GlobalOptoisolator™

VDE | UL | CSA | SETI | SEMKO | DEMKO | NEMKO | BABT

6-Pin DIP Optoisolators AC Input/Transistor Output

H11AA1* [CTR = 20% Min]
H11AA2 [CTR = 10% Min]
H11AA3 [CTR = 50% Min]
H11AA4* [CTR = 100% Min]

***Motorola Preferred Devices**

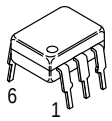
The H11AA1, H11AA2, H11AA3, H11AA4 devices consist of two gallium–arsenide infrared emitting diodes connected in inverse parallel, optically coupled to a monolithic silicon phototransistor detector.

- Built–In Protection for Reverse Polarity
- Guaranteed CTR Minimum Values as High as 100%
- Guaranteed Minimum/Maximum Symmetry Limits
- ***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

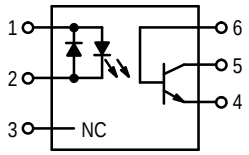
- Detecting or Monitoring ac Signals
- AC Line/Digital Logic Isolation
- Programmable Controllers
- Interfacing and coupling systems of different potentials and impedances
- AC/DC — Input Modules

STYLE 8 PLASTIC



STANDARD THRU HOLE
CASE 730A–04

SCHEMATIC



PIN 1. INPUT LED
2. INPUT LED
3. NO CONNECTION
4. EMITTER
5. COLLECTOR
6. BASE

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
INPUT LED			
Forward Current — Continuous (RMS)	I_F	60	mA
LED Power Dissipation @ T_A = 25°C with Negligible Power in Output Detector Derate above 25°C	P_D	120 1.41	mW mW/°C
OUTPUT TRANSISTOR			
Collector–Emitter Voltage	V_{CEO}	30	Volts
Emitter–Base Voltage	V_{EBO}	5	Volts
Collector–Base Voltage	V_{CBO}	70	Volts
Collector Current — Continuous	I_C	150	mA
Detector Power Dissipation @ T_A = 25°C with Negligible Power in Input LEDs Derate above 25°C	P_D	150 1.76	mW mW/°C
TOTAL DEVICE			
Isolation Surge Voltage(1) (Peak ac Voltage, 60 Hz, 1 sec Duration)	V_{ISO}	7500	Vac(pk)
Total Device Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	250 2.94	mW mW/°C
Ambient Operating Temperature Range(2)	T_A	–55 to +100	°C
Storage Temperature Range(2)	T_{stg}	–55 to +150	°C
Soldering Temperature (10 sec, 1/16″ from case)	T_L	260	°C

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. 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.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)(1)

