Analog IP Cell
MEMS Driver
MD80 XC10LV

SERMA
PRODUCTIVITY ENGINEERING

General Description

The MD80 integrated MEMS Driver is a low power, low voltage single battery cell operated high voltage charge pump intended to be used as driver for an electrostatic (MEMS) micro-motor. It can be used in a single pump implementation to drive a unipolar motor or in a dual pump configuration for creating a high voltage H-bridge driver solution.

It charges a capacitive load to 80V and generates a high voltage ready signal when the predefined maximum output voltage is reached. By using a load dependent clocking scheme and capacitive voltage measurement techniques, the overall current consumption can be minimized.
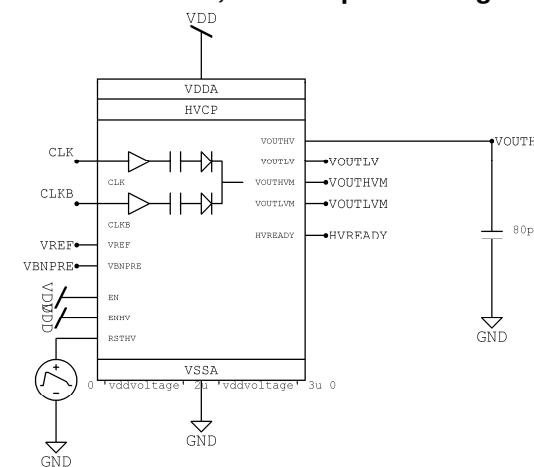
Ratings, Parameters and Conditions

Parameter / Condition	Symbol	Min	Typ.	Max	Unit	Comment
Electrical Parameters:						
Supply Voltage	V_{dd}	1.4	1.55	1.6	V	
Active Supply Current	I_{dd}		320	450	µA	@80pF load
Average Supply Current	I_{ddavg}	2.5	3.5	6	µA	@80pF load and one HV pulse per second
Inactive Supply Current	I_{ddidle}			50	nA	
Output Voltage	V_{outHV}	78	79	80	V	until HV ready
Output Voltage Rise Time	T_{riseHV}	6	8	22	ms	
Output Voltage Fall Time	T_{fallHV}			750	µs	
Output Load	C_{load}	20	80	100	pF	
Absolute Maximum Ratings:						
Operating Temperature	T_{range}	-40		140	℃	
Supply Voltage	V_{dd}	-0.3		6	V	
Input Voltage	V_{in}	-0.3		V_{dd}+0.7		
Output Voltage	V_{out}	-0.3		V_{dd}+0.7		
Operating Conditions:						
Ambient Temperature	T_{amb}	-20	27	80	℃	

IO-Description

Interface	I/O	Function	Comment
VSSA	input	Supply	
VDDA	Input	Supply	
RSTHV	Input	HV MeasSig Reset	
ENHV	Input	HV Enable	
EN	Input	Analogue Enable	
VBNPRE	Input	Bias N Voltage	
VREF	Input	Reference Voltage	606mV nom.
CLK	Input	Clock Signal	1.6MHz nom.
CLKB	Input	inv. Clock Signal	1.6MHz nom.
VOUTHV	Output	HV Output	
VOUTLV	Output	LV Output	
VOUTHVM	Output	HV measurement signal	
VOUTLVM	Output	LV measurement signal	
HVREADY	Output	HV ready signal	

Block schematic, ext. component diagram