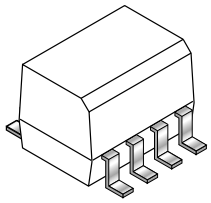
FAIRCHILD
SEMICONDUCTOR®

AC INPUT PHOTOTRANSISTOR SMALL OUTLINE SURFACE MOUNT OPTOCOUPLERS

MOC256-M

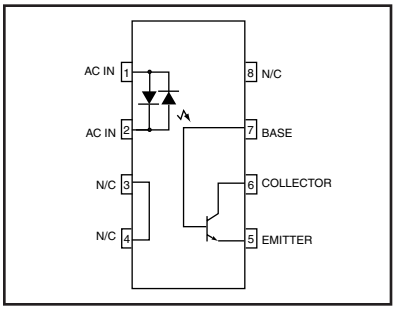
DESCRIPTION

The MOC256 is an AC input phototransistor optocoupler. The device consists of two infrared emitters connected in anti-parallel and coupled to a silicon NPN phototransistor detector. They are designed for applications requiring the detection or monitoring of AC signals. These devices are constructed with a standard SOIC-8 footprint.



FEATURES

- UL Recognized File #E90700
- VDE recognized (File #136616)
  - Ordering option V (i.e. MOC256V-M)
- Industry Standard SOIC-8 Surface Mountable Package
- Standard Lead Spacing of 0.050"
- Available in Tape and Reel Option
- Bidirectional AC Input (Protection Against Reversed DC Bias)
- Guaranteed CTR Symmetry of 2:1 Maximum
- High Input-Output Isolation of 3000 Vac (rms) Guaranteed



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C Unless otherwise specified)

Rating	Symbol	Value	Unit
EMITTER			
Forward Current - Continuous	I_F	60	mA
Forward Current - Peak (PW = 100 µs, 120 pps)	I_F (pk)	1.0	A
Reverse Voltage	V_R	6.0	V
LED Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	90 0.8	mW mW/°C
DETECTOR			
Collector-Emitter Voltage	V_{CEO}	30	V
Emitter-Base Voltage	V_{ECO}	7.0	V
Collector Current-Continuous	I_C	150	mA
Detector Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	150 1.76	mW mW/°C
TOTAL DEVICE			
Input-Output Isolation Voltage (f = 60 Hz, t = 1 min.)	V_{ISO}	3000	Vac(rms)
Total Device Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	250 2.94	mW mW/°C
Ambient Operating Temperature Range	T_A	-40 to +100	°C
Storage Temperature Range	T_{stg}	-40 to +150	°C
Lead Soldering Temperature (1/16" from case, 10 sec. duration)	T_L	260	°C

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

Parameter	Test Conditions	Symbol	Min	Typ**	Max	Unit
EMITTER						
Input Forward Voltage	(I_F = ±10 mA)	V_F	—	1.15	1.5	V
Input Capacitance	(V = 0 V, f = 1 MHz)	C_J	—	20	—	pF
DETECTOR						
Collector-Emitter Dark Current	(V_{CE} = 5.0 V, T_A = 25°C)	I_{CEO}	—	1.0	100	nA
	(V_{CE} = 5.0 V, T_A = 100°C)		—	1.0	—	µA
Collector-Base Dark Current	(V_{CB} = 10V)	I_{CBO}	—	0.2	—	V
Collector-Emitter Breakdown Voltage	(I_C = 10 mA)	$V_{(BR)CEO}$	30	45	—	V
Collector-Base Breakdown Voltage	(I_C = 100 µA)	$V_{(BR)CBO}$	70	100	—	V
Emitter-Collector Breakdown Voltage	(I_E = 100 µA)	$V_{(BR)ECO}$	5	7.8	—	V
DC Current Gain (I_C = 2 mA, V_{CE} = 5.0V)		h_{FE}	—	500	—	
Collector-Emitter Capacitance	(f = 1.0 MHz, V_{CE} = 0)	C_{CE}	—	7	—	pF
Collector-Base Capacitance	(f = 1.0 MHz, V_{CB} = 0)	C_{CB}	—	20	—	pF
Emitter-Base Capacitance	(f = 1.0 MHz, V_{EB} = 0)	C_{EB}	—	10	—	pF
COUPLED						
Collector-Output Current(1)	(I_F = ±10 mA, V_{CE} = 10 V)	CTR	20	150	—	%
Output-Collector Current Symmetry	(I_C @ I_F = +10 mA, V_{CE} = 10V)	—	0.5	1.0	2.0	—
	(I_C @ I_F = -10 mA, V_{CE} = 10V)					
Collector-Emitter Saturation Voltage	(I_C = 0.5 mA, I_F = ±10 mA)	$V_{CE\ (sat)}$	—	0.1	0.4	V
Isolation Surge Voltage(2,3)	(f = 60 Hz AC Peak, t = sec)	V_{ISO}	3000	—	—	Vac(rms)
Isolation Resistance(3)	(V = 500 V)	R_{ISO}	10^{11}	—	—	Ω
Isolation Capacitance(3)	(V = 0 V, f = 1 MHz)	C_{ISO}	—	0.2	—	pF

