NEC

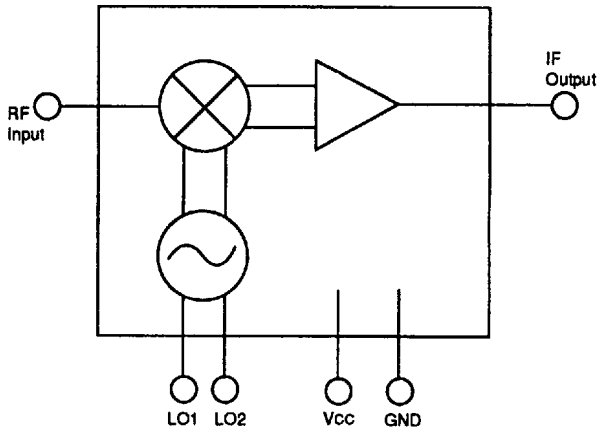
3 V SILICON MMIC L-BAND FREQUENCY DOWN CONVERTER

UPC2756T

FEATURES

- **WIDE BAND OPERATION:** RF = 0.1 to 2.0 GHz
- **ON BOARD OSCILLATOR**
- **LOW CURRENT CONSUMPTION:** 6 mA
- **SUPER SMALL T06 PACKAGE**
- **TAPE AND REEL PACKAGING OPTION AVAILABLE**

INTERNAL BLOCK DIAGRAM



DESCRIPTION

The UPC2756T is a silicon monolithic integrated circuit which is manufactured using the NESAT III process. The NESAT III process produces transistors with f_T approaching 20 GHz. This amplifier was designed as the first down converter for GPS and wireless communications. Operating on a 3 volt supply, this IC is ideally suited for hand held portable designs.

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

ELECTRICAL CHARACTERISTICS (T_A = 25 °C, Z_L = Z_S = 50 Ω, V_{CC} = 3 V)

PART NUMBER PACKAGE OUTLINE			UPC2756T T06		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
I_{CC}	Circuit Current (no signal)	mA	3.5	6.0	8.0
f_{RF}	RF Frequency Response (3 dB down from the gain at f_{RF} = 900 MHz, f_{IF} = 150 MHz)	GHz	0.1		2.0
f_{IF}	IF Frequency Response (3 dB down from the gain at f_{RF} = 900 MHz, f_{IF} = 150 MHz)	MHz	10		300
CG	Conversion Gain[1] f_{RF} = 900 MHz, f_{IF} = 150 MHz f_{RF} = 1.6 GHz, f_{IF} = 20 MHz	dB dB	11 11	14 14	17 17
NF	Noise Figure, f_{RF} = 900 MHz, f_{IF} = 150 MHz f_{RF} = 1.6 GHz, f_{IF} = 20 MHz	dB dB		10 13	13 16
P_{SAT}	Saturated Output Power[2], f_{RF} = 900 MHz, f_{IF} = 150 MHz f_{RF} = 1.6 GHz, f_{IF} = 20 MHz	dBm dBm	-11 -15	-8 -12	
IP_3	SSB Output 3rd Order Intercept Point, f_{RF} = 0.8~2.0 GHz, f_{IF} = 100 MHz	dBm		0	
ISO	LO Leakage, f_{LO} = 0.8~2.0 GHz at RF pin at IF pin	dBm dBm		-35 -23	
PN	Phase Noise[3] fosc = 1.9 GHz	dBc/Hz		-68	
$R_{TH\ (J-A)}$	Thermal Resistance (Junction to Ambient) Free Air Mounted on a 50 x 50 x 1.6 mm epoxy glass PWB	°C/W °C/W			620 230

Notes:
1. P_{IN} = -40 dBm.
2. P_{IN} = -10 dBm.
3. See Application Circuit.

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

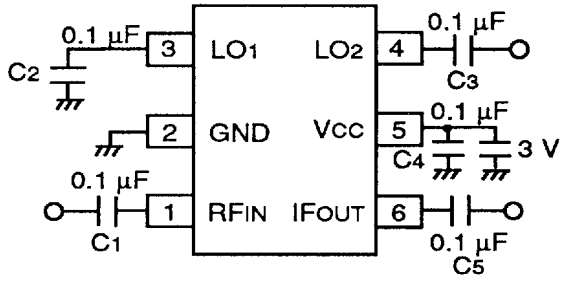
SYMBOLS	PARAMETERS	UNITS	RATINGS
V_{CC}	Supply Voltage	V	5.5
P_T	Total Power Dissipation[2]	mW	280
T_{OP}	Operating Temperature	°C	-40 to +85
T_{STG}	Storage Temperature	°C	-55 to +150

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 = +85°C).

