Small and high accuracy Temperature Sensor IC Series

Analog Output Temperature Sensor IC

BD1020HFV

● Description

Low quiescent current (4uA) and high accuracy temperature sensor
Detecting temperature by itself, output voltage appears linearly along the temperature.

● Features

1) Detection Temperature Range -30～+100℃
2) Operating Voltage Range +2.4V～+5.5V
3) High Accuracy (typically ±1.0℃@Ta=30℃, typically ±2.0℃@Ta=-30～+100℃)
4) Temperature Sensitivity (typically -8.2mV/℃)
5) Low Quiescent Current (typically 4uA)
6) Ultra Small Package (typically 1.60mm×1.60mm×0.60mm)
7) Low Thermal Resistance (typically 187℃/W)
8) ESD Rating 8kV (HBM)
9) Excellent Ripple Rejection Characteristic

● Applications

Cell Phone (RF Module, Battery Thermal Management)
Audio Systems
Digital Still Camera
LCD, PDP
Optical pick up module for DVD,BlueRay

● Absolute Maximum Ratings (Ta=25℃)

PARAMETERS	SYMBOL	LIMIT	UNIT
Power Supply Voltage	V_{DD}	-0.3～7.0 ※1	V
Output Voltage	V_{OUT}	-0.3～V_{DD}+0.3	V
Output Current	I_{OUT}	±1	mA
Power Dissipation	Pd	536 ※2	mW
Storage Temperature Range	T_{stg}	-55～150	℃

※1. Not to exceed Pd
※2. Reduced by 5.36mW for each increase in Ta of 1℃ over 25℃
（ mounted on 70mm×70mm×1.6mm Glass-epoxy PCB ）

● Recommended Operating Condition

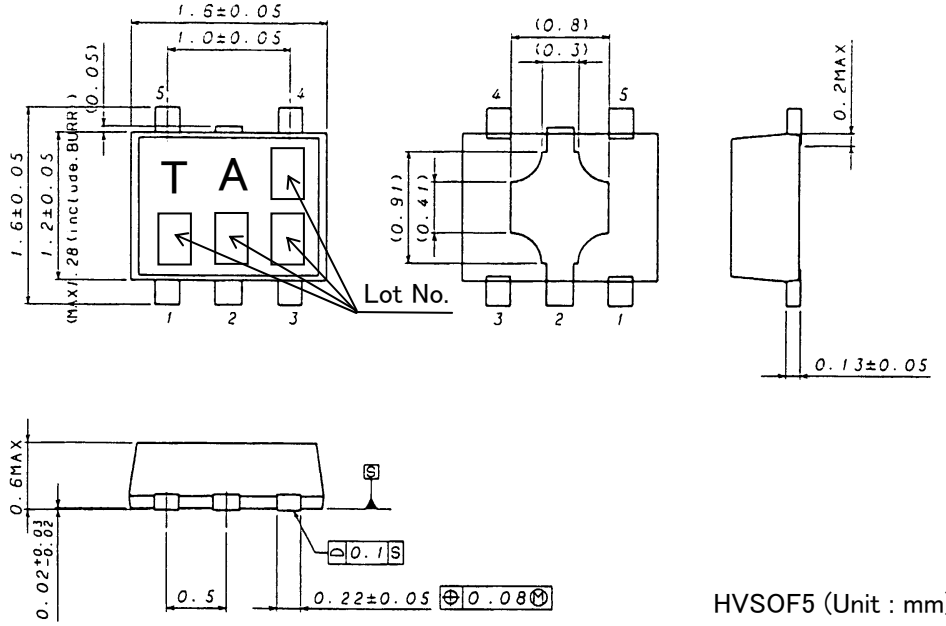
PARAMETERS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Power Supply Voltage	V_{DD}	2.40	3.00	5.50	V
Operation Temperature	T_{opr}	-30	-	100	℃

● Electrical Characteristics and Accuracy (Unless otherwise specified, V_{DD}=3.0V, Ta=25℃)

PARAMETERS	SYMBOL	LIMIT			UNIT	CONDITIONS
		MIN.	TYP.	MAX.		
Accuracy	T_{acc}	-	±1.0	±1.5	℃	Ta = 30℃
		-	±2.0	±2.5		Ta = 100℃
		-	±2.0	±2.5		Ta = -30℃
Temperature Sensitivity	V_{SE}	-8.4	-8.2	-8.0	mV/℃	
Supply Current	I_S	-	4.0	7.0	uA	
Output Voltage	V_{OUT}	1.288	1.300	1.312	V	Ta = 30℃
Output Voltage Line Regulation	$\triangle V_{OUT}V_{DD}$	-	-	4	mV	V_{DD} = 2.4～5.5V
Output Voltage Load Regulation	$\triangle V_{OUT}R_L$	-	-	1	mV	I_{OUT} : 0uA / 0.7uA, Difference

Radiation hardiness is not designed.

