



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 ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
--------	--------	-------	------

INPUT LED

Forward Current — Continuous	I_F	60	mA
Forward Current — Peak Pulse Width = 1 μs , 330 pps	I_F	1.2	Amps
LED Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	120 1.41	mW mW/ $^\circ\text{C}$

OUTPUT TRANSISTOR

Collector–Emitter Voltage	V_{CER}	300	Volts
Emitter–Collector Voltage	V_{ECO}	7	Volts
Collector–Base Voltage	V_{CBO}	300	Volts
Collector Current — Continuous	I_C	100	mA
Detector Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	150 1.76	mW mW/ $^\circ\text{C}$

TOTAL DEVICE

Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	250 2.94	mW mW/ $^\circ\text{C}$
Operating Temperature Range ⁽³⁾	T_J	–55 to +100	$^\circ\text{C}$
Storage Temperature Range ⁽³⁾	T_{stg}	–55 to +150	$^\circ\text{C}$
Soldering Temperature (10 s)	T_L	260	$^\circ\text{C}$
Isolation Surge Voltage Peak ac Voltage, 60 Hz, 1 Second Duration ⁽¹⁾	V_{ISO}	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_{ISO}). H11D2 is rated @ 3535 Volts peak (V_{ISO}). Otherwise they are identical, both parts built by Motorola are rated @ 7500 Volts peak (V_{ISO}).
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.

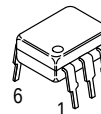
H11D1*

H11D2

[CTR = 20% Min]

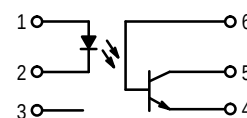
*Motorola Preferred Device

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_A = 25°C unless otherwise noted)⁽¹⁾

Characteristic	Symbol	Min	Typ ⁽¹⁾	Max	Unit
INPUT LED (T _A = 25°C unless otherwise noted)					
Reverse Leakage Current (V _R = 6 V)	I _R	—	—	10	μA
Forward Voltage (I _F = 10 mA)	V _F	—	1.2	1.5	Volts
Capacitance (V = 0 V, f = 1 MHz)	C	—	18	—	pF

OUTPUT TRANSISTOR (T_A = 25°C and I_F = 0 unless otherwise noted)

Collector–Emitter Dark Current (R _{BE} = 1 MΩ) (V _{CE} = 200 V, T _A = 25°C) (T _A = 100°C)	H11D1,2 H11D1,2	I _{CER}	— —	— —	100 250	nA μA
Collector–Base Breakdown Voltage (I _C = 100 μA)	H11D1,2	V _{(BR)CBO}	—	—	300	Volts
Collector–Emitter Breakdown Voltage (I _C = 1 mA, R _{BE} = 1 MΩ)	H11D1,2	V _{(BR)CER}	—	—	300	Volts
Emitter–Base Breakdown Voltage (I _E = 100 μA)		V _{(BR)EBO}	7	—	—	Volts

COUPLED (T_A = 25°C unless otherwise noted)