RECOMMENDED OPERATING CONDITIONS

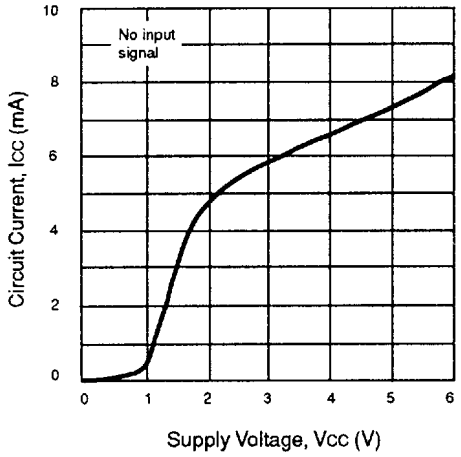
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
V_{CC}	Supply Voltage	V	2.7	3.0	3.3
T_{OP}	Operating Temperature	°C	-40	+25	+85

TEST CIRCUIT

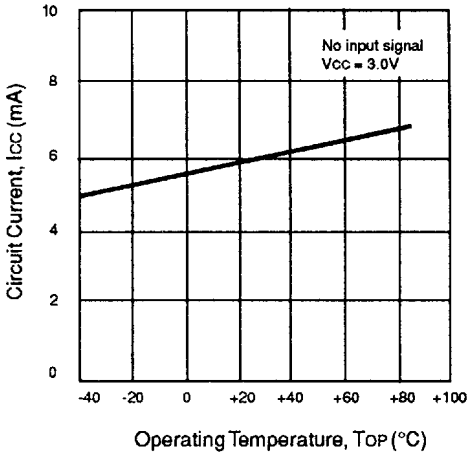


TYPICAL PERFORMANCE CURVES (T_A = 25°C unless otherwise specified)

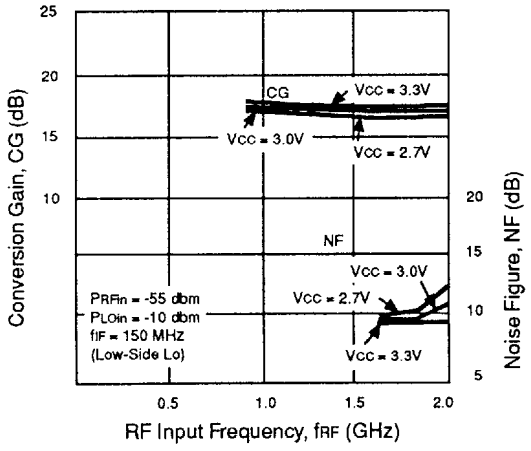
CIRCUIT CURRENT vs. VOLTAGE



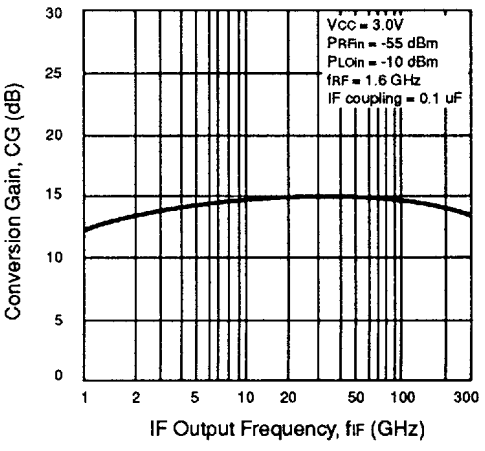
CIRCUIT CURRENT vs. TEMPERATURE



CONVERSION GAIN AND NOISE FIGURE vs. RF INPUT FREQUENCY



CONVERSION GAIN vs. IF OUTPUT FREQUENCY



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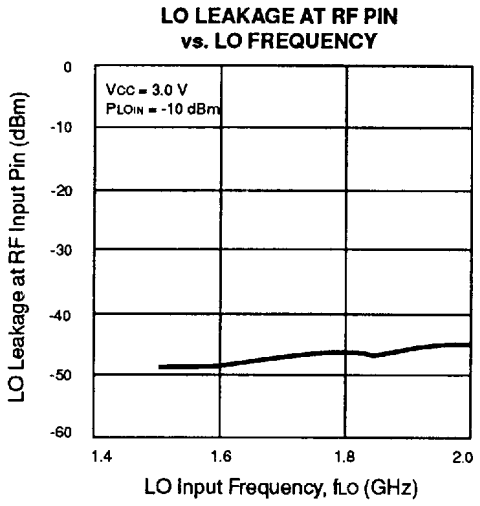
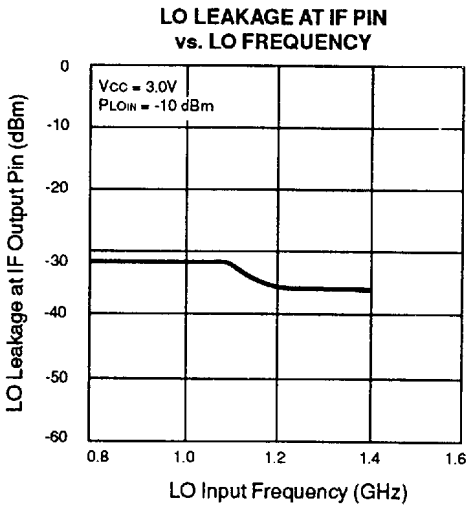
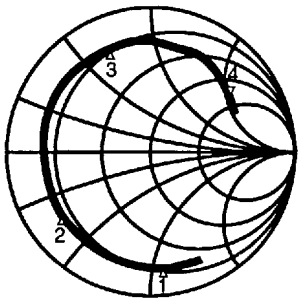
TYPICAL PERFORMANCE CURVES (T_A = 25°C)



