



6-Pin DIP Optoisolators Transistor Output (No Base Connection)

The MOC8111, MOC8112 and MOC8113 devices consist of a gallium arsenide infrared emitting diode optically coupled to a monolithic silicon phototransistor detector. The internal base-to-Pin 6 connection has been eliminated for improved noise immunity.

- *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

- Appliances, Measuring Instruments
- Regulation and Feedback Control
- Programmable Controllers
- Interfacing and coupling systems of different potentials and impedances
- General Purpose Switching Circuits
- High Noise Environments

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

Rating	Symbol	Value	Unit
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INPUT LED

Reverse Voltage	V_R	6	Volts
Forward Current — Continuous	I_F	60	mA
LED Power Dissipation @ $T_A = 25^\circ\text{C}$ with Negligible Power in Output Detector Derate above 25°C	P_D	120 1.41	mW mW/ $^\circ\text{C}$

OUTPUT TRANSISTOR

Collector-Emitter Voltage	V_{CEO}	30	Volts
Emitter-Collector Voltage	V_{ECO}	7	Volts
Collector Current — Continuous	I_C	150	mA
Detector Power Dissipation @ $T_A = 25^\circ\text{C}$ with Negligible Power in Input LED Derate above 25°C	P_D	150 1.76	mW mW/ $^\circ\text{C}$

TOTAL DEVICE

Isolation Surge Voltage ⁽¹⁾ (Peak ac Voltage, 60 Hz, 1 sec Duration)	V_{ISO}	7500	Vac(pk)
Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	250 2.94	mW mW/ $^\circ\text{C}$
Ambient Operating Temperature Range ⁽²⁾	T_A	-55 to +100	$^\circ\text{C}$
Storage Temperature Range ⁽²⁾	T_{stg}	-55 to +150	$^\circ\text{C}$
Soldering Temperature (10 sec, 1/16" from case)	T_L	260	$^\circ\text{C}$

1. Isolation surge voltage is an internal device dielectric breakdown rating.
For this test, Pins 1 and 2 are common, and Pins 4 and 5 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.
GlobalOptoisolator is a trademark of Motorola, Inc.

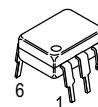
REV 1

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MOC8111*
[CTR = 20% Min]
MOC8112*
[CTR = 50% Min]
MOC8113
[CTR = 100% Min]

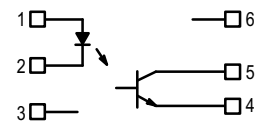
*Motorola Preferred Devices

STYLE 3 PLASTIC



STANDARD THRU HOLE
CASE 730A-04

SCHEMATIC



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



MOTOROLA

MOC8111 MOC8112 MOC8113

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)⁽¹⁾

Characteristic	Symbol	Min	Typ ⁽¹⁾	Max	Unit
INPUT LED					
Forward Voltage ($I_F = 10\text{ mA}$) $T_A = 25^\circ\text{C}$ $T_A = -55^\circ\text{C}$ $T_A = 100^\circ\text{C}$	V_F	—	1.15 1.3 1.05	1.5	Volts
Reverse Leakage Current ($V_R = 6\text{ V}$)	I_R	—	0.05	10	μA
Capacitance ($V = 0$, $f = 1\text{ MHz}$)	C_J	—	18	—	pF

OUTPUT TRANSISTOR

Collector–Emitter Dark Current ($V_{CE} = 10\text{ V}$, $T_A = 25^\circ\text{C}$) ($V_{CE} = 10\text{ V}$, $T_A = 100^\circ\text{C}$)	I_{CEO}	—	1	50	nA
	I_{CEO}	—	1	—	μA
Collector–Emitter Breakdown Voltage ($I_C = 1\text{ mA}$)	$V_{(BR)CEO}$	30	45	—	Volts
Emitter–Collector Breakdown Voltage ($I_E = 100\text{ }\mu\text{A}$)	$V_{(BR)ECO}$	7	7.8	—	Volts
Collector–Emitter Capacitance ($f = 1\text{ MHz}$, $V_{CE} = 0$)	C_{CE}	—	7	—	pF

