



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



Features

- Supply Voltage: 5 V
- Low Power Consumption: 15 mA/5 V
- Output Level and Spurious Products Adjustable (Optional)
- Excellent Sideband Suppression by Means of Duty Cycle Regeneration of the LO Input Signal
- Phase-control Loop for Precise 90° Phase Shifting
- Power-down Mode
- Low LO Input Level: -15 dBm
- 50-Ω Single-ended LO and RF Port
- LO Frequency Range of 30 MHz to 300 MHz

Benefits

- Low Current Consumption
- Few External Components Result in Cost and Board Space Saving
- Adjustment Free Hence Saves Time

Electrostatic sensitive device.

Observe precautions for handling.



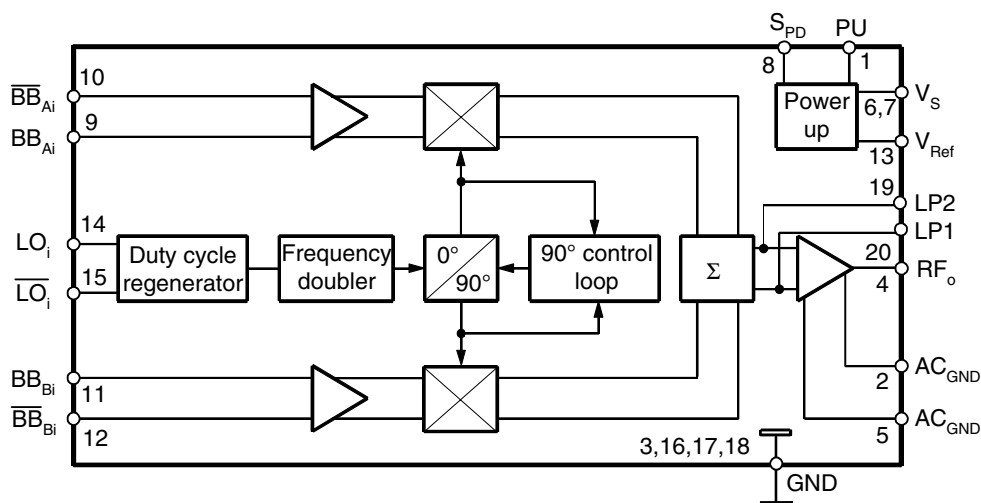
300-MHz Quadrature Modulator

U2793B

Description

The IC U2793B is a 300-MHz quadrature modulator that uses Atmel's advanced UHF process. It features low current consumption, single-ended RF ports and adjustment-free application, which makes the device suitable for all digital radio systems, e.g., GSM, PCN, JDC and WLAN. As an option, output level and spurious products are adjustable at pins 19 and 20. In conjunction with Atmel's U2795B mixer, an up-converter up to 2 GHz can be realized.

