GlobalOptoisolator™

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

6-Pin DIP Optoisolators Darlington Output (On-Chip Resistors)

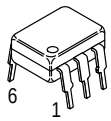
H11G1*
[CTR = 1000% Min]
H11G2*
[CTR = 1000% Min]
H11G3
[CTR = 200% Min]

***Motorola Preferred Devices**

The H11G1, H11G2 and H11G3 devices consist of gallium arsenide IREDs optically coupled to silicon photodarlington detectors which have integral base–emitter resistors. The on–chip resistors improve higher temperature leakage characteristics. Designed with high isolation, high CTR, high voltage and low leakage, they provide excellent performance.

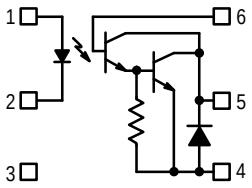
- High CTR, H11G1 & H11G2 — 1000% (@ I_F = 10 mA), 500% (@ I_F = 1 mA)
- High $V_{(BR)CEO}$, H11G1 — 100 Volts, H11G2 — 80 Volts
- ***To order devices that are tested and marked per VDE 0884 requirements, the suffix "V" must be included at end of part number. VDE 0884 is a test option.***

STYLE 1 PLASTIC



STANDARD THRU HOLE
CASE 730A–04

SCHEMATIC



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

Applications

- Interfacing and coupling systems of different potentials and impedances
- Phase and Feedback Controls
- General Purpose Switching Circuits
- Solid State Relays

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

Rating		Symbol	Value	Unit
INPUT LED				
Reverse Voltage		V_R	6	Volts
Forward Current — Continuous		I_F	60	mA
Forward Current — Peak Pulse Width = 300 µs, 2% Duty Cycle		I_F	3	Amps
LED Power Dissipation @ T_A = 25°C Derate above 25°C		P_D	120 1.41	mW mW/°C
OUTPUT DETECTOR				
Collector–Emitter Voltage	H11G1 H11G2 H11G3	V_{CEO}	100 80 55	Volts
Emitter–Base Voltage		V_{EBO}	7	Volts
Collector Current — Continuous		I_C	150	mA
Detector Power Dissipation @ T_A = 25°C Derate above 25°C		P_D	150 1.76	mW mW/°C
TOTAL DEVICE				
Total Device Power Dissipation @ T_A = 25°C Derate above 25°C		P_D	250 2.94	mW mW/°C
Operating Junction Temperature Range(2)		T_A	–55 to +100	°C
Storage Temperature Range(2)		T_{stg}	–55 to +150	°C
Soldering Temperature (10 s)		T_L	260	°C
Isolation Surge Voltage(1) (Peak ac Voltage, 60 Hz, 1 sec Duration)		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. 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						
Reverse Leakage Current (V_R = 3 V)		I_R	—	0.05	10	μA
Forward Voltage I_F = 10 mA)		V_F	—	1.1	1.5	Volts
Capacitance (V = 0 V, f = 1 MHz)		C_J	—	18	—	pF
DARLINGTON OUTPUT (T_A = 25°C and I_F = 0 unless otherwise noted)						
Collector–Emitter Breakdown Current		$V_{(BR)CEO}$				Volts
(I_C = 1 mA, I_F = 0)	H11G1		100	—	—	
	H11G2		80	—	—	
	H11G3		55	—	—	
Collector–Base Breakdown Voltage		$V_{(BR)CBO}$				Volts
(I_C = 100 μA, I_F = 0)	H11G1		100	—	—	
	H11G2		80	—	—	
	H11G3		55	—	—	
Emitter–Base Breakdown Voltage (I_E = 100 μA, I_F = 0)		$V_{(BR)EBO}$	7	—	—	Volts
Collector–Emitter Dark Current		I_{CEO}				
(V_{CE} = 80 V)	H11G1		—	—	100	nA
(V_{CE} = 80 V, T_A = 80°C)	H11G1		—	—	100	μA
(V_{CE} = 60 V)	H11G2		—	—	100	nA
(V_{CE} = 60 V, T_A = 80°C)	H11G2		—	—	100	μA
(V_{CE} = 30 V)	H11G3		—	—	100	nA
Capacitance (V_{CB} = 10 V, f = 1 MHz)		C_{CB}	—	6	—	pF
COUPLED (T_A = 25°C unless otherwise noted)						
Collector Output Current		I_C (CTR)[2]				mA (%)
(V_{CE} = 1 V, I_F = 10 mA)	H11G1, 2		100 (1000)	—	—	
(V_{CE} = 5 V, I_F = 1 mA)	H11G1, 2		5 (500)	—	—	
(V_{CE} = 5 V, I_F = 1 mA)	H11G3		2 (200)	—	—	
Collector–Emitter Saturation Voltage		$V_{CE(sat)}$				Volts
(I_F = 1 mA, I_C = 1 mA)	H11G1, 2		—	0.75	1	
(I_F = 16 mA, I_C = 50 mA)	H11G1, 2		—	0.85	1	
(I_F = 20 mA, I_C = 50 mA)	H11G3		—	0.85	1.2	
Isolation Surge Voltage[3,4] (60 Hz ac Peak, 1 Second)		V_{ISO}	7500	—	—	Vac(pk)
Isolation Resistance[3] (V = 500 Vdc)			—	10^{11}	—	Ohms
Isolation Capacitance[3] (V = 0 V, f = 1 MHz)		C_{IO}	—	2	—	pF
SWITCHING (T_A = 25°C)						
Turn–On Time	(I_F = 10 mA, V_{CC} = 5 V, R_L = 100 Ω, Pulse Width ≤ 300 μs, f = 30 Hz)	t_{on}	—	5	—	μs
Turn–Off Time		t_{off}	—	100	—	

