FAIRCHILD SEMICONDUCTOR®

April 2008

MOC119M
Photodarlington Optocoupler (No Base Connection)

Features

- High current transfer ratio of 300%
- No base connection for improved noise immunity
- Underwriters Laboratory (UL) recognized File #E90700
- IEC 60747-5-2 approval available as a test option – add option 'V' (e.g., MOC119VM)

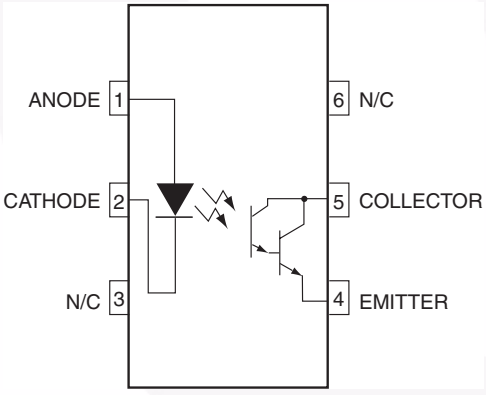
Applications

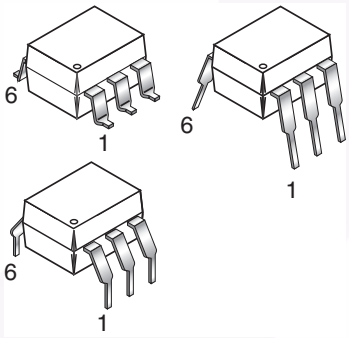
- Appliances, measuring instruments
- I/O interface for computers
- Programmable controllers
- Portable electronics
- Interfacing and coupling systems of different potentials and impedance
- Solid state relays

Description

The MOC119M device has a gallium arsenide infrared emitting diode coupled to a silicon darlington phototransistor.

Schematic





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Absolute Maximum Ratings (T_A = 25°C unless otherwise specified.)

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Value	Units
TOTAL DEVICE			
T_{STG}	Storage Temperature	-40 to +150	°C
T_{OPR}	Operating Temperature	-40 to +100	°C
T_{SOL}	Lead Solder Temperature (wave solder)	260 for 10 sec	°C
P_D	Total Device Power Dissipation @ T_A = 25°C	250	mW
	Derate above 25°C	2.94	mW/°C
EMITTER			
I_F	DC/Average Forward Input Current	60	mA
V_R	Reverse Input Voltage	3	V
P_D	LED Power Dissipation @ T_A = 25°C	120	mW
	Derate above 25°C	1.41	mW/°C
DETECTOR			
V_{CEO}	Collector-Emitter Voltage	30	V
V_{ECO}	Emitter-Collector Voltage	7	V
P_D	Detector Power Dissipation @ T_A = 25°C	150	mW
	Derate above 25°C	1.76	mW/°C
I_C	Continuous Collector Current	150	mA

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Electrical Characteristics (T_A = 25°C unless otherwise specified.)

Individual Component Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.*	Max.	Unit
EMITTER						
V_F	Input Forward Voltage	I_F = 10mA		1.15	1.5	V
C_{IN}	Input Capacitance	V_R = 0, f = 1MHz		18		pF
I_R	Reverse Leakage Current	V_R = 3.0V		0.05	100	µA
DETECTOR						
BV_{CEO}	Collector-Emitter Breakdown Voltage	I_C = 100µA	30			V
BV_{ECO}	Emitter-Collector Breakdown Voltage	I_E = 10µA	7			V
I_{CEO}	Collector-Emitter Dark Current	V_{CE} = 10V			100	nA

Transfer Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.*	Max.	Units
DETECTOR						
CTR	Current Transfer Ratio	I_F = 10mA, V_{CE} = 2V	300	450		%
$V_{CE\ (SAT)}$	Collector-Emitter Saturation Voltage	I_C = 10mA, I_F = 10mA			1	V
SWITCHING TIMES						
t_{on}	Turn-on Time	V_{CE} = 10V, R_L = 100Ω, I_F = 5mA		3.5		µs
t_{off}	Turn-off Time			95		µs

Isolation Characteristics

Symbol	Characteristic	Test Conditions	Min.	Typ.*	Max.	Units
V_{ISO}	Input-Output Isolation Voltage	f = 60Hz, t = 1 sec.	7500			Vac(pk)
R_{ISO}	Isolation Resistance	V_{I-O} = 500VDC		10^{11}		Ω
C_{ISO}	Isolation Capacitance	V = 0V, f = 1MHz		0.2		pF

