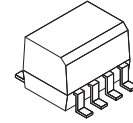


# 8-pin SOIC AC Input Phototransistor Output Optocoupler

## MOC256M



SOIC8  
 CASE 751DZ

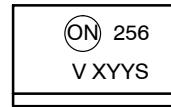
### Description

The MOC256M is an AC input phototransistor opto-coupler. The device consists of two infrared emitters connected in anti-parallel and coupled to a silicon NPN phototransistor detector. It is designed for applications requiring the detection or monitoring of AC signals. The device is constructed with a standard SOIC-8 footprint.

### Features

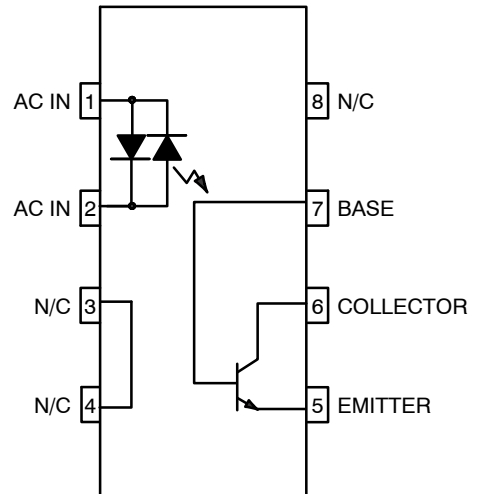
- Bidirectional AC Input
  - ◆ Protection Against Reversed DC Bias
- Guaranteed CTR Symmetry of 2:1 Maximum
- Convenient Plastic SOIC-8 Surface Mountable Package Style, with 0.050" Lead Spacing
- Safety and Regulatory Approvals:
  - ◆ UL1577, 2,500 VAC<sub>RMS</sub> for 1 Minute
  - ◆ DIN-EN/IEC60747-5-5, 565 V Peak Working Insulation Voltage
- These are Pb-Free Devices

### MARKING DIAGRAM



- 256 = Device Number
- V = DIN EN/IEC60747-5-5 Option (only appears on component ordered with this option)
- X = One-Digit Year Code, e.g., "4"
- YY = Digit Work Week, Ranging from "01" to "53"
- S = Assembly Package Code

### SCHEMATIC



### ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

# MOC256M

**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 <sub>RMS</sub>	I-IV
	<300 V <sub>RMS</sub>	I-III
Climatic Classification	55/100/21	
Pollution Degree (DIN VDE 0110/1.89)	2	
Comparative Tracking Index	175	

Symbol	Parameter	Value	Unit
V <sub>PR</sub>	Input-to-Output Test Voltage, Method A, V <sub>IORM</sub> × 1.6 = V <sub>PR</sub> , Type and Sample Test with t <sub>m</sub> = 10 s, Partial Discharge < 5 pC	904	V <sub>peak</sub>
	Input-to-Output Test Voltage, Method B, V <sub>IORM</sub> × 1.875 = V <sub>PR</sub> , 100% Production Test with t <sub>m</sub> = 1 s, Partial Discharge < 5 pC	1060	V <sub>peak</sub>
V <sub>IORM</sub>	Maximum Working Insulation Voltage	565	V <sub>peak</sub>
V <sub>IOTM</sub>	Highest Allowable Over-Voltage	4000	V <sub>peak</sub>
	External Creepage	≥4	mm
	External Clearance	≥4	mm
DTI	Distance Through Insulation (Insulation Thickness)	≥0.4	mm
T <sub>S</sub>	Case Temperature (Note 1)	150	°C
I <sub>S,INPUT</sub>	Input Current (Note 1)	200	mA
P <sub>S,OUTPUT</sub>	Output Power (Note 1)	300	mW
R <sub>IO</sub>	Insulation Resistance at T <sub>S</sub> , V <sub>IO</sub> = 500 V (Note 1)	>10 <sup>9</sup>	Ω

