

# Application Note

## Digital Isolator Selection Guide

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### ABSTRACT

Texas Instruments digital isolators provide safe, high-speed signal isolation and robust protection for sensitive electronics. Advanced technology eliminates ground loops, reduces noise, and enhances reliability in industrial, automotive, and power applications while consuming low power and meeting strict safety certifications. This application note offers design guidance to help engineers select the appropriate TI digital isolator and streamline development.

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## 1 Introduction

TI's digital isolators provide safe and reliable signal isolation, combining high-speed data integrity with robust protection for sensitive electronics. Leveraging advanced isolation technologies, our isolators prevent ground loops, minimize noise, and enhance system reliability in demanding industrial, automotive, and power applications. With low power consumption, long lifetimes, and rigorous safety certifications, TI's isolators offer a dependable and compliant solution. This application note guides the user in selecting the optimal TI digital isolator for specific needs, making it simpler to achieve reliable performance and simplifying the design process.



## 2 Key Specifications for Digital Isolators

Getting started on designing an isolated system is an exciting step, and understanding your system's specific requirements is the key to unlocking a successful project. Take the first step towards creating a safe, efficient, and reliable system by focusing on the key specifications below that are commonly associated with isolated design. These key specifications can be broadly categorized into two types: Operational specifications, which define the system's performance and functionality, and certification specifications, which ensure compliance with regulatory standards:

### 2.1 Operational Specifications

**Working Voltage (VIOWM):** Maximum continuous RMS or DC voltage that an isolator can withstand over lifetime of the isolator, specified by IEC 60747-17 / VDE 0884-17.

**Maximum Surge Isolation Voltage (VIOSM):** Maximum peak of a standardized surge pulse (usually 1.2/50 us) that the isolator can tolerate without failure, specified by IEC 60747-17 / VDE 0884-17 and IEC 61000-4-5. This parameter represents direct and indirect lightning strikes and helps to determine basic or reinforced isolation ratings for a device.

**Maximum Repetitive Peak Voltage (VIORM):** Maximum repetitive peak voltage that can be continuously applied across the isolation barrier over lifetime without degradation, specified by IEC 60747-17 / VDE 0884-17. This spec helps quantify the ability of an isolator to handle high voltage across the barrier on a continuous, daily basis.

**Common-Mode Transient Immunity (CMTI):** The maximum rate of change of common-mode voltage (dV/dt) between isolated sides at which the isolator still switches correctly with no bit errors, specified by IEC 60747-17 / VDE 0884-17.

### 2.2 Certification Specifications

**Creepage:** Creepage is the shortest distance along the surface of a solid insulation material between two sides of the isolation barrier; typically set by safety standards such as IEC 60664-1 and IEC 60601-1 for required spacing at a given working voltage

**Isolation Withstand Voltage (VISO):** RMS test voltage that the isolator must withstand for 60s without isolation barrier breakdown, typically defined by UL1577; referenced alongside IEC 60747-17 / VDE 0884-17

### 3 Selecting a Digital Isolator

#### 3.1 Digital Isolator Decision Tree

Figure 3-1 shows the digital isolation selection decision tree. Start with the general-purpose digital isolator and follow the questions to select a digital isolator for an application.

