

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	-45 to +100	$^\circ\text{C}$
Storage Temperature Range ⁽²⁾	T_{stg}	-45 to +125	$^\circ\text{C}$
Lead Soldering Temperature (10 sec, 1/16" from case)	—	260	$^\circ\text{C}$

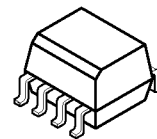
1. Input-output isolation voltage is an internal device dielectric breakdown rating. For this test, Pins 1 and 2 are common, and Pins 5, 6 and 7 are common.
2. Refer to Quality and Reliability Section in Opto Data Book for information on test conditions.

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

MOC256

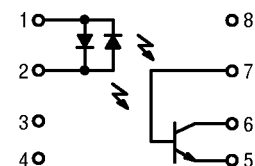
Motorola Preferred Device

**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 ($I_F = 10\text{ mA}$, both 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

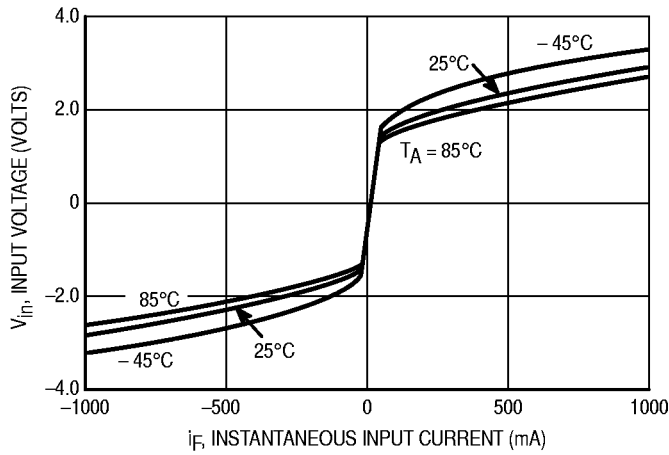


Figure 1. Input Voltage versus Input Current

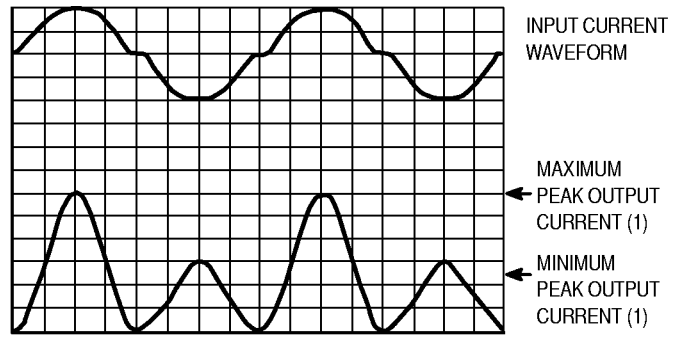


Figure 2. Output Characteristics

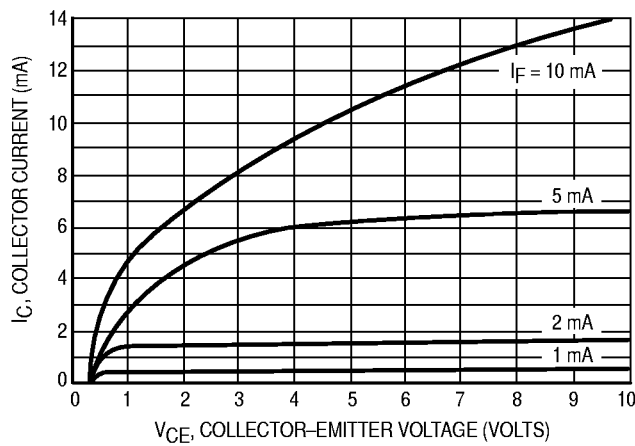


Figure 3. Collector Current versus Collector-Emitter Voltage

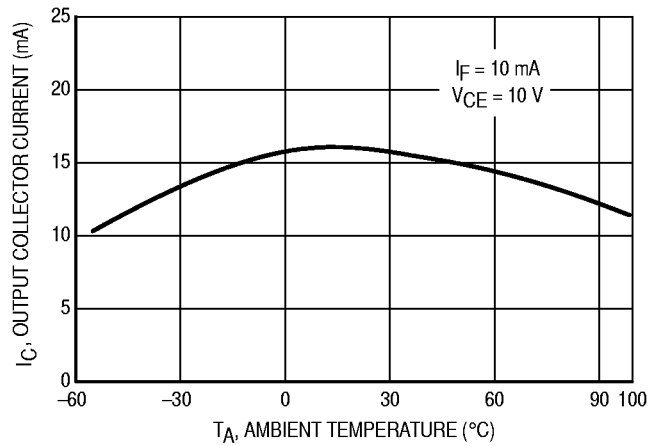


Figure 4. Output Current versus Ambient Temperature

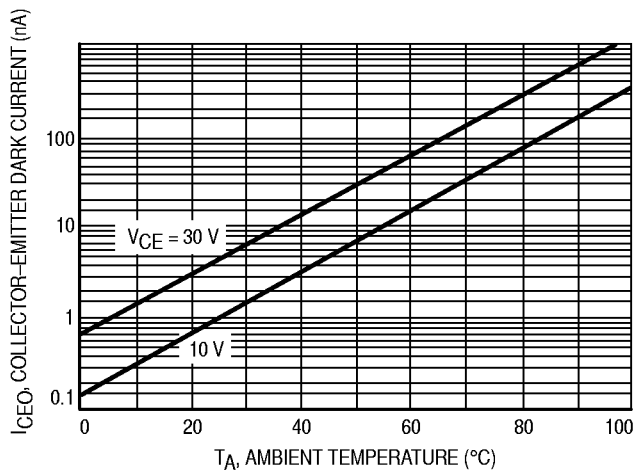


Figure 5. Dark Current versus Ambient Temperature

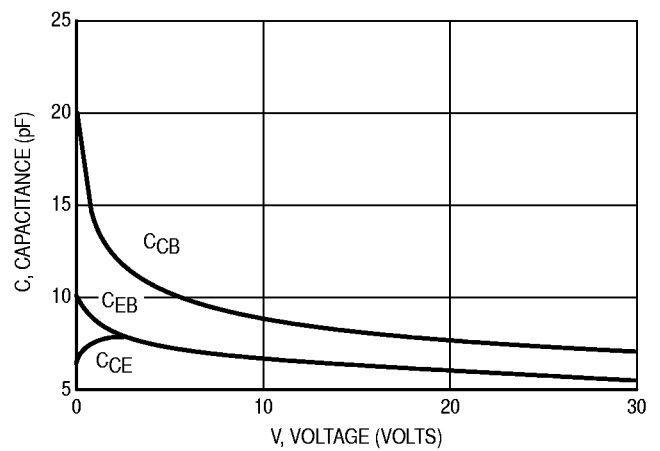
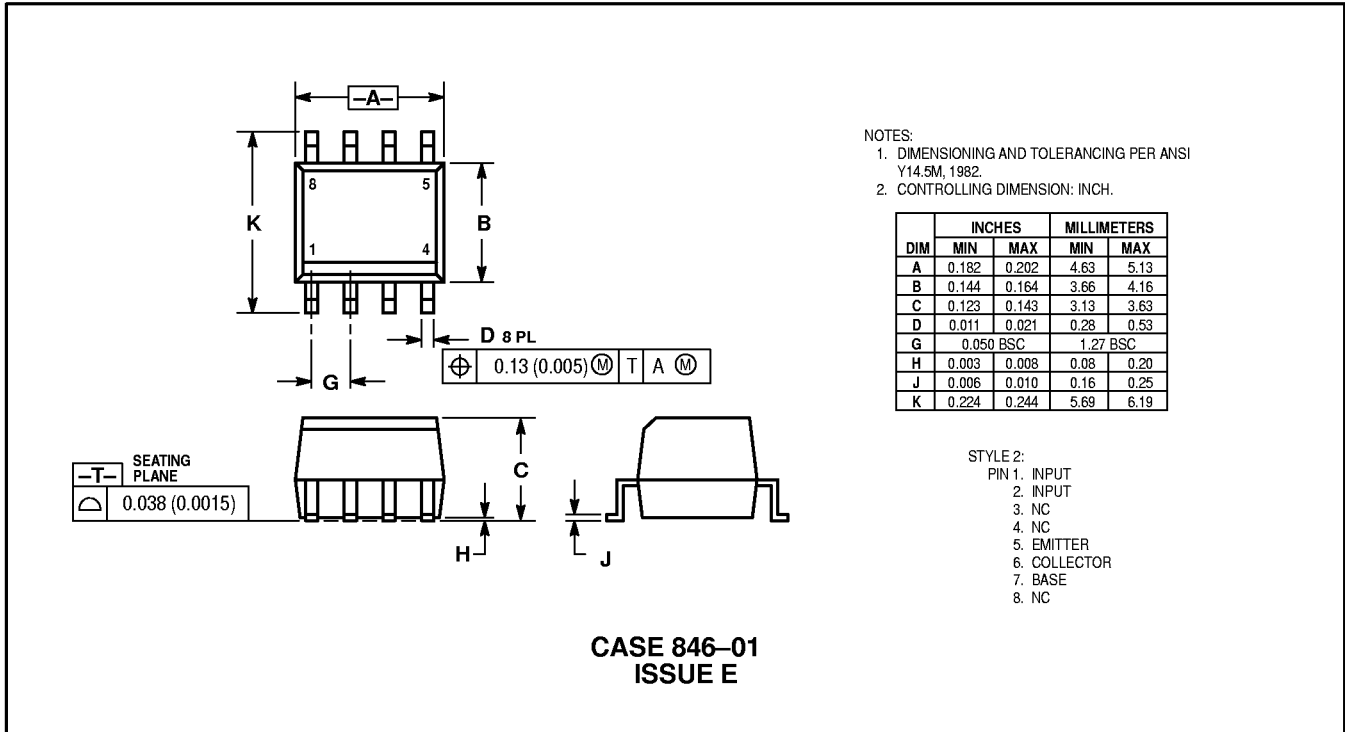


Figure 6. Capacitances versus Voltage

PACKAGE DIMENSIONS



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