COUPLED

Output Collector Current ($I_F = 10\text{ mA}$, $V_{CE} = 10\text{ V}$) MOC8111 MOC8112 MOC8113	I_C (CTR) ⁽²⁾	2 (20) 5 (50) 10 (100)	5 (50) 10 (100) 20 (200)	— — —	mA (%)
Collector–Emitter Saturation Voltage ($I_C = 500\text{ }\mu\text{A}$, $I_F = 10\text{ mA}$)	$V_{CE(sat)}$	—	0.15	0.4	Volts
Turn–On Time ($I_C = 2\text{ mA}$, $V_{CC} = 10\text{ V}$, $R_L = 100\text{ }\Omega$) ⁽³⁾	t_{on}	—	7.5	20	μs
Turn–Off Time ($I_C = 2\text{ mA}$, $V_{CC} = 10\text{ V}$, $R_L = 100\text{ }\Omega$) ⁽³⁾	t_{off}	—	5.7	20	μs
Rise Time ($I_C = 2\text{ mA}$, $V_{CC} = 10\text{ V}$, $R_L = 100\text{ }\Omega$) ⁽³⁾	t_r	—	3.2	—	μs
Fall Time ($I_C = 2\text{ mA}$, $V_{CC} = 10\text{ V}$, $R_L = 100\text{ }\Omega$) ⁽³⁾	t_f	—	4.7	—	μs
Isolation Voltage ($f = 60\text{ Hz}$, $t = 1\text{ sec}$) ⁽⁴⁾	V_{ISO}	7500	—	—	Vac(pk)
Isolation Resistance ($V = 500\text{ V}$) ⁽⁴⁾	R_{ISO}	10^{11}	—	—	Ω
Isolation Capacitance ($V = 0$, $f = 1\text{ MHz}$) ⁽⁴⁾	C_{ISO}	—	0.2	—	pF

1. Always design to the specified minimum/maximum electrical limits (where applicable).
2. Current Transfer Ratio (CTR) = $I_C/I_F \times 100\%$.
3. For test circuit setup and waveforms, refer to Figure 10.
4. For this test, Pins 1 and 2 are common, and Pins 4 and 5 are common.