** Typical values at T_A = 25°C

NOTE:

1. Current Transfer Ratio (CTR) = I_C/I_F x 100%.
2. Isolation Surge Voltage, V_{ISO}, is an internal device dielectric breakdown rating.
3. For this test, Pins 1 and 2 are common and Pins 5, 6 and 7 are common.
4. Thickness through insulation between and output is ≥ 0.5mm.

Fig. 1 Input Voltage vs. Input Current

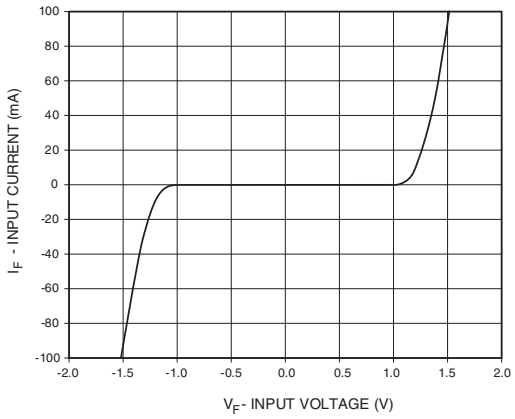


Fig. 2 Output Curent vs. Input Current

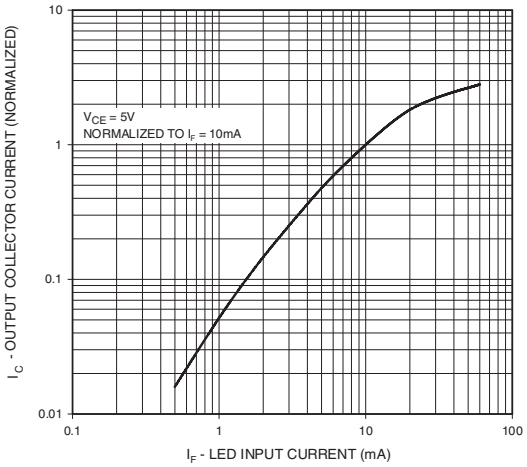


Fig. 3 Output Current vs. Ambient Temperature

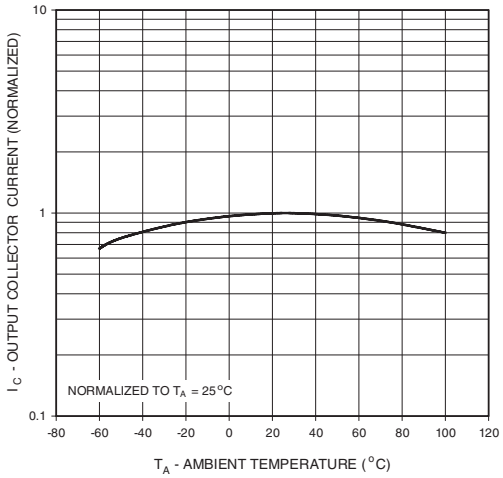


Fig. 4 Output Current vs. Collector - Emitter Voltage

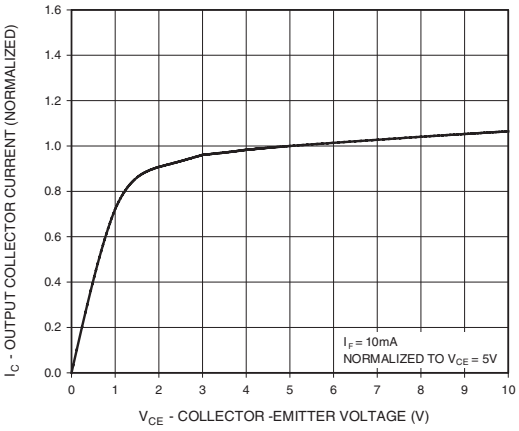
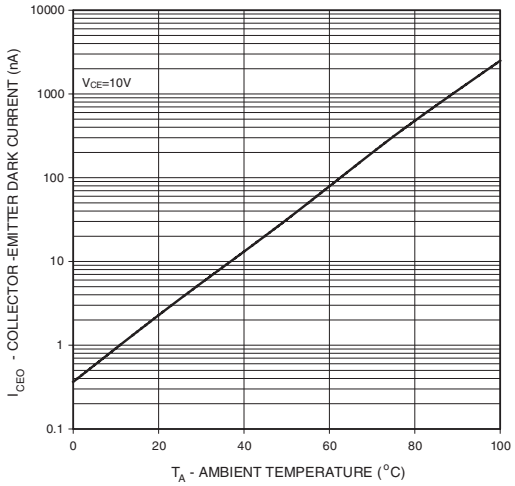


