NEC

3 V, SILICON MMIC FREQUENCY CONVERTER

UPC2757T UPC2758T

FEATURES

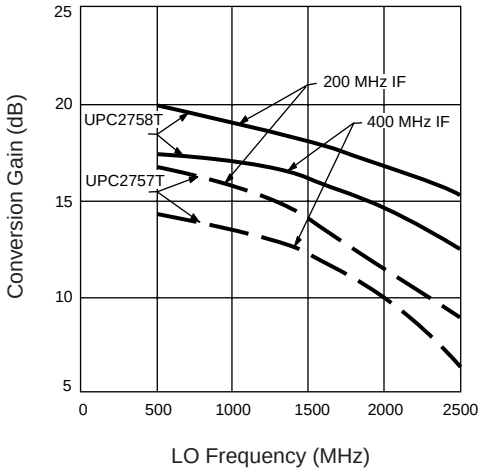
- **WIDE BAND OPERATION UP TO 2.5 GHz**
- **LOW VOLTAGE OPERATION:** 2.7 V Minimum
- **LOW POWER CONSUMPTION:** 15 mW (UPC2757T)
- **POWER SAVE FUNCTION**
- **SUPER SMALL PACKAGE**
- **TAPE AND REEL PACKAGING OPTION AVAILABLE**

DESCRIPTION

The UPC2757T and UPC2758T are L-Band Frequency Converters manufactured using the NESAT III MMIC process. These products consist of a double balanced mixer, IF amplifier and LO buffer amplifier. The UPC2757T is designed for low power consumption while the UPC2758T is designed for low distortion. Both devices operate on a 3 volt supply voltage making them ideal for portable hand held cellular, GPS, PCN and wireless LAN applications.

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

CONVERSION GAIN vs. LO FREQUENCY
Vcc = 3 V, LO Power = -5 dBm
RF Above LO



ELECTRICAL CHARACTERISTICS (T_A = 25°C, V_{CC} = 3 V, V_{PS} = 3 V, P_{LO} = -10 dBm)

PART NUMBER PACKAGE OUTLINE			UPC2757T T06			UPC2758T T06		
SYMBOLS	**PARAMETERS AND CONDITIONS**	**UNITS**	**MIN**	**TYP**	**MAX**	**MIN**	**TYP**	**MAX**
I_{CC}	Circuit Current, V_{PS} = 3 V V_{PS} = 0.5 V	mA μA	3.7	5.6 0.1	7.7	6.6	11 0.1	14.8
f_{RF}	RF Operating Frequency Range (The conversion gain at f_{RF} is not more than 3 dB down from the gain at f_{RF} = 800 MHz, f_{IF} = 130 MHz)	GHz	0.1		2.0	0.1		2.0
f_{IF}	IF Operating Frequency Range (The conversion gain at f_{IF} is not more than 3 dB down from the gain at f_{RF} = 800 MHz, f_{IF} = 130 MHz)	MHz	20		300	20		300
CG	Conversion Gain[1], f_{RF} = 800 MHz, f_{IF} = 130 MHz f_{RF} = 2.0 GHz, f_{IF} = 250 MHz	dB dB	12 10	15 13	18 16	16 14	19 17	22 20
NF	Noise Figure, f_{RF} = 800 MHz, f_{IF} = 130 MHz f_{RF} = 2.0 GHz, f_{IF} = 250 MHz	dB dB		10 13	13 16		9 13	12 15
P_{SAT}	Saturated Output Power[2], f_{RF} = 800 MHz, f_{IF} = 100 MHz	dBm		-3			+1	
P_{1dB}	Output Power at 1dB compression point f_{RF} = 800 MHz, f_{IF} = 100 MHz	dBm		-8			-3.5	
OIP_3	Output 3rd Order Intercept Point, (SSB) P_{LO} = -10 dBm f_{RF} = 0.8~2.0 GHz, f_{IF} = 100 MHz	dBm		0			5	
ISO	LO Leakage, f_{LO} = 0.8 ~2.0 GHz at RF pin at IF pin	dBm dBm		-35 -23			-30 -15	
$R_{TH\ (J-A)}$	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			 620 230

Notes:
1. P_{RF} = -40 dBm.
2. P_{RF} = -10 dBm.

