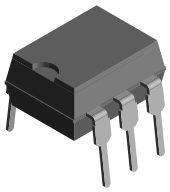
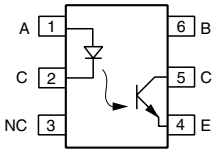
Optocoupler, Phototransistor Output, No Base Connection





i179009

FEATURES

- Isolation test voltage, 5300 V_{RMS}
- No base terminal connection for improved common mode interface immunity
- Long term stability
- Industry standard dual in line package
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

DESCRIPTION

The MOC8101/2/3/4/5 family optocoupler consisting of a gallium arsenide infrared emitting diode optically coupled to a silicon planar phototransistor detector in a plastic plug-in DIP-6 package.

The coupling device is suitable for signal transmission between two electrically separated circuits. The potential difference between the circuits to be coupled should not exceed the maximum permissible reference voltages.

The base terminal of the MOC8101/2/3/4/5 is not connected, resulting in a substantially improved common mode interference immunity.

AGENCY APPROVALS

- UL1577, file no. E52744 system code H or J, double protection
- CSA 93751
- BSI IEC 60950; IEC 60065
- DIN EN 60747-5-2 (VDE 0884)/DIN EN 60747-5-5 pending available with option 1

ORDER INFORMATION

PART	REMARKS
MOC8101	CTR 50 to 80 %, DIP-6
MOC8102	CTR 73 to 117 %, DIP-6
MOC8103	CTR 108 to 173 %, DIP-6
MOC8104	CTR 160 to 256 %, DIP-6
MOC8105	CTR 65 to 133 %, DIP-6
MOC8101-X006	CTR 50 to 80 %, DIP-6 400 mil (option 6)
MOC8101-X007	CTR 50 to 80 %, SMD-6 (option 7)
MOC8101-X009	CTR 50 to 80 %, SMD-6 (option 9)
MOC8102-X006	CTR 73 to 117 %, DIP-6 400 mil (option 6)
MOC8102-X007	CTR 73 to 117 %, SMD-6 (option 7)
MOC8102-X009	CTR 73 to 117 %, SMD-6 (option 9)
MOC8104-X006	CTR 160 to 256 %, DIP-6 400 mil (option 6)
MOC8104-X009	CTR 160 to 256 %, SMD-6 (option 9)
MOC8105-X006	CTR 65 to 133 %, DIP-6 400 mil (option 6)
MOC8105-X009	CTR 65 to 133 %, SMD-6 (option 9)

Note

For additional information on the available options refer to option information.

ABSOLUTE MAXIMUM RATINGS (1)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Reverse voltage		V_R	6.0	V
Forward continuous current		I_F	60	mA
Surge forward current	t ≤ 10 µs	I_{FSM}	2.5	A
Power dissipation		P_{diss}	100	mW
Derate linearly from 25°C			1.33	mW/°C
OUTPUT				
Collector emitter breakdown voltage		BV_{CEO}	30	V
Emitter collector breakdown voltage		BV_{ECO}	7.0	V
Collector current		I_C	50	mA
Derate linearly from 25°C			2.0	mW/°C
Power dissipation		P_{diss}	150	mW
COUPLER				
Isolation test voltage		V_{ISO}	5300	V_{RMS}
Creepage distance			≥ 7.0	mm
Clearance distance			≥ 7.0	mm
Isolation thickness between emitter and detector			≥ 0.4	mm
Comparative tracking index per DIN IEC 112/VDE 0303, part 1		CTI	175	
Isolation resistance	V_{IO} = 500 V	R_{IO}	10^{12}	Ω
Derate linearly from 25 °C			3.33	mW/°C
Total power dissipation		P_{tot}	250	mW
Storage temperature		T_{stg}	- 55 to + 150	°C
Operating temperature		T_{amb}	- 55 to + 100	°C
Junction temperature		T_j	100	°C
Soldering temperature (2)	max. 10 s, dip soldering: distance to seating plane ≥ 1.5 mm	T_{sld}	260	°C

Notes

(1) T_{amb} = 25 °C, unless otherwise specified.
Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

(2) Refer to reflow profile for soldering conditions for surface mounted devices (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).

ELECTRICAL CHARACTERISTICS

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT							
Forward voltage	I_F = 10 mA		V_F		1.25	1.5	V
Breakdown voltage	I_R = 10 µA		V_{BR}	6.0			V
Reverse current	V_R = 6.0 V		I_R		0.01	10	µA
Capacitance	V_R = 0 V, f = 1.0 MHz		C_O		25		pF
Thermal resistance			R_{thja}		750		K/W
OUTPUT							
Collector emitter capacitance	V_{CE} = 5.0 V, f = 1.0 MHz		C_{CE}		5.2		pF
Collector emitter dark current	V_{CE} = 10 V, T_{amp} = 25 °C	MOC8101	I_{CEO1}		1.0	50	nA
	V_{CE} = 10 V, T_{amp} = 100 °C	MOC8102	I_{CEO1}		1.0		µA
Collector emitter breakdown voltage	I_C = 1.0 mA		BV_{CEO}	30			V
Emitter collector breakdown voltage	I_E = 100 µA		BV_{ECO}	7.0			V
Thermal resistance			R_{thja}		500		K/W