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

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

TYPICAL CHARACTERISTICS

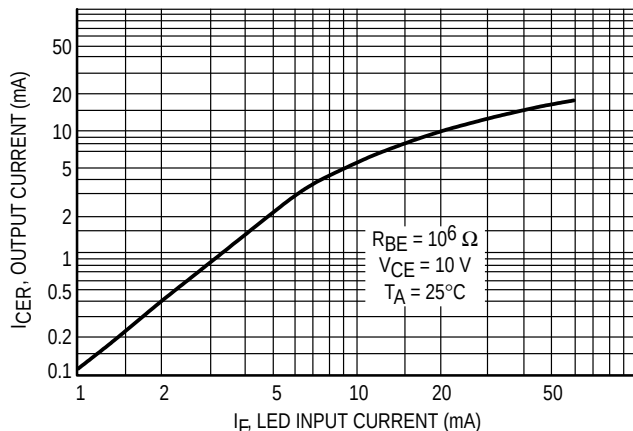


Figure 1. Output Current versus LED Input Current

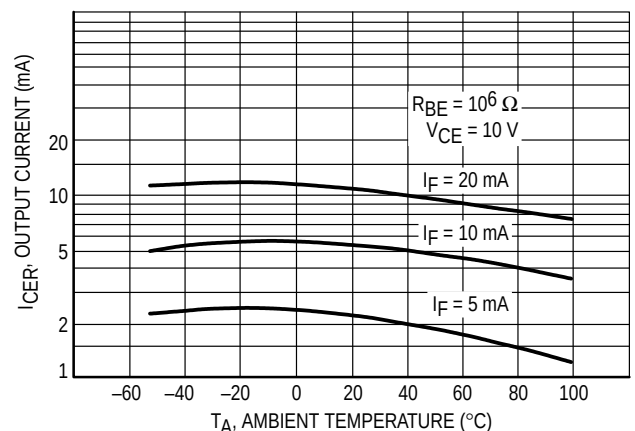
