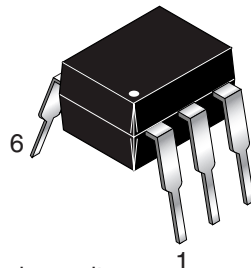


## DESCRIPTION

The MOC119 device has a gallium arsenide infrared emitting diode coupled to a silicon darlington phototransistor.

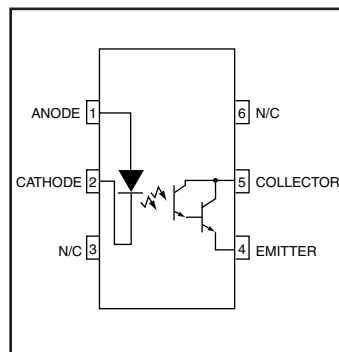


## FEATURES

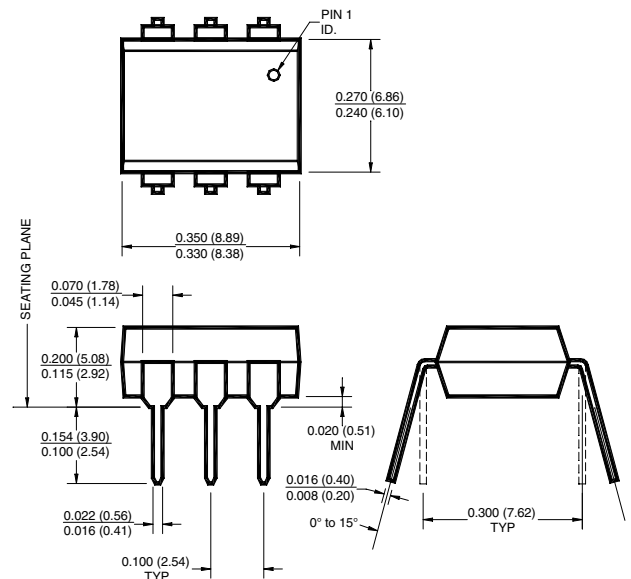
- High current transfer ratio of 300%
- No base connection for improved noise immunity
- Underwriters Laboratory (UL) recognized File# E90700

## 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



## PACKAGE DIMENSIONS



### NOTE

All dimensions are in inches (millimeters)

## ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ Unless otherwise specified.)

| Parameter                                              | Symbol           | Value          | Units    |
|--------------------------------------------------------|------------------|----------------|----------|
| TOTAL DEVICE                                           |                  |                |          |
| Storage Temperature                                    | T <sub>STG</sub> | -55 to +150    | °C       |
| Operating Temperature                                  | T <sub>OPR</sub> | -55 to +100    | °C       |
| Lead Solder Temperature                                | T <sub>SOL</sub> | 260 for 10 sec | °C       |
| Total Device Power Dissipation @ T <sub>A</sub> = 25°C | P <sub>D</sub>   | 250            | mW       |
| Derate above 25°C                                      |                  | 2.94           | mW/°C    |
| Input-Output Isolation Voltage                         | V <sub>ISO</sub> | 5300           | Vac(rms) |
| EMITTER                                                |                  |                |          |
| DC/Average Forward Input Current                       | I <sub>F</sub>   | 60             | mA       |
| Reverse Input Voltage                                  | V <sub>R</sub>   | 3              | V        |
| LED Power Dissipation @ T <sub>A</sub> = 25°C          | P <sub>D</sub>   | 120            | mW       |
| Derate above 25°C                                      |                  | 1.41           | mW/°C    |
| DETECTOR                                               |                  |                |          |
| Collector-Emitter Voltage                              | V <sub>CEO</sub> | 30             | V        |
| Emitter-Collector Voltage                              | V <sub>ECO</sub> | 7              | V        |
| Detector Power Dissipation @ T <sub>A</sub> = 25°C     | P <sub>D</sub>   | 150            | mW       |
| Derate above 25°C                                      |                  | 1.76           | mW/°C    |
| Continuous Collector Current                           | I <sub>C</sub>   | 150            | mA       |

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  Unless otherwise specified.)

