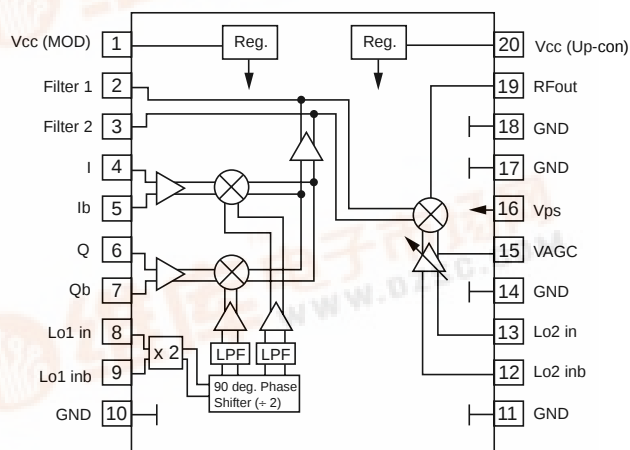


NEC**SILICON MMIC UPCONVERTER
WITH AGC + IQ MODULATOR****UPC8125GR****FEATURES**

- **WIDE SUPPLY VOLTAGE RANGE:** 2.7 to 5.5 V
- **OUTPUT FREQUENCY RANGE:** 1.8 to 2.0 GHz
- **INTERNAL LPF TO REJECT LO & SPURIOUS LEAKAGE**
- **PORTS FOR EXTERNAL IF FILTER**
- **AGC FUNCTION:** 40 dB RANGE
- **POWER SAVE FUNCTION**
- **SMALL 20 PIN SSOP PACKAGE**
- **TAPE AND REEL PACKAGING AVAILABLE**

DESCRIPTION

The UPC8125GR is a Silicon MMIC manufactured with the NESAT III™ silicon bipolar process. The IC consists of a 1.8 - 2.0 GHz upconverter with AGC function and a 220 - 270 MHz IQ modulator. The device operates over a wide 2.7 - 5.5 V supply voltage range and features a power save function. The device

INTERNAL BLOCK DIAGRAM (Top View)

was specifically designed for digital mobile communication applications such as 1900 MHz PCS and PHS handsets.

NEC's stringent quality assurance and test procedures ensure the highest reliability and performance.

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, $V_{CC} = 3.0\text{ V}$, unless otherwise specified)

PART NUMBER PACKAGE OUTLINE			UPC8125GR S20 (SSOP 20)		
SYMBOLS	PARAMETERS AND CONDITIONS		MIN	TYP	MAX
I_{CC}	Total Circuit Current (no input signal)			36	
$I_{CC(PS)}$	Total Circuit Current at Sleep Mode	$V_{PS} \leq 0.5\text{ V (Low)}$		0.3	10
PR_{Fout1}	Total Output Power 1	$V_{AGC} = 3.0\text{ V}$		-10	
PR_{Fout2}	Total Output Power 2	$V_{AGC} = 0.5\text{ V}$		-50	
LOL	Lo Carrier Leak	$f_{Lo1} + f_{Lo2}$		-37	-30
ImR	Image Rejection (Side Band leak)			-35	-30
IM3 I/Q	I/Q 3rd Order Intermodulation Distortion ²			-50	-30
GCR	AGC Amp. Gain control range	$V_{AGC} = 3\text{ V to }0.5\text{ V}$	25	40	
TPS(RISE)	Power Save Rise Time	$V_{PS}(\text{OFF}) \rightarrow V_{PS}(\text{ON})$		2	5
TPS(FALL)	Power Save Fall Time	$V_{PS}(\text{ON}) \rightarrow V_{PS}(\text{OFF})$		2	5
$Z_{I/Q}$	Input Impedance I and Q Ports ²	$f_{I/Q} = 24\text{ KHz}, I \rightarrow I_b, Q \rightarrow Q_b$		200	
$I_{I/Q}$	I/Q Bias Current	$I \rightarrow I_b, Q \rightarrow Q_b$		5	
Z_{Lo1}	Lo1 Input VSWR	$f_{Lo1} = 220\text{ MHz to }270\text{ MHz}$		1.2:1	
EVM	Error Vector Magnitude	MOD Pattern : PN9		2.5	
P_{adj}	Adjacent Channel Power	$\Delta f = 600\text{ KHz}$ MOD Pattern : PN9		-68	

