The H11D1, H11D2, H11D3, H11D4 are optocouplers with

very high BV_{CER}. They are intended for telecommunications

applications or any DC application requiring a high blocking

The H11D1, H11D2 are identical and the H11D3, H11D4 are

Vishay Semiconductors

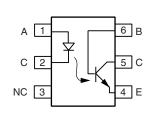


Optocoupler, Phototransistor Output, with Base Connection, High BV_{CER} Voltage



DESCRIPTION

identical.



FEATURES

- • CTR at I_F = 10 mA, BV_{CER} = 10 $V\!:$ \geq 20 %
- Good CTR linearly with forward current
- · Low CTR degradation
- Very high collector emitter breakdown voltage
 - H11D1/H11D2, BV_{CER} = 300 V
 - H11D3/H11D4, BV_{CER} = 200 V
- Isolation test voltage: 5300 V_{RMS}
- · Low coupling capacitance
- · High common mode transient immunity
- · Package with base connection
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

AGENCY APPROVALS

- UL1577, file no. E52744 system code H or J, double protection
- DIN EN 60747-5-5 (VDE 0884) available with option 1
- BSI IEC 60950; IEC 60065
- FIMKO

APPLICATIONS

- Telecommunications
- · Replace relays

ORDER INFORMATION					
PART	REMARKS				
H11D1	CTR > 20 %, DIP-6				
H11D2	CTR > 20 %, DIP-6				
H11D3	CTR > 20 %, DIP-6				
H11D4	CTR > 20 %, DIP-6				
H11D1-X007	CTR > 20 %, SMD-6 (option 7)				
H11D1-X009	CTR > 20 %, SMD-6 (option 9)				
H11D2-X007	CTR > 20 %, SMD-6 (option 7)				
H11D3-X007	CTR > 20 %, SMD-6 (option 7)				

Note

For additional information on the available options refer to option information.

ABSOLUTE MAXIMUM RATINGS									
PARAMETER TEST CONDITION PART SYMBOL VALUE UN									
INPUT									
Reverse voltage			V_R	6	V				
DC forward current			I _F	60	mA				
Surge forward current	t ≤ 10 μs		I _{FSM}	2.5	Α				
Power dissipation			P _{diss}	100	mW				







Optocoupler, Phototransistor Vishay Semiconductors Output, with Base Connection, High BV_{CER} Voltage

ABSOLUTE MAXIMUM RATINGS								
PARAMETER	TEST CONDITION	PART	SYMBOL	VALUE	UNIT			
OUTPUT								
		H11D1	V _{CE}	300	V			
Collector emitter voltage		H11D2	V _{CE}	300	V			
Collector emitter voltage		H11D3	V _{CE}	200	V			
		H11D4	V _{CE}	200	V			
		H11D1	V _{CBO}	300	V			
Callector base valtage		H11D2	V _{CBO}	300	V			
Collector base voltage		H11D3	V_{CBO}	200	V			
		H11D4	V _{CBO}	200	V			
Emitter base voltage			V_{BEO}	7	V			
Collector current			Ic	100	mA			
Power dissipation			P _{diss}	300	mW			
COUPLER								
Isolation test voltage between emitter and detector			V _{ISO}	5300	V_{RMS}			
Insulation thickness between emitter and detector				≥ 0.4	mm			
Creepage distance				≥ 7	mm			
Clearance distance				≥ 7	mm			
Comparative tracking index	per DIN IEC 112/VDE 0303, part 1			175				
la dation variations	V _{IO} = 500 V, T _{amb} = 25 °C		R _{IO}	≥ 10 ¹²	Ω			
Isolation resistance	V _{IO} = 500 V, T _{amb} = 100 °C		R _{IO}	≥ 10 ¹¹	Ω			
Storage temperature range			T _{stg}	- 55 to + 150	°C			
Operating temperature range			T _{amb}	- 55 to + 100	°C			
Junction temperature			Tj	100	°C			
Soldering temperature	max. 10 s, dip soldering: distance to seating plane ≥ 1.5 mm		T _{sld}	260	°C			

Note

 T_{amb} = 25 °C, unless otherwise specified.

