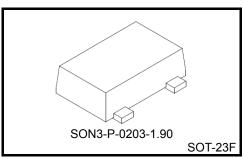
TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TCS20DLR

Digital Output Magnetic Sensor

Feature

Open-Drain Output
South-Pole and North-Pole Detections

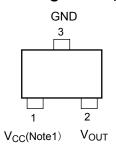


Weight: 11.0 mg (typ.)

Marking



Pin Assignment (Top View)



Function Table

Magnetic Flux Density	Output		
≥ B _{ON}	L		
≤ B _{OFF}	Z(Note 2)		

Note 1 : A $0.47\mu F$ 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: In 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	٧
Output Diode Current	I _{OK}	-10	mA
Output Current	lout	5	mA
Vcc/GND Current	Icc	±10	mA
Power Dissipation	P _D	1 (Note 3)	W
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).

Note 3: Mounted on a FR4 board. (25.4 mm \times 25.4 mm \times 1.6 mm, Cu Pad: 645 mm 2)

Operating Ranges

Characteristics	Symbol	Rating	Unit
Supply Voltage	V _{CC}	2.3 to 5.5	V
Output Voltage	V _{OUT}	0 to 5.5 (Note 4)	V
Output Current	l _{OL}	1.0	mA
Operating Temperature	T _{opr}	-40 to 85	°C

Note 4: $V_{CC} = 0 \text{ V}$ or when output impedance is high.

DC Characteristics (Ta = 25°C)

Characteris	stics	Symbol	Condition	V _{CC} (V)	Min	Тур.	Max	Unit
Output Voltage	Low Level	V _{OL}	I _{OL} = 1.0 mA	2.3	_	_	0.23	V
				2.5	_	_	0.25	
				3.3	_	_	0.33	
				3.6	_	_	0.36	
				5.0	_	_	0.50	
Output Leakage	Current	l _{OFF}	V _{OUT} = 5.5V	0	_	0.5	1	μΑ
Supply Current	Average Current	Icc	Current at pulse driving (Note 5, Fig. A)	2.3	_	7.3	13.2	- μΑ
				2.5	_	8.5		
				3.3	_	12.8	_	
				5.0	_	19.0	_	
	Operating Current	I _{CC} ON	Peak current (Note 5, Fig. A)	2.3	_	0.7	1.1	- mA
				2.5	_	0.8	_	
				3.3	_	1.2	_	
				5.0	_	1.6	_	
Operating Frequency		f _{opr}	(Fig. A)	2.3 to 5.0	_	25	_	Hz

Note 5: Supply current is pulsed periodically by internal circuit.

Magnetic Characteristics (Ta = 25°C)

Cha	aracteristics	Symbol	Condition (Note 6and 7, Fig. B)	V _{CC} (V)	Min	Тур.	Max	Unit
Operating Point Magnetic Flux Density Releasing Point Hysteresis	B _{ON} S	When output logic	2.3 to 3.6	_	3.4	4.4		
	Operating Foint	B _{ON} N turns High to Low	5.0	_	2.8	4.4		
	B _{OFF} S	S When output logic	2.3 to 3.6	0.9	2.0	_	mT*	
	Releasing Foint	B _{OFF} N	turns Low to High	5.0	0.4	1.5	_	
	Hysteresis	B _H	B _{ON} - B _{OFF}	2.3 to 5.0	_	1.4	_	

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*1 mT=10 Gauss

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

Note 7: Output logic is High level with pull-up resistance.



Note: Direction of Magnetic field

Magnetic Field, B

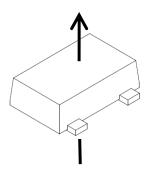
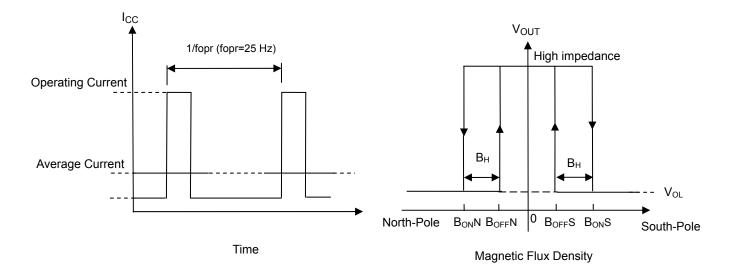


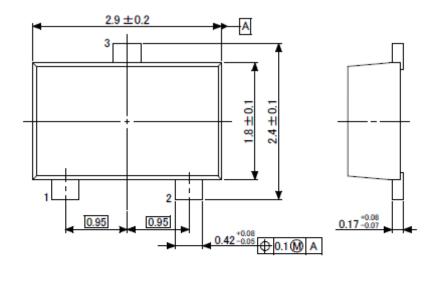
Fig. A : I_{CC} Characteristics

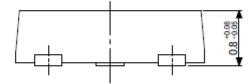
Fig. B : Operating Characteristics

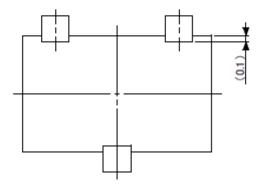


Package Dimension

Unit: mm





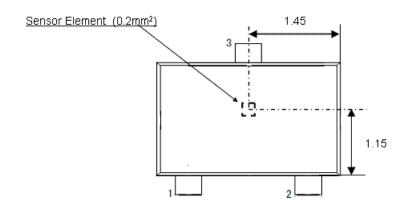


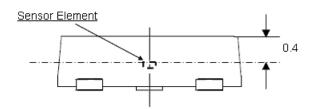
Weight: 11.0 mg (Typ.)

5 2014-03-01

Layout of Sensor Element

Unit: mm





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

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