FAIRCHILD SEMICONDUCTOR®

April 2009

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

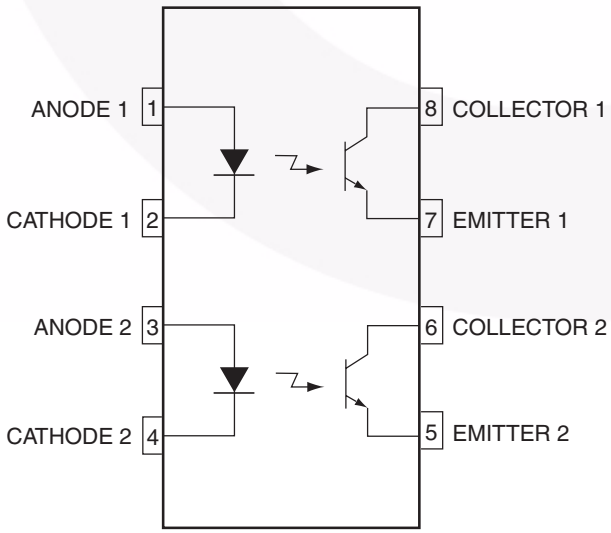
Applications

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

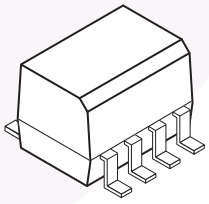
Description

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°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
EMITTER			
I_F	Forward Current – Continuous	60	mA
I_F (pk)	Forward Current – Peak (PW = 100µs, 120pps)	1.0	A
V_R	Reverse Voltage	6.0	V
P_D	LED Power Dissipation @ T_A = 25°C Derate above 25°C	90 0.8	mW mW/°C
DETECTOR			
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°C Derate above 25°C	150 1.76	mW mW/°C
TOTAL DEVICE			
V_{ISO}	Input-Output Isolation Voltage[1, 2] (f = 60Hz, 1 min. Duration)	2500	Vac(rms)
P_D	Total Device Power Dissipation @ T_A = 25°C Derate above 25°C	250 2.94	mW mW/°C
T_A	Ambient Operating Temperature Range	-40 to +100	°C
T_{stg}	Storage Temperature Range	-40 to +125	°C
T_L	Lead Soldering Temperature (1/16” from case, 10 sec. duration)	260	°C

Electrical Characteristics (T_A = 25°C unless otherwise specified)[3]

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

*Typical values at T_A = 25°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 x 100%.

