

# MOCD206M, MOCD207M, MOCD208M Dual Channel Phototransistor Small Outline Surface Mount Optocouplers

## Features

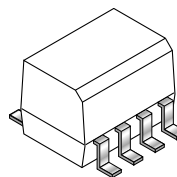
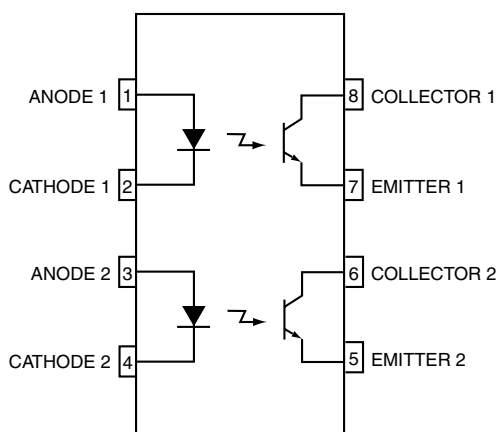
- Dual Channel Optocoupler
- Convenient Plastic SOIC-8 Surface Mountable Package Style
- Two channels in one compact surface mount package
- Closely Matched Current Transfer Ratios to Minimize Unit-to-Unit Variation
- Minimum  $V_{(BR)CEO}$  of 70 Volts Guaranteed
- Standard SOIC-8 Footprint, with 0.050" 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 MOCD206M/MOCD207M/MOCD208M consist of two silicon phototransistors optically coupled to two GaAs infra-red LEDs. These devices are constructed in a small outline surface mount package which conforms to the standard SOIC-8 footprint.