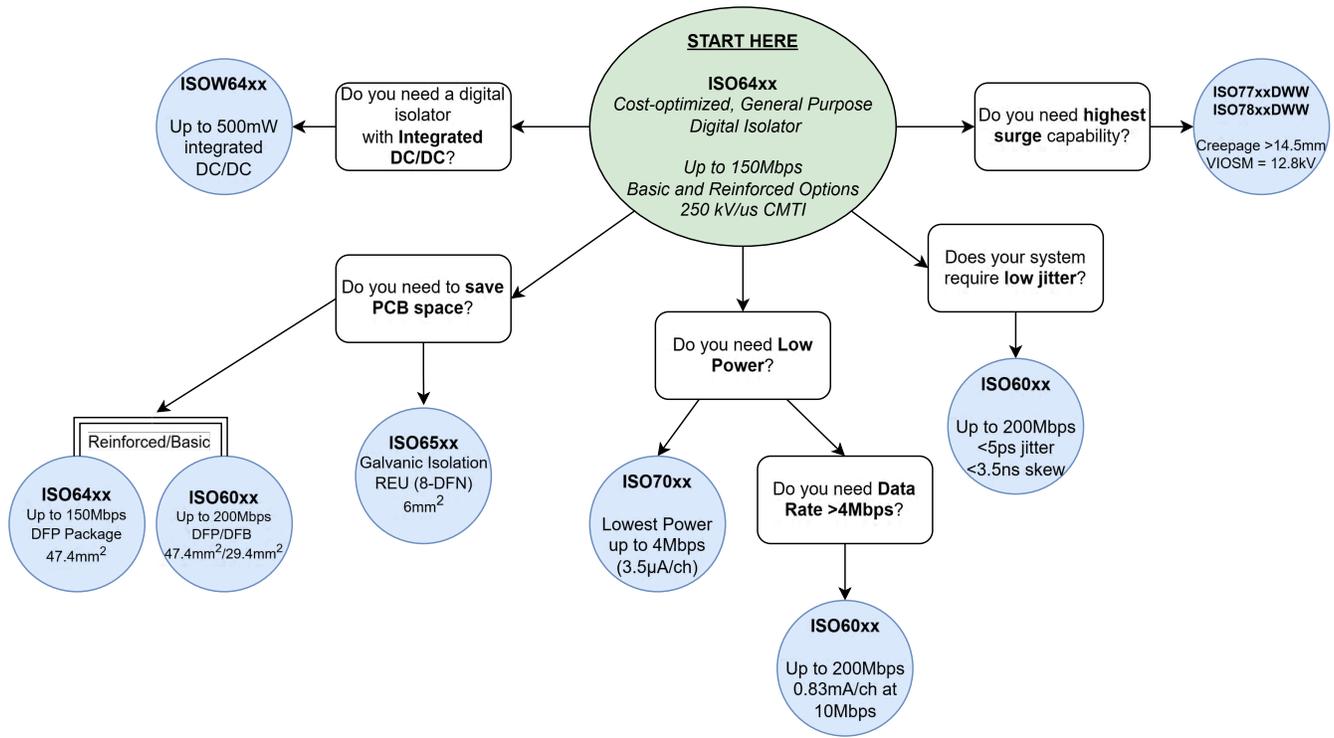


Figure 3-1. Digital Isolator Decision Tree

For more devices, browse through the [online parametric tool](#) to sort by desired voltage, channel numbers, and other features.

### 3.2 Package Options

TI Digital Isolators come in a range of package options to fit different applications. Smaller packages such as REU are preferred for space-constrained designs with lower isolation requirements, while larger options such as DWW offer higher isolation ratings and creepage distances for more demanding applications.

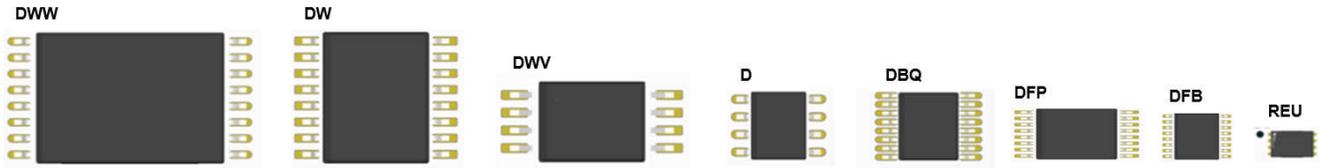


Figure 3-2. Package Options

Table 3-1. Mechanical Specifications of Package Options

Package	Isolation Rating	Creepage	X	Y	Area	Pitch
		(mm)	(mm)	(mm)	(mm <sup>2</sup> )	(mm)
<b>16-DWW</b>	Reinforced	>14.5	17.25	10.3	177.7	1.27
<b>16-DW</b>	Reinforced, Basic	>8.15	10.3	10.3	106.1	1.27
<b>8-DWV</b>	Reinforced	>8.5	11.5	5.85	67.3	1.27
<b>16-DFP</b>	Reinforced, Basic	>8	10.3	4.6	47.4	0.5
<b>16-DFB</b>	Reinforced, Basic	>4	6	4.15	29.4	0.5
<b>8-D</b>	Basic, Galvanic	>4	6	4.9	29.4	1.27
<b>16-DBQ</b>	Reinforced, Basic, Galvanic	>3.7	6	4.9	29.4	0.635
<b>8-REU</b>	Galvanic	>2.2	3	2	6	0.5

For more devices, browse through the [online parametric tool](#) to sort by desired voltage, channel numbers, and other features.

## 4 Device Families and Key Specifications

### 4.1 Digital Isolators

**Table 4-1. Digital Isolator Selection Table**

Device Family	Device	Isolation Rating	Working Voltage (VIOWM)	Surge Isolation Rating (VIOSM)	Data Rate (Mbps)	Common-Mode Transient Immunity (CMTI)	Power Consumption (1Mbps, max)	Package Options	Automotive
ISO60x	ISO6041	Reinforced	1061Vrms	10.4Vpk	200Mbps	±50kV/μs minimum	1Mbps: 0.635mA/Channel	16-DW	No
ISO64xx	ISO6441	Reinforced	1061Vrms	10.4Vpk	150Mbps	±200kV/μs minimum	1Mbps: 2.25mA/Channel	16-DW	No
								16-DBQ	
								16-DFP	
ISO65xx	ISO6541	Galvanic	400Vrms	Galvanic	50Mbps	±150kV/μs	1Mbps: 2.4mA/Channel	16-DBQ	Yes
ISO70xx	ISO7041	Basic	400Vrms	4kVpk	4Mbps	±100kV/μs	1Mbps: 138.7μA/Channel	16-DBQ	Yes
								16-DW	
ISO77xx	ISO7741DWW	Reinforced	2000Vrms	12.8kVpk	100Mbps	±100kV/μs	1Mbps: 2.3mA/Channel	16-DBQ	Yes
								16-DW	
								16-DWW	
ISO78xx	ISO7841DWW	Reinforced	1500Vrms	12.8kVpk	100Mbps	±100kV/μs	1Mbps: 2.35mA/Channel	16-DW	No
								16-DWW	

For more devices, browse through the [online parametric tool](#) to sort by desired voltage, channel numbers, and other features.

