

Optical Isolation for Solar Power Applications



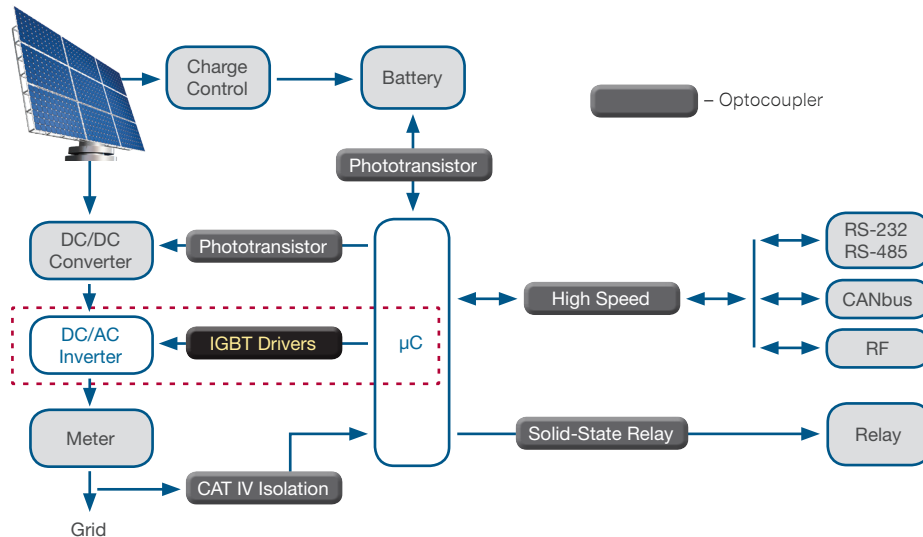
FEATURES

- Wide operating voltages available
- High operating temperature
- Broad range of surface-mount and through-hole package types
- Single- and dual-channel products
- Low on-resistance
- High isolation and high creepage distances

RESOURCES

- Optocoupler product portfolio: <http://www.vishay.com/optocouplers/>
- Optical isolation solar power video: <http://www.vishay.com/videos/optoelectronics/solar-power>
- Complete optoelectronics product portfolio: <http://www.vishay.com/optoelectronics/>
- Technical support: optocoupleranswers@vishay.com
- Sales contacts: <http://www.vishay.com/company/contacts/>

Isolated DC/AC Inverters

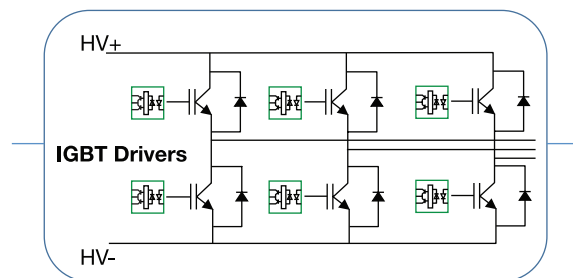


IGBT Drivers

Optically isolated IGBT drivers are used to isolate the high voltage stage of an DC/AC inverter from the low voltage control circuitry. Isolation is required for safety purposes because string inverters are inverting a high voltage DC output from the solar panels to a high voltage output that will be fed to the utility grid. This high voltage must be isolated from the user-accessible low voltage circuitry. Optically isolated IGBT drivers also allow the designers to separate low noise control circuitry from noisy high voltage and high current circuitry, which improves performance, shrinks product size, and simplifies the design process.