Notes:

1. $P_{PIN} = -20\text{ dBm}$ 2. $V_{I/Q} = 1.5\text{ V (DC)} + 0.5\text{ Vp-p (AC)}$

UPC8125GR

ABSOLUTE MAXIMUM RATINGS¹ (TA = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
VCC	Supply Voltage	V	6.0
VPS	Power Save Control Voltage	V	6.0
VAGC	AGC Control Voltage	V	6.0
PD	Power Dissipation ²	mW	430
TOP	Operating Temperature	°C	-40 to +85
TSTG	Storage Temperature	°C	-55 to +150

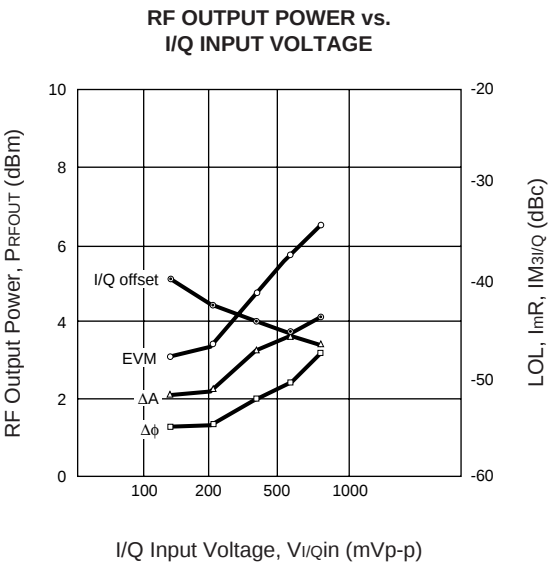
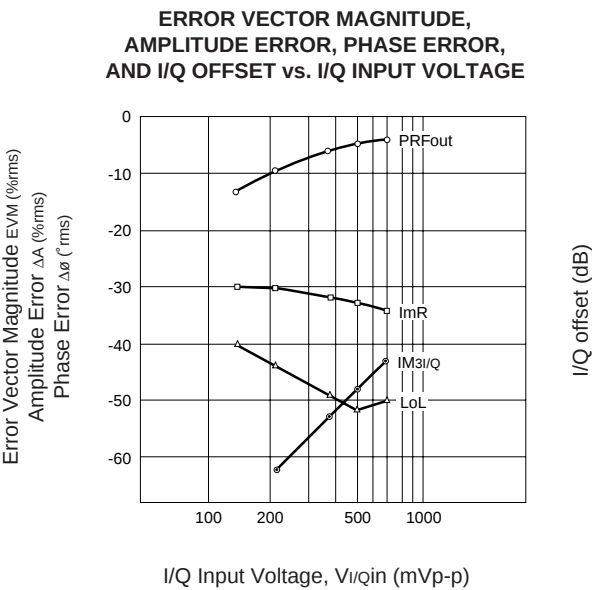
- Notes:
- Operation in excess of any one of these conditions may result in permanent damage.
 - TA = 25°C Mounted on a 50x50x1.6 mm double copper clad epoxy glass board.