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

## ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
<b>TOTAL DEVICE</b>			
T <sub>STG</sub>	Storage Temperature	-40 to +125	°C
T <sub>A</sub>	Ambient Operating Temperature	-40 to +100	°C
T <sub>J</sub>	Junction Temperature Range	-40 to +125	°C
T <sub>SOL</sub>	Lead Solder Temperature	260 for 10 seconds	°C
P <sub>D</sub>	Total Device Power Dissipation @ T <sub>A</sub> = 25°C	240	mW
	Derate Above 25°C	2.94	mW/°C

## EMITTER

I <sub>F</sub>	Continuous Forward Current	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	90	mW
	Derate Above 25°C	0.8	mW/°C

## DETECTOR

I <sub>C</sub>	Continuous Collector Current	150	mA
V <sub>CEO</sub>	Collector-Emitter Voltage	30	V
V <sub>CBO</sub>	Collector-Base Voltage	70	V
V <sub>ECO</sub>	Emitter-Collector Voltage	7	V
P <sub>D</sub>	Detector Power Dissipation @ T <sub>A</sub> = 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.

# MOC256M

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
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### EMITTER

V <sub>F</sub>	Input Forward Voltage	I <sub>F</sub> = ±10 mA	–	1.2	1.5	V
C <sub>IN</sub>	Input Capacitance	V = 0 V, f = 1 MHz	–	20	–	pF

### DETECTOR

I <sub>CEO1</sub>	Collector–Emitter Dark Current	V <sub>CE</sub> = 10 V, T <sub>A</sub> = 25°C	–	1.0	100	nA
I <sub>CEO2</sub>		V <sub>CE</sub> = 10 V, T <sub>A</sub> = 100°C	–	1.0	–	μA
I <sub>CBO</sub>	Collector–Base Dark Current	V <sub>CB</sub> = 10 V	–	0.2	–	nA
BV <sub>CEO</sub>	Collector–Emitter Breakdown Voltage	I <sub>C</sub> = 10 mA	30	100	–	V
BV <sub>CBO</sub>	Collector–Base Breakdown Voltage	I <sub>C</sub> = 100 μA	70	120	–	V
BV <sub>ECO</sub>	Emitter–Collector Breakdown Voltage	I <sub>E</sub> = 100 μA	5	10	–	V
C <sub>CE</sub>	Collector–Emitter Capacitance	f = 1.0 MHz, V <sub>CE</sub> = 0	–	7	–	pF
C <sub>CB</sub>	Collector–Base Capacitance	f = 1.0 MHz, V <sub>CB</sub> = 0	–	20	–	pF
C <sub>EB</sub>	Emitter–Base Capacitance	f = 1.0 MHz, V <sub>EB</sub> = 0	–	10	–	pF

### COUPLED

CTR	Current Transfer Ratio	I <sub>F</sub> = ±10 mA, V <sub>CE</sub> = 10 V	20	150	–	%
	Output–Collector Current Symmetry	$\left( \frac{I_C @ I_F = +10 \text{ mA}, V_{CE} = 10 \text{ V}}{I_C @ I_F = -10 \text{ mA}, V_{CE} = 10 \text{ V}} \right)$	0.5	–	2.0	
V <sub>CE (SAT)</sub>	Collector–Emitter Saturation Voltage	I <sub>C</sub> = 0.5 mA, I <sub>F</sub> = ±10 mA	–	0.1	0.4	V

### ISOLATION CHARACTERISTICS

V <sub>ISO</sub>	Input–Output Isolation Voltage	t = 1 Minute	2500	–	–	V <sub>ACRMS</sub>
C <sub>ISO</sub>	Isolation Capacitance	V <sub>I-O</sub> = 0 V, f = 1 MHz	–	0.2	–	pF
R <sub>ISO</sub>	Isolation Resistance	V <sub>I-O</sub> = ±500 VDC, T <sub>A</sub> = 25°C	10 <sup>11</sup>	–	–	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.