Figure 0-1. Block Diagram



1. Pin Configuration

Figure 1-1. Pinning SSO20

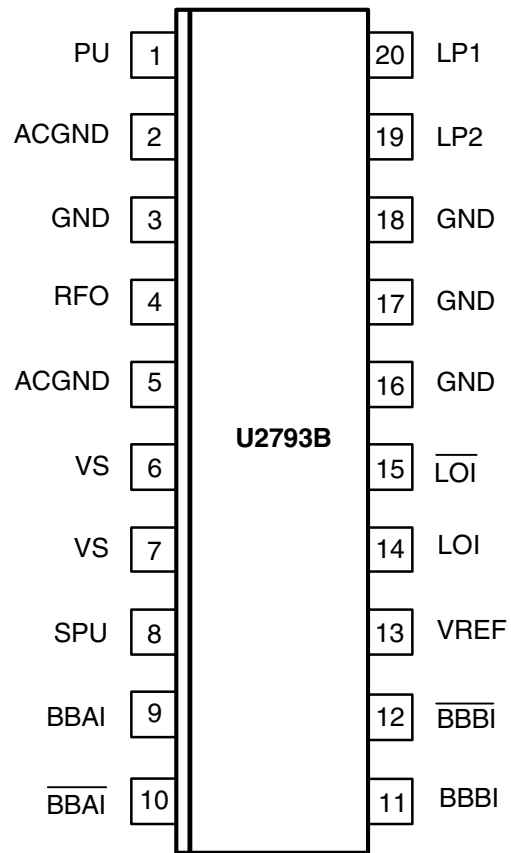


Table 1-1. Pin Description

Pin	Symbol	Function
1	PU	Power-up input
2	ACGND	AC ground
3	GND	Ground
4	RFO	RF output
5	ACGND	AC ground
6	VS	Supply voltage
7	VS	Supply voltage
8	SPU	Settling time power-up
9	BBAI	Baseband input A
10	BBAI	Baseband input A inverse
11	BBBI	Baseband input B
12	BBBI	Baseband input B inverse
13	VREF	Reference voltage (2.5 V)
14	LOI	Input LO
15	LOI	Input LO inverse, typically grounded
16	GND	Ground
17	GND	Ground
18	GND	Ground
19	LP2	Output low pass and power control
20	LP1	Output low pass and power control

2. Absolute Maximum Ratings

Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Parameters	Symbol	Value	Unit
Supply voltage	V_S	6	V
Input voltage	V_i	0 to V_S	V
Junction temperature	T_j	125	°C
Storage temperature range	T_{Stg}	-40 to +125	°C

3. Thermal Resistance

Parameters	Symbol	Value	Unit
Junction ambient SSO20	R_{thJA}	140	K/W

4. Operating Range

Parameters	Symbol	Value	Unit
Supply voltage	V_S	4.5 to 5.5	V
Ambient temperature range	T_{amb}	-40 to +85	°C

5. Electrical Characteristics

Test conditions (unless otherwise specified); $V_S = 5$ V, $T_{amb} = 25^\circ\text{C}$, referred to test circuit.

System impedance $Z_o = 50 \Omega$, $f_{LO} = 150$ MHz, $P_{LO} = -15$ dBm, $V_{BBI} = 1.0$ V_{pp}, differential

No.	Parameters	Test Conditions	Pin	Symbol	Min.	Typ.	Max.	Unit	Type*
1.1	Supply voltage range		6, 7	V_S	4.5	5	5.5	V	A
1.2	Supply current		6, 7	I_S		15		mA	A
2	Baseband Inputs, Pin 9-10, 11-12								
2.1	Input-voltage range (differential)			V_{BBI}		1000	1500	mV _{pp}	D
2.2	Input impedance			Z_{BBI}		30		k Ω	D
2.3	Input-frequency range			f_{BBI}	0		50	MHz	D
2.4	Input voltage, common mode					2.5		V	
3	LO Input, Pins 14 and 15								
3.1	Frequency range			f_{LOi}	30		300	MHz	D
3.2	Input level ⁽¹⁾			P_{LOi}		-15	-5	dBm	D
3.3	Input impedance			Z_{ILO}		(2)		Ω	D
3.4	Voltage standing wave ratio			$VSWR_{LO}$		3.5			D
3.5	Duty-cycle range			DCR_{LO}	0.4		0.6		D

- Notes:
1. Required LO level is a function of the LO frequency.
 2. The LO input impedance is consisting of a 50 Ω resistor in series with a 15 pF capacitor.
 3. With the pins 19 and 20 spurious performance especially for low frequency application can be improved by adding a chip capacitor between LP1 and LP2. In conjunction with a parallel resistor the output level can be adjusted to the following mixer stage without degradation of LO suppression and noise performance which would decrease if the I/Q input level is reduced.
 4. For $T_{amb} = -40^\circ\text{C}$ to $+85^\circ\text{C}$ and $V_S = 4.5$ V to 5.5 V

5. Electrical Characteristics (Continued)

Test conditions (unless otherwise specified); $V_S = 5\text{ V}$, $T_{\text{amb}} = 25^\circ\text{C}$, referred to test circuit.

System impedance $Z_0 = 50\ \Omega$, $f_{\text{LO}} = 150\text{ MHz}$, $P_{\text{LO}} = -15\text{ dBm}$, $V_{\text{BBI}} = 1.0\text{ V}_{\text{pp}}$, differential (Continued)

