



# 6-Pin DIP Optoisolator Darlington Output (No Base Connection)

The MOC119 device consists of a gallium arsenide infrared emitting diode optically coupled to a monolithic silicon photodarlington detector. The chip to Pin 6 connection has been eliminated for better performance when used in high noise environments.

It is designed for use in applications requiring high improved noise immunity.

- Provides Higher Output Collector Current ( $I_C$ ) with Lower Values of Input Drive Current ( $I_F$ )
- **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

- Appliance, Measuring Instruments
- Interfacing and coupling systems of different potentials and impedances
- Monitor and Detection Circuits
- I/O Interfaces for Computers
- Solid State Relays
- Portable Electronics
- Programmable Controllers

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

Rating	Symbol	Value	Unit
<b>INPUT LED</b>			
Reverse Voltage	$V_R$	3	Volts
Forward Current — Continuous	$I_F$	60	mA
LED Power Dissipation @ $T_A = 25^\circ\text{C}$ with Negligible Power in Output Detector	$P_D$	120	mW
Derate above $25^\circ\text{C}$		1.41	mW/ $^\circ\text{C}$

### OUTPUT DETECTOR

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

### TOTAL DEVICE

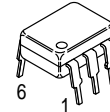
Isolation Surge Voltage <sup>(1)</sup> (Peak ac Voltage, 60 Hz, 1 sec Duration)	$V_{ISO}$	7500	Vac(pk)
Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	250 2.94	mW mW/ $^\circ\text{C}$
Ambient Operating Temperature Range <sup>(2)</sup>	$T_A$	-55 to +100	$^\circ\text{C}$
Storage Temperature Range <sup>(2)</sup>	$T_{stg}$	-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.

GlobalOptoisolator is a trademark of Motorola, Inc.

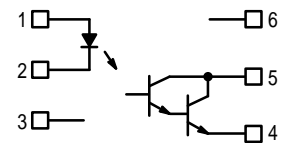
**MOC119**  
[CTR = 300% Min]

### 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.

# MOC119

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)<sup>(1)</sup>

Characteristic	Symbol	Min	Typ <sup>(1)</sup>	Max	Unit
<b>INPUT LED</b>					
Reverse Leakage Current (V <sub>R</sub> = 3 V)	I <sub>R</sub>	—	0.05	100	μA
Forward Voltage (I <sub>F</sub> = 10 mA)	V <sub>F</sub>	—	1.15	1.5	Volts
Capacitance (V <sub>R</sub> = 0 V, f = 1 MHz)	C	—	18	—	pF

## PHOTOTRANSISTOR (T<sub>A</sub> = 25°C and I<sub>F</sub> = 0 unless otherwise noted)

Collector–Emitter Dark Current (V <sub>CE</sub> = 10 V)	I <sub>CEO</sub>	—	—	100	nA
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 100 μA)	V <sub>(BR)CEO</sub>	30	—	—	Volts
Emitter–Collector Breakdown Voltage (I <sub>E</sub> = 10 μA)	V <sub>(BR)ECO</sub>	7	—	—	Volts

## COUPLED (T<sub>A</sub> = 25°C unless otherwise noted)

Collector Output Current <sup>(3)</sup> (V <sub>CE</sub> = 2 V, I <sub>F</sub> = 10 mA)	I <sub>C</sub> (CTR) <sup>(2)</sup>	30 (300)	45 (450)	—	mA (%)
Isolation Surge Voltage <sup>(4,5)</sup> , 60 Hz ac Peak, 1 Second	V <sub>ISO</sub>	7500	—	—	Vac(pk)
Isolation Resistance <sup>(4)</sup> (V = 500 V)	R <sub>ISO</sub>	—	10 <sup>11</sup>	—	Ohms
Collector–Emitter Saturation Voltage <sup>(3)</sup> (I <sub>C</sub> = 10 mA, I <sub>F</sub> = 10 mA)	V <sub>CE(sat)</sub>	—	—	1	Volt
Isolation Capacitance <sup>(4)</sup> (V = 0 V, f = 1 MHz)	C <sub>ISO</sub>	—	0.2	—	pF

## SWITCHING (Figures 4, 5)

Turn–On Time	V <sub>CE</sub> = 10 V, R <sub>L</sub> = 100 Ω, I <sub>F</sub> = 5 mA <sup>(6)</sup>	t <sub>on</sub>	—	3.5	—	μs
Turn–Off Time		t <sub>off</sub>	—	95	—	
Rise Time		t <sub>r</sub>	—	1	—	
Fall Time		t <sub>f</sub>	—	2	—	

1. Always design to the specified minimum/maximum electrical limits (where applicable).
2. Current Transfer Ratio (CTR) = I<sub>C</sub>/I<sub>F</sub> × 100%.
3. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2%.
4. For this test, LED Pins 1 and 2 are common and Phototransistor Pins 4 and 5 are common.
5. Isolation Surge Voltage, V<sub>ISO</sub>, is an internal device dielectric breakdown rating.
6. For test circuit setup and waveforms, refer to Figure 9.

