

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

## SPECIFICATION

### 1 FEATURES

- iHP SiGe BiCMOS 0.25  $\mu\text{m}$
- 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\_02 is a low drop out voltage regulator capable to supply up to 100 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  $\mu\text{m}$  technology.

### 4 STRUCTURE

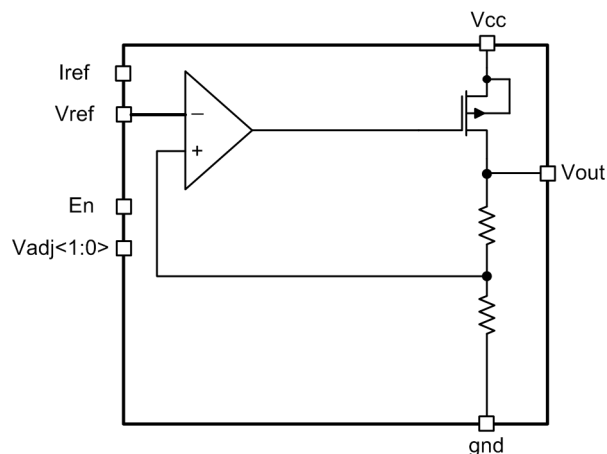


Figure 1: Programmable LDO voltage regulator structure

## 5 PIN DESCRIPTION

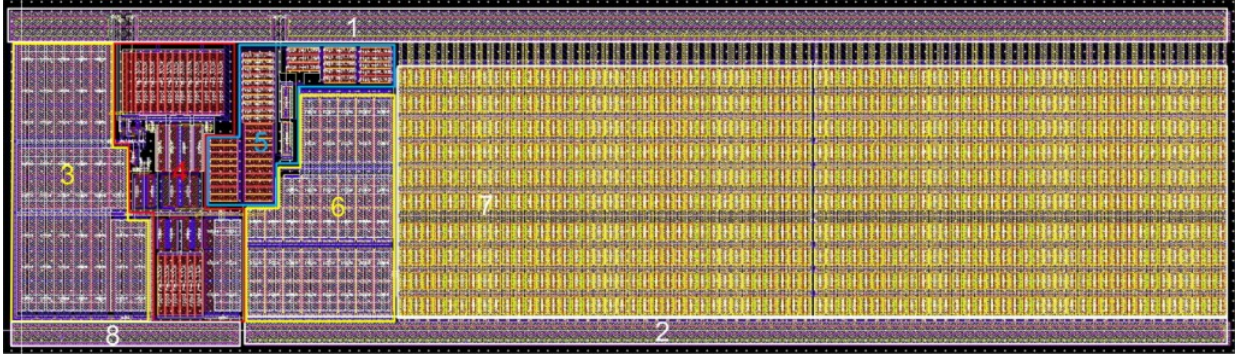
Name	Direction	Description
$I_{ref}$	I	Pedestal current
$V_{ref}$	I	Reference voltage
$V_{out}$	O	Output voltage
$V_{adj}<1:0>$	I	Digital code of output voltage adjustment
En	I	Enable/disadbe
Vcc	IO	Supply voltage
gnd	IO	Ground

## 6 LAYOUT DESCRIPTION

Programmable voltage adjuster dimensions are given in the table 1.

**Table 1:** Block dimensions

Dimension	Value	Unit
Height	114	um
Width	420	um



**Figure 2:** Programmable LDO voltage adjuster general

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 \_\_\_\_\_ 0.05 mm<sup>2</sup>

### 7.2 ELECTRICAL CHARACTERISTICS

The values of electrical characteristics are specified for  $V_{cc} = 2.7 \div 3.6$  V and  $T_a = -60 \div +125$ °C. Typical values are at  $V_{cc} = 2.9$  V and  $T_a = +27$ °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	$V_{out}$	$V_{adj} = "00"$	-	2.5	-	V
		$V_{adj} = "01"$	-	2.57	-	
		$V_{adj} = "10"$	-	2.63	-	
		$V_{adj} = "11"$	-	2.7	-	
Maximum load current	$I_{load\ max}$	-	-	-	100	mA
Quiescence current	$I_q$	-	-	25	-	uA
Standby 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: \* – minimal supply voltage must be more that  $(V_{out} + 0.2)$  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