

# Digital Isolators



## Quad-Channel Magnetic Coupling

Toshiba's new Digital Isolators offer a proprietary magnetic coupling type insulated transmission method for high-speed multi-channel operation. The new devices block destructive transients across data lines, support reliability and real-time stable high-speed digital communications even in the toughest factory floor environments. Toshiba has been providing photocouplers for optically coupled isolation for 50 years and continues to expand the development of new devices in the future.

### Applications

- Factory Automation (Programmable Logic controller - PLC; I/O Interface)
- Motor control
- Inverter

### Features

- High withstand common mode transient immunity; CMTI(min) = 100kV/us
- High speed data transmission rate; tbps = 150Mbps
- Low pulse width distortion; PWD(typ.) = 0.8ns @  $V_{DD1}=V_{DD2}=5V$
- 4 channel (Forward: Reverse = 4:0, 3:1)

### Advantages

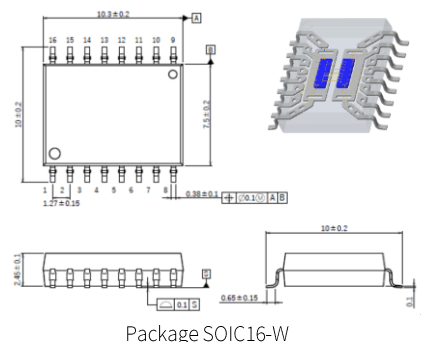
- Products are suitable for harsh & noisy environments
- A choice of channel combination options for various communication standards
- Provides best in class isolation performance
- Enables optimum system performance

### Benefits

- High system reliability reduces cost of operation failures
- Customers can optimize PCB space and design layout.
- Reduction in equipment size leads to an enhanced selling proposition for customer
- Eases design to achieve best performance

### Stable device operation & transmission

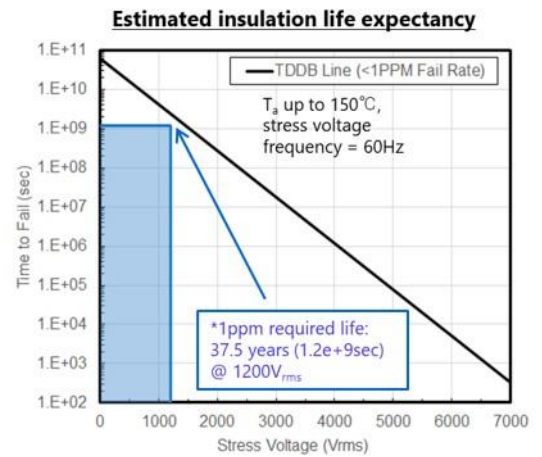
Digital isolators can achieve a high CMTI of 100kV/ $\mu$ s (min) by adopting Toshiba's unique magnetic coupling isolation transmission solution. This makes the devices highly resistant to electrical noise between input and output in isolated signal transmission applications, contributing to stable signal transmission and device operation. The devices also deliver low pulse width distortion of 0.8ns (typ.) ( $V_{DD1}=V_{DD2}=5V$ ) and data transmission speeds of 150Mbps (max), making them especially suitable for high-speed communication applications.



## Main characteristics

Terms	Specification
Storage temperature	-65 ~ 150 °C
Operating temperature	-40 ~ 110 °C
Supply voltage	2.25 ~ 5.5 V
Propagation delay (max.)	21.0 ns
CMTI (min.)	100kV / us
Isolation voltage (min.)	5 kVrms
Safety standard (planned)	UL1577, VDE V0884-11

Long life insulation: >70years @1200Vrms



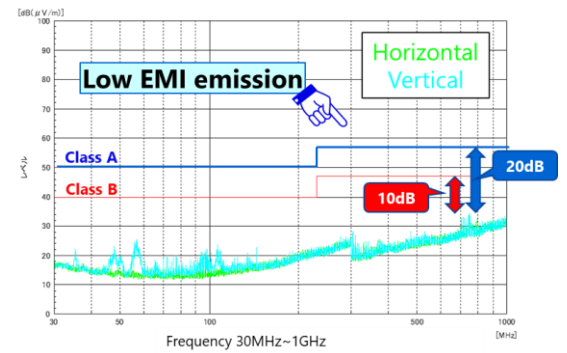
## EMI\* testing for radiated emissions

Magnetic coupling is signal communication using a magnetic field, where there are justified concerns about electromagnetic effects on the surrounding circuit functions. Toshiba has evaluated its products based on CISPR32\*\*, confirming that they are class B compliant or higher. This can ease the design process for engineers considering this technology.

\* Electro Magnetic Interference

\*\* Electro Magnetic Compatibility of Multimedia equipment

### Test Results: Pass CISPR32 Class B



## Digital isolator line-up

Part Number	Number of inputs (Forward reverse)	Default Output State	Default Output State	Max Data rate (Mbps)	Package	Pin Layout
DCL540C01	4:0	Low	Output Enable	150	SOIC16-W	
DCL540D01		High				
DCL540L01		Low				
DCL540H01		High				
DCL541A01	3:1	Low	Input Disable			
DCL541B01		High				
DCL541L01 *1	3:1	Low	Output Enable			
DCL541H01 *1		High				
DCL542L01 *2	2:2	Low	Output Enable			
DCL542H01 *2		High				

\*1 Under development (MP start from June '23) \*2 Under development (MP start from Aug. '23)