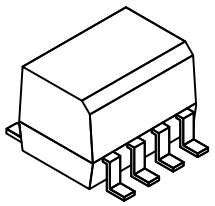
8-pin SOIC Dual-Channel Phototransistor Output Optocoupler

MOCD207M, MOCD208M, MOCD211M, MOCD213M, MOCD217M



SOIC8
M SUFFIX
CASE 751DZ

These devices consist of two gallium arsenide infrared emitting diodes optically coupled to two monolithic silicon phototransistor detectors, in a surface mountable, small outline, plastic package. They are ideally suited for high−density applications, and eliminate the need for through−the−board mounting.

Features

- Closely Matched Current Transfer Ratios
- Minimum BV_{CEO} of 70 V Guaranteed
  – MOCD207M, MOCD208M, MOCD213M
- Minimum BV_{CEO} of 30 V Guaranteed
  – MOCD211M, MOCD217M
- Low LED Input Current Required for Easier Logic Interfacing
  – MOCD217M
- Convenient Plastic SOIC−8 Surface Mountable Package Style, with 0.050″ Lead Spacing
- Safety and Regulatory Approvals:
  – UL1577, 2,500 VAC_{RMS} for 1 Minute
  – DIN−EN/IEC60747−5−5, 565 V Peak Working Insulation Voltage
- These are Pb−Free Devices

Applications

- Feedback Control Circuits
- Interfacing and Coupling Systems of Different Potentials and Impedances
- General Purpose Switching Circuits
- Monitor and Detection Circuits

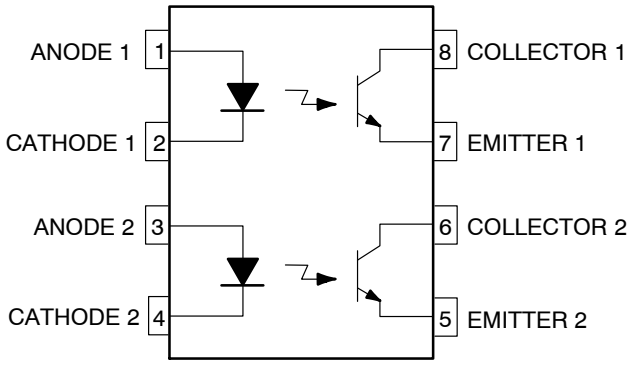
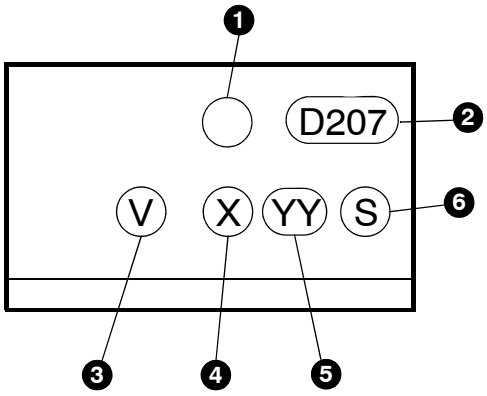


Figure 1. Schematic

MARKING DIAGRAM



1 – Logo
2 – Device Number
3 – DIN EN/IEC60747−5−5 Option (only appears on component ordered with this option)
4 – One−Digit Year Code, e.g., “4”
5 – Digit Work Week, Ranging from “01” to “53”
6 – Assembly Package Code

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 7 of this data sheet.

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Safety and Insulation Ratings

As per DIN EN/IEC 60747−5−5, this optocoupler is suitable for “safe electrical insulation” only within the safety limit data. Compliance with the safety ratings shall be ensured by means of protective circuits.