1. Always design to the specified minimum/maximum electrical limits (where applicable).
2. Current Transfer Ratio (CTR) = I_C/I_F x 100%.
3. For this test, Pins 1 and 2 are common, and Photodarlington Pins 4 and 5 are common.
4. Isolation Surge Voltage, V_{ISO}, is an internal device dielectric breakdown rating.

TYPICAL CHARACTERISTICS

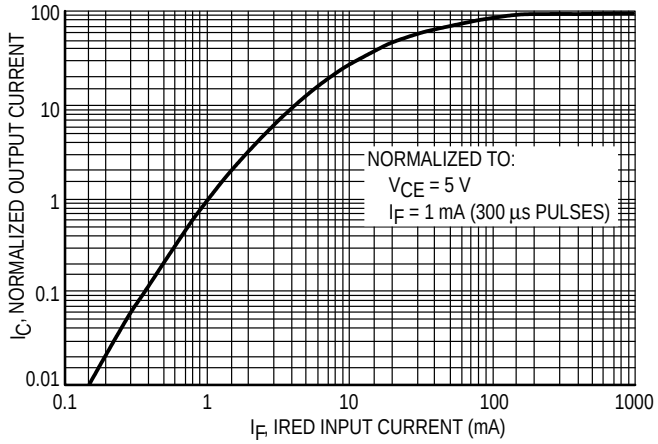


Figure 1. Output Current versus Input Current

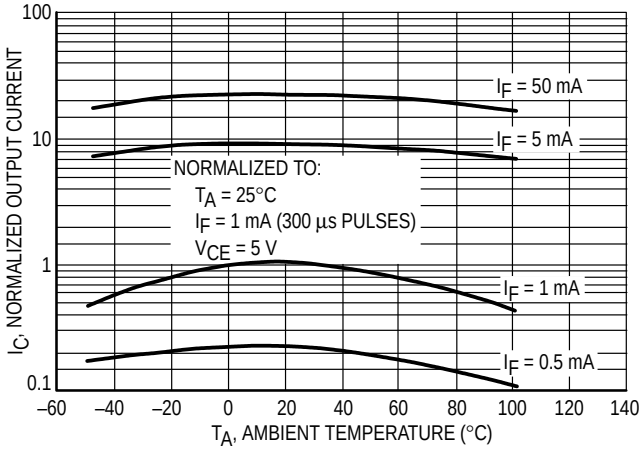


Figure 2. Output Current versus Temperature

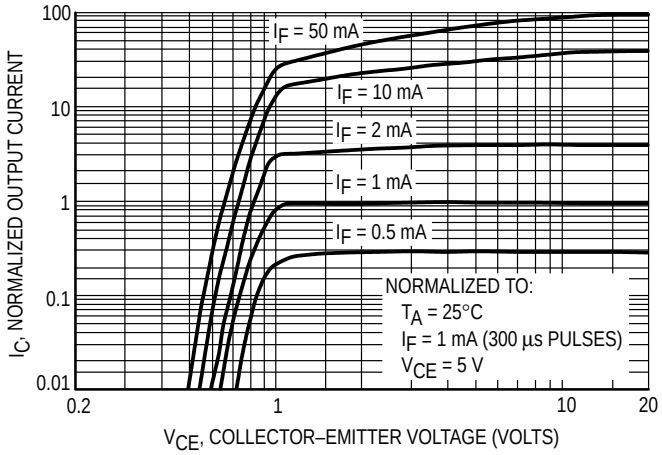


Figure 3. Output Current versus Collector–Emitter Voltage

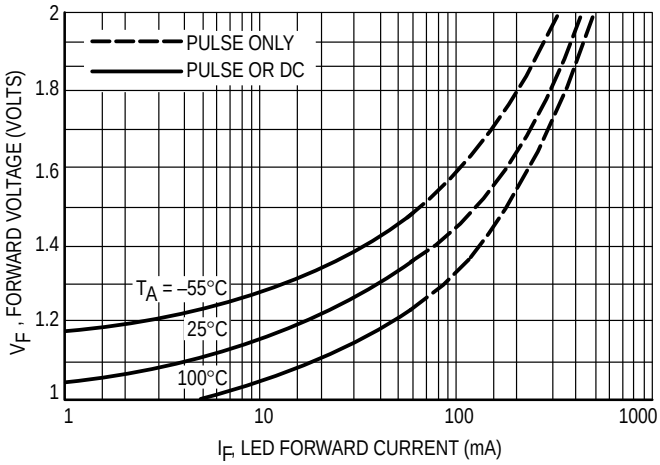