TYPICAL CHARACTERISTICS

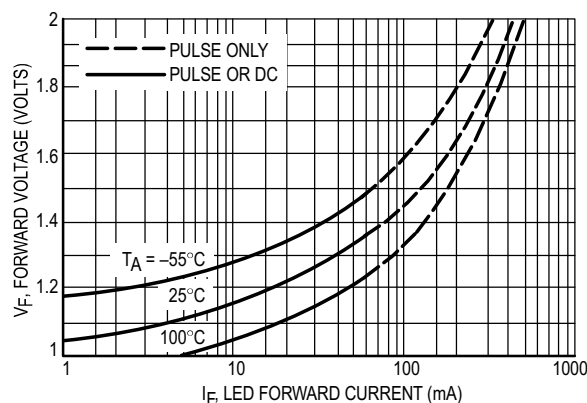


Figure 1. LED Forward Voltage versus Forward Current

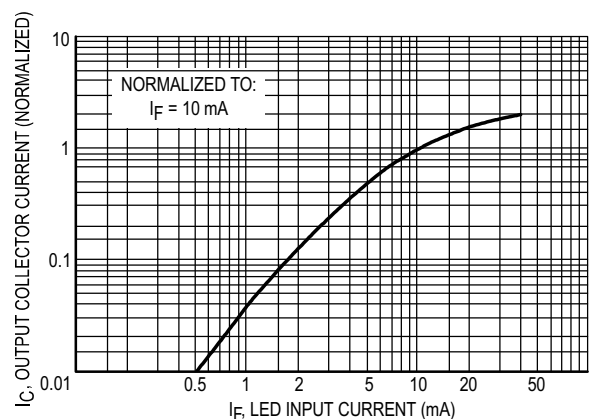


Figure 2. Output Current versus Input Current

MOC8111 MOC8112 MOC8113

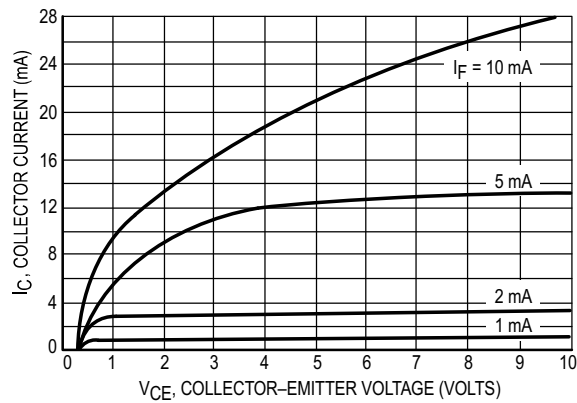


Figure 3. Collector Current versus Collector-Emitter Voltage

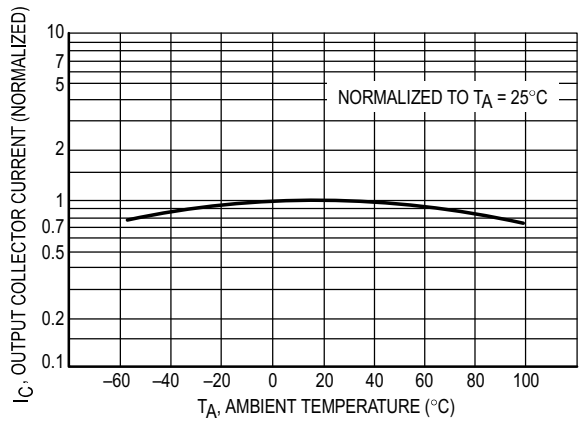


Figure 4. Output Current versus Ambient Temperature

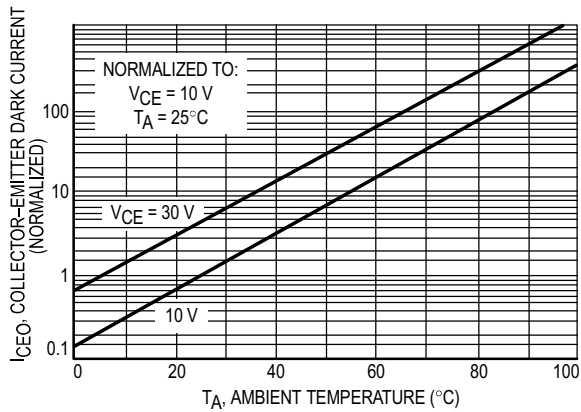


Figure 5. Dark Current versus Ambient Temperature

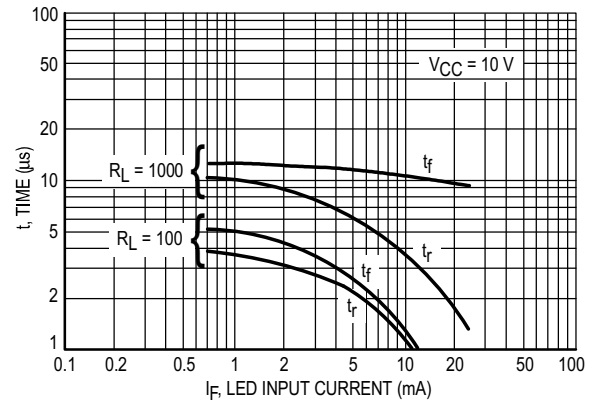


Figure 6. Rise and Fall Times (Typical Values)

