

### Description

The Si3217x devices are pin-compatible single-channel ProSLIC products that implement a complete foreign exchange station (FXS) telephony interface solution in accordance with all relevant LSSGR, ITU, and ETSI specifications. The Si3217x ProSLIC ICs are available in a 5x7 mm 42-pin QFN package and operate from a 3.3 V supply and support 3.3 V and 1.8 V I/O.

The Si32170/1/6/7 devices use a standard PCM/SPI digital interface to connect to SoCs, while the Si32172/3/5 devices use Silicon Labs' proprietary three-wire digital Integrated Serial Interface (ISI) to connect to SoCs with the ISI pre-integrated.

The Si3217x integrated dc-dc controller automatically generates the optimal battery voltages required for each line state. The Si3217x ICs are available with voltage ratings of -110 V or -140 V to support a wide range of ringing voltages. See the Ordering Guide for the voltage rating of each Si3217x version.

[For more information, visit the Si3217x ProSLIC web page.](#)

### Features

- Complete FXS solution in 5x7 mm
- Choice of PCM/SPI Interfaces or 3-wire ISI bus that combines PCM, SPI, and interrupt data
- Performs all BORSCHT functions
- Ideal for short to medium loops
- Global programmability
- Internal balanced or unbalanced ringing
- Patented low power ringing
- Simplified configuration and diagnostics
- Supported by ProSLIC API
- Ultra low power consumption

- Tracking dc-dc controller with direct connection to MOSFET
- Wideband voice support (Si32172/3/6/7)
- On-hook transmission
- Loop or ground start operation
- Smooth polarity reversal
- A-Law/u-Law companding, linear PCM
- Software-programmable parameters:
  - Ringing frequency, amplitude, cadence, and waveshape
  - Two-wire ac impedance
  - Transhybrid balance
  - DC current loop feed (10-45 mA)
  - Loop closure and ring trip thresholds
  - Ground key detect threshold
- DTMF generation
- DTMF detection (Si32170/1/5)
- Pulse metering
- 3.3 V operation
- Support for 1.8 V I/O
- Maximum battery up to -140 V
- Pb-free/RoHS-compliant packaging

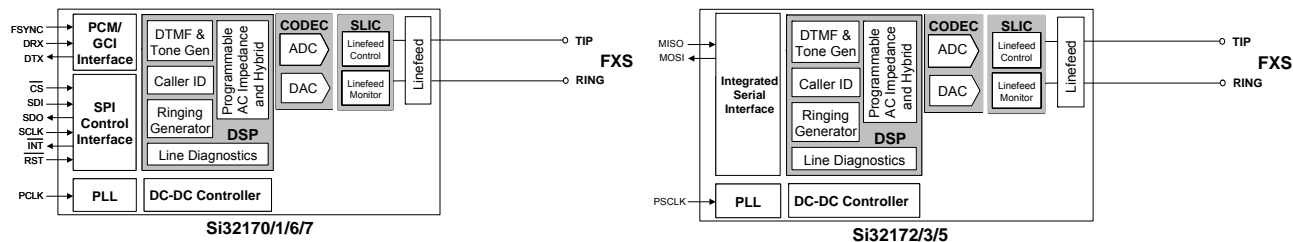
### Applications

- Customer Premise Equipment (CPE)
- VoIP DSL Gateways and Routers
- Wireless Local Loop (WLL)
- Integrated Access Devices (IAD)
- Analog Terminal Adapters (ATA)
- Small Office/Home Office PBX

### Ordering Guide

Part #	SoC Interface	Max Vbat	Wideband	DTMF Detection	Pulse Metering	Temperature
Si32170-C-FM1	PCM/SPI	-140 V		✓	✓	0 to 70 °C
Si32170-C-GM1						-40 to 85 °C
Si32171-C-FM1	PCM/SPI	-110 V		✓	✓	0 to 70 °C
Si32171-C-GM1						-40 to 85 °C
Si32172-C-FM1	ISI	-110 V	✓			0 to 70 °C
Si32172-C-GM1						-40 to 85 °C
Si32173-C-FM1	ISI	-140 V	✓			0 to 70 °C
Si32173-C-GM1						-40 to 85 °C
Si32175-C-FM1	ISI	-110 V		✓	✓	0 to 70 °C
Si32175-C-GM1						-40 to 85 °C
Si32176-C-FM1	PCM/SPI	-110 V	✓			0 to 70 °C
Si32176-C-GM1						-40 to 85 °C
Si32177-C-FM1	PCM/SPI	-140 V	✓			0 to 70 °C
Si32177-C-GM1						-40 to 85 °C

