

8-pin SOIC AC Input Phototransistor Output Optocoupler

MOC256M

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_{RMS} for 1 Minute
 - DIN-EN/IEC60747-5-5, 565 V Peak Working Insulation Voltage
- These are Pb-Free Devices



MARKING DIAGRAM



256 = Device Number

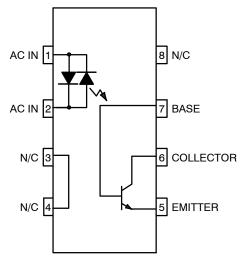
V = DIN EN/IEC60747-5-5 Option (only appears on component ordered with this option)

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.

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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, $V_{IORM} \times 1.6 = V_{PR}$, Type and Sample Test with $t_m = 10$ s, Partial Discharge < 5 pC	904	V _{peak}
	Input-to-Output Test Voltage, Method B, VIORM 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		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 Power (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 ($T_A = 25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Value	Unit
TOTAL DEVIC	E		
T _{STG}	Storage Temperature	-40 to +125	°C
T _A	Ambient Operating Temperature	-40 to +100	°C
T_J	Junction Temperature Range	-40 to +125	°C
T _{SOL}	Lead Solder Temperature	260 for 10 seconds	°C
P_{D}	otal Device Power Dissipation @ T _A = 25°C 240		mW
	Derate Above 25°C	2.94	mW/°C
EMITTER			
l _F	Continuous Forward Current	60	mA
I _F (pk)	Forward Current – Peak (PW = 100 μs, 120 pps)	1.0	Α
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			
Ic	Continuous Collector Current	150	mA
V _{CEO}	Collector-Emitter Voltage	30	V
V_{CBO}	Collector-Base Voltage	70	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	Test Conditions	Min	Тур	Max	Unit
EMITTER						•
V _F	Input Forward Voltage	I _F = ±10 mA	-	1.2	1.5	V
C _{IN}	Input Capacitance	V = 0 V, f = 1 MHz	-	20	-	pF
DETECTO	R					
I _{CEO1}	Collector-Emitter Dark Current	V _{CE} = 10 V, T _A = 25°C	-	1.0	100	nA
I _{CEO2}		V _{CE} = 10 V, T _A = 100°C	-	1.0	-	μΑ
I _{CBO}	Collector-Base Dark Current	V _{CB} = 10 V	-	0.2	-	nA
BV _{CEO}	Collector-Emitter Breakdown Voltage	I _C = 10 mA	30	100	-	V
BV _{CBO}	Collector-Base Breakdown Voltage	I _C = 100 μA	70	120	-	V
BV _{ECO}	Emitter-Collector Breakdown Voltage	I _E = 100 μA	5	10	-	V
C _{CE}	Collector-Emitter Capacitance	f = 1.0 MHz, V _{CE} = 0	-	7	-	pF
C _{CB}	Collector-Base Capacitance	f = 1.0 MHz, V _{CB} = 0	-	20	-	pF
C _{EB}	Emitter-Base Capacitance	f = 1.0 MHz, V _{EB} = 0	-	10	-	pF
COUPLED						
CTR	Current Transfer Ratio	$I_F = \pm 10 \text{ mA}, V_{CE} = 10 \text{ V}$	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 _{CE (SAT)}	Collector-Emitter Saturation Voltage	$I_C = 0.5 \text{ mA}, I_F = \pm 10 \text{ mA}$	-	0.1	0.4	V
ISOLATIO	N CHARACTERISTICS					
V _{ISO}	Input-Output Isolation Voltage	t = 1 Minute	2500	-	-	VAC _{RMS}
C _{ISO}	Isolation Capacitance	V _{I-O} = 0 V, f = 1 MHz	-	0.2	-	pF
R _{ISO}	Isolation Resistance	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 PERFORMANCE CURVES

