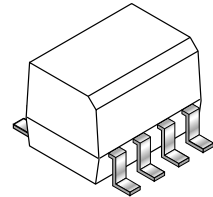


## MOC256-M

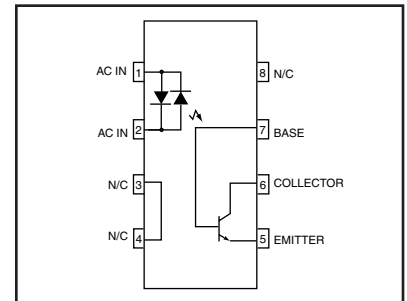
### DESCRIPTION

The MOC256-M is an AC input phototransistor optocoupler. The device consists of two infra-red emitters connected in anti-parallel and coupled to a silicon NPN phototransistor detector. It is designed for applications requiring the detection or monitoring of AC signals. The device is constructed with a standard SOIC-8 footprint.



### FEATURES

- UL Recognized File (#E90700, Volume 2)
- VDE recognized (File #136616)
  - Ordering option V (i.e. MOC256V-M)
- Industry Standard SOIC-8 Surface Mountable Package, with 0.050" lead spacing
- Available in Tape and Reel Option
- Bidirectional AC Input (Protection Against Reversed DC Bias)
- Guaranteed CTR Symmetry of 2:1 Maximum
- High Input-Output Isolation of 2500 Vac (rms) Guaranteed



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

| Rating                                                                                       | Symbol           | Value       | Unit                       |
|----------------------------------------------------------------------------------------------|------------------|-------------|----------------------------|
| <b>EMITTER</b>                                                                               |                  |             |                            |
| Forward Current - Continuous                                                                 | $I_F$            | 60          | mA                         |
| Forward Current - Peak (PW = 100 $\mu\text{s}$ , 120 pps)                                    | $I_F(\text{pk})$ | 1.0         | A                          |
| LED Power Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$          | $P_D$            | 90<br>0.8   | mW<br>mW/ $^\circ\text{C}$ |
| <b>DETECTOR</b>                                                                              |                  |             |                            |
| Collector-Emitter Voltage                                                                    | $V_{CEO}$        | 30          | V                          |
| Emitter-Base Voltage                                                                         | $V_{ECO}$        | 7.0         | V                          |
| Collector Current-Continuous                                                                 | $I_C$            | 150         | mA                         |
| Detector Power Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$     | $P_D$            | 150<br>1.76 | mW<br>mW/ $^\circ\text{C}$ |
| <b>TOTAL DEVICE</b>                                                                          |                  |             |                            |
| Input-Output Isolation Voltage<br>(f = 60 Hz, t = 1 min.)                                    | $V_{ISO}$        | 2500        | Vac(rms)                   |
| Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$            | 250<br>2.94 | mW<br>mW/ $^\circ\text{C}$ |
| Ambient Operating Temperature Range                                                          | $T_A$            | -40 to +100 | $^\circ\text{C}$           |
| Storage Temperature Range                                                                    | $T_{stg}$        | -40 to +150 | $^\circ\text{C}$           |

