

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)

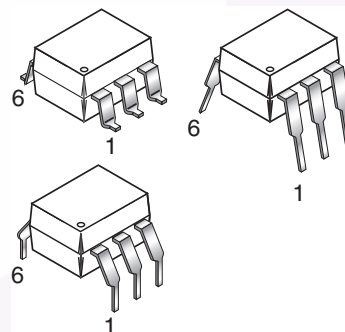
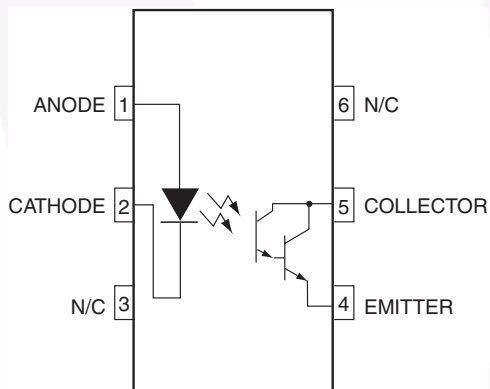
Applications

- 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



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

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise specified.)**Individual Component Characteristics**

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

Transfer Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.*	Max.	Units
DETECTOR						
CTR	Current Transfer Ratio	$I_F = 10\text{mA}, V_{CE} = 2\text{V}$	300	450		%
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	$I_C = 10\text{mA}, I_F = 10\text{mA}$			1	V
SWITCHING TIMES						
t_{on}	Turn-on Time	$V_{CE} = 10\text{V}, R_L = 100\Omega,$ $I_F = 5\text{mA}$		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	$f = 60\text{Hz}, t = 1 \text{ sec.}$	7500			Vac(pk)
R_{ISO}	Isolation Resistance	$V_{I-O} = 500\text{VDC}$		10^{11}		Ω
C_{ISO}	Isolation Capacitance	$V = 0\text{V}, f = 1\text{MHz}$		0.2		pF