Characteristic		Symbol	Min	Typ(1)	Max	Unit
INPUT LED						
Forward Voltage (I_F = 10 mA, either direction)	H11AA1,3,4	V_F	—	1.15	1.5	Volts
	H11AA2		—	1.15	1.8	
T_A = –55°C	All devices		—	1.3	—	
T_A = 100°C	All devices		—	1.05	—	
Capacitance (V = 0 V, f = 1 MHz)		C_J	—	20	—	pF
OUTPUT TRANSISTOR						
Collector–Emitter Dark Current (V_{CE} = 10 V)	H11AA1,3,4	I_{CEO}	—	1	100	nA
	H11AA2		—	1	200	nA
T_A = 100°C	All devices		—	1	—	μA
Collector–Base Dark Current (V_{CB} = 10 V)		I_{CBO}	—	0.2	—	nA
Collector–Emitter Breakdown Voltage (I_C = 10 mA)		$V_{(BR)CEO}$	30	45	—	Volts
Collector–Base Breakdown Voltage (I_C = 100 μA)		$V_{(BR)CBO}$	70	100	—	Volts
Emitter–Collector Breakdown Voltage (I_E = 100 μA)		$V_{(BR)ECO}$	5	7.8	—	Volts
DC Current Gain (I_C = 2 mA, V_{CE} = 5 V) (Typical Value)		h_{FE}	—	500	—	—
Collector–Emitter Capacitance (f = 1 MHz, V_{CE} = 0 V)		C_{CE}	—	1.7	—	pF
Collector–Base Capacitance (f = 1 MHz, V_{CB} = 0 V)		C_{CB}	—	20	—	pF
Emitter–Base Capacitance (f = 1 MHz, V_{EB} = 0 V)		C_{EB}	—	10	—	pF
COUPLED						
Output Collector Current (I_F = ±10 mA, V_{CE} = 10 V)	H11AA1	I_C (CTR)(2)	2 (20)	5 (50)	—	mA (%)
	H11AA2		1 (10)	2 (20)	—	
	H11AA3		5 (50)	10 (100)	—	
	H11AA4		10 (100)	15 (150)	—	
Output Collector Current Symmetry(3) $\left(\frac{I_C \text{ at } I_F = +10 \text{ mA}, V_{CE} = 10 \text{ V}}{I_C \text{ at } I_F = -10 \text{ mA}, V_{CE} = 10 \text{ V}}\right)$	H11AA1,3,4	—	0.33	—	3	—
Collector–Emitter Saturation Voltage (I_C = 0.5 mA, I_F = ±10 mA)		$V_{CE(sat)}$	—	0.1	0.4	Volts
Isolation Voltage (f = 60 Hz, t = 1 sec)(4)		V_{ISO}	7500	—	—	Vac(pk)
Isolation Resistance (V = 500 V)(4)		R_{ISO}	10^{11}	—	—	Ω
Isolation Capacitance (V = 0 V, f = 1 MHz)(4)		C_{ISO}	—	0.2	—	pF

1. Always design to the specified minimum/maximum electrical limits (where applicable).
2. Current Transfer Ratio (CTR) = I_C/I_F x 100%.
3. This specification guarantees that the higher of the two I_C readings will be no more than 3 times the lower at I_F = 10 mA.
4. For this test, Pins 1 and 2 are common, and Pins 4, 5 and 6 are common.

