900-MHz ISM Band Transmitter

Description

The transmitter IC U2763B is specifically designed for cordless telephone applications in the 900-MHz ISM band. The IC is manufactured using TEMIC's advanced UHF process. It consists of a 900-MHz VCO and mixer, 0-dBm PA and buffers. The device features 2.9-V operation. In conjunction with TEMIC's receiver IC U2762B and the PLL U2781B, a complete ISM RF IC kit is available which fits perfectly with AMD's PhoX controllers AM79C432A and AM79C433.

Electrostatic sensitive device.
Observe precautions for handling.

Features

- 0-dBm PA and RX/TX VCO integrated
- Buffer for PLL and mixer integrated
- Supply-voltage range 2.7 V to 3.3 V
- Low current consumption, typical 16 mA
- SSO20 package

Benefits

- Single VCO for entire RF part saves cost
- Integrated PA stage with 50-Ω output saves external components and board space
- Integrated mixer to increase duplex spacing

Block Diagram

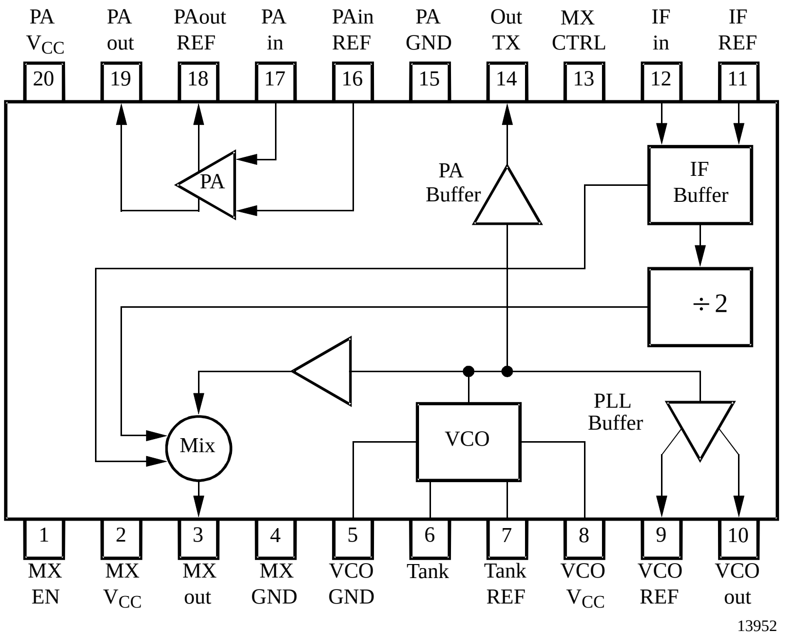

Figure 1. Block diagram

Ordering Information

Extended Type Number	Package	Remarks
U2763B-AFN	SSO20	Tubes, MOQ 830 pcs
U2763B-AFGG3	SSO20	Taped and reeled, MOQ 4000 pcs

Functional Description

VCO

Symmetrical cross-coupled pair type VCO with external tank circuit. It can be used with LC or λ/4 resonator circuit.

PA

The PA is designed to drive a 50-Ω load with 0 dBm (1 mW, compliant with FCC rules) and can be connected directly to the TX/RX switch.

PA Buffer

The PA buffer decouples the VCO from the PA to reduce VCO pulling when the PA is turned on and off.

PLL Buffer

The PLL buffer is a dedicated output to drive a PLL circuit.

Divide-by-2 Stage + Mixer

The duplex frequency offset can be increased by shifting the RX LO frequency via the PLL xtal frequency and optionally by half of the xtal frequency. These functions are activated by MX CTRL (Pin 13).

