

FEATURES

- Single-Chip Mixer/Oscillator and Phase-Locked Loop (PLL) Synthesizer
- Three-Band Local Oscillator and Mixer
- Inter-Integrated Circuit (I²C) Bus Protocol (Bidirectional Data Transmission)
- 30-V Tuning-Voltage Output
- Four NPN-Type Band-Switch (BS) Drivers
- Programmable Reference Divider Ratio (512, 640, or 1024)
- 5-V Power Supply
- 32-Pin Thin Shrink Small-Outline Package (TSSOP)

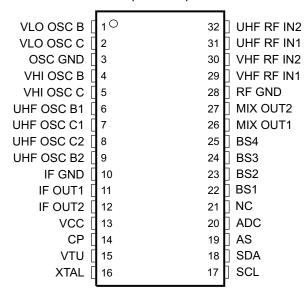
APPLICATIONS

- TVs
- VCR/DVD Recorders
- Set-Top Boxes

DESCRIPTION

The SN761683B is a synthesized tuner IC designed for TV tuning systems. The circuit consists of a phase-locked loop (PLL) synthesizer, three-band local oscillator and mixer, 30-V output tuning amplifier, and four NPN band-switch drivers, and is available in a small-outline package. A 15-bit programmable counter and reference divider are controlled by inter-integrated circuit (I²C) bus protocol.

TSSOP PACKAGE (TOP VIEW)



NC - No internal connection



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

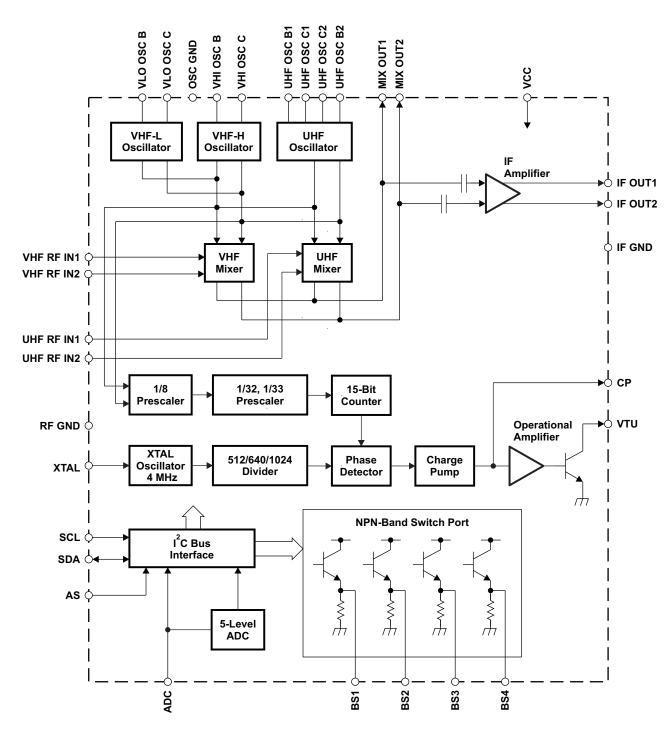
SLES180-MAY 2006





These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the bipolar device.

FUNCTIONAL BLOCK DIAGRAM



B0089-02



TERMINAL FUNCTIONS

TERMINAL		DECORPORTION	COUEMATIC
NAME	NO.	DESCRIPTION	SCHEMATIC
ADC	20	ADC input	Figure 1
AS	19	Address selection input	Figure 2
BS1	22	Band-switch 1 output (NPN emitter follower)	Figure 3
BS2	23	Band-switch 2 output (NPN emitter follower)	Figure 3
BS3	24	Band-switch 3 output (NPN emitter follower)	Figure 3
BS4	25	Band-switch 4 output (NPN emitter follower)	Figure 3
СР	14	Charge-pump output	Figure 4
IF GND	10	IF ground	
IF OUT1	11	IF output 1	Figure 5
IF OUT2	12	IF output 2	Figure 5
MIX OUT1	26	Mixer output 1	Figure 6
MIX OUT2	27	Mixer output 2	Figure 6
NC	21	No connection	
OSC GND	3	Oscillator ground	
RF GND	28	RF ground	
SCL	17	Serial clock input	Figure 7
SDA	18	Serial data input/output	Figure 8
UHF OSC B1	6	UHF oscillator base 1	Figure 9
UHF OSC B2	9	UHF oscillator base 2	Figure 9
UHF OSC C1	7	UHF oscillator collector 1	Figure 9
UHF OSC C2	8	UHF oscillator collector 2	Figure 9
UHF RF IN1	31	UHF RF input 1	Figure 10
UHF RF IN2	32	UHF RF input 2	Figure 10
VCC	13	Supply voltage for mixer/oscillator/PLL: 5 V	
VHF RF IN1	29	VHF RF input 1	Figure 11
VHF RF IN2	30	VHF RF input 2	Figure 11
VHI OSC B	4	VHF HIGH oscillator base	Figure 12
VHI OSC C	5	VHF HIGH oscillator collector	Figure 12
VLO OSC B	1	VHF LOW oscillator base	Figure 13
VLO OSC C	2	VHF LOW oscillator collector	Figure 13
VTU	15	Tuning voltage amplifier output	Figure 14
XTAL	16	4-MHz crystal oscillator input	Figure 15