## TYPICAL CHARACTERISTICS

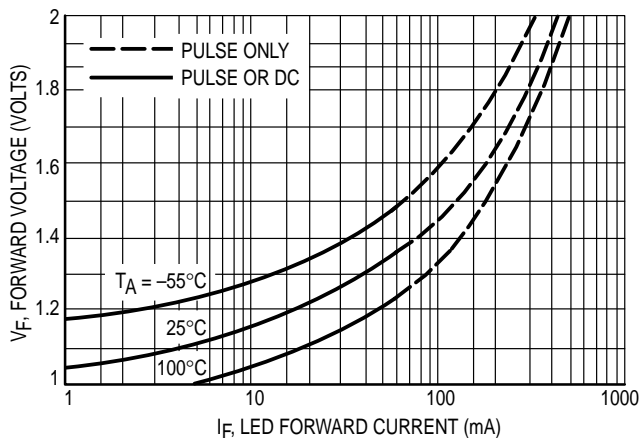


Figure 1. LED Forward Voltage versus Forward Current

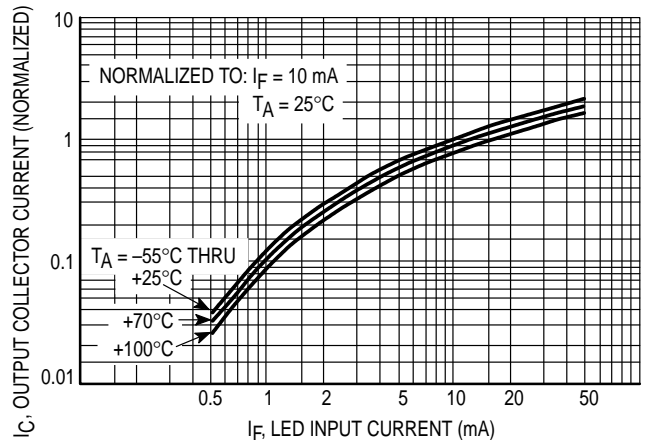


Figure 2. Output Current versus Input Current

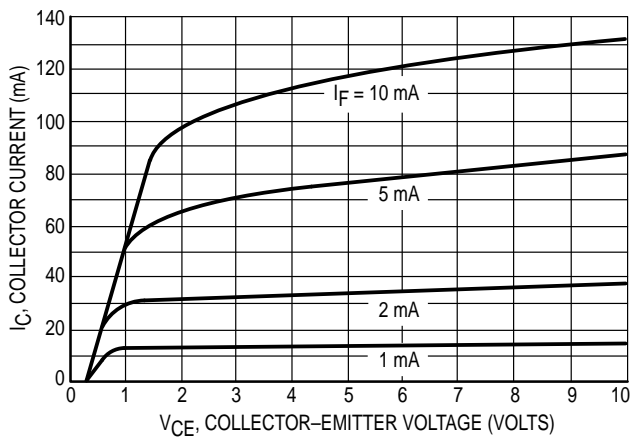


Figure 3. Collector Current versus Collector-Emitter Voltage

