

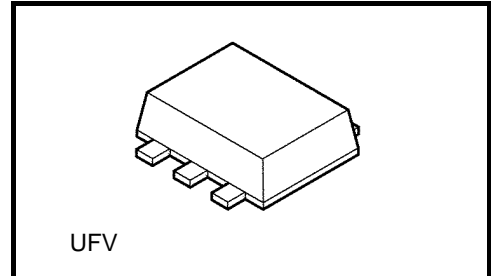
TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TCS10DLU

Digital-Output Magnetic Sensor

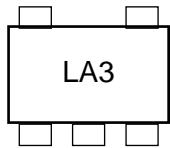
Feature

- Open-Drain Output
- South-Pole or North-Pole Detection

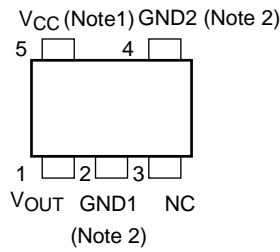


Weight: 0.007 g (typ.)

Marking



Pin Assignment (top view)



Function Table

| Magnetic Flux Density | Output |
|-----------------------|------------|
| $\geq B_{ON}$ | L |
| $\leq B_{OFF}$ | Z (Note 3) |

- Note 1: It is recommended to add a capacitor of about 0.1 μ F between Vcc and GND.
- 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.

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 |
| V _{CC} /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 driving (Note 5, 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 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: Supply Current is pulsed periodically by internal circuit.

Magnetic Characteristics (Ta = 25°C)

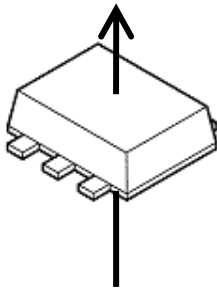
| Characteristics | | Symbol | Condition (Note 6, Fig. B) | V _{CC} (V) | Min | Typ. | Max | Unit |
|-----------------------|-----------------|-------------------|------------------------------------|---------------------|------|------|------|------|
| Magnetic Flux Density | Operating Point | B _{ONS} | V _{OUT} = V _{OL} | 2.3 to 3.6 | — | 1.8 | 2.5 | mT |
| | | B _{ONN} | | | -2.5 | -1.8 | — | |
| | Releasing Point | B _{OFFS} | V _{OUT} = Z (Note 7) | 2.3 to 3.6 | 0.3 | 0.8 | — | |
| | | B _{OFFN} | | | — | -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.

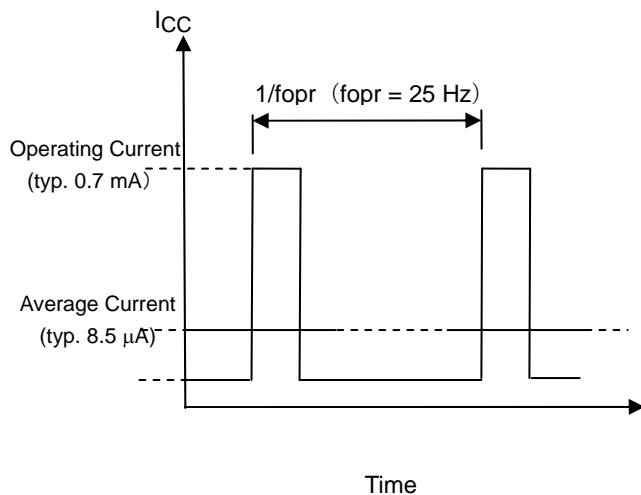
Note 7: In the high-impedance state.