# MOC256M

## TYPICAL PERFORMANCE CURVES

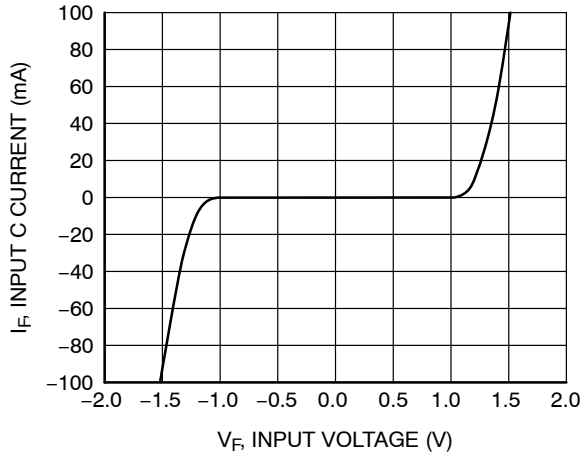


Figure 1. Input Current vs. Input Voltage

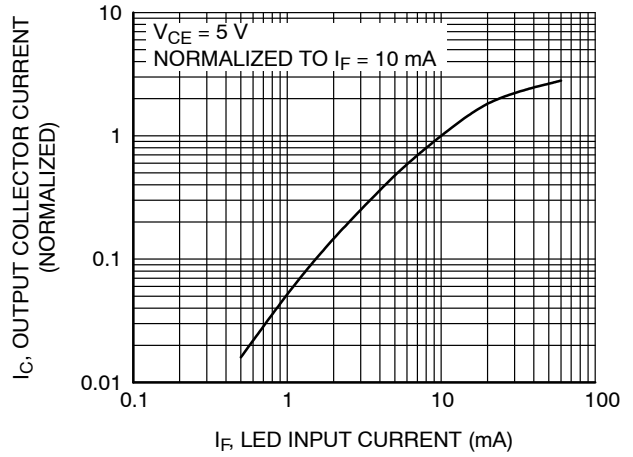


Figure 2. Output Current vs. Input Current

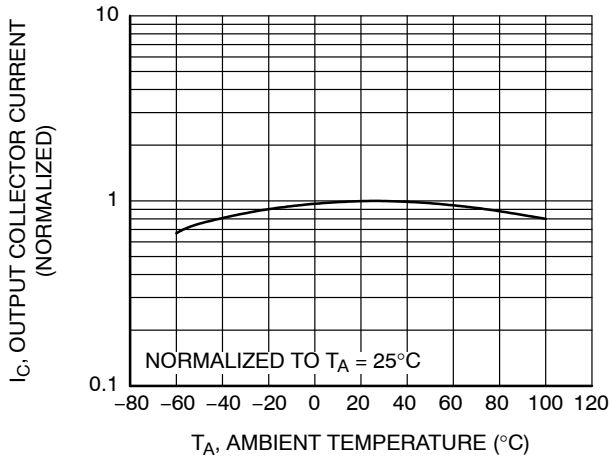


Figure 3. Output Current vs. Ambient Temperature

