PRELIMINARY DATA SHEET

NEC

SILICON MMIC L-BAND DOWNCONVERTER

UPC2734GR

FEATURES

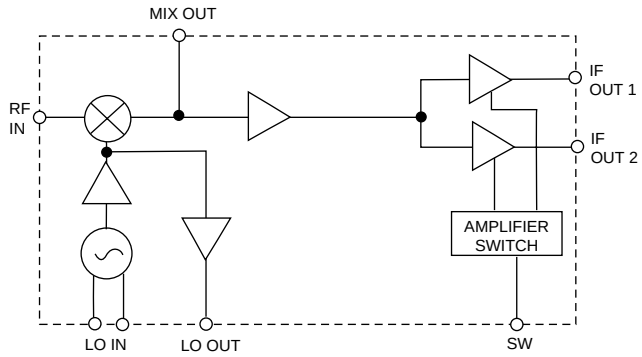
- **BROADBAND FREQUENCY OPERATION**
  RF = 0.9 - 2.1 GHz, LO = 1.1 - 2.5 GHz
- **HIGH DYNAMIC RANGE:**
  P_{SAT} = +5 dBm Typical
- **LOW DISTORTION:**
  IP_3 = +11 dBm Typical
- **SWITCHABLE IF OUTPUTS**
- **SMALL SSOP20 PACKAGE**
- **TAPE AND REEL PACKAGING AVAILABLE**

DESCRIPTION

The UPC2734GR Silicon MMIC Frequency Downconverter is manufactured using the NESAT III MMIC process. The NESAT III process produces transistors with f_T approaching 20 GHz. The device was designed specifically for use as a Receiver/Downconverter in wide-dynamic range DBS, compressed video or spread-spectrum receivers.

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

INTERNAL BLOCK DIAGRAM



SW	OUTPUT
$V_{SW} \leq 2$ V*	IF OUT 1
$V_{SW} \oplus 3$ V	IF OUT 2

* If SW is left open, IF OUT1 is selected.

ELECTRICAL CHARACTERISTICS[1] (T_A = 25° C, V_{CC} = 5 V, P_{LO} = -10 dBm)

PART NUMBER / PACKAGE OUTLINE			UPC2734GR S20 (SSOP20)		
SYMBOLS	**PARAMETERS AND CONDITIONS**	**UNITS**	**MIN**	**TYP**	**MAX**
I_{CC}	Circuit Current (no signal)	mA	28	40	52
f_{RF}	RF Frequency Range	GHz	0.9		2.1
CG	Conversion Gain f_{RF} = 900 MHz, f_{IF} = 402.8 MHz	dB	10	13	16
	f_{RF} = 900 MHz, f_{IF} = 479.5 MHz	dB	9	12	15
	f_{RF} = 2.1 GHz, f_{IF} = 402.8 MHz	dB	7.5	10.5	13.5
	f_{RF} = 2.1 GHz, f_{IF} = 479.5 MHz	dB	7	10	13
NF	Noise Figure f_{RF} = 900 MHz, f_{IF} = 402.8 MHz	dB		9	11
	f_{RF} = 900 MHz, f_{IF} = 479.5 MHz	dB		10	13
	f_{RF} = 2.1 GHz, f_{IF} = 402.8 MHz	dB		14	17
	f_{RF} = 2.1 GHz, f_{IF} = 479.5 MHz	dB		15	18
P_{SAT}	Saturated Output Power (P_{IN} = 0 dBm)				
	f_{RF} = 900 MHz, f_{IF} = 402.8 MHz	dBm	+1	+4	
	f_{RF} = 900 MHz, f_{IF} = 479.5 MHz	dBm	+0.5	+3.5	
	f_{RF} = 2.1 GHz, f_{IF} = 402.8 MHz	dBm	+1	+4	
	f_{RF} = 2.1 GHz, f_{IF} = 479.5 MHz	dBm	0	+3	
IP_3	SSB 3rd Order Intercept Point				
	f_1 = 900 MHz, f_2 = 930 MHz	dBm		+11	
	f_1 = 2.1 GHz, f_2 = 2.13 GHz	dBm		+10	

Note:
1. Test Circuit.

ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V_{CC}	Supply Voltage	V	6
P_D	Power Dissipation[2]	mW	433
T_{OP}	Operating Temperature	°C	-40 to +85
T_{STG}	Storage Temperature	°C	-65 to +150

Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
2. Mounted on a 50 x 50 x 1.6 mm epoxy glass PWB (T_A = +75°C).

