

PRELIMINARY DATA SHEET

NEC

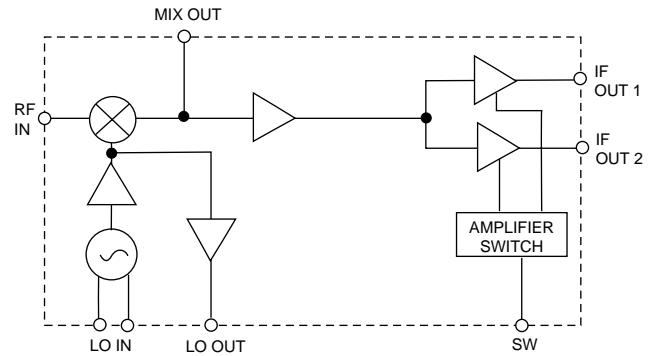
SILICON MMIC L-BAND DOWNCONVERTER

UPC2734GR

FEATURES

- **BROADBAND FREQUENCY OPERATION**
RF = 0.9 - 2.1 GHz, LO = 1.1 - 2.5 GHz
- **HIGH DYNAMIC RANGE:**
PSAT = +5 dBm Typical
- **LOW DISTORTION:**
IP3 = +11 dBm Typical
- **SWITCHABLE IF OUTPUTS**
- **SMALL SSOP20 PACKAGE**
- **TAPE AND REEL PACKAGING AVAILABLE**

INTERNAL BLOCK DIAGRAM



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.

| 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 CHARACTERISTICS¹ (TA = 25° C, VCC = 5 V, PLO = -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 |
| | | dB | 9 | 12 | 15 |
| | | dB | 7.5 | 10.5 | 13.5 |
| | | dB | 7 | 10 | 13 |
| NF | Noise Figure f _{RF} = 900 MHz, f _{IF} = 402.8 MHz | dB | | 9 | 11 |
| | | dB | | 10 | 13 |
| | | dB | | 14 | 17 |
| | | dB | | 15 | 18 |
| PSAT | Saturated Output Power (P _{IN} = 0 dBm) f _{RF} = 900 MHz, f _{IF} = 402.8 MHz | dBm | +1 | +4 | |
| | | dBm | +0.5 | +3.5 | |
| | | dBm | +1 | +4 | |
| | | dBm | 0 | +3 | |
| IP ₃ | SSB 3rd Order Intercept Point f ₁ = 900 MHz, f ₂ = 930 MHz | dBm | | +11 | |
| | | dBm | | +10 | |

Note:

1. Test Circuit.

ABSOLUTE MAXIMUM RATINGS¹ (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

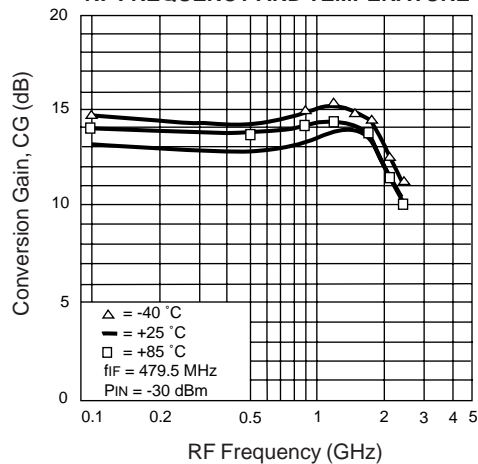
| SYMBOLS | PARAMETERS | UNITS | MIN | TYP | MAX |
|-----------------|-----------------------|-------|-----|-----|-----|
| V _{CC} | Supply Voltage | V | 4.5 | 5.0 | 5.5 |
| T _{OP} | Operating Temperature | °C | -40 | 25 | 85 |

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

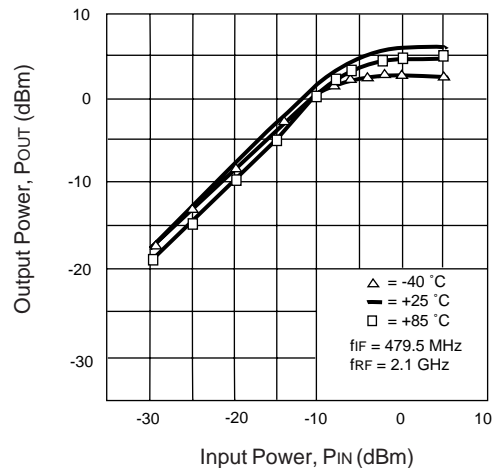
| PART NUMBER PACKAGE OUTLINE | | | UPC2734GR S20 (SSOP20) | | |
|--------------------------------|--|-------|---------------------------|------|-----|
| SYMBOLS | PARAMETERS AND CONDITIONS | UNITS | MIN | TYP | MAX |
| f _{RF} | RF Frequency Range | GHz | 0.9 | | 2.1 |
| CG | Conversion Gain f _{RF}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

