

FEATURES

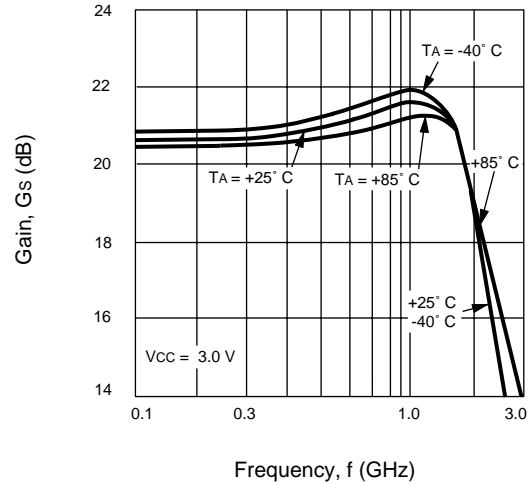
- **HIGH GAIN:** 21 dB at 900 to 1500 MHz Typical
- **HIGH OUTPUT POWER:** $P_{SAT} = +12.5$ dBm at 900 MHz
+11 dBm at 1500 MHz
- **LOW BIAS VOLTAGE:** 3.0 V Typical, 2.7 V Minimum
- **SUPER SMALL PACKAGE:** SOT-363
- **TAPE AND REEL PACKAGING OPTION AVAILABLE**

DESCRIPTION

The UPC2771TB 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. The UPC2771TB is pin compatible and has comparable performance as the larger UPC2771T, so it is suitable for use as a replacement to help reduce system size. The IC is housed in a 6 pin super minimold or SOT-363 package. 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.

GAIN vs. FREQUENCY AND TEMPERATURE



ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, $Z_L = Z_S = 50\ \Omega$, $V_{CC} = 3.0\text{ V}$)

PART NUMBER PACKAGE OUTLINE			UPC2771TB S06		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
I_{CC}	Circuit Current (no signal)	mA		36	45
G_s	Small Signal Gain, $f = 900\text{ MHz}$ $f = 1500\text{ MHz}$	dB	19	21	24
		dB	18	21	24
f_U	Upper Limit Operating Frequency (The gain at f_U is 3 dB down from the gain at 100 MHz)	GHz	1.8	2.2	
P_{1dB}	1 dB Compressed Output Power, $f = 900\text{ MHz}$ $f = 1500\text{ MHz}$	dBm	+9	+11.5	
		dBm	+7	+9.5	
P_{SAT}	Saturated Output Power, $f = 900\text{ MHz}$ $f = 1500\text{ MHz}$	dBm		+12.5	
		dBm		+11	
NF	Noise Figure, $f = 900\text{ MHz}$ $f = 1500\text{ MHz}$	dB		6	7.5
		dB		6	7.5
RLIN	Input Return Loss, $f = 900\text{ MHz}$ $f = 1500\text{ MHz}$	dB	10	14	
		dB	10	14	
RLOUT	Output Return Loss, $f = 900\text{ MHz}$ $f = 1500\text{ MHz}$	dB	6.5	9.0	
		dB	5.5	8.5	
ISOL	Isolation, $f = 900\text{ MHz}$ $f = 1500\text{ MHz}$	dB	25	30	
		dB	25	30	
OIP3	SSB Output Third Order Intercept Point $f = 900, 902\text{ MHz}$, $P_{OUT} = +4\text{ dBm}$ $f = 1500, 1502\text{ MHz}$, $P_{OUT} = +4\text{ dBm}$	dBm		+13	
		dBm		+10	
PADJ1	Adjacent Channel Power 1, $f = 900\text{ MHz}$, $\pi/4$ QPSK wave ¹ , $P_{OUT} = +7\text{ dBm}$ $\Delta f = \pm 50\text{ kHz}$ $\Delta f = \pm 100\text{ kHz}$	dBc		-61	
		dBc		-72	
PADJ2	Adjacent Channel Power 2, $f = 1.5\text{ GHz}$, $\pi/4$ QPSK wave ¹ , $P_{OUT} = +7\text{ dBm}$ $\Delta f = \pm 50\text{ kHz}$ $\Delta f = \pm 100\text{ kHz}$	dBc		-59	
		dBc		-72	

