



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
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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.

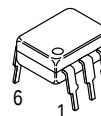
H11D1*

H11D2

[CTR = 20% Min]

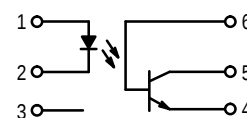
*Motorola Preferred Device

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

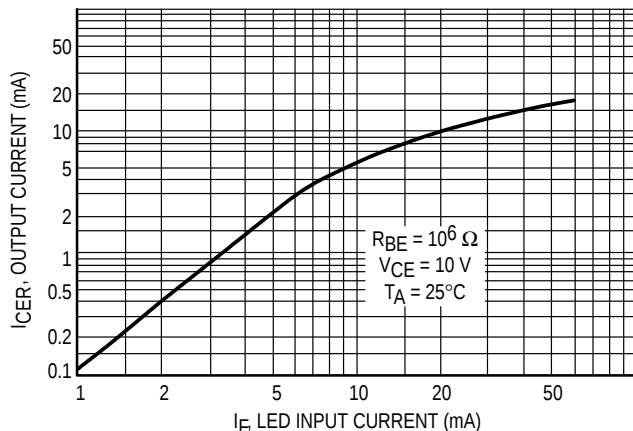


Figure 1. Output Current versus LED Input Current

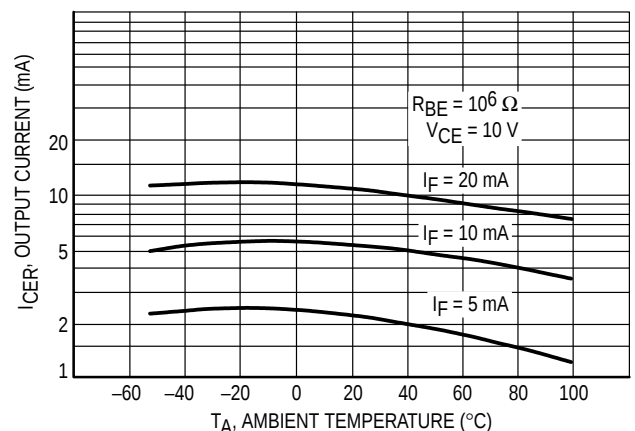
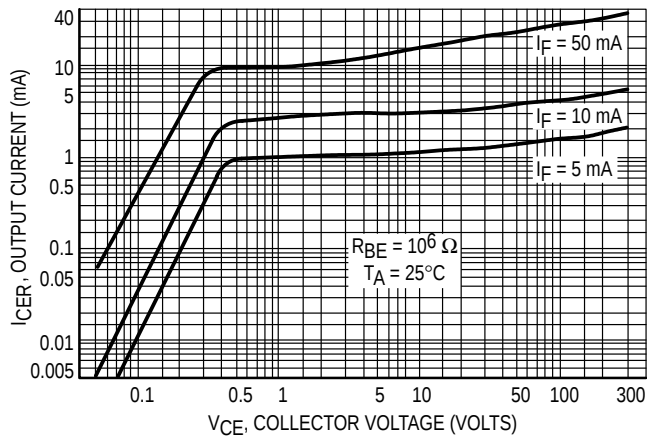
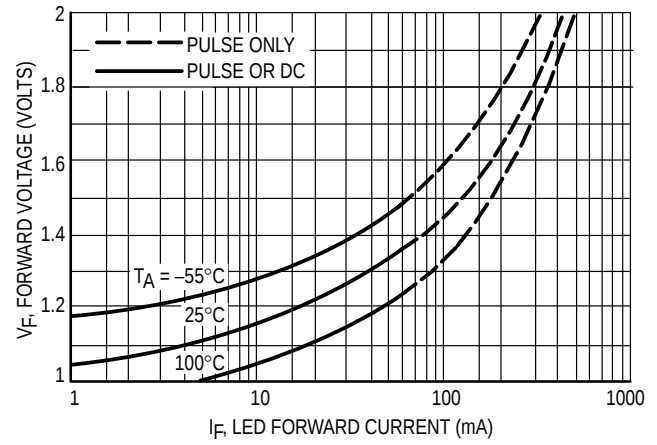
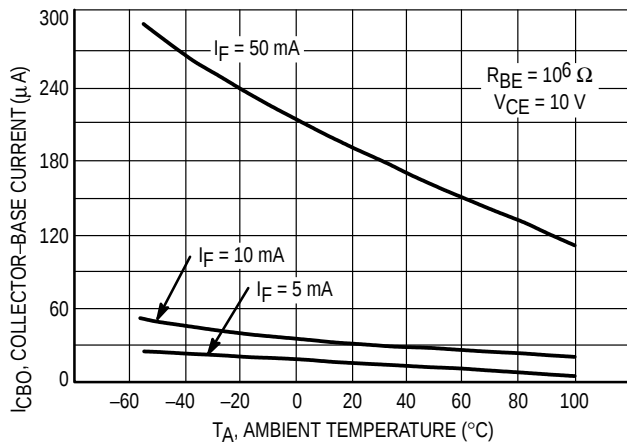
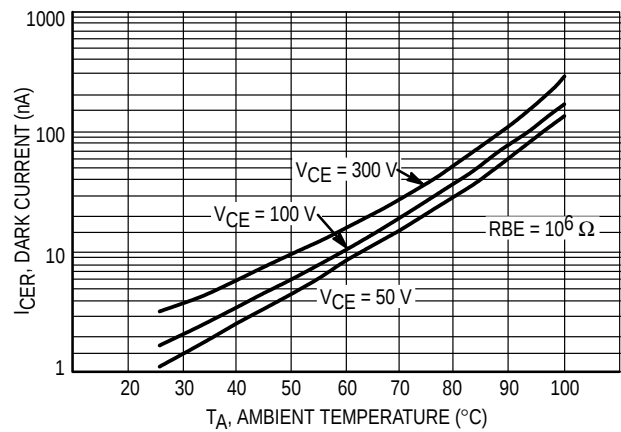
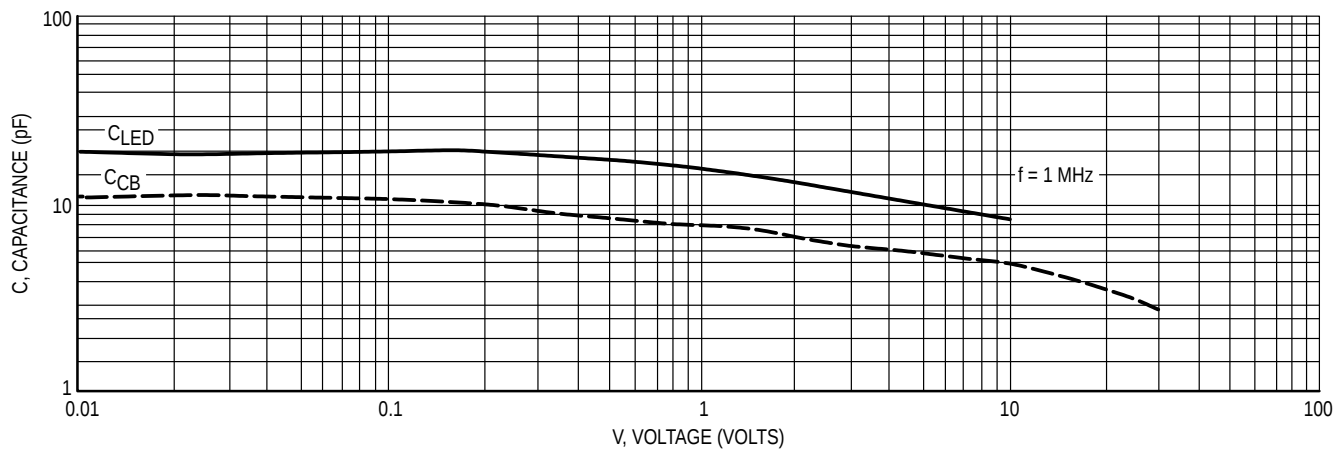
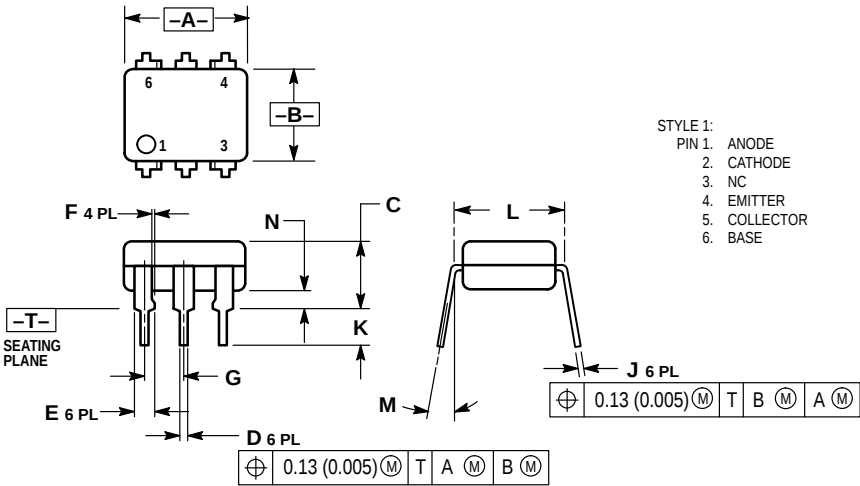


