

NEC

3 V, SUPER MINIMOLD SILICON MMIC WIDEBAND AMPLIFIER

UPC2745TB
UPC2746TB

FEATURES

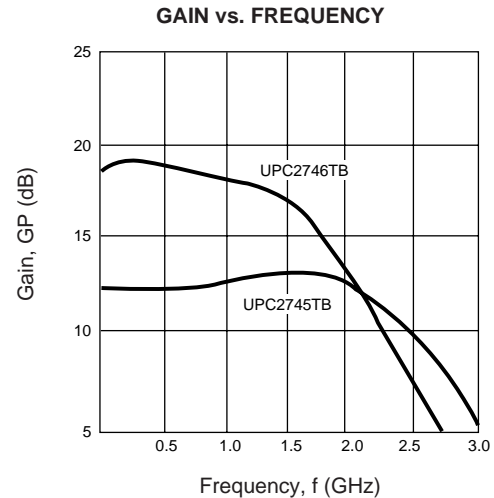
- **HIGH DENSITY SURFACE MOUNTING:**
6 pin super minimold or SOT-363 package
- **LOW SUPPLY VOLTAGE:** $V_{CC} = 1.8$ to 3.3 V
- **WIDEBAND RESPONSE:**
UPC2745TB: $f_u = 2.7$ GHz TYP
UPC2746TB: $f_u = 1.5$ GHz TYP
- **HIGH ISOLATION:**
UPC2745TB: ISOL = 38 dB TYP
UPC2746TB: ISOL = 45 dB TYP

DESCRIPTION

The UPC2745TB and UPC2746TB are Silicon MMIC Wideband Amplifiers manufactured using NEC's 20 GHz f_T NESAT™ III silicon bipolar process. These devices are designed for use as buffer amps in mobile communication applications such as Cellular, PCS, and Cordless handsets, and WLAN transceivers. The UPC2745/46TB are pin compatible and have comparable performance as the larger UPC2745/46T, so they are suitable for use as a replacement to help reduce system size. These IC's are housed in a 6 pin super minimold or SOT-363 package.

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

TYPICAL PERFORMANCE CURVES



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

PART NUMBER PACKAGE OUTLINE			UPC2745TB S06			UPC2746TB S06		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX
I _{CC}	Circuit Current (no signal), $V_{CC} = 3.0$ V $V_{CC} = 1.8$ V	mA mA	5.0	7.5 4.5	10.0	5.0	7.5 4.5	10.0
GP	Power Gain, $V_{CC} = 3.0$ V, $f = 0.5$ GHz $V_{CC} = 3.0$ V, $f = 1$ GHz $V_{CC} = 3.0$ V, $f = 2$ GHz $V_{CC} = 1.8$ V, $f = 500$ MHz	dB dB dB dB	9.0	12 12 11 7	14	16	19 18.5 14	21
f_u	Upper Limit Operating Frequency (3 dB down from the gain at $f = 100$ MHz) $V_{CC} = 3.0$ V $V_{CC} = 1.8$ V	GHz GHz	2.3	2.7 1.8		1.1	1.5 1.1	
P _{O(SAT)}	Maximum Output Level $V_{CC} = 3.0$ V, $f = 0.5$ GHz, $P_{IN} = -6$ dBm $V_{CC} = 3.0$ V, $f = 1$ GHz, $P_{IN} = -6$ dBm $V_{CC} = 3.0$ V, $f = 2$ GHz, $P_{IN} = -6$ dBm $V_{CC} = 1.8$ V, $f = 500$ MHz, $P_{IN} = -10$ dBm	dBm dBm dBm dBm	-4	-1 -2.5 -3.5 -11		-3	0 -1 -8	
NF	Noise Figure, $V_{CC} = 3.0$ V, $f = 0.5$ GHz $V_{CC} = 3.0$ V, $f = 1$ GHz $V_{CC} = 3.0$ V, $f = 2$ GHz $V_{CC} = 1.8$ V, $f = 500$ MHz	dB dB dB dB		6 5.5 5.7 8.0	7.5		4.0 4.2 5.0	5.5

ELECTRICAL CHARACTERISTICS (TA = +25 °C, ZL = ZS = 50 Ω)

PART NUMBER PACKAGE OUTLINE			UPC2745TB S06			UPC2746TB S06		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX
RLIN	Input Return Loss, Vcc = 3.0 V, f = 0.5 GHz	dB	8	11		10	13	
	Vcc = 3.0 V, f = 1 GHz	dB		10				
	Vcc = 3.0 V, f = 2 GHz	dB						
	Vcc = 1.8 V, f = 0.5 GHz	dB		10				
RLOUT	Output Return Loss, Vcc = 3.0 V, f = 0.5 GHz	dB	2.5	5.5		5.5	8.5	
	Vcc = 3.0 V, f = 1 GHz	dB		8.5				
	Vcc = 3.0 V, f = 2 GHz	dB						
	Vcc = 1.8 V, f = 0.5 GHz	dB		9.5				
ISOL	Isolation, Vcc = 3.0 V, f = 0.5 GHz	dB	33	38		40	45	
	Vcc = 3.0 V, f = 1 GHz	dB		38				
	Vcc = 3.0 V, f = 2 GHz	dB						
	Vcc = 1.8 V, f = 0.5 GHz	dB		37				
IM3	3rd Order Intermodulation Distortion							
	Vcc = 3.0 V, POUT = -20 dBm, f1 = 500 MHz, f2 = 502 MHz	dBc		-54			-51	
	Vcc = 3.0 V, POUT = -20 dBm, f1 = 1000 MHz, f2 = 1002 MHz	dBc		-50				
	Vcc = 1.8 V, POUT = -20 dBm, f1 = 500 MHz, f2 = 502 MHz	dBc		-31			-37	