Note:

1. $\pi/4$ QPSK modulated wave input, data rate 42 kbps, Filter roll off $\alpha = 0.5$

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{CC}	Supply Voltage	V	3.6
I _{CC}	Total Supply Current	mA	77.7
P _{IN}	Input Power	dBm	+13
P _T	Total Power Dissipation ²	mW	200
T _{OP}	Operating Temperature	°C	-40 to +85
T _{STG}	Storage Temperature	°C	-55 to +150

Notes:

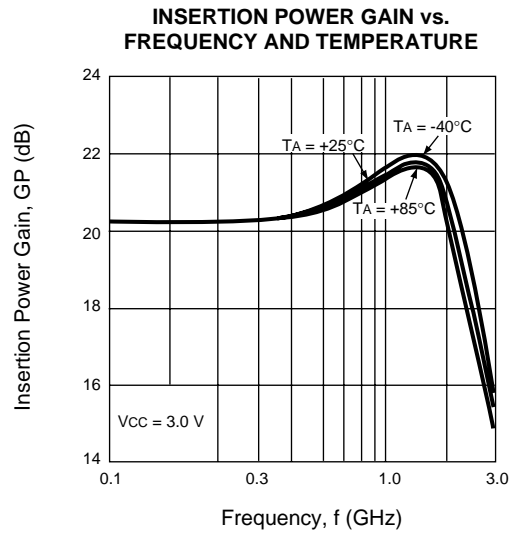
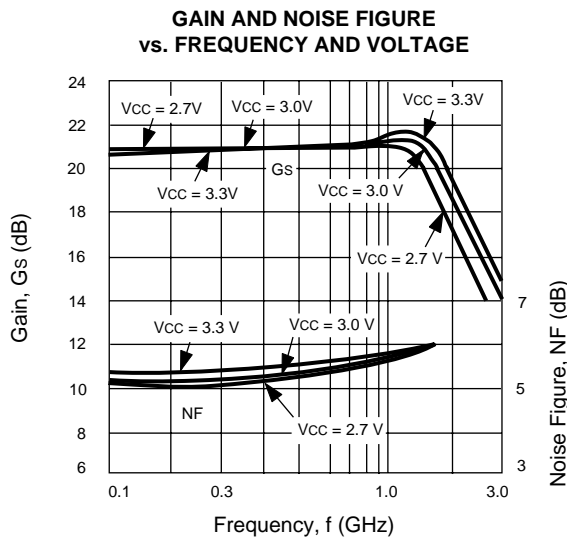
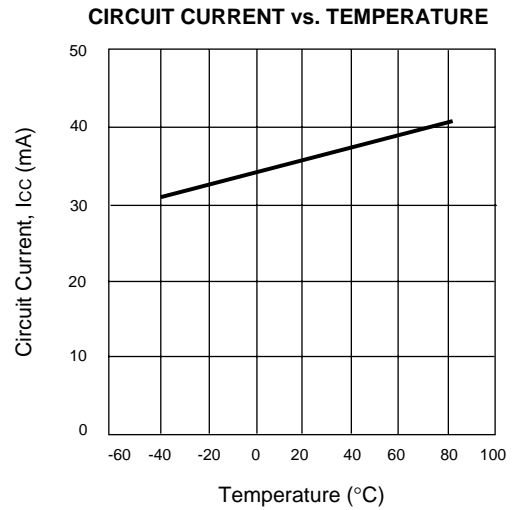
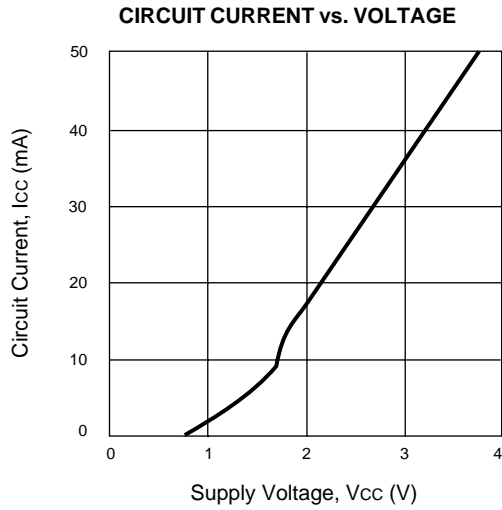
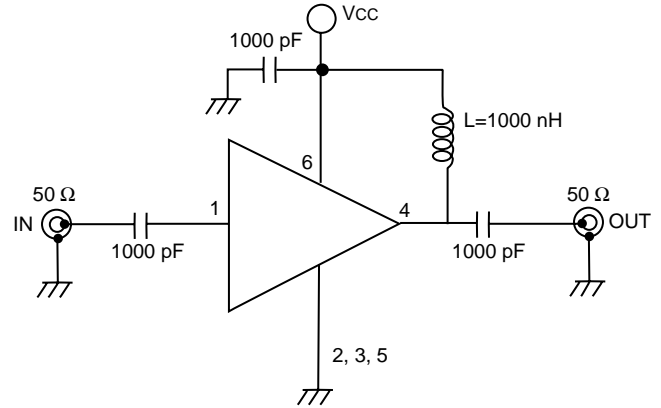
1. Operation in excess of any one of these parameters may result in permanent damage.
2. Mounted on a 50 X 50 X 1.6 mm epoxy glass PWB (T_A = 85°C).