Parameter		Characteristics
Installation Classifications per DIN VDE 0110/1.89 Table 1, For Rated Mains Voltage	< 150 V_{RMS}	I−IV
	< 300 V_{RMS}	I−III
Climatic Classification		55/100/21
Pollution Degree (DIN VDE 0110/1.89)		2
Comparative Tracking Index		175

Symbol	Parameter	Value	Unit
V_{PR}	Input−to−Output Test Voltage, Method A, V_{IORM} x 1.6 = V_{PR}, Type and Sample Test with t_m = 10 s, Partial Discharge < 5 pC	904	V_{peak}
	Input−to−Output Test Voltage, Method B, V_{IORM} x 1.875 = V_{PR}, 100% Production Test with t_m = 1 s, Partial Discharge < 5 pC	1060	V_{peak}
V_{IORM}	Maximum Working Insulation Voltage	565	V_{peak}
V_{IOTM}	Highest Allowable Over−Voltage	4000	V_{peak}
	External Creepage	≥4	mm
	External Clearance	≥4	mm
DTI	Distance Through Insulation (Insulation Thickness)	≥0.4	mm
T_S	Case Temperature (Note 1)	150	°C
$I_{S,INPUT}$	Input Current (Note 1)	200	mA
$P_{S,OUTPUT}$	Output Current (Note 1)	300	mW
R_{IO}	Insulation Resistance at T_S, V_{IO} = 500 V (Note 1)	$>10^9$	Ω

1. Safety limit values − maximum values allowed in the event of a failure.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Symbol	Rating	Value	Unit
TOTAL DEVICE			
T_{STG}	Storage Temperature	−40 to +125	°C
T_A	Ambient Operating Temperature	−40 to +100	°C
T_J	Junction Temperature	−40 to +125	°C
T_{SOL}	Lead Solder Temperature	260 for 10 seconds	°C
P_D	Total Device Power Dissipation @ T_A = 25°C	240	mW
	Derate Above 25°C	2.94	mW/°C
EMITTER			
I_F	Continuous Forward Current	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°C	90	mW
	Derate Above 25°C	0.8	mW/°C
DETECTOR			
I_C	Continuous Collector Current	150	mA
V_{CEO}	Collector−Emitter Voltage − MOCD207M, MOCD208M, MOCD213M	70	V
	− MOCD211M, MOCD217M	30	V
V_{ECO}	Emitter−Collector Voltage	7	V
P_D	Detector Power Dissipation @ T_A = 25°C	150	mW
	Derate Above 25°C	1.76	mW/°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Device	Test Conditions	Min	Typ	Max	Unit
EMITTER							
V_F	Input Forward Voltage	MOCD217M	I_F = 1 mA	–	1.05	1.3	V
		MOCD213M	I_F = 10 mA	–	1.15	1.5	V
		MOCD207M, MOCD208M, MOCD211M	I_F = 30 mA	–	1.25	1.5	V
I_R	Reverse Leakage Current	All	V_R = 6 V	–	0.001	100	μA
C_{IN}	Input Capacitance	All		–	18	–	pF
DETECTOR							
I_{CEO}	Collector−Emitter Dark Current	All	V_{CE} = 10 V, T_A = 25°C	–	1.0	50	nA
			V_{CE} = 10 V, T_A = 100°C	–	1.0	–	μA
BV_{CEO}	Collector−Emitter Breakdown Voltage	MOCD211M, MOCD217M	I_C = 100 μA	30	100	–	V
		MOCD207M, MOCD208M, MOCD213M	I_C = 100 μA	70	100	–	V
BV_{ECO}	Emitter−Collector Breakdown Voltage	All	I_E = 100 μA	7	10	–	V
C_{CE}	Collector−Emitter Capacitance	All	f = 1.0 MHz, V_{CE} = 0	–	7	–	pF
COUPLED							
CTR	Collector−Output Current	MOCD207M	I_F = 10 mA, V_{CE} = 5 V	100	–	200	%
		MOCD208M	I_F = 10 mA, V_{CE} = 5 V	40	–	125	%
		MOCD211M	I_F = 10 mA, V_{CE} = 5 V	20	–	–	%
		MOCD213M	I_F = 10 mA, V_{CE} = 5 V	100	–	–	%
		MOCD217M	I_F = 1 mA, V_{CE} = 5 V	100	–	–	%
$V_{CE(SAT)}$	Collector−Emitter Saturation Voltage	MOCD207M, MOCD208M, MOCD211M, MOCD213M	I_C = 2 mA, I_F = 10 mA	–	–	0.4	V
		MOCD217M	I_C = 100 μA, I_F = 1 mA	–	–	0.4	V
t_{on}	Turn−On Time	All	I_C = 2 mA, V_{CC} = 10 V, R_L = 100 Ω (Figure 7)	–	7.5	–	μs
t_{off}	Turn−Off Time	All	I_C = 2 mA, V_{CC} = 10 V, R_L = 100 Ω (Figure 7)	–	5.7	–	μs
t_r	Rise Time	All	I_C = 2 mA, V_{CC} = 10 V, R_L = 100 Ω (Figure 7)	–	3.2	–	μs
t_f	Fall Time	All	I_C = 2 mA, V_{CC} = 10 V, R_L = 100 Ω (Figure 7)	–	4.7	–	μs
ISOLATION							
V_{ISO}	Input−Output Isolation Voltage	All	t = 1 Minute	2500	–	–	VAC_{RMS}
C_{ISO}	Isolation Capacitance	All	V_{I-O} = 0 V, f = 1 MHz	–	0.2	–	pF
R_{ISO}	Isolation Resistance	All	V_{I-O} = ±500 VDC, T_A = 25°C	10^{11}	–	–	Ω