RECOMMENDED OPERATING CONDITIONS

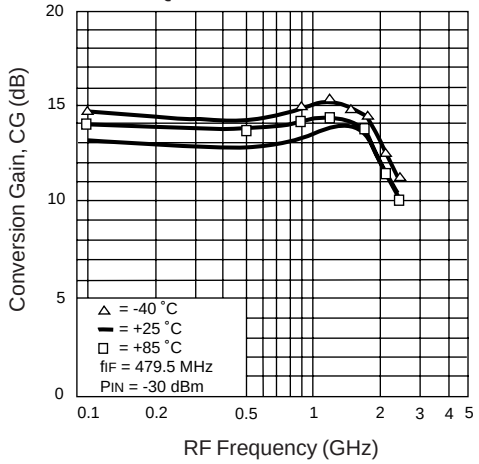
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
V_{CC}	Supply Voltage	V	4.5	5.0	5.5
T_{OP}	Operating Temperature	°C	-40	25	85

ELECTRICAL CHARACTERISTICS (T_A = 25° C, V_{CC} = 5 V, Measured using Application Circuit)

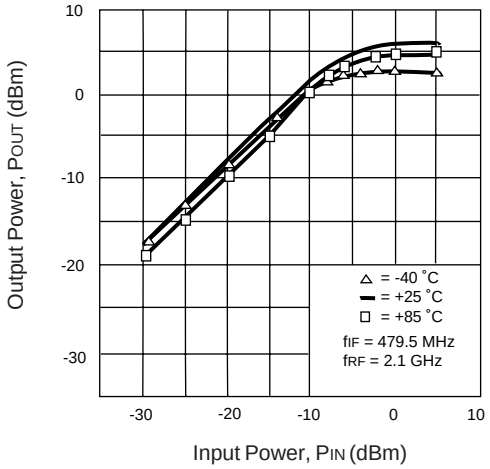
PART NUMBER PACKAGE OUTLINE			UPC2734GR S20 (SSOP20)		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
f_{RF}	RF Frequency Range	GHz	0.9		2.1
CG	Conversion Gain f_{RF} = 900 MHz, f_{IF} = 402.8 MHz	dB		14	
	f_{RF} = 900 MHz, f_{IF} = 479.5 MHz	dB		13.5	
	f_{RF} = 2.1 GHz, f_{IF} = 402.8 MHz	dB		14.5	
	f_{RF} = 2.1 GHz, f_{IF} = 479.5 MHz	dB		14	
NF	Noise Figure f_{RF} = 900 MHz, f_{IF} = 402.8 MHz	dB		9.7	
	f_{RF} = 900 MHz, f_{IF} = 479.5 MHz	dB		9.7	
	f_{RF} = 2.1 GHz, f_{IF} = 402.8 MHz	dB		11	
	f_{RF} = 2.1 GHz, f_{IF} = 479.5 MHz	dB		11	
P_{SAT}	Saturated Output Power (P_{IN} = 0 dBm)				
	f_{RF} = 900 MHz, f_{IF} = 402.8 MHz	dBm		+5	
	f_{RF} = 900 MHz, f_{IF} = 479.5 MHz	dBm		+4	
	f_{RF} = 2.1 GHz, f_{IF} = 402.8 MHz	dBm		+5	
	f_{RF} = 2.1 GHz, f_{IF} = 479.5 MHz	dBm		+5.5	
IP_3	SSB 3rd Order Intercept Point				
	f_{RF1} = 900 MHz, f_{RF2} = 930 MHz	dBm		+11	
	f_{RF1} = 2.1 GHz, f_{RF2} = 2.13 GHz	dBm		+11	

TYPICAL PERFORMANCE CURVES (V_{CC} = 5 V, from Test Circuit)

