



# 6-Pin DIP Optoisolators

## High Voltage Transistor Output (300 Volts)

The H11D1 and H11D2 consist of gallium arsenide infrared emitting diodes optically coupled to high voltage, silicon, phototransistor detectors in a standard 6-pin DIP package. They are designed for high voltage applications and are particularly useful in copy machines and solid state relays.

- **To order devices that are tested and marked per VDE 0884 requirements, the suffix "V" must be included at end of part number. VDE 0884 is a test option.**

### Applications

- Copy Machines
- Interfacing and coupling systems of different potentials and impedances
- Monitor and Detection Circuits
- Solid State Relays

### MAXIMUM RATINGS (T<sub>A</sub> = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
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#### INPUT LED

Forward Current — Continuous	I <sub>F</sub>	60	mA
Forward Current — Peak Pulse Width = 1 μs, 330 pps	I <sub>F</sub>	1.2	Amps
LED Power Dissipation @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	120 1.41	mW mW/°C

#### OUTPUT TRANSISTOR

Collector–Emitter Voltage	V <sub>CER</sub>	300	Volts
Emitter–Collector Voltage	V <sub>ECO</sub>	7	Volts
Collector–Base Voltage	V <sub>CBO</sub>	300	Volts
Collector Current — Continuous	I <sub>C</sub>	100	mA
Detector Power Dissipation @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	150 1.76	mW mW/°C

#### TOTAL DEVICE

Total Device Power Dissipation @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	250 2.94	mW mW/°C
Operating Temperature Range <sup>(3)</sup>	T <sub>J</sub>	–55 to +100	°C
Storage Temperature Range <sup>(3)</sup>	T <sub>stg</sub>	–55 to +150	°C
Soldering Temperature (10 s)	T <sub>L</sub>	260	°C
Isolation Surge Voltage Peak ac Voltage, 60 Hz, 1 Second Duration <sup>(1)</sup>	V <sub>ISO</sub>	7500	Vac(pk)

1. Isolation surge voltage is an internal device dielectric breakdown rating. For this test, Pins 1 and 2 are common, and Pins 4, 5 and 6 are common.
2. H11D1 is rated @ 5656 Volts peak (V<sub>ISO</sub>). H11D2 is rated @ 3535 Volts peak (V<sub>ISO</sub>)  
Otherwise they are identical, both parts built by Motorola are rated @ 7500 Volts peak (V<sub>ISO</sub>)
3. Refer to Quality and Reliability Section in Opto Data Book for information on test conditions.

**Preferred** devices are Motorola recommended choices for future use and best overall value.

GlobalOptoisolator is a trademark of Motorola, Inc.

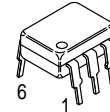
**H11D1\***

**H11D2**

[CTR = 20% Min]

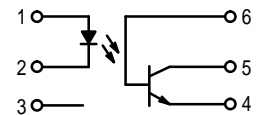
\*Motorola Preferred Device

### STYLE 1 PLASTIC



STANDARD THRU HOLE  
CASE 730A–04

### SCHEMATIC



- PIN 1. ANODE  
2. CATHODE  
3. N.C.  
4. EMITTER  
5. COLLECTOR  
6. BASE

# H11D1 H11D2

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)<sup>(1)</sup>

Characteristic	Symbol	Min	Typ <sup>(1)</sup>	Max	Unit
<b>INPUT LED</b> (T <sub>A</sub> = 25°C unless otherwise noted)					
Reverse Leakage Current (V <sub>R</sub> = 6 V)	I <sub>R</sub>	—	—	10	μA
Forward Voltage (I <sub>F</sub> = 10 mA)	V <sub>F</sub>	—	1.2	1.5	Volts
Capacitance (V = 0 V, f = 1 MHz)	C	—	18	—	pF

## OUTPUT TRANSISTOR (T<sub>A</sub> = 25°C and I<sub>F</sub> = 0 unless otherwise noted)

Collector–Emitter Dark Current (R <sub>BE</sub> = 1 MΩ) (V <sub>CE</sub> = 200 V, T <sub>A</sub> = 25°C) (T <sub>A</sub> = 100°C)	H11D1,2 H11D1,2	I <sub>CER</sub>	— —	— —	100 250	nA μA
Collector–Base Breakdown Voltage (I <sub>C</sub> = 100 μA)	H11D1,2	V <sub>(BR)CBO</sub>	—	—	300	Volts
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 1 mA, R <sub>BE</sub> = 1 MΩ)	H11D1,2	V <sub>(BR)CER</sub>	—	—	300	Volts
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 100 μA)		V <sub>(BR)EBO</sub>	7	—	—	Volts