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

TYPICAL CHARACTERISTICS

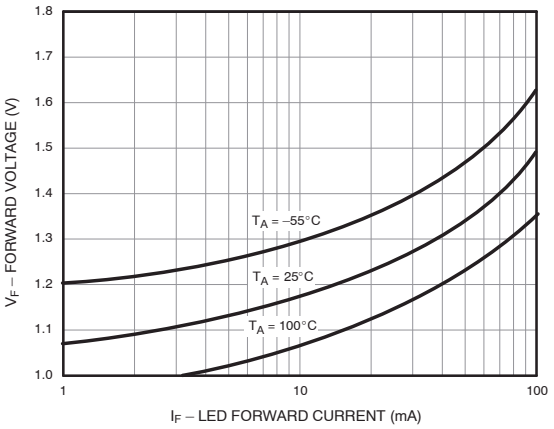


Figure 2. LED Forward Voltage vs. Forward Current

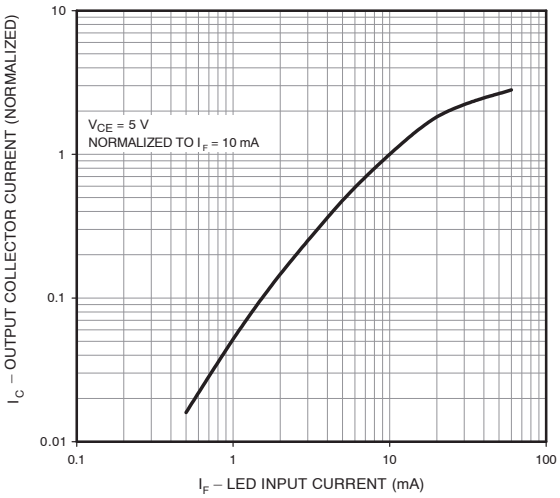


Figure 3. Output Current vs. Input Current

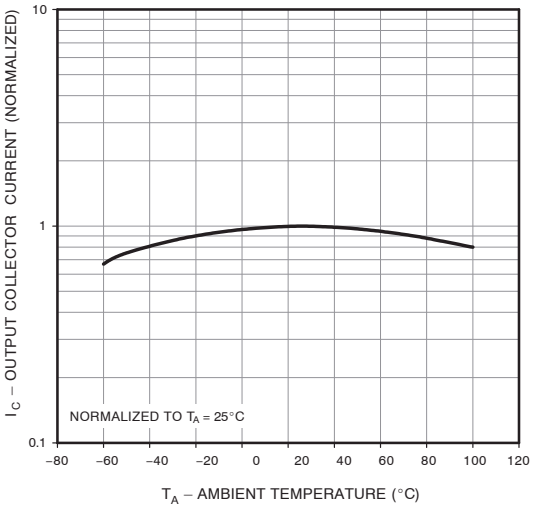


Figure 4. Output Current vs. Ambient Temperature

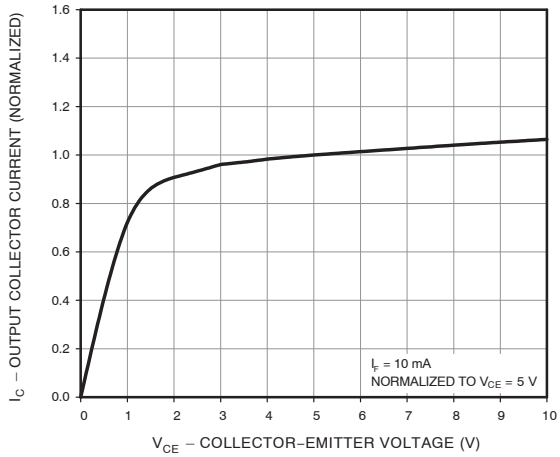


