

## Apple 3G iPhone

### Quad-band GSM/Tri-band W-CDMA with EDGE/HSDPA Report # 11000-080711-BCg

Weight: 134.8 grams measured  
(1.8 grams more than spec)



### Product Description:

Accompanied by media frenzy, the July 2008 release of the Apple 3G iPhone proved to be an event of worldwide significance. Retaining the sleek glass-faced bar form and touchscreen interface of its predecessor, the new iPhone builds on an established platform by doubling available memory and adding functionality. Of particular interest is the addition of W-CDMA/HSDPA capability and Assisted GPS, improvements that propel the 3G iPhone into the "World Phone" arena. Both the 8GB and 16GB models were examined for this report. With the exception of memory capacity, the two are essentially identical. The now-familiar feature set, including orientation-sensitive display, 2.0MP camera, 802.11b/g WiFi, Bluetooth, music and video player, and games, is again integrated into a highly intuitive user environment.

### Report Contents:

- Detailed external & internal photos
- Detailed step-by-step disassembly
- Power measurements
- Block Diagram
- Circuit board & packaging metrics
- Complete parts list & component count
- Manufacturing cost analysis
- Description of most interesting electronic features & packaging concepts

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## Integrated Circuit Components

Functional Area	Location	Package Info										Die Info				Estimated Costs				
		Qty	Brand Name	Part Number	Die Description	Form	Pin Count	Pch (mm)	Length (mm)	Width (mm)	Height (mm)	Die Pch	Die Qty	Brand Name	Part Number	Die Description	Length (mm)	Width (mm)	Both	ToBI
Power	Main Board, Board 1	1	Infineon Microelectronics	PM86917	Mobile MultiMedia 800 EEC	BGA (QFP)	65	0.50	5.00	4.50	0.59	1.1	1	Infineon Microelectronics	PM86917	Mobile MultiMedia 800 EEC	3.46	3.22	0.0794	0.1295
		2	IXP Semiconductor	PEF53033	Power Management	BGA	69	0.50	6.00	5.50	0.59	2.1	1	IXP Semiconductor	PEF53033	Power Management	3.46	3.36	1.5203	1.5203
		3	Infineon	PM86920	Cellular Power Management	BGA (QFP)	61	0.50	5.00	5.00	0.59	3.1	1	Infineon	PM86920	Cellular Power Management	3.71	3.69	1.5203	1.5203
		4	Linear Technology	LTC4089-2	Battery Charge/FSB Controller	DFP	14	0.50	3.99	2.99	0.89	4.1	1	Linear Technology	LTC4089-2	Battery Charge/FSB Controller	1.93	1.43	0.0263	0.2283
		5	BTMicroelectronics	LM8313L	3-axis Accelerance for MEMS Micro	BGA (Micro) >1	16	0.50	3.01	3.01	1.01	5.2	1	BTMicroelectronics	LM8313L	3-axis Accelerance for MEMS Micro	2.14	1.84	0.0513	0.5913
		6	Maxim	MAX9818	EEPROM Controller ?	DFP (Chip, Bumper (QFP)	16	0.50	2.00	2.00	0.63	6.1	1	Maxim	MAX9818	EEPROM Controller ?	2.09	2.09	0.3442	0.3442
		7	Linear Technology	LT3460	Step-up DC/DC Converter	DFP (Chip, Bumper (QFP)	6	0.50	1.90	1.90	0.91	9.1	1	Linear Technology	LT3460	Step-up DC/DC Converter	0.84	0.91	0.1110	0.1110
		8	Texas	T909914401	200mA 1.5V LDO Regulator	DFP (Chip, Bumper (QFP)	4	0.50	0.96	0.96	0.80	0.1	1	Texas	T909914401	200mA 1.5V LDO Regulator	0.97	0.96	0.1263	0.1263
		9	IXP Semiconductor	14LVC2033	3.3V 20mA I/O Buffer	DFP	6	0.50	1.90	1.90	0.45	9.1	1	IXP Semiconductor	14LVC2033	3.3V 20mA I/O Buffer	0.62	0.41	0.0703	0.1410
		10	IXP Semiconductor	14AU20126	3.3V 20mA I/O Buffer	DFP	6	0.50	1.93	1.93	0.47	10.1	1	IXP Semiconductor	14AU20126	3.3V 20mA I/O Buffer	0.56	0.43	0.0703	0.0703
		12	IXP Semiconductor	14LVC1069	Multi-Function Diode	DFP	6	0.50	1.98	1.98	0.48	12.1	1	IXP Semiconductor	14LVC1069	Multi-Function Diode	0.61	0.35	0.0363	0.0363
		13	Infineon Microelectronics	17588	100mA 1.5V 200mA LDO Voltage Regulator	DFP (Chip, Bumper (QFP)	6	0.50	1.93	1.93	0.56	13.1	1	Infineon Microelectronics	17588	100mA 1.5V 200mA LDO Voltage Regulator	1.93	1.93	0.1163	0.363
		15	Infineon Microelectronics	LM8313A	LDO Regulator	DFP (Chip, Bumper (QFP)	6	0.40	1.22	0.52	0.43	15.1	1	Infineon Microelectronics	LM8313A	LDO Regulator	1.22	0.52	0.1110	0.1110
		16	IXP Semiconductor	81724416	Passive Filter for USB	DFP (Chip, Bumper (QFP)	6	0.50	1.94	1.25	0.55	16.1	1	IXP Semiconductor	81724416	Passive Filter for USB	1.33	1.25	0.0363	0.363
		17	Maxim	1509A100	100mA LDO Regulator	DFP (Chip, Bumper (QFP)	4	0.50	0.96	0.96	0.45	9.1	1	Maxim	1509A100	100mA LDO Regulator	0.97	0.96	0.0703	0.0703
		18	IXP Semiconductor	14AU20126	3.3V 20mA I/O Buffer	DFP	6	0.50	1.93	1.93	0.47	10.1	1	IXP Semiconductor	14AU20126	3.3V 20mA I/O Buffer	0.56	0.43	0.0703	0.0703
		19	Maxim	MAX9212	Media Line Driver	DFP (Chip, Bumper (QFP)	6	0.50	1.46	1.46	0.39	19.1	1	Maxim	MAX9212	Media Line Driver	1.46	1.46	0.1863	0.1863
		21	IXP Semiconductor	14LVC1069	Single 2-Input AND Gate	DFP (QFP)	6	0.35	1.00	1.00	0.43	21.1	1	IXP Semiconductor	14LVC1069	Single 2-Input AND Gate	0.48	0.31	0.0263	0.1263
		22	IXP Semiconductor	14LVC2034	3.3V 20mA I/O Buffer	DFP (QFP)	6	0.35	1.00	1.00	0.43	22.1	1	IXP Semiconductor	14LVC2034	3.3V 20mA I/O Buffer	0.56	0.45	0.0363	0.0363
		25	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	25.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.47	0.30	0.0363	0.0363
26	IXP Semiconductor	14AU20126	3.3V 20mA I/O Buffer	DFP	6	0.35	1.00	1.00	0.43	26.1	1	IXP Semiconductor	14AU20126	3.3V 20mA I/O Buffer	0.56	0.41	0.0363	0.1263		
27	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	27.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.46	0.29	0.0363	0.0363		
28	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	28.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.47	0.30	0.0363	0.0363		
29	IXP Semiconductor	14AU20126	3.3V 20mA I/O Buffer	DFP	6	0.35	1.00	1.00	0.43	29.1	1	IXP Semiconductor	14AU20126	3.3V 20mA I/O Buffer	0.46	0.29	0.0363	0.0363		
29	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	29.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.46	0.29	0.0363	0.0363		
30	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	30.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.46	0.29	0.0363	0.0363		
30	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	30.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.46	0.29	0.0363	0.0363		
30	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	30.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.46	0.29	0.0363	0.0363		
30	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	30.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.46	0.29	0.0363	0.0363		
30	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	30.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.46	0.29	0.0363	0.0363		
30	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	30.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.46	0.29	0.0363	0.0363		
30	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	30.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.46	0.29	0.0363	0.0363		
30	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	30.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.46	0.29	0.0363	0.0363		
30	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	30.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.46	0.29	0.0363	0.0363		
30	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	30.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.46	0.29	0.0363	0.0363		
30	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	30.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.46	0.29	0.0363	0.0363		
30	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	30.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.46	0.29	0.0363	0.0363		
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30	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	DFP	6	0.35	1.00	1.00	0.43	30.1	1	IXP Semiconductor	14LVC1039	Single 8-Input OR Gate	0.46					