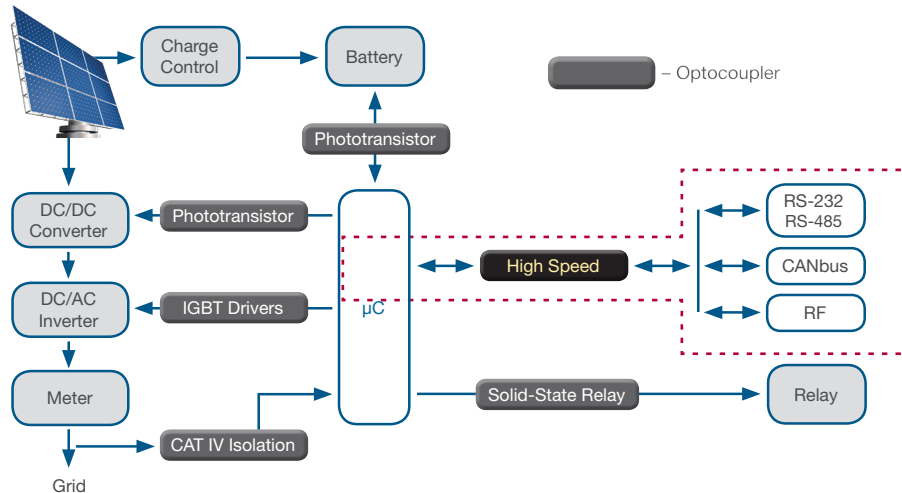
Features

- Widest operating voltage from 15 V to 32 V
- High operating temperature up to 110 °C
- Low input supply current of 2.5 mA or less
- Leading isolation voltage of 5300 V_{RMS}
- Under-voltage lockout with hysteresis



Part Number	Output Current I _O (A)	Operating Voltage Range V _{CC} (V)	Pulse Width Distortion PWD max. (µs)	Supply Current I _{CC} (mA)	Common Mode Transient Immunity CMTI min. (kV/µs)	V _{IORM} (V)	External Creepage Distance (mm)
VO3120	2.5	15 to 32	0.2	2.5	25	890	> 7
VO3150A	0.5					> 7	
VOW3120	2.5		0.3		48	1414	> 10
VOL3120	2.5		> 8				
VOD3120AB/D/G	2.5	15 to 30	0.07	3.5	35	891	> 7

Isolated Communication Ports

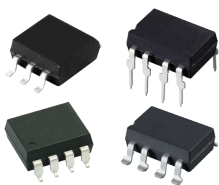
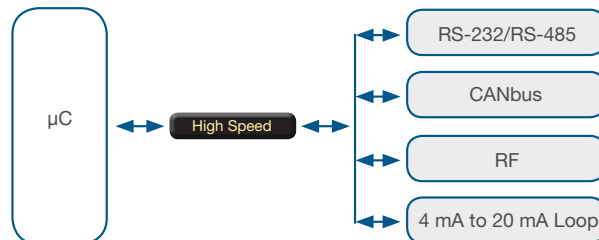


High Speed Analog and Digital Optocouplers

I/O communications ports in string inverters require isolation for safety and for minimizing the RF noise that can be created when noise coupling turns communication cables into highly efficient antennas for RF emissions. The use of optical isolation can quickly and easily eliminate extremely expensive EMI / RFI complications and reduce design risk. In other words, a pinch of optocouplers can be worth a pound of ferrite beads and copper shielding!