CONVERSION GAIN vs. RF FREQUENCY AND TEMPERATURE

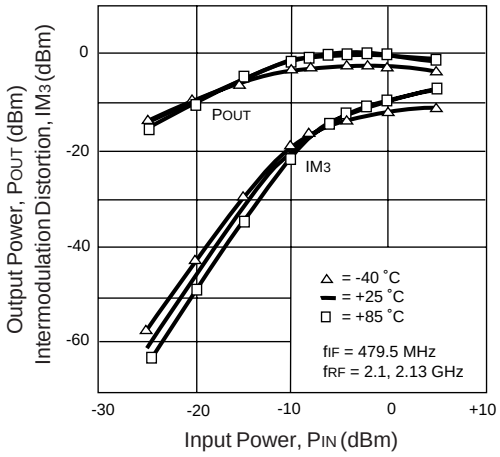


OUTPUT POWER vs. INPUT POWER AND TEMPERATURE

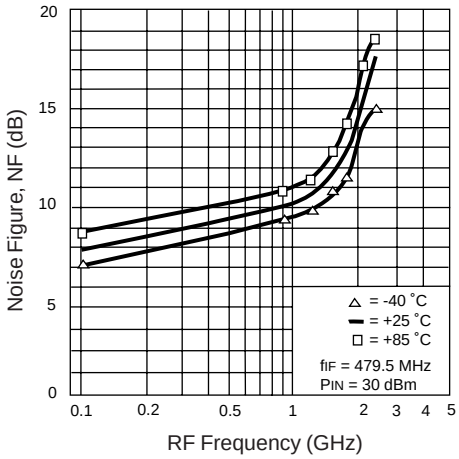


TYPICAL PERFORMANCE CURVES (V_{CC} = 5 V, from Test Circuit)

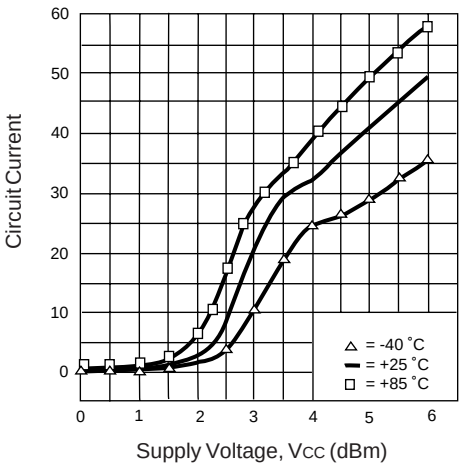
THIRD ORDER INTERMODULATION vs. INPUT POWER AND TEMPERATURE



NOISE FIGURE vs. RF FREQUENCY AND TEMPERATURE

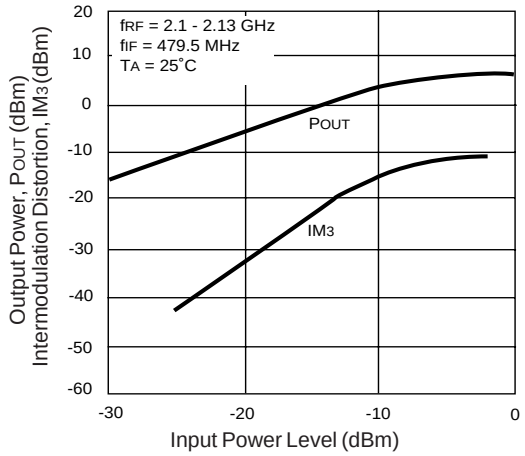


CIRCUIT CURRENT vs. VOLTAGE AND TEMPERATURE

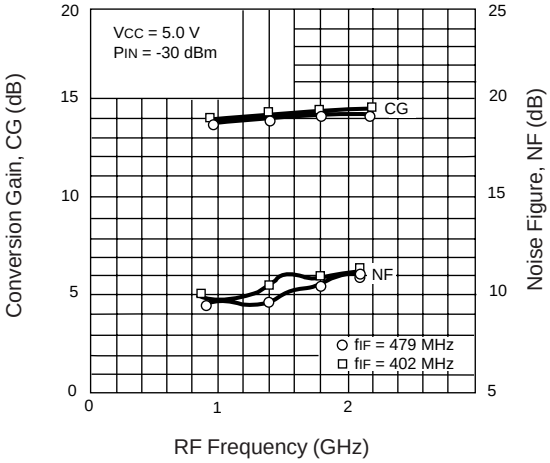


TYPICAL PERFORMANCE CURVES (V_{CC} = 5 V, from Application Circuit)