Pin Description

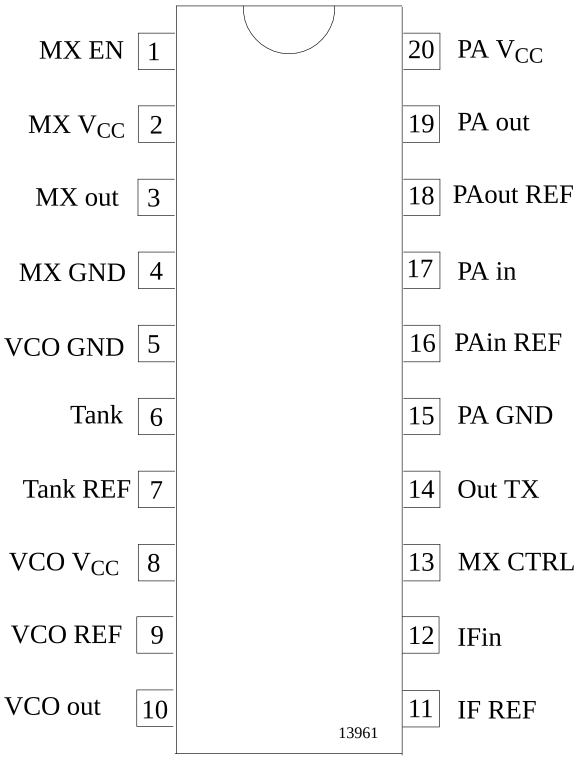

Figure 2. Pinning

Pin	Symbol	Function
1	MX EN	Mixer enable
2	MX V_{CC}	Power supply Mixer
3	MX out	Mixer output
4	MX GND	Mixer ground
5	VCO GND	VCO ground
6	Tank	Resonator
7	Tank REF	Resonator reference
8	VCO V_{CC}	Power supply VCO
9	VCO REF	VCO output reference
10	VCO out	VCO output
11	IF REF	IF input reference
12	IF in	IF input
13	MX CTRL	Control pin for Mixer modi
14	Out TX	Transmit signal output
15	PA GND	Power-amplifier ground
16	PAin REF	Power-amplifier input reference
17	PA in	Power-amplifier input
18	PAout REF	Power-amplifier output reference
19	PA out	Power-amplifier output
20	PA V_{CC}	Power supply for power amplifier

Absolute Maximum Ratings

Parameters		Symbol	Value	Unit
Supply voltage		V_{CC}	0 to +3.5	V
Input voltages	Pins 1 and 13	V_{in}	0 to V_{CC}	V
Input voltages	Pins 3, 6, 7, 9, 10, 11, 12, 14, 16, 17, 18 and 19	V_{in}	0.5 to V_{CC} – 1 V	V
Junction temperature		T_j	125	°C
Storage temperature range		T_{stg}	–40 to +125	°C

Thermal Resistance

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

Operating Range

Parameters	Symbol	Value	Unit
Supply voltage	V_{CC}	2.7 to 3.3	V
Ambient temperature	T_{amb}	0 to +70	°C

Electrical Characteristics VCO

V_{CC} = 2.9 V at Pin 8

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Supply-voltage range	Pin 8	V_{CC}	2.7	2.9	3.3	V
Supply current	Pin 8	I_{CC}		6		mA
Frequency bandwidth		f_{BW}			1200	MHz
Sensitivity	Externally defined	f_S		7		MHz/V
Phase noise ± 100 kHz		P_N		–86		dBc/Hz
Output impedance TX port	Pin 14			50		Ω
Output impedance PLL port	Pin 10			50		Ω
Output power TX	50-Ω termination single ended Pin 14	P_{TXout}		–15		dBm
Output power VCO	50-Ω termination single ended Pin 10	P_{VCOout}		–10		dBm

Electrical Characteristics PA

V_{CC} = 2.8 V at Pin 20

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Supply-voltage range	Pin 20	V_{CC}	2.7	2.8	3.3	V
Supply current	Pin 20	I_{CC}		11.5		mA
PA input impedance	Pin 17	Z_{PAin}		50		Ω
PA output impedance	Pin 19	Z_{PAout}		50		Ω
Operation frequency		f_{PA}			1200	MHz
Input power	Pin 17	PA_{in}		–16		dBm
Output power	50-Ω termination single ended Pin 19	PA_{out}	–2	–0.5	2	dBm
Output –1dB compression		P_{1dB}	–1	0		dBm