RECOMMENDED OPERATING CONDITIONS

SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
V _{CC}	Supply Voltage	V	2.7	3	3.3
T _{OP}	Operating Temperature	°C	-40	+25	+85

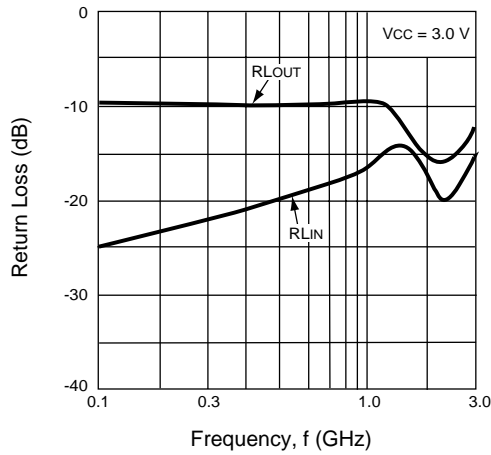
TYPICAL PERFORMANCE CURVES (T_A = 25°C)

TEST CIRCUIT

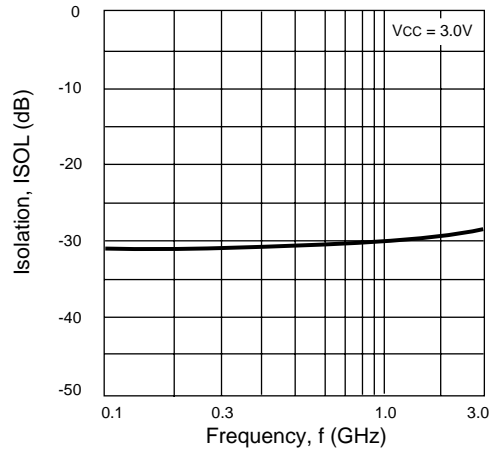


TYPICAL PERFORMANCE CURVES ($T_A = 25^\circ$)

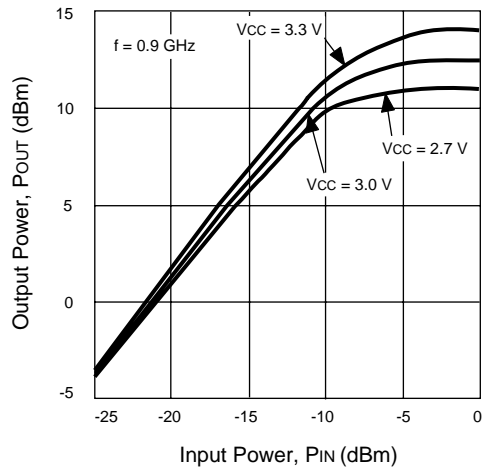
INPUT RETURN LOSS AND OUTPUT RETURN LOSS vs. FREQUENCY