Note: Direction of the Magnetic field

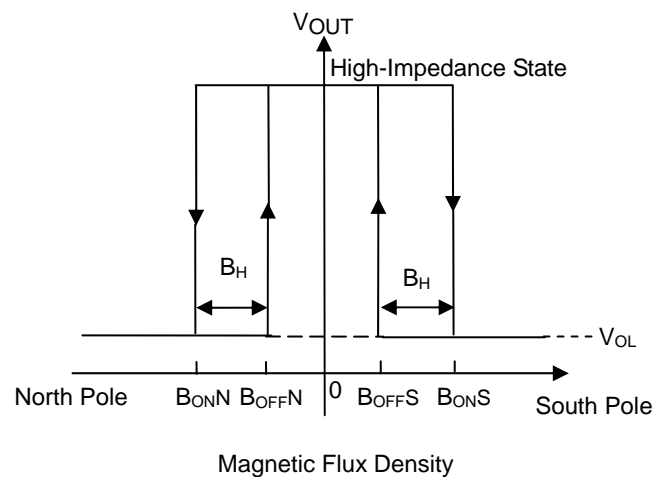
Magnetic Field, B



(Fig. A): I_{CC} Characteristics

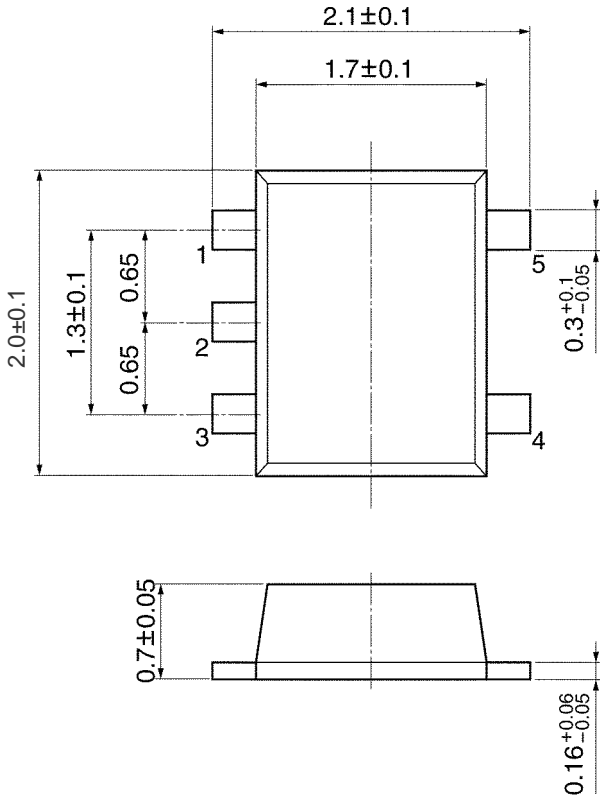


(Fig. B): Operating Characteristics



Package Dimensions

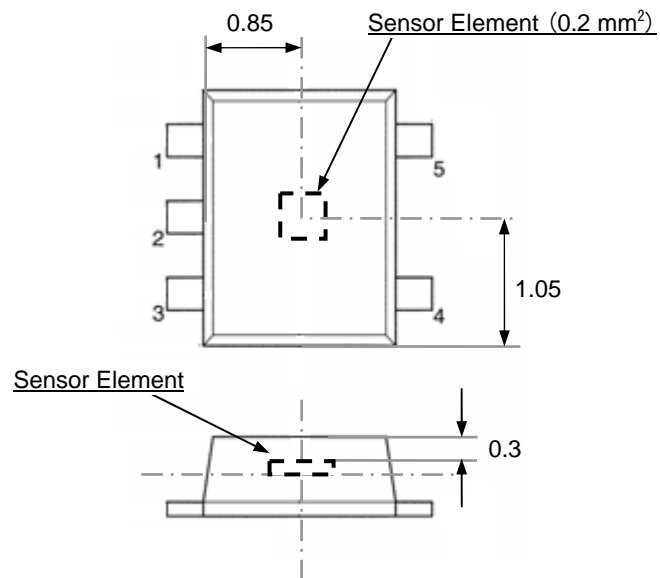
Unit: mm



Weight: 0.007 g (Typ.)

Layout of Magnetic Detection Part

Unit: mm



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

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