

# MOCD207M, MOCD208M

## Dual Channel Phototransistor Small Outline Surface Mount Optocouplers

### Features

- Dual channel optocoupler
- Convenient plastic SOIC-8 surface mountable package style
- Two channels in one compact surface mount package
- Closely matched current transfer ratios to minimize unit-to-unit variation
- Minimum  $V_{(BR)CEO}$  of 70 volts guaranteed
- Standard SOIC-8 footprint, with 0.050" lead spacing
- Compatible with dual wave, vapor phase and IR reflow soldering
- High input-output isolation of 2500 Vac (rms) guaranteed
- Meets U.L. regulatory requirements, file #E90700, volume 2

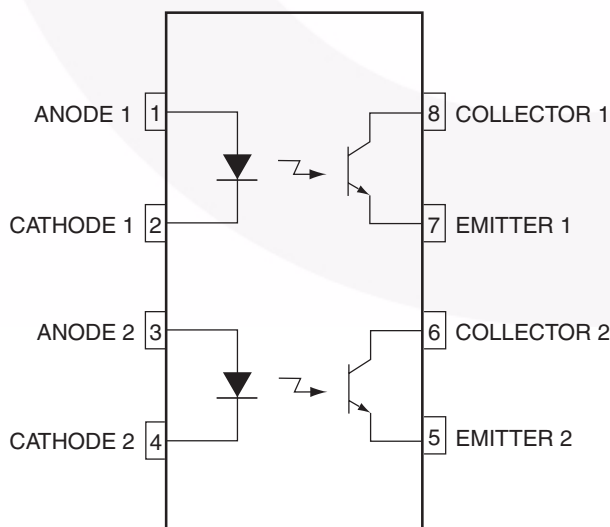
### Applications

- Feedback control circuits
- Interfacing and coupling systems of different potentials and impedances
- General purpose switching circuits
- Monitor and detection circuits

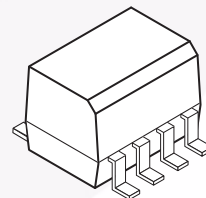
### Description

The MOCD207M/MOCD208M consist of two silicon phototransistors optically coupled to two GaAs infrared LEDs. These devices are constructed in a small outline surface mount package which conforms to the standard SOIC-8 footprint.

### Schematic



### Package



**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              | Rating   | Value       | Unit                       |
|---------------------|--|-------------|----------------------------|
| <b>EMITTER</b>      |  |             |                            |
| $I_F$               | Forward Current – Continuous   | 60          | mA                         |
| $I_F$ (pk)          | Forward Current – Peak (PW = 100 $\mu$ s, 120pps)  | 1.0         | A                          |
| $V_R$               | Reverse Voltage  | 6.0         | V                          |
| $P_D$               | LED Power Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$          | 90<br>0.8   | mW<br>mW/ $^\circ\text{C}$ |
| <b>DETECTOR</b>     |  |             |                            |
| $V_{CEO}$           | Collector-Emitter Voltage  | 70          | V                          |
| $V_{CBO}$           | Collector-Base Voltage   | 70          | V                          |
| $V_{ECO}$           | Emitter-Collector Voltage  | 7.0         | V                          |
| $I_C$               | Collector Current-Continuous   | 150         | mA                         |
| $P_D$               | Detector Power Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$     | 150<br>1.76 | mW<br>mW/ $^\circ\text{C}$ |
| <b>TOTAL DEVICE</b> |  |             |                            |
| $V_{ISO}$           | Input-Output Isolation Voltage <sup>(1, 2)</sup><br>(f = 60Hz, 1 min. Duration)              | 2500        | Vac(rms)                   |
| $P_D$               | Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | 250<br>2.94 | mW<br>mW/ $^\circ\text{C}$ |
| $T_A$               | Ambient Operating Temperature Range  | -40 to +100 | $^\circ\text{C}$           |
| $T_{stg}$           | Storage Temperature Range  | -40 to +125 | $^\circ\text{C}$           |
| $T_L$               | Lead Soldering Temperature (1/16" from case,<br>10 sec. duration)                            | 260         | $^\circ\text{C}$           |

**Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)<sup>(3)</sup>

| Symbol          | Parameter   | Test Conditions   | Device   | Min.      | Typ.* | Max. | Unit          |
|-----------------|---|---|----------|-----------|-------|------|---------------|
| <b>EMITTER</b>  |   |   |          |           |       |      |               |
| $V_F$           | Input Forward Voltage                                       | $I_F = 30\text{mA}$   | All      |           | 1.25  | 1.55 | V             |
| $I_R$           | Reverse Leakage Current                                     | $V_R = 6.0\text{V}$   | All      |           | 0.001 | 100  | $\mu\text{A}$ |
| C               | Capacitance   |   | All      |           | 18    |      | pF            |
| <b>DETECTOR</b> |   |   |          |           |       |      |               |
| $I_{CEO}$       | Collector-Emitter Dark Current                              | $V_{CE} = 10\text{V}, T_A = 25^\circ\text{C}$                   | All      |           | 1.0   | 50   | nA            |
| $I_{CEO}$       |   | $V_{CE} = 10\text{V}, T_A = 100^\circ\text{C}$                  | All      |           | 1.0   |      | $\mu\text{A}$ |
| $V_{(BR)CEO}$   | Collector-Emitter Breakdown Voltage                         | $I_C = 100\mu\text{A}$  | All      | 70        | 100   |      | V             |
| $V_{(BR)CEO}$   | Emitter-Collector Breakdown Voltage                         | $I_E = 100\mu\text{A}$  | All      | 7.0       | 10    |      | V             |
| $C_{CE}$        | Collector-Emitter Capacitance                               | $f = 1.0\text{ MHz}, V_{CE} = 0\text{V}$                        | All      |           | 7.0   |      | pF            |
| <b>COUPLED</b>  |   |   |          |           |       |      |               |
| CTR             | Current Transfer Ratio, Collector to Emitter <sup>(4)</sup> | $I_F = 10\text{mA}, V_{CE} = 5\text{V}$                         | MOCD207M | 100       |       | 200  | %             |
|                 |   |   | MOCD208M | 40        |       | 125  |               |
|                 |   | $I_F = 1\text{mA}, V_{CE} = 5\text{V}$                          | MOCD207M | 34        |       |      |               |
|                 |   |   | MOCD208M | 13        |       |      |               |
| $V_{CE(sat)}$   | Collector-Emitter Saturation Voltage                        | $I_C = 2.0\text{mA}, I_F = 10\text{mA}$                         | All      |           |       | 0.4  | V             |
| $t_{on}$        | Turn-On Time  | $I_C = 2.0\text{mA}, V_{CC} = 10\text{V}, R_L = 100\Omega$      | All      |           | 3.0   |      | $\mu\text{s}$ |
| $t_{off}$       | Turn-Off Time   | $I_C = 2.0\text{mA}, V_{CC} = 10\text{V}, R_L = 100\Omega$      | All      |           | 2.8   |      | $\mu\text{s}$ |
| $t_r$           | Rise Time   | $I_C = 2.0\text{mA}, V_{CC} = 10\text{V}, R_L = 100\Omega$      | All      |           | 1.6   |      | $\mu\text{s}$ |
| $t_f$           | Fall Time   | $I_C = 2.0\text{mA}, V_{CC} = 10\text{V}, R_L = 100\Omega$      | All      |           | 2.2   |      | $\mu\text{s}$ |
| $V_{ISO}$       | Isolation Surge Voltage <sup>(1)(2)</sup>                   | $f = 60\text{Hz}, t = 1\text{ min.}, I_{I-O} \leq 2\mu\text{A}$ | All      | 2500      |       |      | Vac(rms)      |
| $R_{ISO}$       | Isolation Resistance <sup>(2)</sup>                         | $V_{I-O} = 500\text{V}$   | All      | $10^{11}$ |       |      | $\Omega$      |
| $C_{ISO}$       | Isolation Capacitance <sup>(2)</sup>                        | $V_{I-O} = 0\text{V}, f = 1\text{MHz}$                          | All      |           | 0.2   |      | pF            |

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

1. Input-Output Isolation Voltage,  $V_{ISO}$ , is an internal device dielectric breakdown rating.
2. For this test, Pins 1, 2, 3 and 4 are common and Pins 5, 6, 7 and 8 are common.
3. Always design to the specified minimum/maximum electrical limits (where applicable).
4. Current Transfer Ratio (CTR) =  $I_C/I_F \times 100\%$ .

