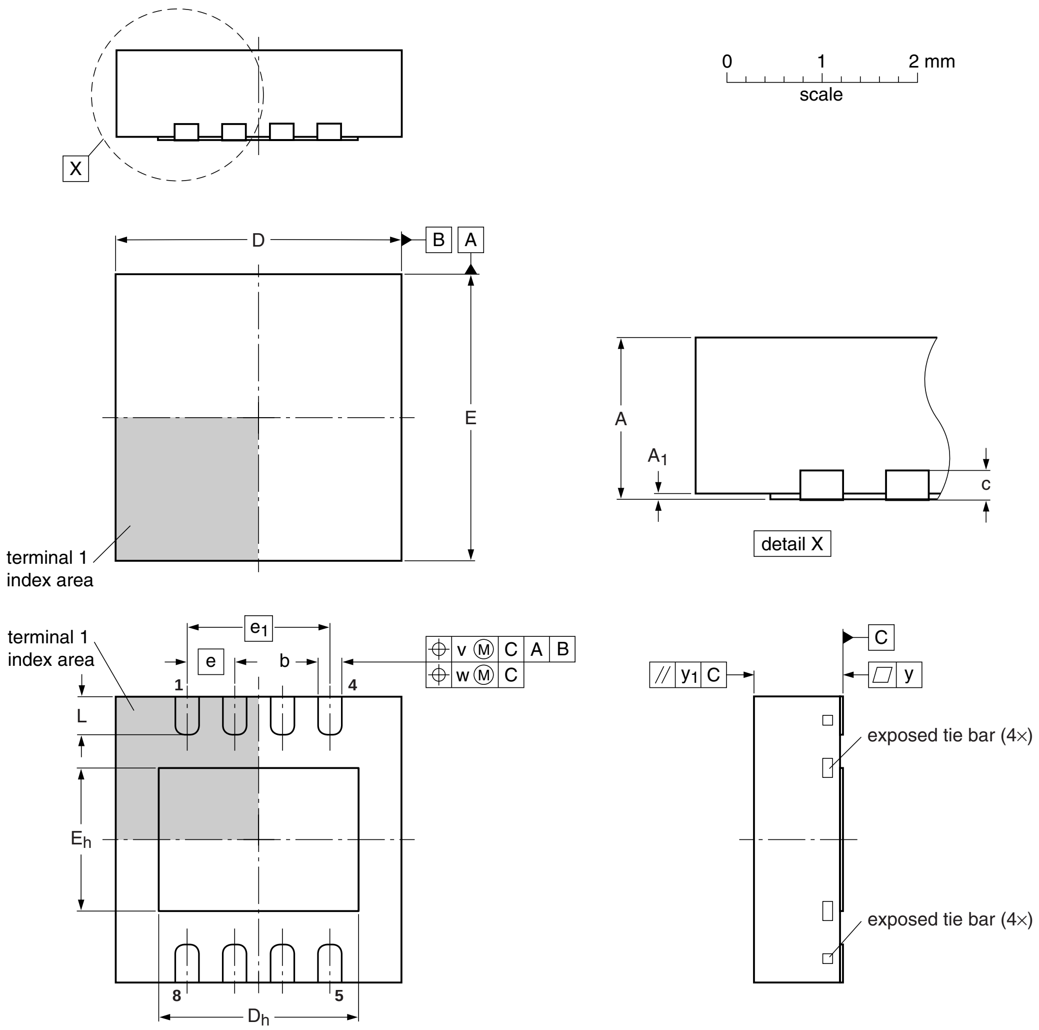


Dielectric constant for RO4003C; $\varepsilon_r = 3.38$

Fig 35. PCB stack

13. Package outline

HVSON8: plastic thermal enhanced very thin small outline package; no leads; 8 terminals; body 3 x 3 x 0.85 mm **SOT908-1**



DIMENSIONS (mm are the original dimensions)

UNIT	A(1) max.	A_1	b	c	D(1)	D_h	E(1)	E_h	e	e_1	L	v	w	y	y_1
mm	1	0.05 0.00	0.3 0.2	0.2	3.1 2.9	2.25 1.95	3.1 2.9	1.65 1.35	0.5	1.5	0.5 0.3	0.1	0.05	0.05	0.1

Note

1. Plastic or metal protrusions of 0.075 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT908-1		MO-229				~~05-09-26~~ 05-10-05

Fig 36. Package outline SOT908-1 (HVSON8)

14. Abbreviations

Table 16. Abbreviations

Acronym	Description
3GPP	3rd Generation Partnership Project
CPE	Customer-Premises Equipment
DC	Direct Current
DPCH	Dedicated Physical CHannel
ESD	ElectroStatic Discharge
HTOL	High Temperature Operating Life
ISM	Industrial, Scientific and Medical
MMIC	Monolithic Microwave Integrated Circuit
MoCA	Multimedia over Coax Alliance
RFID	Radio Frequency IDentification
SMA	SubMiniature version A
TX	Transmit
W-CDMA	Wideband Code Division Multiple Access
WLAN	Wireless Local Area Network

15. Revision history

Table 17. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BGA7127 v.3	20101203	Product data sheet	-	BGA7127 v.2
Modifications:	• Figure 10 on page 9: Figure has been changed • Figure 11 on page 9: Figure has been changed • Figure 25 on page 16: Figure has been changed • Figure 26 on page 16: Figure has been changed • Some page- layout enhancements have been made			
BGA7127 v.2	20100913	Product data sheet	-	BGA7127 v.1
BGA7127 v.1	20100726	Product data sheet	-	-

16. Legal information

16.1 Data sheet status

Document status[1][2]	Product status[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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18. Contents

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Date of release: 3 December 2010

Document identifier: BGA7127