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

ELECTRICAL CHARACTERISTCS								
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT	
INPUT								
Forward voltage	I _F = 10 mA		V _F		1.1	1.5	V	
Reverse voltage	I _R = 10 μA		V _R	6			V	
Reverse current	V _R = 6 V		I _R		0.01	10	μΑ	
Capacitance	V _R = 0 V, f = 1 MHz		Co		25		pF	
Thermal resistance			R _{thJA}		750		K/W	

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ELECTRICAL CHARACTERISTCS								
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT	
OUTPUT								
		H11D1	BV _{CER}	300			V	
Collector emitter breakdown voltage	$I_{CE} = 1 \text{ mA}, R_{BE} = 1 \text{ M}\Omega$	H11D2	BV _{CER}	300			V	
Collector enlitter breakdown voltage	ICE = I IIIA, NBE = I IVISZ	H11D3	BV _{CER}	200			V	
		H11D4	BV _{CER}	200			V	
Emitter base breakdown voltage	I _{EB} = 100 μA		BV _{EBO}	7			V	
Collector emitter capacitance	V _{CE} = 10 V, f = 1 MHz		C _{CE}		7		pF	
Collector base capacitance	V _{CB} = 10 V, f = 1 MHz		C _{CB}		8		pF	
Emitter base capacitance	V _{EB} = 5 V, f = 1 MHz		C _{EB}		38		pF	
Thermal resistance			R _{th}		250		K/W	
COUPLER								
Coupling capacitance			C _C		0.6		pF	
Current transfer ratio	$I_F = 10 \text{ mA}, V_{CE} = 10 \text{ V},$ $R_{BE} = 1 \text{ M}\Omega$		I _C /I _F	20			%	
Collector emitter, saturation voltage	$I_F = 10 \text{ mA}, \ I_C = 0.5 \text{ mA}, \\ R_{BE} = 1 \text{ M}\Omega$		V _{CEsat}		0.25	0.4	V	
	V 200 V D 1 MO	H11D1	I _{CER}			100	nA	
Collector emitter, leakage current	$V_{CE} = 200 \text{ V}, R_{BE} = 1 \text{ M}\Omega$	H11D2	I _{CER}			100	nA	
	$V_{CE} = 300 \text{ V}, R_{BE} = 1 \text{ M}\Omega,$	H11D1	I _{CER}			250	μΑ	
	T _{amb} = 100 °C	H11D2	I _{CER}			250	μΑ	

Note

 T_{amb} = 25 °C, unless otherwise specified.

Minimum and maximum values were tested requierements. Typical values are characteristics of the device and are the result of engineering evaluations. Typical values are for information only and are not part of the testing requirements.

CURRENT TRANSFER RATIO							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Current transfer ratio	$I_F = 10 \text{ mA}, V_{CE} = 10 \text{ V},$ $R_{BE} = 1 \text{ M}\Omega$		CTR	20			%

SWITCHING CHARACTERISTICS								
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT		
Turn-on time	I_C = 2 mA (to be adjusted by varying I_F), R_L = 100 Ω , V_{CC} = 10 V	t _{on}		5		μs		
Rise time	I_C = 2 mA (to be adjusted by varying I_F), R_L = 100 Ω , V_{CC} = 10 V	t _r		2.5		μs		
Turn-off time	I_C = 2 mA (to be adjusted by varying I_F), R_L = 100 Ω , V_{CC} = 10 V	t _{off}		6		μs		
Fall time	I_C = 2 mA (to be adjusted by varying I_F), R_L = 100 Ω , V_{CC} = 10 V	t _f		5.5		μs		

Note

Switching times measurement-test circuit and waveforms



Optocoupler, Phototransistor Output, with Base Connection, High BV_{CER} Voltage Vishay Semiconductors

TYPICAL CHARACTERISTICS

T_{amb} = 25 °C, unless otherwise specified

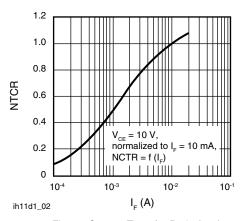


Fig. 1 - Current Transfer Ratio (typ.)

