Process

C35 (0.35µm)

Key Features

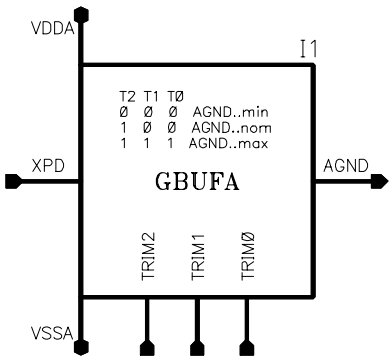
- Small Area 0.089 mm²
- Size x = 517 µm, y = 172 µm
- Supply Voltage 3.0 to 3.6V
- Temperature Range –40 to 125°C
- Power Down Mode
- Trimmable Output Voltage
- TK < 100 ppm

Description

The GBUFA cell is an Analog Reference Generator Cell. The nominal output voltage is 1.52V (trim range about ±150mV).

The pin AGND must be externally buffered with a 1µF capacitor (connected via a low ohmic analog pad) !

Symbol



Pinlist

Pin	Description	Type
AGND	Output Voltage	Analog
XPD	Power Down not	Digital
VDDA	Positive Analog Supply Voltage	Supply
VSSA	Negative Analog Supply Voltage	Supply
TRIM2	MSB trim bit	Digital
TRIM1	MSB-1 trim bit	Digital
TRIM0	LSB trim bit	Digital

TECHNICAL DATA FOR 3.3V SUPPLY

($T_{junction}$ = –40 to 125°C, VDDA=+3.0V to +3.6V, unless otherwise specified)

GENERAL PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$T_{junction}$	Junction Temperature		–40	27	125	°C
X	x – Size of macro cell			517		µm
Y	y – Size of macro cell			172		µm

DC PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
TK [1]	Temperature Coefficient	–30 to 120°C			100	ppm
TK_{nom}	Temp. Coefficient	27°C		0		ppm
VAGND	Output Voltage untrimmed		1.49	1.52	1.57	V
TR [2]	Trim Range			±150		mV

AC PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
R_{out}	Output Resistance	1 kHz		2.3		Ω
$PSFTP_{1Hz}$ [3]	Pos. Power Supply Feed Through	1Hz		–70		dB
$PSFTP_{1kHz}$	Pos. Power Supply Feed Through	1kHz		–68		dB
$PSFTP_{100kHz}$	Pos. Power Supply Feed Through	100kHz		–35		dB

NOISE PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$EOVN_{1Hz}$	Equiv. Output Voltage Noise	1Hz		6.6		µV/√Hz
$EOVN_{1kHz}$	Equiv. Output Voltage Noise	1kHz		0.39		µV/√Hz
$EOVN_{100kHz}$	Equiv. Output Voltage Noise	100kHz		260		nV/√Hz
$EOVN_{RMS}$	Equiv. Output Voltage Noise RMS	1Hz – 10MHz		150		µVrms

[1] Measured with Box-Method $TK = \frac{VAGND_{max} - VAGND_{min}}{T_{max} - T_{min}} \times \frac{1}{VAGND_{@27°C}} \times 10^6$ [ppm]

[2] If the trim bits T2,T1,T0 are "Low" VAGND is set to its minimum

[3] Defines the relative feed through of the power supply change to the reference voltage change in dB

$$\Delta VREF = VREF \times \left(\frac{\Delta VDDA}{VDDA}\right) \times 10^{\left(\frac{PSFTP_{1Hz}}{20}\right)}$$

E.g.:

POWER REQUIREMENTS

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
VDDA	Pos. Analog Supply Voltage		3.0	3.3	3.6	V
VSSA	Neg. Analog Supply Voltage		0	0	0	V
IDDA	Supply Current Analog			240	420	µA
P_{diss}	Power Consumption			792	1512	µW
$IDDA_{PD}$	Power Down Supply Current Analog			0.19	165	nA
P_{diss_PD}	Power Down Power Consumption			0.63	594	nW

TRANSIENT PARAMETERS

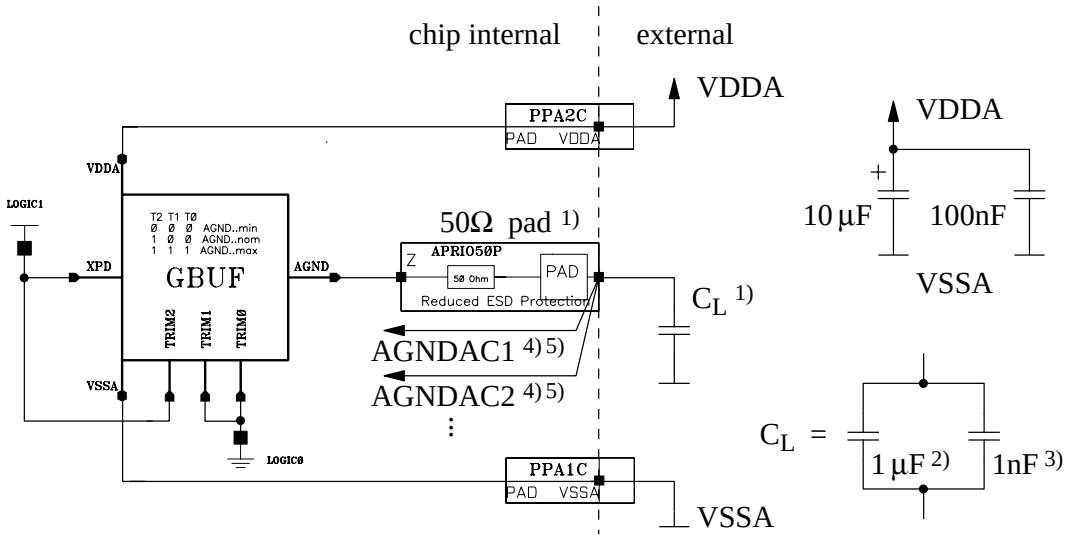
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{wakeup} 1)	Wakeup Time	VAGND ± 0.5%	3.9	12	22500	µs
$T_{startup\_fast}$ 2)	Startup Time Fast	VAGND ± 0.5%	4.8	13	63400	µs
$T_{startup\_slow}$ 3)	Startup Time Slow	VAGND ± 0.5%	15.2	20	7000	µs

OUTPUT PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{source} 4)	Source Current		5.3	26.4	47.1	mA
I_{sink} 4)	Sink Current		14	23.6	37.7	mA

1) Power down rise/fall time of 1ns
2) Power supply rise time of 1us
3) Power supply rise time of 10us
4) Output source/sink current for a variation of VAGND less than 1%

TYPICAL APPLICATION



1) To make the GBUFA cell stable the APRIO50P 50 Ohm pad and the C_L capacitor at the output are needed.
2) For the 1µF capacitor at the output use the type MKT for best performance.
3) For the 1nF capacitor at the output use the type MKP for best performance.
4) Use AGNDAC1, ... as internal analog ground. It is recommended not to use these grounds with DC loads.
5) Each AGNDACx path must have an ESD protection.

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