

Programmable LDO voltage regulator (output voltage 1.6 to 2.2 V)

SPECIFICATION

1 FEATURES

- iHP SiGe BiCMOS 0.25 um
- Output voltage 1.6...2.2 V
- High precision stabilization voltage
- Several operating modes
- Low current consumption
- Small area
- Low output level vs. supply voltage in a wide range
- Supported foundries: TSMC, UMC, Global Foundries, SMIC, iHP, AMS, Vanguard, SilTerra

2 APPLICATION

The output voltage can be used for both analog and digital blocks. The main application:

- Portable electronic devices
- System-on-chip for different purposes
- Measurement and calibration systems
- Navigation systems
- Communication systems

3 OVERVIEW

250iHP_LDOVR_04 is a low drop out voltage regulator capable to supply up to 10 mA of output current. Target output voltage can be set to one of four specified values in 1.6 - 2.2 V range.

The voltage regulator contains an error amplifier, a PMOS power transistor and resistors for setting output voltage. Error amplifier compares input reference voltage with voltage from feedback resistor divider and adjusts the impedance of the pass PMOS transistor for stabilization of output voltage at the set level. The output voltage adjustment is defined by the digital code $V_{adj}<1:0>$.

The block is designed on iHP SiGe BiCMOS 0.25 um technology.

4 STRUCTURE

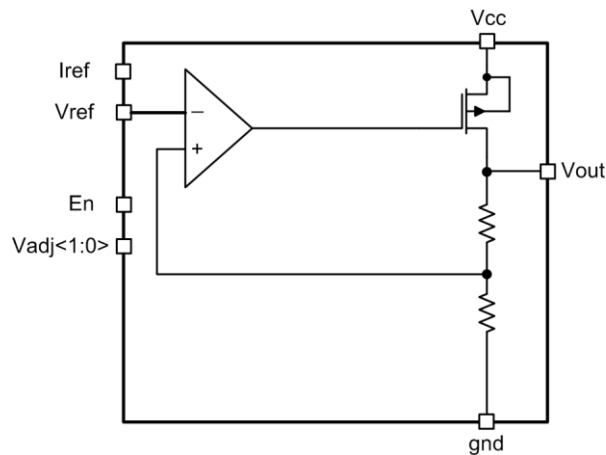


Figure 1: Voltage regulator structure

5 PIN DESCRIPTION

Name	Direction	Description
Iref	I	Reference current (5uA)
Vref	I	Reference voltage
En	I	Enable/disable
Vadj<1:0>	I	Output voltage control
Vout	O	Output voltage
Vcc	IO	Supply voltage
gnd	IO	Ground

6 LAYOUT DESCRIPTION

The block dimensions are given in the table 1.

Table 1: Block dimensions

Dimension	Value	Unit
Height	278	μm
Width	130	μm

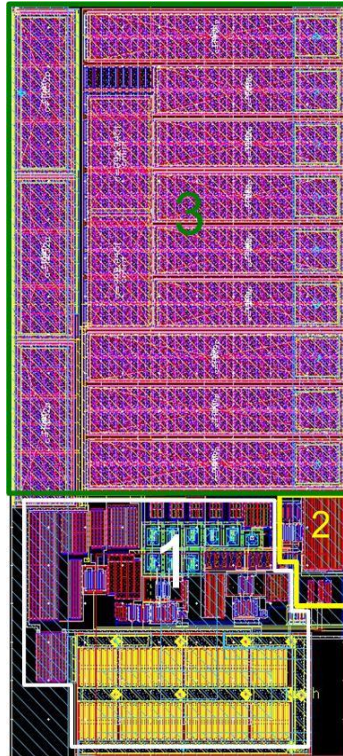


Figure 2: Device layout

1. OTA
2. Control logic
3. Filtering capacitors

7 OPERATING CHARACTERISTICS

7.1 TECHNICAL CHARACTERISTICS

Technology _____ iHP SiGe BiCMOS 0.25 um
 Status _____ silicon proven
 Area _____ 0.035mm²

7.2 ELECTRICAL CHARACTERISTICS

The values of electrical characteristics are specified for $V_{cc} = 1.9 \div +2.7$ V and $T = -45 \div +85^{\circ}\text{C}$. Typical values are at $V_{cc} = 2.05$ V and $T = +27^{\circ}\text{C}$, unless otherwise specified.

Parameter	Symbol	Condition	Value			Unit
			min	typ.	max	
Supply voltage	V_{cc}	-	1.9	2.05	2.7	V
Operating temperature range	T	-	-45	27	85	$^{\circ}\text{C}$
Reference voltage	V_{ref}	-	-	1.17	-	V
Reference current	I_{ref}	-	-	5	-	μA
Maximum load current	$I_{load\ max}$	-	-	-	10	mA
Voltage regulator output level	V_{out}	$V_{adj}<1:0> = "00"$	-	1.6	-	V
		$V_{adj}<1:0> = "01"$	1.796	1.8	1.81	
		$V_{adj}<1:0> = "10"$	-	2.0	-	
		$V_{adj}<1:0> = "11"$	-	2.20	-	
Quiescence current	I_q	-	-	28.3	29.27	μA
Current consumption in a standby mode	I_{stb}	-	-	0.4	18	nA
Input logic-high level	V_{IH}	For digital inputs	$0.7V_{cc}$	-	$V_{cc}+0.25$	V
Input logic-low level	V_{IL}	$V_{adj}<1:0>$ and En	-0.25	-	$0.3V_{cc}$	V

8 DELIVERABLES

Depending on license type IP may include:

- Schematic or NetList
- Abstract view (.lef and .lib files)
- Layout (optional)
- Verilog behavior model
- Extracted view (optional)
- GDSII
- DRC, LVS, antenna report
- Test bench with saved configurations (optional)
- Documentation

REVISION HISTORY

From version 1.0:

- Section 3
- Section 4