**MOC256-M**

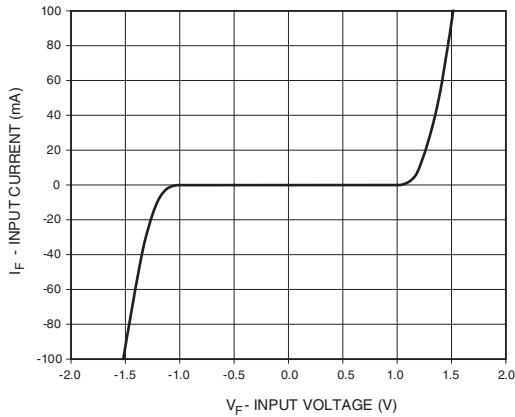
| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise specified) |                                                                                                                          |               |           |      |     |               |
|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|---------------|-----------|------|-----|---------------|
| Parameter                                                                                | Test Conditions                                                                                                          | Symbol        | Min       | Typ* | Max | Unit          |
| <b>EMITTER</b>                                                                           |                                                                                                                          |               |           |      |     |               |
| Input Forward Voltage                                                                    | ( $I_F = \pm 10\text{ mA}$ )                                                                                             | $V_F$         | —         | 1.2  | 1.5 | V             |
| Input Capacitance                                                                        | ( $V = 0\text{ V}$ , $f = 1\text{ MHz}$ )                                                                                | $C_J$         | —         | 20   | —   | pF            |
| <b>DETECTOR</b>                                                                          |                                                                                                                          |               |           |      |     |               |
| Collector-Emitter Dark Current                                                           | ( $V_{CE} = 10\text{ V}$ , $T_A = 25^\circ\text{C}$ )                                                                    | $I_{CE01}$    | —         | 1.0  | 100 | nA            |
|                                                                                          | ( $V_{CE} = 10\text{ V}$ , $T_A = 100^\circ\text{C}$ )                                                                   | $I_{CE02}$    | —         | 1.0  | —   | $\mu\text{A}$ |
| Collector-Base Dark Current                                                              | ( $V_{CB} = 10\text{ V}$ )                                                                                               | $I_{CBO}$     | —         | 0.2  | —   | nA            |
| Collector-Emitter Breakdown Voltage                                                      | ( $I_C = 10\text{ mA}$ )                                                                                                 | $BV_{CEO}$    | 30        | 100  | —   | nA            |
| Collector-Base Breakdown Voltage                                                         | ( $I_C = 100\text{ }\mu\text{A}$ )                                                                                       | $BV_{CBO}$    | 70        | 120  | —   | V             |
| Emitter-Collector Breakdown Voltage                                                      | ( $I_E = 100\text{ }\mu\text{A}$ )                                                                                       | $BV_{ECO}$    | 5         | 10   | —   | V             |
| Collector-Emitter Capacitance                                                            | ( $f = 1.0\text{ MHz}$ , $V_{CE} = 0$ )                                                                                  | $C_{CE}$      | —         | 7    | —   | pF            |
| Collector-Base Capacitance                                                               | ( $f = 1.0\text{ MHz}$ , $V_{CB} = 0$ )                                                                                  | $C_{CB}$      | —         | 20   | —   | pF            |
| Emitter-Base Capacitance                                                                 | ( $f = 1.0\text{ MHz}$ , $V_{EB} = 0$ )                                                                                  | $C_{EB}$      | —         | 10   | —   | pF            |
| <b>COUPLED</b>                                                                           |                                                                                                                          |               |           |      |     |               |
| Current Transfer Ratio <sup>(1)</sup>                                                    | ( $I_F = \pm 10\text{ mA}$ , $V_{CE} = 10\text{ V}$ )                                                                    | CTR           | 20        | 150  | —   | %             |
| Output-Collector Current Symmetry                                                        | $\left( \frac{I_C @ I_F = +10\text{ mA}, V_{CE} = 10\text{ V}}{I_C @ I_F = -10\text{ mA}, V_{CE} = 10\text{ V}} \right)$ | —             | 0.5       | —    | 2.0 | —             |
| Collector-Emitter Saturation Voltage                                                     | ( $I_C = 0.5\text{ mA}$ , $I_F = \pm 10\text{ mA}$ )                                                                     | $V_{CE(sat)}$ | —         | 0.1  | 0.4 | V             |
| Isolation Surge Voltage <sup>(2,3)</sup>                                                 | ( $f = 60\text{ Hz AC Peak}$ , $t = \text{min}$ )                                                                        | $V_{ISO}$     | 2500      | —    | —   | Vac(rms)      |
| Isolation Resistance <sup>(3)</sup>                                                      | ( $V = 500\text{ V}$ )                                                                                                   | $R_{ISO}$     | $10^{11}$ | —    | —   | $\Omega$      |
| Isolation Capacitance <sup>(3)</sup>                                                     | ( $V = 0\text{ V}$ , $f = 1\text{ MHz}$ )                                                                                | $C_{ISO}$     | —         | 0.2  | —   | pF            |

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

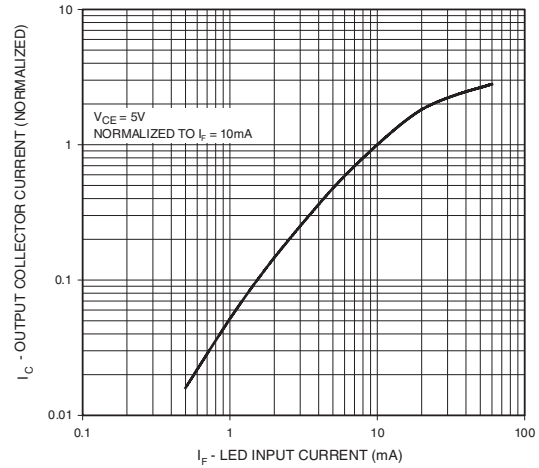
**NOTE:**

1. Current Transfer Ratio (CTR) =  $I_C/I_F \times 100\%$ .
2. Isolation Surge Voltage,  $V_{ISO}$ , is an internal device dielectric breakdown rating.
3. For this test, Pins 1 and 2 are common and Pins 5, 6 and 7 are common.