**Absolute Maximum Ratings** ( $T_A = 25^\circ\text{C}$  Unless otherwise specified)

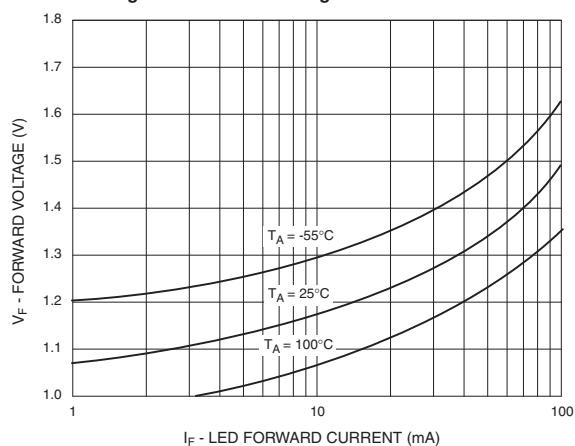
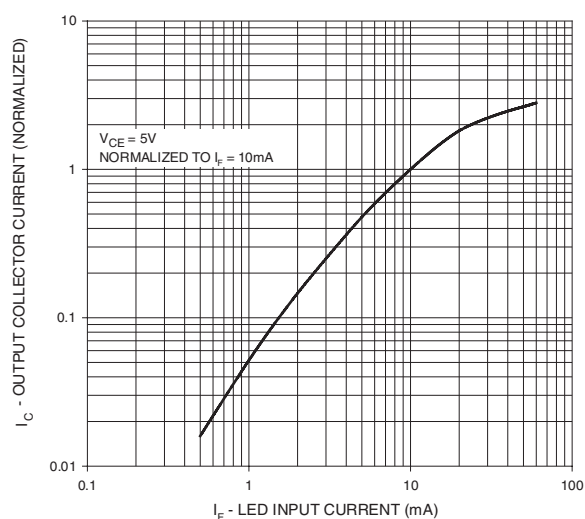
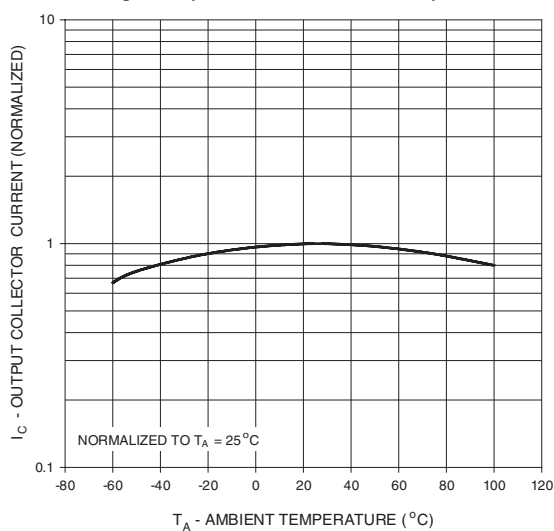
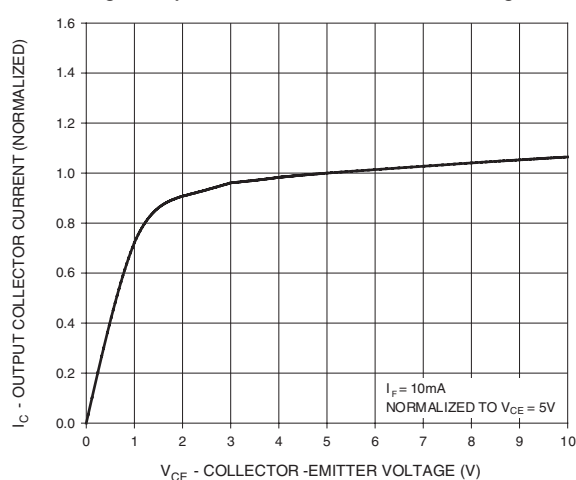
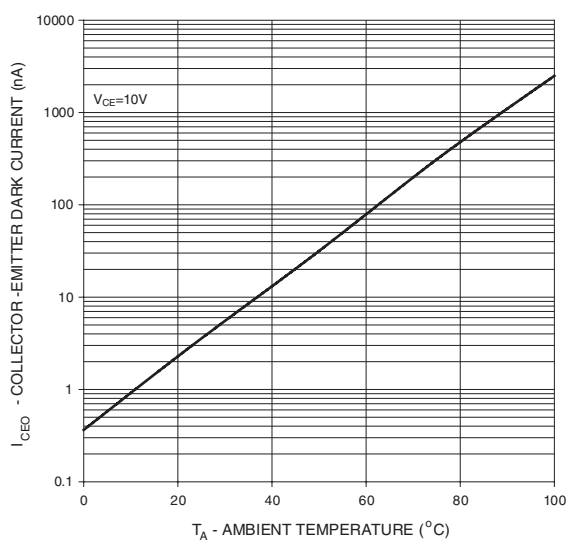
| Symbol              | Rating                                                                          | Value       | Unit        |
|---------------------|---------------------------------------------------------------------------------|-------------|-------------|
| EMITTER             |                                                                                 |             |             |
| I <sub>F</sub>      | Forward Current – Continuous                                                    | 60          | mA          |
| I <sub>F</sub> (pk) | Forward Current – Peak (PW = 100 μs, 120 pps)                                   | 1.0         | A           |
| V <sub>R</sub>      | Reverse Voltage                                                                 | 6.0         | V           |
| P <sub>D</sub>      | LED Power Dissipation @ T <sub>A</sub> = 25°C<br>Derate above 25°C              | 90<br>0.8   | mW<br>mW/°C |
| DETECTOR            |                                                                                 |             |             |
| V <sub>CEO</sub>    | Collector-Emitter Voltage                                                       | 70          | V           |
| V <sub>CBO</sub>    | Collector-Base Voltage                                                          | 70          | V           |
| V <sub>ECO</sub>    | Emitter-Collector Voltage                                                       | 7.0         | V           |
| I <sub>C</sub>      | Collector Current-Continuous                                                    | 150         | mA          |
| P <sub>D</sub>      | Detector Power Dissipation @ T <sub>A</sub> = 25°C<br>Derate above 25°C         | 150<br>1.76 | mW<br>mW/°C |
| TOTAL DEVICE        |                                                                                 |             |             |
| V <sub>ISO</sub>    | Input-Output Isolation Voltage <sup>(1, 2)</sup><br>(f = 60Hz, 1 min. Duration) | 2500        | Vac(rms)    |
| P <sub>D</sub>      | Total Device Power Dissipation @ T <sub>A</sub> = 25°C<br>Derate above 25°C     | 250<br>2.94 | mW<br>mW/°C |
| T <sub>A</sub>      | Ambient Operating Temperature Range                                             | -40 to +100 | °C          |
| T <sub>stg</sub>    | Storage Temperature Range                                                       | -40 to +125 | °C          |
| T <sub>L</sub>      | Lead Soldering Temperature (1/16” from case,<br>10 sec. duration)               | 260         | °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> | $I_F = 10\text{mA}, V_{CE} = 5\text{V}$                         | MOCD206M | 63        | —     | 125  | %             |
|                 |                                                             |                                                                 | MOCD207M | 100       | —     | 200  |               |
|                 |                                                             |                                                                 | MOCD208M | 40        | —     | 125  |               |
|                 |                                                             | $I_F = 1\text{mA}, V_{CE} = 5\text{V}$                          | MOCD206M | 22        | —     | —    |               |
|                 |                                                             |                                                                 | 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            |