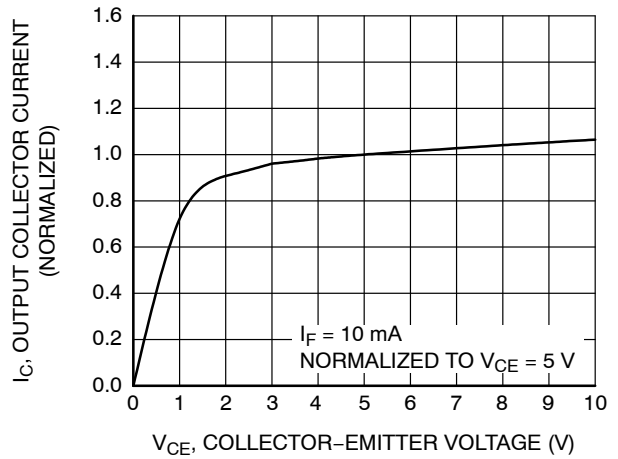


Figure 4. Output Current vs. Collector-Emitter Voltage

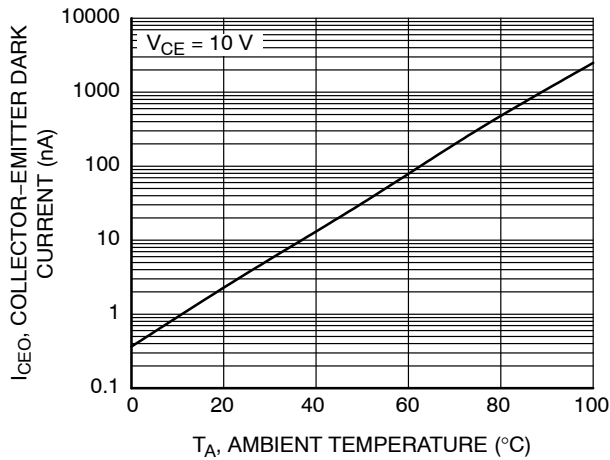


Figure 5. Dark Current vs. Ambient Temperature

# MOC256M

## REFLOW PROFILE

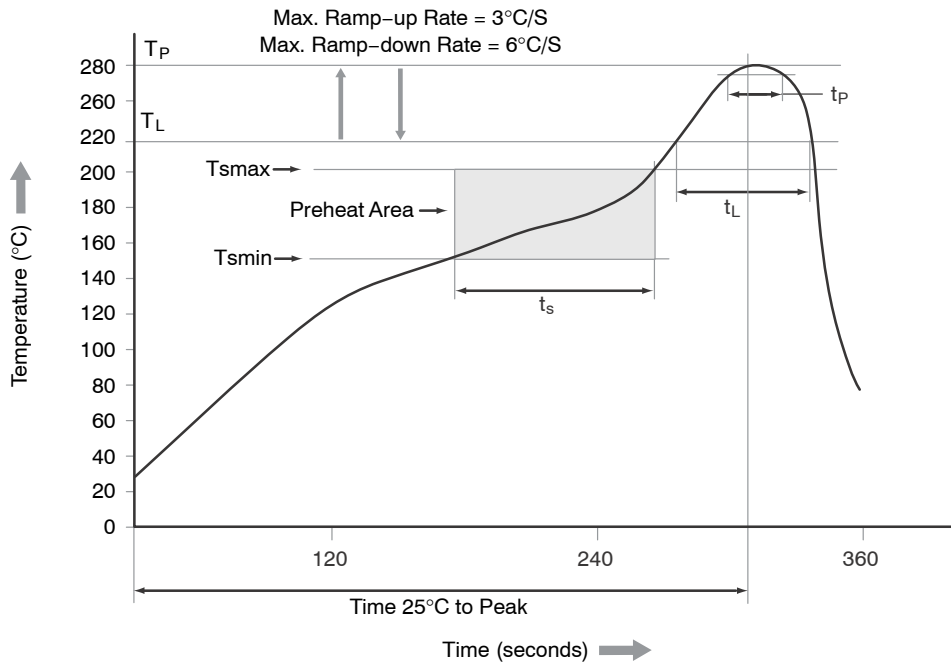


Figure 6. Reflow Profile

Table 1.