Figure 4. LED Forward Characteristics

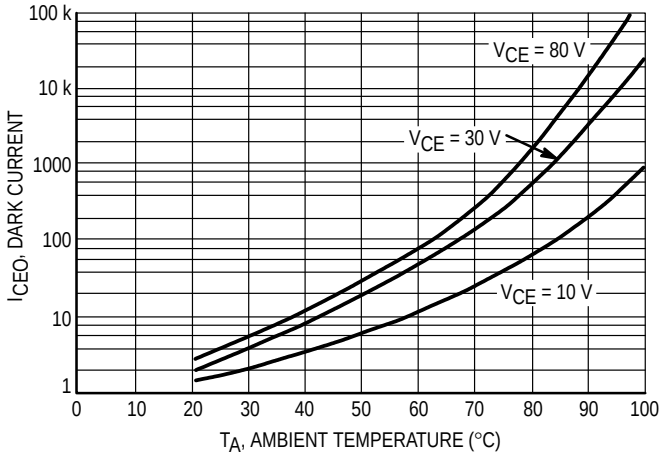


Figure 5. Collector–Emitter Dark Current versus Temperature

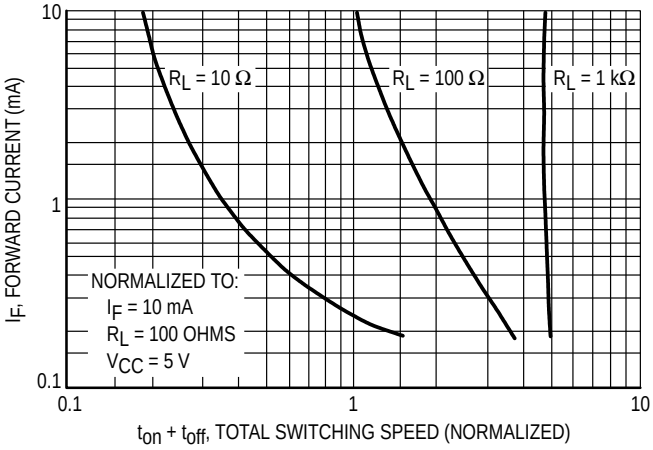
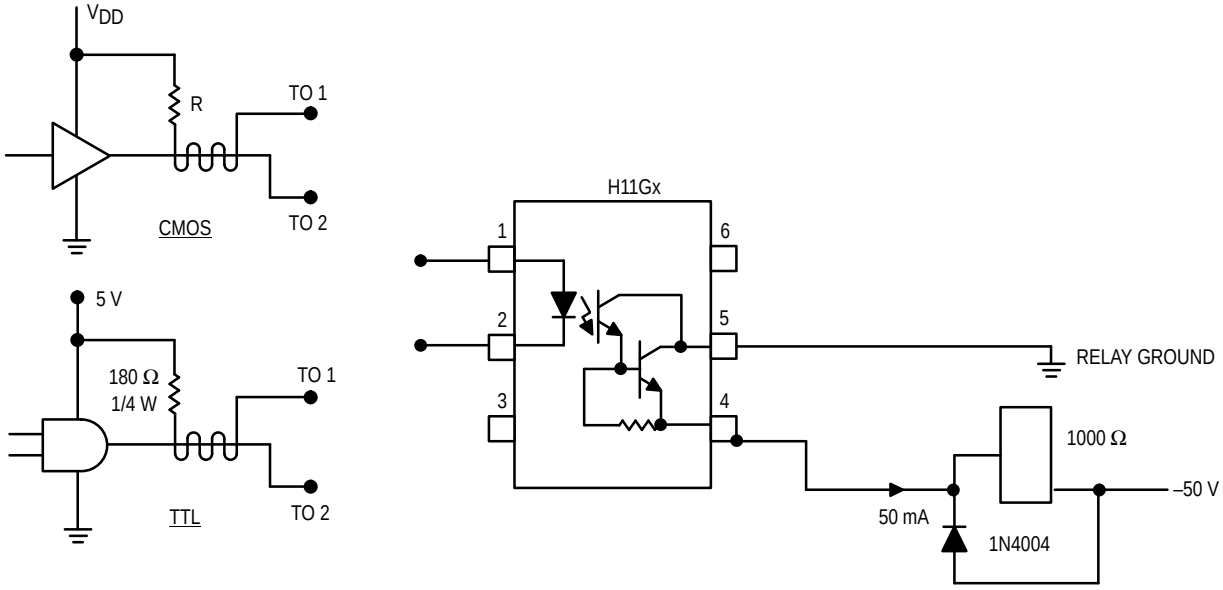


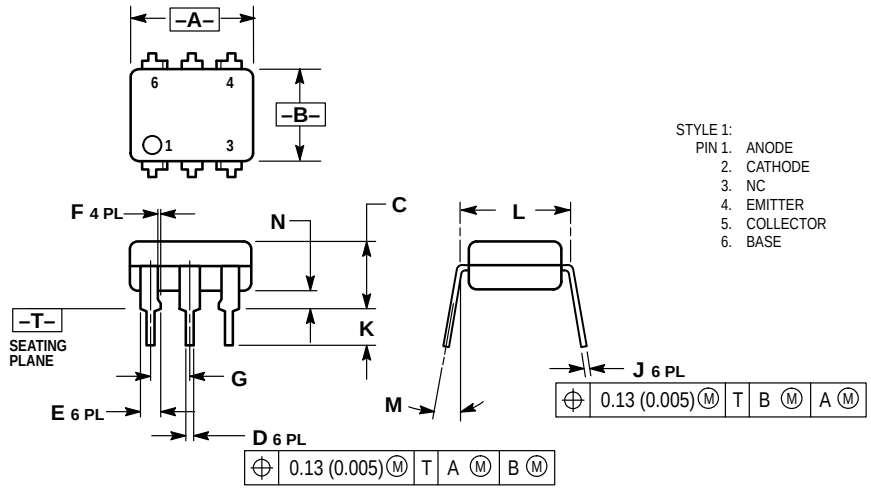
Figure 6. Input Current versus Total Switching Speed (Typical Values)