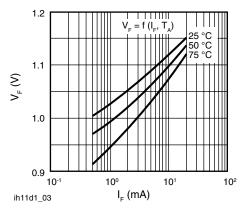


Fig. 2 - Diode Forward Voltage (typ.)

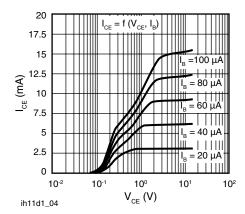


Fig. 3 - Output Characteristics

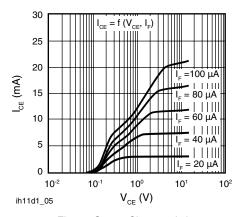


Fig. 4 - Output Characteristics

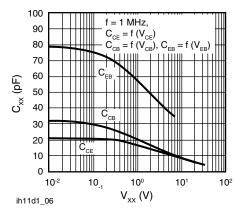


Fig. 5 - Transistor Capacitances (Typ.)

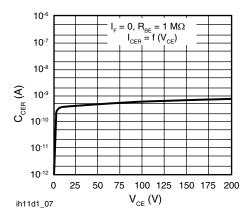


Fig. 6 - Collector Emitter Leakage Current (Typ.)

Vishay Semiconductors

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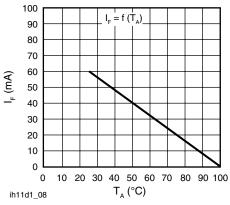


Fig. 7 - Permissible Loss Diode

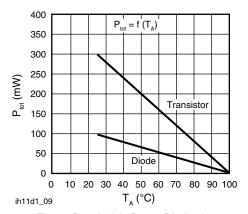
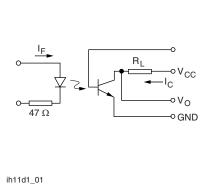


Fig. 8 - Permissible Power Dissipation



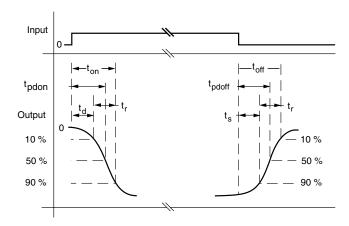
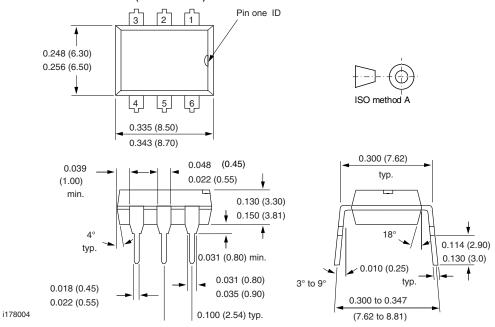


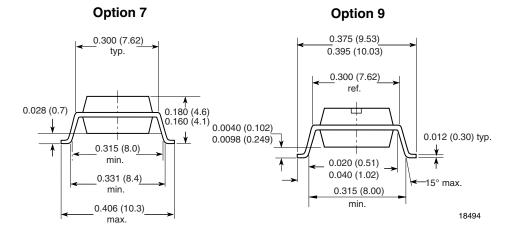
Fig. 9 - Switching Times Measurement-Test Circuit and Waveform

PACKAGE DIMENSIONS in inches (millimeters)





Optocoupler, Phototransistor Vishay Semiconductors Output, with Base Connection, High BV_{CER} Voltage



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Optocoupler, Phototransistor Output, with Base Connection, High BV_{CER} Voltage



OZONE DEPLETING SUBSTANCES POLICY STATEMENT

It is the policy of Vishay Semiconductor GmbH to

- 1. Meet all present and future national and international statutory requirements.
- 2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

- 1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively.
- 2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
- 3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design and may do so without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany



Vishay

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