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

SYMBOLS	PARAMETERS	UNITS	RATINGS
V_{CC}, V_{PS}	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

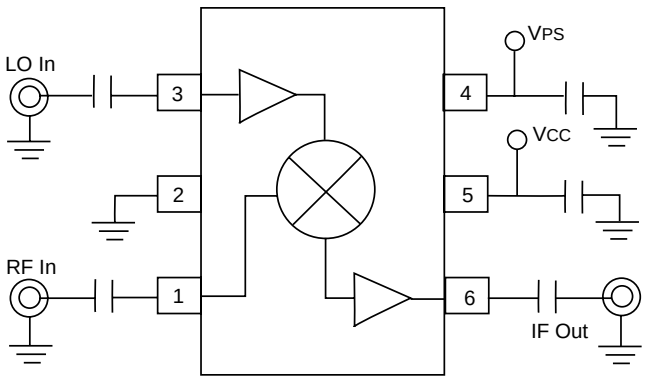
Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
2. Mounted on a 50 x 50 x 1.6 mm epoxy glass PWB (T_A = +85°C).

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
P_{LO}	LO Input Level	dBm	-15	-10	-5

TEST CIRCUIT/BLOCK DIAGRAM

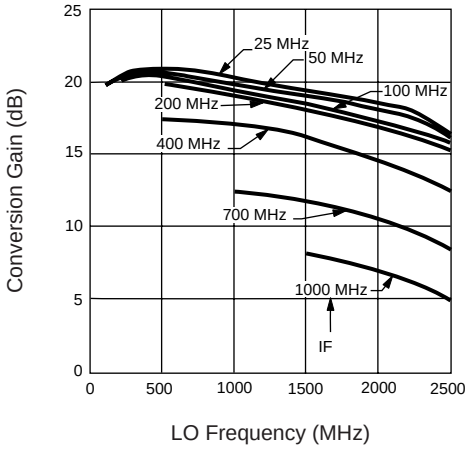
UPC2757T, UPC2758T



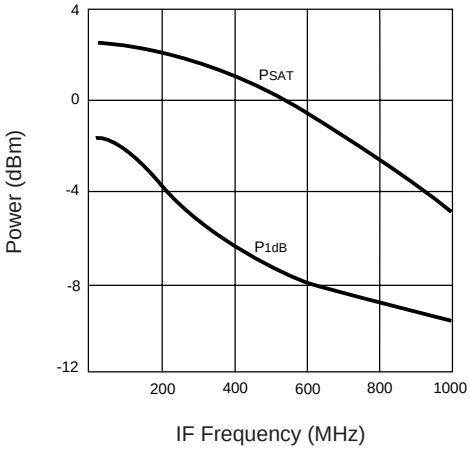
All Capacitors 0.1 µF

TYPICAL PERFORMANCE CURVES (T_A = 25°C)

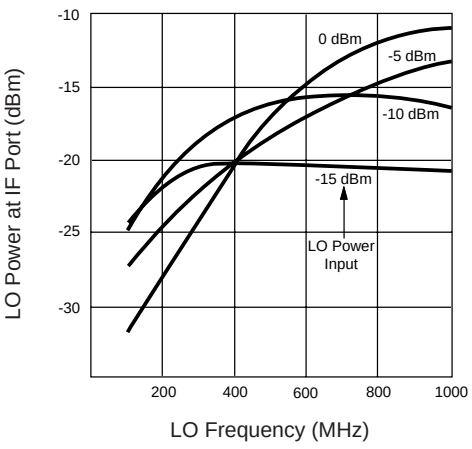
UPC2758T
CONVERSION GAIN vs. LO FREQUENCY
V_{CC} = 3 V, LO Power = -5 dBm
RF Above LO



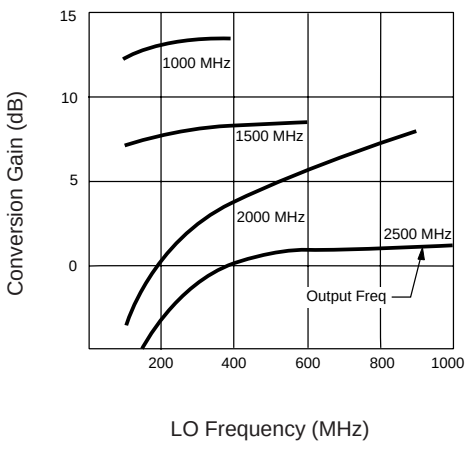
UPC2758T
OUTPUT POWER vs. IF FREQUENCY
V_{CC} = 3 V, LO Power = -5 dBm
RF Above LO



