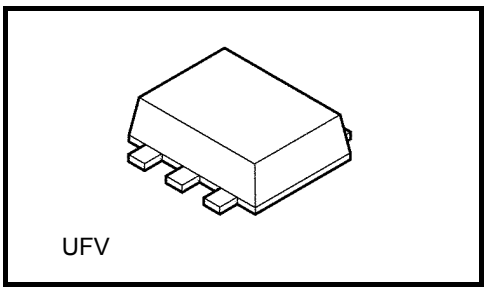
TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TCS10DPU

Digital Output Magnetic Sensor

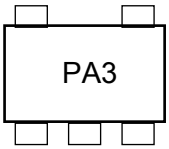
Feature

Push-Pull Output
South-Pole or North-Pole Detection

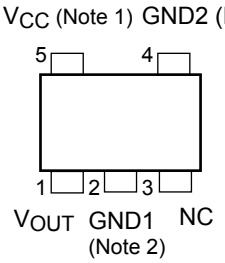


Weight: 7.0 mg (typ.)

Marking



Pin Assignment (top view)



Function Table

Magnetic Flux Density	Output
≥ B_{ON}	L
≤ B_{OFF}	H

Note 1: A 0.47μF capacitor should be connected near the device. This condition will not guarantee successful operation. Check the performance thorough evaluation using the actual application to set the condition.

Note 2: The GND1 and GND2 pins should be tied to ground.
The GND2 pin is used as a test pin during production.

Start of commercial production
2008-09

Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply Voltage	V_{CC}	−0.5 to 6.0	V
Output Voltage	V_{OUT}	−0.5 to 6.0	V
Output Diode Current	I_{OK}	±10	mA
Output Current	I_{OUT}	±5	mA
Vcc/GND Current	I_{CC}	±10	mA
Power Dissipation	P_D	200	mW
Storage Temperature Range	T_{stg}	−65 to 150	°C

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Operating Range

Characteristics	Symbol	Rating	Unit
Supply Voltage	V_{CC}	2.3 to 3.6	V
Output Voltage	V_{OUT}	0 to V_{CC}	V
Output Current	I_{OH} / I_{OL}	±1.0	mA
Operating Temperature	T_{opr}	−40 to 85	°C

DC Characteristics (Ta = 25°C)

Characteristics		Symbol	Condition	V_{CC} (V)	Min	Typ.	Max	Unit
Output Voltage	High-Level	V_{OH}	I_{OH} = −1.0 mA	2.3 to 3.6	V_{CC} x 90%	—	—	V
	Low-Level	V_{OL}	I_{OL} = 1.0 mA	2.3 to 3.6	—	—	V_{CC} x 10%	
Supply Current	Average Current	I_{CC}	Current at pulse riving (Note 3, Fig. A)	2.3 to 2.7	—	8.5	13.2	μA
				3.0 to 3.6	—	12.4	18.3	
	Operating Current	$I_{CC}ON$	Peak current (Note 3, Fig. A)	2.3 to 3.6	—	0.7	1.3	mA
Operating Frequency		f_{opr}	(Fig. A)	2.3 to 3.6	—	25	—	Hz

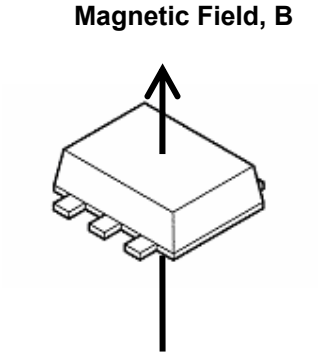
Note 3: I_{CC} is pulsed periodically.

Magnetic Characteristics (Ta = 25°C)

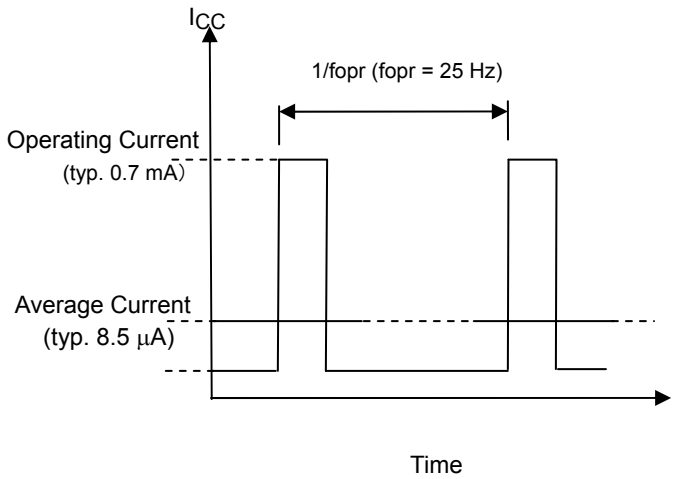
Characteristics		Symbol	Condition (Note 4, Fig. B)	V_{CC} (V)	Min	Typ.	Max	Unit
Magnetic Flux Density	Operating Point	$B_{ON}S$	$V_{OUT} = V_{OL}$	2.3 to 3.6	—	1.8	2.5	mT
		$B_{ON}N$			-2.5	-1.8	—	
	Releasing Point	$B_{OFF}S$	$V_{OUT} = V_{OH}$	2.3 to 3.6	0.3	0.8	—	
		$B_{OFF}N$			—	-0.8	-0.3	
	Hysteresis	B_H	$\|B_{ON} - B_{OFF}\|$	2.3 to 3.6	—	1.0	—	

Note 4: Uniform magnetic field perpendicularly to the magnetic sensor.