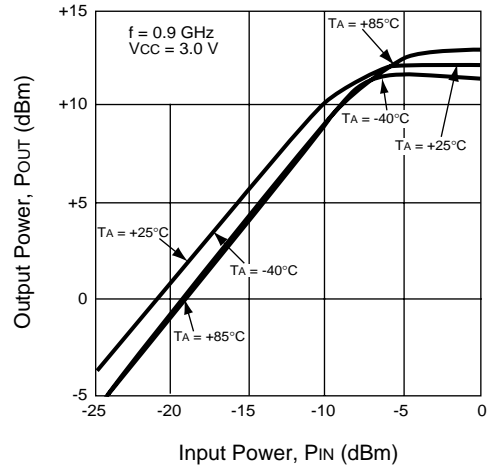
ISOLATION vs. FREQUENCY



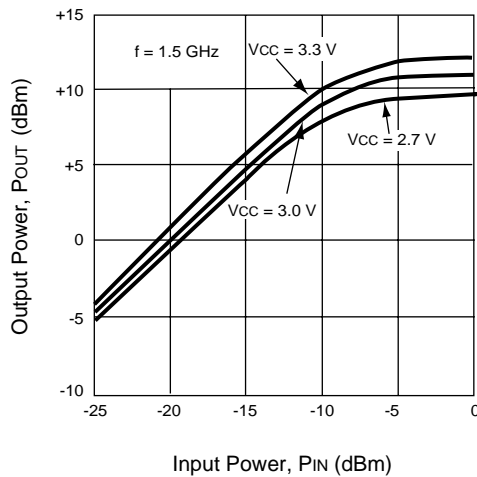
OUTPUT POWER vs. INPUT POWER AND VOLTAGE



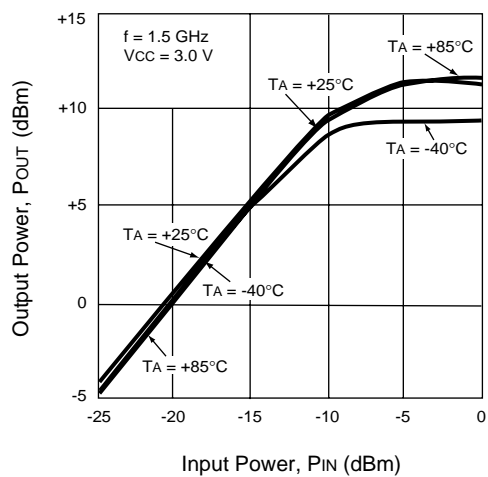
OUTPUT POWER vs. INPUT POWER AND TEMPERATURE



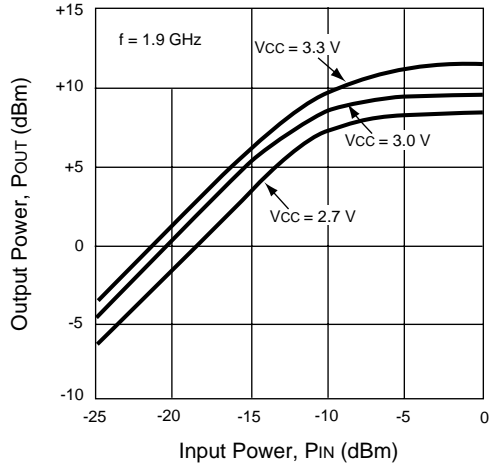
OUTPUT POWER vs. INPUT POWER AND VOLTAGE



