

2.0-3.6V to 1.0-1.4V step down DC/DC converter

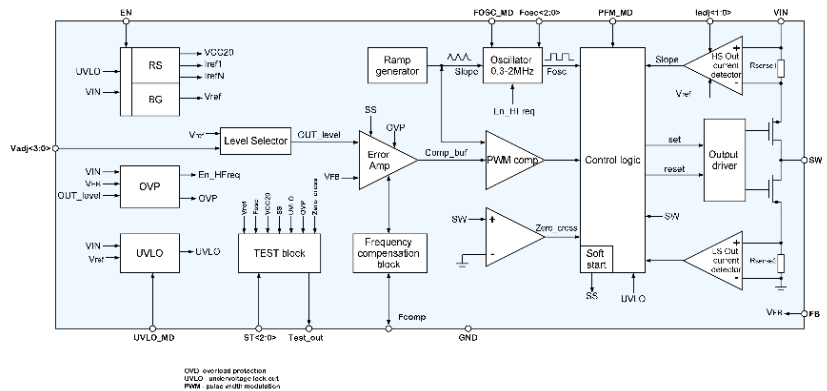
OVERVIEW

055UMC_DCDC_01 is high-efficiency step-down DC/DC switching buck converter targeted for operation from 2.0V to 3.6V input voltage. It is able to supply circuits with 1.2V and up to 50 mA average output current. The DC/DC converter contains adjustment of output current limit, overload protection, and under voltage-lockout circuit. During startup time DC/DC converter works in the soft start mode, which provides the gradual increase of the output voltage.

IP technology UMC 55nm eFlash CMOS technology.

IP status: silicon proven.

Area: 0.3707mm².



ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Value			Units	
			min	typ.	max		
Operating temperature range	T_j	-	-40	27	100	°C	
Input supply voltage	V_{IN}	-	2	3	3.6	V	
Quiescent current	I_Q	$I_{OUT} = 50\text{mA}, V_{OUT} = 1.2\text{V}, V_{IN} = 3.0\text{V}$	-	0.3	1	mA	
Shutdown current	I_{shd}	-	-	35	250	nA	
UVLO threshold	V_{UVLO_R}	UVLO enabled	Rising	-	1.95	2.0	V
	V_{UVLO_F}		Falling	-	1.89	1.93	
Input logic-level high	V_{IL}	For digital inputs	$V_{IN}-0.15$	-	V_{IN}	V	
Input logic-level low	V_{IH}	For digital inputs	0	-	0.2	V	
Output voltage	V_{OUT}	Adjustable	1.14	1.2	1.26	V	
Output current	I_{OUT}	-	-	50	55	mA	
Output ripple	R_{OUT}	$I_{OUT} = 5-50\text{mA}, R_b = 100\text{m}\Omega, L_b = 1\text{nH}$	8	35	-	mV	
OVP threshold	V_{OVP_R}	Rising, $V_{adj} = 1.2\text{V}$	-	1.35	$1.095 \times V_{OUT}$	V	
	V_{OVP_F}	Falling, $V_{adj} = 1.2\text{V}$	$V_{OVP_R} - 0.14 \times V_{OUT}$	1.12	-	V	
Power conversion efficiency	E	$I_{OUT} = 50\text{mA}, V_{IN} = 2\text{V} \div 3.6\text{V}, R_b = 100\text{m}\Omega, L_b = 1\text{nH}$	80	89	-	%	
High-side switch-on resistance	$R_{DS(on)}$	$V_{IN} = 3\text{V}, I_{OUT} = 50\text{mA}$	-	1.0	2.0	Ω	
Low-side switch-on resistance		$V_{IN} = 3\text{V}, I_{OUT} = 50\text{mA}$	-	0.9	1.5	Ω	
Upper switch current limit	I_{LIM}	$I_{adj} = \text{min.}, V_{OUT} = 0\text{V}, V_{COMP} = 1.9\text{V}$	-	150	220	mA	
Operating frequency	F_{OSC}	$F_{OSC} = 1\text{MHz}, V_{COMP} = 1\text{V}$	0.680	1.0	1.45	MHz	
Short circuit switching frequency	F_{SW}	$V_{OUT} < 0.3\text{V}$	0.28	0.3	0.33	MHz	
Reference voltage	V_{REF}	-	642	651	657	V	
Maximum duty cycle	D_{max}	UVLO disabled	-	-	90	%	
COMP to current transconductance	G_{comp}	-	-	125	-	mA/V	
Startup time	T_{st}	90% V_{OUT}	-	1	7	ms	