Electrical Characteristics Divide-by-2 Stage + Mixer

V_{CC} = 2.9 V at Pin 2

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Supply-voltage range	Pin 2	V_{CC}	2.7	2.9	3.3	V
Supply current [1]	MX_{EN} < 0.3 V Pin 2	I_{SMXon}		9		mA
Supply current	$MX_{EN} \geq V_{CC}$–0.3 V Pin 2	I_{SMXoff}			500	μA
MX turn-on time		t_{MXon}		2.5		μs
MX output impedance	@ 900 MHz Pin 3	Z_{MXout}		50		Ω
MX IF input frequency		f_{MXIFin}			22	MHz
Output frequency	Pin 3	f_{MXout}	800	950	1200	MHz
Output power [2] IF buffer linear, Mixer active	50-Ω termination single ended V_{IFin} = 50 mV_{rms} MX_{EN} < 0.3 V $MX_{CTRL} = V_{CC}$ Pin 3	P_{MXout}		–15		dBm
Output power [2] ÷ 2 active, Mixer active	50-Ω termination single ended V_{IFin} = 50 mV_{rms} MX_{EN} < 0.3 V $V_{CTRL} = V_{CC}$ MX_{CTRL} = 0 V Pin 3	P_{MXout}		–15		dBm
Output power Mixer = buffer stage	50-Ω termination single ended MX_{EN} < 0.3 V MX_{CTRL} = open Pin 3	P_{MXout}		–10		dBm
Noise figure	SSB	N_F		18		dB
LO leakage [3]	MX_{out}-port, V_{IFin} = 50 mV_{rms} Pin 3	Lk_{LO}		–25		dBm
IF leakage	MX_{out}-port, V_{IFin} = 50 mV_{rms} Pin 3	Lk_{IF}		–45		dBm
(2 × IF) leakage	MX_{out}-port, V_{IFin} = 50 mV_{rms} Pin 3	Lk_{2IF}		–35		dBm
(3 × IF) leakage	MX_{out}-port, V_{IFin} = 50 mV_{rms} Pin 3	Lk_{3IF}		–55		dBm
IF input frequency		f_{IFin}	10	12.8	22	MHz
IF input voltage level		V_{IFin}	40	50	125	mV
IF input impedance	Base input $MX_{EN} \geq V_{CC}$ – 0.3 V $MX_{EN} \leq$ 0.3 V Pin 12	Z_{IFin}	 1 1			 kΩ kΩ

Comment: The IF signal is limited when divided by two.