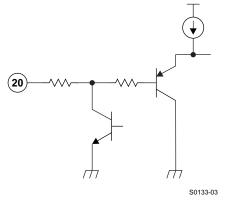


Figure 1.

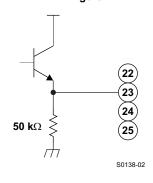


Figure 3.

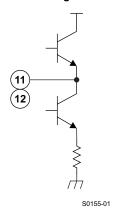


Figure 5.

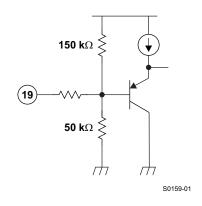


Figure 2.

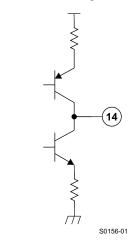


Figure 4.

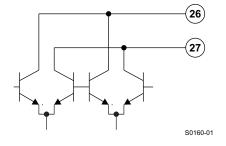
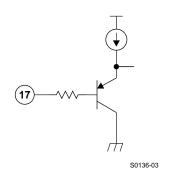


Figure 6.





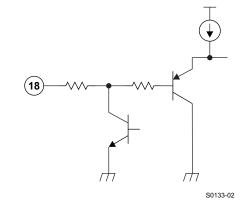
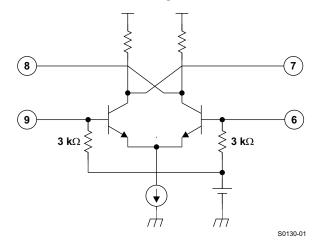


Figure 7.



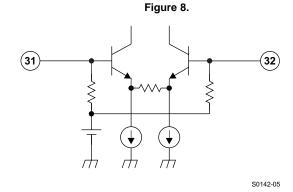
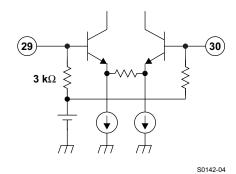


Figure 9.



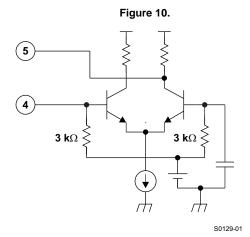


Figure 11.

Figure 12.

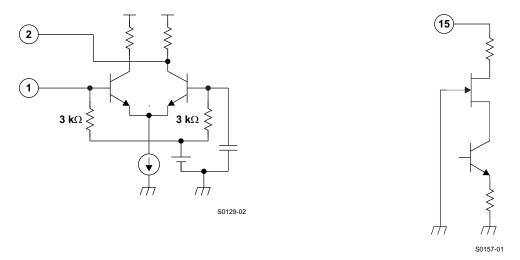


Figure 13.

Figure 14.

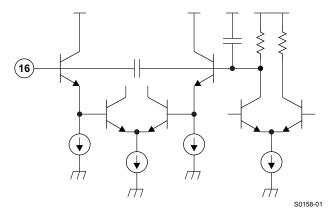


Figure 15.

Absolute Maximum Ratings(1)

over operating free-air temperature range (unless otherwise noted)

			MIN	MAX	UNIT
V _{CC}	Supply voltage range ⁽²⁾	VCC	-0.4	6.5	V
V_{GND}	Input voltage range 1 (2)	RF GND, OSC GND	-0.4	0.4	V
V _{VTU}	Input voltage range 2 ⁽²⁾	VTU	-0.4	35	V
V _{IN}	Input voltage range 3 ⁽²⁾	All other pins	-0.4	6.5	V
P _D	Continuous total dissipation (3)	T _A ≤ 25°C		1040	mW
T _A	Operating free-air temperature range		-20	85	°C
T _{stg}	Storage temperature range		-65	150	°C
T _{JC}	Maximum junction temperature			150	°C
t _{SC(max)}	Maximum short-circuit time	All pins to VCC, All pins to IFGND, OSCGND, RFGND		10	s

⁽¹⁾ Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) Voltage values are with respect to IF GND.

