

3 V SILICON MMIC L-BAND FREQUENCY DOWN CONVERTER

UPC2756T

FEATURES

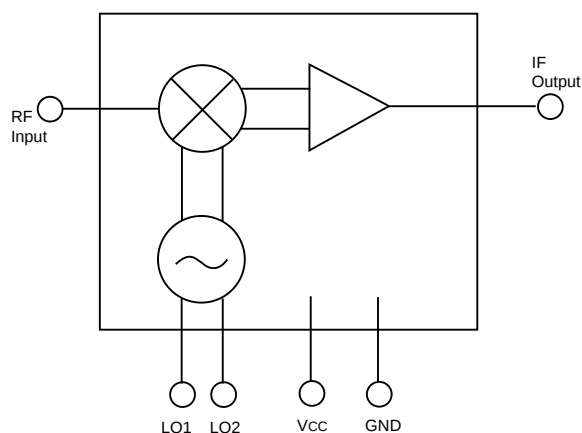
- **WIDE BAND OPERATION:** RF = 0.1 to 2.0 GHz
- **ON BOARD OSCILLATOR**
- **LOW CURRENT CONSUMPTION:** 6 mA
- **SUPER SMALL T06 PACKAGE**
- **TAPE AND REEL PACKAGING OPTION AVAILABLE**

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 device 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 ensure the highest reliability and performance.

INTERNAL BLOCK DIAGRAM



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

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	11	14	17
		dB	11	14	17
NF	Noise Figure f _{RF} = 900 MHz, f _{IF} = 150 MHz f _{RF} = 1.6 GHz, f _{IF} = 20 MHz	dB		10	13
		dB		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	-11	-8	
		dBm	-15	-12	
OIP 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		-35	
		at IF pin		-23	
PN	Phase Noise ³ , f _{osc} = 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			620
		°C/W			230

Notes:

1. P_{RF} = -40 dBm.

2. P_{RF} = -10 dBm.

3. See Application Circuit.

ABSOLUTE MAXIMUM RATINGS¹ (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

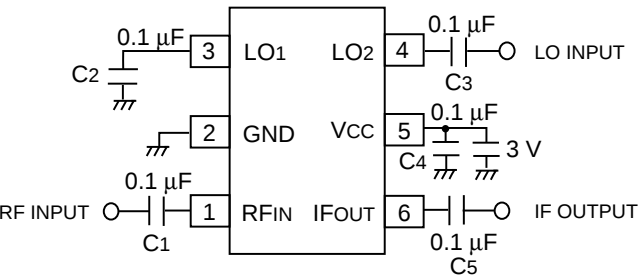
Notes:

- 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).

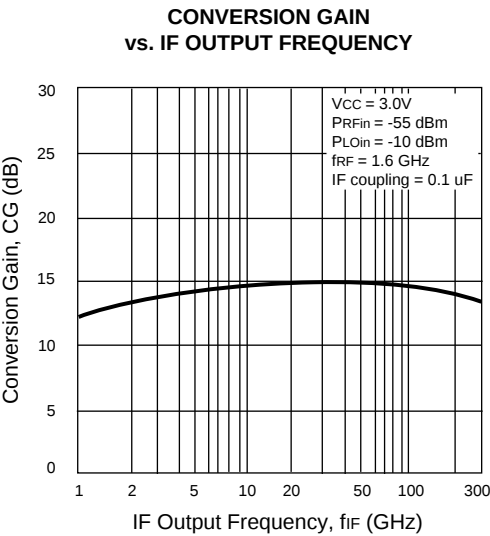
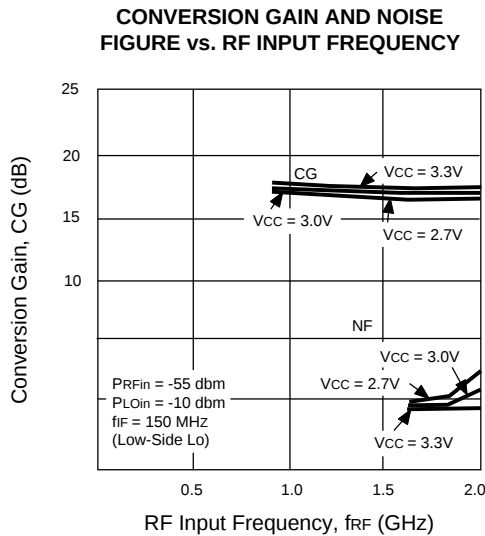
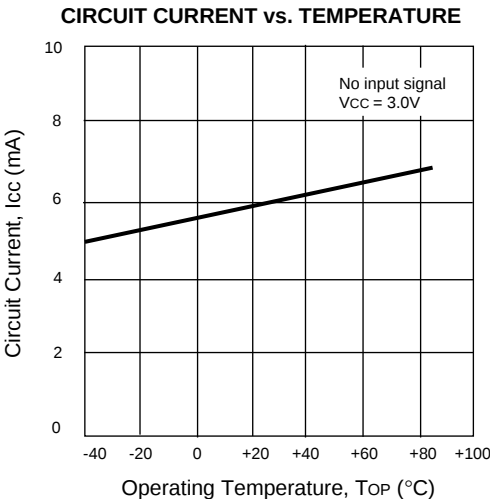
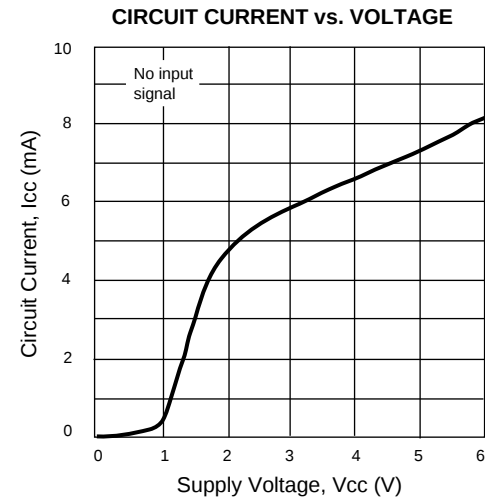
RECOMMENDED
OPERATING CONDITIONS

