UHF AM/FM Transmitter

Description

The U2740B is a one-chip multi-purpose UHF AM/FM transmitter designed for various applications in a wide frequency range. When supplying a **C**hip-**S**elect signal (CS), the IC starts operation (Power-up, XTO, VCO, PD) and the VCO is then locked to 128*f(XTO). The locked status is indicated by the **L**ock-**D**etect (LD) output.

The digital data is supplied to either an AM- or FM-input-pin whereby the output power is set by use of the AM-input-pin. A differential output provides simple application with loop antennas. An output driver (XTO out) can be used for clocking the microcontrolller.

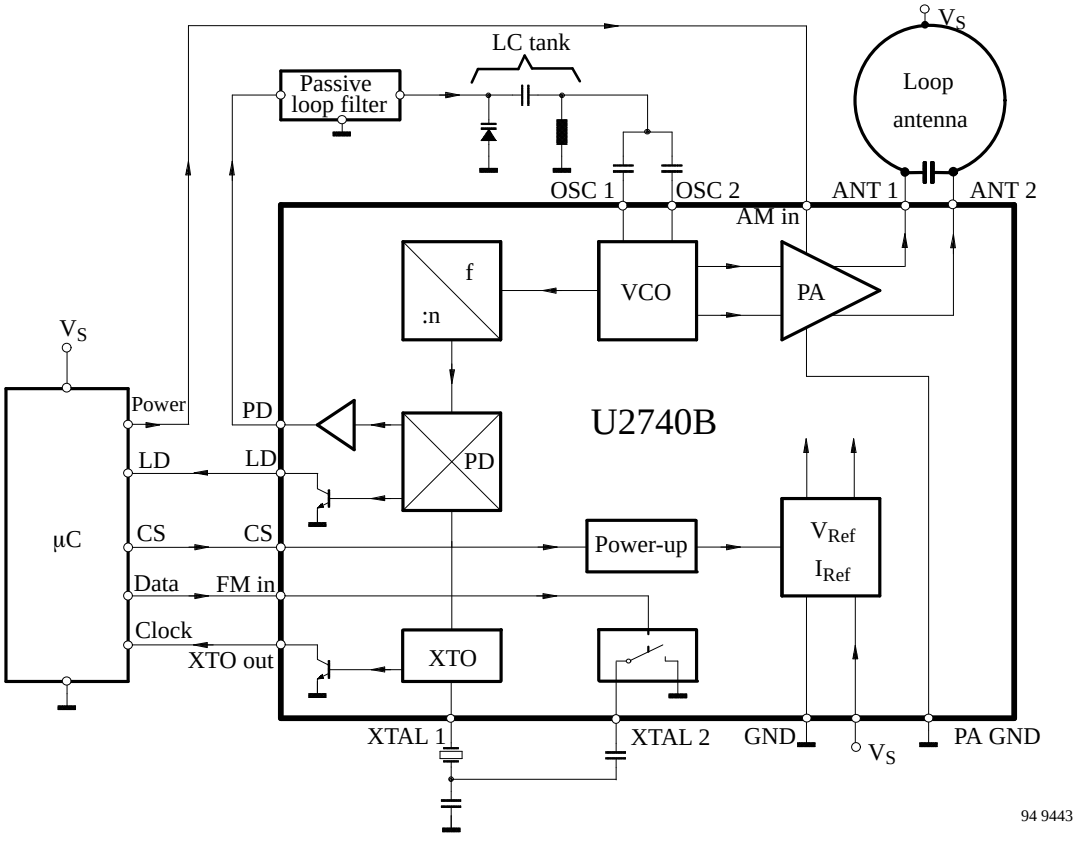
Features

- One-chip solution with few external components
- Wide frequency range (200 to 500 MHz)
- Single voltage supply (2.4 to 6 V) with power down feature
- Adjustable output power with differential output for loop antenna
- PLL lock-detect signal
- XTO output for µC clock
- ESD protection according to MIL–STD. 883