## COUPLED (T<sub>A</sub> = 25°C unless otherwise noted)

Output Collector Current (V <sub>CE</sub> = 10 V, I <sub>F</sub> = 10 mA, R <sub>BE</sub> = 1 MΩ)	H11D1,2	I <sub>C</sub> (CTR) <sup>(2)</sup>	2 (20)	—	—	mA (%)
Surge Isolation Voltage (Input to Output) <sup>(3)</sup> Peak ac Voltage, 60 Hz, 1 sec		V <sub>ISO</sub>	7500	—	—	Vac(pk)
Isolation Resistance <sup>(3)</sup> (V = 500 V)		R <sub>ISO</sub>	—	10 <sup>11</sup>	—	Ohms
Collector–Emitter Saturation Voltage (I <sub>C</sub> = 0.5 mA, I <sub>F</sub> = 10 mA, R <sub>BE</sub> = 1 MΩ)		V <sub>CE(sat)</sub>	—	—	0.4	Volts
Isolation Capacitance <sup>(3)</sup> (V = 0, f = 1 MHz)		C <sub>ISO</sub>	—	0.2	—	pF
Turn-On Time	V <sub>CC</sub> = 10 V, I <sub>C</sub> = 2 mA, R <sub>L</sub> = 100 Ω	t <sub>on</sub>	—	5	—	μs
Turn-Off Time		t <sub>off</sub>	—	5	—	

1. Always design to the specified minimum/maximum electrical limits (where applicable).
2. Current Transfer Ratio (CTR) = I<sub>C</sub>/I<sub>F</sub> × 100%.
3. For this test, Pins 1 and 2 are common, and Pins 4, 5 and 6 are common.

## TYPICAL CHARACTERISTICS

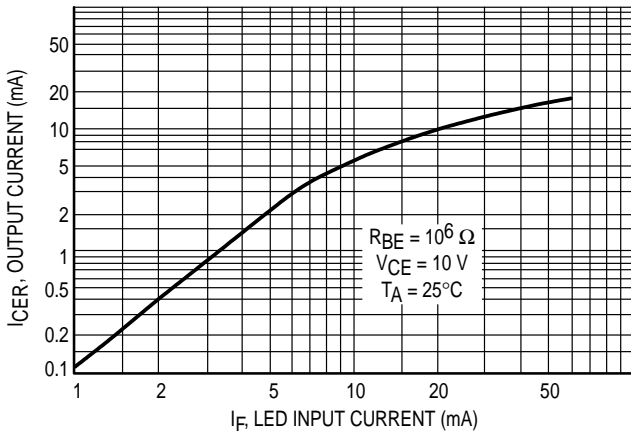


Figure 1. Output Current versus LED Input Current

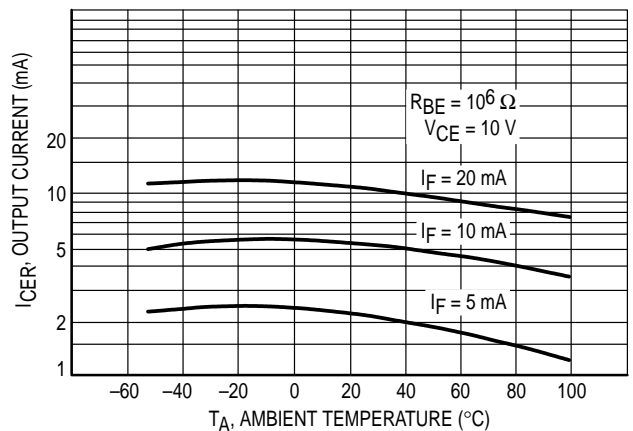
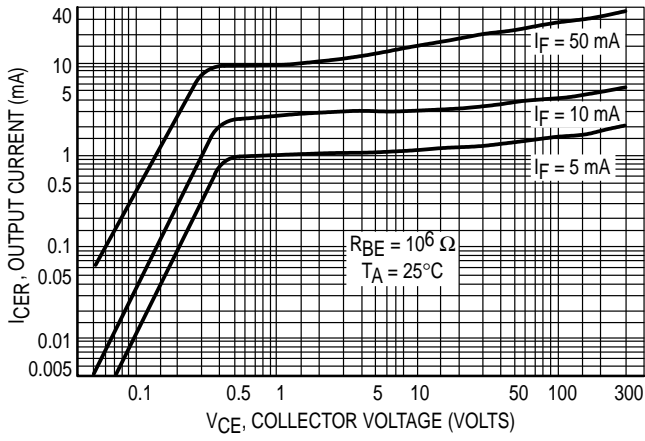
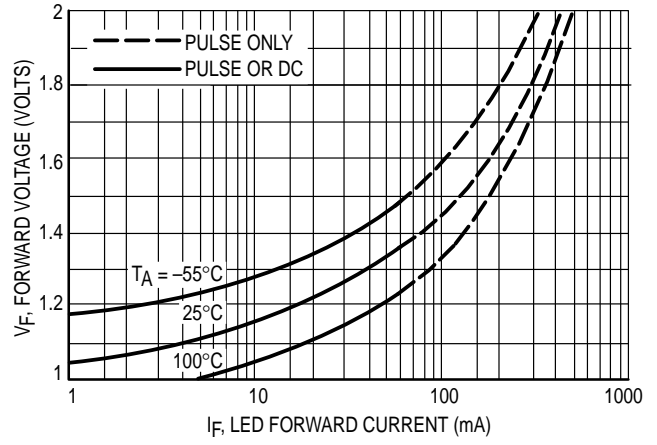