*Typical values at T_A = 25°C

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Typical Performance Curves

Fig. 1 LED Forward Voltage vs. Forward Current

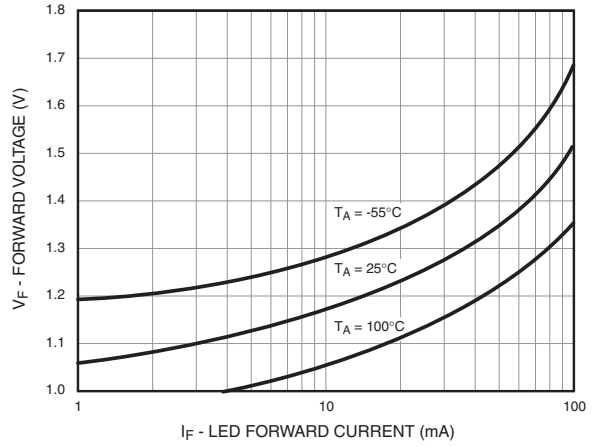


Fig. 2 Normalized CTR vs. Forward Current

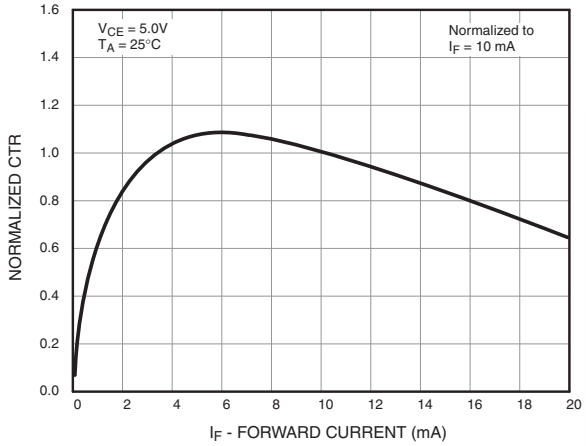


Fig. 3 Normalized CTR vs. Ambient Temperature

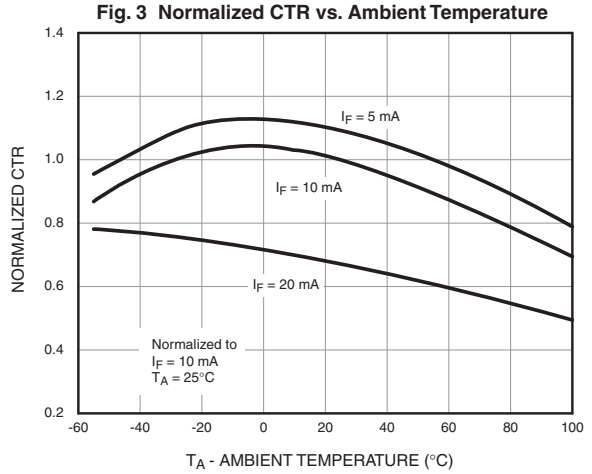


Fig. 4 Collector-Emitter Saturation Voltage vs. Collector Current

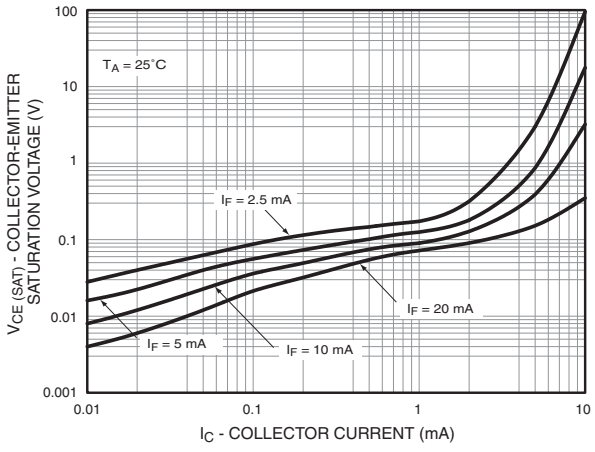
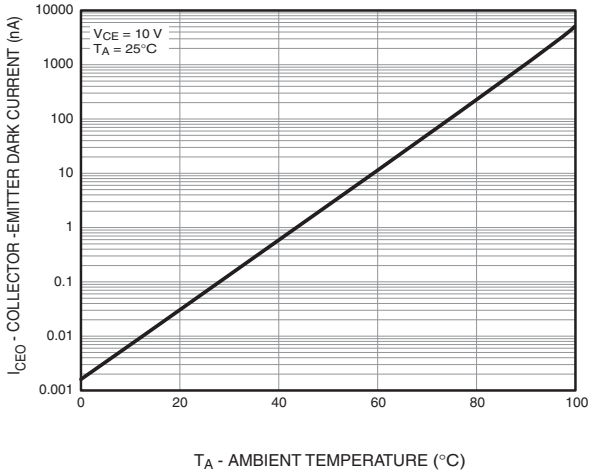
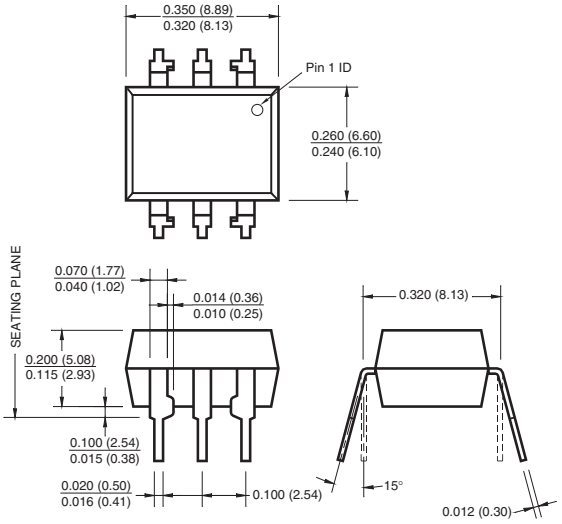