Typical Performance Curves

Fig. 1 LED Forward Voltage vs. Forward Current

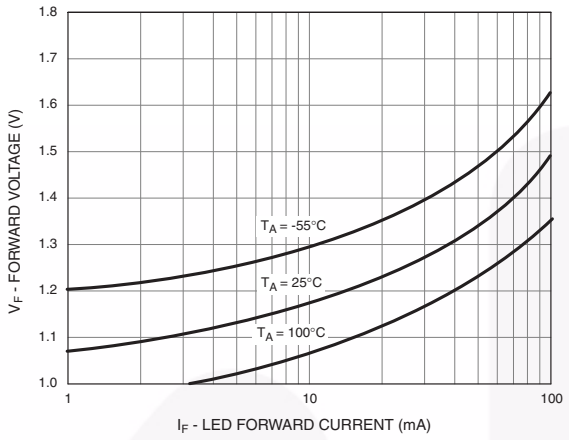


Fig. 2 Output Curent vs. Input Current

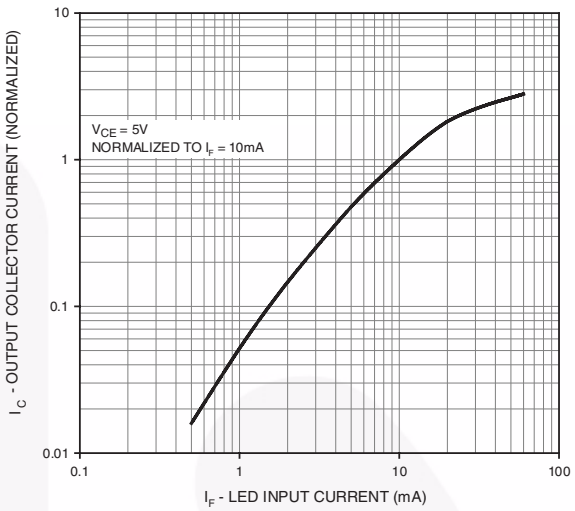


Fig. 3 Output Current vs. Ambient Temperature

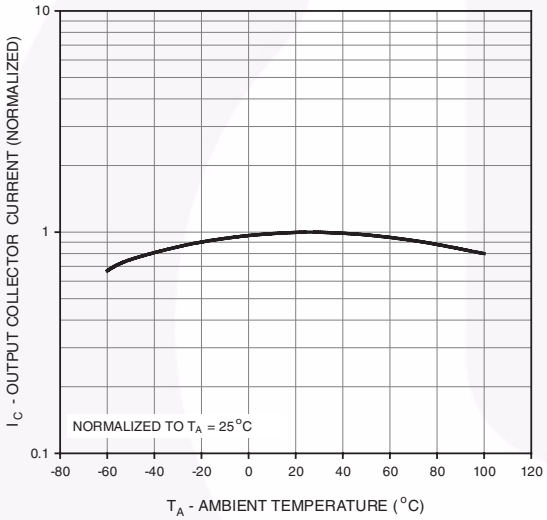


Fig. 4 Output Current vs. Collector - Emitter Voltage

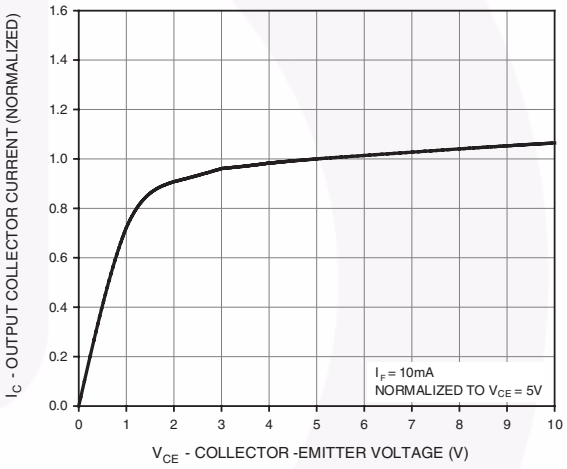
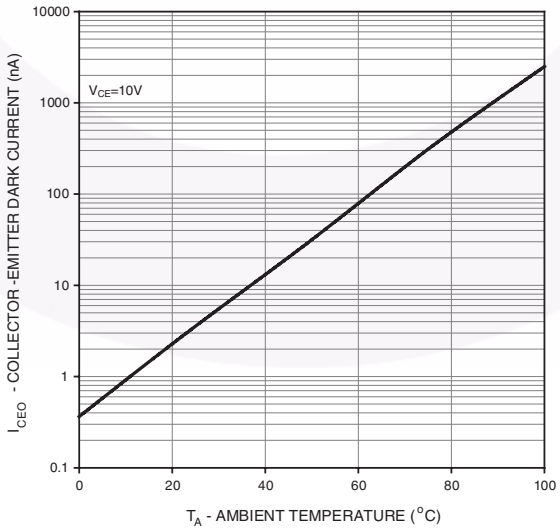
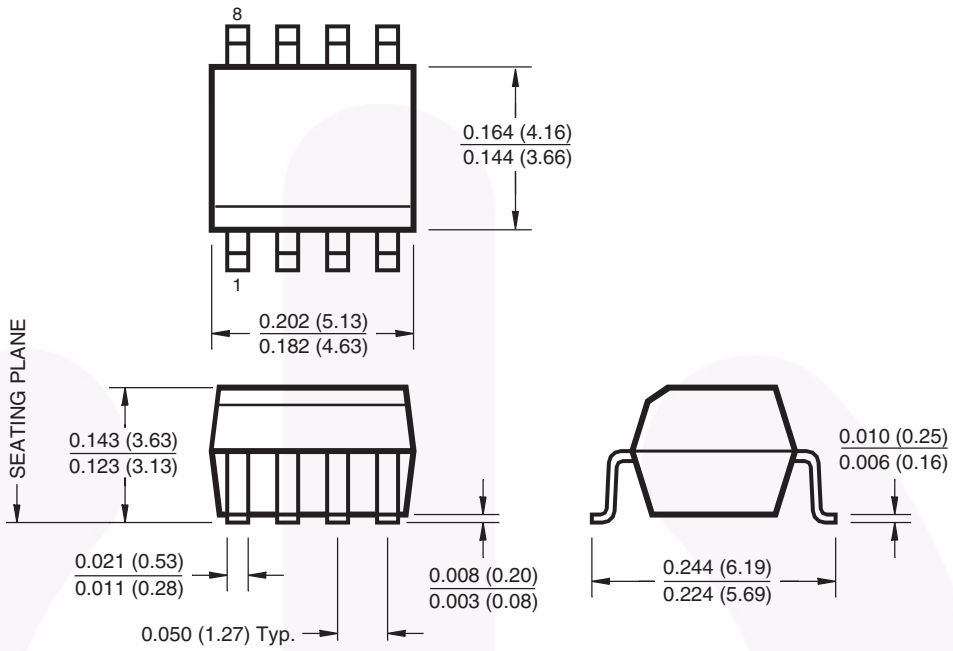