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

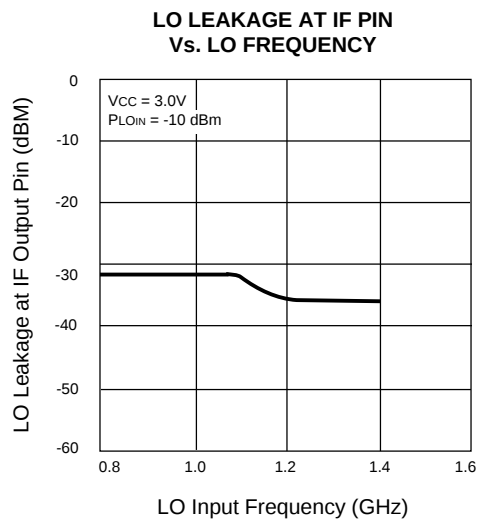
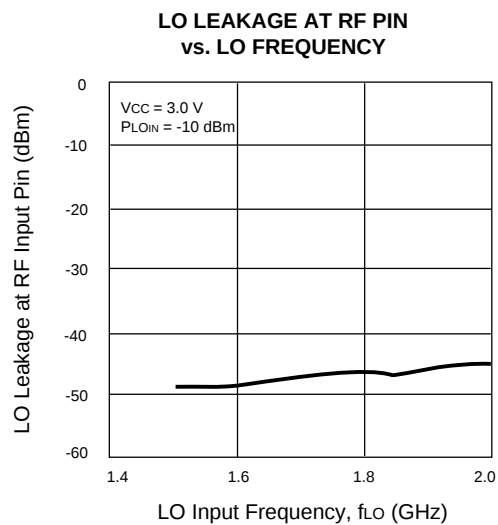
TEST CIRCUIT



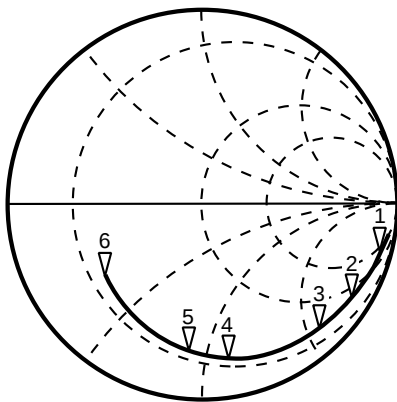
TYPICAL PERFORMANCE CURVES (T_A = 25°C unless otherwise specified)



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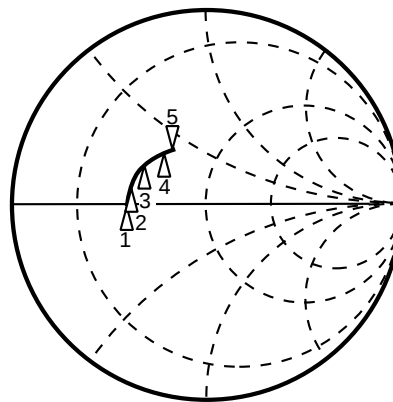


UPC2756T SCATTERING PARAMETERS



RF Port
V_{CC} = 3 V

- 1: 100 MHz 330.7 Ω — j861.6 Ω
- 2: 500 MHz 38.8 Ω — j194.3 Ω
- 3: 900 MHz 25.5 Ω — j107.6 Ω
- 4: 1500 MHz 20.5 Ω — j60.7 Ω
- 5: 1900 MHz 17.9 Ω — j44.2 Ω
- 6: 3000 MHz 19.5 Ω — j16.3 Ω



RF Port
V_{CC} = 3 V

- 1: 50 MHz 21.4 Ω + j2.4 Ω
- 2: 80 MHz 21.8 Ω + j5.5 Ω
- 3: 130 MHz 23.1 Ω + j9.4 Ω
- 4: 240 MHz 27.4 Ω + j16.3 Ω
- 5: 300 MHz 30.6 Ω + j19.1 Ω