No.	Parameters	Test Conditions	Pin	Symbol	Min.	Typ.	Max.	Unit	Type*
4	RF Output, Pin 4								
4.1	Output level	$f_{\text{LO}} = 150\text{ MHz}$, $V_{\text{BBI}} = 1\text{ V}_{\text{pp}}$, differential $f_{\text{LO}} = 50\text{ MHz}$, $V_{\text{BBI}} = 0.3\text{ V}_{\text{pp}}$, differential		P_{RFo}	-3	-1 0	+2	dBm	A/B
4.2	LO suppression	$P_{\text{LO}} = -20\text{ dBm}$		LO_{RFo}	32	45		dB	A
4.3	Voltage standing wave ratio			VSWR_{RF}		1.4	2		D
4.4	Sideband suppression ⁽³⁾			SBS_{RFo}	35	45		dB	A
4.5	Phase error ⁽⁴⁾			P_e		< 1		deg	D
4.6	Amplitude error			A_e		< ± 0.25		dB	D
4.7	Noise floor	$V_{\text{BBI}} = 2\text{ V}$, $V_{\text{BBI}} = 3\text{ V}$ $V_{\text{BBI}} = V_{\text{BBI}} = 2.5\text{ V}$		N_{FL}		-137 -143		dBm/Hz	D
5	Power-up Mode								
5.1	Supply current	$V_{\text{PU}} \leq 0.5\text{ V}$, pins 6, 7 $V_{\text{PU}} = 1\text{ V}$		I_{PU}		10	1	μA	D
5.2	Settling time	Pins 1 to 4, $C_{\text{SPU}} = 100\text{ pF}$ $C_{\text{LO}} = 100\text{ pF}$, $C_{\text{RFo}} = 1\text{ nF}$		t_{SPU}		10		μs	D
6	Switching Voltage, Pin 1								
6.1	Power on			V_{PUON}	4			V	D
7	Reference Voltage, Pin 13								
7.1	Voltage range			V_{Ref}	2.375	2.5	2.625	V	A
7.2	Output impedance			$Z_{0\text{Ref}}$		30		Ω	D

- Notes:
1. Required LO level is a function of the LO frequency.
 2. The LO input impedance is consisting of a $50\ \Omega$ resistor in series with a 15 pF capacitor.
 3. With the pins 19 and 20 spurious performance especially for low frequency application can be improved by adding a chip capacitor between LP1 and LP2. In conjunction with a parallel resistor the output level can be adjusted to the following mixer stage without degradation of LO suppression and noise performance which would decrease if the I/Q input level is reduced.
 4. For $T_{\text{amb}} = -40^\circ\text{C}$ to $+85^\circ\text{C}$ and $V_S = 4.5\text{ V}$ to 5.5 V