**INDIVIDUAL COMPONENT CHARACTERISTICS**

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

**TRANSFER CHARACTERISTICS**

| DC Characteristic       | Test Conditions                                  | Symbol | Min      | Typ**    | Max | Units  |
|-------------------------|--------------------------------------------------|--------|----------|----------|-----|--------|
| Current Transfer Ratio, | ( $I_F = 10\text{ mA}$ , $V_{CE} = 2\text{ V}$ ) | CTR    | 30 (300) | 45 (450) |     | mA (%) |

**TRANSFER CHARACTERISTICS**

| Characteristic         | Test Conditions                                                                 | Symbol    | Min | Typ** | Max | Units         |
|------------------------|---------------------------------------------------------------------------------|-----------|-----|-------|-----|---------------|
| <b>SWITCHING TIMES</b> |                                                                                 |           |     |       |     |               |
| Turn-on Time           | (V <sub>CE</sub> = 10 V, R <sub>L</sub> = 100 $\Omega$ , I <sub>F</sub> = 5 mA) | $t_{on}$  |     | 3.5   |     | $\mu\text{s}$ |
| Turn-off Time          |                                                                                 | $t_{off}$ |     | 95    |     | $\mu\text{s}$ |

**ISOLATION CHARACTERISTICS**

| Characteristic                         | Test Conditions                                 | Symbol        | Min  | Typ**     | Max | Units    |
|----------------------------------------|-------------------------------------------------|---------------|------|-----------|-----|----------|
| Input-Output Isolation Voltage         | ( $I_{I-O} \leq 1\text{ }\mu\text{A}$ , 1 min.) | $V_{ISO}$     | 7500 |           |     | Vac(pk)  |
|                                        | ( $I_{I-O} \leq 1\text{ }\mu\text{A}$ , 1 min.) |               | 5300 |           |     | Vac(rms) |
| Isolation Resistance                   | ( $V_{I-O} = 500\text{ VDC}$ )                  | $R_{ISO}$     |      | $10^{11}$ |     | $\Omega$ |
| Isolation Capacitance                  | ( $V = 0\text{ V}$ , $f = 1\text{ MHz}$ )       | $C_{ISO}$     |      | 0.2       |     | pf       |
| Collector - Emitter Saturation Voltage | ( $I_C = 10\text{ mA}$ , $I_F = 10\text{ mA}$ ) | $V_{CE(SAT)}$ |      |           | 1   | V        |