ABSOLUTE MAXIMUM RATINGS¹ (TA = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
VCC	Supply Voltage (Pin 5, Pin 8)	V	4.0
PIN	Input Power	dBm	TBD
PT	Total Power Dissipation ²	mW	TBD
TOP	Operating Temperature	°C	-45 to +85
TSTG	Storage Temperature	°C	-55 to +150

RECOMMENDED
OPERATING CONDITIONS

SYMBOL	PARAMETER	UNITS	MIN	TYP	MAX
VCC	Supply Voltage	V	2.7	3.0	3.3
TOP	Operating Temperature	°C	-40	+25	+85

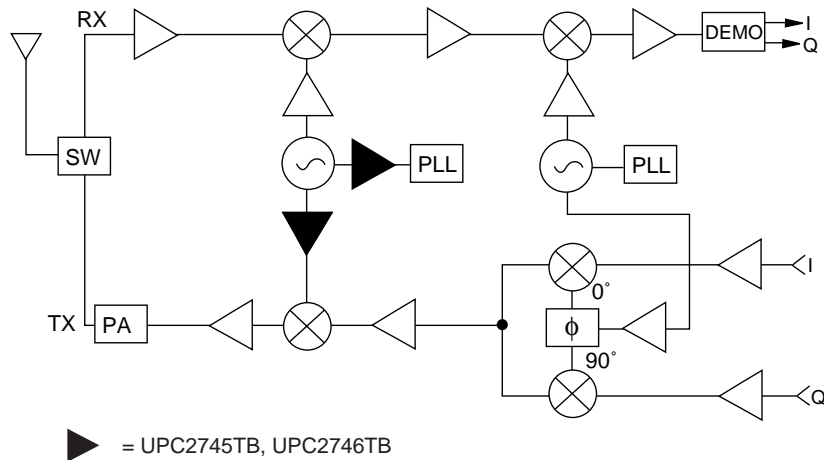
- Notes:
- Operation in excess of any one of these parameters may result in permanent damage.
 - Mounted on double sided copper clad 50 x 50 x 1.6 mm epoxy glass PWB (TA = +85°C).

PIN DESCRIPTION

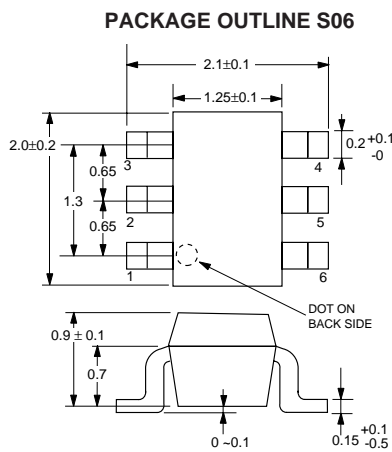
Pin No.	Pin Name	Applied Voltage (V)	Description	Internal Equivalent Circuit
1	Input		Signal input pin. An internal matching circuit, configured with resistors, enables 50 Ω connection over a wide bandwidth. This pin must be coupled to the signal source with a blocking capacitor.	
4	Output		Signal output pin. An internal matching circuit, configured with resistors, enables 50 Ω connection over a wide bandwidth. This pin must be coupled to the output load with a blocking capacitor.	
6	VCC	2.7 to 3.3	Power supply pin. This pin should be externally equipped with a bypass capacitor to minimize ground impedance.	
2 3 5	GND	0	Ground pin. This pin 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.	

SYSTEM APPLICATION EXAMPLE

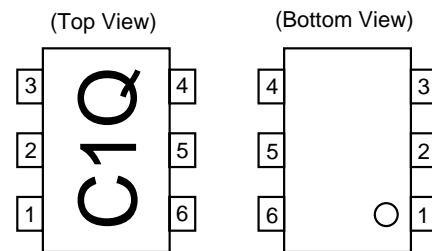
PCS



OUTLINE DIMENSIONS (Units in mm)



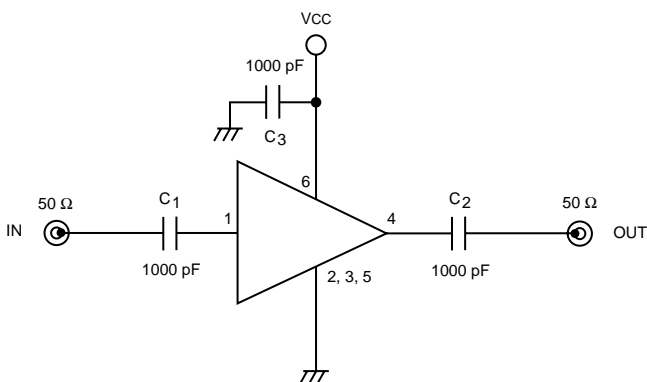
PIN CONNECTIONS



Marking is an example of UPC2745TB

- | | |
|----------|-----------|
| 1. Input | 4. Output |
| 2. GND | 5. GND |
| 3. GND | 6. Vcc |

TEST CIRCUIT



ORDERING INFORMATION

PART NUMBER	MARKING	QTY
UPC2745TB-E3	C1Q	3 K/reel
UPC2746TB-E3	C1R	3 K/reel

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