Figure 5. Output Current vs. Collector−Emitter Voltage

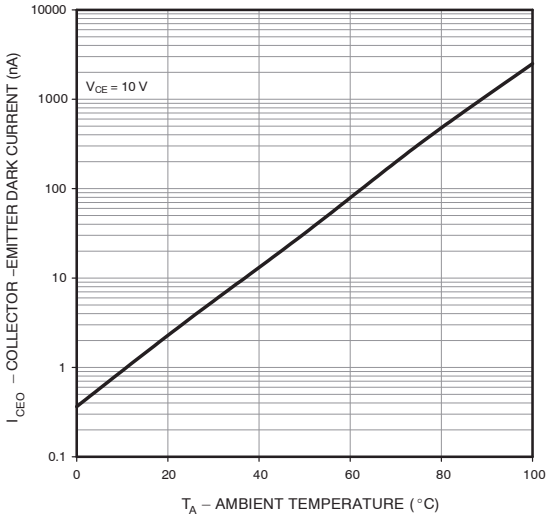


Figure 6. Dark Current vs. Ambient Temperature

SWITCHING TIME TEST CIRCUIT AND WAVEFORMS

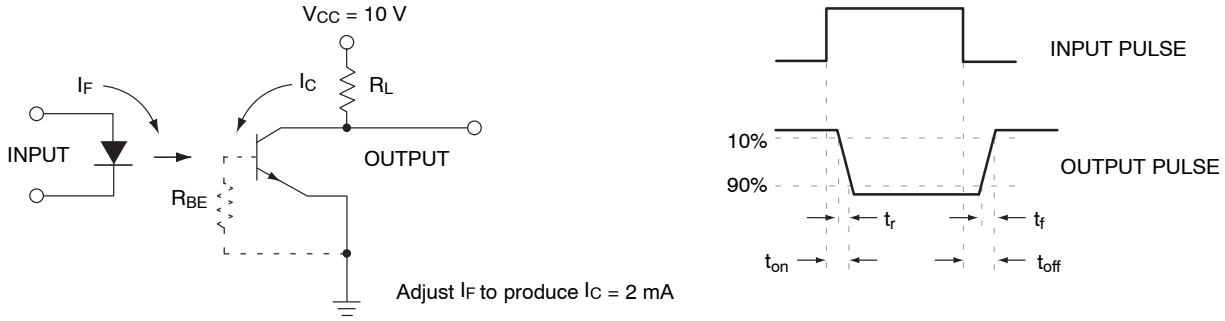


Figure 7. Switching Time Test Circuit and Waveforms

REFLOW PROFILE

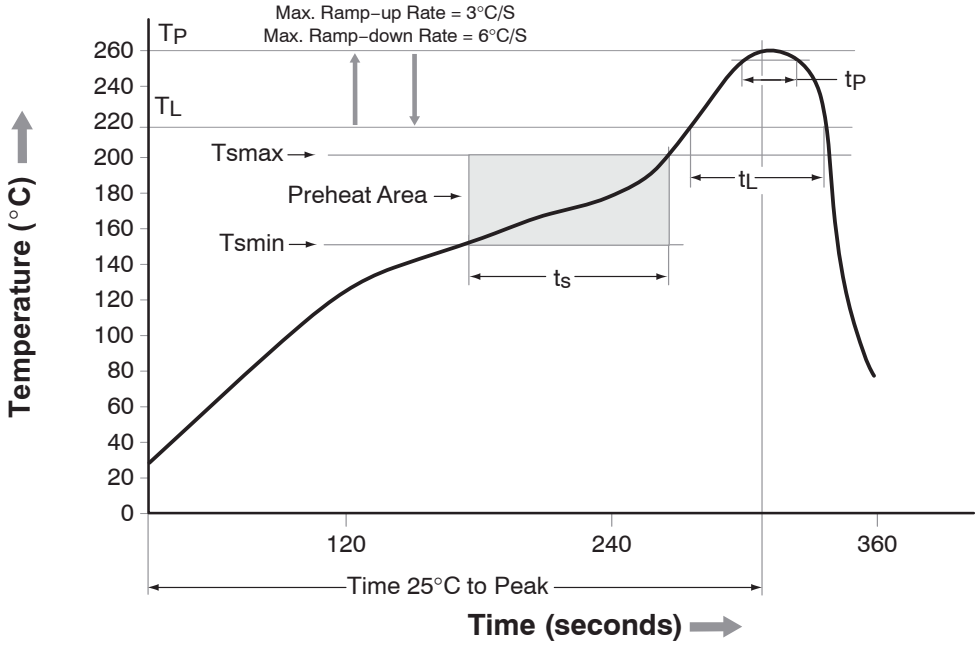


Figure 8. Reflow Profile