RECOMMENDED OPERATING CONDITIONS

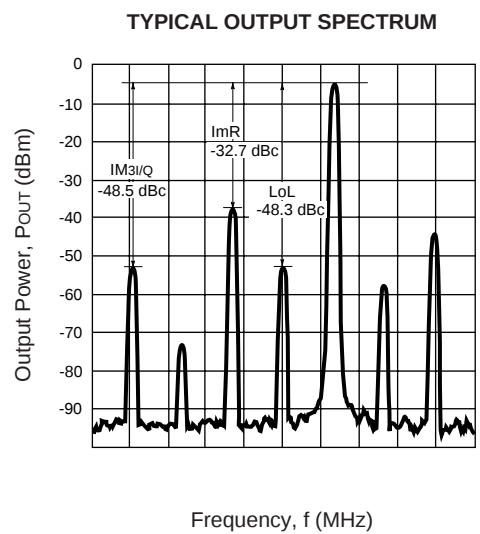
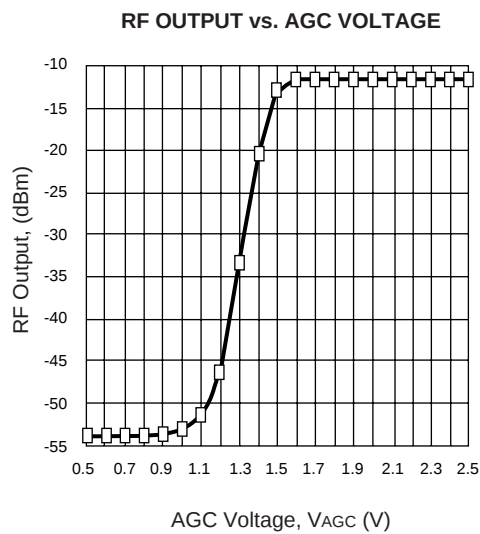
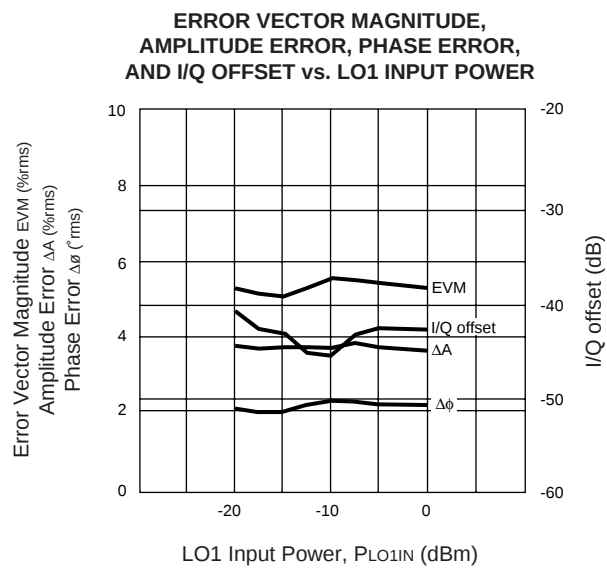
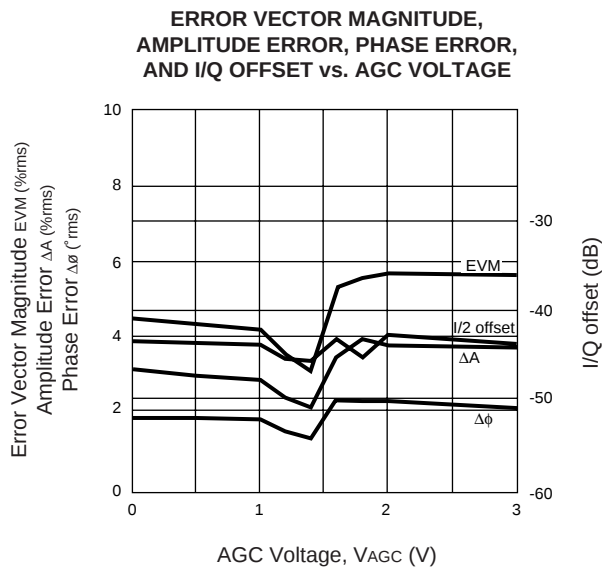
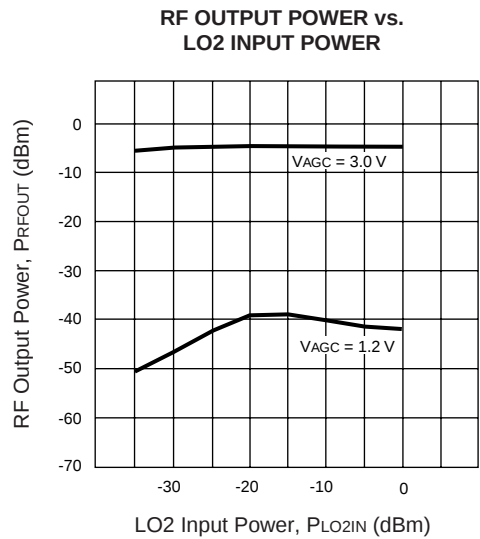
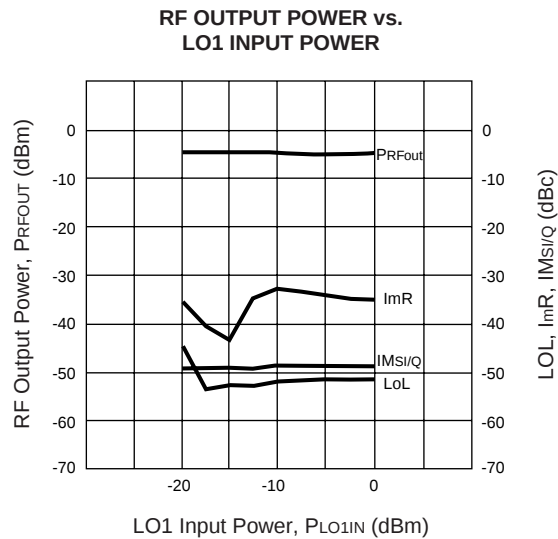
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
VCC	Supply Voltage	V	2.7	3.0	5.5
TOP	Operating Temperature	°C	-40	+25	+85
fRFout	Up Converter RF Frequency	GHz	1.8		2.0
fUPCONin	Up Converter Input Freq.	MHz	220		270
fMODout	Modulator Output Frequency				
fLO1in	Lo1 Input Frequency, PLO1in = -10 dBm				
fLO2in	Lo2 Input Frequency, PLO2in = -10 dBm	MHz	1500		1800
fi/Qin	I/Q Input Frequency, Vi/Qin = 500 mVp-p MAX (Single ended)	MHz	DC		10
PLo1in	Lo1 Input Level	dBm	(-13)	-10	-5
PLo2in	Lo2 Input Level	dBm	(-15)	-10	-5
Vi/Qin	I/Q Input Amplitude, Single ended Input	mVp-p			500
	Differential Input				250