(3) Derating factor is 8.33 mW/°C for T_A ≥ 25°C.



Recommended Operating Conditions

			MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage		4.5	5	5.5	V
V_{TU}	Tuning supply voltage			30	33	V
I_{BS}	Output current of band switch	One port on			10	mA
T_A	Operating free-air temperature		-20		85	°C

Total Device and Serial Interface Electrical Characteristics

 $\rm V_{CC}$ = 4.5 V to 5.5 V, $\rm T_A$ = $-20^{\circ}C$ to 85°C (unless otherwise noted)

	PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
I _{CC} 1	Supply current 1				60		mA
I _{CC} 2	Supply current 2		One band switch on (I _{BS} = 10 mA)		70		mA
V_{IH}	High-level input voltage	SCL, SDA		2.8		V_{CC}	V
V_{IL}	Low-level input voltage	SCL, SDA				1.4	٧
I _{IH}	High-level input current	SCL, SDA				10	μΑ
I _{IL}	Low-level input current	SCL, SDA		-10			μΑ
V _{POR}	Power-on-reset supply voltage (threshold of supply voltage between reset and operation mode)			2.1	2.8	3.6	٧
I ² C Interf	ace						
V _{ASH}	Address-select high-input voltage	AS	V _{CC} = 5 V	4.5		5	V
V _{ASM1}	Address-select mid1-input voltage	AS	V _{CC} = 5 V	2		3	V
V _{ASM2}	Address-select mid2-input voltage	AS	V _{CC} = 5 V	1		1.5	V
V _{ASL}	Address-select low-input voltage	AS	V _{CC} = 5 V			0.5	V
I _{ASH}	Address-select high-input current	AS				140	μΑ
I _{ASL}	Address-select low-input current	AS		-50			μΑ
V_{ADC}	ADC input voltage		See Table 8	0		V_{CC}	V
I _{ADH}	ADC high-level input current		$V_{ADC} = V_{CC}$			10	μΑ
I _{ADL}	ADC low-level input current		V _{ADC} = 0 V	-50			μΑ
V _{OL}	Low-level output voltage	SDA	$V_{CC} = 5 \text{ V}, I_{OL} = 3 \text{ mA}$			0.4	V
I _{SDAH}	High-level output leakage current	SDA	V _{SDA} = 5.5 V			10	μΑ
f _{SCL}	Clock frequency	SCL			100	400	kHz
t _{hd(DAT)}	Data hold time		See Figure 16	0			μs
t _(BUF)	Bus free time		See Figure 16	1.3			μs
t _{hd(STA)}	Start hold time		See Figure 16	0.6			μs
t _(LOW)	SCL-low hold time		See Figure 16	1.3			μs
t _(HIGH)	SCL-high hold time		See Figure 16	0.6			μs
t _{su(STA)}	Start setup time		See Figure 16	0.6			μs
t _{su(DAT)}	Data setup time		See Figure 16	0.1			μs
t _r	SCL, SDA rise time		See Figure 16			0.3	μs
t _f	SCL, SDA fall time		See Figure 16			0.3	μs
t _{su(STO)}	Stop setup time		See Figure 16	0.6			μs



PLL and Band-Switch Electrical Characteristics

 $\rm V_{\rm CC} = 4.5~V$ to 5.5 V, $\rm T_{\rm A} = -20^{\circ}C$ to 85°C (unless otherwise noted)

	PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
N	Divider ratio		15-bit frequency word	256		32767	
f _{XTAL}	Crystal oscillator frequency		R_{XTAL} = 25 Ω to 300 Ω	3.2	4	4.48	MHz
Z _{XTAL}	Crystal oscillator input impedance				1.6		kΩ
V _{IXTAL2}	Minimum reference input sensitivity	XTAL	4 MHz, AC coupling with 0.1-μF capacitor			100	mVp-p
V_{VTUL}	Tuning amplifier low-level output voltage	е	$R_L = 27 \text{ k}\Omega, V_{TU} = 33 \text{ V}$		0.4	0.5	V
I _{VTUOFF}	Tuning amplifier leakage current (OFF)		OS = 1, V _{TU} = 33 V			10	μΑ
I _{CPH}	Charge-pump high-level input current		CP = 1		280		μΑ
I _{CPL}	Charge-pump low-level input current		CP = 0		60		μΑ
V _{CP}	Charge-pump output voltage		PLL locked		1.95		V
I _{CPOFF}	Charge-pump leakage current		T2 = 0, T1 = 1, V _{CP} = 2 V, T _A = 25°C	-15		15	nA
I_{BS}	Band-switch driver output current					10	mA
V _{BS1}	Bond quitab driver cutout valtage		I _{BS} = 10 mA	3			V
V_{BS2}	Band-switch driver output voltage		I _{BS} = 10 mA, V _{CC} = 5 V, T _A = 25°C	3.5	3.9		V
I _{BSOFF}	Band-switch driver leakage current		V _{BS} = 0 V			3	μΑ



Mixer, Oscillator, IF Amplifier Electrical Characteristics

 V_{CC} = 5 V, T_A = 25°C, measured in Figure 17 reference measurement circuit at 50- Ω system, IF filter characteristics: f_{peak} = 43 MHz (unless otherwise noted)

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
G _{c1}	Conversion gain (mixer-IF amplifier),	f _{in} = 58 MHz	22	25	28	dB
G _{c3}	VHF-LOW ⁽¹⁾	f _{in} = 130 MHz	22	25	28	uБ
G _{c4}	Conversion gain (mixer-IF amplifier),	f _{in} = 136 MHz	22	25	28	dB
G _{c6}	VHF-HIGH ⁽¹⁾	f _{in} = 364 MHz	22	25	28	uБ
G _{c7}	Conversion asia (miyer IF amplifier) LIIIF(1)	f _{in} = 370 MHz	26	29	32	40
G _{c9}	Conversion gain (mixer-IF amplifier), UHF ⁽¹⁾	f _{in} = 804 MHz	25	28	31	dB
NF ₁	Noise figure VIIII LOW	f _{in} = 55.25 MHz		9.5		dB
NF ₃	Noise figure, VHF-LOW	f _{in} = 127.25 MHz		9.5		uБ
NF ₄	Naise figure VIII I II CII	f _{in} = 133.25 MHz		10		5
NF ₆	Noise figure, VHF-HIGH	f _{in} = 361.25 MHz		10		dB
NF ₇	Noise figure 11115	f _{in} = 367.25 MHz		11		40
NF ₉	Noise figure, UHF	f _{in} = 801.25 MHz		11		dB
CM ₁	10/ gross modulation distortion VIII I OM/(2)	f _{in} = 55.25 MHz		89		dΒμV
CM ₃	1% cross-modulation distortion, VHF-LOW ⁽²⁾	f _{in} = 127.25 MHz		89		αБμν
CM ₄	40/ 2022 2024 (124)	f _{in} = 133.25 MHz		86		
CM ₆	1% cross-modulation distortion, VHF-HIGH ⁽²⁾	f _{in} = 361.25 MHz	86			dΒμV
CM ₇	10/ gross modulation distortion LILE(2)	f _{in} = 367.25MHz		87		4D\/
CM ₉	1% cross-modulation distortion, UHF ⁽²⁾	f _{in} = 801.25 MHz		87		dΒμV
V _{IFO1}	IF autout valtage VIIF LOW(3)	f _{in} = 55.25 MHz	117			4D. 37
V _{IFO3}	IF output voltage, VHF-LOW ⁽³⁾	f _{in} = 127.25 MHz		117		dΒμV
V _{IFO4}	IF output voltage V/IIF LIICH(3)	f _{in} = 133.25 MHz		117		4D\/
V _{IFO6}	IF output voltage, VHF-HIGH ⁽³⁾	f _{in} = 361.25 MHz		117		dΒμV
V_{IFO7}	IF output voltage, UHF ⁽³⁾	f _{in} = 367.25MHz		117		dBµV
$V_{\rm IFO9}$	ir output voltage, of ir (-)	f _{in} = 801.25 MHz		117		αБμν
$\Phi_{ extsf{OSC1}}$	Phase noise, VHF-LOW ⁽⁴⁾	f _{in} = 55.25 MHz		88		dBc/Hz
Φ_{OSC3}	Fridse floise, VHF-LOWV	f _{in} = 127.25 MHz		88		UDC/FIZ
Φ_{OSC4}	Phase noise, VHF-HIGH ⁽⁴⁾	f _{in} = 133.25 MHz		86		dBc/Hz
$\Phi_{\sf OSC6}$	i nase noise, vi ii -i non.	f _{in} = 361.25 MHz		86		UDC/FIZ
Φ_{OSC7}	Phase noise, UHF ⁽⁴⁾	f _{in} = 367.25MHz		84		dBc/Hz
Φ_{OSC9}	Filase Huise, UTF (1)	f _{in} = 801.25 MHz		84		UDU/FIZ
	Prescaler beat ⁽⁵⁾				25	dΒμV