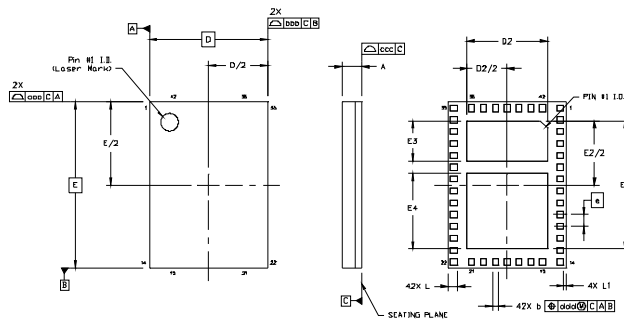
### Functional Block Diagrams



### Selected Electrical Specifications

Parameter	Symbol	Test Condition	Min	Typical	Max	Unit
Ambient Temperature	$T_A$	F-Grade	0	25	70	°C
		G-Grade	-40	25	85	°C
Supply Voltage	$V_{DD}$		3.13	3.3	3.47	V
Battery Voltage, Si32171/2/5/6	$V_{BAT}$		-110	-95	-15	V
Battery Voltage, Si32171/3/7	$V_{BAT}$		-140	-130	-15	V
Maximum Loop Resistance (loop + load)	$R_{LOOP}$	$R_{DC,MAX} = 430 \Omega$ , $I_{LOOP} = 18 \text{ mA}$ , $V_{BAT} = -52 \text{ V}$ , $R_{PROT} = 0 \Omega$ ,	—	—	2000	$\Omega$
DC Differential Output Resistance	$R_{DO}$	$I_{LOOP} < I_{LIM}$	160	—	640	$\Omega$
Idle Channel Noise		C-Message weighted	—	8	12	dBrnC
		Psophometric weighted	—	-82	-78	dBmP
PSRR from $V_{DD}$ , $V_{DDIO}$ @ 3.3 V		RX and TX, 200 Hz to 3.4 kHz	—	55	0	dB
Longitudinal to Metallic/PCM Balance (forward or reverse)		200 Hz to 1 kHz	58	60	—	dB
		1 kHz to 3.4 kHz	53	58	—	dB
Metallic/PCM to Longitudinal Balance		200 Hz to 3.4 kHz	40	—	—	dB
Longitudinal Impedance		200 Hz to 3.4 kHz at TIP or RING	—	50	—	$\Omega$
Longitudinal Current Capability		Active off-hook 60 Hz Reg 73 = 0x0B	—	25	—	mA
DC Feed Current		Differential	—	—	45	mA
		Common Mode	—	—	30	mA
		Differential + Common Mode	—	—	45	mA
2-Wire Return Loss		200 Hz to 3.4 kHz	26	30	—	dB
Transhybrid Balance		300 Hz to 3.4 kHz	26	30	—	dB
Thermal Resistance (QFN-42)	$\Theta_{JA}$		—	53	—	°C/W
	$\Theta_{JB}$		—	33	—	
	$\Theta_{JC}$		—	39	—	
Continuous Power Dissipation (QFN-42)	PD	$T_A = 85 \text{ °C}$	—	0.75	—	W

### Package Information



### 42-Pin QFN/LGA Package Diagram Dimensions

Dimension	Min	Nom	Max
A	0.80	0.85	0.90
b	0.20	0.25	0.30
D	5.00 BSC		
D2	3.35	3.40	3.45
e	0.50 BSC		
E	7.00 BSC		
E2	5.35	5.40	5.45
E3	1.65	1.70	1.75
E4	3.15	3.20	3.25
L	0.35	0.40	0.45
L1	0.05	0.10	0.15
aaa	—	—	0.10
bbb	—	—	0.10
ccc	—	—	0.08
ddd	—	—	0.10