- Notes:
- IF frequency range includes Up-Converter IF input, Modulator IF Output and Modulator LO Input Frequency (LO1).
 - Vi/QIN = 600 mVp-p maximum.

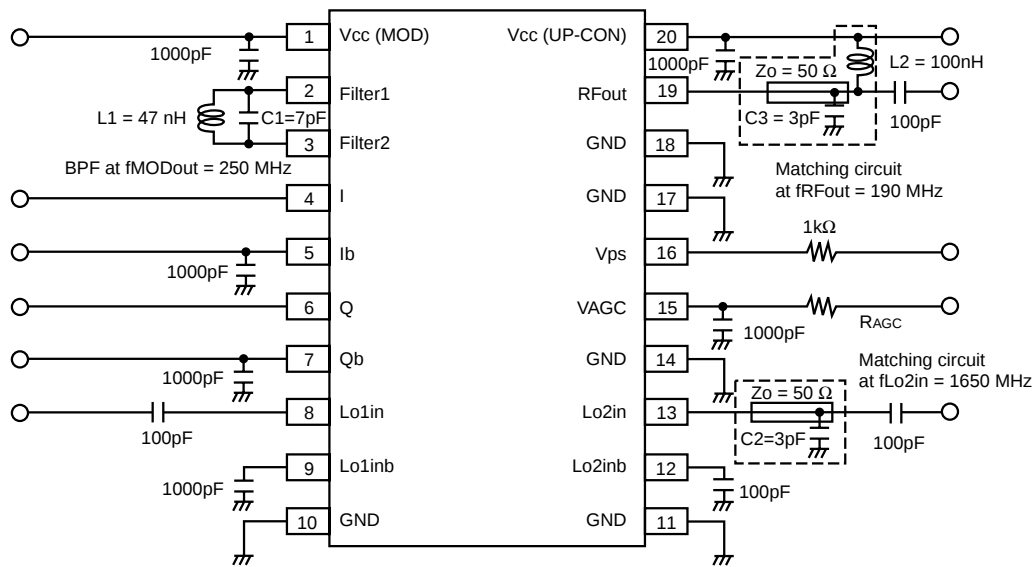
TYPICAL PERFORMANCE CURVES (TA = 25°C)