Fig. 5 Dark Current vs. Ambient Temperature



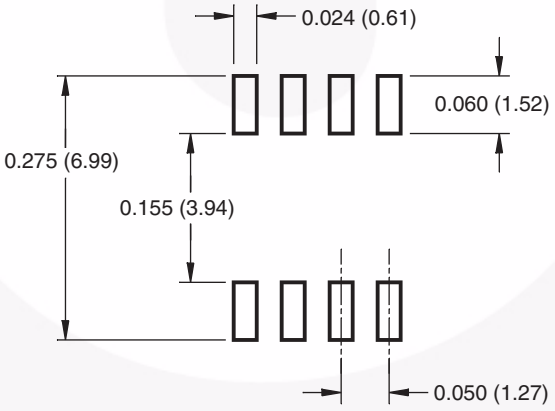
Package Dimensions

8-pin SOIC Surface Mount



Lead Coplanarity: 0.004 (0.10) MAX

Recommended Pad Layout



Dimensions in inches (mm).

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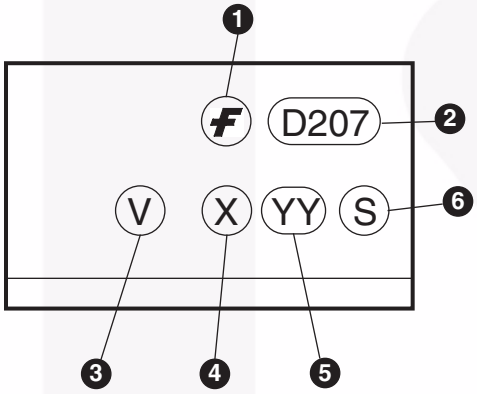
http://www.fairchildsemi.com/packaging/