UPC2758T
LO TO IF ISOLATION vs. LO FREQUENCY
V_{CC} = 3 V

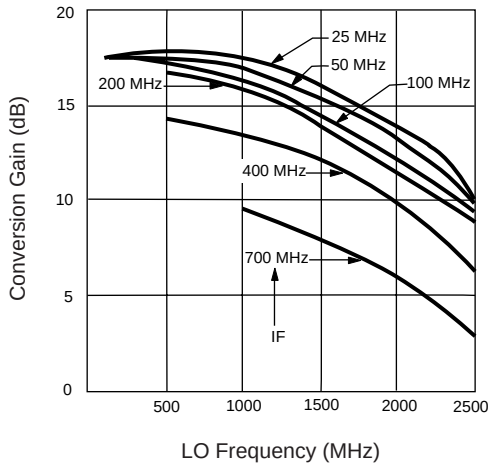


UPC2758T
UP-CONVERSION GAIN vs. LO FREQUENCY
V_{CC} = 3 V, LO Power = -5 dBm
Input Above LO

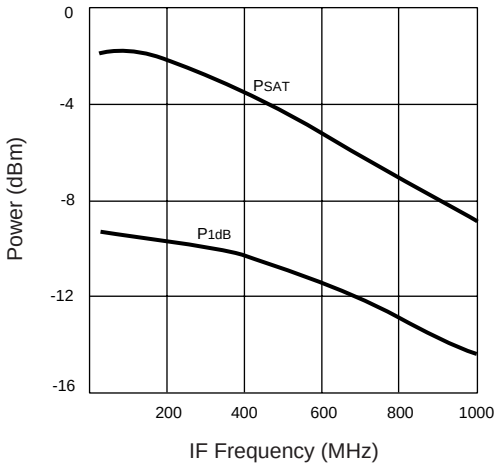


TYPICAL PERFORMANCE CURVES (T_A = 25°C)

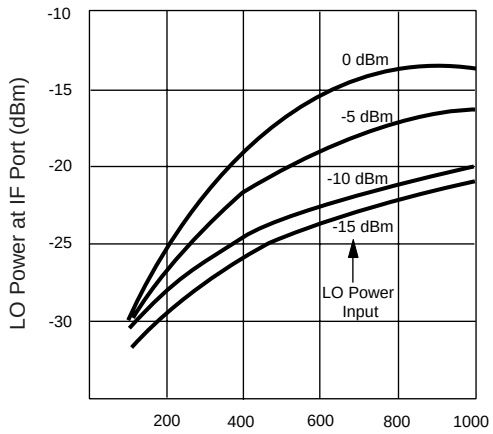
UPC2757T
CONVERSION GAIN vs. LO FREQUENCY
V_{CC} = 3 V, LO Power = -5 dBm
RF Above LO



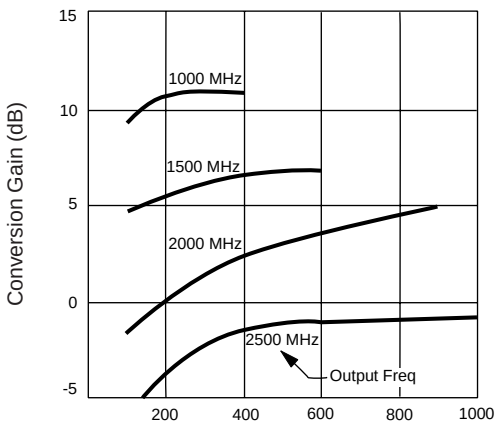
UPC2757T
OUTPUT POWER vs. IF FREQUENCY
V_{CC} = 3 V, LO Power = -5 dBm
RF Above LO



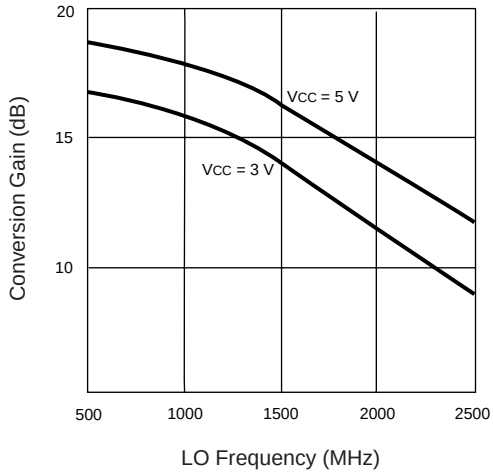
UPC2757T
LO TO IF ISOLATION vs. LO FREQUENCY
V_{CC} = 3 V



