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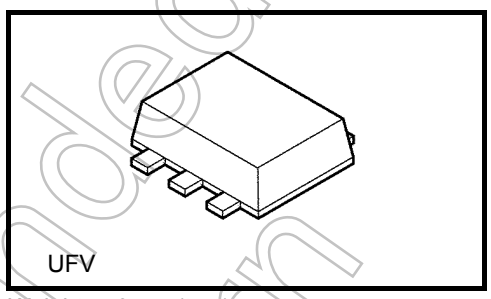
TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TCS10NLU

Digital Output Magnetic Sensor

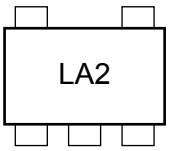
Features

Open-Drain Output
North-pole Detection

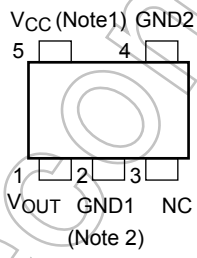


Weight: 7.0 mg (typ.)

Marking



Pin Assignment (top view)



Operating Diagram

Magnetic Flux Density	Output
≥ B_{ON}	L
≤ B_{OFF}	Z (Note 3)

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.

Note 3: In the high-impedance state.

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 5.5 (Note 4)	V
Output Current	I_{OL}	1.0	mA
Operating Temperature	T_{opr}	−40 to 85	°C

Note 4: V_{CC} = 0.0 V or when the output is in the high-impedance state.

DC Characteristics (Ta = 25°C)

Characteristics		Symbol	Condition	V_{CC} (V)	Min	Typ.	Max	Unit
Output Voltage	Low- Level	V_{OL}	I_{OL} = 1.0 mA	2.3 to 3.6	—	—	V_{CC} x 10%	V
Output Leakage Current		I_{OFF}	V_{OUT} = 5.5V	0	—	0.5	1	μA
Supply Current	Average Current	I_{CC}	Current at pulse riving (Note 5, Fig. A)	2.3 to 2.7	—	5.5	9.5	μA
				3.0 to 3.6	—	8.7	13.2	
	Operating Current	I_{CC} ON	Peak current (Note 5, 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 5: I_{CC} is pulsed periodically.

Magnetic Characteristics (Ta = 25°C)

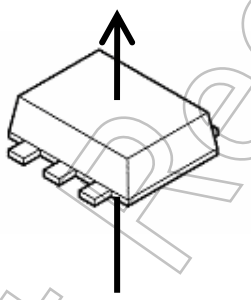
Characteristics		Symbol	Condition (Note 6, Fig. B)	V_{CC} (V)	Min	Typ.	Max	Unit
Magnetic Flux Density	Operating Point	B_{ON}	V_{OUT} = V_{OL}	2.3 to 3.6	-2.5	-1.8	—	mT
	Releasing Point	B_{OFF}	V_{OUT} =Z (Note 7)	2.3 to 3.6	—	-0.8	-0.3	
	Hysteresis	B_H	$\|B_{ON} - B_{OFF}\|$	2.3 to 3.6	—	1.0	—	

Note 6: Uniform magnetic field perpendicularly to the magnetic sensor.

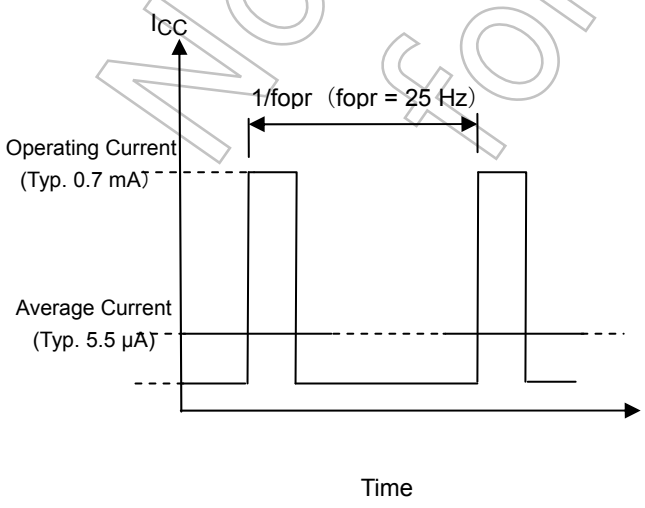
Note 7: In the high-impedance state.