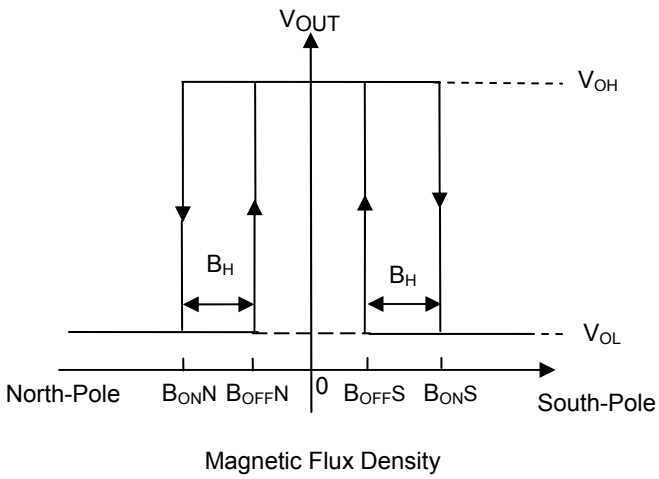
Note: Direction of the Magnetic field



(Fig. A): I_{CC} Characteristics

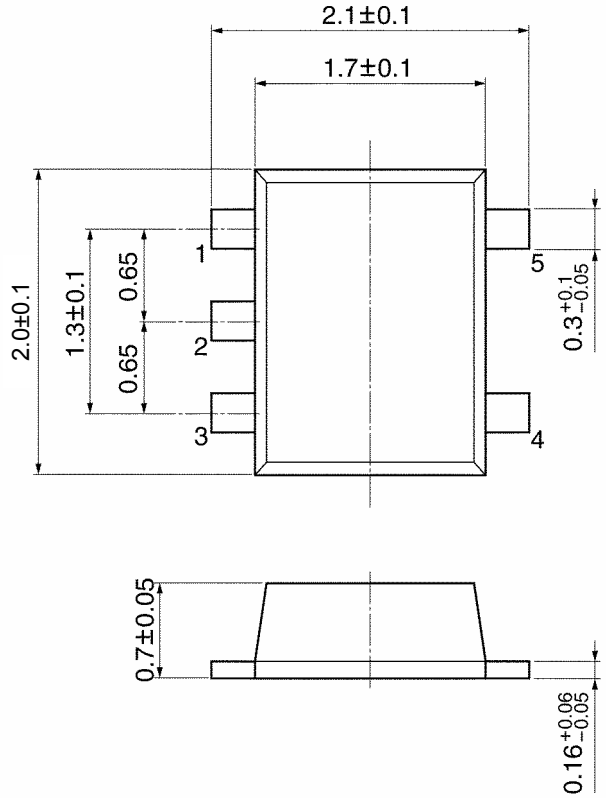


(Fig. B): Operating Characteristics



Package Dimension

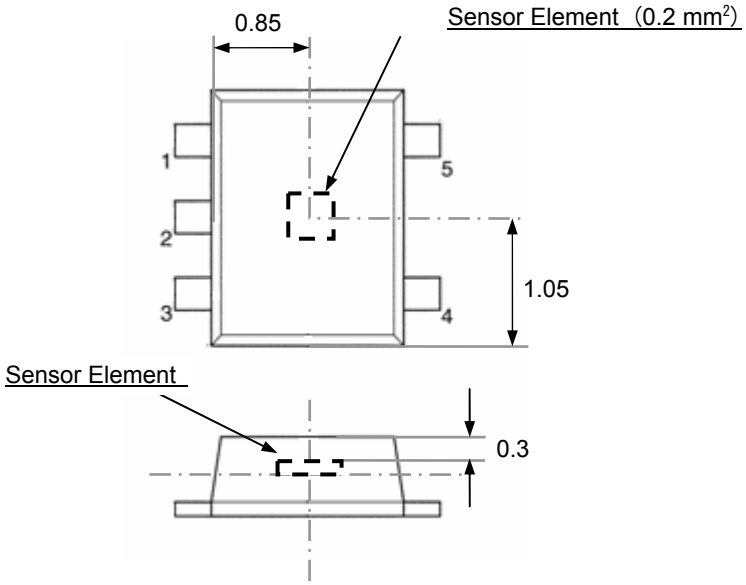
Unit: mm



Weight: 7.0 mg (typ.)

Layout of Sensor Element

Unit: mm



Note: Dimensional tolerances are ± 0.1 mm, unless otherwise specified.

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