

W55RFS27T1B



1. GENERAL DESCRIPTION

The Winbond W55RFS27T1B is a fully integrated, S-R (Super-regeneration) RF transmitter with full-function baseband command encoder for R/C vehicles, toys, or wireless data communication applications.

The W55RFS27T1B provides two input modes: ***uC-mode***, for general-purpose, micro-controller interfaces to the RF transmitter; and ***manual-mode***, for a 6-function, baseband command encoder and RF transmitter that works conveniently with the W55RFS27R1B to provide a simple remote control capability with low cost and high performance.

The S-R RF transmitter meets FCC/ETSI regulations for 27 MHz, 35 MHz, 40 MHz, and 49 MHz S-R (Super-regeneration) modulation, and it is compliant with FCC part 15 class B and 15.227 / ETSI 300 220-1, making it easier for wireless end products to get FCC and ETSI compliance approval.

In addition, the W55RFS27T1B accommodates a wide range of operating voltages (2.2 V to 5.5 V), supports 2-battery or 3-battery R/C applications, and transmits very efficiently.

1.1 Features

- Operating frequency: 27 MHz ~ 49 MHz
- Wide operating voltage: 2.2 V ~ 5.5 V
- Two input modes—uC-mode and manual-mode—for more flexibility
- (uC-mode) Transmission data rate up to 10 Kbps for 30%-70% duty-cycle signals
- (manual-mode) R/C-toy baseband control command encoder, supporting 4 or 6 functions; Forward, Backward, Left-turn, Right-turn, and 2 user-defined functions F1 and F2 (user-defined functions not available in 4-function mode)
- Highly-efficient transmissions with minimum current consumption
- Power-down current consumption less than 1uA
- Fewer external components required
- Compliant with FCC part 15 class B and 15.227 / ETSI 300 220-1 low-power and short-range device requirements
- Dice form available for PCB bonding
- Operating temperature: 0°C ~ 70°C

W55RFS27T1B



1.2 W55RFS27T1B Pad Definition

1.2.1 Pad Description

SYMBOL	PAD NO.	I/O	FUNCTIONAL DESCRIPTION
S3	1	I	Manual-mode input, internal pull-high
S4	2	I	Manual-mode input, internal pull-high
CKSEL0	3	I	Clock frequency select LSB (please see section 1.2.2 for setup)
TEST	4	I	TEST=0 for 6-function mode, TEST=1 for 4-function mode
CKSEL1	5	I	Clock frequency select MSB (please see section 1.2.2 for setup)
ANT	6	O	RF signal output. An external matching circuit is necessary for connecting with an antenna.
GND	7	Ground	Ground return path
VDD	8	Power	Power path
RESET	9	I	RESET=0 resets whole chip, internal pull-high
X1	10	I	Input of internal crystal oscillator to connect to an external crystal
X2	11	O	Output of internal crystal oscillator to connect to an external crystal
ID1	12	I	ID setting MSB (please see section 1.2.3 for setup)
ID0	13	I	ID setting LSB (please see section 1.2.3 for setup)
TXOUT	14	O	TXD Data output
S1/~TXD	15	I	Manual-mode input or uC-mode: ~TXD, internal pull-high
S2/~ENB	16	I	Manual-mode input or uC-mode: ~ENB, internal pull-high

1.2.2 Clock Frequency Select (CKSEL) Setup

(CKSEL1,CKSEL0)	CLOCK FREQUENCY
(0,0)	27.145 MHz
(0,1)	35.48 MHz
(1,0)	40.68 MHz
(1,1)	49.86 MHz

W55RFS27T1B



1.2.3 uC-Mode & Manual Mode (Baseband Data Rate) Setup

(ID1, ID0)	FUNCTION	ENCODER TIME BASE
(0,0)	Data Rate = 2.5 KBPS	T = 200 us
(0,1)	Data Rate = 1.25 KBPS	T = 400 us
(1,0)	Data Rate = 0.625 KBPS	T = 800 us
(1,1)	uC-Mode	Externally-controlled

(Note: W55RFS27R1B Data Rate = 1.25 KBPS; W55RFS27R1A Data Rate = 2.5 KBPS)