### 4.2 Digital Isolators with Integrated DC/DC Converters

**Table 4-2. Digital Isolator with Integrated DC/DC Selection Table**

Device Family	Device	Isolation Rating	Working Voltage (VIOWM)	Surge Isolation Rating (VIOSM)	Data Rate	Load Current (5V-5V)	VISO Accuracy (5VDO) At 10mA Load	Ripple with 20μF Output Capacitor (mV pk-pk)	I/O Voltage Support (Min)	Power Converter Enable/Disable	Package Options	Automotive
ISOW64xx	ISOW6441	Reinforced	1061Vrms	10.4kVpk	150Mbps	110mA	4.75V to 5.25V	30mV	2.5V	No	16-DWE	Yes
ISOW77xx	ISOW7741	Reinforced	1061Vrms	10.4kVpk	100Mbps	110mA	4.75V to 5.25V	24mV	1.171V	Available for 2-channel (ISOW7721)	20-DFM	Yes

For more devices, browse through the [online parametric tool](#) to sort by desired voltage, channel numbers, and other features.

### 4.3 Channel Count and Package Configurations

		ISOW7721			ISOW7740	ISOW7741	ISOW7742						DFM	Package Options	
						ISOW6441	ISOW6442						DWE		
ISO7810	ISO7820	ISO7821	ISO7830	ISO7831	ISO7840	ISO7741 ISO7841	ISO7842						DWW		
ISO7710	ISO7720	ISO7721	ISO7730	ISO6431 ISO7731	ISO6040 ISO6440 ISO7740	ISO6041 ISO6441 ISO7741	ISO6042 ISO6442 ISO7742	ISO6060 ISO6460 ISO7760	ISO6061 ISO6461 ISO7761	ISO6062 ISO6462 ISO7762	ISO6063 ISO6463 ISO7763		DW		
				ISO6431	ISO6040 ISO6440	ISO6041 ISO6441	ISO6042 ISO6442	ISO6060	ISO6061	ISO6062	ISO6063		DFP		
	ISO6020	ISO6021			ISO6040	ISO6041	ISO6042	ISO6060	ISO6061	ISO6062	ISO6063		DFB		
	ISO6420	ISO6421											DWV		
			ISO7730	ISO6431 ISO7731	ISO6040 ISO6440 ISO6540 ISO7740	ISO6041 ISO6441 ISO6541 ISO7741	ISO6042 ISO6442 ISO6542 ISO7742	ISO7760	ISO7761	ISO7762	ISO7763		DBQ		
ISO7710	ISO6020 ISO6420 ISO6520 ISO7720	ISO7021 ISO6021 ISO6421 ISO7721											D		
	ISO6520	ISO6521											REU		
<b>1:0</b>	<b>2:0</b>	<b>2:1</b>	<b>3:0</b>	<b>3:1</b>	<b>4:0</b>	<b>4:1</b>	<b>4:2</b>	<b>6:0</b>	<b>6:1</b>	<b>6:2</b>	<b>6:3</b>				
1 Channel	2 Channel		3 Channel		4 Channel			6 Channel							
<b>Channel Count and Configuration</b>															
General purpose		Small Package			Ultra-low power			High Data-rate			Integrated DC/DC				

**Figure 4-1. Digital Isolator Channel Count and Package Options Table**

For more devices, browse through the [online parametric tool](#) to sort by desired voltage, channel numbers, and other features.

## 5 Additional Resources

- Read the datasheets for TI's
- Read TI's white paper, "[High-voltage reinforced isolation: Definitions and test methodologies.](#)"
- Learn more about isolation with TI's [Isolation Glossary](#)
- [Digital Isolator Design Guide](#)
- [Top Design Questions About Digital Isolators](#)
- [Digital Isolators - Top Questions, Answered - TI E2E support forums](#)
- Check out more TI Digital Isolators on the [Online Parametric Tool](#)
- Need additional assistance? Ask our engineers a question on the [TI E2E™ Isolation Support Forum](#)

## 6 Summary

In summary, TI's digital isolators deliver safe, high-speed signal isolation with robust protection for sensitive electronics. Leveraging advanced isolation technology, digital isolators eliminate ground loops, suppress noise, and boost system reliability in even the toughest industrial, automotive, and power-conversion environments. Low-power operation, long life-span, and strict safety certifications make TI digital isolators a dependable, standards-compliant choice. This application note equips you with the guidance you need to select the right TI digital isolator, helping you simplify your design process while achieving reliable, high-performance results.

## 7 References

1. Texas Instruments, [Digital Isolator Design Guide](#), application note.
2. Texas Instruments, [Top 9 Design Questions about Digital Isolators](#), technical article.
3. Texas Instruments, [Considerations for Selecting Digital Isolators](#), application brief.
4. Texas Instruments, [Improve Your System Performance by Replacing Optocouplers with Digital Isolators](#), technical white paper.

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