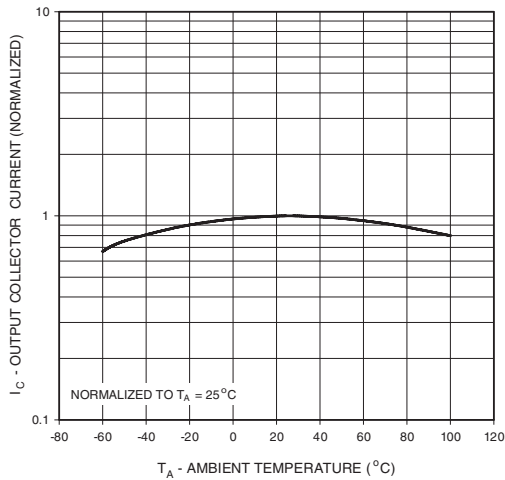
**Fig. 1 Input Voltage vs. Input Current**



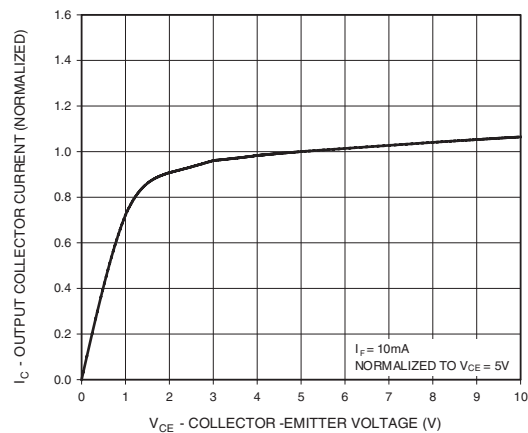
**Fig. 2 Output Current vs. Input Current**



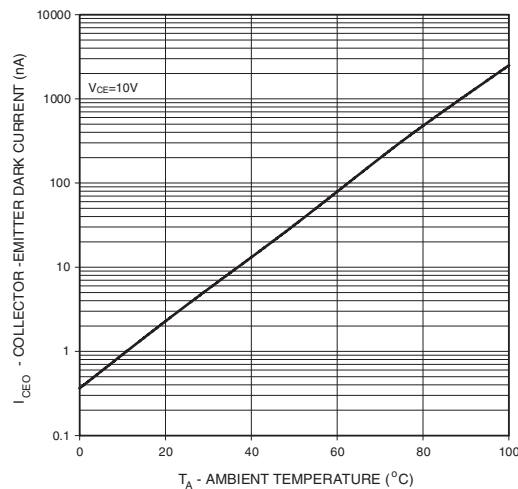
**Fig. 3 Output Current vs. Ambient Temperature**