Fig. 5 Dark Current vs. Ambient Temperature

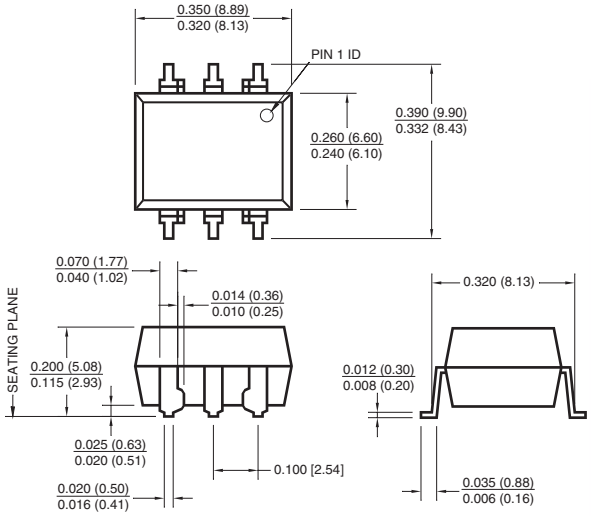


Package Dimensions

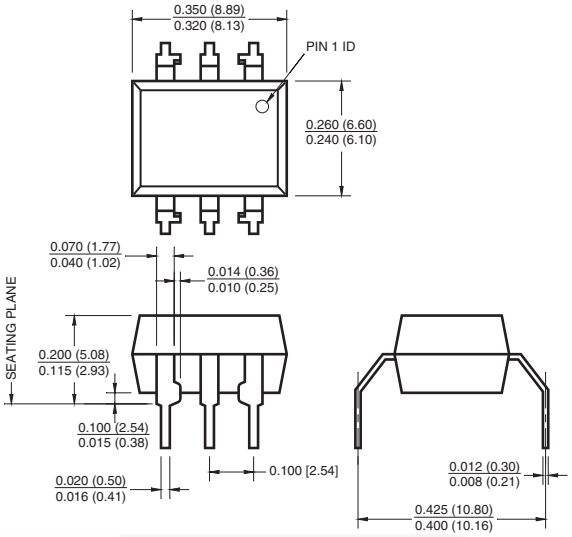
Through Hole



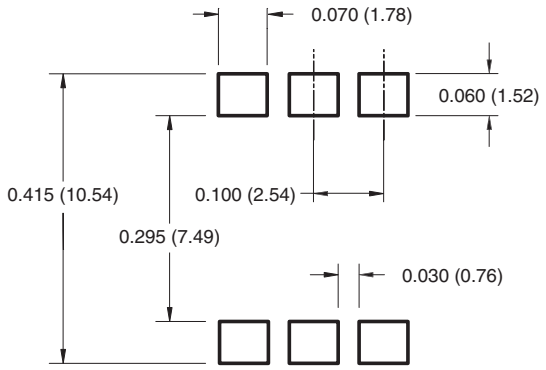
Surface Mount



0.4" Lead Spacing



Recommended Pay Layout for Surface Mount Leadform

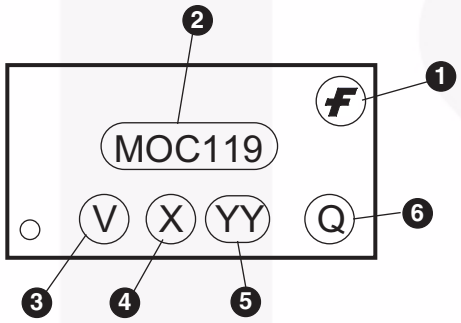


Note:
All dimensions are in inches (millimeters).

