

AC Input Phototransistor Small Outline Surface Mount Optocoupler

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.

- Guaranteed Current Transfer Ratio CTR of 20% at $I_F=10$ mA
- UL Recognized. File Number E54915
- Industry Standard SOIC-8 Surface Mountable Package
- Standard Lead Spacing of 0.050 inches
- Available in Tape and Reel Option (Conforms to EIA Standard RS481A)
- Bidirectional AC Input (Protection Against Reversed DC Bias)
- Guaranteed CTR Symmetry of 2:1 Maximum
- High Input-Output Isolation of 3000 Vac (rms) Guaranteed

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
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INPUT LED

Forward Current — Continuous	I_F	60	mA
Forward Current — Peak (PW = 100 μs , 120 pps)	$I_F(\text{pk})$	1	A
Reverse Voltage	V_R	6	V
LED Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	90 0.8	mW mW/ $^\circ\text{C}$

OUTPUT TRANSISTOR

Collector-Emitter Voltage	V_{CEO}	30	V
Emitter-Base Voltage	V_{ECO}	7	V
Collector Current — Continuous	I_C	150	mA
Detector Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	150 1.76	mW mW/ $^\circ\text{C}$

TOTAL DEVICE

Input-Output Isolation Voltage ⁽¹⁾ (60 Hz, 1 sec Duration)	V_{ISO}	3000	Vac(rms)
Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	250 2.94	mW mW/ $^\circ\text{C}$
Ambient Operating Temperature Range ⁽²⁾	T_A	-55 to +100	$^\circ\text{C}$
Storage Temperature Range ⁽²⁾	T_{stg}	-55 to +150	$^\circ\text{C}$
Lead Soldering Temperature (10 sec, 1/16" from case)	—	260	$^\circ\text{C}$

1. Input-output isolation voltage is an internal device dielectric breakdown rating. For this test, Pins 1 and 2 are common, and Pins 5, 6 and 7 are common.
2. Refer to Quality and Reliability Section in Opto Data Book for information on test conditions.

NOTE: Thickness through insulation between input and output is ≥ 0.5 mm.

Preferred devices are Motorola recommended choices for future use and best overall value.

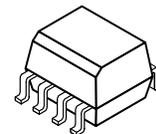
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MOC256

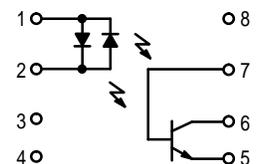
Motorola Preferred Device

**SMALL OUTLINE
OPTOISOLATORS
AC INPUT
TRANSISTOR OUTPUT**



**CASE 846-01, STYLE 2
PLASTIC**

SCHEMATIC



- PIN 1. AC IN
2. AC IN
3. N.C.
4. N.C.
5. EMITTER
6. COLLECTOR
7. BASE
8. N.C.

MOC256

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)⁽¹⁾

Characteristic	Symbol	Min	Typ ⁽¹⁾	Max	Unit
INPUT LED					
Forward Voltage ($I_F = 10\text{ mA}$, either direction)	V_F	—	1.15	1.5	Volts
Capacitance ($V = 0\text{ V}$, $f = 1\text{ MHz}$)	C_J	—	20	—	pF
OUTPUT TRANSISTOR					
Collector–Emitter Dark Current ($V_{CE} = 10\text{ V}$) $T_A = 100^\circ\text{C}$	I_{CEO}	—	1	100	nA
Collector–Base Dark Current ($V_{CB} = 10\text{ V}$)	I_{CBO}	—	0.2	—	nA
Collector–Emitter Breakdown Voltage ($I_C = 10\text{ mA}$)	$V_{(BR)CEO}$	30	45	—	Volts
Collector–Base Breakdown Voltage ($I_C = 100\text{ }\mu\text{A}$)	$V_{(BR)CBO}$	70	100	—	Volts
Emitter–Collector Breakdown Voltage ($I_E = 100\text{ }\mu\text{A}$)	$V_{(BR)ECO}$	5	7.8	—	Volts
DC Current Gain ($I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$)	h_{FE}	—	500	—	—
Collector–Emitter Capacitance ($f = 1\text{ MHz}$, $V_{CE} = 0\text{ V}$)	C_{CE}	—	7	—	pF
Collector–Base Capacitance ($f = 1\text{ MHz}$, $V_{CB} = 0\text{ V}$)	C_{CB}	—	20	—	pF
Emitter–Base Capacitance ($f = 1\text{ MHz}$, $V_{EB} = 0\text{ V}$)	C_{EB}	—	10	—	pF
COUPLED					
Output Collector Current ($I_F = \pm 10\text{ mA}$, $V_{CE} = 10\text{ V}$)	I_C (CTR) ⁽⁵⁾	2 (20)	15 (150)	—	mA (%)
Output Collector Current Symmetry ⁽³⁾ $\left(\frac{I_C \text{ at } I_F = +10\text{ mA}, V_{CE} = 10\text{ V}}{I_C \text{ at } I_F = -10\text{ mA}, V_{CE} = 10\text{ V}} \right)$	—	0.5	1.0	2.0	—
Collector–Emitter Saturation Voltage ($I_C = 0.5\text{ mA}$, $I_F = \pm 10\text{ mA}$)	$V_{CE(sat)}$	—	0.1	0.4	Volts
Input–Output Isolation Voltage ($f = 60\text{ Hz}$, $t = 1\text{ sec}$) ^(4,5)	V_{ISO}	3000	—	—	Vac(rms)
Isolation Resistance ($V = 500\text{ V}$) ⁽⁵⁾	R_{ISO}	10^{11}	—	—	Ω
Isolation Capacitance ($V = 0\text{ V}$, $f = 1\text{ MHz}$) ⁽⁵⁾	C_{ISO}	—	0.2	—	pF