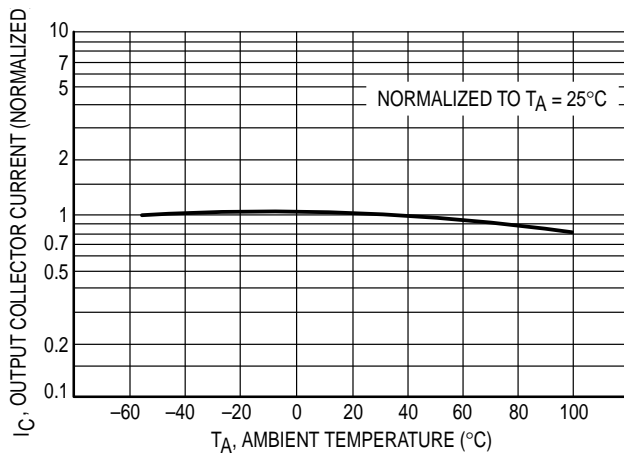


Figure 4. Output Current versus Ambient Temperature

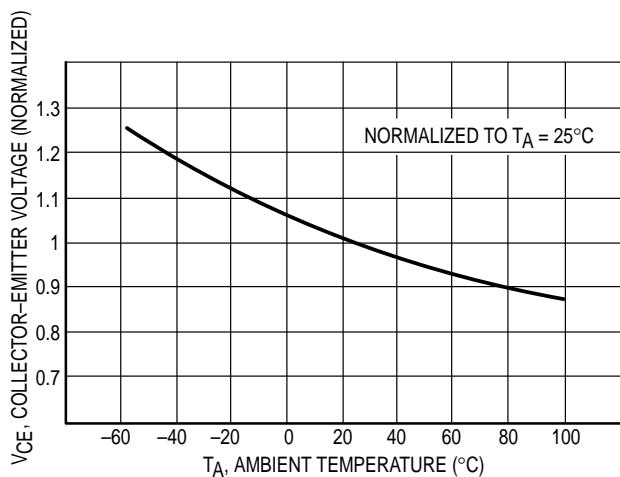


Figure 5. Collector-Emitter Voltage versus Ambient Temperature

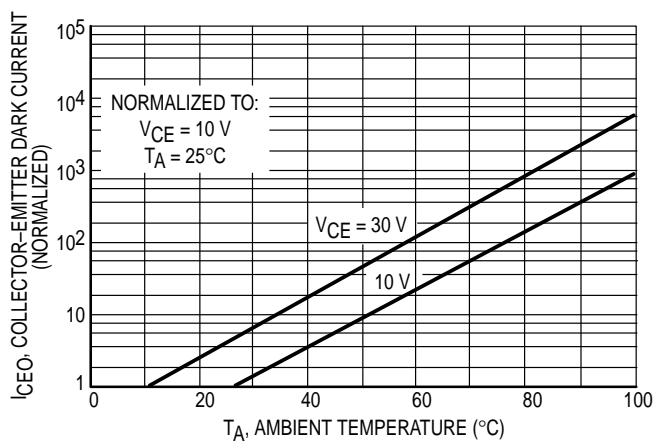