6. Diagrams

Figure 6-1. Reference Voltage versus T_{amb}

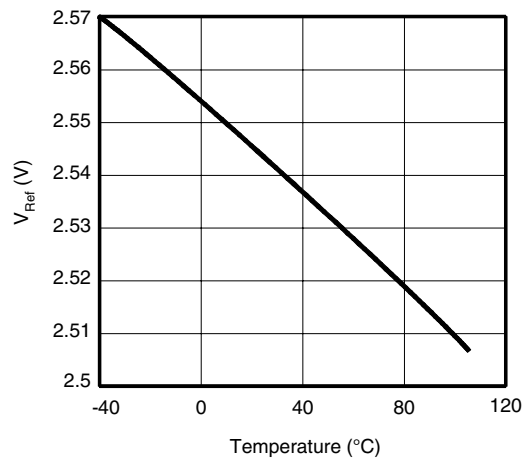


Figure 6-2. OIP3 versus T_{amb} , LO = 150 MHz, Level -10 dBm

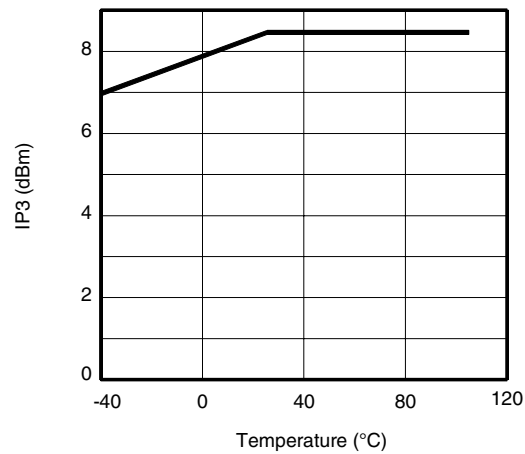


Figure 6-3. Supply Current versus T_{amb}

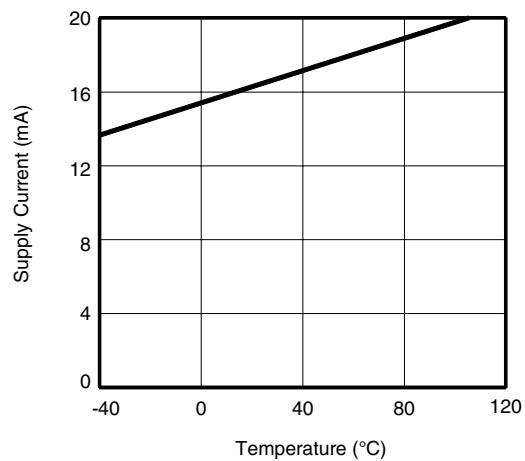


Figure 6-4. Recommended LO Power Range versus LO Frequency at $T_{amb} = 25^{\circ}\text{C}$

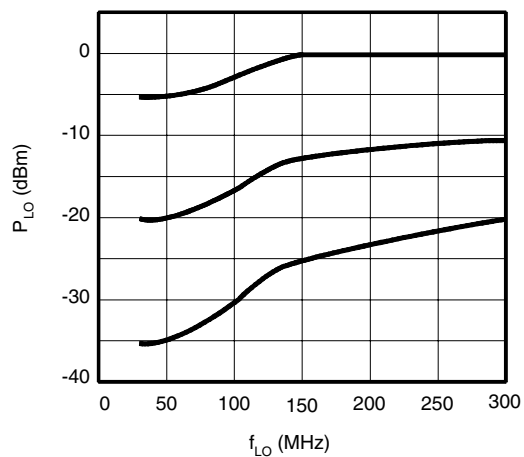


Figure 6-5. Output Power versus T_{amb}

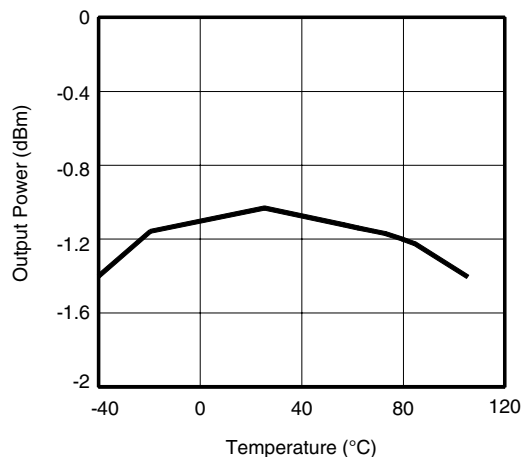


Figure 6-6. Typical Output Power versus LO Frequency at $T_{amb} = 25^{\circ}\text{C}$, $V_{BBI} = 250\text{ mV}$ (Differential)