THIRD ORDER INTERMODULATION vs. INPUT POWER

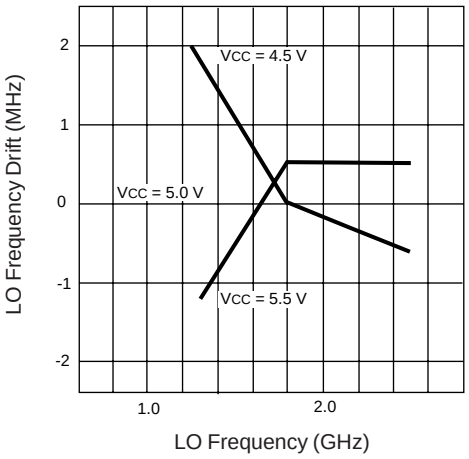


CONVERSION GAIN AND NOISE FIGURE vs. RF FREQUENCY

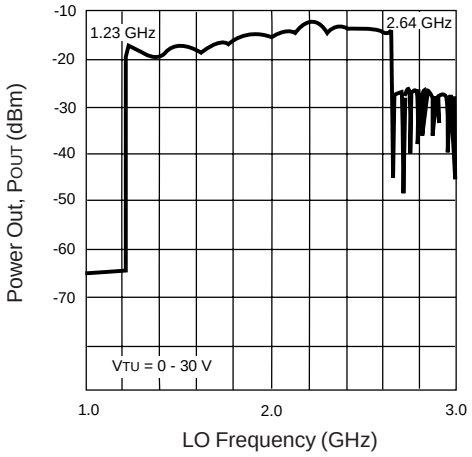


TYPICAL PERFORMANCE CURVES (T_A = 25°C, V_{CC} = 5 V unless otherwise specified, from Application Circuit)

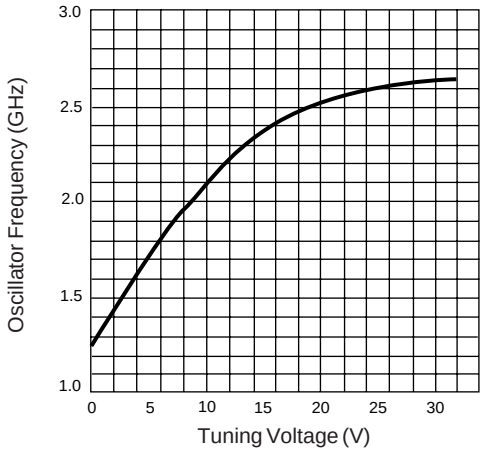
OSCILLATOR FREQUENCY DRIFT vs. SUPPLY VOLTAGE