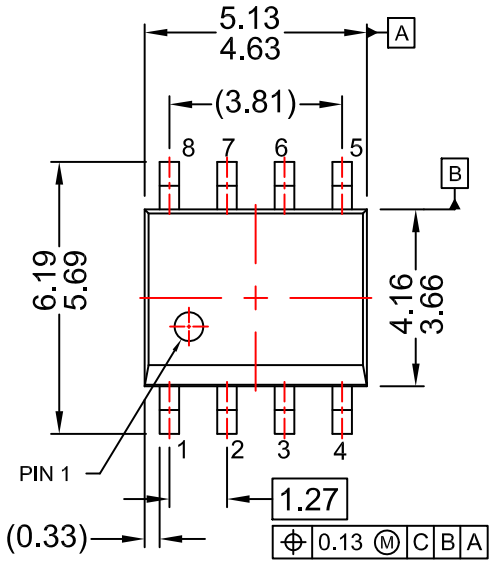
Profile Feature	Pb−Free Assembly Profile
Temperature Minimum (Tsmin)	150°C
Temperature Maximum (Tsmax)	200°C
Time (t_S) from (Tsmin to Tsmax)	60 − 120 seconds
Ramp−up Rate (t_L to t_P)	3°C/second maximum
Liquidous Temperature (T_L)	217°C
Time (t_L) Maintained Above (T_L)	60 − 150 seconds
Peak Body Package 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