## Typical Performance Curves

Fig. 1 LED Forward Voltage vs. Forward Current

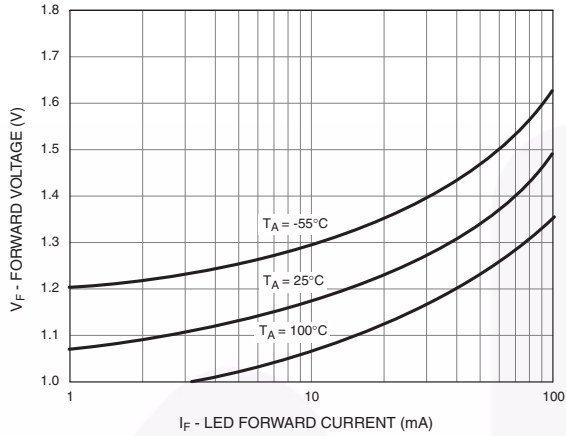


Fig. 2 Output Current vs. Input Current

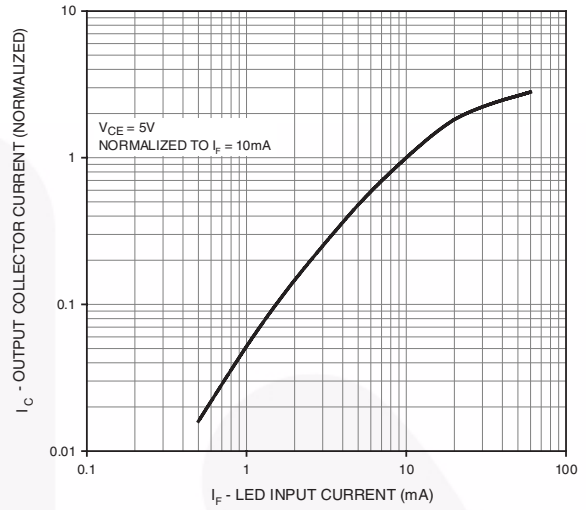


Fig. 3 Output Current vs. Ambient Temperature