- (1) IF = 43 MHz, RF input level = 80 dB μ V (2) f_{undes} = f_{des} ±6 MHz, Pin = 80 dB μ V, AM 1 kHz, 30%, DES/CM = S/I = 46 dB (3) IF = 45.75 MHz
- (4) Offset = 10 kHz, RF input level = 70 dBμV
- (5) Design parameter, not tested



FUNCTIONAL DESCRIPTION

I²C Bus Mode

I^2C Write Mode (R/W = 0)

Table 1. Write Data Format

	MSB							LSB	
Address byte (ADB)	1	1	0	0	0	MA1	MA0	R/W = 0	A ⁽¹⁾
Divider byte 1 (DB1)	0	N14	N13	N12	N11	N10	N9	N8	A ⁽¹⁾
Divider byte 2 (DB2)	N7	N6	N5	N4	N3	N2	N1	N0	A ⁽¹⁾
Control byte (CB)	1	CP	T2	T1	T0	RSA	RSB	os	A ⁽¹⁾
Band-switch byte (BB)	Х	Х	Х	Х	BS4	BS3	BS2	BS1	A ⁽¹⁾

(1) Acknowledge

Table 2. I²C Write-Mode Data-Symbol Description

			DESCRIPTION		DEFAULT				
Address									
Program	mable co	ounter set b	oits						
	Oscillatio	n frequenc	$cy = f_r \times 8 \times N$	vider	Nn = 0				
Charge-	pump cur	rent set bi	t		CD 1				
	60 μA (C	P = 0), 280	0 μA (CP = 1)		CP = 1				
Test bits	s (see Tal	ole 4)			T2 = 0, T1 = 0, T0 = 1				
	Normal n	node: T2 =	0, T1 = 0, T0 = 1/0		12 = 0, 11 = 0, 10 = 1				
Referen	ce divider	ratio sele	ction bits (see Table 6)		RSA = 0, $RSB = 1$				
Tuning a	amplifier o	control bit							
				OS = 0					
Band-sv	vitch ports	s control bi							
	BS3 = 1: BS3 = 0:	BS3 port 0							
Band se	lection by	/ BS1, BS2	2, and BS4 bits:						
BS1	BS2	BS4	SELECTED BAND	"ON" PORT					
0 1 0 1 0 1 0 1 (1) These	0 0 1 1 0 0 1 1	0 0 0 0(1) 1 1(1) 1(1) 1(1)	UHF VHF-LOW VHF-HIGH VHF-HIGH UHF UHF UHF UHF UHF UHF	BS4 BS1 BS2 (BS1, BS2) BS4 (BS1, BS4) (BS2, BS4) (BS1, BS2, BS4) and-switch output current.	BSn = 0 (UHF)				
	•		,	,					
	Program Charge- Test bits Referen Tuning a Band-sw Band se BS1 0 1 0 1 0 1 0 1 (1) These	Programmable con $N = N14$ Oscillation $f_r = Refer$ Charge-pump curned $60 \mu A$ (C) Test bits (see Tall Normal in Reference divided Tuning amplifier of Tuning with Tuning vibration $BS3 = 1$: $BS3 = 0$: $BS3$	Programmable counter set I N = N14 \times 2 ¹⁴ + N1 Oscillation frequency f_r = Reference divider ratio selex. Tuning amplifier control bit Tuning voltage on (Tuning voltage of f_r = Sample 4 Sample 5 Sample 6 Sample 6 Sample 6 Sample 6 Sample 6 Sample 7 S	Charge-pump current set bit $60 \mu A (CP=0), 280 \mu A (CP=1)$ Test bits (see Table 4) Normal mode: $T2=0, T1=0, T0=1/0$ Reference divider ratio selection bits (see Table 6) Tuning amplifier control bit Tuning voltage on $(OS=0)$ Tuning voltage off, high impedance $(OS=1)$ Band-switch ports control bits $BS3=1$: $BS3$ port ON $BS3=0$: $BS3$ port OFF Band selection by $BS1$, $BS2$, and $BS4$ bits: BS1 BS2 BS4 SELECTED BAND 0 0 0 UHF 1 0 0 0 VHF-LOW 0 1 0 VHF-HIGH 1 1 0 0'1 VHF-HIGH 0 0 1 UHF 1 0 1(1) UHF 1 0 1(1) UHF 1 1 1 1(1) UHF 1 1 1 1(1) UHF	Programmable counter set bits $N = N14 \times 2^{14} + N13 \times 2^{13} + + N1 \times 2 + N0$ Oscillation frequency = $f_r \times 8 \times N$ $f_r = Reference$ frequency = 4 MHz/Reference divider Charge-pump current set bit $60 \ \mu A \ (CP = 0), 280 \ \mu A \ (CP = 1)$ Test bits (see Table 4) Normal mode: $T2 = 0$, $T1 = 0$, $T0 = 1/0$ Reference divider ratio selection bits (see Table 6) Tuning amplifier control bit Tuning voltage on $(OS = 0)$ Tuning voltage off, high impedance $(OS = 1)$ Band-switch ports control bits $BS3 = 1: BS3 \ port \ ON$ $BS3 = 0: BS3 \ port \ OFF$ Band selection by BS1, BS2, and BS4 bits: $BS1 \ BS2 \ BS4 \ SELECTED \ BAND \ "ON" \ PORT$ $0 \ 0 \ 0 \ UHF \ BS4$ $1 \ 0 \ 0 \ VHF-LOW \ BS1$ $0 \ 1 \ 0 \ VHF-HIGH \ BS2$ $1 \ 1 \ 0 \ 0' VHF-HIGH \ BS2$ $1 \ 1 \ 0 \ 0' VHF-HIGH \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS4$ $1 \ 0 \ 1'' \ UHF \ BS5$ $1 \ 0 \ 1 \ 1'' \ UHF \ BS5$ $1 \ 0 \ 1 \ 1'' \ UHF \ BS5$ $1 \ 0 \ 1 \ 1'' \ UHF \ BS5$ $1 \ 0 \ 1 \ 1'' \ UHF \ BS5$ $1 \ 0 \ 1 \ 1'' \ UHF \ BS5$ $1 \ 0 \ 1 \ 1'' \ UHF \ BS5$ $1 \ 0 \ 1 \ 1'' \ UHF \ BS5$ $1 \ 0 \ 1'$				