INTERFACING TTL OR CMOS LOGIC TO 50–VOLT, 1000–OHMS RELAY FOR TELEPHONY APPLICATIONS

In order to interface positive logic to negative–powered electromechanical relays, a change in voltage level and polarity plus electrical isolation are required. The H11Gx can provide this interface and eliminate the external amplifiers and voltage divider networks previously required. The circuit below shows a typical approach for the interface.



PACKAGE DIMENSIONS

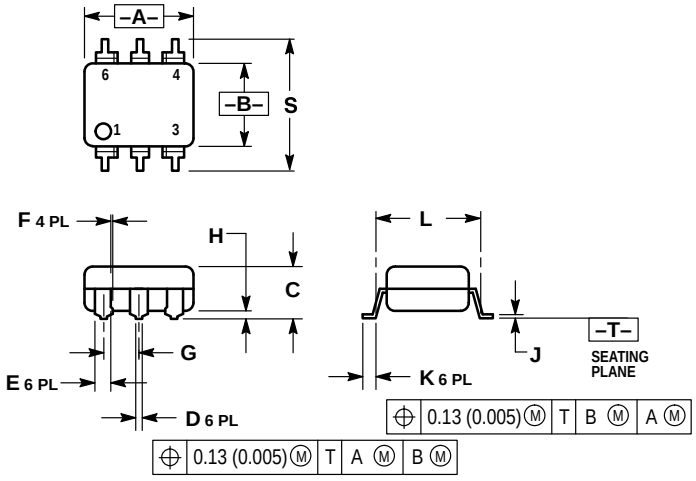


STYLE 1:
PIN 1. ANODE
2. CATHODE
3. NC
4. EMITTER
5. COLLECTOR
6. BASE

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

	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

CASE 730A–04
ISSUE G



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	INCHES		MILLIMETERS	
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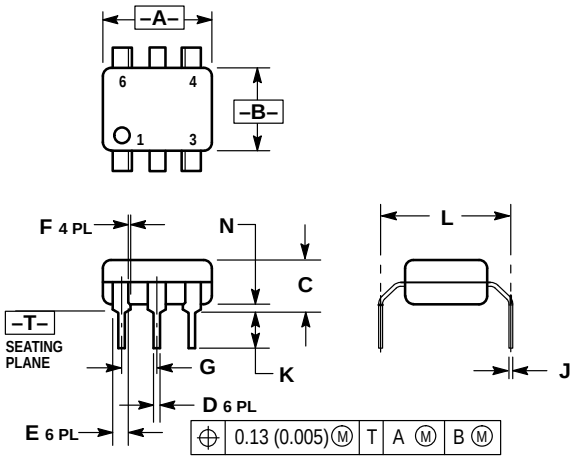
B	0.240	0.260	6.10	6.60
C	0.115	0.200	2.93	5.08
D	0.016	0.020	0.41	0.50
E	0.040	0.070	1.02	1.77
F	0.010	0.014	0.25	0.36
G	0.100 BSC		2.54 BSC	
H	0.020	0.025	0.51	0.63
J	0.008	0.012	0.20	0.30
K	0.006	0.035	0.16	0.88
L	0.320 BSC		8.13 BSC	
S	0.332	0.390	8.43	9.90

***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.

	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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