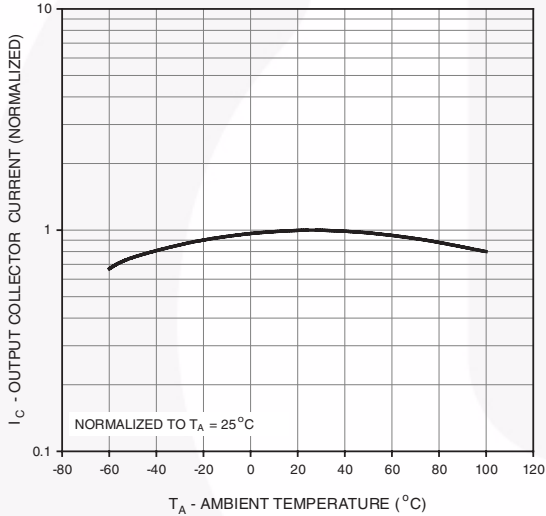


Fig. 4 Output Current vs. Collector - Emitter Voltage

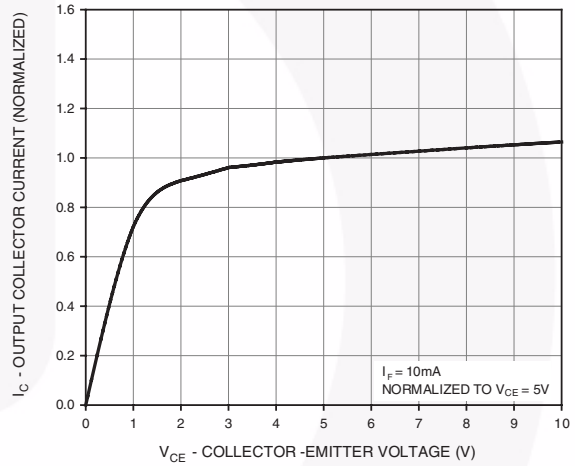
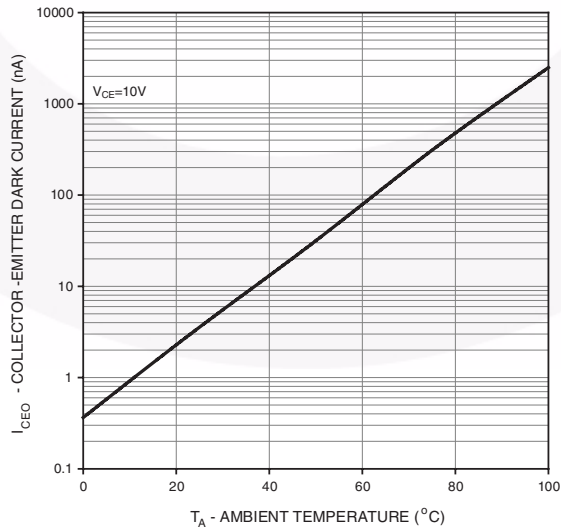
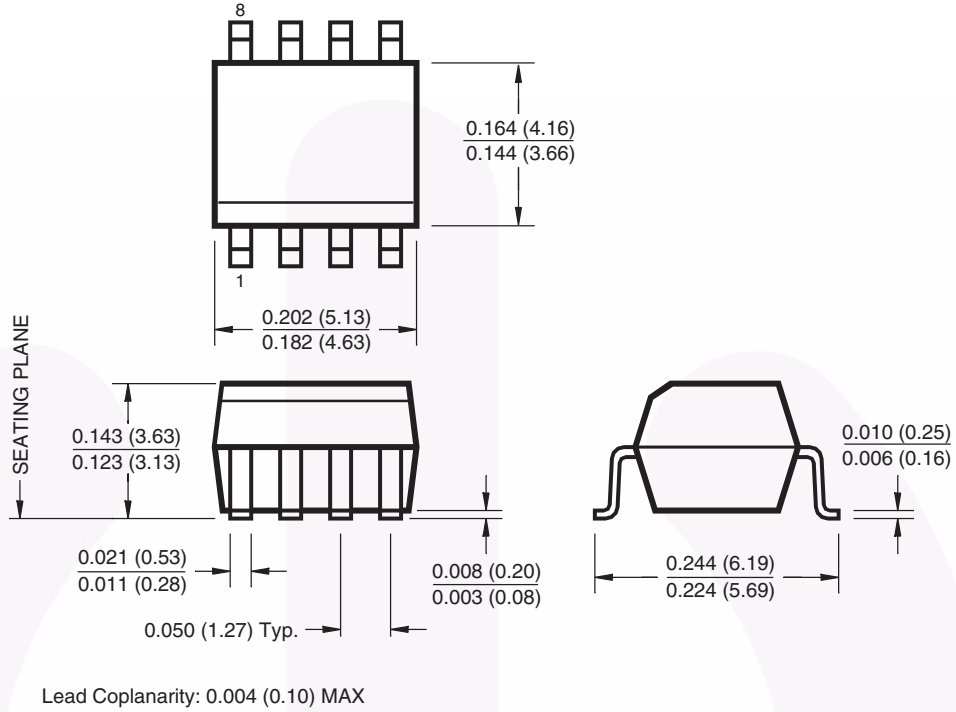