Note

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

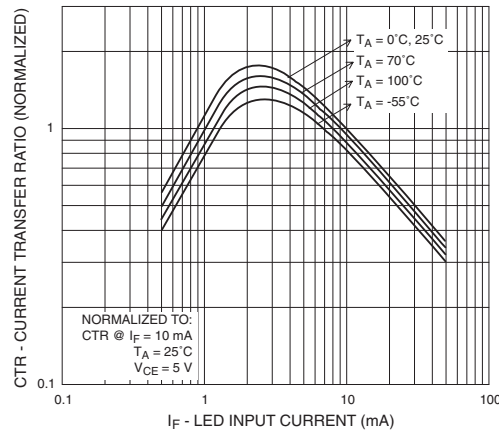


Fig. 1 Output Current vs. Input Current

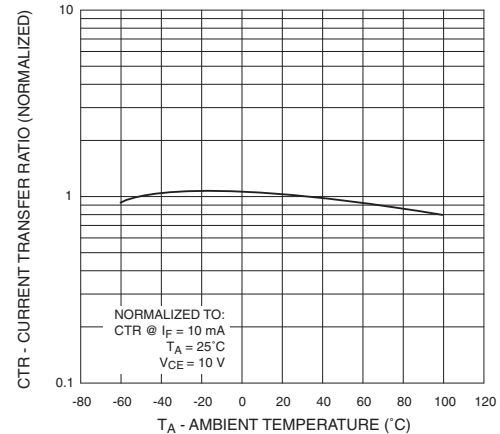


Fig. 2 Current Transfer Ratio vs. Ambient Temperature

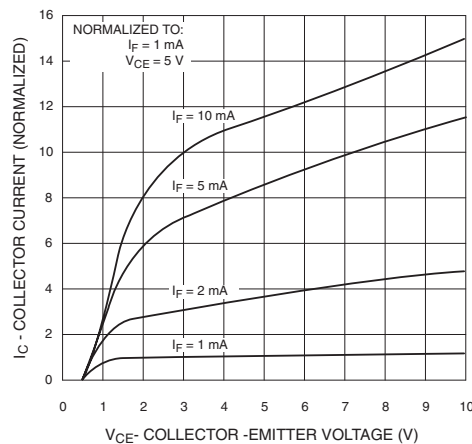


Fig. 3 Collector Current vs. Collector-Emitter Voltage

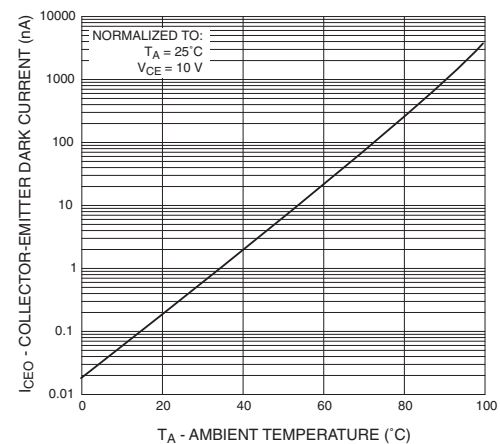


Fig. 4 Dark Current vs. Ambient Temperature

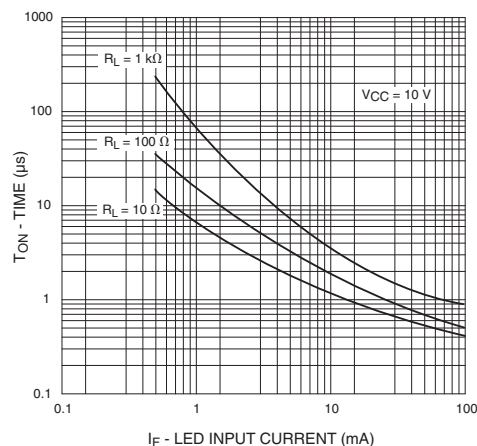


Fig. 5 Turn-On Time vs. Input Current

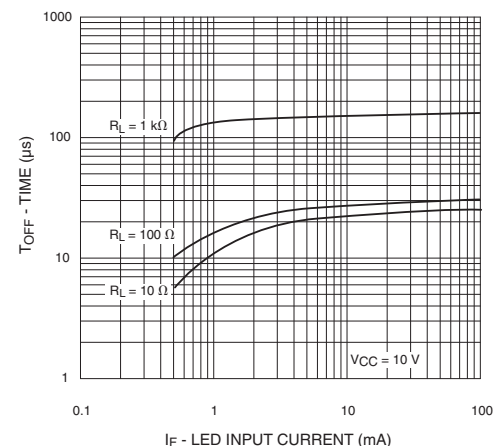
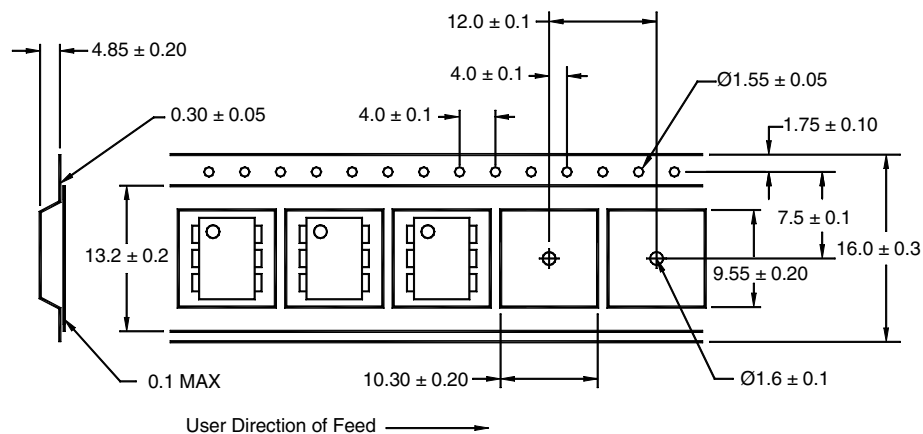


