

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 V Guaranteed
- Standard SOIC-8 Footprint, with 0.050" Lead Spacing
- High Input-Output Isolation of 2500 V_{AC(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

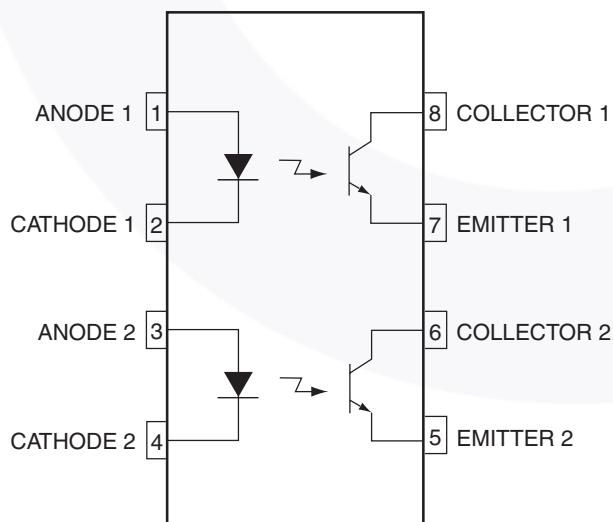


Figure 1. Schematic

Package Outline

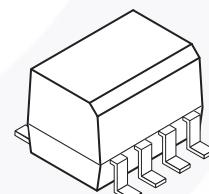


Figure 2. Package Outline

Absolute Maximum Ratings

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. $T_A = 25^\circ\text{C}$ unless otherwise specified.

Symbol	Rating	Value	Unit
Emitter			
I_F	Forward Current – Continuous	60	mA
I_F (pk)	Forward Current – Peak (PW = 100 μs , 120 pps)	1.0	A
V_R	Reverse Voltage	6.0	V
P_D	LED Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	90 0.8	mW mW/ $^\circ\text{C}$
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 @ $T_A = 25^\circ\text{C}$ Derate above 25°C	150 1.76	mW mW/ $^\circ\text{C}$
Total Device			
V_{ISO}	Input-Output Isolation Voltage ^(1, 2) ($f = 60\text{ Hz}$, $t = 1\text{ minute}$)	2500	Vac(rms)
P_D	Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	250 2.94	mW 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, 10 second duration)	260	$^\circ\text{C}$

Electrical Characteristics $T_A = 25^\circ\text{C}$ unless otherwise specified⁽³⁾

Symbol	Parameter	Test Conditions	Device	Min.	Typ.*	Max.	Unit
Emitter							
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	μA
C	Capacitance		All		18		pF
Detector							
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		μA
$V_{(BR)CEO}$	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
Coupled							
CTR	Current Transfer Ratio, Collector to Emitter ⁽⁴⁾	$I_F = 10 \text{ mA}, V_{CE} = 5 \text{ V}$	MOCD207M	100		200	%
			MOCD208M	40		125	
		$I_F = 1 \text{ mA}, V_{CE} = 5 \text{ V}$	MOCD207M	34			
			MOCD208M	13			
$V_{CE}(\text{sat})$	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		μs
t_{off}	Turn-Off Time	$I_C = 2.0 \text{ mA}, V_{CC} = 10 \text{ V}, R_L = 100 \Omega$	All		2.8		μs
t_r	Rise Time	$I_C = 2.0 \text{ mA}, V_{CC} = 10 \text{ V}, R_L = 100 \Omega$	All		1.6		μs
t_f	Fall Time	$I_C = 2.0 \text{ mA}, V_{CC} = 10 \text{ V}, R_L = 100 \Omega$	All		2.2		μs
V_{ISO}	Isolation Surge Voltage ⁽¹⁾⁽²⁾	$f = 60 \text{ Hz}, t = 1 \text{ minute}, I_{I-O} \leq 2 \mu\text{A}$	All	2500			Vac(rms)
R_{ISO}	Isolation Resistance ⁽²⁾	$V_{I-O} = 500 \text{ V}$	All	10^{11}			Ω
C_{ISO}	Isolation Capacitance ⁽²⁾	$V_{I-O} = 0 \text{ V}, f = 1 \text{ MHz}$	All		0.2		pF