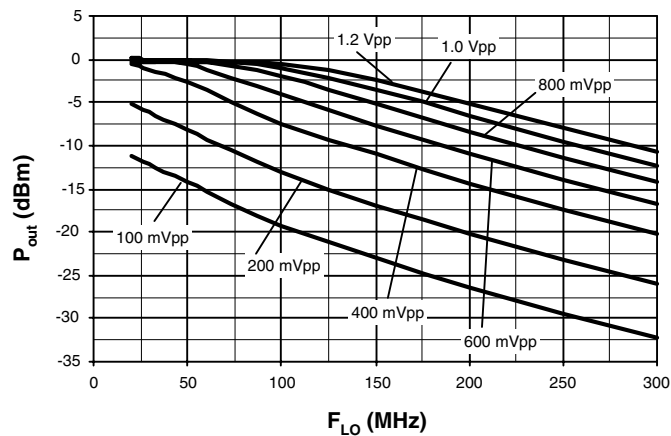
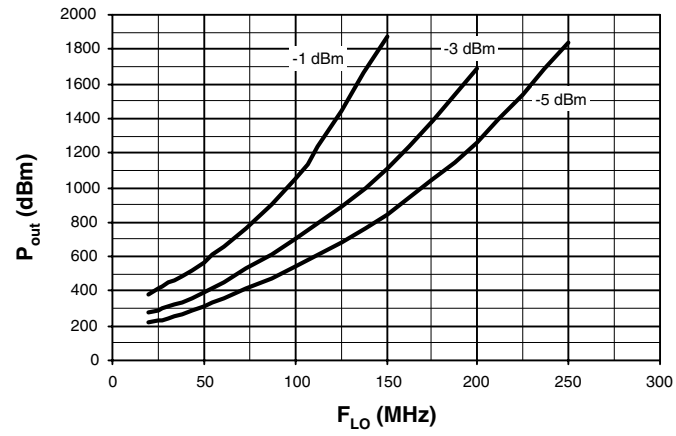
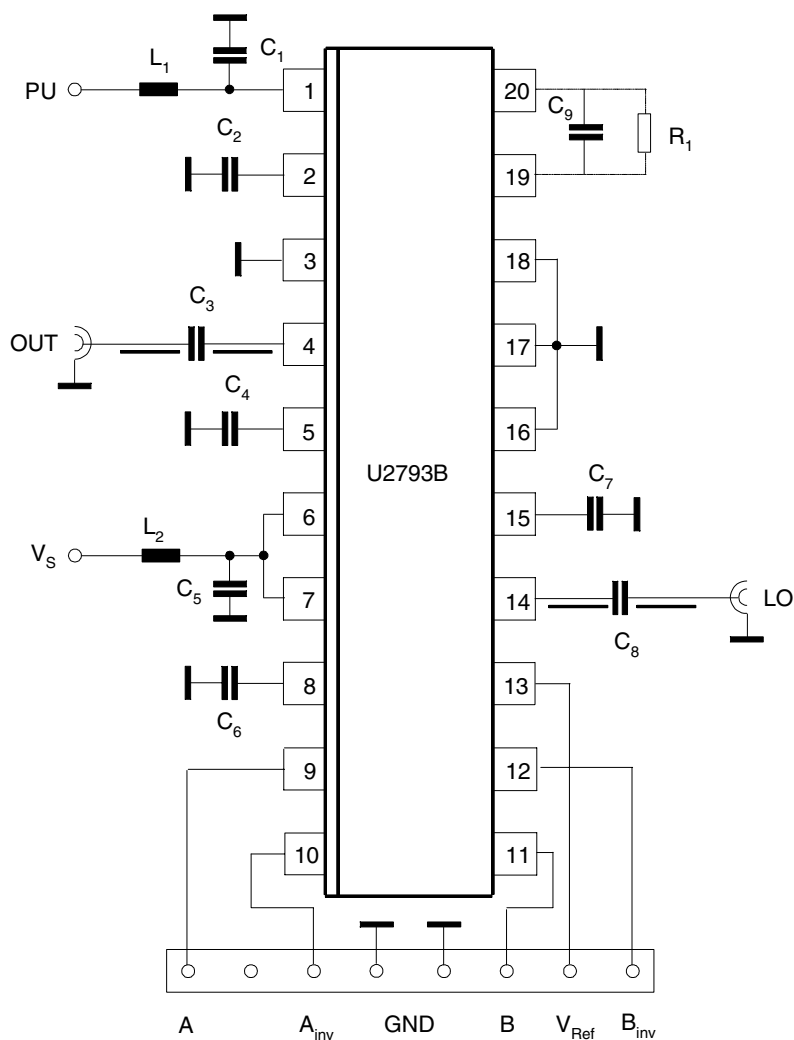


Figure 6-7. Typical Required V_{BBI} Input Signal (Differential) versus LO Frequency for $P_{\text{O}} = 1 \text{ dBm}$ and $P_{\text{O}} = -3 \text{ dBm}$

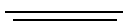
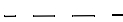