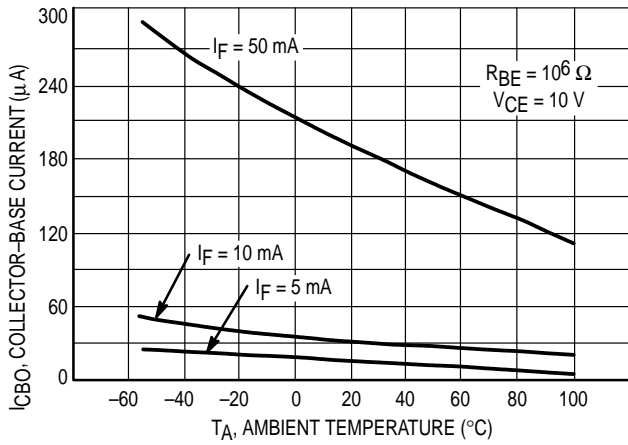
Figure 2. Output Current versus Temperature



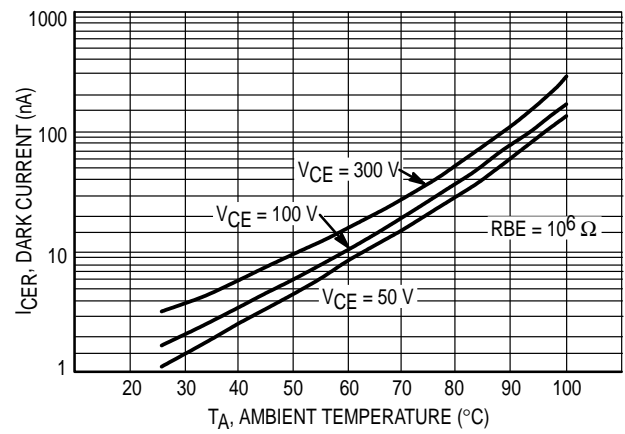
**Figure 3. Output Characteristics**



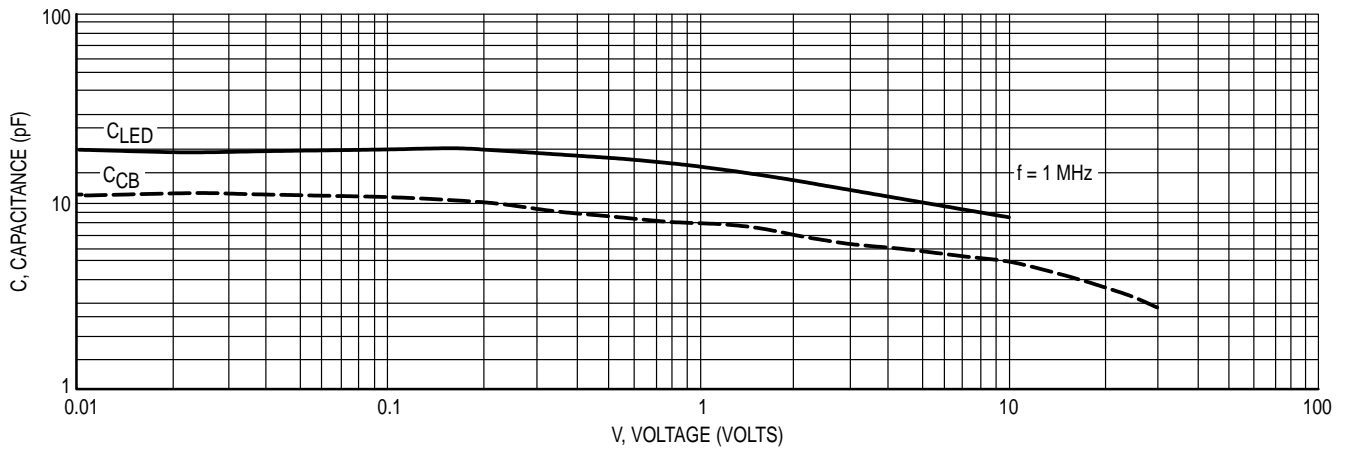
