

Ultra low power voltage regulator with power-on-reset (ULPVregPOR1)

Description

This is a special ultra-low power linear voltage regulator with power on reset functionality.

It is specially designed for low power battery applications, where the nominal battery voltage does not correlate with the 0.25 μm thin-oxide transistor supply voltage.

The regulator is implemented in the MagnaChip 0.25 μm CMOS process HM25E with EEPROM option; it utilises the 'super' high voltage transistors and can therefore handle input voltages up to 5 V.

The built-in voltage bandgap reference makes it very stable towards supply voltage, temperature and process variations.

Features

- Ultra low supply current ($<1 \mu\text{A}$)
- Very accurate output voltage (bandgap stabilised)
- Temperature stable output voltage
- Power on reset circuit with static threshold levels (correlated with the bandgap)

Applications

- Supplying 'low voltage' circuits in ultra-low power battery applications
- Keeping data retention on RAM blocks in sleep mode
- Generating reliable power-on-reset in battery application (static reset threshold)

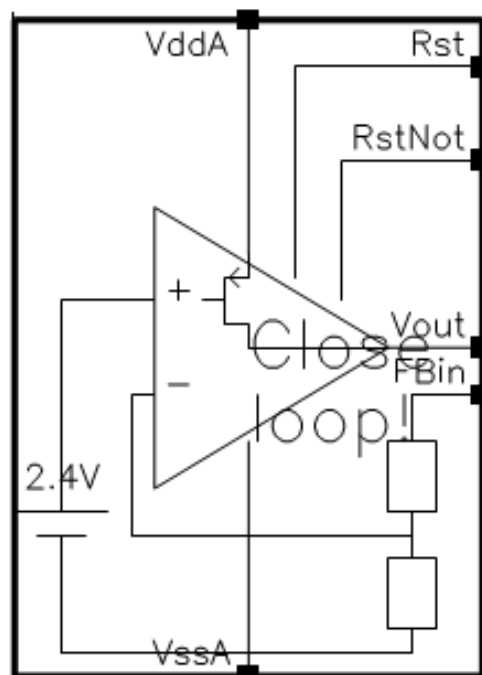
Technology

MagnaChip HM25E.

Portable to alternative CMOS technologies.

Proven in silicon

Schematic



For further information please contact us

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Pin list

Signal name	Direction	Description
VddA	Analog	Positive power supply
Vout	Analog	Regulated output voltage
Rst	Out	Power-on-reset
RstNot	Out	Inverted power-on-reset
FBin	Analog	Feedback input (must be connected to Vout always)
VssA	Analog	Negative power supply

Electrical characteristics

Parameter	Condition/Note	Minimum	Typical	Maximum	Unit
V _{th_up}	Less than 100 mV/1s slope Included 20 mV offset	2.07	2.12	2.16	V
V _{th_down}		1.94	1.99	2.02	
V _{hysteresis}		0.11	0.13	0.16	
V _{th_up}	Mismatch Monte-Carlo, one sigma		36		mV
V _{th_down}			32		
V _{hysteresis}			8		
Output voltage	Supply voltage 2.5 V-to-5.0 V	2.32	2.36	2.41	V
	Mismatch Monte-Carlo, one sigma		24		mV
LoopGain	-	55	60	61	dB
PhaseMargin	C _{digital_supply} = 1 μ F, I _{load} = 5 nA	87	87		deg
	C _{digital_supply} = 1 μ F, I _{load} = 10 μ A	69	77		
I _{supply, static}	Supply voltage 2.7 V-to-3.3 V	580	760	1000	nA
	Supply voltage 2.5 V-to-5.0 V	570		1120	nA
Supply voltage	-	2.7	3.0	3.3	V
Extended sup. voltage		2.5		5.0	V

Measurement

The ULPVregPOR1 has been tested in silicon. The measured performance complies very well with the simulated electrical characteristics. The output voltage variation on one lot has been measured to 23 mV (one sigma).