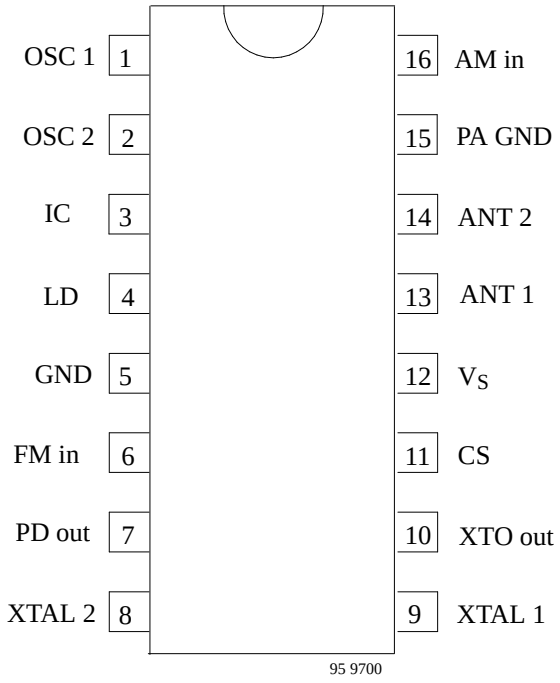
Applications

- Keyless entry (automotive, domestic,...)
- Alarm systems
- Remote control
- Communication systems

Block Diagram



Pin Description



Pin	Symbol	Function
1	OSC 1	VCO tank
2	OSC 2	VCO tank
3	IC	Internally connected
4	LD	Lock-detect (open collector)
5	GND	Ground
6	FM in	FM modulation input
7	PD out	Phase detector output
8	XTAL 2	FM modulation capacitor
9	XTAL 1	XTAL
10	XTO out	XTO output (open collector)
11	CS	Chip-select (power-up)
12	V_S	Supply voltage
13	ANT 1	Differential output 1
14	ANT 2	Differential output 2
15	PA GND	Power amplifier ground
16	AM in	AM modulation input

Absolute Maximum Ratings

All voltages are referred to GND (Pin 5). T_A = 25°C, unless otherwise specified.

Parameters		Symbol	Min.	Max.	Unit
Supply voltage	Pin 12	V_S	2.4	6.2	V
Output current Lock-detect	R4 = 2.7 kΩ connected to V_S = 3 V Pin 4	I4		1	mA
Output current XTO out	R10 = 2.7 kΩ connected to V_S = 3 V Pin 10	I10		1	mA
Input current AM in	R16 = 2.7 kΩ connected to V_S = 3 V Pin 16	I16		0.5	mA
Junction temperature		T_{jmax}		125	°C
Storage temperature		T_{stor}	–40	125	°C

Operating Range

All voltages are referred to GND (Pin 5). T_A = 25°C, unless otherwise specified.

Parameters		Symbol	Min.	Typ.	Max.	Unit
Supply voltage	Pin 12	V_S	2.4	3.0	6.2	V
Ambient temperature		T_{amb}	–40		85	°C

Maximum Thermal Resistance

All voltages are referred to GND (Pin 5). T_A = 25°C, unless otherwise specified.

Parameters	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance	R_{thJA}		120		K/W