**Figure 4. Forward Characteristics**



**Figure 5. Collector-Base Current versus Temperature**



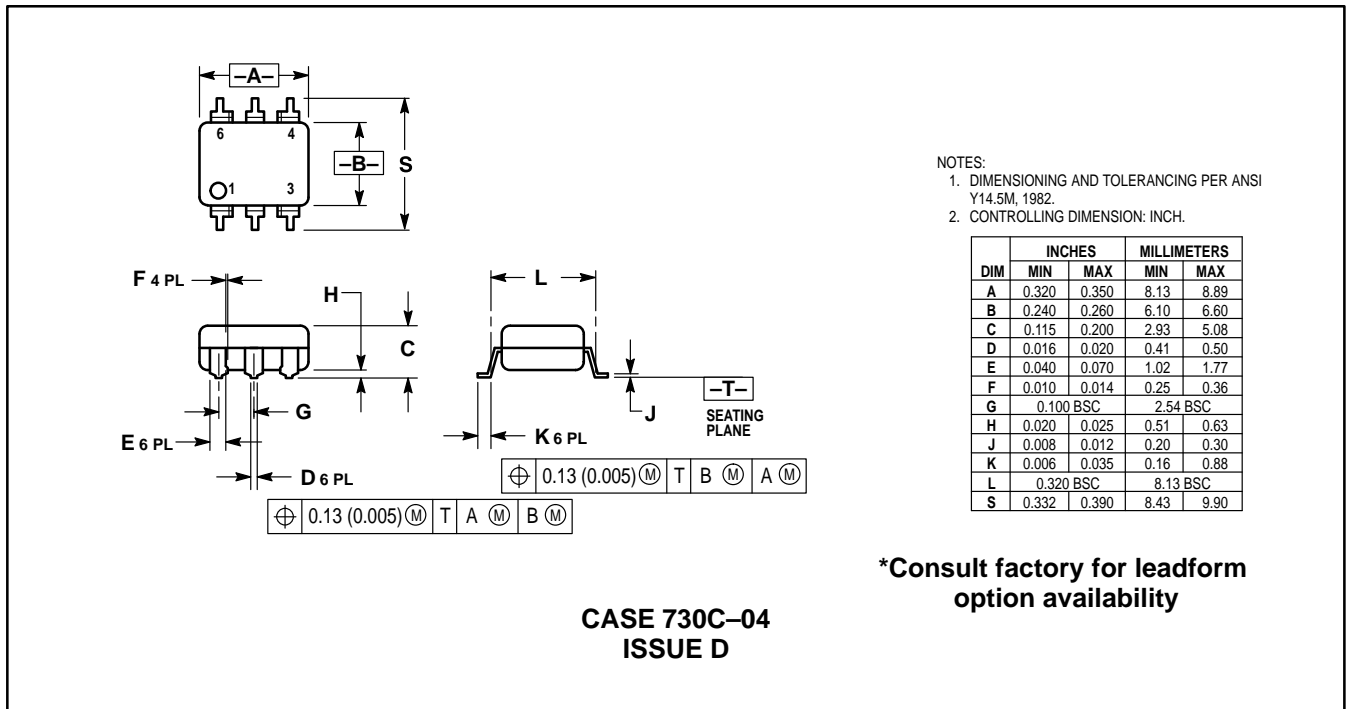
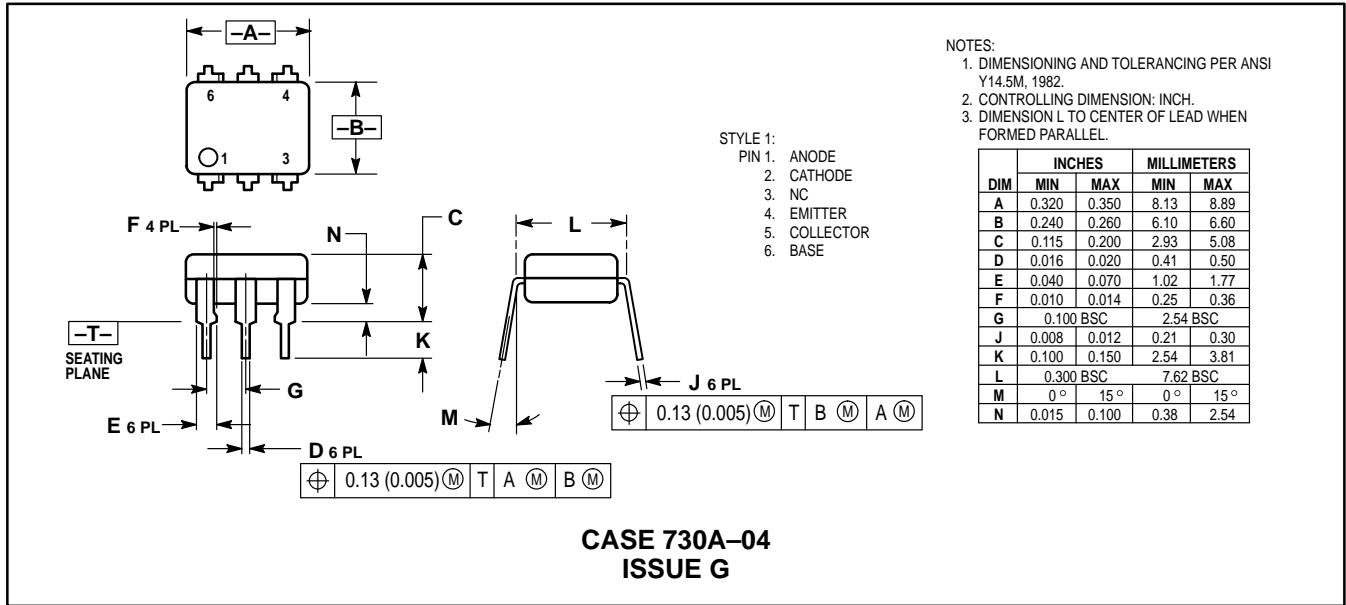
**Figure 6. Dark Current versus Temperature**