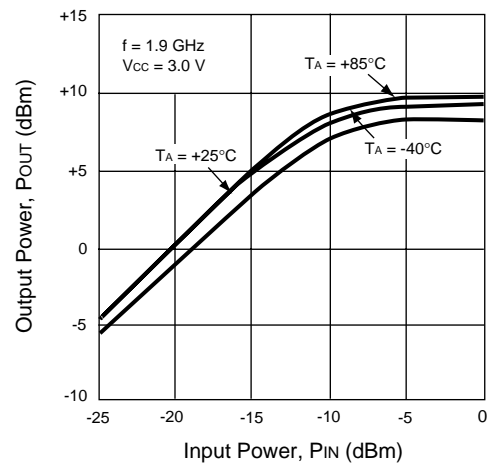
OUTPUT POWER vs. INPUT POWER AND TEMPERATURE



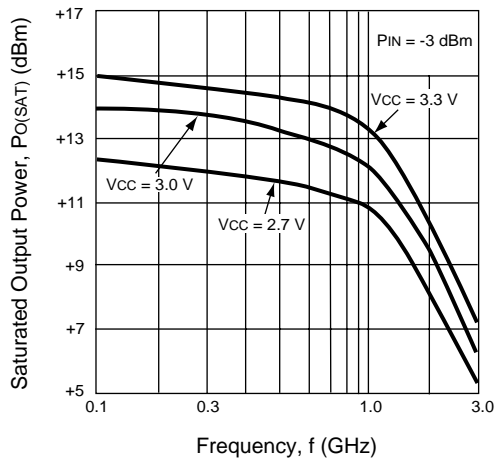
OUTPUT POWER vs. INPUT POWER AND VOLTAGE



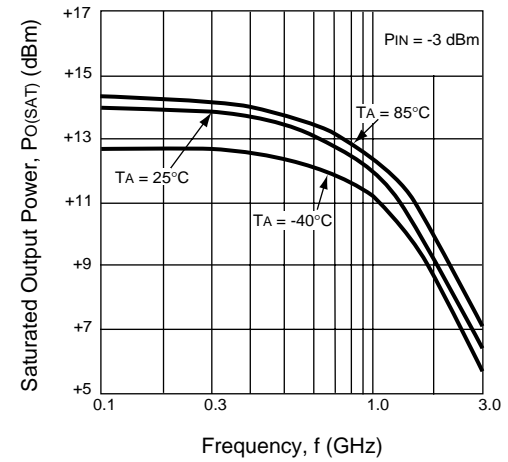
OUTPUT POWER vs. INPUT POWER AND VOLTAGE



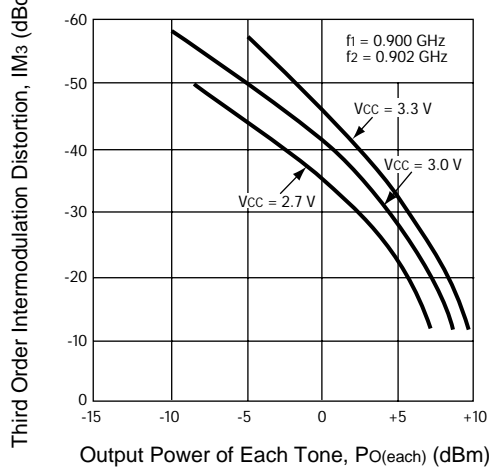
SATURATED OUTPUT POWER vs. FREQUENCY AND VOLTAGE



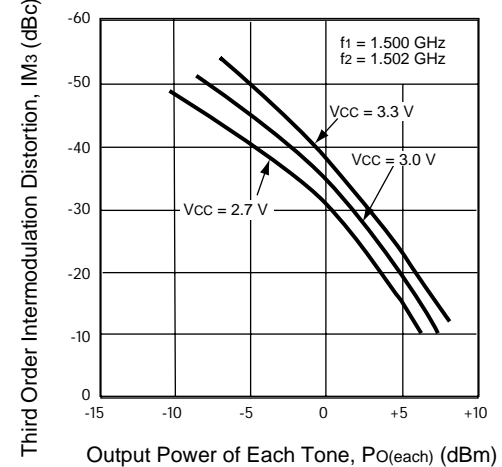
SATURATED OUTPUT POWER vs. FREQUENCY AND TEMPERATURE