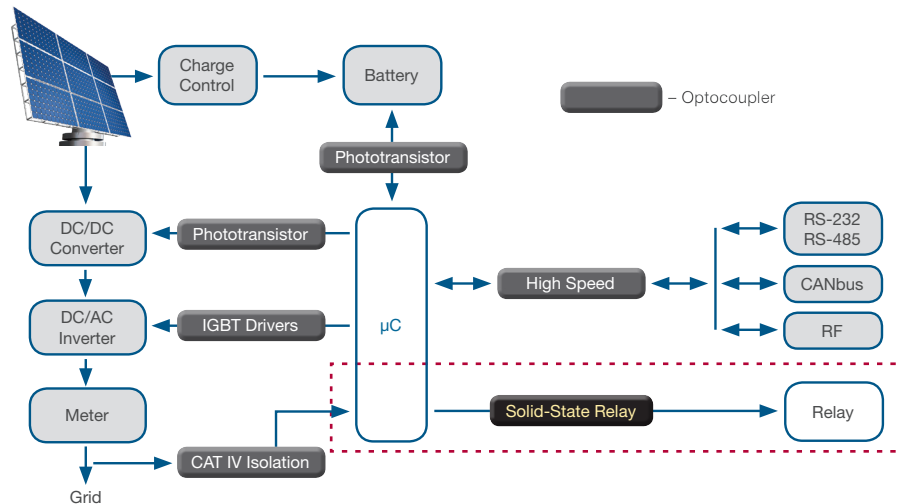
Features

- Broad range of surface-mount package types
- Single- and dual-channel
- Data rate of 1 MBd and 10 MBd
- Test isolation voltage up to 5300 V_{RMS}
- High common mode transient immunity
- Very high working voltage up to 1414 V
- Very high transient isolation voltage up to 8000 V



Part Number	Data Rate	Package	Key Features
VOM452T VOM453T	1 MBd	SOP-5	Small package footprint
SFH6325	1 MBd	DIP-8, SMD-8	≥ 7 mm creepage distance
VOH1016AB/D/G	1 MBd	DIP-6, SMD-6	Schmitt-Trigger output, Low power supply
VOW135 VOW136	1 MBd	DIP-8 widebody, SMD-8 widebody	Creepage > 10 mm, CMR of 1000 V/µs
VO0661T	10 MBd	SOIC-8	Dual-channel, CMR of 25 kV/µs
VOW137 VOW2611	10 MBd	DIP-8 widebody, SMD-8 widebody	Creepage > 10 mm, CMR of 40 kV/µs (typ.)

Isolated Relays and Alarms

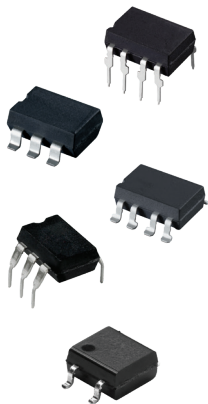
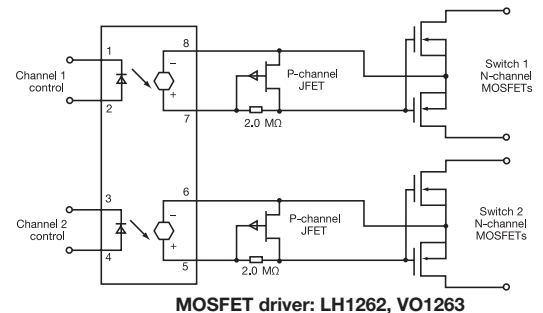
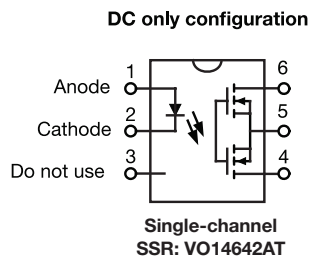


Solid-State Relays and MOSFET Drivers

It is common to include relay contact outputs for actuation of external devices, such as audible alarms in case of power outages and fans for auxiliary cooling. While mechanical relays can be used in these applications, it is more reliable to use optically isolated solid-state relays. In addition to Vishay's broad selection of SSRs, customers also have the option of using MOSFET drivers to build a custom relay using discrete standard MOSFETs.

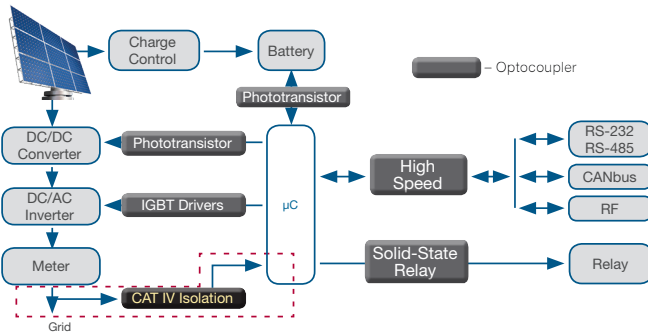
Features

- Single- and dual-channel options
- Packages include DIP, SMD, and SOP
- Low R_{ON}
- High open circuit voltage
- High short circuit current
- Isolation test voltage up to 5300 V_{RMS}