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

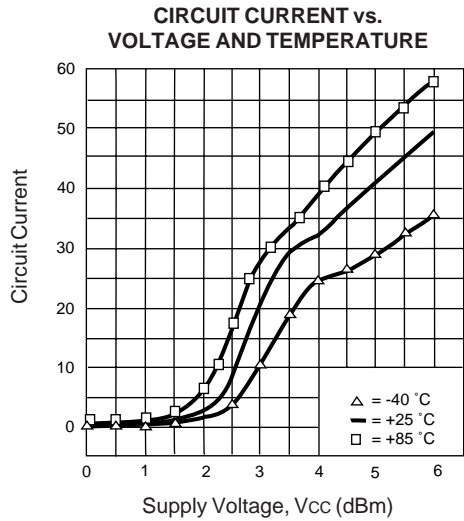
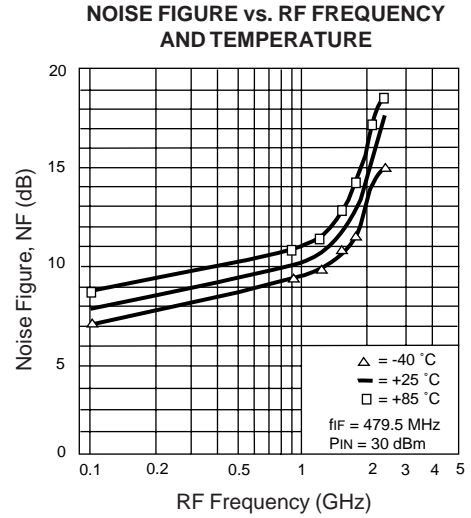
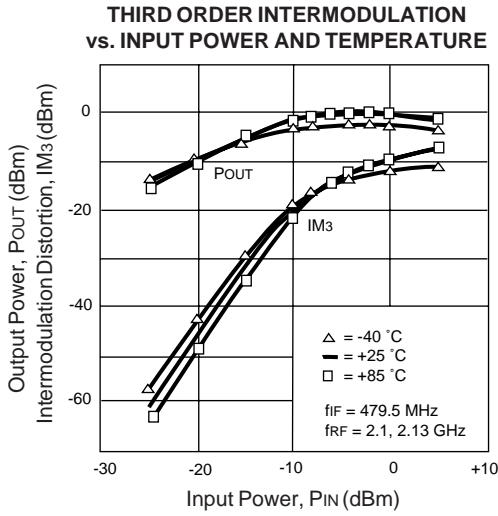
CONVERSION GAIN vs.
RF FREQUENCY AND TEMPERATURE



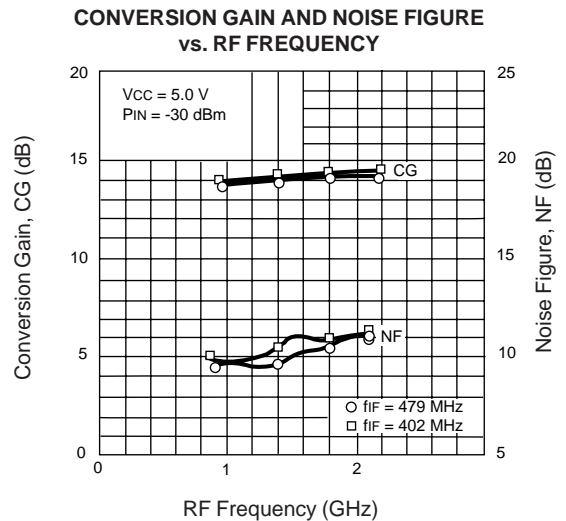
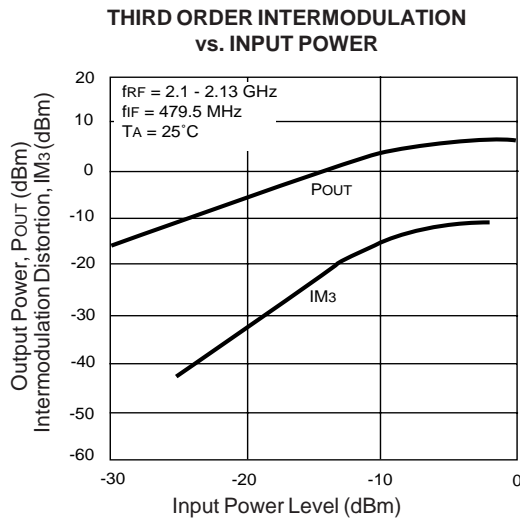
OUTPUT POWER vs. INPUT POWER
AND TEMPERATURE