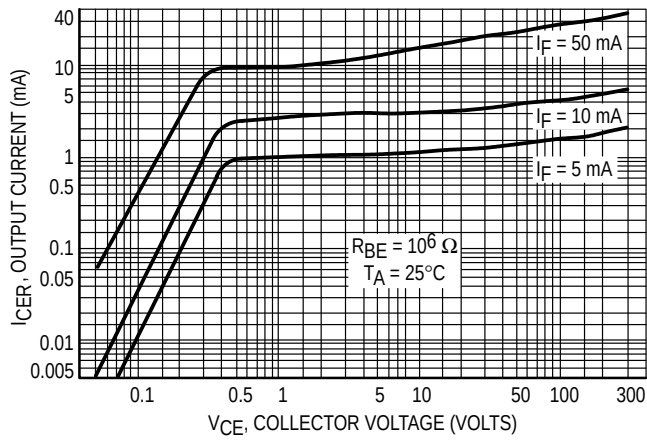
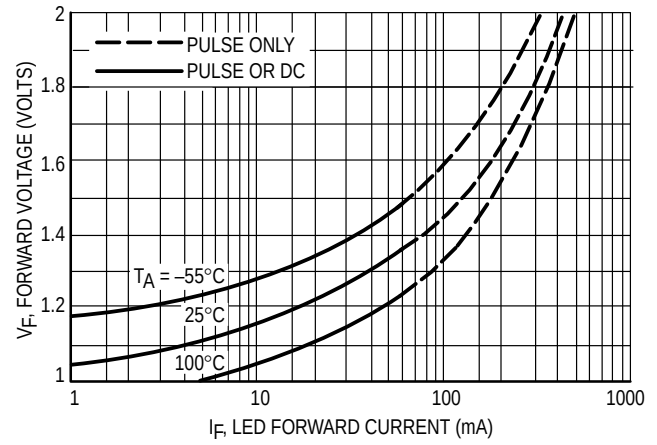
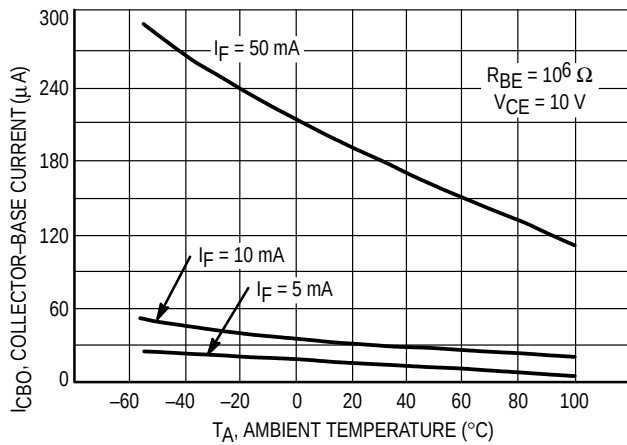
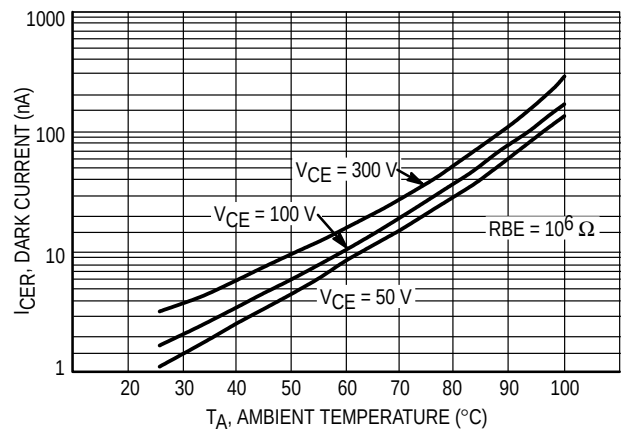
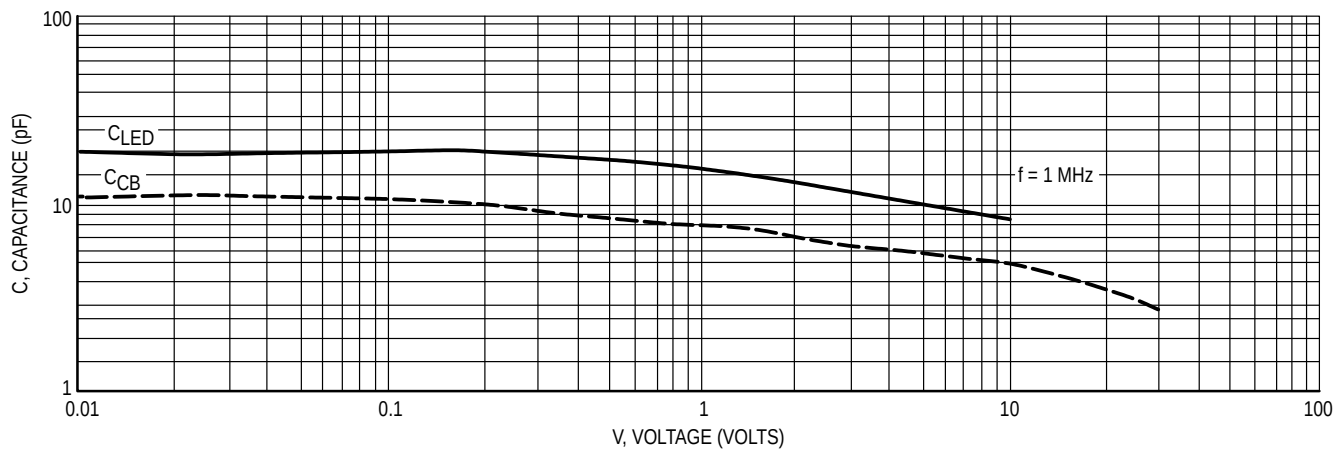
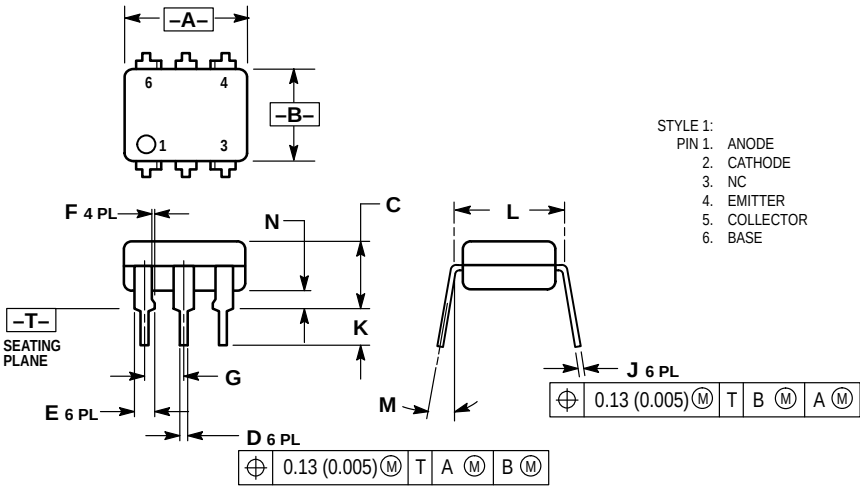