Table 3. Address Selection

MA1	MA0	VOLTAGE APPLIED ON AS INPUT
0	0	LOW: 0 V to 0.1 V _{CC}
0	1	MID2: open, or 0.2 V _{CC} to 0.3 V _{CC}
1	0	MID1: 0.4 V _{CC} to 0.6 V _{CC}
1	1	HIGH: 0.9 V _{CC} to V _{CC}

Table 4. Test Bits (1)

T2	T1	ТО	DEVICE OPERATION	NOTE
0	0	0	Normal operation	
0	0	1	Normal operation	Default
0	1	X	Charge pump is off.	
1	1	0	Charge pump is sink.	
1	1	1	Charge pump is source.	
1	0	Х	Test mode	ADC not available

(1) Not used for other bit patterns

Table 5. Reference Divider Ratio

RSA	RSB	REFERENCE DIVIDER RATIO
X	0	640
0	1	1024
1	1	512

Example of I²C Data-Write Sequences

Telegram Examples

Start - ADB - DB1 - DB2 - CB - BB - Stop

Start - ADB - DB1 - DB2 - Stop

Start - ADB - CB - BB - Stop

Abbreviations

ADB: Address byte DB1: Divider byte 1 DB2: Divider byte 2 CB: Control byte Band-switch byte BB: Start: Start condition Stop: Stop condition

Note: Following bytes after band-switch byte (BB) are ignored.

Start - ADB - DB1 - DB2 - CB - BB - (ignored) - (ignored) - Stop

Start - ADB - CB - BB - (ignored) - (ignored) - Stop



I^2C Read Mode (R/W = 1)

Table 6. Read Data Format

	MSB							LSB	
Address byte (ADB)	1	1	0	0	0	MA1	MA0	R/W = 1	A ⁽¹⁾
Status byte (SB)	POR	FL	1	1	1	A2	A1	A0	-

(1) Acknowledge

Table 7. I²C Read-Mode Data-Symbol Description

SYMBOL	DESCRIPTION	DEFAULT
MA1, MA0	Address set bits (see Table 3)	
	Power-on reset flag bit	
POR	POR set: Power on POR reset: End-of-data transmission procedure	POR = 1
	In-lock flag bit	
FL	PLL locked (FL = 1) PLL unlocked (FL = 0)	
A2-A0	Digital data bits of ADC (see Table 8)	