7. Evaluation Board Drawings

Figure 7-1. Evaluation Board Circuitry

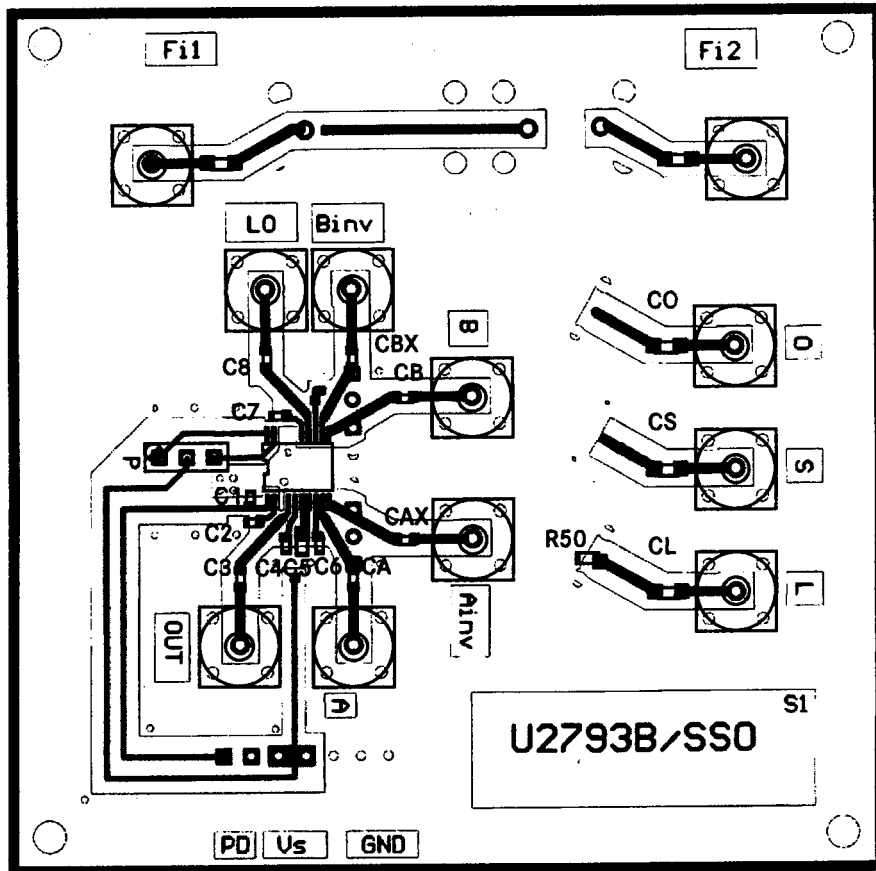


Part List

C_1, C_2, C_3, C_4, C_6	=	1 nF
C_7, C_8	=	100 pF
C_5	=	100 nF
C_9, R_1	=	1 pF to 10 pF
	=	50-Ω Microstrip
	=	optional

The above listed components result in a PD settling time of <20 μ s. The use of other component values will require consideration for time requirements in burst-mode applications.

Figure 7-2. PCB Layout Evaluation Board



8. Application Circuits

Bias network for AC-coupled baseband inputs (V_{BA} , V_{BB}).

$R_1 = 2.5 \text{ k}\Omega$, $R_2 \leq 10 \text{ k}\Omega$ for $\geq 35 \text{ dB}$ LO suppression which is in reference to $< 2 \text{ mV}$ input offset.

Figure 8-1. Application Circuit with AC-coupled Baseband Inputs

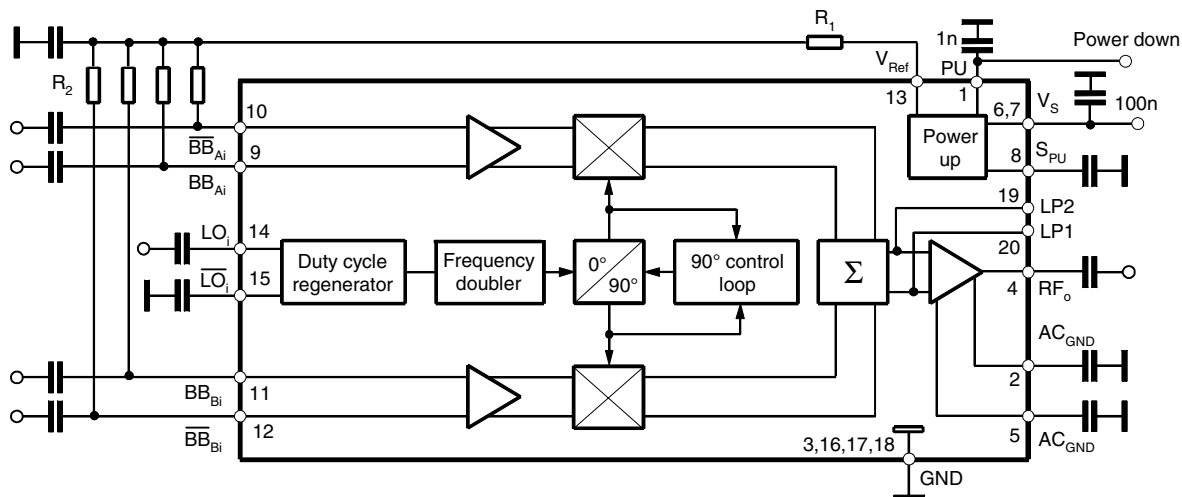
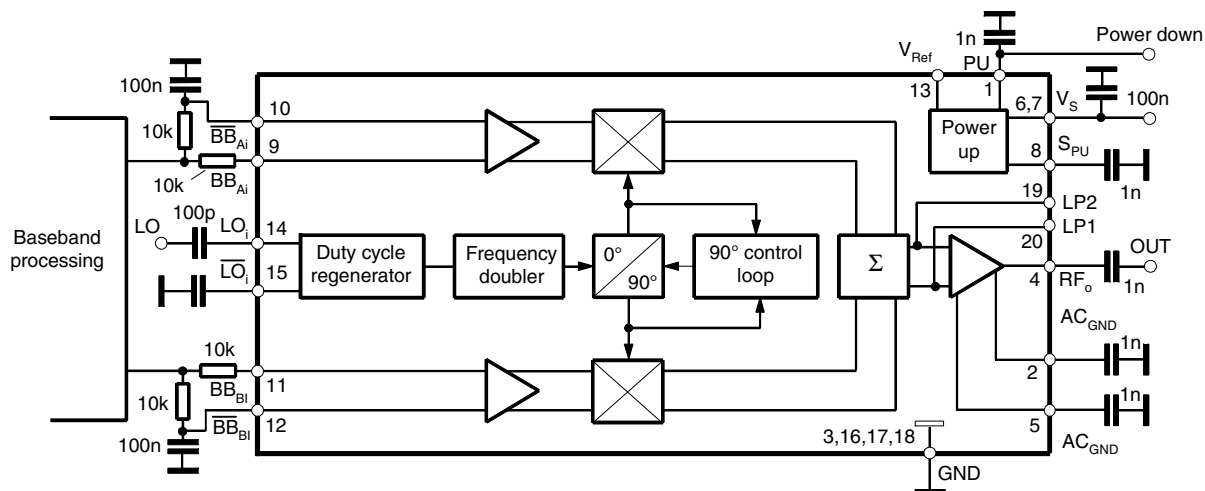