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

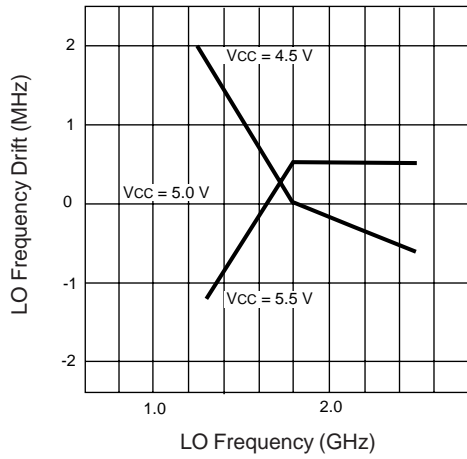


TYPICAL PERFORMANCE CURVES ($V_{CC} = 5\text{ V}$, from Application Circuit)

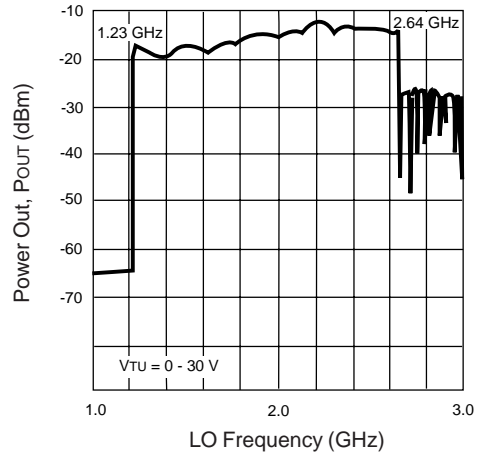


TYPICAL PERFORMANCE CURVES ($T_A = 25^\circ\text{C}$, $V_{CC} = 5\text{ V}$ unless otherwise specified, from Application Circuit)

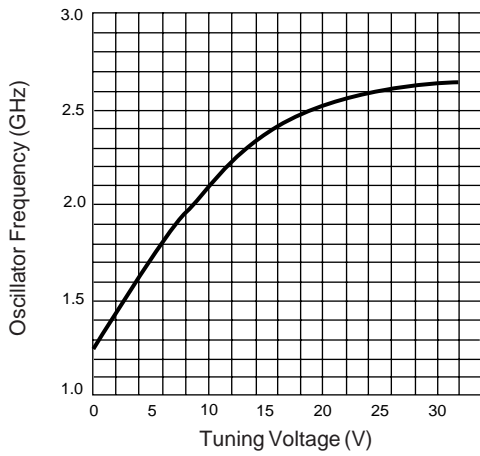
OSCILLATOR FREQUENCY DRIFT vs. SUPPLY VOLTAGE