Figure 6. Collector-Emitter Dark Current versus Ambient Temperature

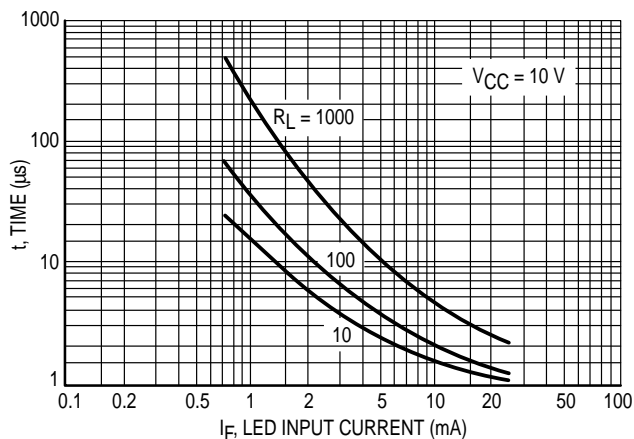


Figure 7. Turn-On Switching Times

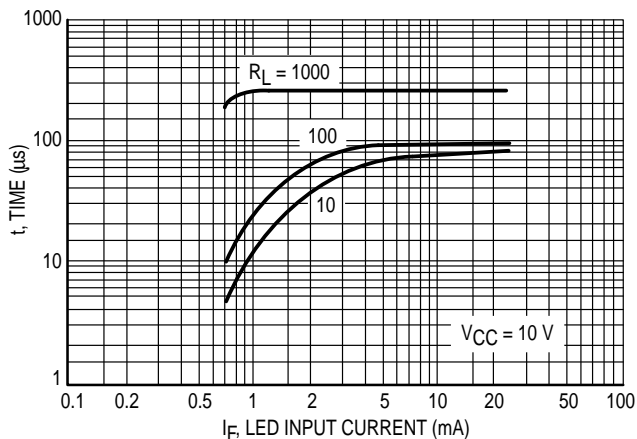
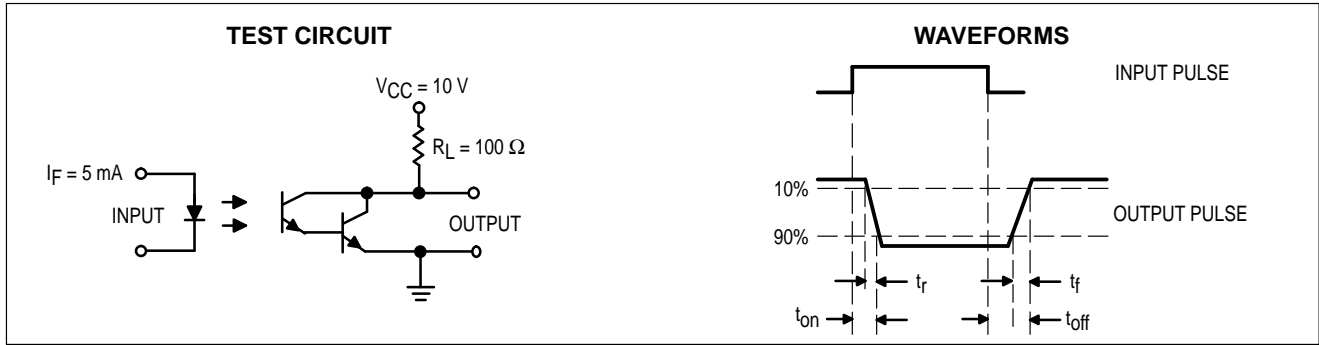
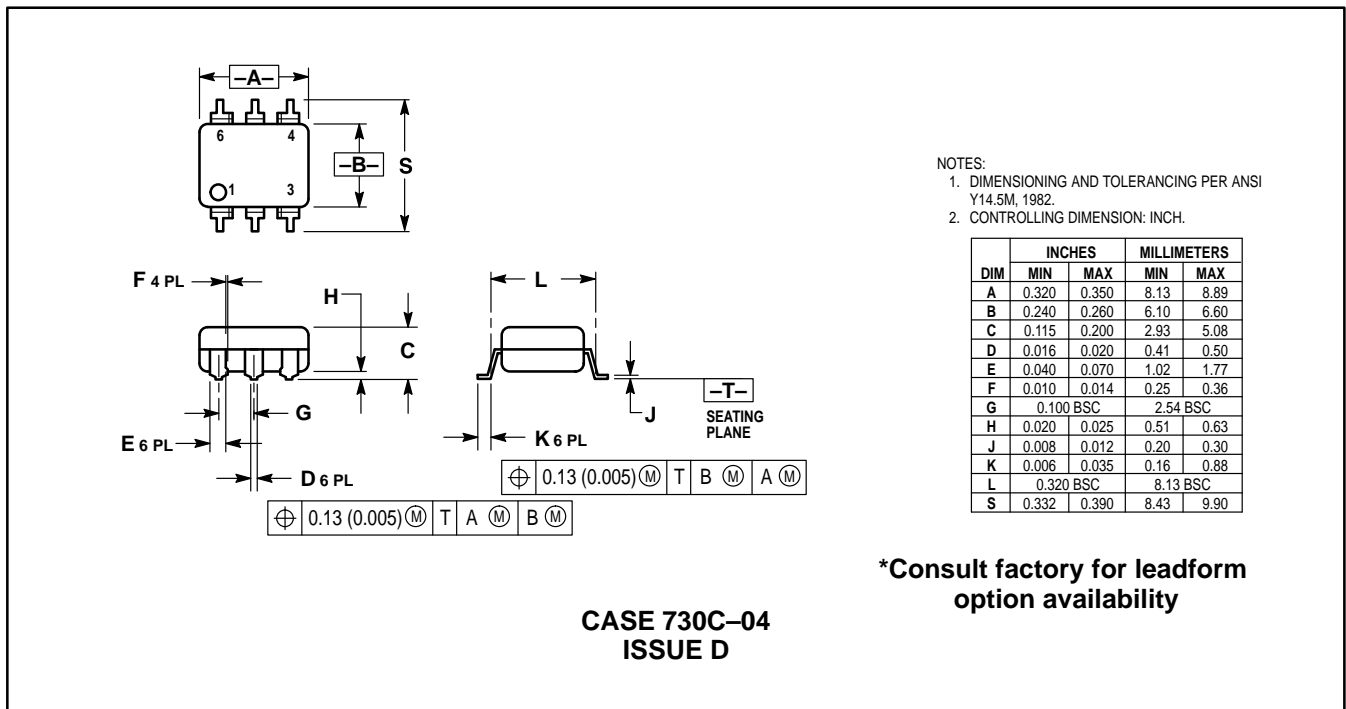
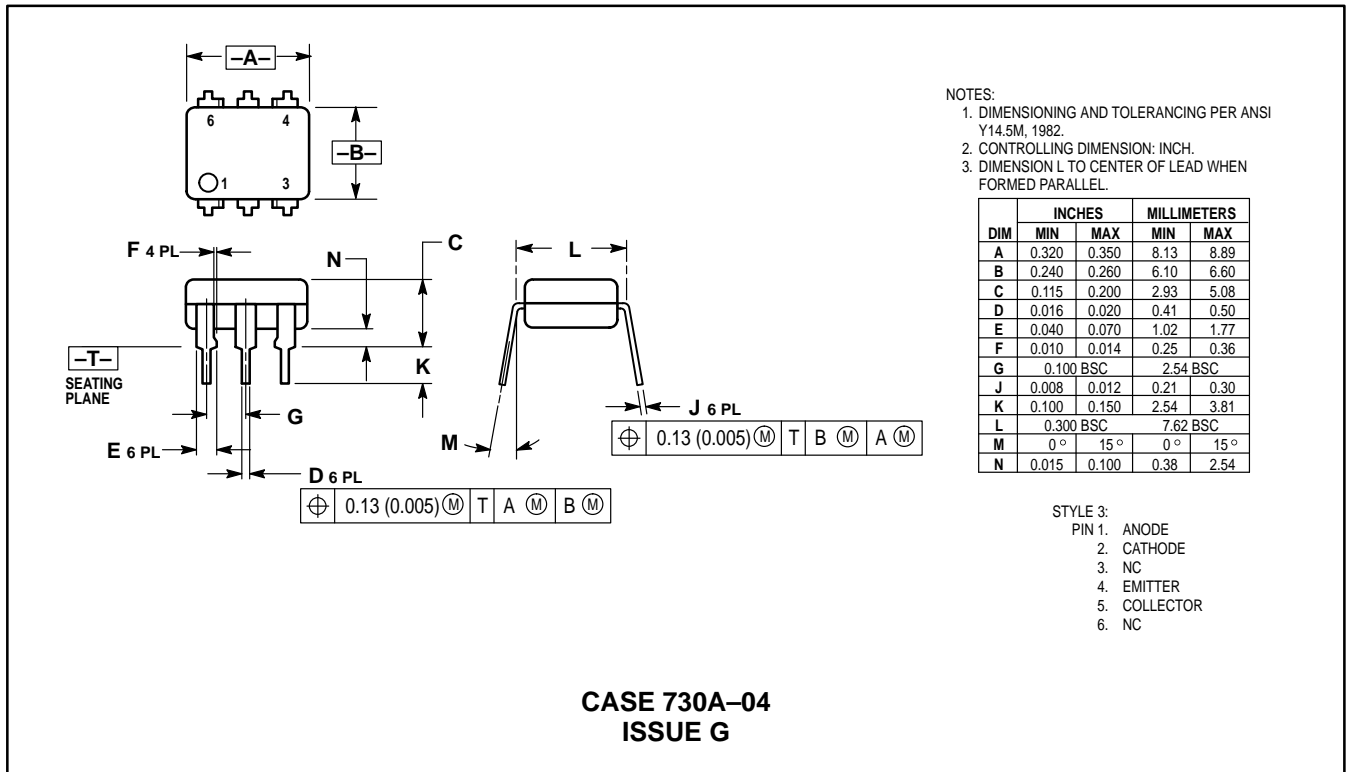


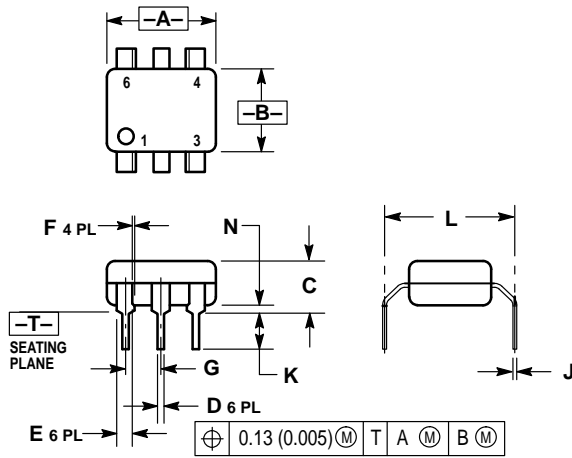
Figure 8. Turn-Off Switching Times



**Figure 9. Switching Time Test Circuit and Waveforms**

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	0.400	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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