TYPICAL CHARACTERISTICS

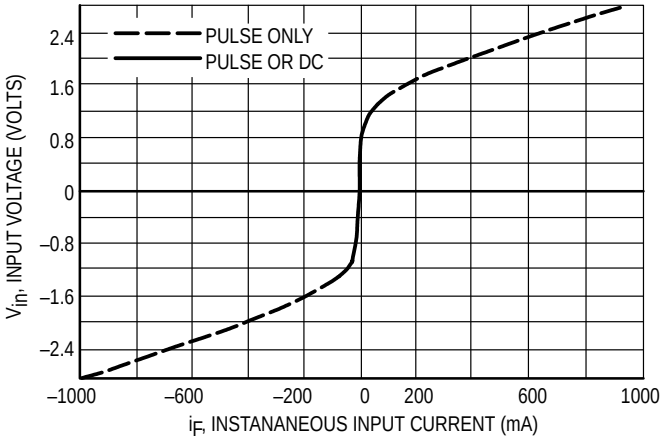


Figure 1. Input Voltage versus Input Current

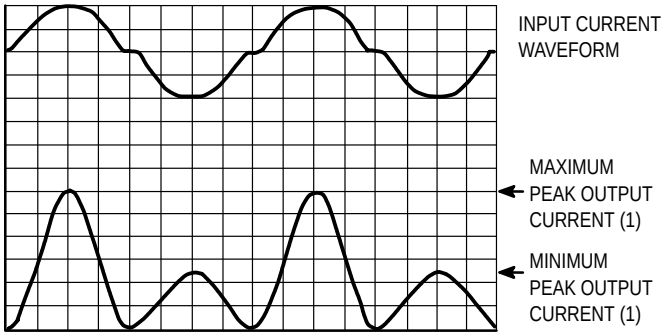


Figure 2. Output Characteristics

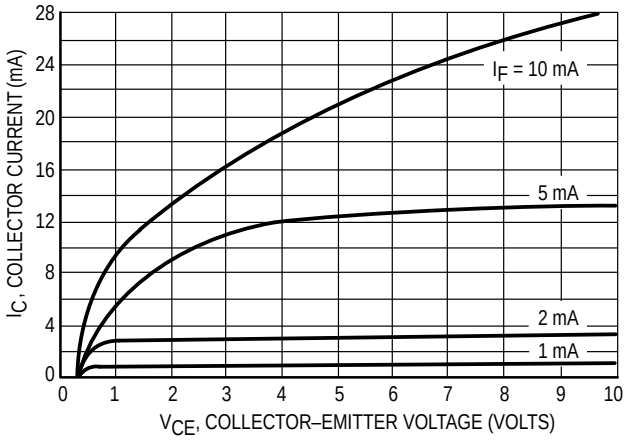


Figure 3. Collector Current versus Collector–Emitter Voltage

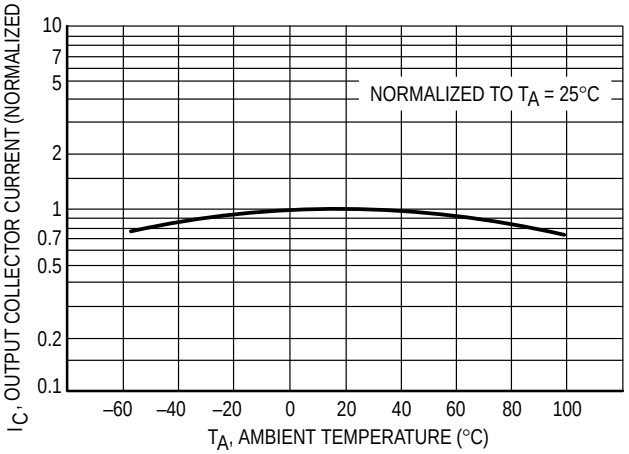


Figure 4. Output Current versus Ambient Temperature

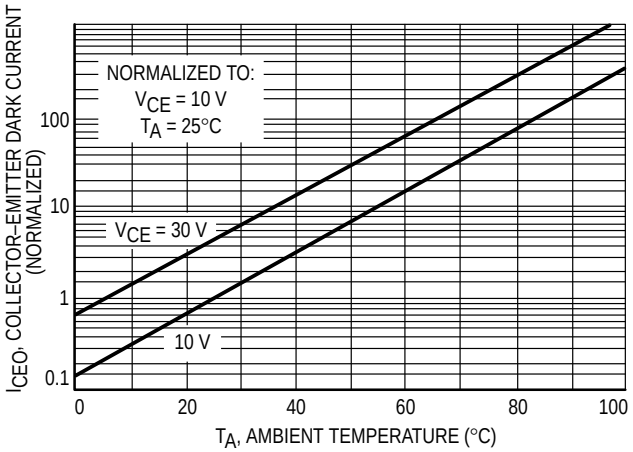


Figure 5. Dark Current versus Ambient Temperature

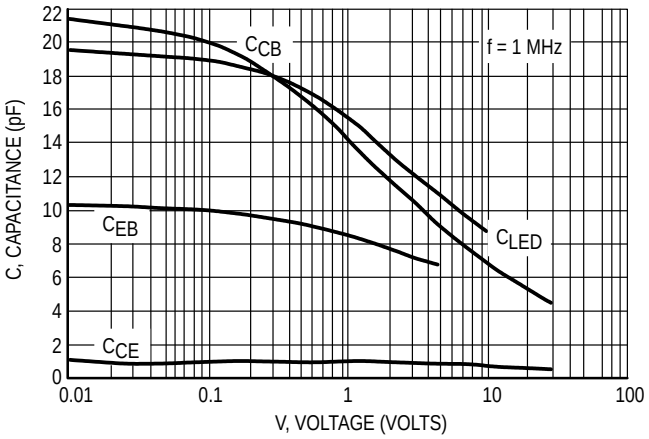
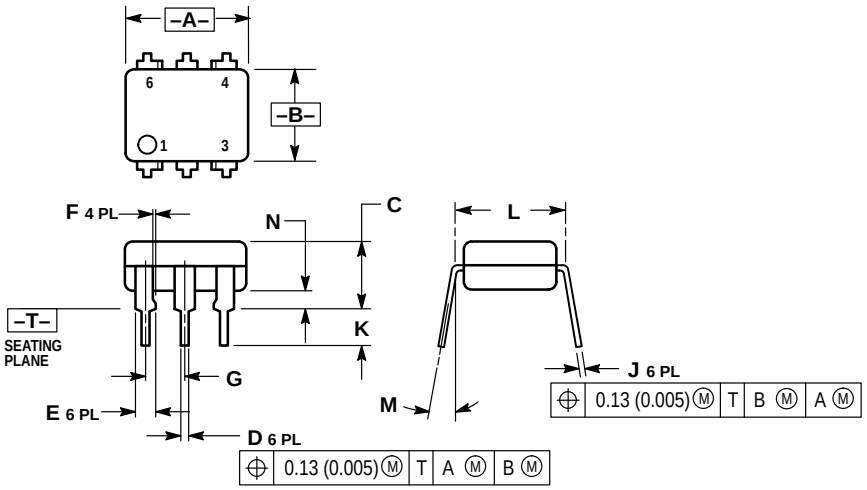