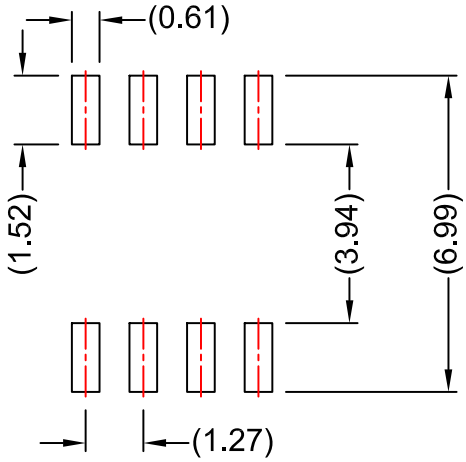
ORDERING INFORMATION

Part Number	Package	Shipping
MOCD207M	Small Outline 8−Pin	50 Units / Tube
MOCD207R2M	Small Outline 8−Pin	2500 Units / Tape & Reel
MOCD207VM	Small Outline 8−Pin, DIN EN/IEC60747−5−5 Option	50 Units / Tube
MOCD207R2VM	Small Outline 8−Pin, DIN EN/IEC60747−5−5 Option	2500 Units / Tape & Reel
MOCD208M	Small Outline 8−Pin	50 Units / Tube
MOCD208R2M	Small Outline 8−Pin	2500 Units / Tape & Reel
MOCD208VM	Small Outline 8−Pin, DIN EN/IEC60747−5−5 Option	50 Units / Tube
MOCD208R2VM	Small Outline 8−Pin, DIN EN/IEC60747−5−5 Option	2500 Units / Tape & Reel
MOCD211M	Small Outline 8−Pin	50 Units / Tube
MOCD211R2M	Small Outline 8−Pin	2500 Units / Tape & Reel
MOCD211VM	Small Outline 8−Pin, DIN EN/IEC60747−5−5 Option	50 Units / Tube
MOCD211R2VM	Small Outline 8−Pin, DIN EN/IEC60747−5−5 Option	2500 Units / Tape & Reel
MOCD213M	Small Outline 8−Pin	50 Units / Tube
MOCD213R2M	Small Outline 8−Pin	2500 Units / Tape & Reel
MOCD213VM	Small Outline 8−Pin, DIN EN/IEC60747−5−5 Option	50 Units / Tube
MOCD213R2VM	Small Outline 8−Pin, DIN EN/IEC60747−5−5 Option	2500 Units / Tape & Reel
MOCD217M	Small Outline 8−Pin	50 Units / Tube
MOCD217R2M	Small Outline 8−Pin	2500 Units / Tape & Reel
MOCD217VM	Small Outline 8−Pin, DIN EN/IEC60747−5−5 Option	50 Units / Tube
MOCD217R2VM	Small Outline 8−Pin, DIN EN/IEC60747−5−5 Option	2500 Units / Tape & Reel

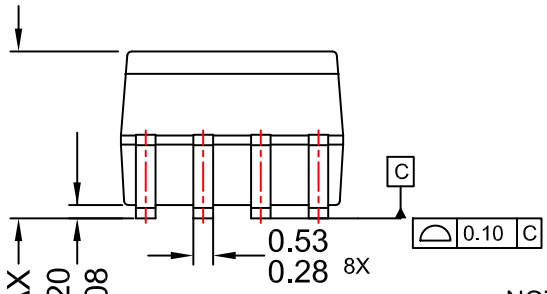
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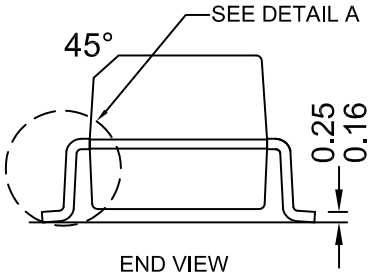
DATE 30 SEP 2016



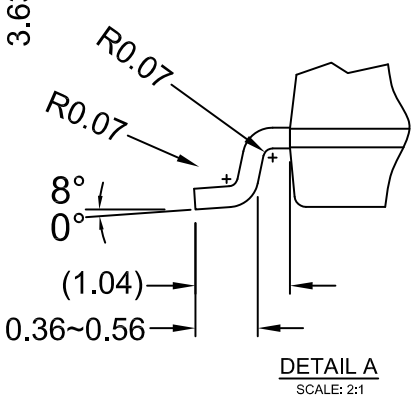


LAND PATTERN RECOMMENDATION





END VIEW



DETAIL A
SCALE: 2:1

NOTES:

A) NO STANDARD APPLIES TO THIS PACKAGE
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS.
D) LANDPATTERN STANDARD: SOIC127P600X175-8M.

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