

### FEATURES

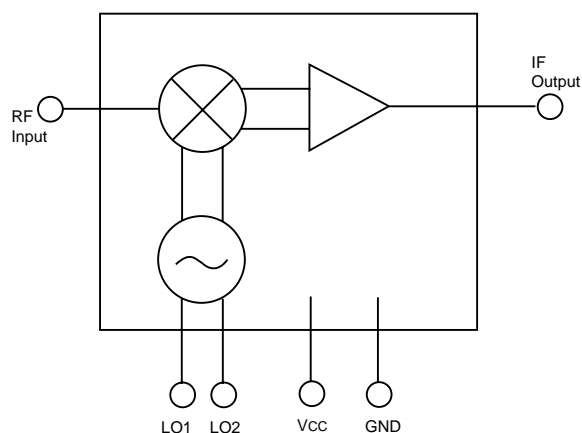
- **WIDE BAND OPERATION:** RF = 0.1 to 2.0 GHz
- **ON BOARD OSCILLATOR**
- **LOW CURRENT CONSUMPTION:** 6 mA
- **SUPER SMALL T06 PACKAGE**
- **TAPE AND REEL PACKAGING OPTION AVAILABLE**

### 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 (TA = 25°C, ZL = Zs = 50 Ω, Vcc = 3V)

PART NUMBER PACKAGE OUTLINE		UPC2756T T06			
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
I <sub>CC</sub>	Circuit Current (no signal)	mA	3.5	6.0	8.0
f <sub>RF</sub>	RF Frequency Response (3 dB down from the gain at f <sub>RF</sub> = 900 MHz, f <sub>IF</sub> = 150 MHz)	GHz	0.1		2.0
f <sub>IF</sub>	IF Frequency Response (3 dB down from the gain at f <sub>RF</sub> = 900 MHz, f <sub>IF</sub> = 150 MHz)	MHz	10		300
CG	Conversion Gain <sup>1</sup> f <sub>RF</sub> = 900 MHz, f <sub>IF</sub> = 150 MHz f <sub>RF</sub> = 1.6 GHz, f <sub>IF</sub> = 20 MHz	dB	11	14	17
		dB	11	14	17
NF	Noise Figure f <sub>RF</sub> = 900 MHz, f <sub>IF</sub> = 150 MHz f <sub>RF</sub> = 1.6 GHz, f <sub>IF</sub> = 20 MHz	dB		10	13
		dB		13	16
P <sub>SAT</sub>	Saturated Output Power <sup>2</sup> f <sub>RF</sub> = 900 MHz, f <sub>IF</sub> = 150 MHz f <sub>RF</sub> = 1.6 GHz, f <sub>IF</sub> = 20 MHz	dBm	-11	-8	
		dBm	-15	-12	
OIP <sub>3</sub>	SSB Output 3rd Order Intercept Point f <sub>RF</sub> = 0.8~2.0 GHz, f <sub>IF</sub> = 100 MHz	dBm		0	
ISO	LO Leakage, f <sub>LO</sub> = 0.8 ~2.0 GHz	at RF pin		-35	
		at IF pin		-23	
PN	Phase Noise <sup>3</sup> , f <sub>osc</sub> = 1.9 GHz	dBc/Hz		-68	
R <sub>TH</sub> (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<sub>RF</sub> = -40 dBm.
2. P<sub>RF</sub> = -10 dBm.
3. See Application Circuit.

### ABSOLUTE MAXIMUM RATINGS<sup>1</sup> (T<sub>A</sub> = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V <sub>CC</sub>	Supply Voltage	V	5.5
P <sub>T</sub>	Total Power Dissipation <sup>2</sup>	mW	280
T <sub>OP</sub>	Operating Temperature	°C	-40 to +85
T <sub>STG</sub>	Storage Temperature	°C	-55 to +150

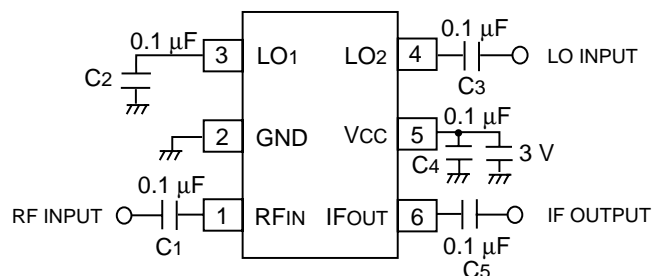
Notes:

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<sub>A</sub> = +85°C).