Note: [1] Including IF buffer
[2] Each sideband
[3] In mixing mode

Internal Pin Configuration

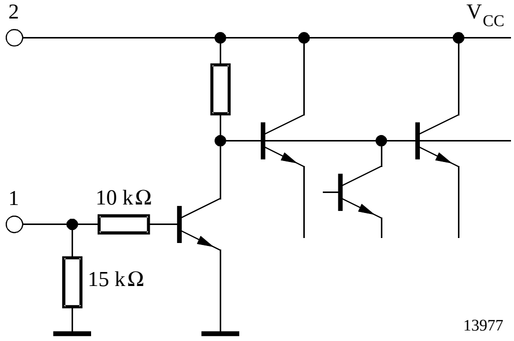

Figure 3. Pin 1: Mixer enable

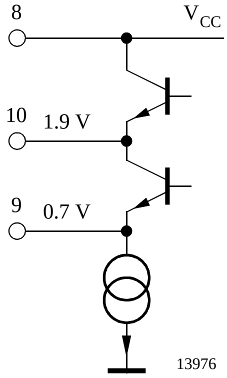

Figure 6. Pins 9/11: PLL buffer

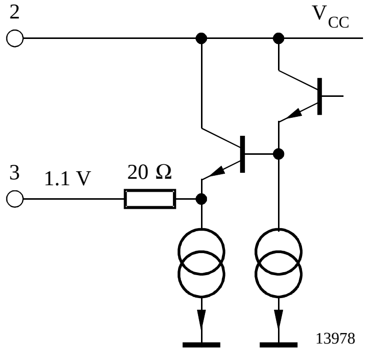

Figure 4. Pin 3: Mixer output

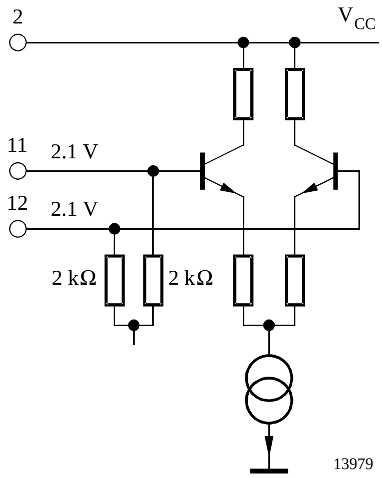

Figure 7. Pins 11/12: IF input

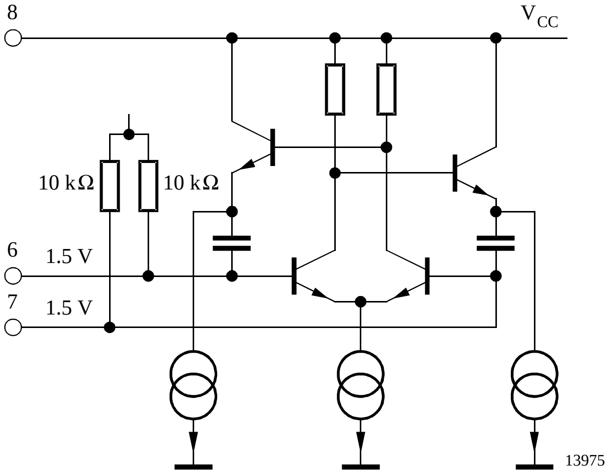

Figure 5. Pins 6/7: VCO

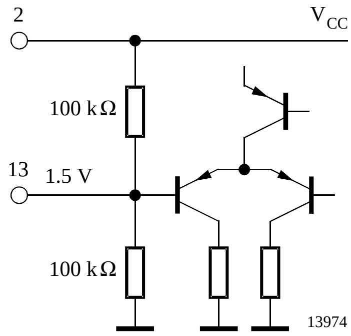

Figure 8. Pin 13: Control pin for Mixer modi

Preliminary Information

Internal Pin Configuration

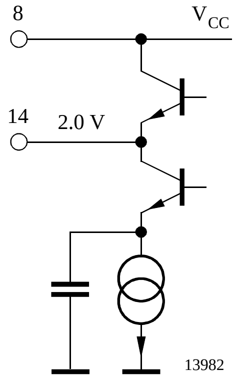

Figure 9. Pin 14: Transmit signal output

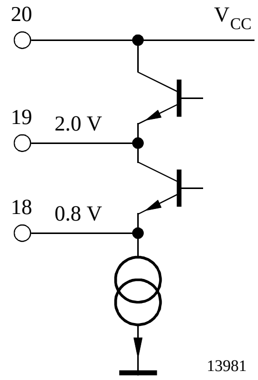

Figure 11. Pins 18/19: Power amplifier output

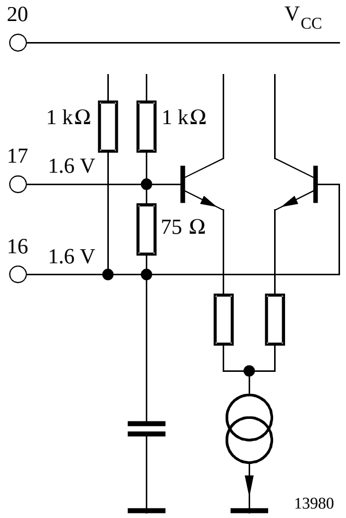

Figure 10. Pins 16/17: Power amplifier input

Application Circuit