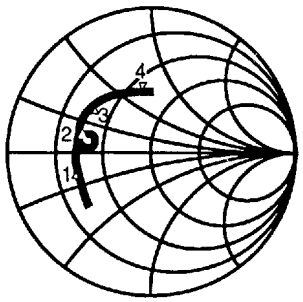


UPC2756T SCATTERING PARAMETERS



RF Port
V_{CC} = 3 V

1: 500 MHz 7.4 - j 54.8
2: 900 MHz 5.9 - j 14.9
3: 1500 MHz 9.7 + j 34.3
4: 1900 MHz 85.6 + j 104.4

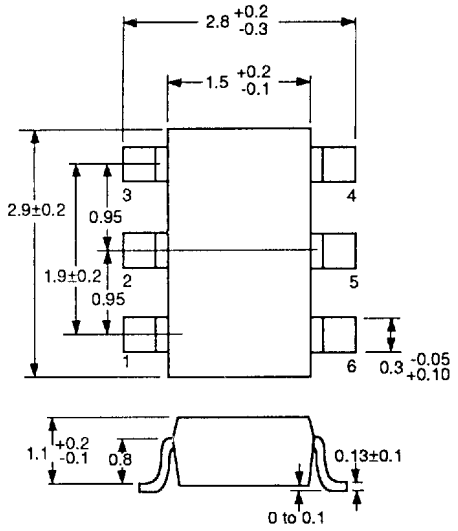


IF Port
V_{CC} = 3 V

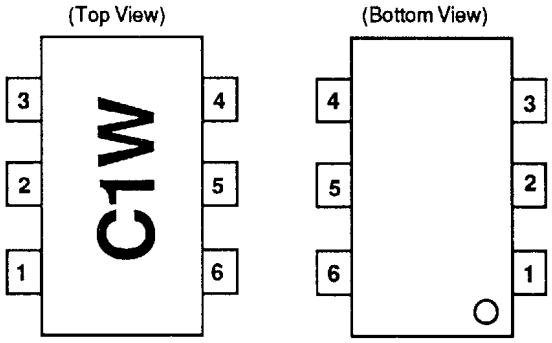
1: 20 MHz 18.0 - j 8.5
2: 80 MHz 18.9 - j 5.7
3: 130 MHz 21.1 + j 13.5
4: 240 MHz 29.8+ j 26.2

OUTLINE DIMENSIONS (Units in mm)

PACKAGE OUTLINE T06



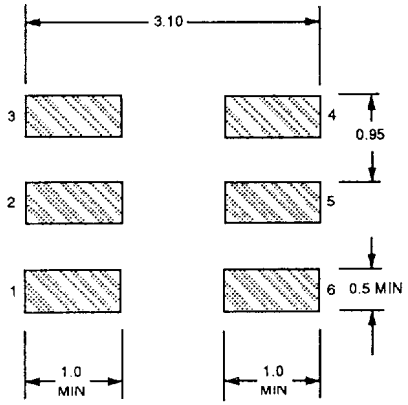
LEAD CONNECTIONS



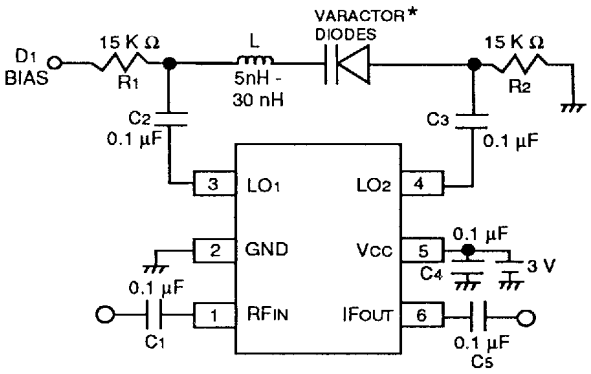
1. RF INPUT
2. GND
3. LO_1
4. LO_2
5. Vcc
6. IF OUTPUT

RECOMMENDED P.C.B. LAYOUT (Units in mm)

Note:
All dimensions are typical unless otherwise specified.



APPLICATION CIRCUIT EXAMPLE



* Recommended Varactor Diodes: Alpha SMV1204-4,
Toshiba 1SV186
or equivalent

ORDERING INFORMATION

PART NUMBER	QTY
UPC2756T-E3	3K/Reel

Note:
Embossed Tape, 8 mm wide,
Pins 1, 2, 3 are in tape pull-out direction.

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