● Package Outlines

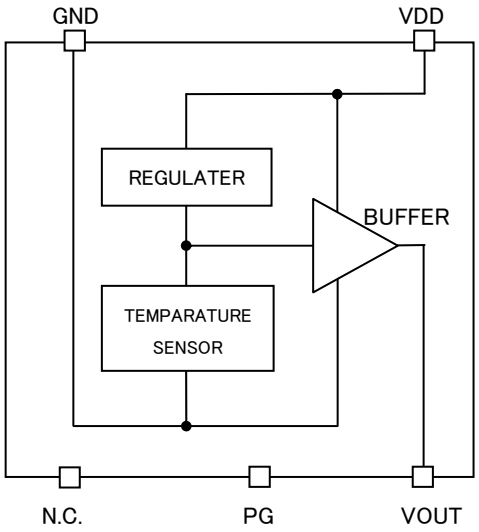


HVSOF5 (Unit : mm)

● PIN Descriptions

PIN No.	PIN NAME	FUNCTION	COMMENT
1	N.C.		Please set to OPEN .
2	PG	Heat Condition	Please connect to temperature measurement part.
3	VOUT	Output Voltage for proportional temperature reversely	
4	VDD	Power Supply	
5	GND	Ground	

● Block Diagram



● Caution On Use

1) Absolute Maximum Ratings

An excess in the absolute maximum ratings, such as supply voltage, temperature range of operating conditions, etc., can break down devices, thus making impossible to identify breaking mode such as a short circuit or an open circuit. If any special mode exceeding the absolute maximum ratings is assumed, consideration should be given to take physical safety measures including the use of fuses, etc.

2) GND voltage

Make setting of the potential of the GND terminal so that it will be maintained at the minimum in any operating state.

3) Pin short and mistake fitting

When mounting the IC on the PCB, pay attention to the orientation of the IC. If there is a placement mistake, the IC may be burned up.

4) Operation in strong electric field

Be noted that using ICs in the strong electric field can malfunction them.

5) Mutual impedance

Use short and wide wiring tracks for the power supply and ground to keep the mutual impedance as small as possible. Use a capacitor to keep ripple to a minimum.

6) Please connect it with the temperature measurement part (GND line usually) to make thermal conductivity with the mount board side the best though the PG pin (Pin NO.2) is hindered and doesn't exist about OPEN even if it connects it with GND.