Fig. 6 Turn-Off Time vs. Input Current

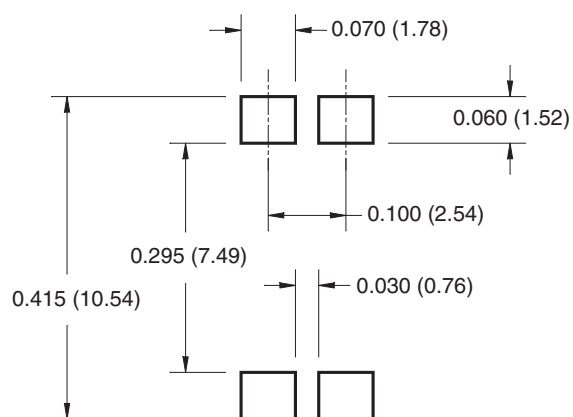
## ORDERING INFORMATION

| Option | Order Entry Identifier | Description                          |
|--------|------------------------|--------------------------------------|
| S      | .S                     | Surface Mount Lead Bend              |
| SD     | .SD                    | Surface Mount; Tape and reel         |
| W      | .W                     | 0.4" Lead Spacing                    |
| 300    | .300                   | VDE 0884                             |
| 300W   | .300W                  | VDE 0884, 0.4" Lead Spacing          |
| 3S     | .3S                    | VDE 0884, Surface Mount              |
| 3SD    | .3SD                   | VDE 0884, Surface Mount, Tape & Reel |

## QT Carrier Tape Specifications ("D" Taping Orientation)



**Footprint Dimensions (Surface Mount)**

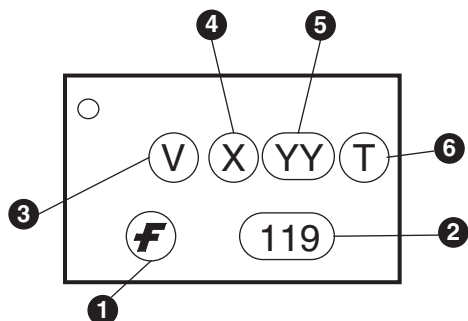


**NOTE**

All dimensions are in inches (millimeters)

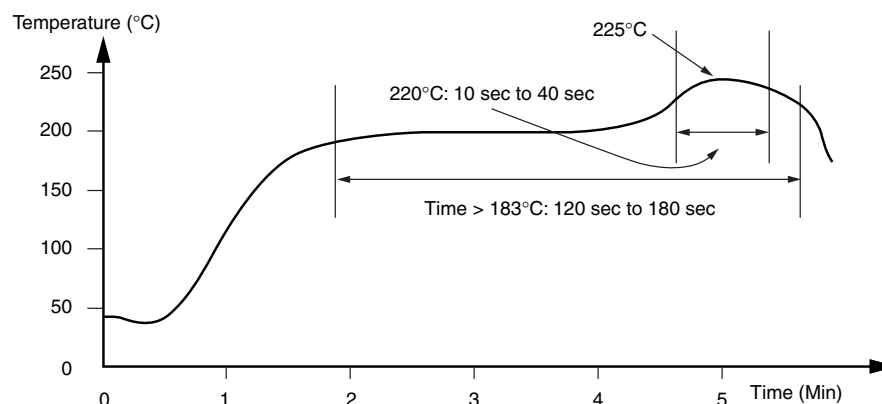
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## MARKING INFORMATION



| 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                                                                    |
| 5           | Two digit work week ranging from '01' to '53'                                          |
| 6           | Assembly package code                                                                  |

### Recommended Thermal Reflow Profile for Surface Mount DIP Package



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| ActiveArray™                         | FASTr™              | LittleFET™    | PowerEdge™          | SuperFET™       |
| Bottomless™                          | FPS™                | MICROCOUPLER™ | PowerSaver™         | SuperSOT™-3     |
| CoolFET™                             | FRFET™              | MicroFET™     | PowerTrench®        | SuperSOT™-6     |
| CROSSVOLT™                           | GlobalOptoisolator™ | MicroPak™     | QFET®               | SuperSOT™-8     |
| DOMETM                               | GTO™                | MICROWIRE™    | QST™                | SyncFET™        |
| EcoSPARK™                            | HiSeC™              | MSX™          | QT Optoelectronics™ | TinyLogic®      |
| E <sup>2</sup> CMOS™                 | IPCTM               | MSXPro™       | Quiet Series™       | TINYOPTO™       |
| EnSigna™                             | i-Lo™               | OCX™          | RapidConfigure™     | TruTranslation™ |
| FACT™                                | ImpliedDisconnect™  | OCXPro™       | RapidConnect™       | UHC™            |
| FACT Quiet Series™                   |                     | OPTOLOGIC®    | µSerDes™            | UltraFET®       |
| Across the board. Around the world.™ |                     | OPTOPLANAR™   | SILENT SWITCHER®    | VCX™            |
| The Power Franchise®                 |                     | PACMAN™       | SMART START™        |                 |
| Programmable Active Droop™           |                     | POP™          | SPM™                |                 |

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| 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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