

3.3V to 1.8V 0.7A Step-down DC-DC converter

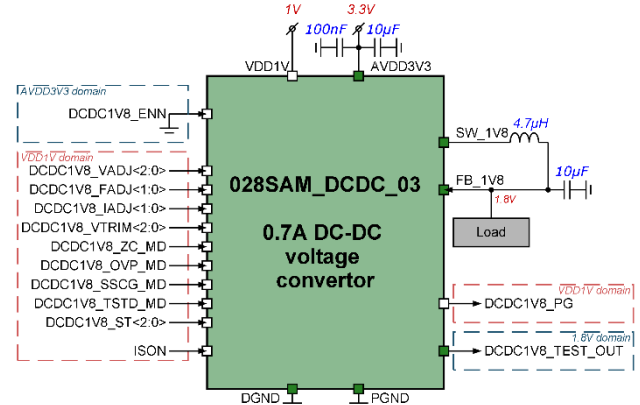
OVERVIEW

High-efficiency step-down DC-DC converter is targeted for operation from 3.3V input voltage. It is able to supply circuits with programmable output voltage 1.8V at 0.7A output current. The DC-DC converter contains overvoltage protection, and undervoltage-lockout circuit. During startup time DC-DC converter can operate both in the soft start mode, which provides the gradual increase of the output voltage and without it. The embedded Bias and LDO blocks provide a required voltage and current references to DC-DC sub-blocks.

IP technology: Samsung 28nm FDSOI technology process.

IP status: silicon proven.

Area: 0.93mm².



ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Value			Units	
			min	typ.	max		
Analog supply voltage	AVDD3V3	-	2.97	3.3	3.63	V	
Digital supply voltage	VDD1V	-	0.95	1.0	1.05	V	
Output current	I _{OUT}	-	-	700	1000	mA	
Quiescent current	I _Q	V _{OUT} =1.8 V, AVDD3V3=3.3V	no switching	0.5	1.2	mA	
			switching	1.2	1.6		
		V _{OUT} =1.8 V, VDD1V=1.0V	-	3.5	51	nA	
Shutdown current	I _{SD_DC}	AVDD3V3=3.3V, DCDC disabled	-	95	1300	uA	
		AVDD1V=1.0V, DCDC disabled	-	70	125	nA	
Output voltage	V _{OUT}	DCDC1V8_VADJ<2:0>= "x00"	1.76	1.81	1.9	V	
		DCDC1V8_VADJ<2:0>= "001"	-	1.75	-		
		DCDC1V8_VADJ<2:0>= "010"	-	1.80	-		
		DCDC1V8_VADJ<2:0>= "011"	-	1.85	-		
		DCDC1V8_VADJ<2:0>= "101"	-	1.90	-		
		DCDC1V8_VADJ<2:0>= "110"	-	1.95	-		
		DCDC1V8_VADJ<2:0>= "111"	-	2.05	-		
Output voltage accuracy	A _{OUT}	After trimming	-5	-	+5	%	
Output ripple	V _{R_OUT}	I _{OUT} =700 mA, AVDD3V3=3.3V, peak-to-peak, F _{osc} =594kHz	-	7	37	mV	
External capacitor	C _{EXT}	ESR = 30mΩ	-	10	-	μF	
External inductor	L _{EXT}	-	-	4.7	-	μH	
Power conversion efficiency	E _{DC}	I _{OUT} =500 mA	T _J =27°C, F _{osc} =594kHz, AVDD3V3=3.3	-	89	-	%
		I _{OUT} =700 mA		-	86.8	-	
		I _{OUT} =1000 mA		-	82.6	-	
		I _{OUT} =500 mA	T _J =125°C, F _{osc} =594kHz, AVDD3V3=3.3	-	87.5	-	%
		I _{OUT} =700 mA		-	85.5	-	
		I _{OUT} =1000 mA		-	81.5	-	
High-Side Switch-On Resistance	R _{DS(on)_HS}	AVDD3V3=3.3V, I _{OUT} =700 mA	-	150	-	mΩ	
Low-Side Switch-On Resistance	R _{DS(on)_LS}		-	90	-	mΩ	
Upper switch current limit	I _{LIM}	V _{out} =0 V	2.0	2.1	2.4	A	
Operating frequency	F _{osc}	-	445	594	802	kHz	
OVP Threshold	V _{OVP}	DCDC1V8_VADJ<2:0>= "000"	1.93	1.96	2.0	V	
Short circuit switching frequency	F _{SW}	V _{OUT} <0.3 V, F _{osc} =594kHz	-	116	-	kHz	
Maximum duty cycle	D _{MAX}	AVDD3V3=3.3V, V _{out} =1.8V, I _{out} =1A	81	87	91	%	
Reference voltage	VREF	-	576	600	624	mV	