*Typical values at $T_A = 25^\circ\text{C}$

Typical Performance Curves

Fig. 1 LED Forward Voltage vs. Forward Current

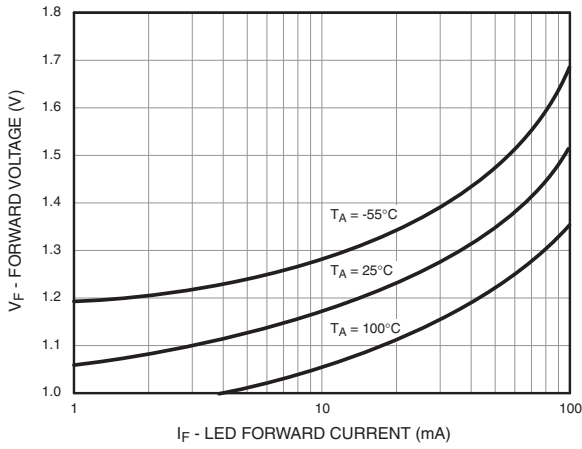


Fig. 2 Normalized CTR vs. Forward Current

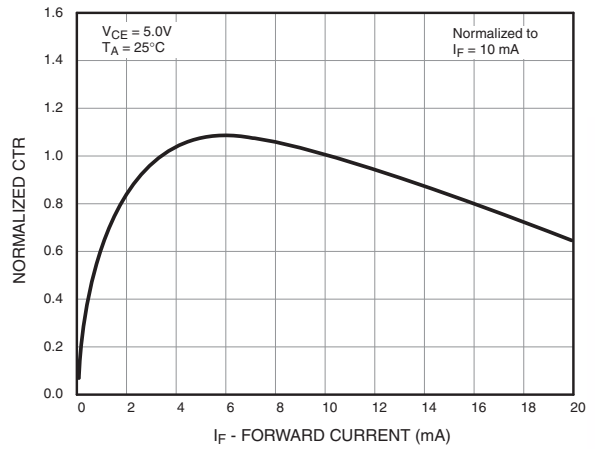


Fig. 3 Normalized CTR vs. Ambient Temperature

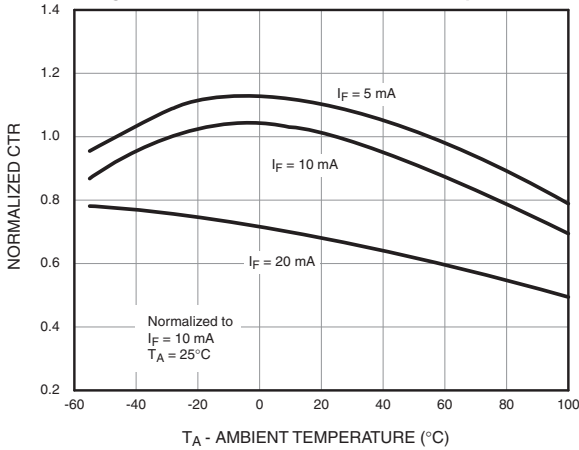


Fig. 4 Collector-Emitter Saturation Voltage vs. Collector Current

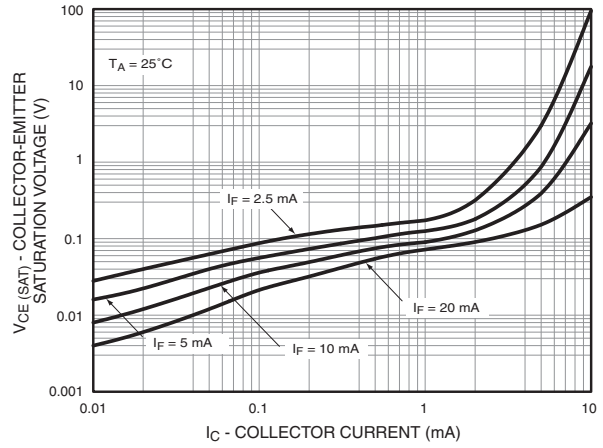
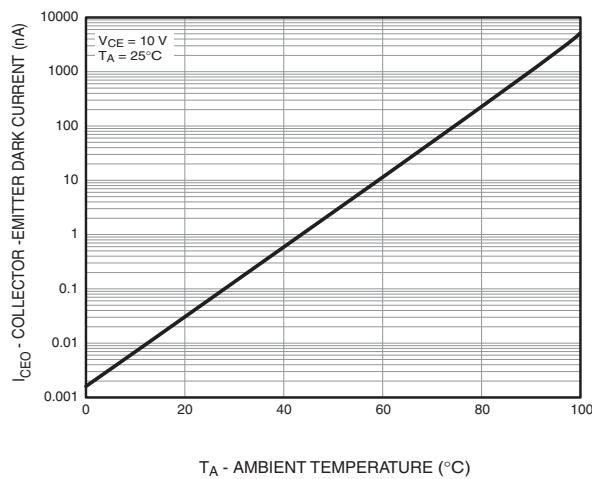
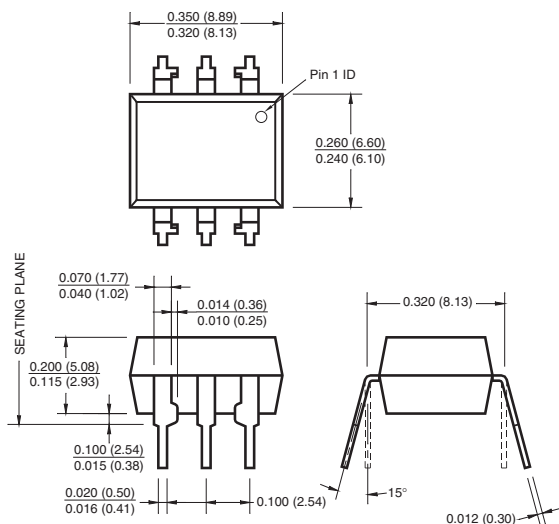