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

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

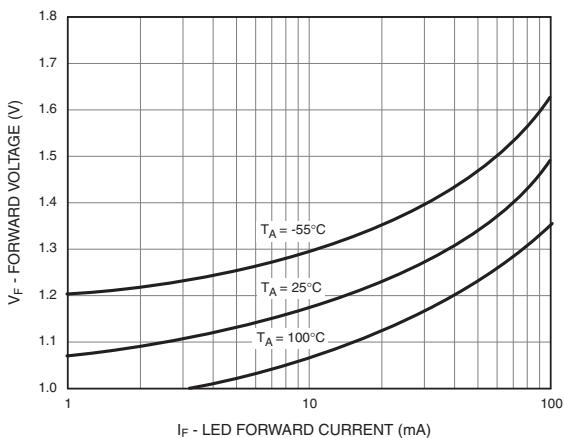


Figure 3. LED Forward Voltage vs. Forward Current

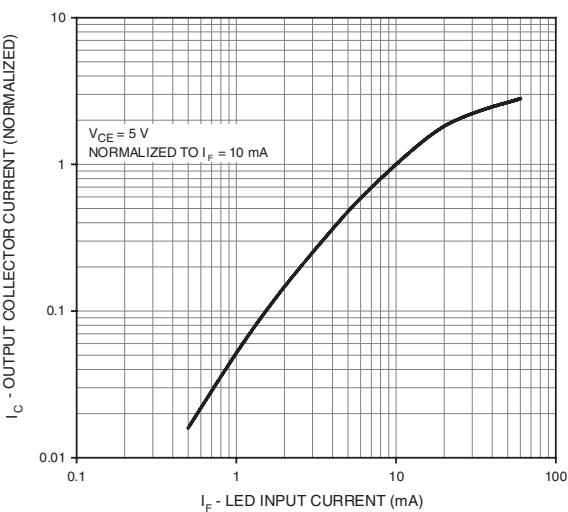


Figure 4. Output Current vs. Input Current

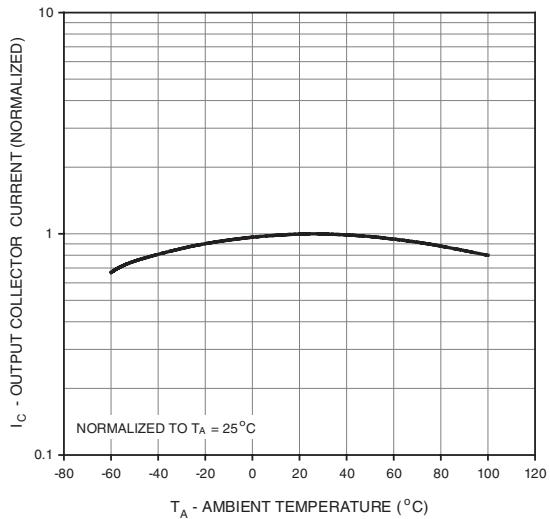


Figure 5. Output Current vs. Ambient Temperature