Part Number	Function	Package	Output	R_{ON} Typical (Ω)	t_{on} / t_{off} (μs)	I/O Isolation (V_{RMS})
VO14642AT	SSR, Low R_{ON}	SMD-6 DIP-6	1 Form A	0.18	370 / 50	5300
VO1400AEFTR	SSR, Multi-purpose	SOP-4	1 Form A	2.3	52 / 36	3750
Part Number	Function	Package	Open Circuit Voltage Typ. (V)	Short Circuit Current Typ. (μA)	t_{on} / t_{off} $I_F = 20 mA$ (μs)	I/O Isolation (V_{RMS})
LH1262	MOSFET Driver	SMD-8	13.9	6.9	35 / 90	5300
VO1263		DIP-8	14.7	21	16 / 472	5300
VOM1271T		SOP-4	8.7	30	53 / 24	3750

CAT IV Isolation



IEC/EN 61010-1 Overvoltage Protection Category	Transient Test Voltage
CAT II 600 V	4000 V
CAT III 300 V	
CAT III 600 V	6000 V
CAT IV 300 V	
CAT III 1000 V	8000 V
CAT IV 600 V	

High-Voltage Optocouplers

Isolation requirements vary depending on the device's installation category. As shown in the diagram, Category IV devices are connected to utility power. To protect low voltage electronics from high voltage power, ordinary optocouplers may not be sufficient. For CAT IV, AC isolation should be at least 8000 V.

Features

- AC isolation of 8200 V_{RMS} minimum
- Distance through insulation > 3 mm
- VDE 0160 and VDE 0884 for electrical power installation
- IEC 60065 for mains-operated electronics

CNY6XX Ultra High Isolation High Creepage Couplers

Features

- DTI > 3 mm
- V_{IOTM} = 12 000 V
- Phototransistor output
- SMD or through-hole

	CNY64x	CNY65x	CNY66x
Creepage	9.5 mm	14.0 mm	17.0 mm

Ordering Information

Package	Through-Hole			
	Current Transfer Ratio % (CTR)			
	50 to 300	63 to 125	100 to 200	100 to 300
DIP-4 HV	CNY64	CNY64A	CNY64B	-
	CNY65	CNY65A	CNY65B	CNY651AGR
	CNY66	-	CNY66B	-

Package	Surface-Mount (SMD)			
	Current Transfer Ratio % (CTR)			
	50 to 300	50 to 150	80 to 240	100 to 300
SMD-4 HV	CNY64ST	CNY64AYST	CNY64ABST	CNY64AGRST
	CNY65ST	CNY65AYST	CNY65ABST	CNY65AGRST
	-	CNY651AYST	-	CNY651AGRST

VOWXX Widebody, High Isolation and High Creepage Couplers

Features

- Widebody package with > 10 mm clearance and creepage distance
- High working voltage up to 1414 V
- High transient voltage of 8000 V
- Data rate of 1 MBd and 10 MBd
- High operating temperature up to 100 °C
- Extremely high common mode transient immunity up to 40 kV/µs (typ)

Ordering Information

Widebody High Isolation and High Speed Optocouplers			
Part Number	Data Rate	Package	Key Features
VOW137 VOW2611	10 MBd	Widebody, DIP-8, SMD-8	<ul style="list-style-type: none"> • Creepage > 10 mm • V_{IORM} = 1414 V • V_{IORM} = 8000 V
VOW135 VOW136	1 MBd	Widebody, DIP-8, SMD-8	<ul style="list-style-type: none"> • Creepage > 10 mm • V_{IORM} = 1414 V • V_{IORM} = 8000 V