Figure 2. Output Current versus Temperature


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

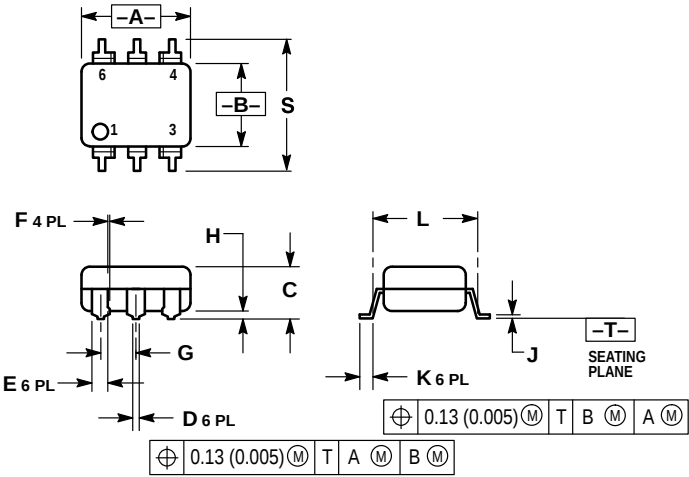
PACKAGE DIMENSIONS



- 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

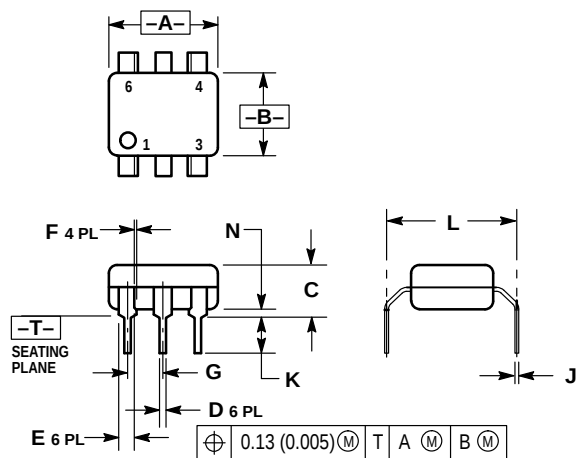


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DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
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B	0.240	0.260	6.10	6.60
C	0.115	0.200	2.93	5.08
D	0.016	0.020	0.41	0.50
E	0.040	0.070	1.02	1.77
F	0.010	0.014	0.25	0.36
G	0.100 BSC		2.54 BSC	
H	0.020	0.025	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**

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