

General Description

Ambient temperature is one of the most important and most common measured environmental figures. It's reliable, accurate and reproducible measurement is of great interest in many systems for logging or protection functions. A fully monolithic implementation is feasible and beneficent for integrated circuits having no external temperature sensor because of cost, space or pin count reasons.

The TMS temperature measurement system comprises of two different Bandgap reference sources, one producing a temperature constant current, the other one producing a current proportional to the absolute temperature. These currents are driving two current controlled oscillators clocking binary counters. The counting difference between these counters is a measure for the ambient (chip) temperature and can be translated to °C or °F in software.

The whole circuit is optimized for current consumption and can be operated on a single cell primary battery using the appropriate charge pump converting the battery voltage to 2.5VDC. The two internal oscillator have to be trimmed by 7Bit control words to ensure maximum accuracy.

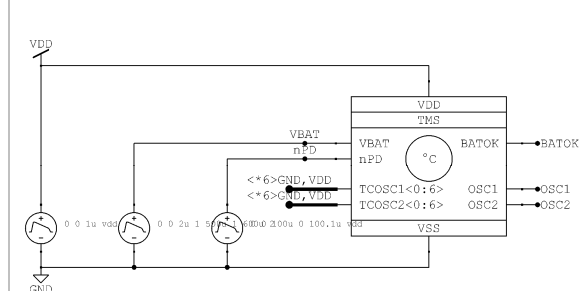
Ratings, Parameters and Conditions

Parameter / Condition	Symbol	Min	Typ.	Max	Unit	Comment
Electrical Parameters:						
Supply Voltage	V _{dd}	2.0	2.5	3.3	V	
Battery Supply Voltage	V _{BAT}	1.2	1.5	V _{dd}	V	
Active Supply Current	I _{dd}	55	65	75	µA	
Temp. Independent Clock	f _{CLKnoTEMP}	18950		19000	Hz	
Temp. Dependent Clock	f _{CLKTEMP}	2000		30000	Hz	
Temperature Accuracy after Trimming	T _{delta}	-0.5		0.5	K	
Absolute Maximum Ratings:						
Operating Temperature	T _{range}	-40		140	°C	
Supply Voltage	V _{dd}	-0.3		6	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	°C	

IO-Description

Interface	I/O	Function	Comment
VSS	input	Supply	
VDD	Input	Supply	
VBAT	Input	Supply	
nPD	Input	Power Down Input	
TCOSC1	Input	7Bit TC trimming word oscillator 1	
TCOSC2	Input	7Bit TC trimming word oscillator 2	
BATOK	Output	Signal showing sufficient supply voltage level	
OSC1	Output	clock output OSC 1	
OSC2	Output	clock output OSC 2	

Block schematic, ext. component diagram



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