

General Description

Creating reference voltages and currents is of major importance in nearly every mixed signal circuit for biasing and comparative purposes. Because of the ambient temperature's impact on most of the circuit's properties, the Bandgap reference makes use of two temperature dependencies having opposite characteristic:

- a pn junction voltage having a temperature coefficient of appr. -2 mV/K
- a multiple of the temperature voltage V_T having a temperature coefficient of appr. +0.085 mV/K

Combination of both allows achieving a zero first order temperature dependency. This analog IP cell generates a reference voltage of 1.15V. Trimming is not required. Additionally, the output voltage is converted to a constant current of 10uA.

The circuit is optimised to give a very low temperature dependency of the output voltage V_{out} .

Ratings, Parameters and Conditions, typical conditions

Parameter / Condition	Symbol	Min	Typ.	Max	Unit	Comment
Electrical Parameters:						
Supply Voltage	V_{dd}	3.0	3.3	3.6	V	
Supply Current	I_{dd}	22	25	29	μ A	
Output Voltage	V_{BGOUT}		1.15		V	
Output Current	$I_{IREF10u}$	8.5	10.4	12.5	μ A	
Temp. Coeff. V_{BGOUT}	$TC_{V_{BG}}$	17			ppm/ $^{\circ}$ C	
Voltage Coeff. V_{BGOUT}	$VC_{V_{BG}}$		0.25		mV/V	
PSRR V_{BGOUT}	$RR_{V_{BG}}$		75		dB	
Temp. Coeff. $I_{IREF10u}$	$TC_{I_{BG}}$			100	ppm/ $^{\circ}$ C	
Voltage Coeff. $I_{IREF10u}$	$VC_{I_{BG}}$		104		nA/V	
PSRR $I_{IREF10u}$	$RR_{I_{BG}}$		43		dB	
P Ch. Bias Voltage	V_{PB}		$V_{dd}-1.12$		V	t.b.d
N Ch. Bias Voltage	V_{NB}		1.07		V	t.b.d.
Absolute Maximum Ratings:						
Operating Temperature	T_{range}	-20		80	$^{\circ}$ C	
Supply Voltage	V_{dd}	-0.3		5	V	
Input Voltage	V_{in}	-0.3		$V_{dd}+0.7$		
Output Voltage	V_{out}	-0.3		$V_{dd}+0.7$		
Operating Conditions:						
Ambient Temperature	T_{amb}	-20	27	80	$^{\circ}$ C	

IO-Description

Interface	I/O	Function	Comment
GNDA	Input	Supply	ground
VDDA	Input	Supply	supply voltage
VBG	Output	reference voltage	
Iref	Output	reference current	
VBGN	Output	N channel MOS bias voltage	
VBGP	Output	P channel MOS bias voltage	

Symbol / external schematic