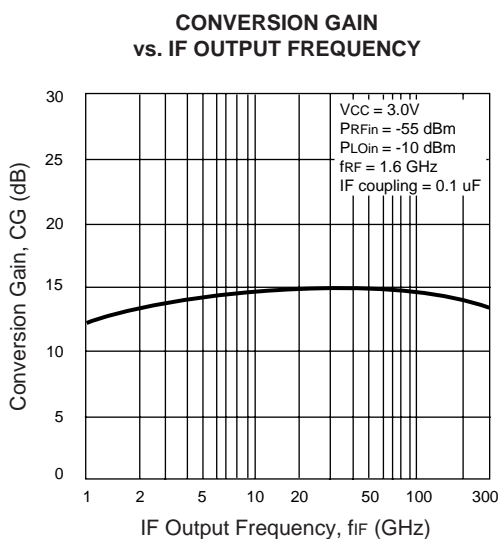
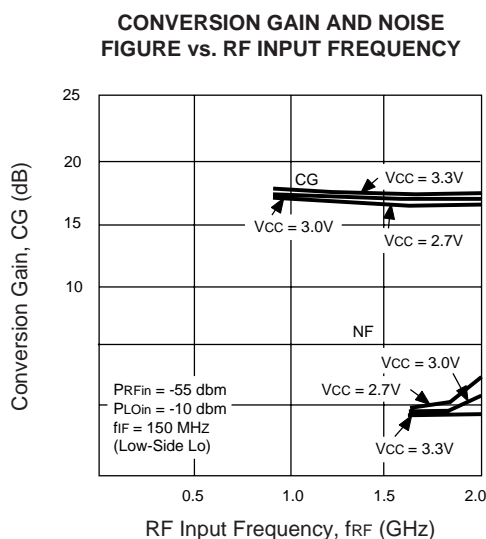
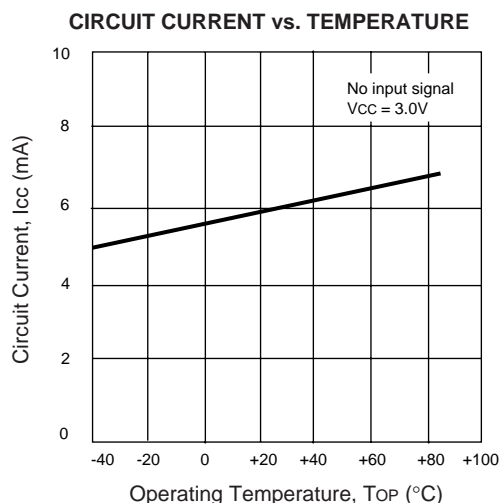
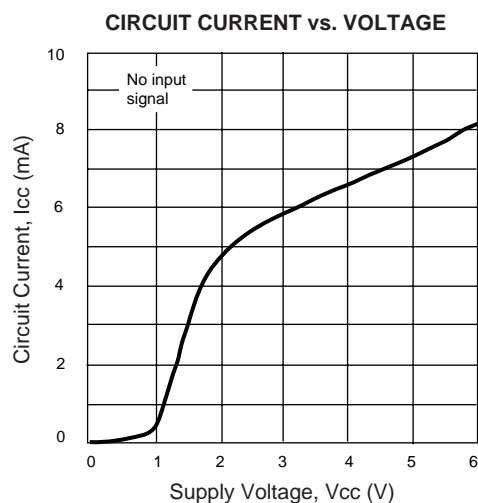
### RECOMMENDED OPERATING CONDITIONS

SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
V <sub>CC</sub>	Supply Voltage	V	2.7	3.0	3.3
T <sub>OP</sub>	Operating Temperature	°C	-40	+25	+85

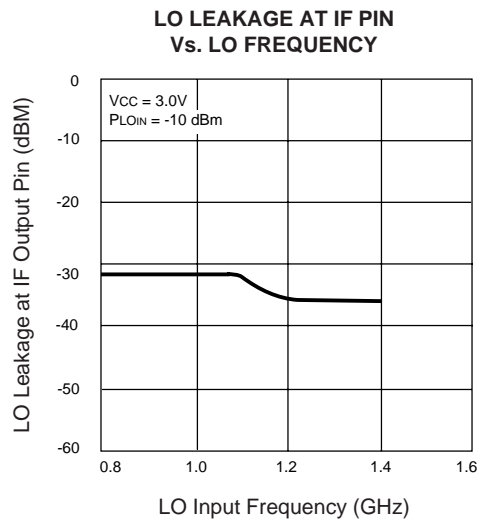
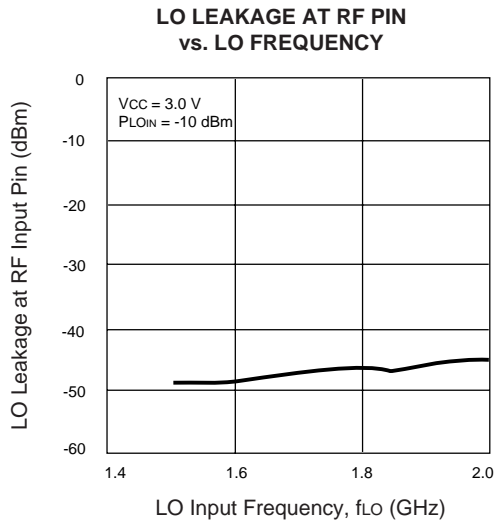
### TEST CIRCUIT