Fig. 5 Dark Current vs. Ambient Temperature



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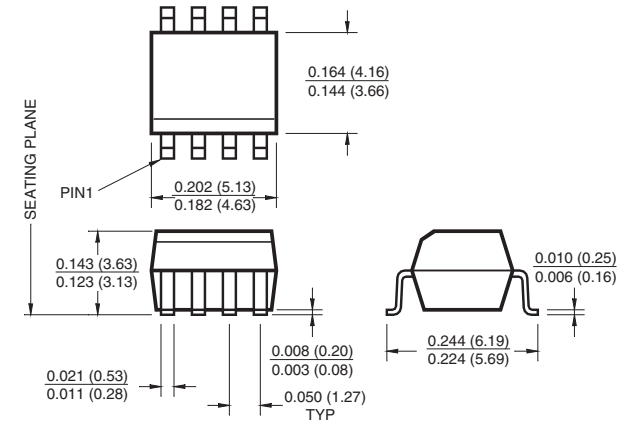
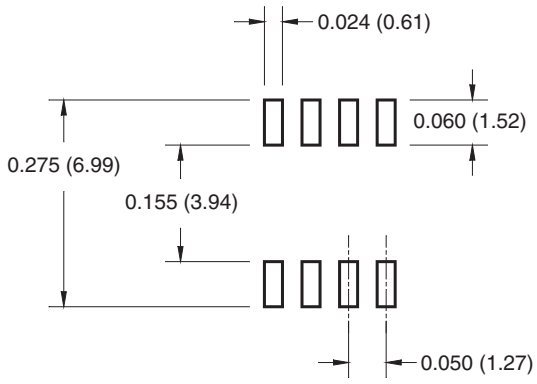
Package Dimensions (Surface Mount)



Lead Coplanarity : 0.004 (0.10) MAX

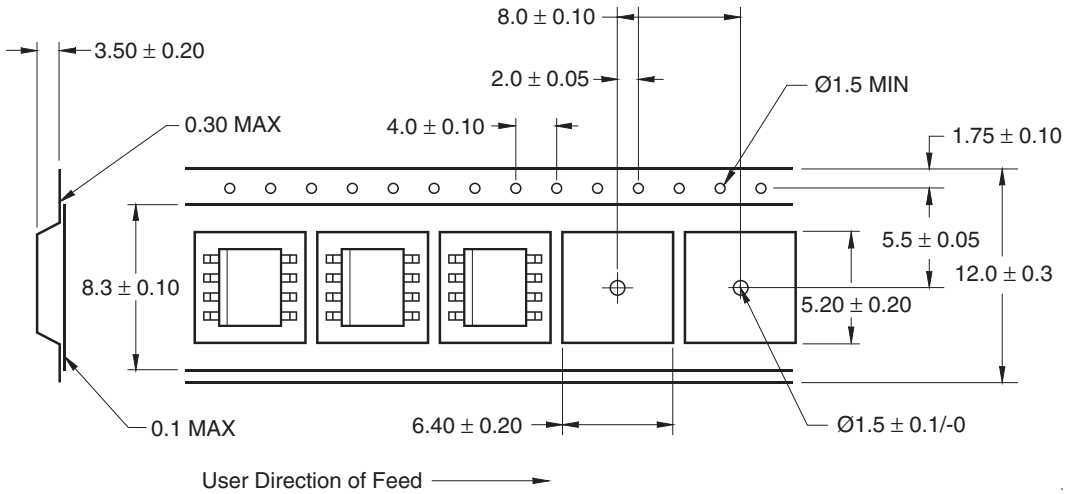
8-Pin Small Outline



ORDERING INFORMATION

Option	Order Entry Identifier	Description
R1	R1	Tape and reel (500 units per reel)
R2	R2	Tape and reel (2500 units per reel)

QT Carrier Tape Specifications ("D" Taping Orientation)



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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.