Profile Feature	Pb-Free Assembly Profile
Temperature Minimum ( $T_{smin}$ )	150°C
Temperature Maximum ( $T_{smax}$ )	200°C
Time ( $t_s$ ) from ( $T_{smin}$ to $T_{smax}$ )	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†
MOC256M	Small Outline 8-Pin, SOIC8 (Pb-Free)	50 Units / Tube
MOC256R2M	Small Outline 8-Pin, SOIC8 (Pb-Free)	2500 Units / Tape & Reel
MOC256VM	Small Outline 8-Pin, SOIC8, DIN EN/IEC60747-5-5 Option (Pb-Free)	50 Units / Tube
MOC256R2VM	Small Outline 8-Pin, SOIC8, DIN EN/IEC60747-5-5 Option (Pb-Free)	2500 Units / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# MECHANICAL CASE OUTLINE

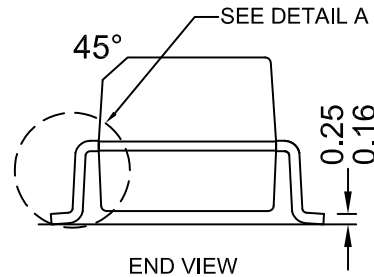
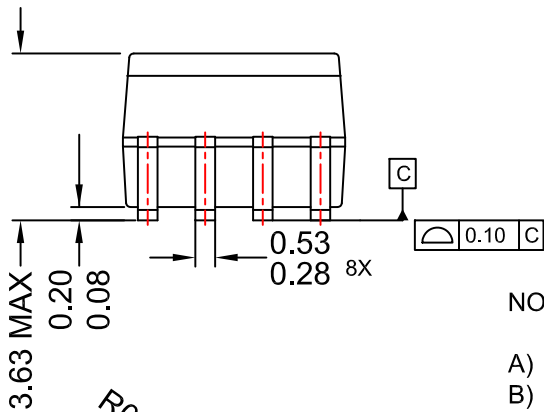
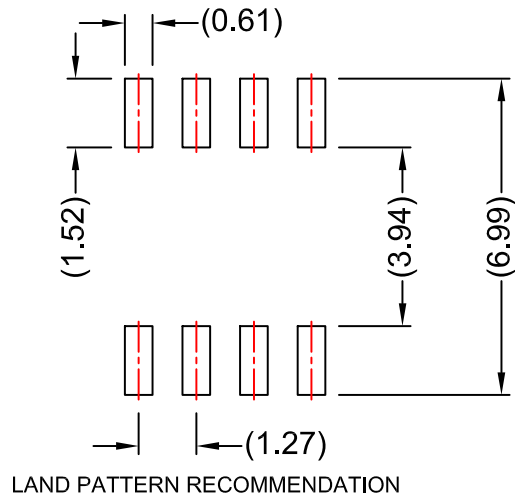
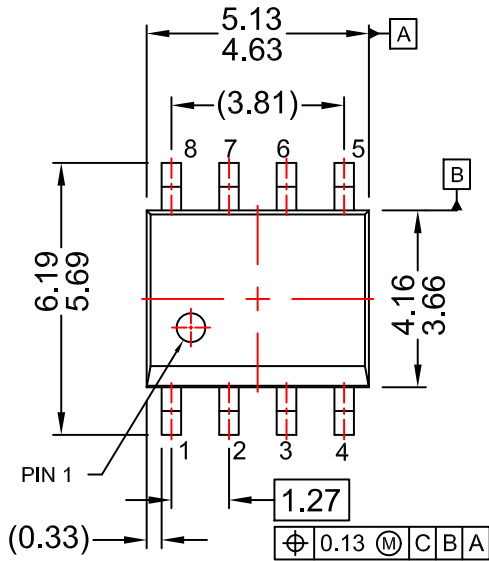
## PACKAGE DIMENSIONS

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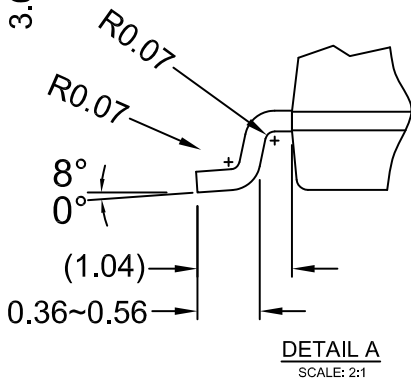
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ISSUE O

DATE 30 SEP 2016



**NOTES:**

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- C) DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS.
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