THIRD ORDER INTERMODULATION DISTORTION vs. OUTPUT POWER OF EACH TONE AND VOLTAGE

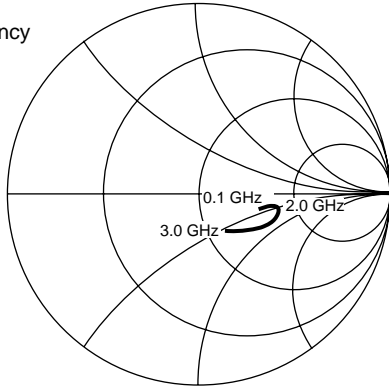


THIRD ORDER INTERMODULATION DISTORTION vs. OUTPUT POWER OF EACH TONE AND VOLTAGE

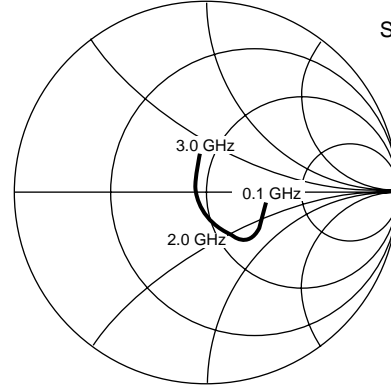


TYPICAL SCATTERING PARAMETERS (TA = 25°C)

