

12-bit 2-channel up to 50 MSPS current steering DAC

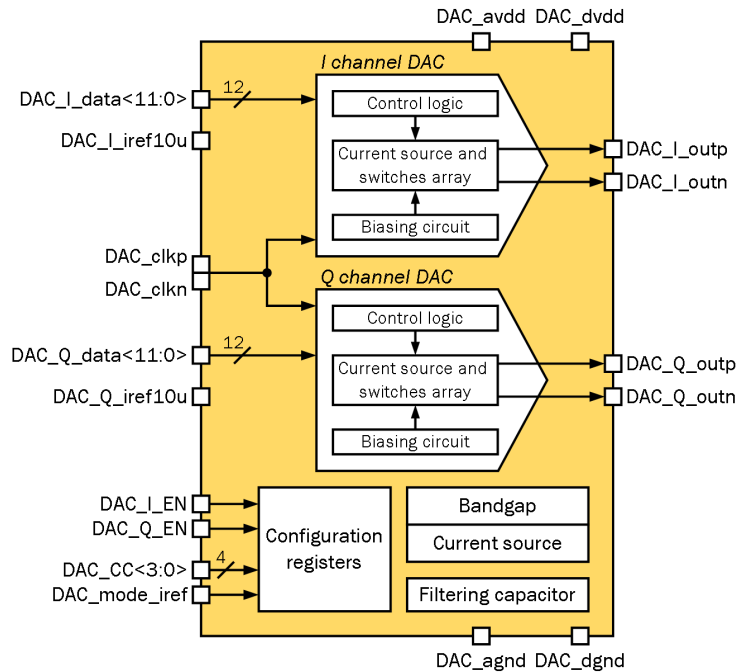
OVERVIEW

180TSMC_DAC_07 is a 12-bit 50 MSPS dual current steering DAC contains two DAC cores, reference current, bandgap, configuration register. Core DAC is based on current steering architecture and contains control logic, current source, switches array and reference voltage. There are two operation modes: with external reference current and internal reference current, which independent from voltage supply, temperature and dependent from process variations of resistor. DAC has a feature of adjusting output current. A segmented DAC architecture and Q^2 random walk algorithm are used. DAC requires: 3.0 ÷ 3.6 V analog supply, 3.0 ÷ 3.6 V digital supply, differential input clock signal with duty cycle 45 ÷ 55%. 12-bit 50 MSPS dual current steering DAC supports standby mode.

IP technology: TSMC CMOS 180 nm.

IP status: silicon proven.

Area: 0.68mm².



ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Value			Units	
			min	typ.	max		
Analog blocks supply voltage	V_{dd_a}	Pin DAC_avdd	3.0	3.3	3.6	V	
Digital blocks supply voltage	V_{dd_d}	Pin DAC_dvdd	3.0	3.3	3.6	V	
Operating temperature range	T_j	-	-40	+27	+125	°C	
Reference current	I_{ref}	-	9.8	10	10.2	uA	
Output current range	I_{OUT_p-p}	DAC_CC<3:0> = "0000"	-	5	-	mA	
		DAC_CC<3:0> = "0101"	-	10	-	mA	
		DAC_CC<3:0> = "1111"	-	20	-	mA	
Resolution	N	-	-	12	-	bit	
Duty cycle	S	-	45	50	55	%	
Sampling rate	F_s	-	0	-	50	MSPS	
Standby current	I_{STB}	-	-	100	-	nA	
Power dissipation	P_{en}	DAC_CC<3:0> = "0101"	-	75.24	-	mW	
Current consumption	I_{cn}	DAC_CC<3:0> = "0101"	-	22.8	-	mA	
Spurious-free dynamic range	SFDR	$F_{in}=1.575$ MHz	-	88	-	dB	
		$F_{in}=11.513$ MHz	-	89	-	dB	
Signal-to-noise ratio	SNR	$F_s = 50$ MSPS, DAC_CC<3:0>="0101"	$F_{in}=1.575$ MHz	-	70	-	dB
			$F_{in}=11.513$ MHz	-	70	-	dB
Signal-to-noise and distortion ratio	SINAD		$F_{in}=1.575$ MHz	-	70	-	dB
			$F_{in}=11.513$ MHz	-	70	-	dB
Input high-logic level	V_{IH}	-	$0.7V_{dd_d}$	-	-	V	
Input low-logic level	V_{IL}	-	-	-	$0.3V_{dd_d}$	V	