● Reference Data

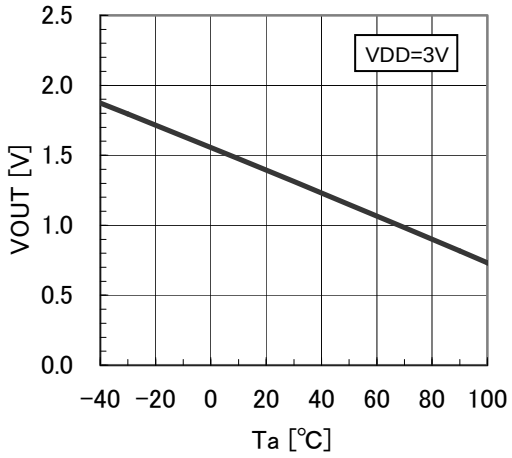


Fig.1 Output Voltage vs. Temperature

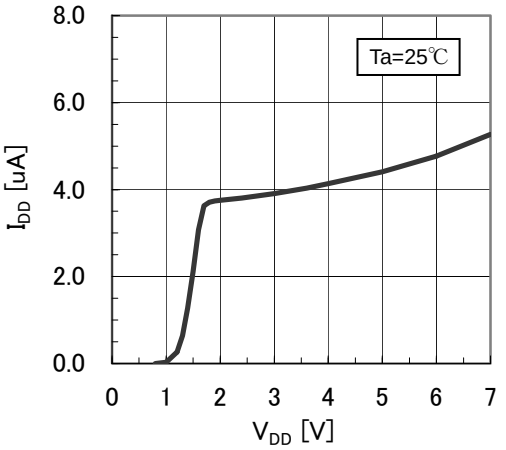


Fig.2 Supply Current vs. Supply Voltage

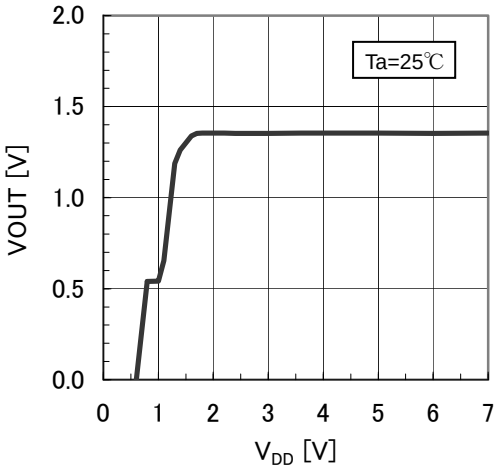


Fig.3 Output Voltage vs. Supply Voltage

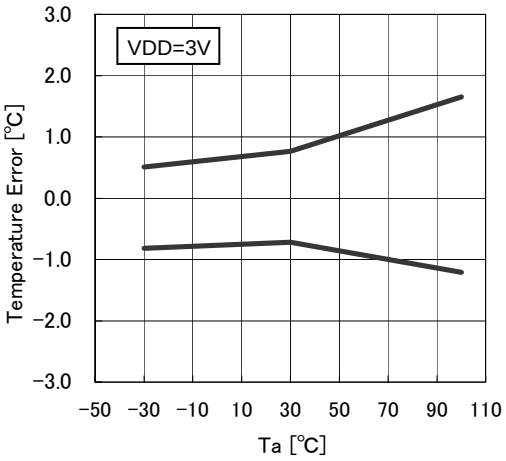


Fig.4 Error vs. Temperature

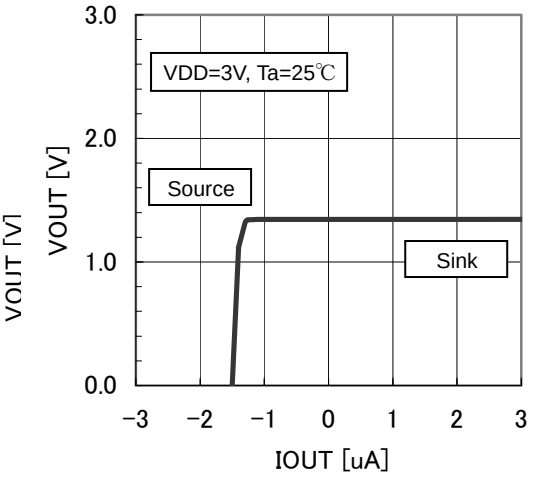


Fig.5 Output Voltage vs. Output Current

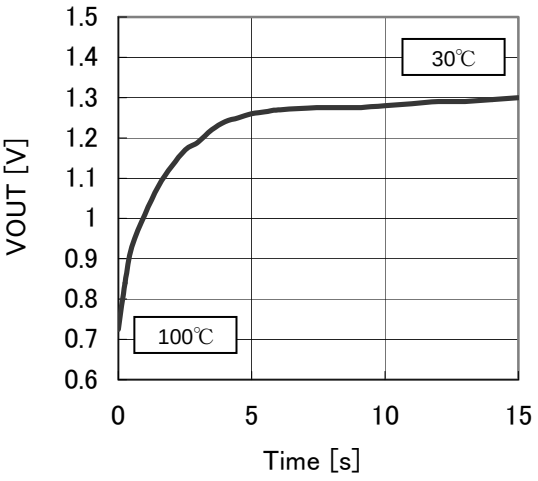


Fig.6 Start Up Response
(VOUT response 100℃→30℃ in atmosphere)

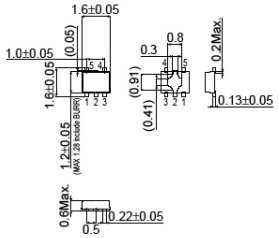
●Product Designations (Selecting a model name when ordering)

B	D	1	0	2	0	H	F	V	—	T	R

ROHM model　　Part number　　Package type　　TR = Reel-wound embossed taping

HVSOF5

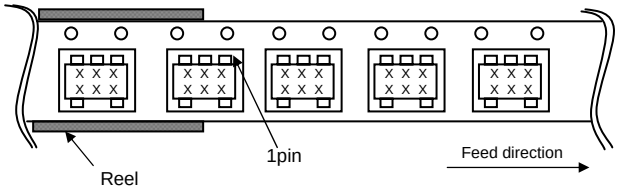
<Dimensions>



(Unit: mm)

< Tape/Reel Info >

Tape	Embossed carrier tape
Quantity	3000pcs
Direction of feed	TR (Correct direction: With reel in the left hand, the 1pin of the product should be at the upper left. Pull tape out with the right hand)



※Orders are available in complete units only.

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