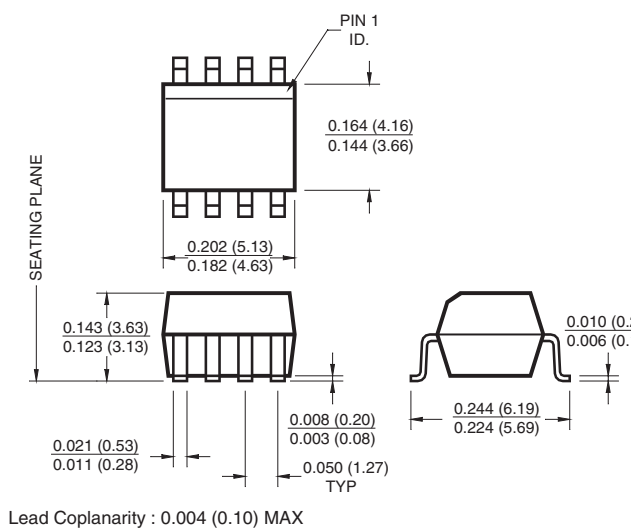
\*\* Typical values at  $T_A = 25^\circ\text{C}$ **Note:**

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) =  $I_C/I_F \times 100\%$ .

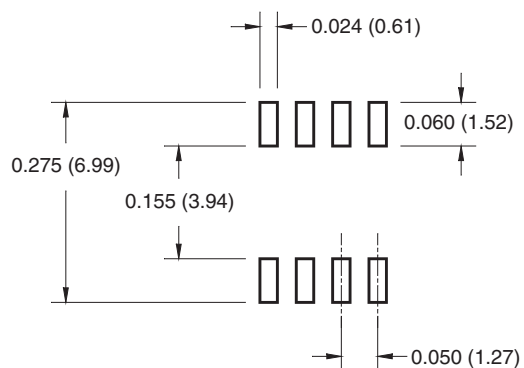
**Fig. 1 LED Forward Voltage vs. Forward Current**