Ordering Information

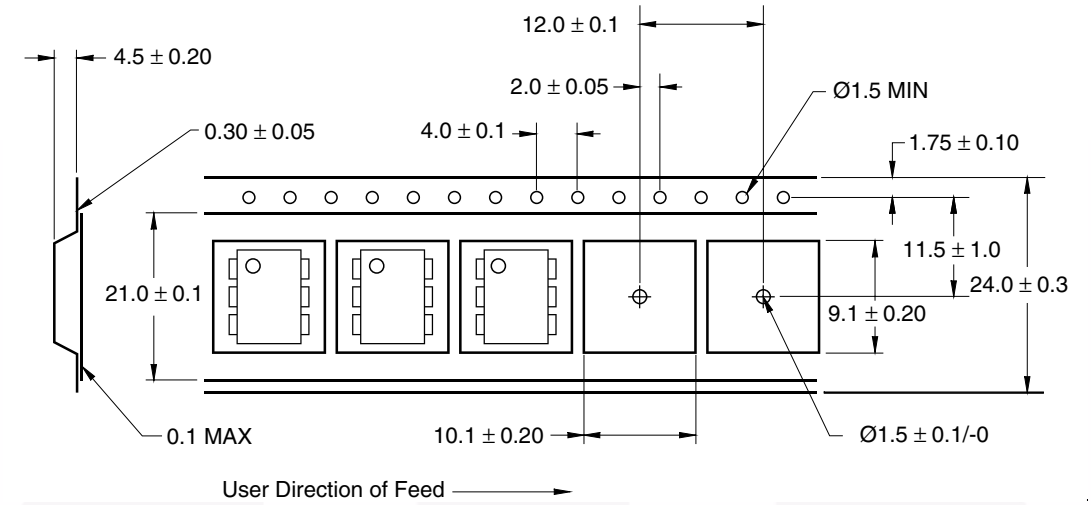
Suffix	Example	Option
No Suffix	MOC119M	Standard Through Hole Device (50 units per tube)
S	MOC119SM	Surface Mount Lead Bend
SR2	MOC119SR2M	Surface Mount; Tape and Reel (1,000 units per reel)
T	MOC119TM	0.4" Lead Spacing
V	MOC119VM	IEC60747-5-2 approved
TV	MOC119TVM	IEC60747-5-2 approved, 0.4" Lead Spacing
SV	MOC119SVM	IEC60747-5-2 approved, Surface Mount
SR2V	MOC119SR2VM	IEC60747-5-2 approved, Surface Mount, Tape & Reel (1,000 units per reel)

Marking Information



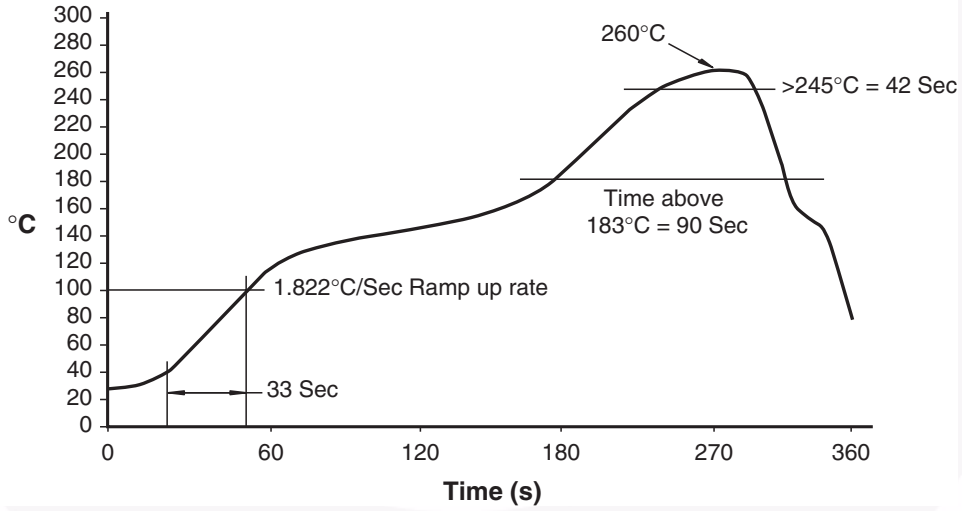
Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One digit year code, e.g., ‘7’
5	Two digit work week ranging from ‘01’ to ‘53’
6	Assembly package code

Tape Dimensions



Note:
All dimensions are in millimeters.

Reflow Soldering Profile



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Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
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