

What is an opto-emulator?

TI Precision Labs: Opto-emulators

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Agenda

1. Background: Optocouplers
2. What is New? Opto-Emulators!
3. How do opto-emulators work?
4. What are the different opto-emulator families?
5. Quiz questions

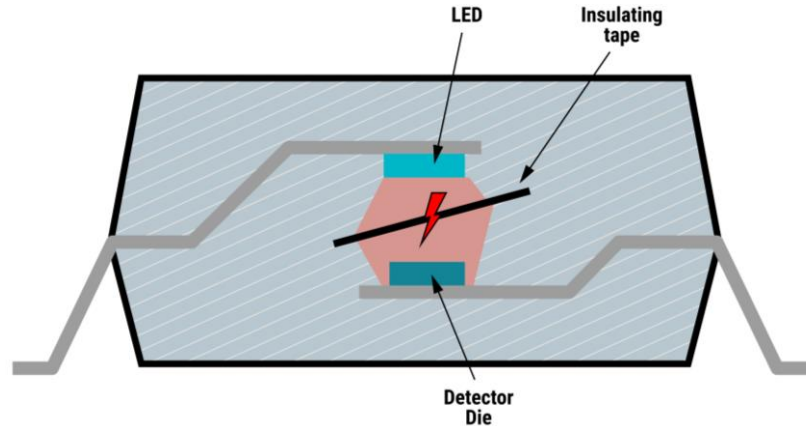
Background: Optocouplers

What are optocouplers?

- Used since the 1970s, optocouplers are semiconductor devices that allows for the transmission of a signal between two isolated circuits
- Uses an LED to transmit digital or analog signals across an isolation barrier where a phototransistor detects the signal on the other side

What are optocouplers used for?

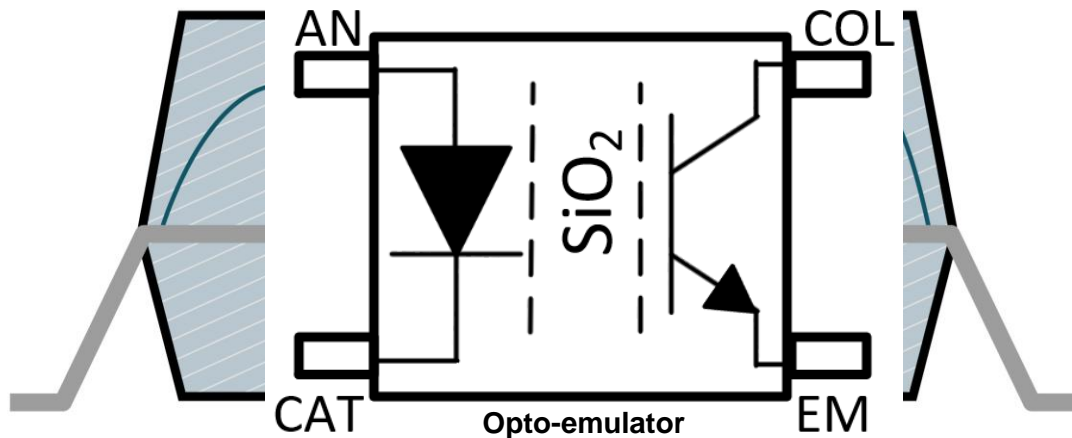
- Provide galvanic signal isolation for industrial and automotive applications



What is New? Opto-emulators!

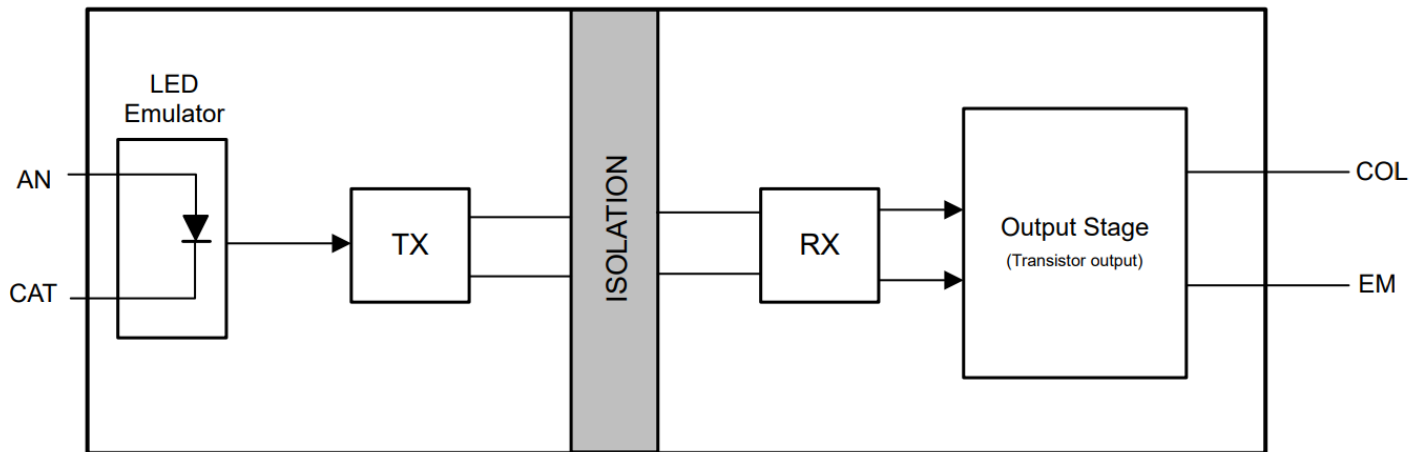
What are opto-emulators?