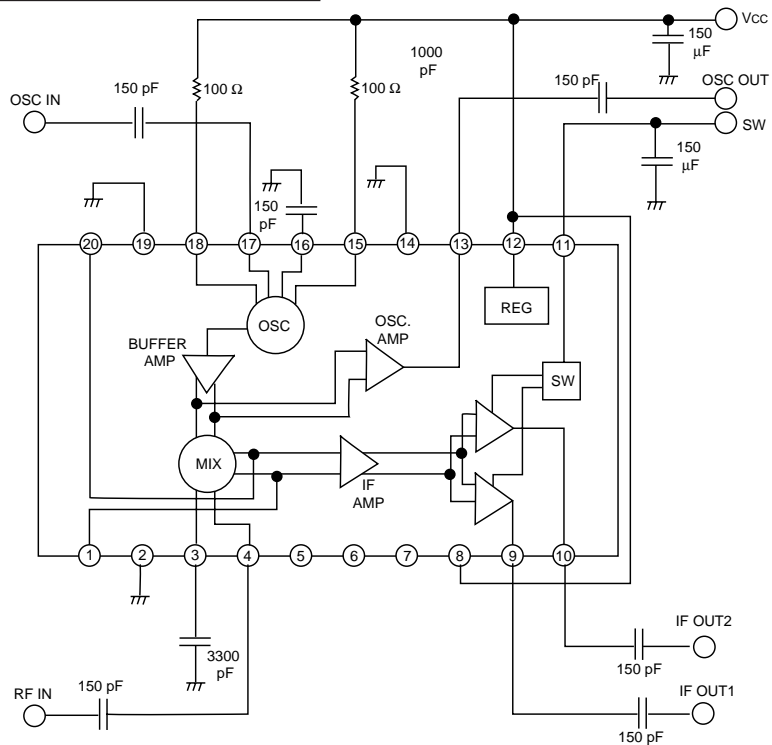
OSCILLATOR FREQUENCY BANDWIDTH



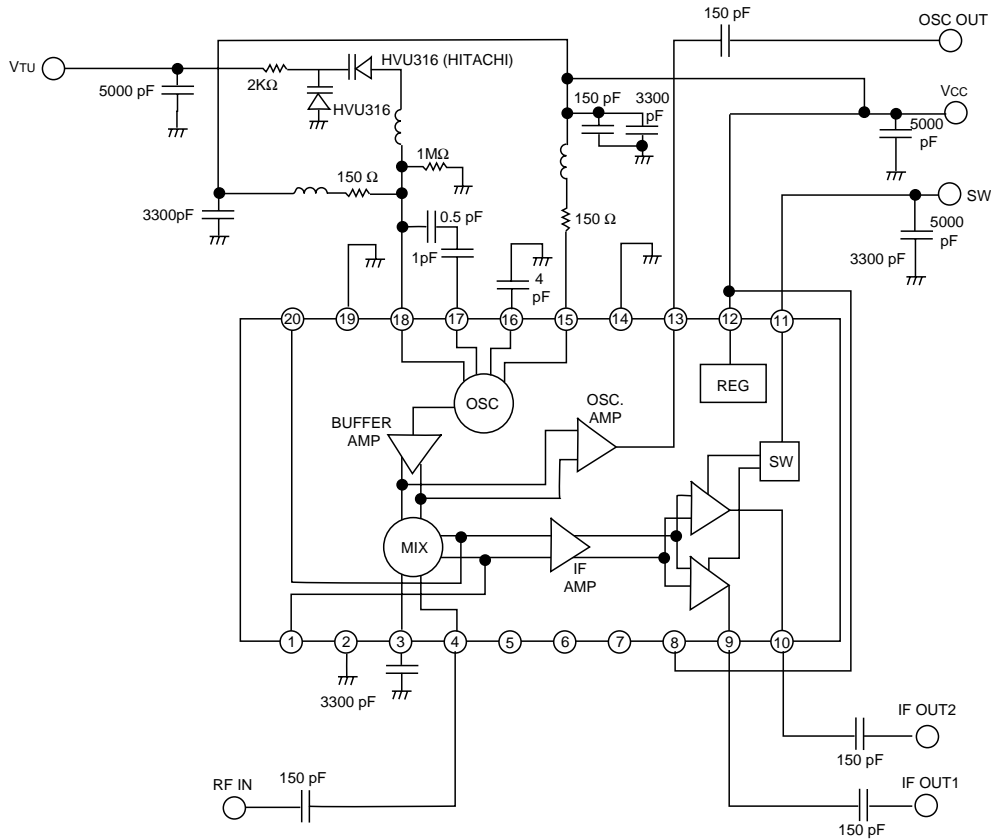
TUNING VOLTAGE vs. OSCILLATOR FREQUENCY



TEST CIRCUIT

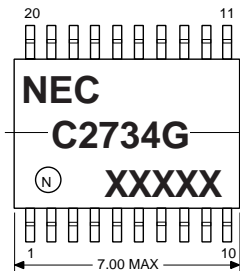


APPLICATION CIRCUIT

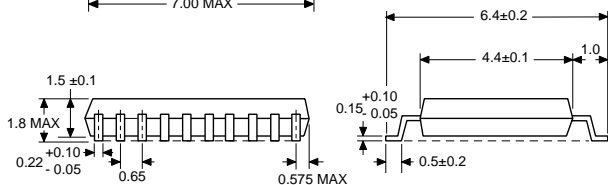


OUTLINE DIMENSIONS (Units in mm)

PACKAGE OUTLINE SSOP 20



XXX = Lot/Date Code



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.

EXCLUSIVE NORTH AMERICAN AGENT FOR **NEC** RF, MICROWAVE & OPTOELECTRONIC SEMICONDUCTORS

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