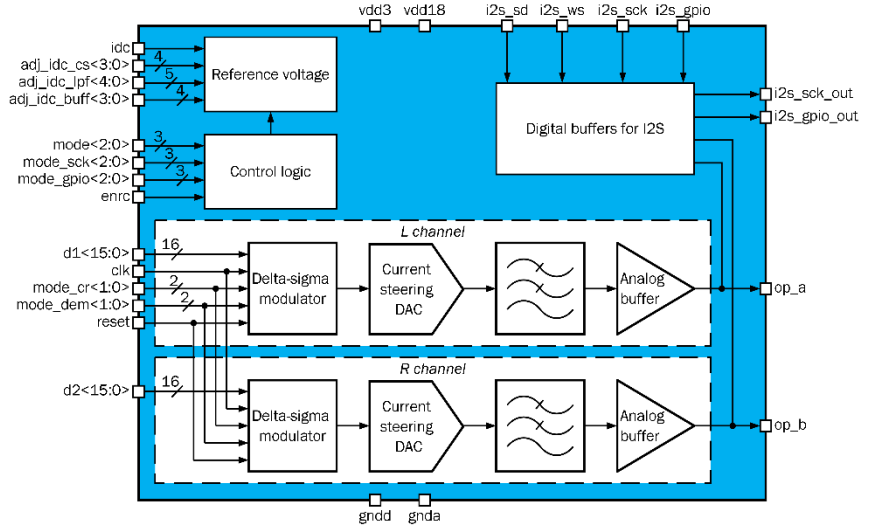


16-bit 2-channel 25 kHz bandwidth delta-sigma stereo, audio DAC
OVERVIEW

180TSMC_DAC_03 contains: reference voltage, control logic, digital buffers I2S interface, two identical channels L and R: 2-order delta-sigma modulator, current steering DAC, low pass filter, analog buffer. Delta-sigma stereo, audio DAC requires 2.8 ÷ 3.6V analog supply, 1.62 ÷ 1.98V digital supply, reference current 4.95 ÷ 5.05uA, input clock with duty cycle 45 ÷ 55%. Delta-sigma stereo, audio DAC supports standby mode. There is the ability to configure the operating modes of the delta-sigma stereo, audio DAC with digital registers: register **mode<2:0>** controls the modes of the delta-sigma stereo, audio DAC and I2S interface, register **mode_sck<2:0>** controls the modes of I2S interface, register **mode_gpio<2:0>** controls the modes of I2S interface. There is the ability to configure current consumption of the delta-sigma stereo, audio DAC with digital register: register **adj_idc_buff<3:0>** adjusts current of the analog buffer, register **adj_idc_cs<3:0>** adjusts current of the current steering DAC, register **adj_idc_lpf<4:0>** adjusts current of the low pass filter, signal **enrc** adjusts current of current steering DAC changing linearity of the current steering DAC.



IP technology: TSMC SiGe BiCMOS 0.18 um.

IP status: silicon proven.

Area: 0.57mm².

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Value			Units	
			min	typ.	max		
Analog blocks supply voltage	V _{dd3}	-	2.8	3.0	3.6	V	
Digital blocks supply voltage	V _{dd18}	-	1.62	1.8	1.98	V	
Operating temperature range	T _j	-	-40	+27	+80	°C	
Reference current	I _{idc}	-	4.95	5.00	5.05	uA	
Duty cycle	S	-	45	50	55	%	
Resolution	N	-	-	16	-	bit	
Clock frequency	F _{clk}	-	8	-	32	MHz	
Oversampling ratio	OSR	-	-	512	-	-	
Standby current	I _{stb}	Analog parts	1.0	1.2	8.9	nA	
		Digital parts	0.008	0.05	5.4	uA	
Output voltage range peak to peak	A _{INp-p}	-	-	1	-	V	
Input signal bandwidth	F _b	-	7.8	-	31.25	kHz	
Low power dissipation	P _d	Low impedance mode R _{load} = 320hm	-	61.3	-	mW	
		Low impedance mode R _{load} =32kOhm	-	5.95	-	mW	
Current consumption digital parts	I _{cc_d}	F _{clk} = 25MHz, F _b = 12.2kHz	-	0.5	-	mA	
Current consumption analog parts	I _{cc_a}	F _{clk} = 25MHz, F _b = 12.2kHz	R _{load} = 320hm	-	20	-	mA
			without R _{load}	11.8	13	16.22	mA
			R _{load} = 32kOhm	1.52	1.55	1.63	mA
Spurious-free dynamic range	SFDR	F _{clk} =25MHz, F _b =12.2kHz	R _{load} = 320hm	-	83	-	dB
			R _{load} =32kOhm	-	76	-	dB
Signal-to-noise ratio	SNR	F _{clk} =25MHz, F _b =12.2kHz	R _{load} = 320hm	-	69	-	dB
			R _{load} =32kOhm	-	73	-	dB
Clock frequency I2S interface	F _{clk}	C _{load} = 10pF	-	-	32	MHz	
High input voltage level	V _{IH}	-	0.7V _{dd18}	-	-	V	
Low input voltage level	V _{IL}	-	-	-	0.3V _{dd18}	V	