
Programmable LDO voltage regulator (output voltage 2.5 V to 2.7 V)

SPECIFICATION

1 FEATURES

- iHP SiGe BiCMOS 0.25 μm
- Low drop out
- Low current consumption
- Output voltage digital adjustment
- Supported foundries: TSMC, UMC, Global Foundries, SMIC, iHP, AMS, Vanguard, SilTerra

2 APPLICATION

- Supply voltage sensitive circuits

3 OVERVIEW

250iHP_LDOVR_03 is a low drop out voltage regulator capable to supply up to 50 mA of output current. Target output voltage can be set to one of four specified values in 2.5 - 2.7 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 fabricated on iHP SiGe BiCMOS 0.25 μm technology.

4 STRUCTURE

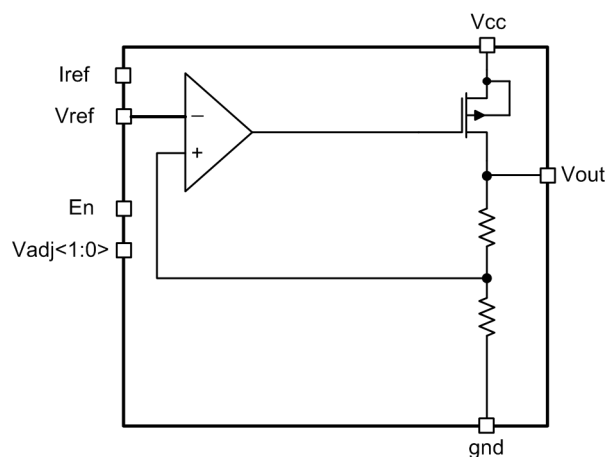


Figure 1: Programmable LDO voltage regulator structure

5 PIN DESCRIPTION

Name	Direction	Description
I_{ref}	I	Reference current
V_{ref}	I	Reference voltage
V_{out}	I	Output voltage
$V_{adj}<1:0>$	I	Digital code of output voltage adjustment
En	I	Enable/disable
Vcc	IO	Supply voltage
gnd	IO	Ground

6 LAYOUT DESCRIPTION

Programmable LDO voltage regulator dimensions are given in the table 1.

Table 1: Block dimensions

Dimension	Value	Unit
Height	114	μm
Width	275	μm

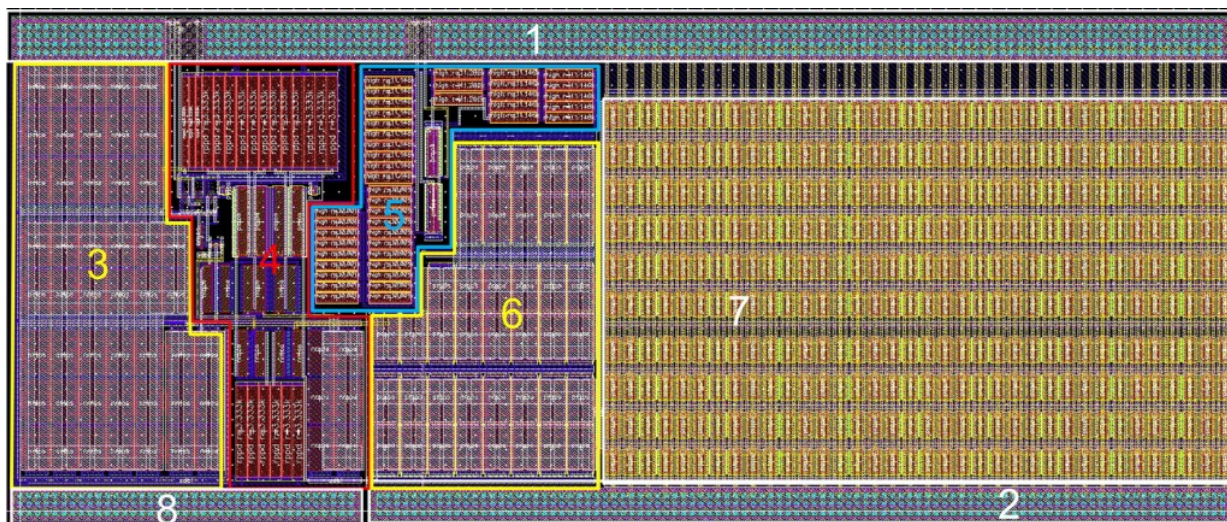


Figure 2: Programmable LDO voltage regulator layout

1. Supply high voltage bus
2. Supply stabilized voltage bus
3. Reference voltage filter
4. Differential amplifier
5. Feedback divider
6. Control voltage filter
7. Pass transistor
8. Ground bus

7 OPERATING CHARACTERISTICS

7.1 TECHNICAL CHARACTERISTICS

Technology _____ iHP SiGe BiCMOS 0.25 um
 Status _____ silicon proven
 Area _____ 0.03 mm²

7.2 ELECTRICAL CHARACTERISTICS

The values of electrical characteristics are specified for $V_{cc} = 2.7 \div 3.6$ V and $T_a = -60 \div +125^\circ\text{C}$. Typical values are at $V_{CC} = 2.8$ V, $T_a = +27^\circ\text{C}$, unless otherwise specified.

Parameter	Symbol	Condition	Value			Unit
			min	typ.	max	
Supply voltage*	V_{cc}	-	2.7	2.9	3.6	V
Operating temperature range	T_a	-	-60	27	+125	°C
Reference voltage	V_{ref}	-	-	1.2	-	V
Reference current	I_{ref}	-	-	5	-	uA
Output voltage	V_{out}	$V_{adj} = \text{"00"}$	-	2.5	-	V
		$V_{adj} = \text{"01"}$		2.57		
		$V_{adj} = \text{"10"}$		2.63		
		$V_{adj} = \text{"11"}$		2.7		
Maximum load current	$I_{load\ max}$	-	-	-	50	mA
Quiescence current	I_q	-	-	25	-	uA
Stand-by current	I_{stb}	-	-	0.2	-	nA
Input logic-level high	V_{IH}	For digital inputs	$0.9V_{cc}$	-	2.85	V
Input logic-level low	V_{IL}	$V_{adj} < 1:0 >$ and En	-0.2	-	0.2	V

Note: * – minimum supply voltage must be more than $(V_{out} + 0.2)$ 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 1.1:

- Section 3
- Section 4