**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

### Surface Mount



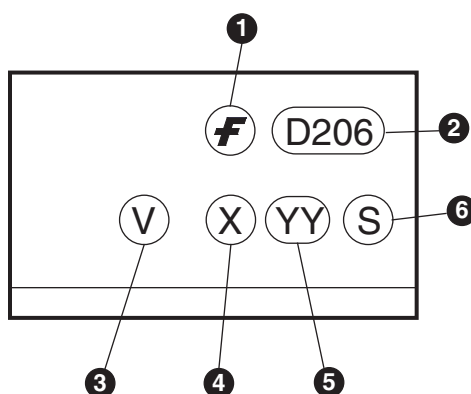
### 8-Pin Small Outline



# Ordering Information

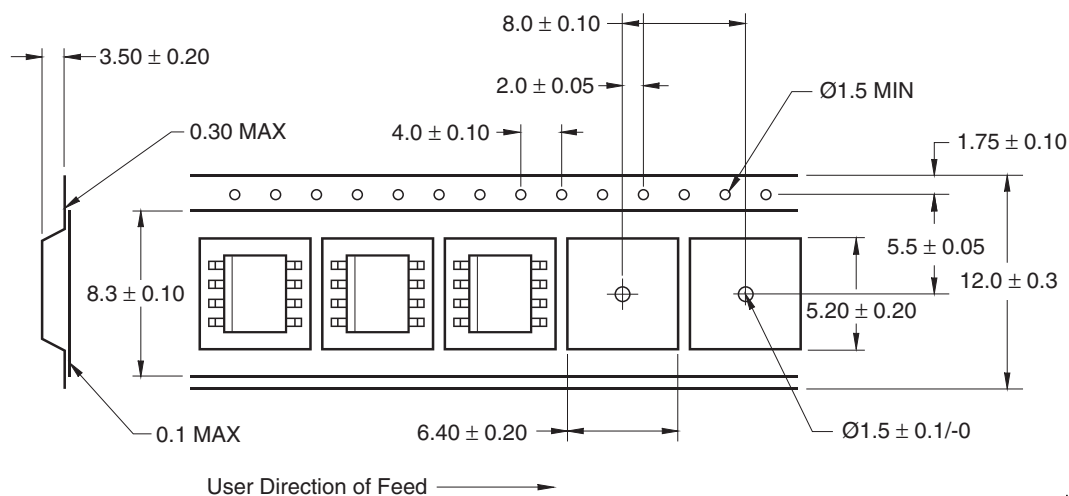
| Option | Order Entry Identifier | Description                                                              |
|--------|------------------------|--------------------------------------------------------------------------|
| V      | V                      | VDE Approved                                                             |
| 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 |
| R1     | R1                     | Tape & Reel (500 units per reel), 12mm width carrier tape                |
| R1V    | R1V                    | VDE Approved, Tape & Reel (500 units per reel), 12mm 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