Fig. 5 Dark Current vs. Ambient Temperature

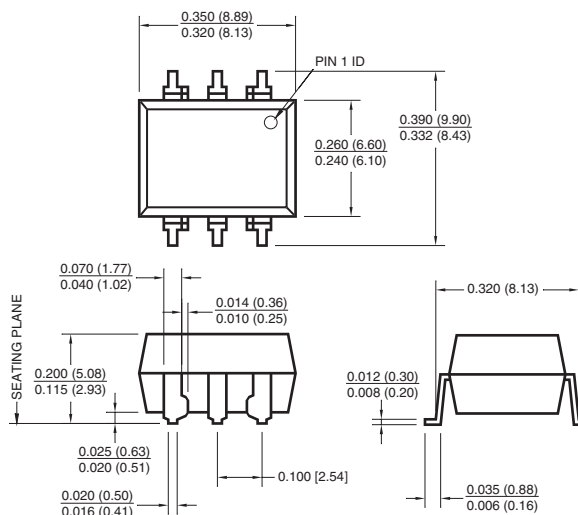


Package Dimensions

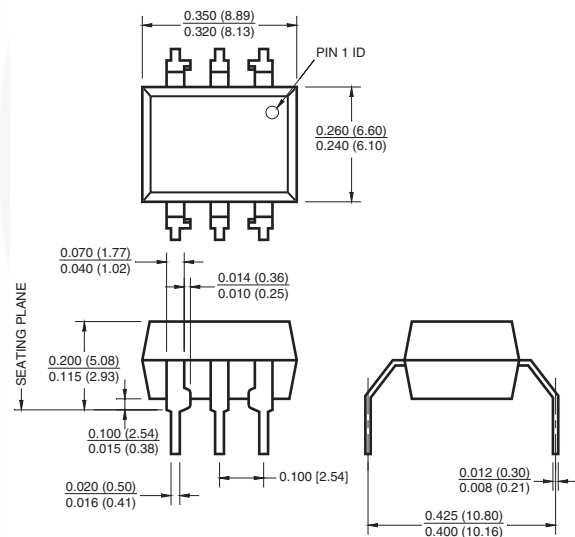
Through Hole



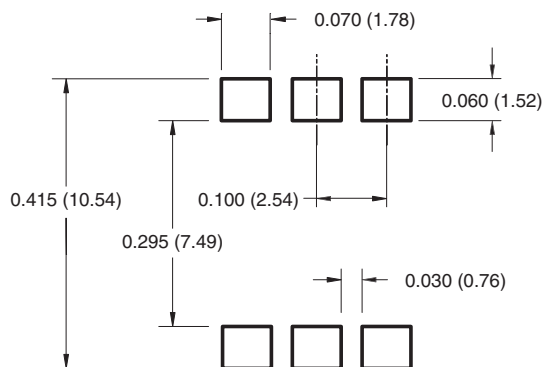
Surface Mount



0.4" Lead Spacing



Recommended Pay Layout for Surface Mount Leadform



Note:

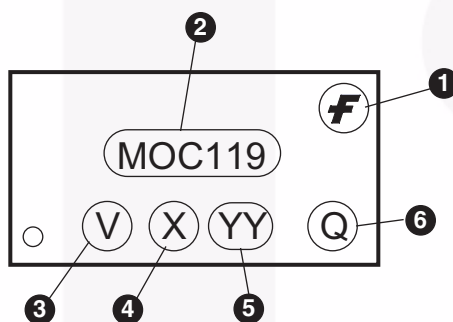
All dimensions are in inches (millimeters).