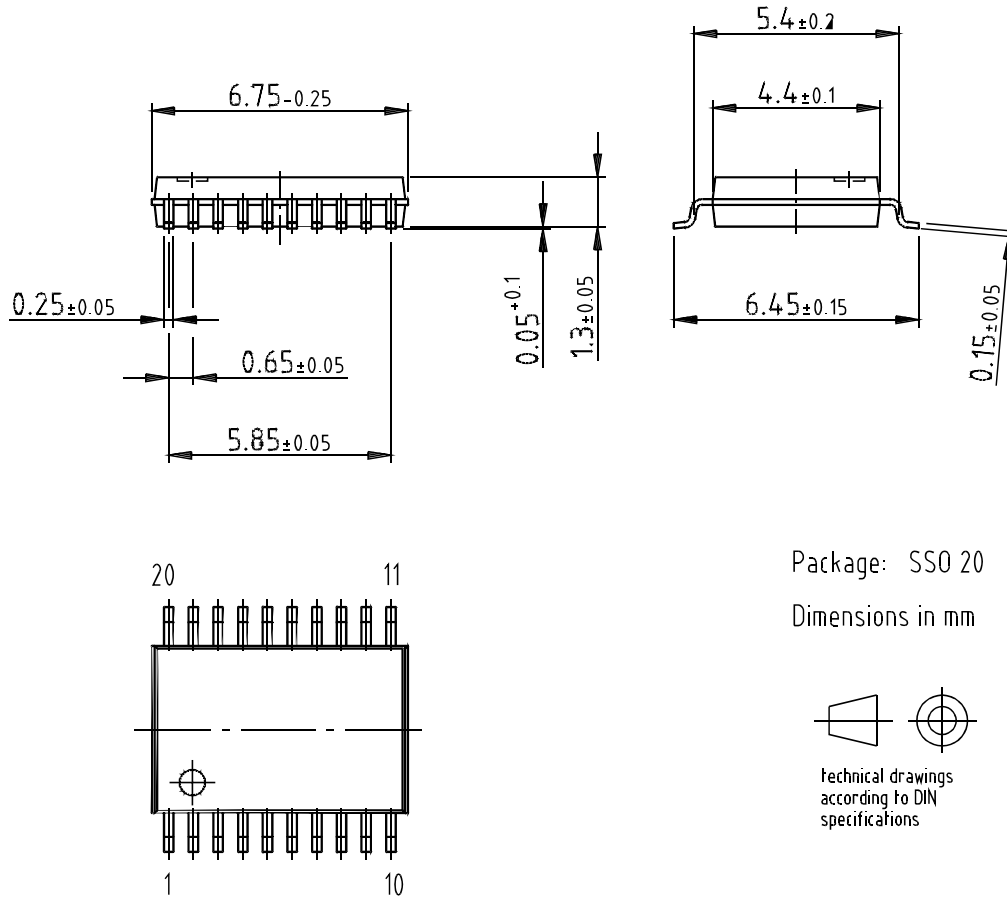
Figure 8-2. Application Circuit with DC-coupled Baseband Inputs