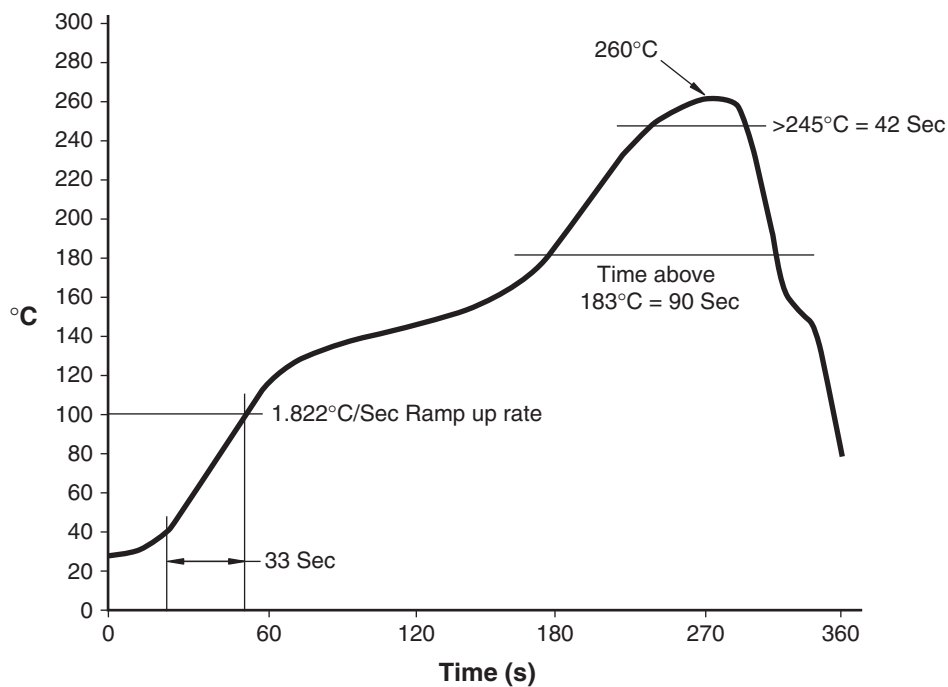


| Definitions |                                                                                        |
|-------------|----------------------------------------------------------------------------------------|
| 1           | Fairchild logo                                                                         |
| 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



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| Bottomless <sup>™</sup>                          | GTO <sup>™</sup>                | OPTOLOGIC <sup>®</sup>          | SPM <sup>™</sup>             | VCX <sup>™</sup>      |
| Build it Now <sup>™</sup>                        | HiSeC <sup>™</sup>              | OPTOPLANAR <sup>™</sup>         | Stealth <sup>™</sup>         | Wire <sup>™</sup>     |
| CoolFET <sup>™</sup>                             | I <sup>2</sup> C <sup>™</sup>   | PACMAN <sup>™</sup>             | SuperFET <sup>™</sup>        |                       |
| CROSSVOLT <sup>™</sup>                           | i-Lo <sup>™</sup>               | POP <sup>™</sup>                | SuperSOT <sup>™</sup> -3     |                       |
| DOMET <sup>™</sup>                               | ImpliedDisconnect <sup>™</sup>  | Power247 <sup>™</sup>           | SuperSOT <sup>™</sup> -6     |                       |
| EcoSPARK <sup>™</sup>                            | IntelliMAX <sup>™</sup>         | PowerEdge <sup>™</sup>          | SuperSOT <sup>™</sup> -8     |                       |
| E <sup>2</sup> CMOS <sup>™</sup>                 | ISOPLANAR <sup>™</sup>          | PowerSaver <sup>™</sup>         | SyncFET <sup>™</sup>         |                       |
| EnSigna <sup>™</sup>                             | LittleFET <sup>™</sup>          | PowerTrench <sup>®</sup>        | TCM <sup>™</sup>             |                       |
| FACT <sup>™</sup>                                | MICROCOUPLER <sup>™</sup>       | QFET <sup>®</sup>               | TinyBoost <sup>™</sup>       |                       |
| FAST <sup>®</sup>                                | MicroFET <sup>™</sup>           | QS <sup>™</sup>                 | TinyBuck <sup>™</sup>        |                       |
| FAST <sub>r</sub> <sup>™</sup>                   | MicroPak <sup>™</sup>           | QT Optoelectronics <sup>™</sup> | TinyPWM <sup>™</sup>         |                       |
| FPS <sup>™</sup>                                 | MICROWIRE <sup>™</sup>          | Quiet Series <sup>™</sup>       | TinyPower <sup>™</sup>       |                       |
| FRFET <sup>™</sup>                               | MSX <sup>™</sup>                | RapidConfigure <sup>™</sup>     | TinyLogic <sup>®</sup>       |                       |
|                                                  | MSXPro <sup>™</sup>             | RapidConnect <sup>™</sup>       | TINYOPTO <sup>™</sup>        |                       |
| Across the board. Around the world. <sup>™</sup> |                                 | μSerDes <sup>™</sup>            | TruTranslation <sup>™</sup>  |                       |
| The Power Franchise <sup>®</sup>                 |                                 | ScalarPump <sup>™</sup>         | UHC <sup>™</sup>             |                       |
| Programmable Active Droop <sup>™</sup>           |                                 |                                 |                              |                       |

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## PRODUCT STATUS DEFINITIONS

### 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, and 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. |
| No Identification Needed | Full Production        | This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.                                                       |
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