1. Always design to the specified minimum/maximum electrical limits (where applicable).
2. Current Transfer Ratio (CTR) = $I_C/I_F \times 100\%$.
3. This specification guarantees that the higher of the two I_C readings will be no more than 3 times the lower at $I_F = 10\text{ mA}$.
4. Input–Output Isolation Voltage, V_{ISO} , is an internal device dielectric breakdown rating.
5. For this test, pins 1 and 2 are common, and pins 5, 6 and 7 are common.

TYPICAL CHARACTERISTICS

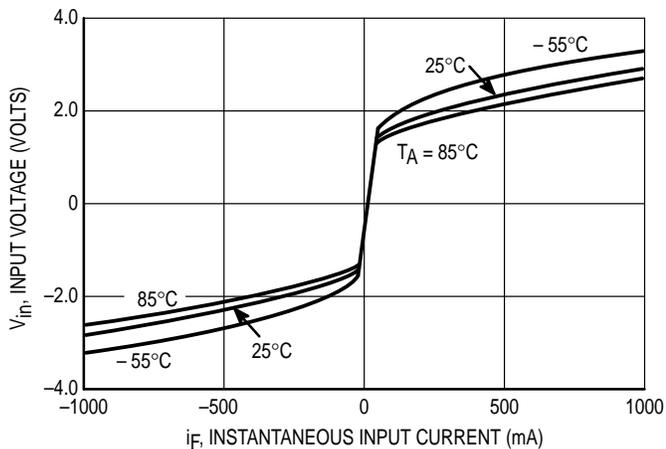


Figure 1. Input Voltage versus Input Current

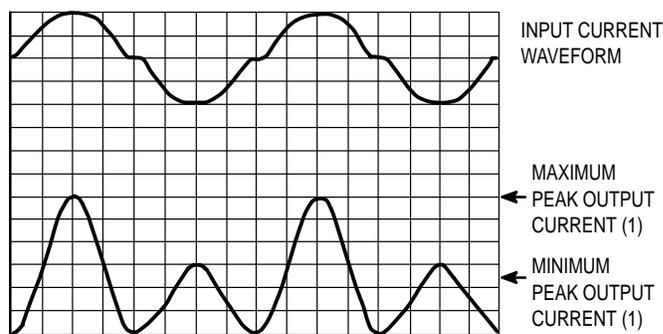


Figure 2. Output Characteristics

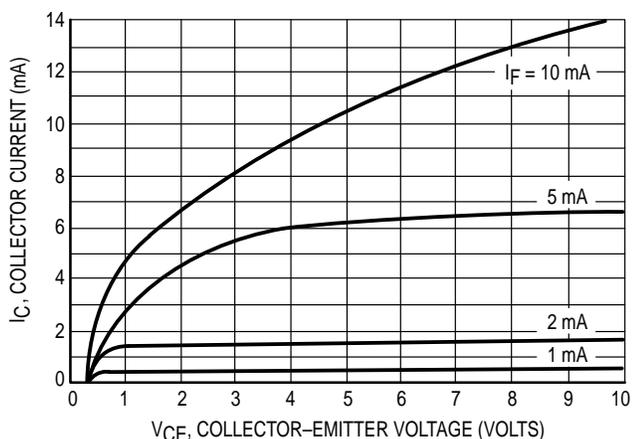


Figure 3. Collector Current versus Collector-Emitter Voltage

