

3.3V to 1.0V 3.0A 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 1.0V at 3A output current.

The DC-DC converter contains overload 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.

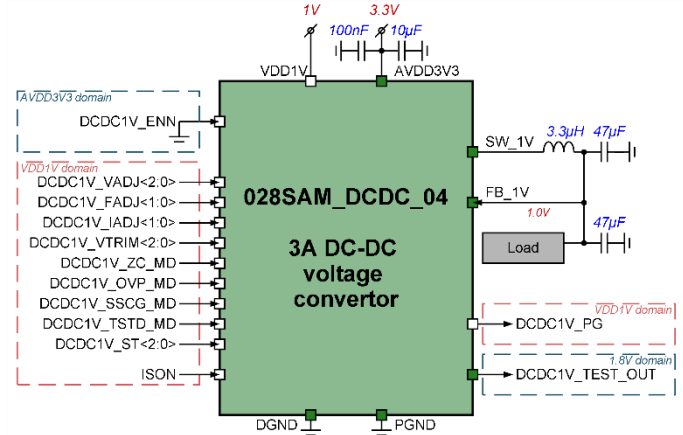
Independent power good, enable and soft start pins allow simple power sequencing approaches for driving digital loads.

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: 1.7mm².



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}	-	-	2.0	3.0	A	
Quiescent current	I _Q	V _{OUT} =1.0 V, AVDD3V3=3.3V	no switching	-	0.5	4.2	mA
			switching	-	2.8	3.8	
		V _{OUT} =1.0 V, VDD1V=1.0V	-	3.0	122	nA	
Shutdown current	I _{SD_DC}	AVDD3V3=3.3V, DCDC disabled	-	95	7800	uA	
		AVDD1V=1.0V, DCDC disabled	-	70	123	nA	
Output voltage	V _{OUT}	DCDC1V_VADJ<2:0>= "000"	-	1.00	-	V	
		DCDC1V_VADJ<2:0>= "001"	-	0.85	-		
		DCDC1V_VADJ<2:0>= "010"	-	0.90	-		
		DCDC1V_VADJ<2:0>= "011"	-	0.95	-		
		DCDC1V_VADJ<2:0>= "100"	-	1.00	-		
		DCDC1V_VADJ<2:0>= "101"	-	1.05	-		
		DCDC1V_VADJ<2:0>= "110"	-	1.10	-		
Output voltage accuracy	A _{OUT}	After trimming	-5	-	+5	%	
Output ripple	V _{R_OUT}	I _{OUT} =2A, AVDD3V3=3.3V, peak-to-peak, F _{osc} =521kHz	-	14	20	mV	
External capacitor	C _{EXT}	ESR = 30mΩ	-	47+47	-	μF	
External inductor	L _{EXT}	-	-	3.3	-	μH	
Power conversion efficiency*	E _{DC}	I _{OUT} =1 A	T _j =27°C, F _{osc} =521kHz	-	85	-	%
		I _{OUT} =2 A		-	82	-	
		I _{OUT} =3 A		-	77	-	
		I _{OUT} =1 A	T _j =125°C, F _{osc} =521kHz	-	84	-	%
		I _{OUT} =2 A		-	81	-	
		I _{OUT} =3 A		-	76	-	
High-Side Switch-On Resistance	R _{DS(on) HS}	AVDD3V3=3.3V, I _{OUT} =2A	-	40	-	mΩ	
Low-Side Switch-On Resistance	R _{DS(on) LS}		-	25	-	mΩ	
Upper switch current limit	I _{LIM}	V _{out} =0 V	4.6	5.1	6.2	A	
Operating frequency	F _{osc}	-	385	520	710	kHz	
OVP Threshold	V _{OVP}	DCDC1V_VADJ<2:0>= "000"	-	1.1	-	V	
Short circuit switching frequency	F _{SW}	V _{OUT} <0.3 V, F _{osc} =521kHz	-	99	-	kHz	
Maximum duty cycle	D _{MAX}	AVDD3V3=3.3V, V _{out} =1.0V, I _{out} =3A	82	89	93	%	
Reference voltage	VREF	-	576	600	624	mV	