Ordering Information

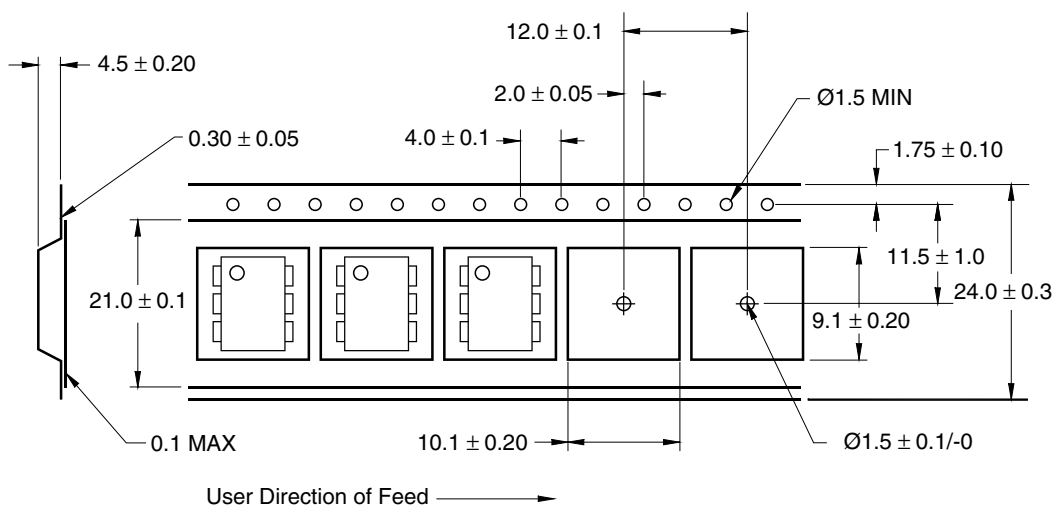
Suffix	Example	Option
No Suffix	MOC119M	Standard Through Hole Device (50 units per tube)
S	MOC119SM	Surface Mount Lead Bend
SR2	MOC119SR2M	Surface Mount; Tape and Reel (1,000 units per reel)
T	MOC119TM	0.4" Lead Spacing
V	MOC119VM	IEC60747-5-2 approved
TV	MOC119TVM	IEC60747-5-2 approved, 0.4" Lead Spacing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



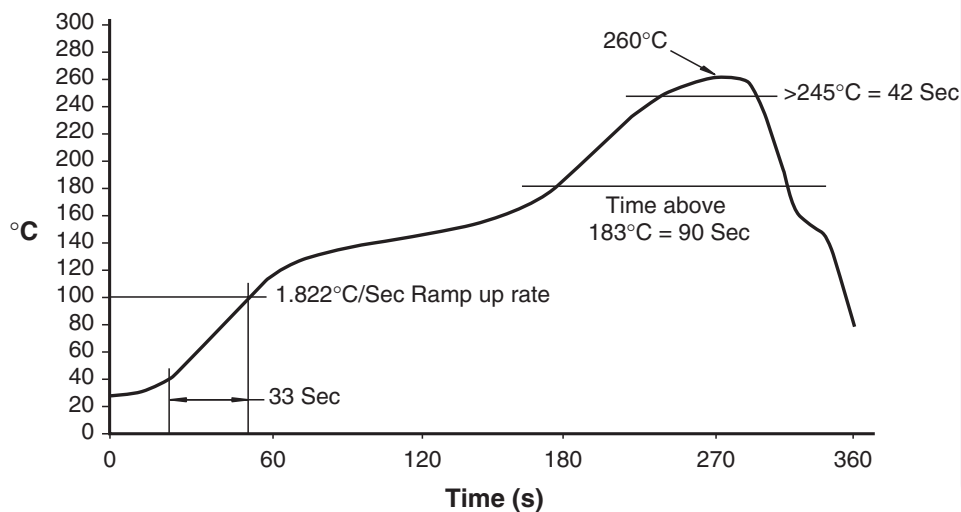
Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One digit year code, e.g., '7'
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

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.
Preliminary	First Production	This datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
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