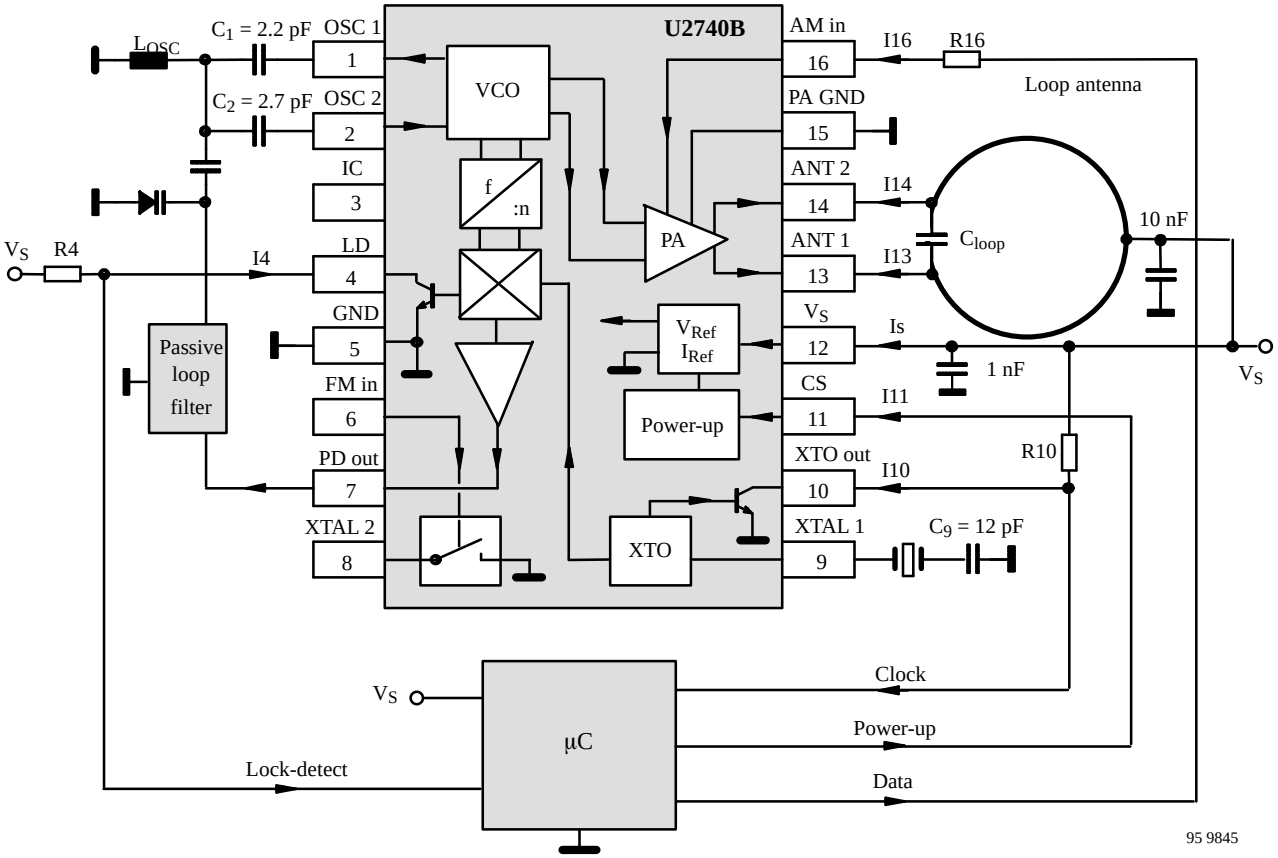
Electrical Characteristics

Test conditions (unless otherwise specified): V_S = 3 V, T_{amb} = 25°C

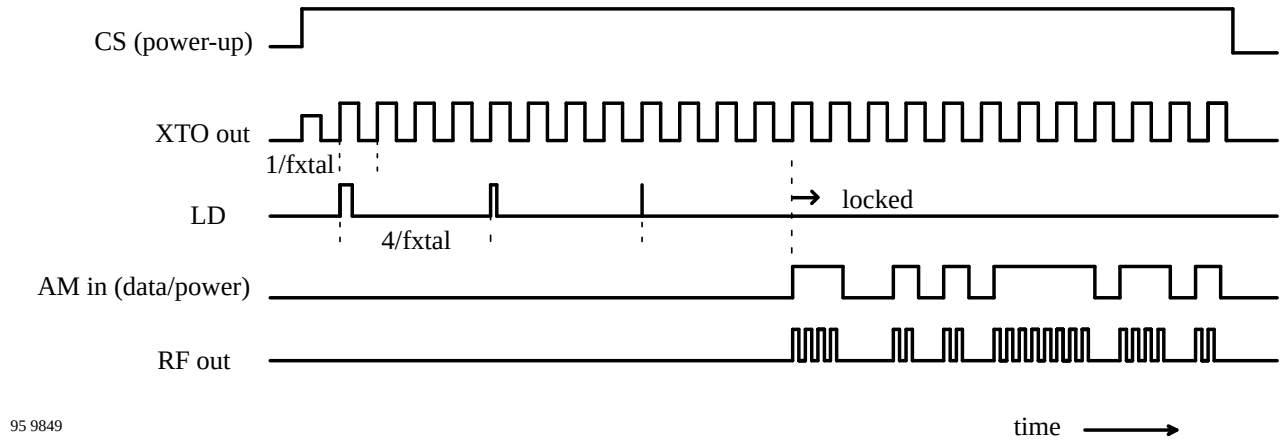
Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Supply current (power-down)	V11 = 0, I16 = 0 Pin 12	$I_{S, OFF}$		0.05	1	µA
Supply current (power-up)	V11 = 3 V, I16 = 0 V11 = 3 V, I16 = 0.4 mA Pin 12	$I_{S, ON}$ $I_{S, ON,0.4}$		5.0 9.5		mA
Power-down voltage	I16 = 0 Pin 11	$V_{11,OFF}$			0.4	V
Power-down current	V11 = 0, I16 = 0 Pin 11	$I_{11, OFF}$			0.1	µA
Power-up voltage	I16 = 0 Pin 11	$V_{11,ON}$	1.0			V
Power-up current	V11 = 3 V, I16 = 0 Pin 11	$I_{11, ON}$		40		µA
Output power (f_{VCO} = 433.92 MHz)	V11 = 3 V I16 = 0 V11 = 3 V I16 = 0.4 mA Pins 13 and 14	$P_{out, OFF}$ $P_{out, ON}$		–40 0		dBm dBm
Hold in range	Pins 13 and 14	Δf_H				MHz
Phase detector Output current	Pin 7	I_{PD}	–1		1	mA
Enable settling time	Pins 11/13 and 14	T_{enable}				µs
Output frequency range	Pins 13 and 14	f_{VCO}	200		500	MHz
XTO frequency range	Pins 9 and 10	f_{XTO}	3		6	MHz
Input current AM in	R16 = 0 connected to V_S Pin 16	I16		0.5		mA
Amplitude modulation bandwidth	Pin 16	BW_{AM}				kHz
Input current FM in	V6 = 3 V Pin 6	I6		16		µA
Frequency modulation bandwidth	Pin 6	BW_{FM}				kHz
Output current Lock-detect	R4 = 27 kΩ connected to V_S Pin 4	I4 [1)]		0.1		mA
Output current XTO out	R10 = 27 kΩ connected to V_S Pin 10	I10 [1)]		0.1		mA