Fig. 5 Dark Current vs. Ambient Temperature

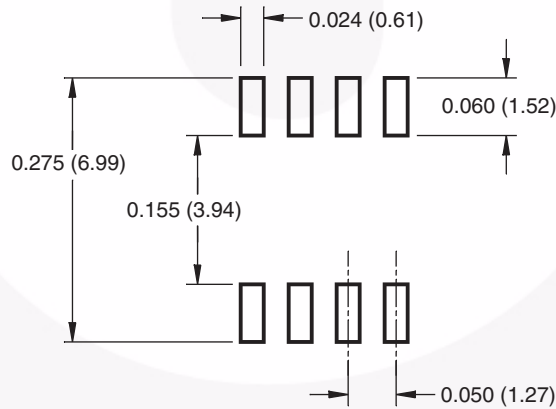


## Package Dimensions

### 8-pin SOIC Surface Mount



### Recommended Pad Layout



Dimensions in inches (mm).

Package drawings are provided as a service to customers considering Fairchild components. Drawings may change in any manner without notice. Please note the revision and/or date on the drawing and contact a Fairchild Semiconductor representative to verify or obtain the most recent revision. Package specifications do not expand the terms of Fairchild's worldwide terms and conditions, specifically the warranty therein, which covers Fairchild products.

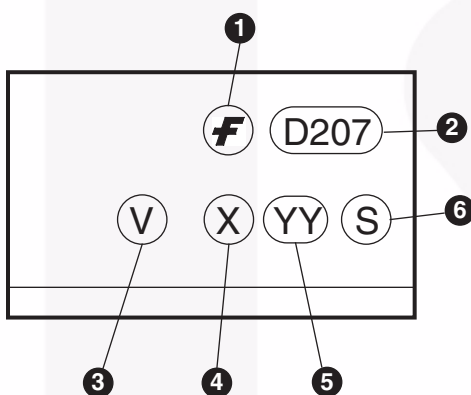
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## Ordering Information

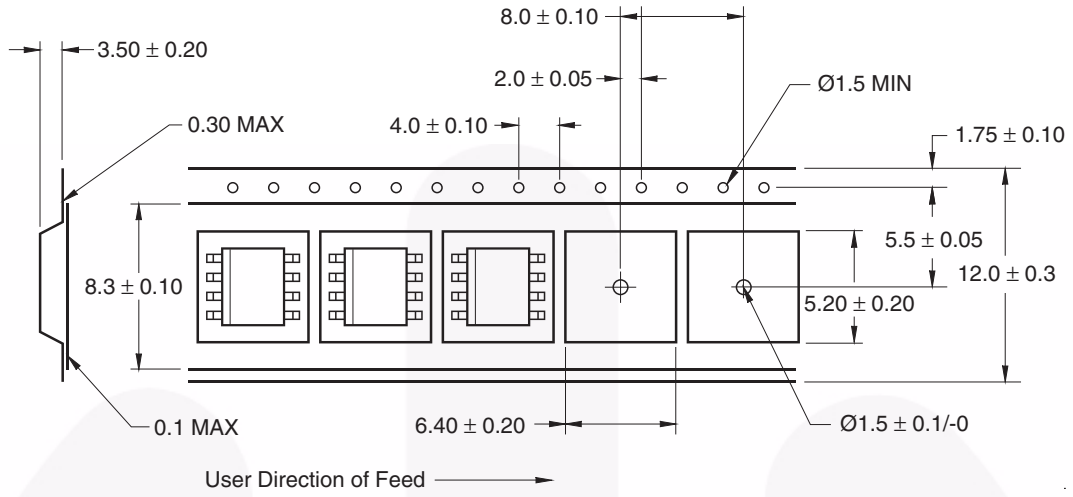
| Option | Order Entry Identifier | Description  |
|--------|------------------------|--|
| V      | V                      | VDE Approved   |
| D1     | D1                     | Tape & Reel (500 units per reel), 16mm width carrier tape                |
| D1V    | D1V                    | VDE Approved, Tape & Reel (500 units per reel), 16mm width carrier tape  |
| D2     | D2                     | Tape & Reel (2500 units per reel), 16mm width carrier tape               |
| D2V    | D2V                    | VDE Approved, Tape & Reel (2500 units per reel), 16mm width carrier tape |
| R2     | R2                     | Tape & Reel (2500 units per reel), 12mm width carrier tape               |
| R2V    | R2V                    | VDE Approved, Tape & Reel (2500 units per reel), 12mm width carrier tape |