Figure 2. Output Current versus Temperature


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

PACKAGE DIMENSIONS

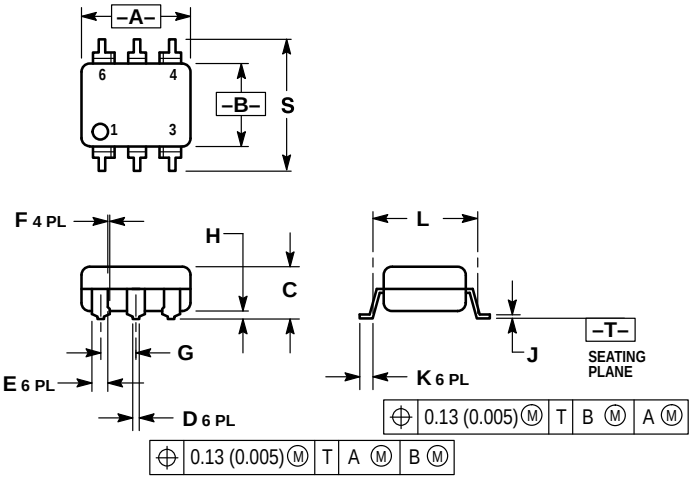


STYLE 1:
PIN 1. ANODE
2. CATHODE
3. NC
4. EMITTER
5. COLLECTOR
6. BASE

- 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	0.300 BSC		7.62 BSC	
M	0° 15°		0° 15°	
N	0.015	0.100	0.38	2.54

CASE 730A-04
ISSUE G

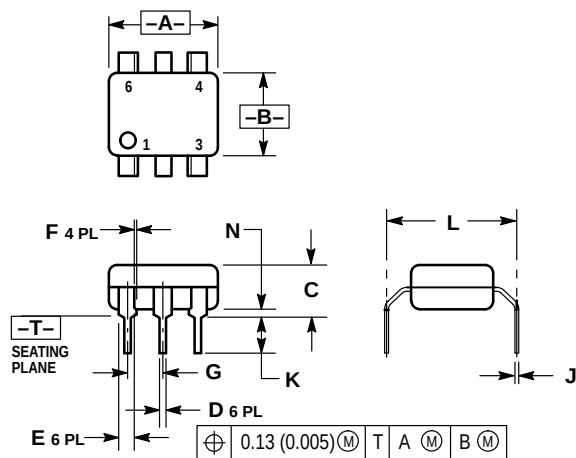


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

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	
H	0.020	0.025	0.51	0.63
J	0.008	0.012	0.20	0.30
K	0.006	0.035	0.16	0.88
L	0.320 BSC		8.13 BSC	
S	0.332	0.390	8.43	9.90

*Consult factory for leadform
option availability

CASE 730C-04
ISSUE D



- 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**

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters can and do vary in different applications. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

How to reach us:

USA / EUROPE: Motorola Literature Distribution;
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447

JAPAN: Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, Toshikatsu Otsuki,
6F Seibu-Butsuryu-Center, 3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-3521-8315

MFAX: RMFA00@email.sps.mot.com – TOUCHTONE (602) 244-6609
INTERNET: <http://Design-NET.com>

HONG KONG: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

**MOTOROLA****H11D1/D**