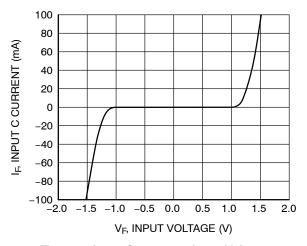


Figure 1. Input Current vs. Input Voltage

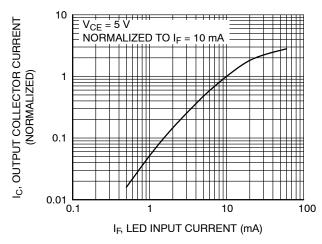


Figure 2. Output Current vs. Input Current

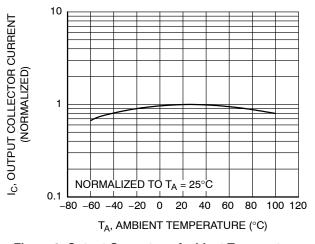


Figure 3. Output Current vs. Ambient Temperature

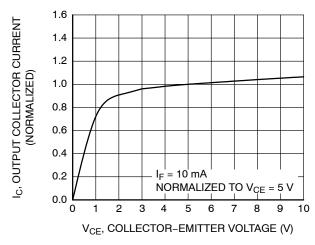


Figure 4. Output Current vs. Collector-Emitter Voltage

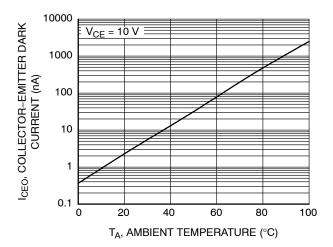


Figure 5. Dark Current vs. Ambient Temperature

REFLOW PROFILE

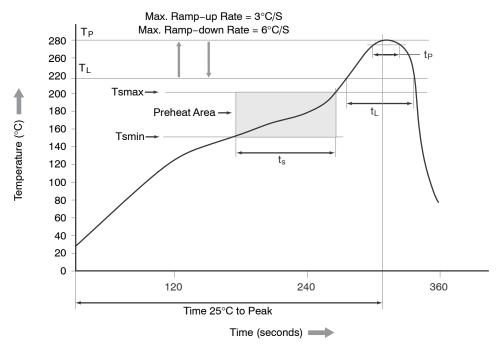


Figure 6. Reflow Profile

Table 1.

Profile Freature	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

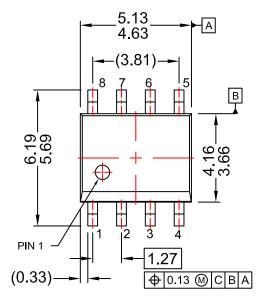
Part Number Package		Shipping [†]	
MOC256M	Small Outline 8-Pin, SOIC8 (Pb-Free)	50 Units / Tube	
MOC256R2M	Small Outline 8-Pin, SOIC8 (Pb-Free)	2500 Units / Tape & Reel	
MOC256VM	Small Outline 8-Pin, SOIC8, DIN EN/IEC60747-5-5 Option (Pb-Free)		
MOC256R2VM	Small Outline 8-Pin, SOIC8, DIN EN/IEC60747-5-5 Option (Pb-Free)	2500 Units / Tape & Reel	

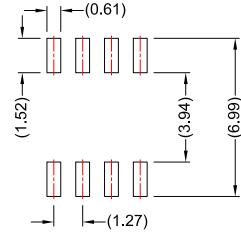
[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.



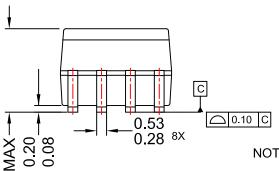
SOIC8 CASE 751DZ ISSUE O

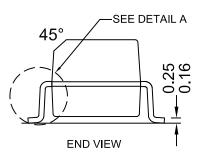
DATE 30 SEP 2016





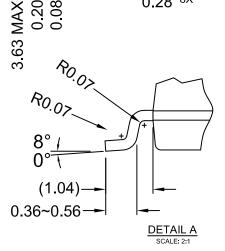
LAND PATTERN RECOMMENDATION





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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