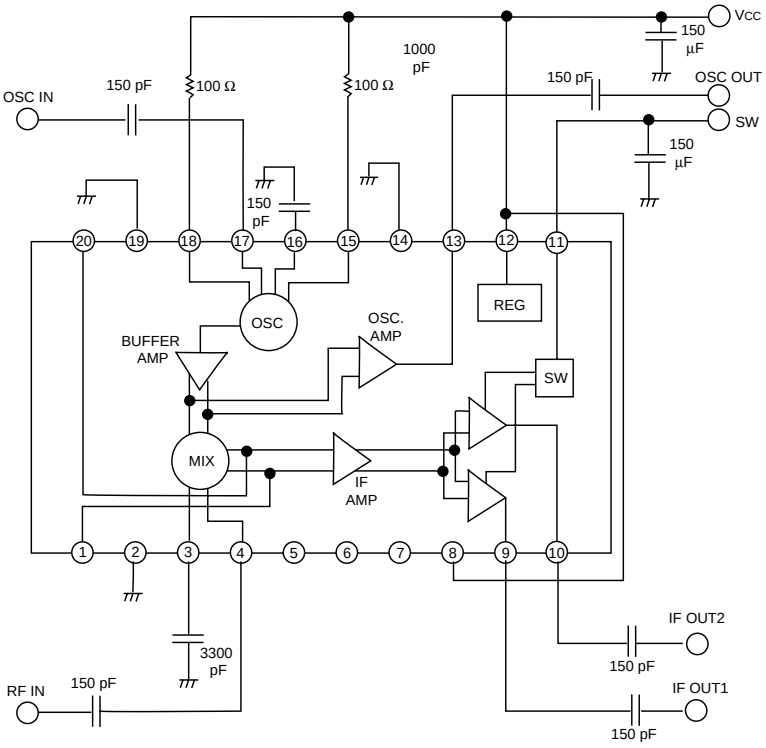
OSCILLATOR FREQUENCY BANDWIDTH



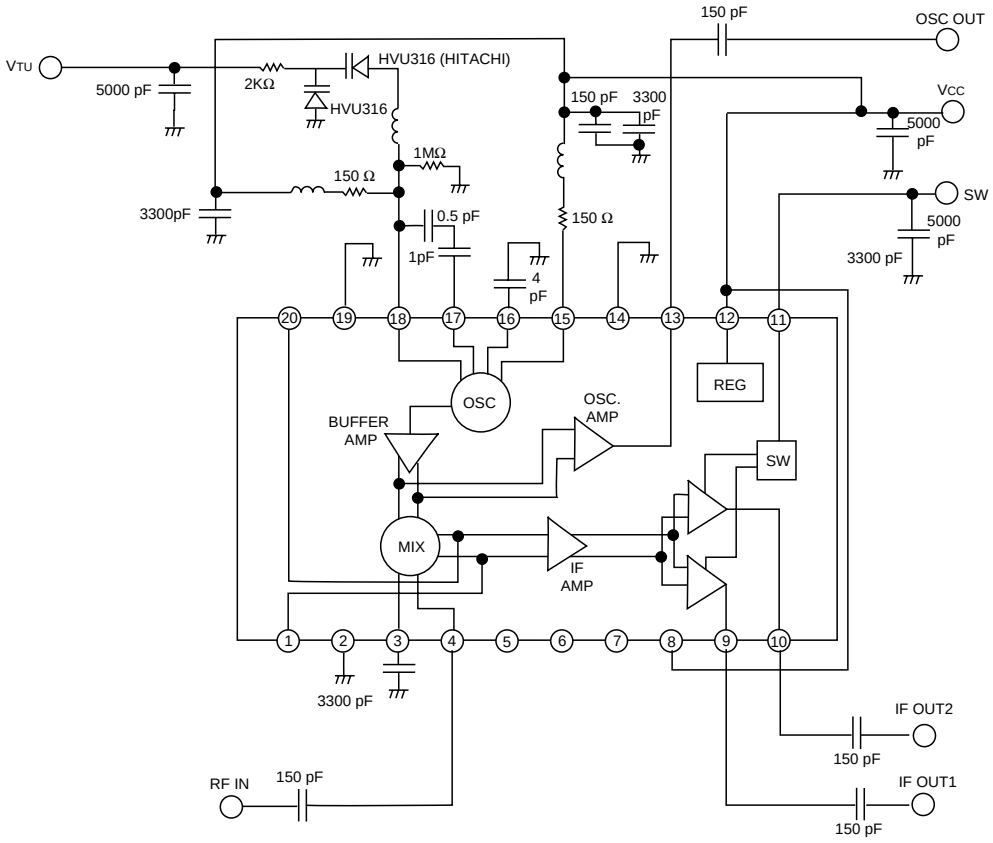
TUNING VOLTAGE vs. OSCILLATOR FREQUENCY



TEST CIRCUIT

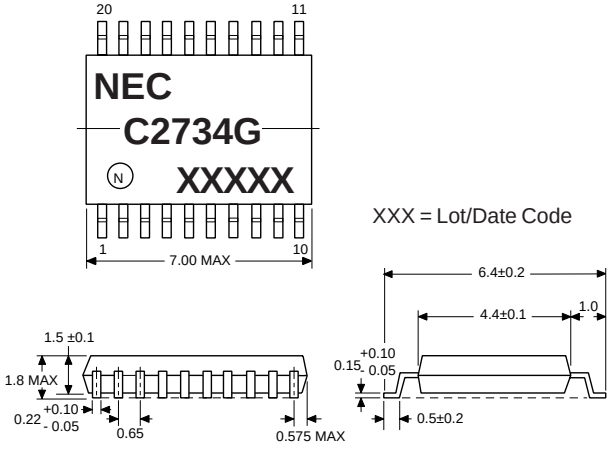


APPLICATION CIRCUIT



OUTLINE DIMENSIONS (Units in mm)

PACKAGE OUTLINE SSOP 20



All dimensions are typical unless otherwise specified.
Lead Material: Alloy 42
Lead Plating: Lead Tin Alloy

LEAD CONNECTIONS

1.	Mixer IF Output	11.	SW - IF Amp Switch
2.	GND	12.	VCC
3.	Bypass (RF IN)	13.	OSC OUT
4.	RF IN	14.	GND
5.	NC	15.	OSC Collector 1
6.	NC	16.	OSC Base 2
7.	NC	17.	OSC Base 1
8.	VCC	18.	OSC Collector 2
9.	IF OUT 1	19.	GND
10.	IF OUT 2	20.	Bypass (Mixer IF OUT)

NC = No Connection

ORDERING INFORMATION

PART NUMBER	QUANTITY
UPC2734GR-E1	2500/Reel

Note:
Embossed Tape, 12 mm wide.
Pins 1 through 10 are in tape pull-out direction.