## Active Discrete Components

Location	Functional Area	Qty	Functional Description	Package					Estimated Costs	
				Form	Top Marking	Pin Count	Length (mm)	Width (mm)	Each	Total
Main Board, Side 1	Analog	2	Diode	SOD-523f	DA	2	1.20	0.80	\$0.015	\$0.030
		3	Diode	SOD-523f	H L	2	1.20	0.80	\$0.015	\$0.045
		4	Transistor	ML3	H	3	1.00	0.80	\$0.025	\$0.100
		1	Transistor	SOT-490f	KB H	3	1.60	1.60	\$0.025	\$0.025
		3	Diode Array		N K	6	1.00	1.00	\$0.040	\$0.120
		1	Diode Array		2 E	5	1.00	1.00	\$0.030	\$0.030
		1	Transistor	SOT-490f	ARKV5	6	1.60	1.60	\$0.030	\$0.030
	Logic	1	Transistor	ML3	H	3	1.00	0.80	\$0.025	\$0.025
Display	1	Diode	SOD-723f	C	2	1.40	0.60	\$0.015	\$0.015	
Main Board, Side 2	Analog	1	Diode	SOD-723f	D	2	1.40	0.60	\$0.015	\$0.015
		1	Diode	SOD-723f	KA	2	1.40	0.60	\$0.015	\$0.015
Earpiece/Sensor Board, Side 1	Analog	1	Transistor	ML3	S C	3	1.00	0.60	\$0.025	\$0.025
Docking Board, Side 1	Analog	2	Diode Array		2 E	5	1.00	1.00	\$0.030	\$0.060
<b>TOTALS</b>		<b>22</b>				<b>76</b>			<b>\$0.53</b>	