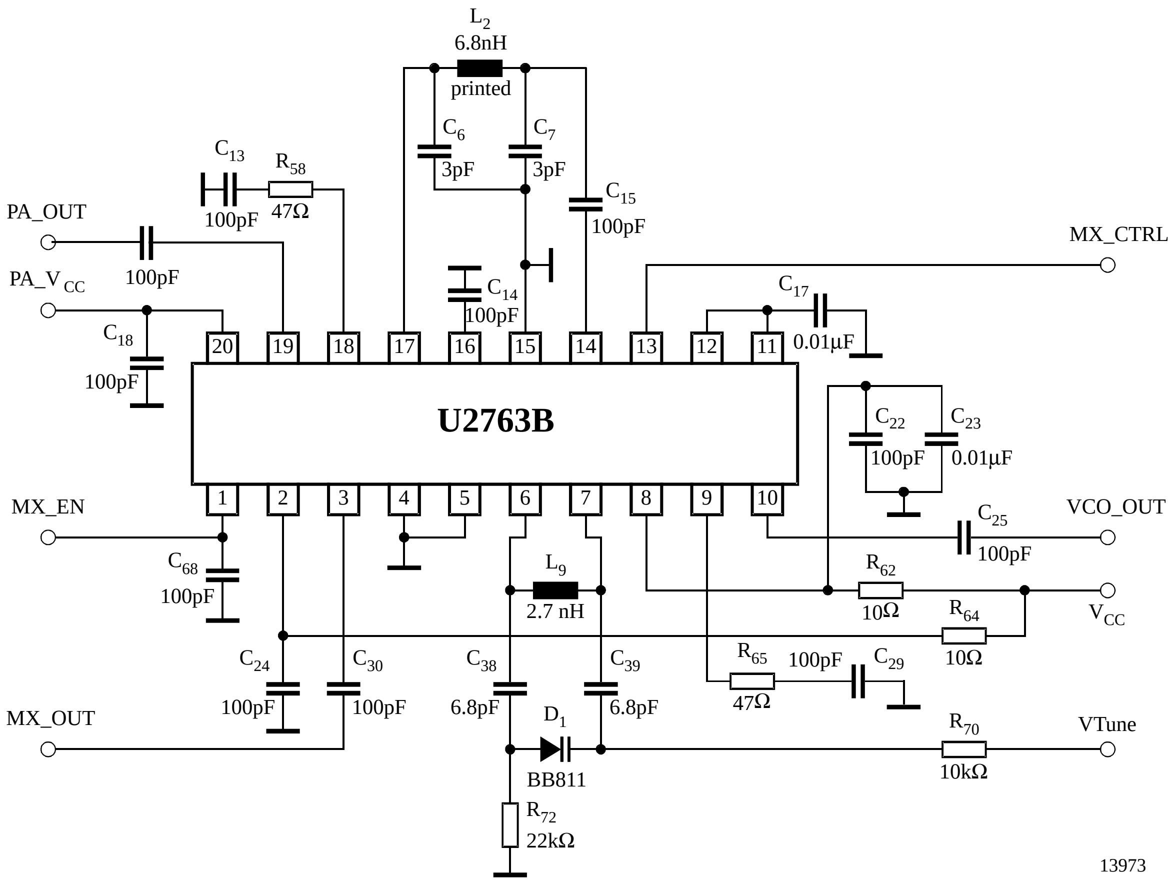

Figure 12. Application circuit

Preliminary Information

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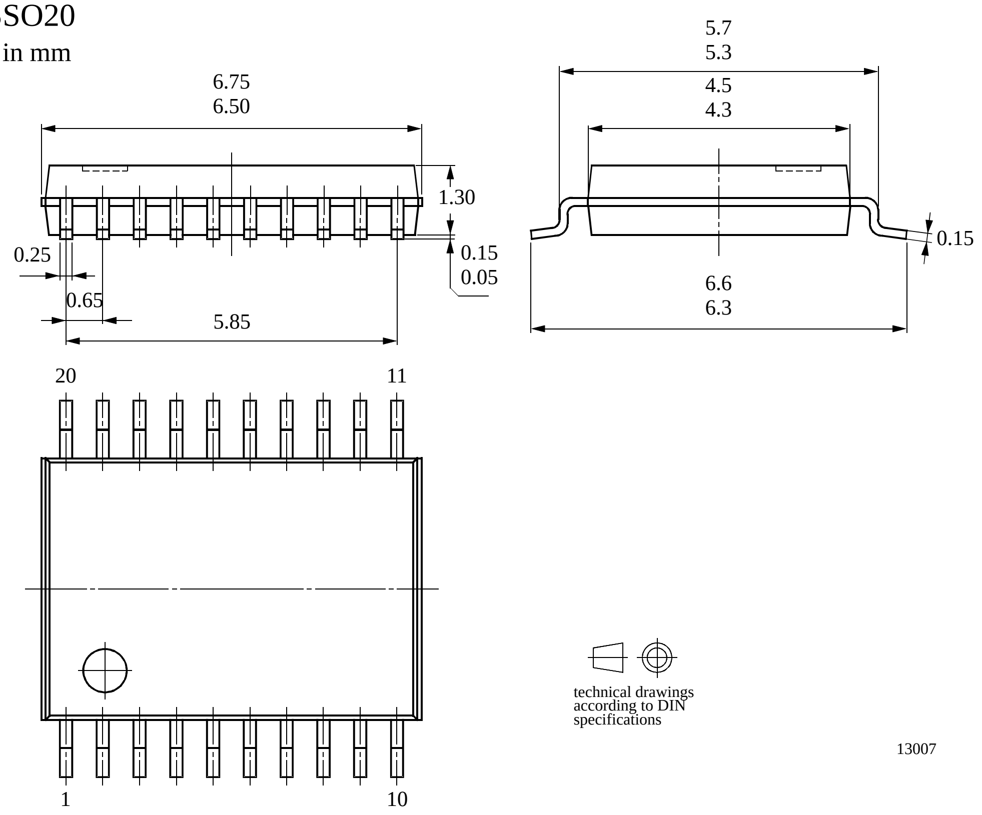
Package Information

Package SSO20
Dimensions in mm



TELEFUNKEN Semiconductors
Rev. A1, 02-Dec-97

Preliminary Information

Ozone Depleting Substances Policy Statement

It is the policy of **TEMIC TELEFUNKEN microelectronic GmbH** to

1. Meet all present and future national and international statutory requirements.

2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

TEMIC TELEFUNKEN microelectronic GmbH semiconductor division has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively

2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA

3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

TEMIC can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

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