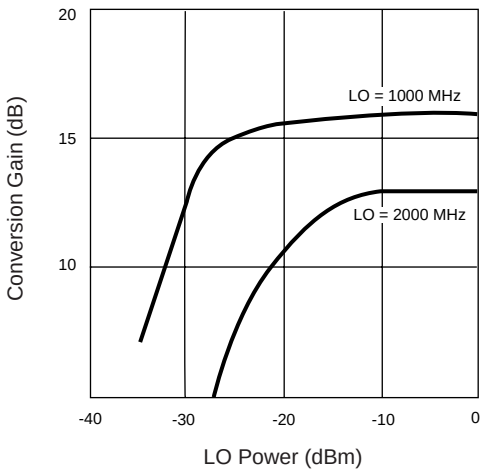
UPC2757T
UP-CONVERSION GAIN vs. LO FREQUENCY
V_{CC} = 3 V, LO Power = -5 dBm
Input above LO



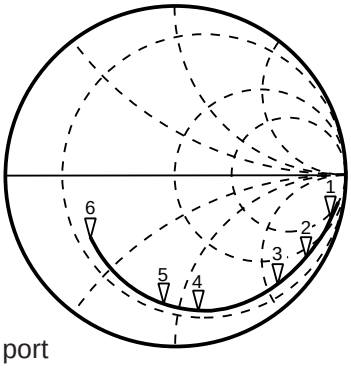
UPC2757T
CONVERSION GAIN vs. LO FREQUENCY
IF = 200 MHz, LO Power = -5 dBm
RF Above LO



UPC2757T
CONVERSION GAIN vs. LO POWER
IF = 200 MHz, V_{CC} = 3 V
RF Above LO



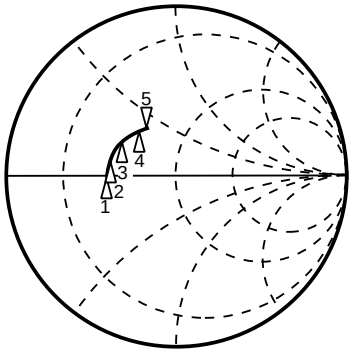
UPC2757T AND UPC2758T PORT IMPEDANCES



RF port and LO port

V_{CC} = 3.0 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



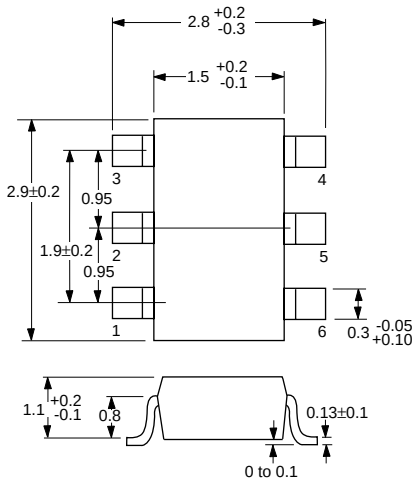
IF port

V_{CC} = 3.0 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)

PACKAGE OUTLINE T06



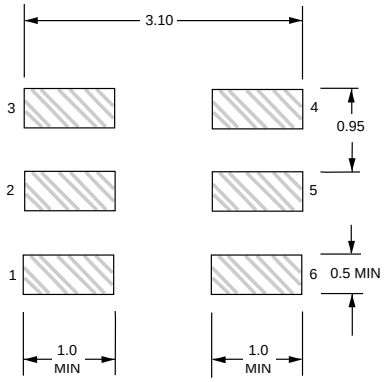
Note:
All dimensions are typical unless otherwise specified.

ORDERING INFORMATION

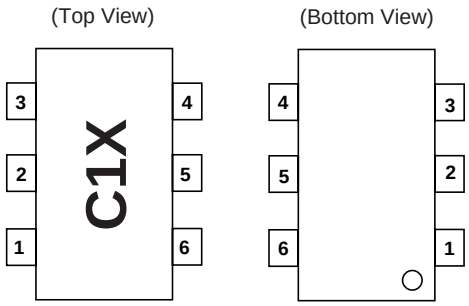
PART NUMBER	QTY
UPC2757T-E3	3K/Reel
UPC2758T-E3	3K/Reel

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

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



LEAD CONNECTIONS



1. RF INPUT
2. GND
3. LO INPUT
4. PS
5. V_{CC}
6. IF OUTPUT

Note:
Package Markings:
C1X: UPC2757T
C1Y: UPC2758T

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