Table 8. ADC Level

A2	A1	A0	VOLTAGE APPLIED ON ADC INPUT ⁽¹⁾
1	0	0	0.6 V _{CC} to V _{CC}
0	1	1	0.45 V _{CC} to 0.6 V _{CC}
0	1	0	0.3 V _{CC} to 0.45 V _{CC}
0	0	1	0.15 V _{CC} to 0.3 V _{CC}
0	0	0	0 to 0.15 V _{CC}

(1) Accuracy is $0.03 \times V_{CC}$.

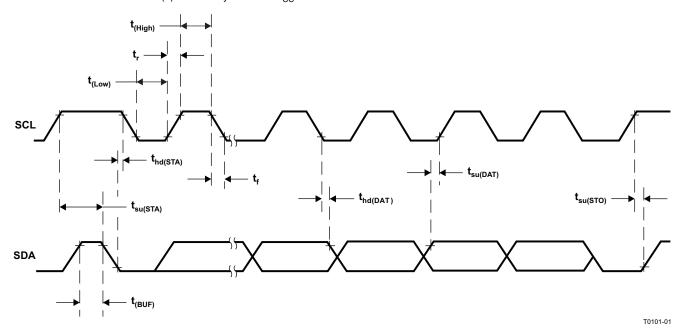
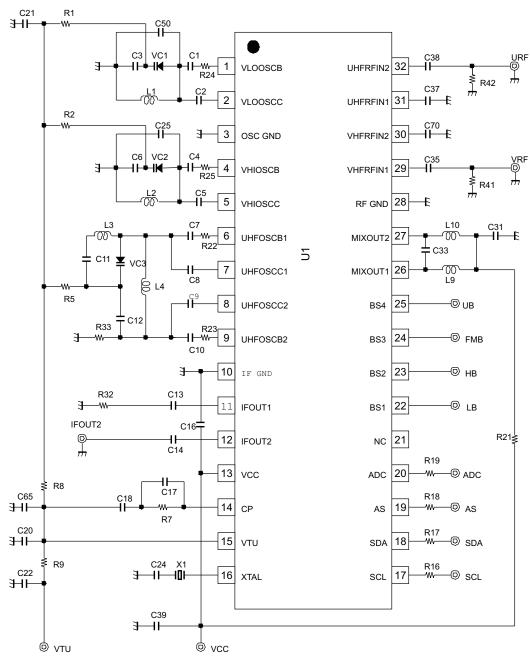


Figure 16. I²C Timing Chart



APPLICATION INFORMATION



NOTE: This application information is advisory, and a performance check is required for actual application circuits. TI assumes no responsibility for the consequences of use of this circuit, such as an infringement of intellectual property rights or other rights, including patents, of third parties.

Figure 17. Reference Measurement Circuit



Table 9. Component Values for Measurement Circuit

PART NAME	VALUE	PART NAME	VALUE
C1	1p	L1	φ3mm, 8T, wire 0.32mm
C2	1p	L2	φ2.4mm, 4T, wire 0.4mm
C3	47p	L3	φ3mm, 2T, wire 0.4mm
C4	2p	L4	φ2mm, 3T, wire 0.4mm
C5	3р	L9	φ3mm, 15T, wire 0.25mm
C6	68p	L10	φ3mm, 15T, wire 0.25mm
C7	1.5p	R1	33k
C8	1p	R2	33k
C9	1p	R5	22k
C10	1.5p	R7	22k
C11	100p	R8	33k
C12	12p	R9	22k
C13	2.2n	R16	330
C14	2.2n	R17	330
C16	4.7n	R18	330
C17	2.2n	R19	330
C18	0.1u	R21	0
C20	2.2n	R22	20
C21	2.2n	R23	20
C22	2.2n	R24	20
C24	68p	R25	20
C25	open	R32	51
C31	4.7n	R33	22k
C33	22p	R41	51
C35	2.2n	R42	51
C37	2.2n	U1	SN761683B
C38	2.2n	VC1	1T363A
C39	4.7n	VC2	1T363A
C50	3p	VC3	1T363A
C65	2.2n	X1	Crystal 4 MHz
C70	2.2n		