Note: Direction of the Magnetic field

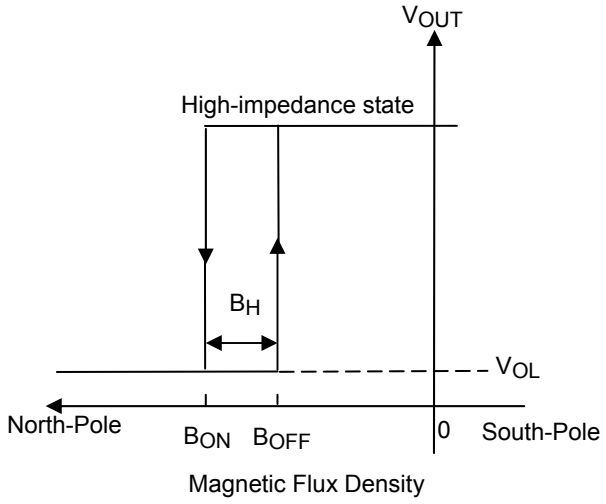
Magnetic Field, B



(Fig. A): I_{CC} Characteristics

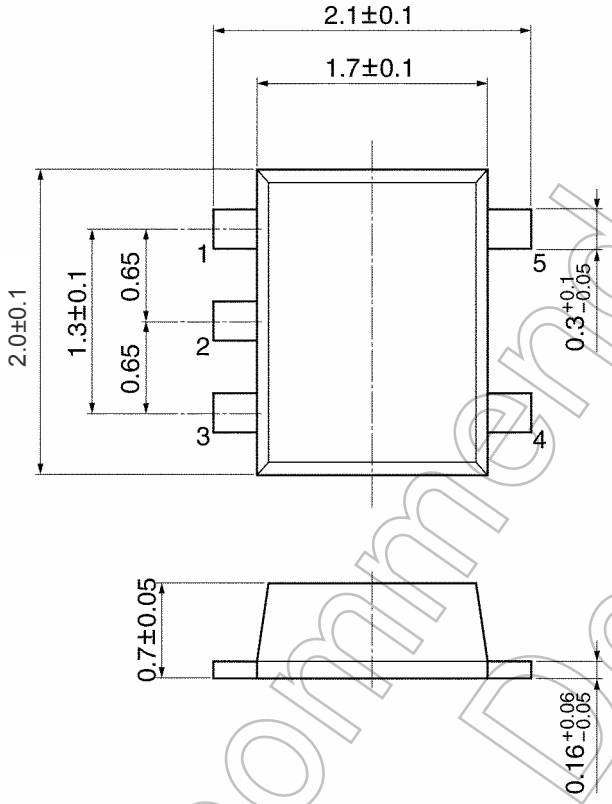


(Fig. B): Operating Characteristics



Package Dimensions

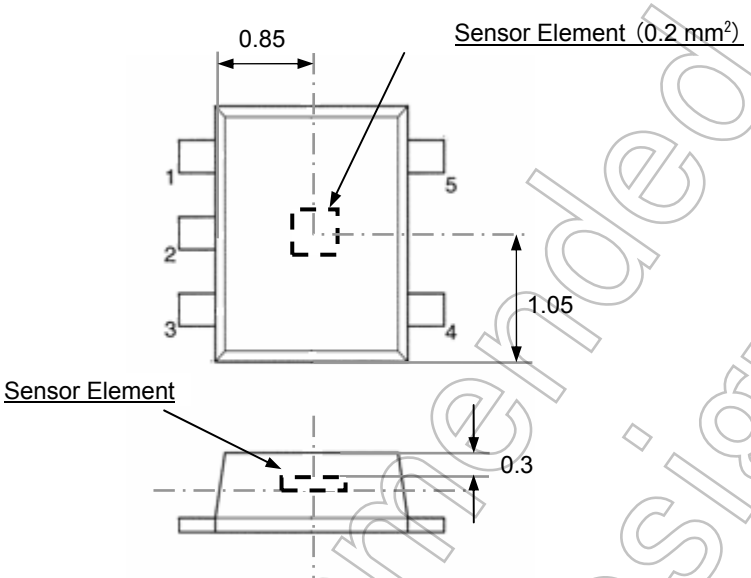
Unit: mm



Weight: 7.0 mg (typ.)

Layout of Magnetic Detection Part

Unit: mm



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

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