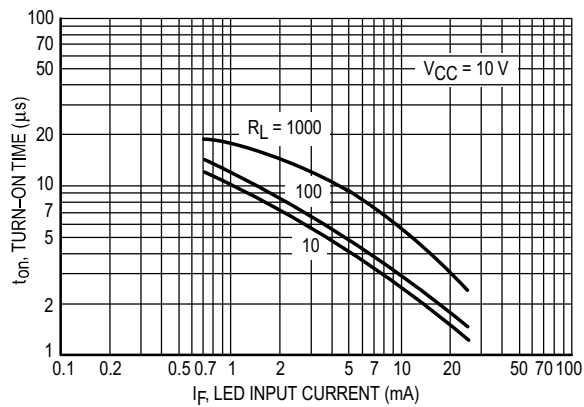


Figure 7. Turn-On Switching Times

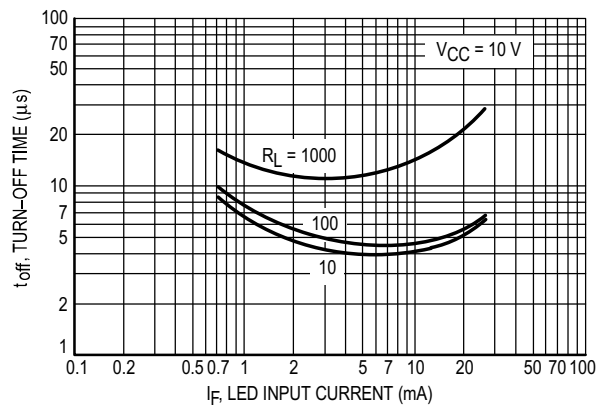


Figure 8. Turn-Off Switching Times

MOC8111 MOC8112 MOC8113

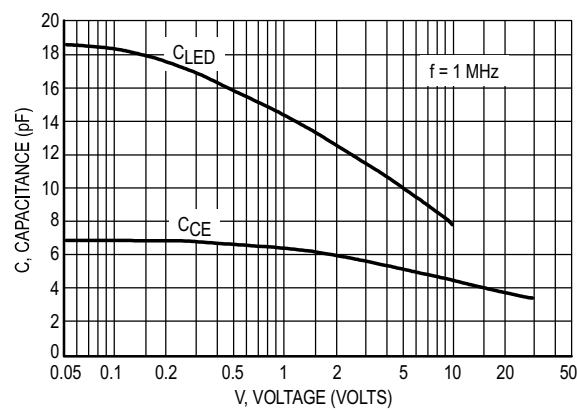


Figure 9. Capacitances versus Voltage

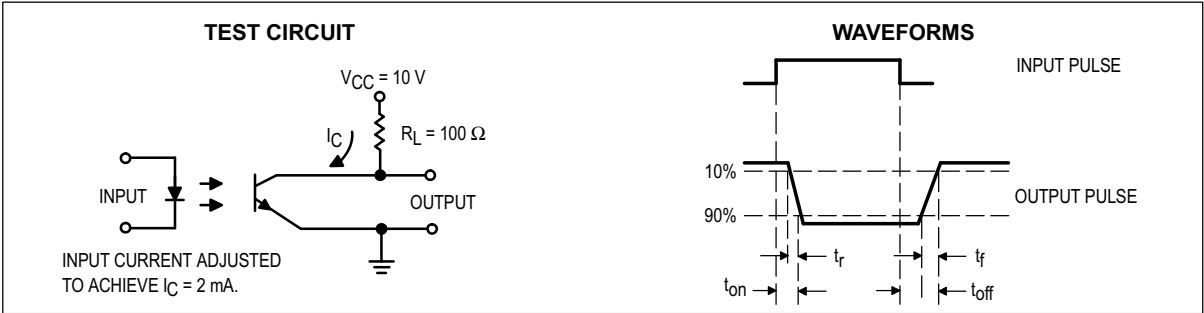
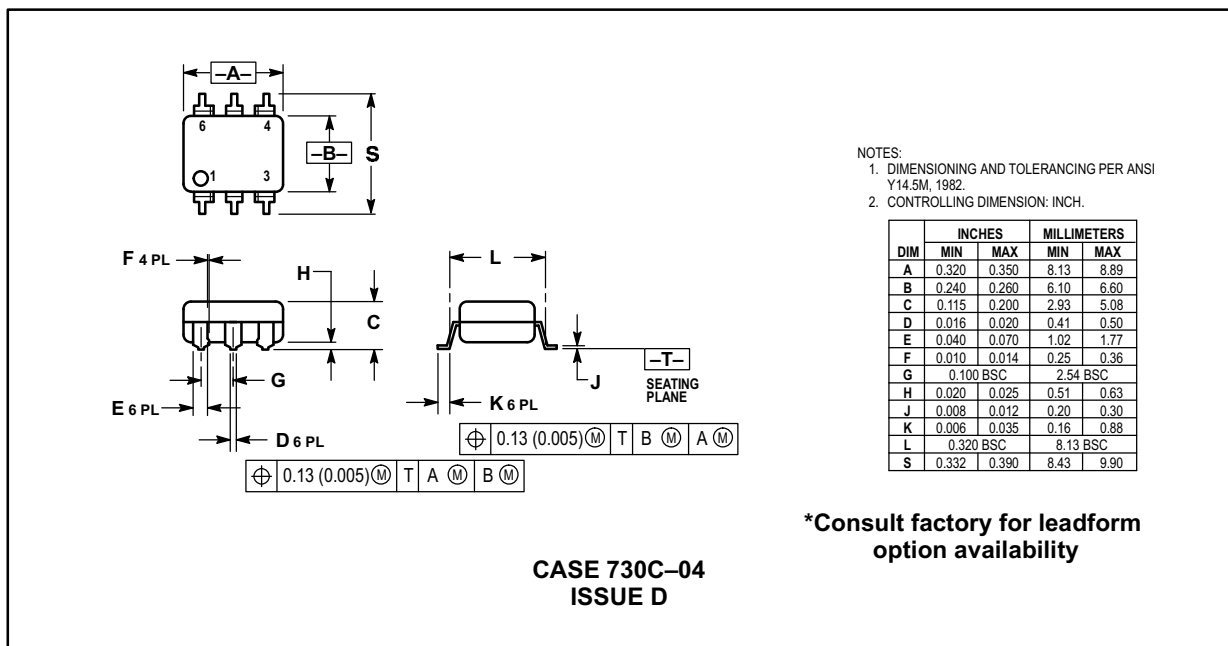