Ordering Information

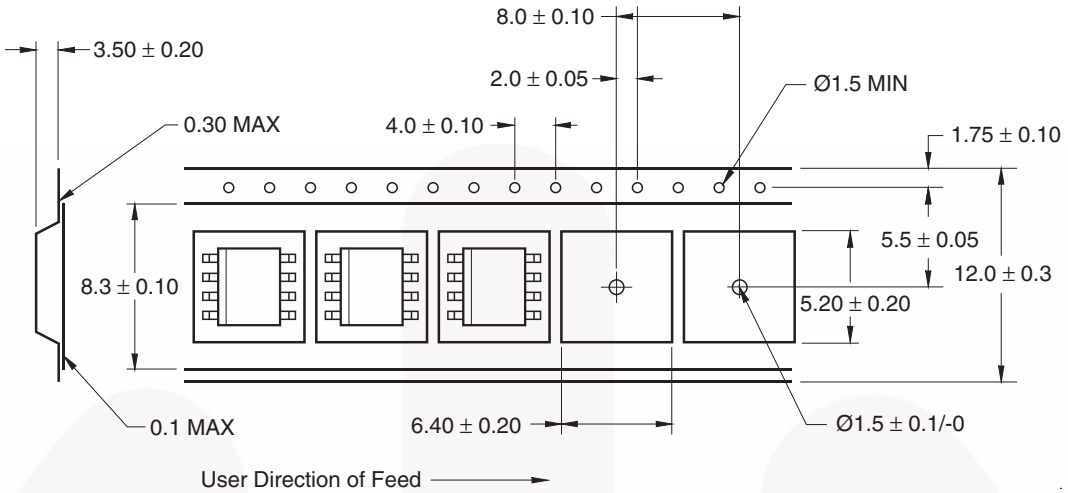
Option	Order Entry Identifier	Description
V	V	VDE Approved
D1	D1	Tape & Reel (500 units per reel), 16mm width carrier tape
D1V	D1V	VDE Approved, Tape & Reel (500 units per reel), 16mm width carrier tape
D2	D2	Tape & Reel (2500 units per reel), 16mm width carrier tape
D2V	D2V	VDE Approved, Tape & Reel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

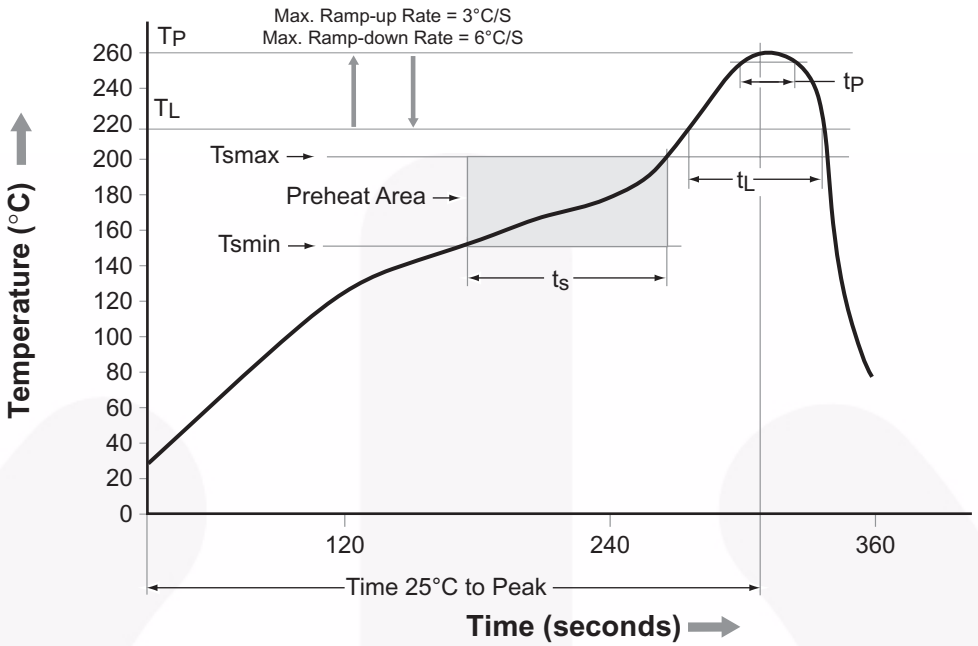


Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One digit year code, e.g., ‘3’
5	Two digit work week ranging from ‘01’ to ‘53’
6	Assembly package code

Carrier Tape Specifications



Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	150°C
Temperature Max. (Tsmax)	200°C
Time (t_S) from (Tsmin to Tsmax)	60–120 seconds
Ramp-up Rate (t_L to t_P)	3°C/second max.
Liquidous Temperature (T_L)	217°C
Time (t_L) Maintained Above (T_L)	60–150 seconds
Peak Body Package Temperature	260°C +0°C / –5°C
Time (t_P) within 5°C of 260°C	30 seconds
Ramp-down Rate (T_P to T_L)	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.

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Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	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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Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I40

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Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург, Промышленная ул, дом № 19, литера Н, помещение 100-Н Офис 331