**Fig. 4 Output Current vs. Collector - Emitter Voltage**

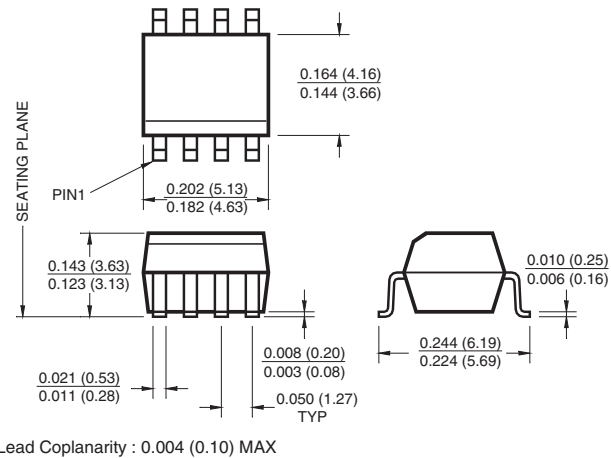


**Fig. 5 Dark Current vs. Ambient Temperature**

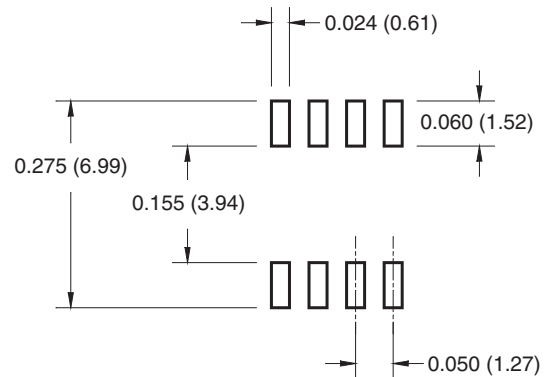


**MOC256-M**

**Package Dimensions (Surface Mount)**



**8-Pin Small Outline**

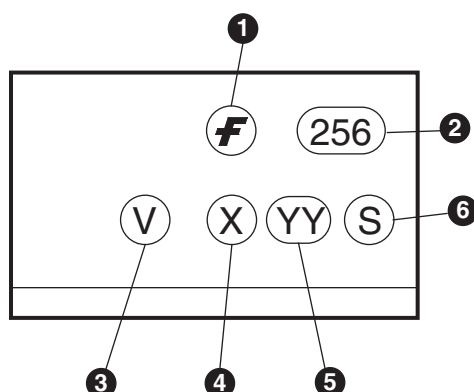


## MOC256-M

### ORDERING INFORMATION

| Option | Order Entry Identifier | Description                                   |
|--------|------------------------|-----------------------------------------------|
| V      | V                      | VDE 0884                                      |
| R1     | R1                     | Tape and reel (500 units per reel)            |
| R1V    | R1V                    | VDE 0884, Tape and reel (500 units per reel)  |
| R2     | R2                     | Tape and reel (2500 units per reel)           |
| R2V    | R2V                    | VDE 0884, Tape and reel (2500 units per reel) |

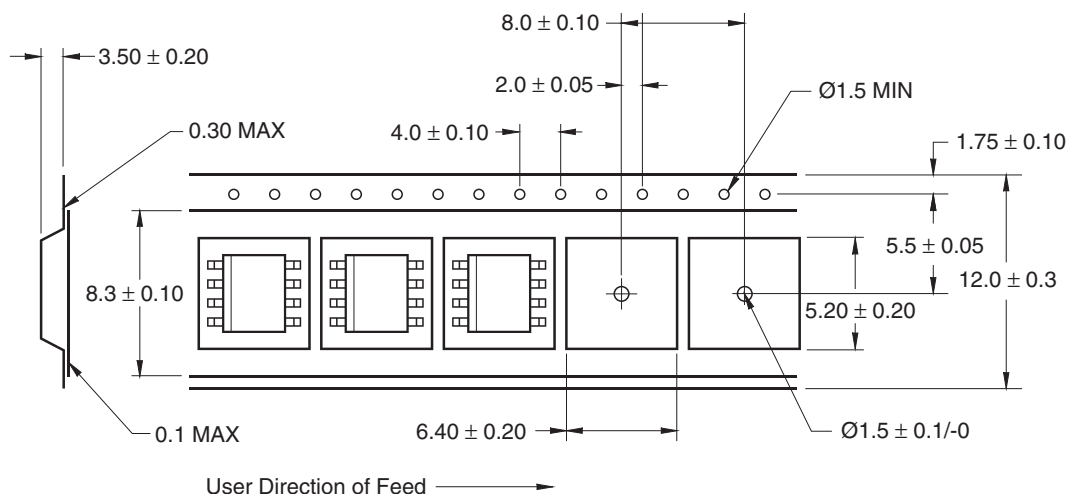
### MARKING INFORMATION



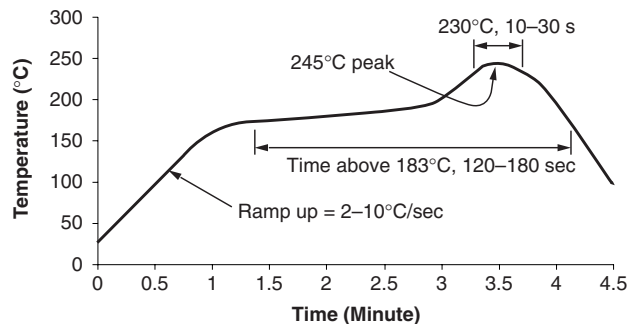
| Definitions |                                                                                        |
|-------------|----------------------------------------------------------------------------------------|
| 1           | Fairchild logo                                                                         |
| 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., '3'                                                         |
| 5           | Two digit work week ranging from '01' to '53'                                          |
| 6           | Assembly package code                                                                  |

**MOC256-M**

**Carrier Tape Specifications**



**Reflow Profile**



- Peak reflow temperature:  $245^\circ\text{C}$  (package surface temperature)
- Time of temperature higher than  $183^\circ\text{C}$  for  $120-180 \text{ seconds}$
- One time soldering reflow is recommended

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.