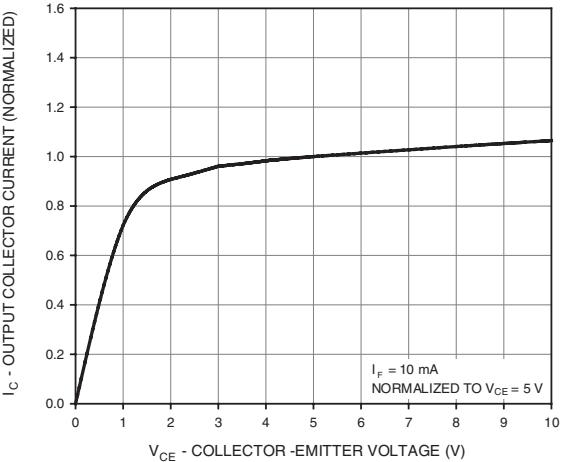


Figure 6. Output Current vs. Collector-Emitter Voltage

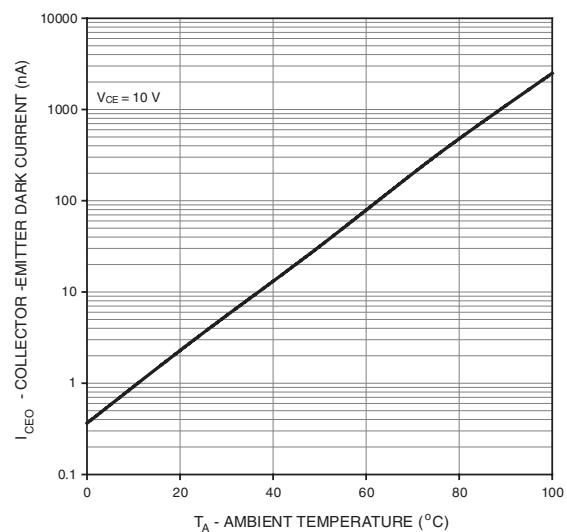
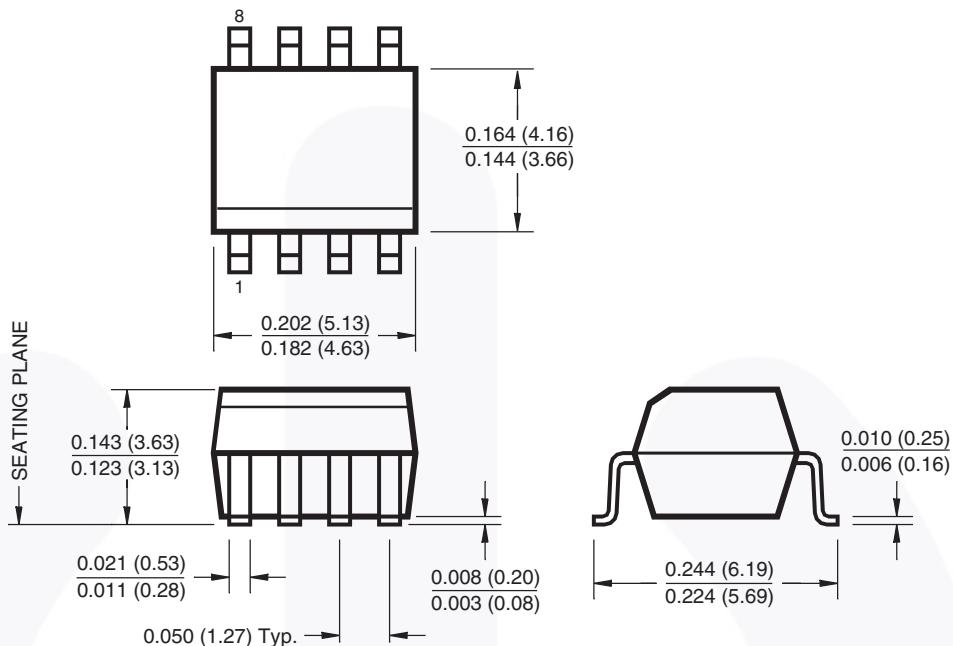


Figure 7. Dark Current vs. Ambient Temperature

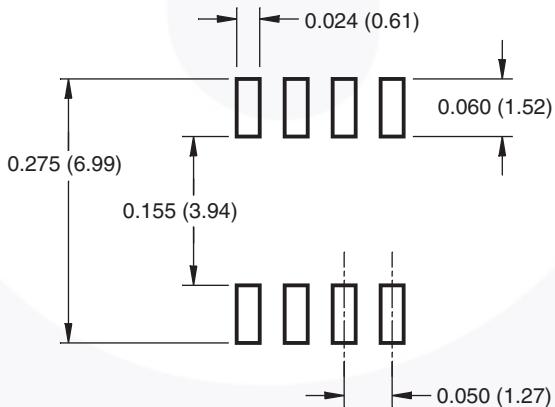
Package Dimensions

8-pin SOIC Surface Mount



Lead Coplanarity: 0.004 (0.10) MAX

Recommended Pad Layout



Dimensions in inches (mm).