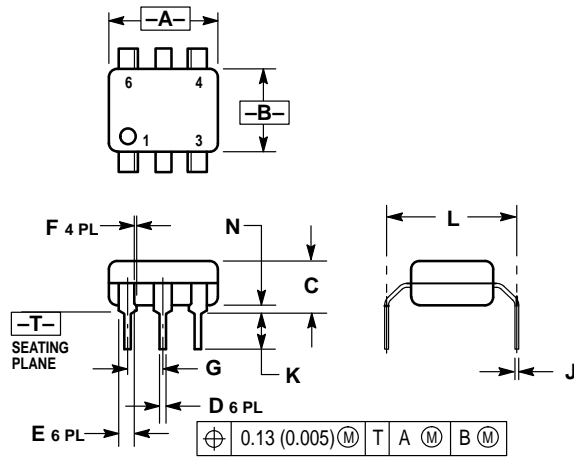


**Figure 7. Capacitance versus Voltage**

# H11D1 H11D2

## PACKAGE DIMENSIONS






- NOTES:  
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
 2. CONTROLLING DIMENSION: INCH.  
 3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.320	0.350	8.13	8.89
B	0.240	0.260	6.10	6.60
C	0.115	0.200	2.93	5.08
D	0.016	0.020	0.41	0.50
E	0.040	0.070	1.02	1.77
F	0.010	0.014	0.25	0.36
G	0.100 BSC		2.54 BSC	
J	0.008	0.012	0.21	0.30
K	0.100	0.150	2.54	3.81
L	0.400	0.425	10.16	10.80
N	0.015	0.040	0.38	1.02

**\*Consult factory for leadform option availability**

**CASE 730D-05  
 ISSUE D**

# H11D1 H11D2

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H11D1/D