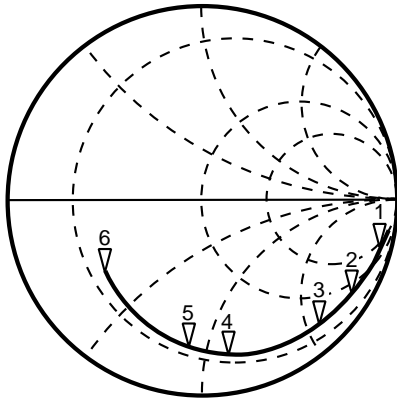
### TYPICAL PERFORMANCE CURVES (T<sub>A</sub> = 25°C unless otherwise specified)



TYPICAL PERFORMANCE CURVES (TA = 25°C)

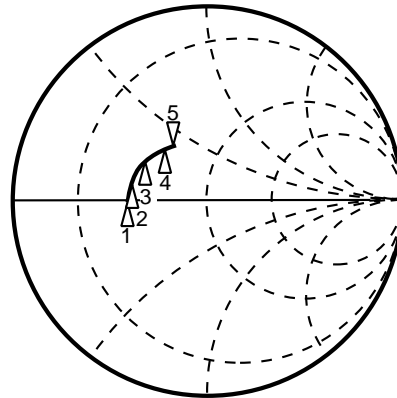


UPC2756T SCATTERING PARAMETERS



RF Port  
Vcc = 3 V

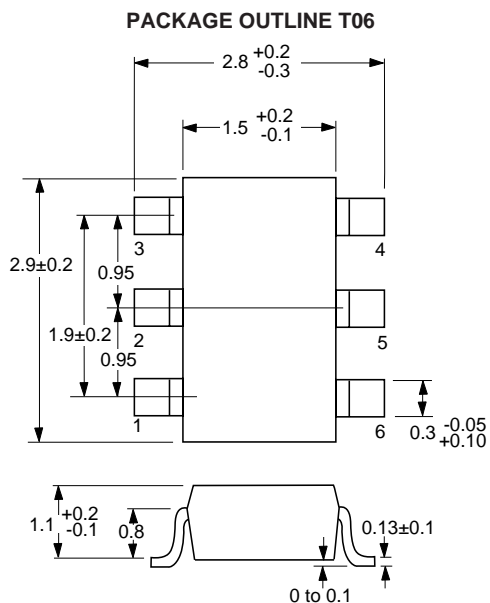
- 1: 100 MHz 330.7 Ω — j861.6 Ω
- 2: 500 MHz 38.8 Ω — j194.3 Ω
- 3: 900 MHz 25.5 Ω — j107.6 Ω
- 4: 1500 MHz 20.5 Ω — j60.7 Ω
- 5: 1900 MHz 17.9 Ω — j44.2 Ω
- 6: 3000 MHz 19.5 Ω — j16.3 Ω



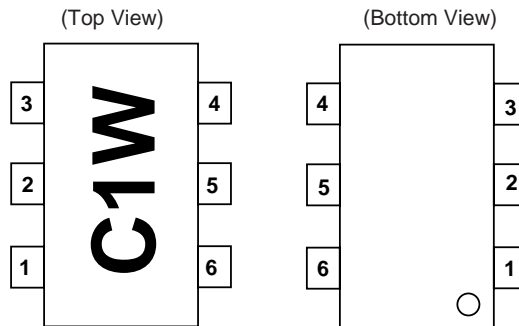
RF Port  
Vcc = 3 V

- 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

### OUTLINE DIMENSIONS (Units in mm)



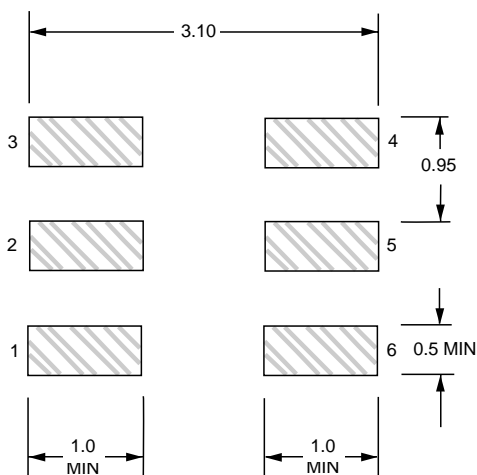
### LEAD CONNECTIONS



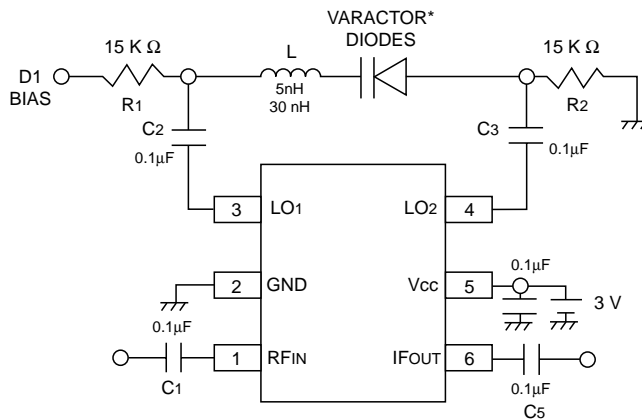
1. RF INPUT
2. GND
3. LO<sub>1</sub>
4. LO<sub>2</sub>
5. V<sub>CC</sub>
6. IF OUTPUT

### 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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