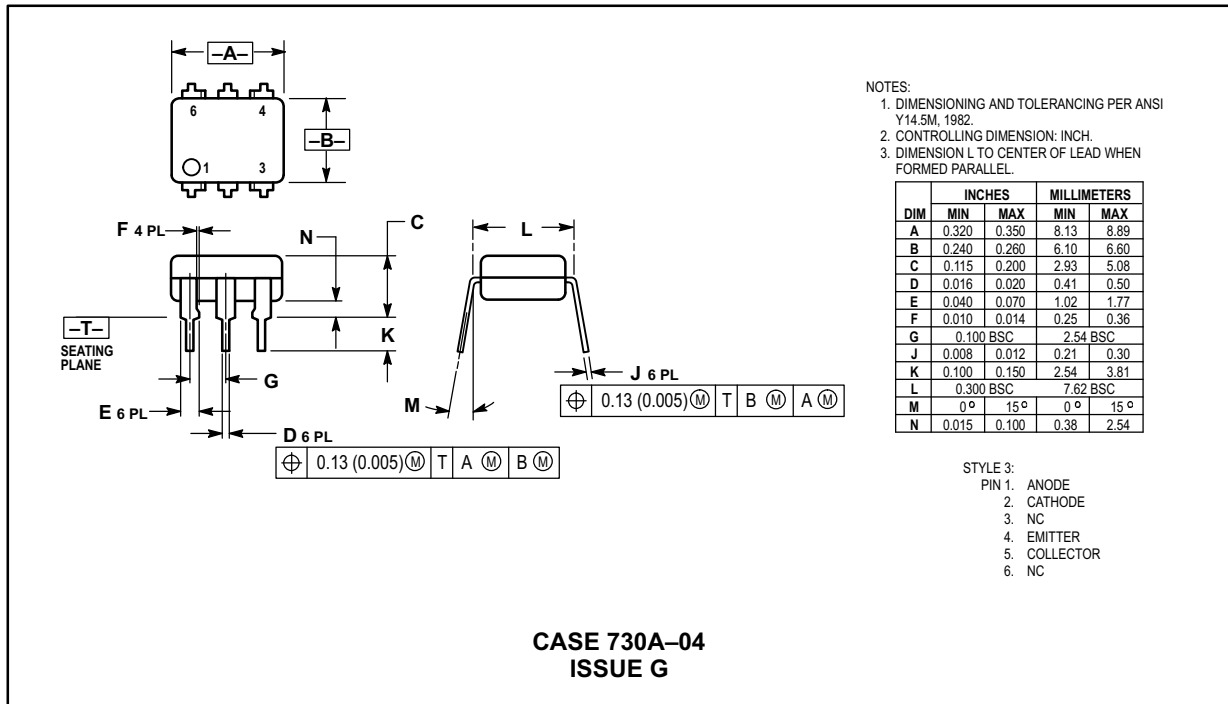


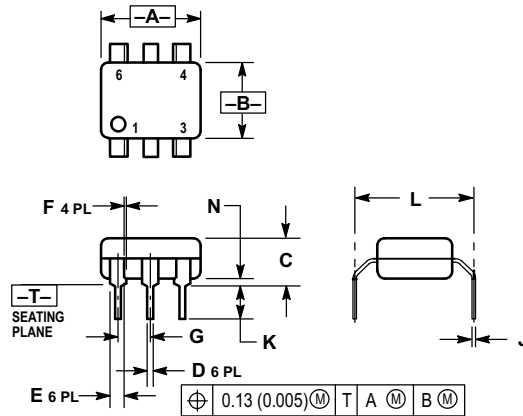
Figure 10. Switching Time Test Circuit and Waveforms

MOC8111 MOC8112 MOC8113

PACKAGE DIMENSIONS



MOC8111 MOC8112 MOC8113



- 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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MOC8111/D