## Marking Information

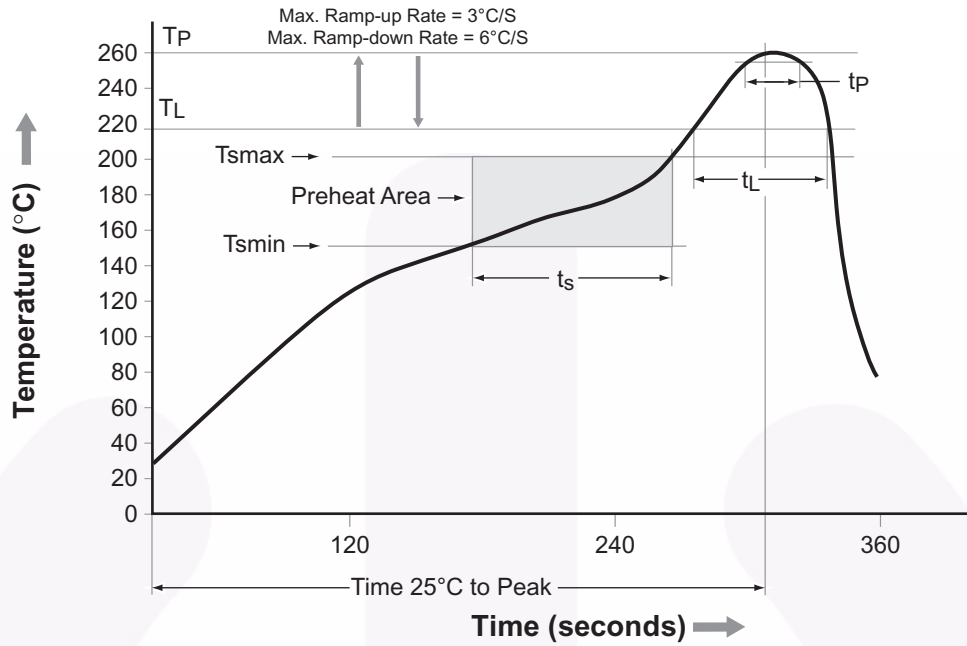


| Definitions |  |
|-------------|--|
| 1           | Fairchild logo   |
| 2           | Device number  |
| 3           | VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table) |
| 4           | One digit year code, e.g., '3'   |
| 5           | Two digit work week ranging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

### Carrier Tape Specifications



### Reflow Profile








| Profile Feature                 | Pb-Free Assembly Profile |
|---------------------------------|--------------------------|
| Temperature Min. (Tsmín)        | 150°C                    |
| Temperature Max. (Tsmáx)        | 200°C                    |
| Time (ts) from (Tsmín to Tsmáx) | 60–120 seconds           |
| Ramp-up Rate (tL to tp)         | 3°C/second max.          |
| Liquidous Temperature (TL)      | 217°C                    |
| Time (tL) Maintained Above (TL) | 60–150 seconds           |
| Peak Body Package Temperature   | 260°C +0°C / -5°C        |
| Time (tp) within 5°C of 260°C   | 30 seconds               |
| Ramp-down Rate (TP to TL)       | 6°C/second max.          |
| Time 25°C to Peak Temperature   | 8 minutes max.           |





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| CROSSVOLT™  | Green FPS™ e-Series™   | QST™  | TinyBuck™   |
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| Current Transfer Logic™   | GTO™                   |   | TINYOPTO™   |
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| EfficientMax™   | ISOPLANAR™             | Saving our world, 1mW/W/kW at a time™   | TinyPWM™  |
| EZSWITCH™*  | MegaBuck™              | SmartMax™   | TinyWire™   |
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| FlashWriter®*   | PDP SPM™               | Sync-Lock™  | XS™   |
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