Figure 6. Capacitances versus Voltage

PACKAGE DIMENSIONS

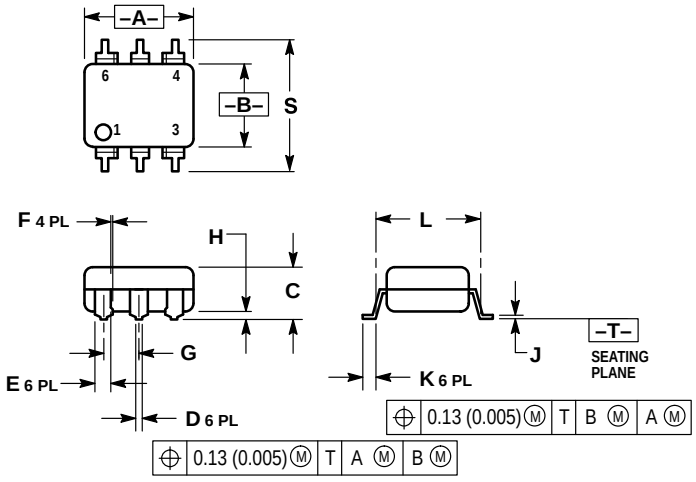


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.

	INCHES		MILLIMETERS	
DIM	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

STYLE 8:
PIN 1. LED 1 ANODE/LED 2 CATHODE
2. LED 1 CATHODE/LED 2 ANODE
3. NC
4. EMITTER
5. COLLECTOR
6. BASE

CASE 730A–04
ISSUE G

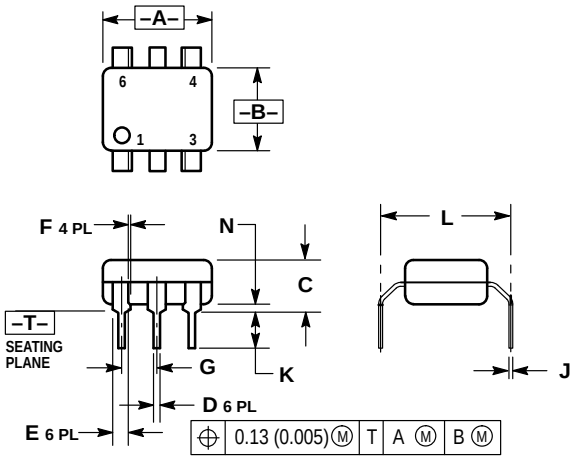


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C	0.115	0.200	2.93	5.08
D	0.016	0.020	0.41	0.50
E	0.040	0.070	1.02	1.77
F	0.010	0.014	0.25	0.36
G	0.100 BSC		2.54 BSC	
H	0.020	0.025	0.51	0.63
J	0.008	0.012	0.20	0.30
K	0.006	0.035	0.16	0.88
L	0.320 BSC		8.13 BSC	
S	0.332	0.390	8.43	9.90

***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.

	INCHES		MILLIMETERS	
DIM	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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