TEST CIRCUITS

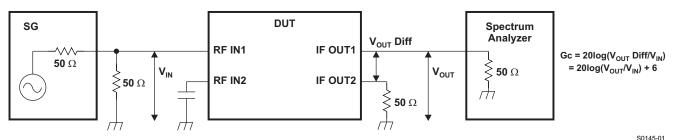


Figure 18. Conversion Gain-Measurement Circuit

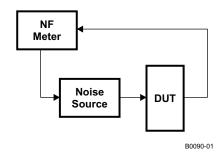


Figure 19. Noise-Figure Measurement Circuit

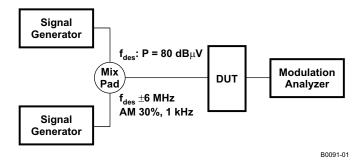


Figure 20. 1% Cross-Modulation Distortion Measurement Circuit



TYPICAL CHARACTERISTICS

Band-Switch Driver Output Voltage (BS1-BS4)

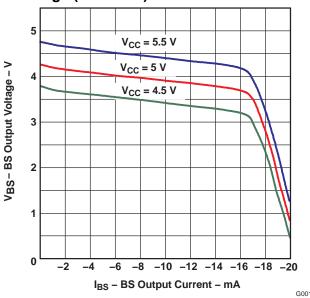


Figure 21. BS Output Current vs Output Voltage

S-Parameter

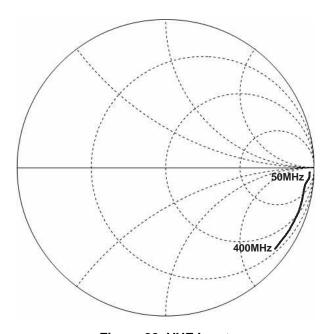


Figure 22. VHF Input



TYPICAL CHARACTERISTICS (continued)

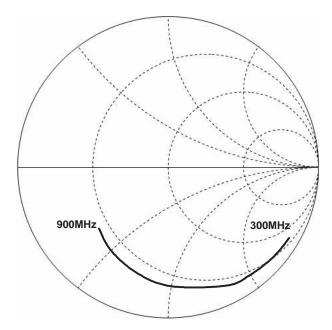


Figure 23. UHF Input

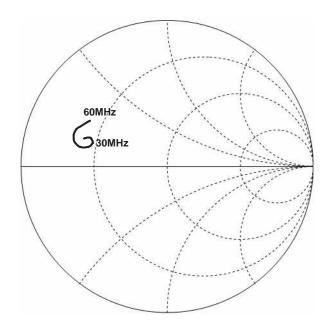


Figure 24. IF Output





i.com 31-Jul-2006

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	n MSL Peak Temp ⁽³⁾
SN761683BDA	ACTIVE	TSSOP	DA	32	46	TBD	Call TI	Call TI
SN761683BDAG4	ACTIVE	TSSOP	DA	32	46	TBD	Call TI	Call TI
SN761683BDAR	ACTIVE	TSSOP	DA	32	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
SN761683BDARG4	ACTIVE	TSSOP	DA	32	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

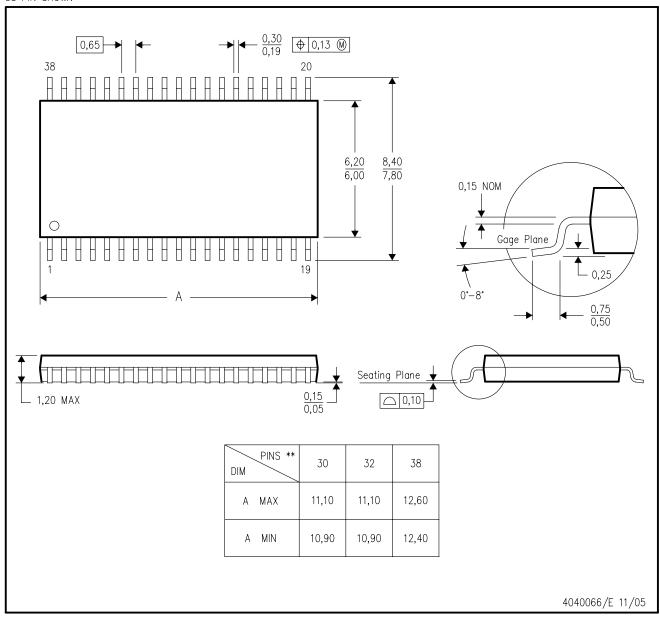
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DA (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

38 PIN SHOWN



NOTES:

- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
 - D. Falls within JEDEC MO-153



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