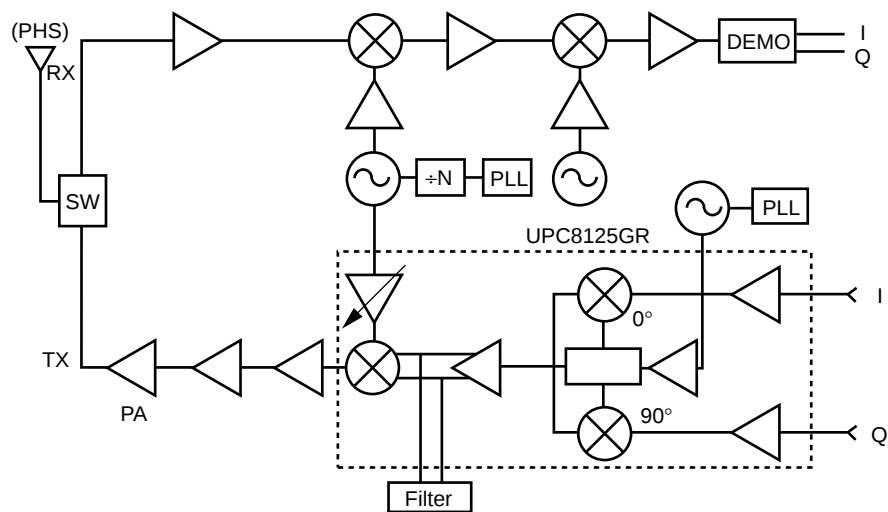
TYPICAL PERFORMANCE CURVES (T_A = 25°C)



APPLICATION CIRCUIT

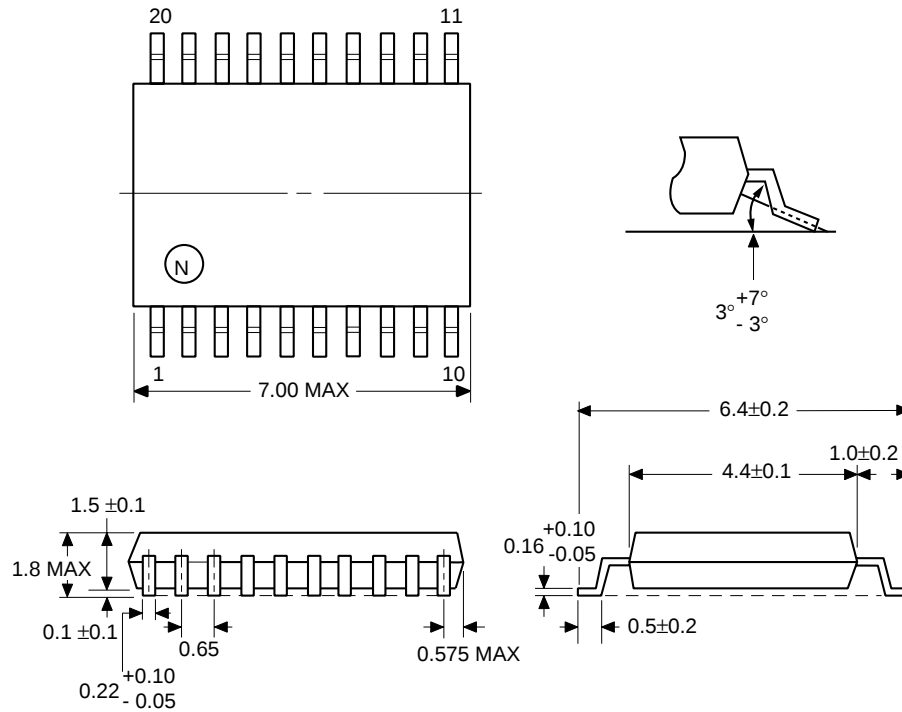


APPLICATION CIRCUIT



PACKAGE DIMENSIONS (Units in mm)

PACKAGE OUTLINE SSOP 20



ORDERING INFORMATION

PART NUMBER	QUANTITY
UPC8125GR-E1	2500/Reel

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PRINTED IN USA ON RECYCLED PAPER -7/97