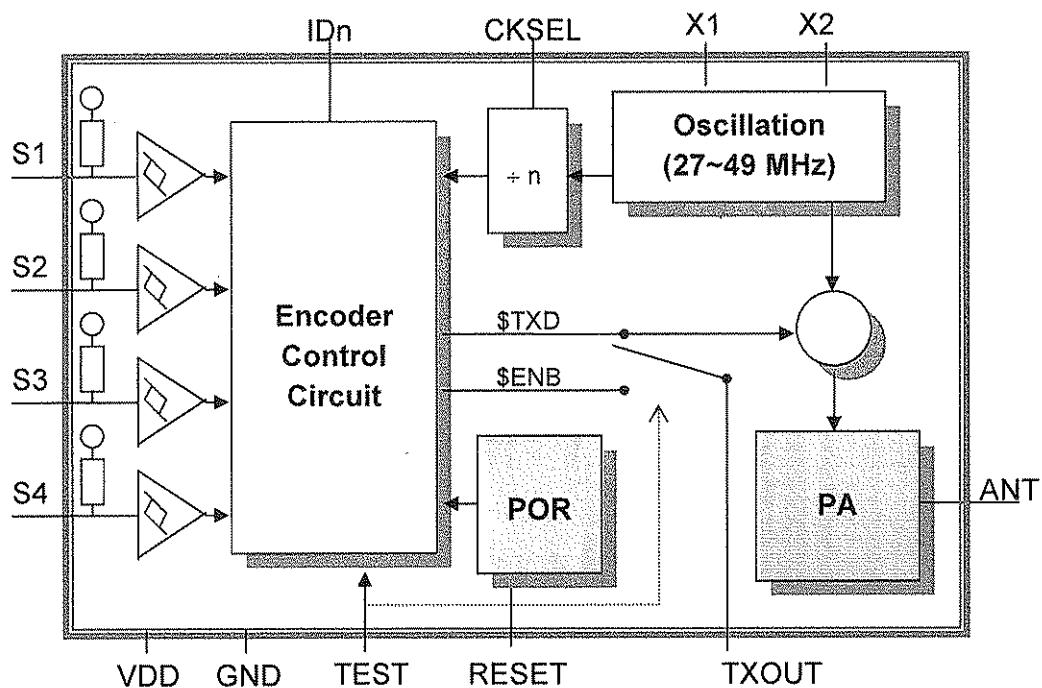
1.2.4 Baseband Encoder Control Function Description

INPUT PIN NAME	CONNECT TO	6-FUNCTION (TEST=0)	4-FUNCTION (TEST=1)
S1	Default (pull high)	F = 0, B = 0	F = 0
	GND	F = 0, B = 1	F = 1
	TXOUT	F = 1, B = 0	-
S2	Default (pull high)	L = 0, R = 0	B = 0
	GND	L = 0, R = 1	B = 1
	TXOUT	L = 1, R = 0	-
S3	Default (pull high)	F1 = 0	L = 0
	GND	F1 = 1	L = 1
S4	Default (pull high)	F2 = 0	R = 0
	GND	F2 = 1	R = 1

(Note: F ⇔ Forward; B ⇔ Backward; L ⇔ Left-turn; R ⇔ Right-turn; F1, F2 ⇔ two user-defined functions)

2. SYSTEM DESCRIPTION

2.1 W55RFS27T1B System Block Diagram



W55RFS27T1B



2.2 W55RFS27T1B Functional Description

The W55RFS27T1B provides two operating modes, *Manual-mode* and *uC-mode*, for remote-control product development.

In *Manual-mode*, the W55RFS27T1B encodes one of up to six functions, modulates it with the on-chip RF power amplifier, and transmits it to the receiver (e.g., W55RFS27R1B). This mode supports up to six functions: Forward, Backward, Left-turn, Right-turn (for general R/C-vehicle control) and two user-defined functions F1 and F2.

uC-mode provides a digital interface for any external micro-controller to control the S-R RF transmitter easily and efficiently. The micro-controller only uses two pins: *TXD* (S1), to send data; and *ENB* (S2), to tell the W55RFS27T1B to enter and exit power-down mode, as needed.

The transmitter meets FCC/ETSI regulations for 27 MHz, 35 MHz, 40 MHz, and 49 MHz S-R (Super-regeneration) modulation, and it is compliant with FCC part 15 class B and 15.227 / ETSI 300 220-1, making it easier for wireless end products to get FCC and ETSI compliance approval.

In addition, the W55RFS27T1B accommodates a wide range of operating voltages (2.2 V to 5.5 V), supports 2-battery or 3-battery R/C applications, and transmits at 15 dBm very efficiently.