- Pin-to-pin and behave just like optocouplers
- SiO_2 insulation material allows for high-voltage reliability
- Combines the benefits of traditional optocouplers with TI's SiO_2 -based isolation technology
- Opto-emulator transmit and receive circuits enhance the electrical characteristics in comparison to optocouplers
- Can directly replace optocouplers in existing designs or systems.



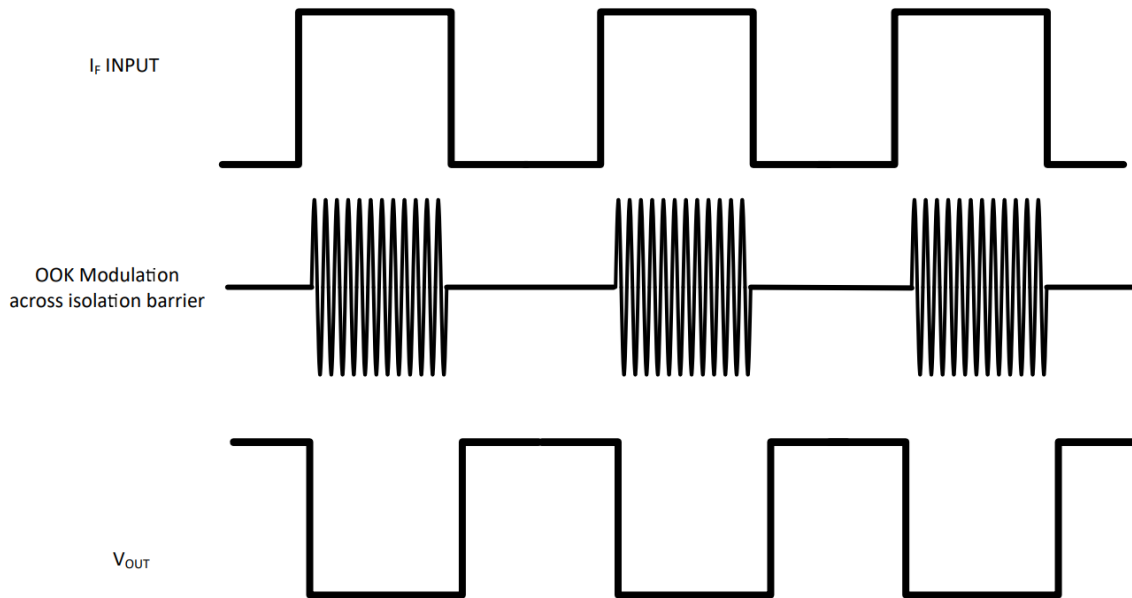
How do opto-emulators work?

- The input side contains a diode emulator
 - Takes a current driven input
 - Have same forward voltage drop that optocouplers have
 - No system modifications are required to replace optocouplers with opto-emulators



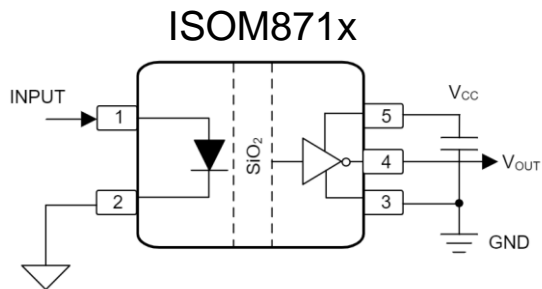
How do opto-emulators work?

- The input signal is transmitted across the isolation barrier using on-off keying (OOK) modulation scheme
 - Transmit side sends a high frequency carrier signal across the barrier.
 - Receive side demodulates OOK signal and produces output signal

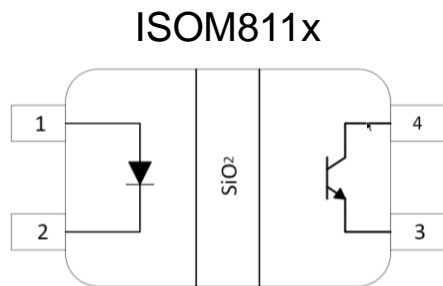


What are the different opto-emulator families?

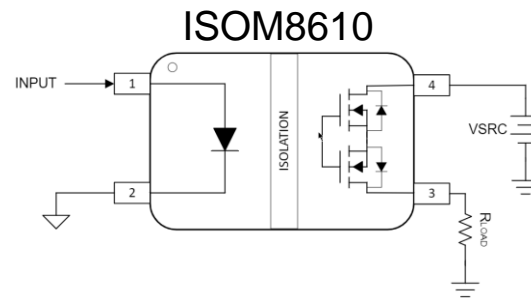
Digital output opto-emulator



Analog output opto-emulator



Isolated switch opto-emulator



Quiz question #1

What modulation scheme do opto-emulators use in order to transmit signals across the isolation barrier?

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The on-off keying modulation scheme

Quiz question #2

What TI technology allows for opto-emulators to have high-voltage reliability?

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What TI technology allows for opto-emulators to have high-voltage reliability?

Silicon dioxide (SiO_2) insulation material

Thank You for Watching!

To find more opto-emulator technical resources and search products, visit ti.com/isolation