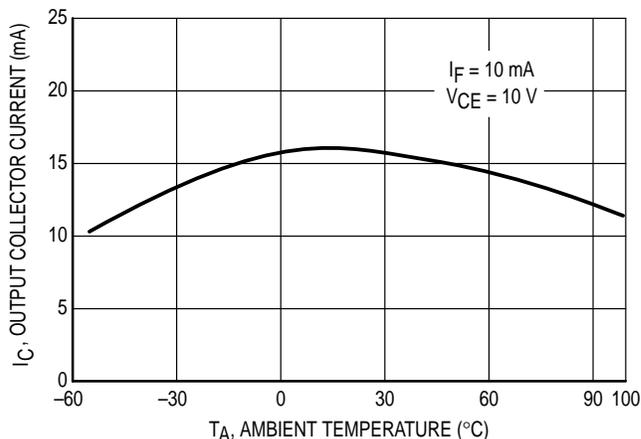


Figure 4. Output Current versus Ambient Temperature

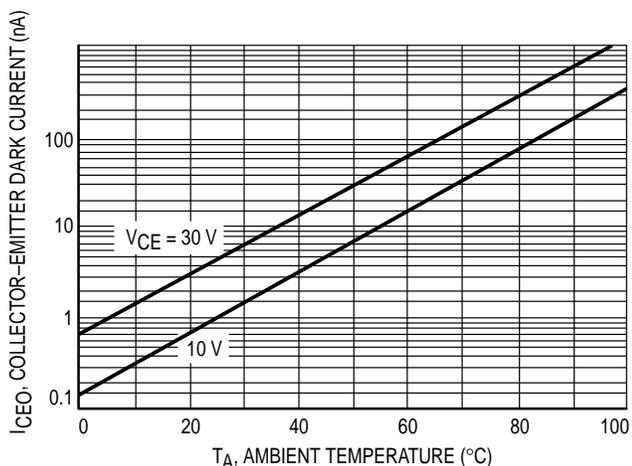


Figure 5. Dark Current versus Ambient Temperature

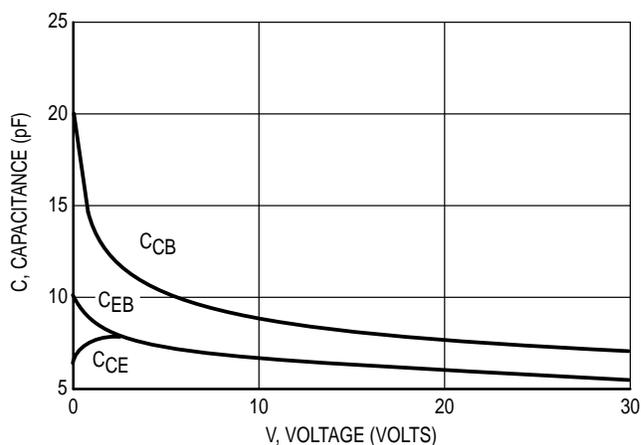
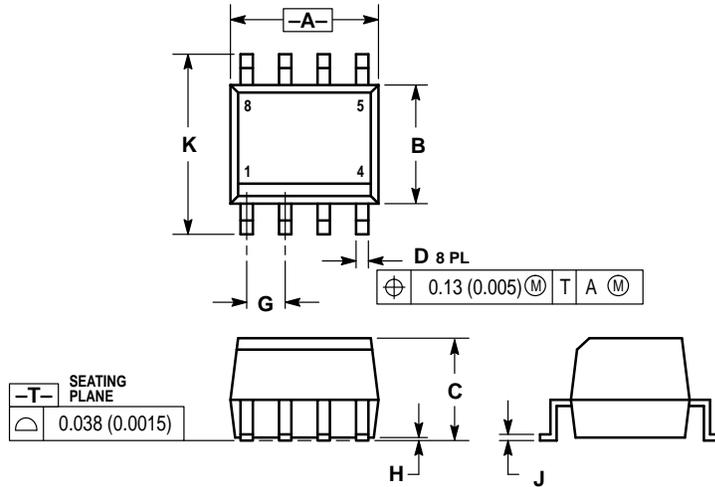


Figure 6. Capacitances versus Voltage

PACKAGE DIMENSIONS



- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.182	0.202	4.63	5.13
B	0.144	0.164	3.66	4.16
C	0.123	0.143	3.13	3.63
D	0.011	0.021	0.28	0.53
G	0.050 BSC		1.27 BSC	
H	0.003	0.008	0.08	0.20
J	0.006	0.010	0.16	0.25
K	0.224	0.244	5.69	6.19

- STYLE 2:
 PIN 1. INPUT
 2. INPUT
 3. NC
 4. NC
 5. EMITTER
 6. COLLECTOR
 7. BASE
 8. NC

CASE 846-01
 ISSUE B

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