

12-bit 4-channel 1MSPS R/2R DAC

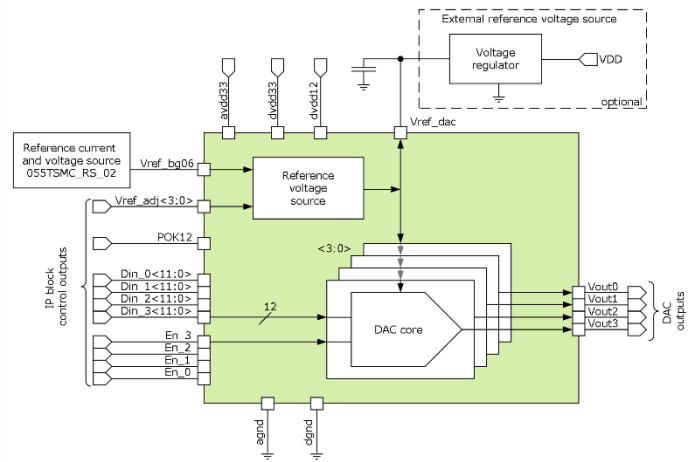
OVERVIEW

The 4-channel 12-bit R/2R DAC designed for generating analog control signals. The DAC has the ability to work with an external and internal full-scale reference voltage generator and the ability to disable each channel. The DAC consists of three main blocks: the reference voltage source, the DAC core and the control unit.

IP technology: TSMC 55nm CMOS

IP status: silicon proven

Silicon area: 0.104mm²



ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Value			Parameter	
			min	typ.	max		
Supply voltage	V _{avdd33}	-	2.25	2.5	3.6	V	
	V _{dvdd33}	-	2.25	2.5	3.6		
	V _{dvdd12}	-	1.08	1.2	1.32		
Operating temperature range	T _j	-	-45	25	+85	°C	
Current consumption in normal operation mode with internal bandgap	I _{vdd_bg_int_1}	For 1 channel, C _{load} =10pF, F _{SR} = 1MSPS, sine signal	53.85	75.4	116.3	uA	
	I _{vdd_bg_int_4}	For 4 channels, C _{load} =10pF, F _{SR} = 1MSPS, sine signal	151.2	203.3	266.5		
Current consumption in normal operation mode with an external bandgap	I _{vdd_bg_ext_1}	For 1 channel, C _{load} =10pF, F _{SR} = 1MSPS, sine signal	29.86	43.41	51.01	uA	
	I _{vdd_bg_ext_4}	For 4 channels, C _{load} =10pF, F _{SR} = 1MSPS, sine signal	116.21	168.31	201.51		
Current consumption of digital part in shutdown mode	I _{vdd_shd}	-	-	-	1.087	uA	
Reference voltage	V _{ref_bg06}	-	-	0.6	-	V	
Output impedance	R _{out}	-	21	25	30	kOhm	
Resolution	N	-	-	12	-	bit	
Output frequency bandwidth	BW	-	-	-	20	kHz	
Output signal	V _{out}	-	0	-	V _{avdd33}	V	
Sampling rate	F _{SR}	-	0	-	1	MSPS	
Differential nonlinearity	DNL	-	-	-	±1	LSB	
Integral nonlinearity	INL	-	-	-	±2	LSB	
Output signal rising time	t _r	The output signal changes from the min value (000h) to the max scale value (FFFh), C _{load} =10pF	-	525	555	ns	
Output signal falling time	t _f	The output signal changes from the max value (FFFh) to the min scale value (000h), C _{load} =10pF	-	538	600	ns	
Spurious-free dynamic range	SFDR	F _{SR} =1MSPS, C _{load} = 10pF	F _{out} =1kHz	-	64	-	dB
			F _{out} =5kHz	-	62.7	-	dB
			F _{out} =15kHz	-	56	-	dB