9. Ordering Information

Extended Type Number	Package	Remarks
U2793B-NFSH	SSO20	Tube, lead free
U2793B-NFSG3H	SSO20	Taped and reeled, lead free

10. Package Information



Drawing-No.: 6.543-5056.01-4
Issue: 1; 10.03.04



Atmel Corporation

2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 487-2600

Regional Headquarters

Europe

Atmel Sarl
Route des Arsenaux 41
Case Postale 80
CH-1705 Fribourg
Switzerland
Tel: (41) 26-426-5555
Fax: (41) 26-426-5500

Asia

Room 1219
Chinachem Golden Plaza
77 Mody Road Tsimshatsui
East Kowloon
Hong Kong
Tel: (852) 2721-9778
Fax: (852) 2722-1369

Japan

9F, Tonetsu Shinkawa Bldg.
1-24-8 Shinkawa
Chuo-ku, Tokyo 104-0033
Japan
Tel: (81) 3-3523-3551
Fax: (81) 3-3523-7581

Atmel Operations

Memory

2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 436-4314

Microcontrollers

2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 436-4314

La Chantrerie
BP 70602
44306 Nantes Cedex 3, France
Tel: (33) 2-40-18-18-18
Fax: (33) 2-40-18-19-60

ASIC/ASSP/Smart Cards

Zone Industrielle
13106 Rousset Cedex, France
Tel: (33) 4-42-53-60-00
Fax: (33) 4-42-53-60-01

1150 East Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906, USA
Tel: 1(719) 576-3300
Fax: 1(719) 540-1759

Scottish Enterprise Technology Park
Maxwell Building
East Kilbride G75 0QR, Scotland
Tel: (44) 1355-803-000
Fax: (44) 1355-242-743

RF/Automotive

Theresienstrasse 2
Postfach 3535
74025 Heilbronn, Germany
Tel: (49) 71-31-67-0
Fax: (49) 71-31-67-2340

1150 East Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906, USA
Tel: 1(719) 576-3300
Fax: 1(719) 540-1759

*Biometrics/Imaging/Hi-Rel MPU/
High Speed Converters/RF Datacom*
Avenue de Rochepleine
BP 123
38521 Saint-Egreve Cedex, France
Tel: (33) 4-76-58-30-00
Fax: (33) 4-76-58-34-80

Literature Requests

www.atmel.com/literature

Disclaimer: The information in this document is provided in connection with Atmel products. No license, express or implied, by estoppel or otherwise, to any intellectual property right is granted by this document or in connection with the sale of Atmel products. **EXCEPT AS SET FORTH IN ATMEL'S TERMS AND CONDITIONS OF SALE LOCATED ON ATMEL'S WEB SITE, ATMEL ASSUMES NO LIABILITY WHATSOEVER AND DISCLAIMS ANY EXPRESS, IMPLIED OR STATUTORY WARRANTY RELATING TO ITS PRODUCTS INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. IN NO EVENT SHALL ATMEL BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE, SPECIAL OR INCIDENTAL DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF PROFITS, BUSINESS INTERRUPTION, OR LOSS OF INFORMATION) ARISING OUT OF THE USE OR INABILITY TO USE THIS DOCUMENT, EVEN IF ATMEL HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.** Atmel makes no representations or warranties with respect to the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and product descriptions at any time without notice. Atmel does not make any commitment to update the information contained herein. Atmel's products are not intended, authorized, or warranted for use as components in applications intended to support or sustain life.

© Atmel Corporation 2005. All rights reserved. Atmel®, logo and combinations thereof, and other, are registered trademarks, and Everywhere You AreSM and others are the trademarks of Atmel Corporation or its subsidiaries. Other terms and product names may be trademarks of others.



Printed on recycled paper.

4651D-CELL-03/05