Note: [1)] depends on value of resistor connected to V_S

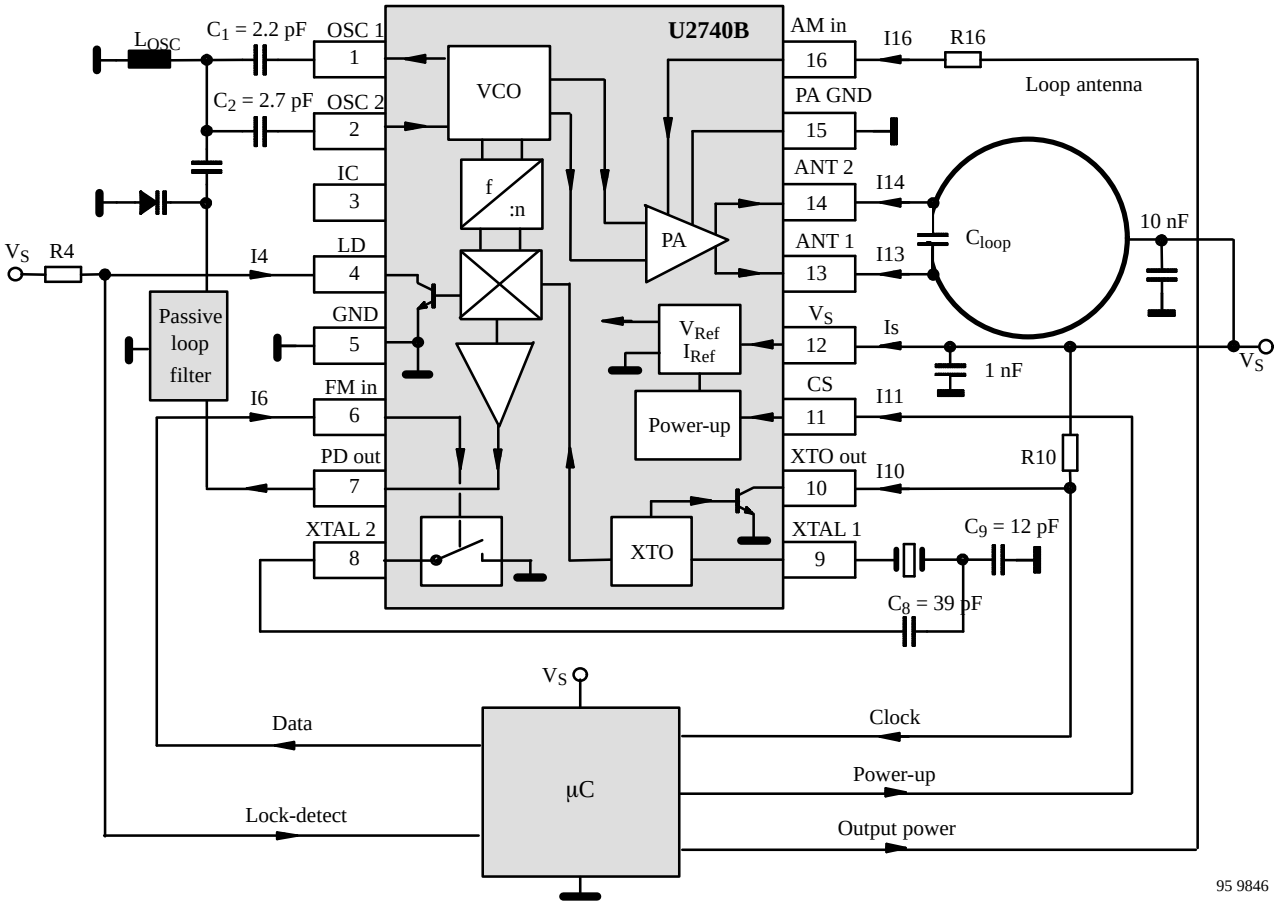
Application Circuit (AM Modulation)