S11 Frequency



S22 Frequency

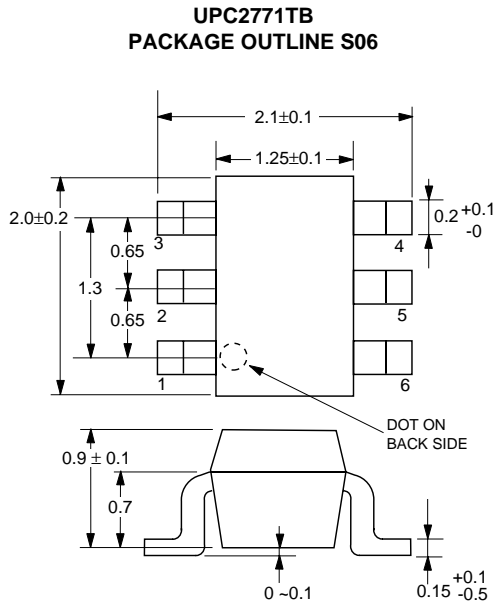


Vcc = Vout = 3.0 V, Icc = 35 mA

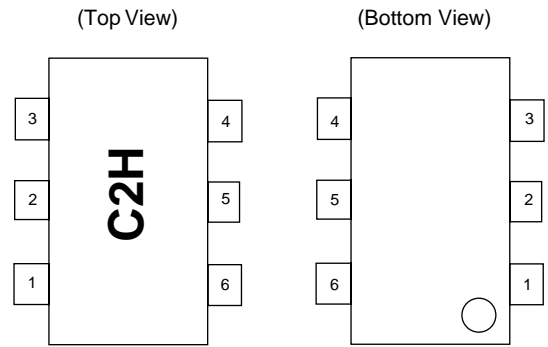
FREQUENCY GHz	S11		S21		S12		S22		K
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	
0.1	0.045	19.7	10.570	-4.7	0.028	0.8	0.327	-6.2	1.65
0.2	0.057	37.0	10.638	-9.5	0.028	5.0	0.325	-11.5	1.63
0.3	0.075	41.3	10.775	-14.1	0.029	8.6	0.323	-16.2	1.58
0.4	0.090	43.3	11.004	-19.4	0.030	11.1	0.326	-20.9	1.49
0.5	0.105	42.2	11.275	-24.4	0.030	14.9	0.331	-26.4	1.45
0.6	0.118	40.2	11.586	-30.0	0.031	15.8	0.342	-32.0	1.37
0.7	0.138	34.9	12.041	-35.9	0.031	19.8	0.350	-37.3	1.29
0.8	0.163	32.5	12.367	-42.1	0.032	20.1	0.359	-42.8	1.20
0.9	0.186	29.4	12.844	-48.8	0.032	23.2	0.361	-49.4	1.15
1.0	0.202	26.3	13.300	-56.6	0.032	23.9	0.371	-56.1	1.11
1.1	0.219	21.7	13.771	-64.6	0.033	24.9	0.389	-62.5	1.03
1.2	0.233	15.4	14.082	-73.5	0.033	26.6	0.400	-69.3	0.99
1.3	0.252	8.4	14.365	-83.2	0.036	28.8	0.405	-75.4	0.92
1.4	0.267	-0.1	14.336	-92.6	0.036	30.0	0.402	-83.6	0.91
1.5	0.285	-6.8	14.142	-102.4	0.036	32.0	0.406	-91.6	0.90
1.6	0.293	-13.9	13.929	-112.0	0.037	31.6	0.413	-99.3	0.89
1.7	0.304	-20.9	13.428	-121.6	0.039	32.5	0.414	-105.8	0.88
1.8	0.290	-28.1	12.722	-131.0	0.038	34.7	0.401	-113.7	0.96
1.9	0.285	-35.3	11.966	-139.6	0.038	36.1	0.387	-120.8	1.03
2.0	0.273	-41.8	11.232	-147.5	0.038	37.4	0.378	-127.6	1.09
2.1	0.267	-47.4	10.500	-154.8	0.039	39.1	0.366	-133.1	1.14
2.2	0.254	-51.6	9.815	-161.7	0.040	41.4	0.356	-138.0	1.20
2.3	0.237	-57.1	9.168	-168.0	0.041	43.7	0.342	-142.8	1.28
2.4	0.221	-61.1	8.570	-173.7	0.041	48.3	0.325	-148.3	1.37
2.5	0.212	-68.8	7.967	-179.7	0.042	48.3	0.322	-152.6	1.44
2.6	0.208	-72.2	7.507	174.9	0.043	50.8	0.314	-156.7	1.49
2.7	0.202	-74.1	7.004	170.0	0.045	53.7	0.309	-160.1	1.53
2.8	0.190	-76.3	6.667	164.7	0.047	54.2	0.303	-164.0	1.56
2.9	0.178	-76.7	6.336	160.7	0.051	57.7	0.292	-167.8	1.55
3.0	0.154	-82.3	6.003	155.6	0.051	56.5	0.287	-172.8	1.62
3.1	0.147	-88.0	5.772	151.3	0.054	59.3	0.279	-176.4	1.61

UPC2771TB

OUTLINE DIMENSIONS (Units in mm)



LEAD CONNECTIONS



1. INPUT
2. GND
3. GND
4. OUTPUT
5. GND
6. Vcc

PIN DESCRIPTION

Pin No.	Pin Name (V)	Applied Voltage	Description	Internal Equivalent Circuit
1	Input	—	Signal input pin. An internal matching circuit, configured with resistors, enables 50 Ω connection over a wide bandwidth. A multi-feedback circuit is designed to cancel the deviations of h _{FE} and resistance. This pin must be coupled to the signal source with a blocking capacitor.	
4	Output	2.7 to 3.3	Signal output pin. Connect an inductor between this pin and VCC to supply current to the internal output transistors.	
6	VCC		Power supply pin. This pin should be externally equipped with a bypass capacitor to minimize ground impedance.	
2	GND	0	Ground pins. These pins should be connected to system ground with minimum inductance. Ground pattern on the board should be formed as wide as possible. All the ground pins must be connected together with wide ground pattern to minimize impedance difference.	

ORDERING INFORMATION

PART NUMBER	QTY
UPC2771TB-E3	3K/Reel

Note: Embossed Tape, 8 mm wide. Pins 1, 2 and 3 face perforated side of tape.

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