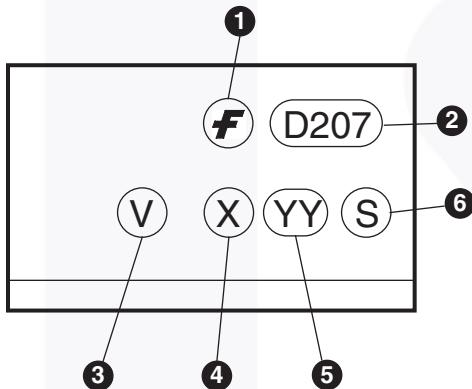
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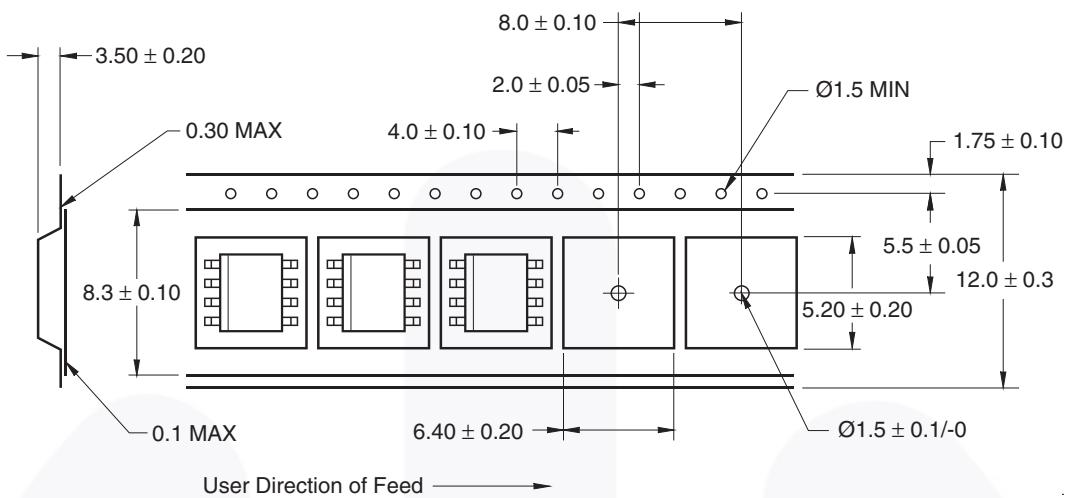
Option	Order Entry Identifier	Description
V	V	VDE Approved
D1	D1	Tape and Reel (500 units per reel), 16 mm Width Carrier Tape
D1V	D1V	VDE Approved, Tape and Reel (500 units per reel), 16 mm Width Carrier Tape
D2	D2	Tape and Reel (2500 units per reel), 16 mm Width Carrier Tape
D2V	D2V	VDE Approved, Tape and Reel (2500 units per reel), 16 mm Width Carrier Tape
R2	R2	Tape and Reel (2500 units per reel), 12 mm Width Carrier Tape
R2V	R2V	VDE Approved, Tape and Reel (2500 units per reel), 12 mm Width Carrier Tape

Marking Information

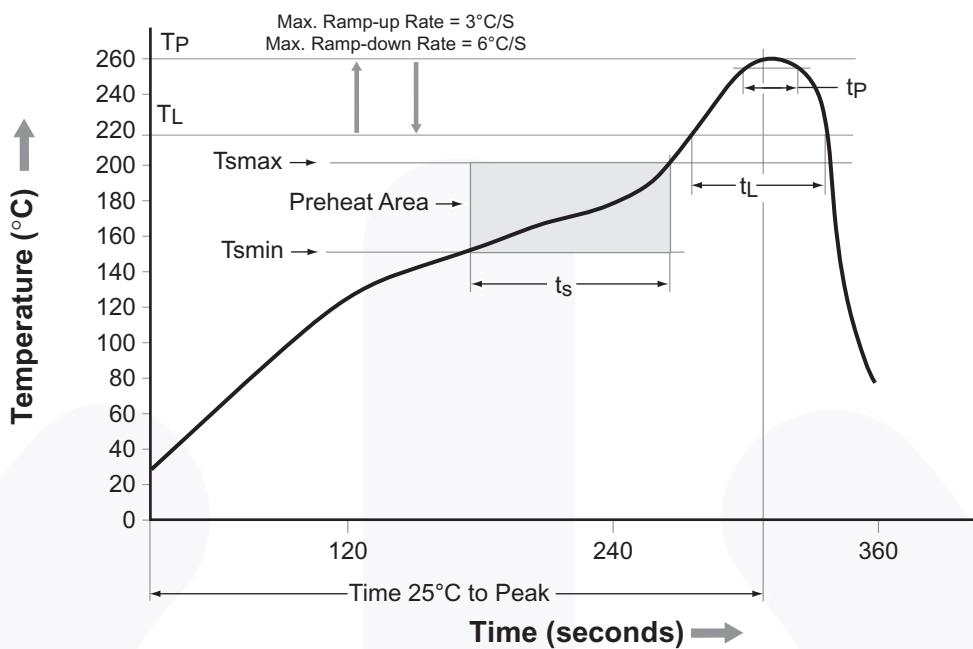


Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One digit year code, e.g., '3'
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

Carrier Tape Specifications



Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Minimum (Tsmin)	150°C
Temperature Maximum (Tsmax)	200°C
Time (t _S) from (Tsmin to Tsmax)	60–120 seconds
Ramp-up Rate (t _L to t _P)	3°C/second maximum
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 maximum
Time 25°C to Peak Temperature	8 minutes maximum



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