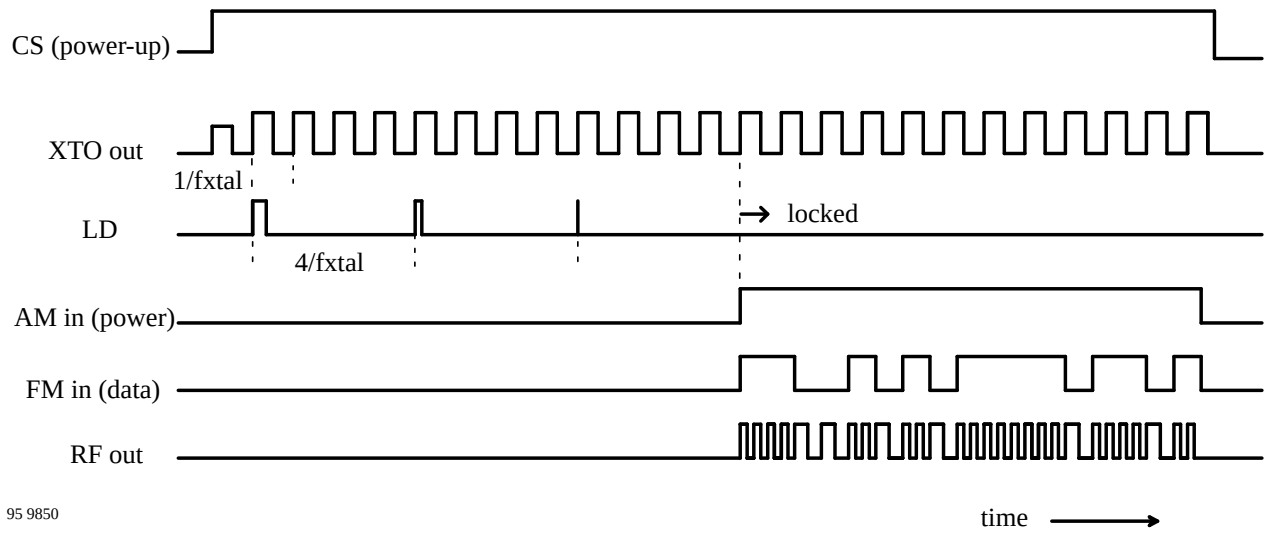
Principle of Operation (AM Modulation)



Application Circuit (FM Modulation)

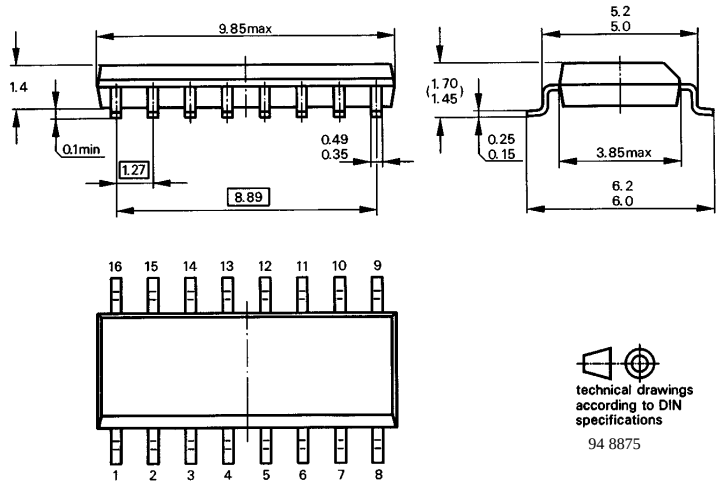


Principle of Operation (FM Modulation)



Dimensions in mm

Package: SO 16



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 and

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.

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

The Montreal Protocol (1987) and its London Amendments (1990) will soon 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 any 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 and

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 and do not contain ozone depleting substances.

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