ELECTRICAL CHARACTERISTICS

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
COUPLER							
Saturation voltage collector emitter	I_F = 5.0 mA		V_{CEsat}		0.25	0.4	V
Coupling capacitance			C_C		0.6		pF

Note

T_{amb} = 25 °C, unless otherwise specified.
Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

CURRENT TRANSFER RATIO

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Current transfer ratio	V_{CE} = 10 V, I_F = 10 mA	MOC8101	CTR	50		80	%
		MOC8102	CTR	73		117	%
		MOC8103	CTR	108		173	%
		MOC8104	CTR	160		256	%
		MOC8105	CTR	65		133	%

SWITCHING CHARACTERISTICS

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	V_{CC} = 10 V, I_C = 2.0 mA, R_L = 100 Ω	t_{on}		3.0		µs
Turn-off time	V_{CC} = 10 V, I_C = 2.0 mA, R_L = 100 Ω	t_{off}		2.3		µs
Rise time	V_{CC} = 10 V, I_C = 2.0 mA, R_L = 100 Ω	t_r		2.0		µs
Fall time	V_{CC} = 10 V, I_C = 2.0 mA, R_L = 100 Ω	t_f		2.0		µs
Cut off frequency		f_{co}		250		kHz

TYPICAL CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

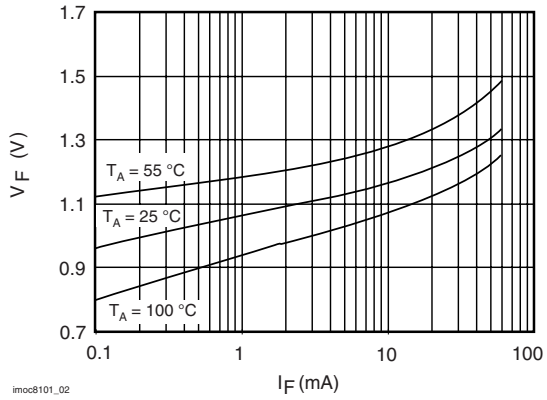


Fig. 1 - Forward Voltage vs. Forward Current

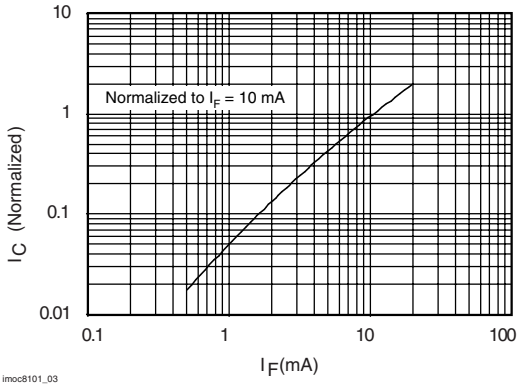


Fig. 2 - Collector Current vs. LED Forward Current

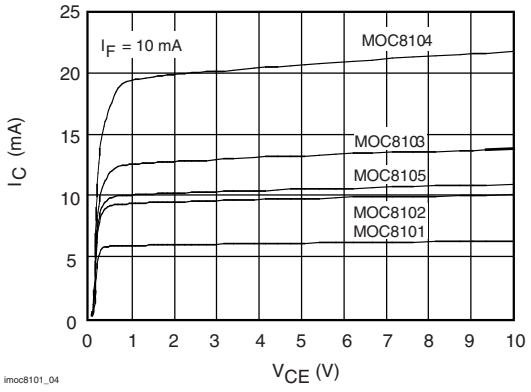


Fig. 3 - Collector Current vs. Collector Emitter Voltage

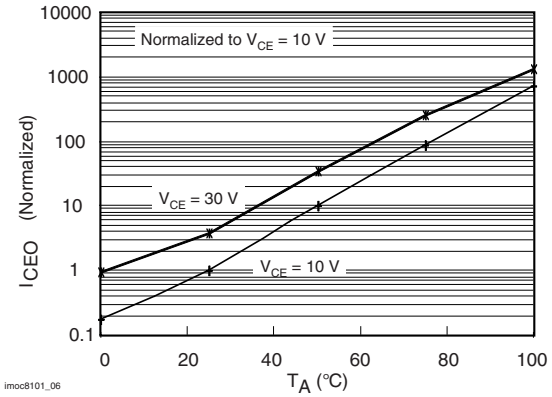


Fig. 5 - Collector Emitter Dark Current vs. Ambient Temperature

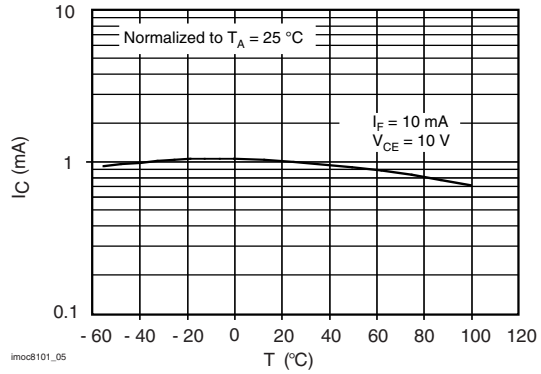


Fig. 4 - Collector Current vs. Ambient Temperature

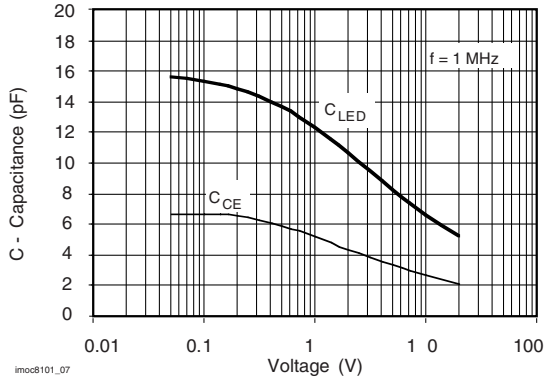


Fig. 6 - Capacitance vs. Voltage

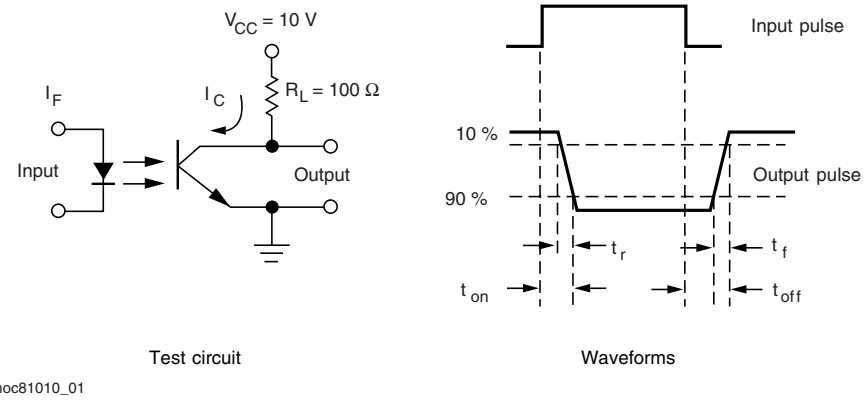
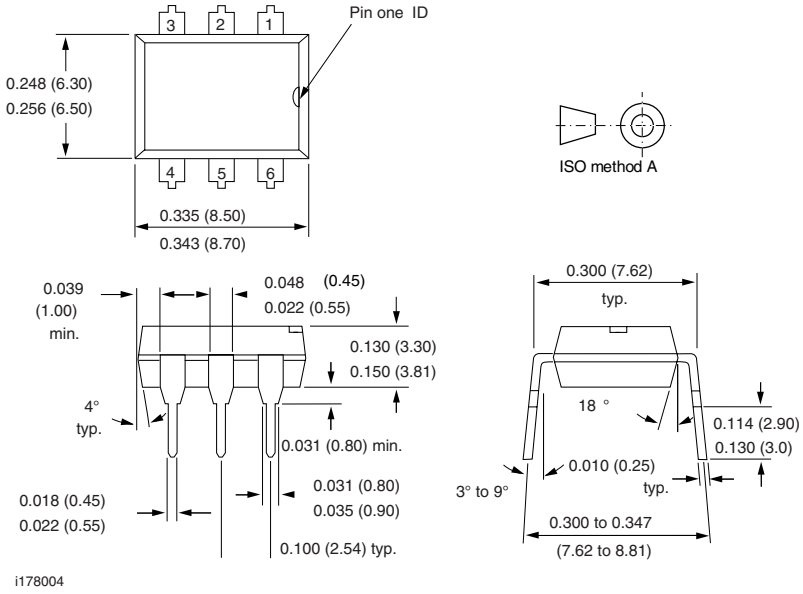
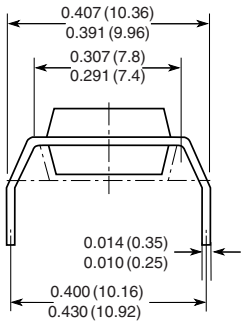


Fig. 7 - Switching Time Test Circuit and Waveforms

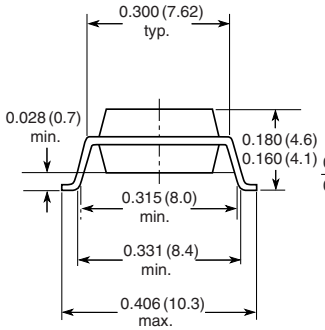
PACKAGE DIMENSIONS in inches (millimeters)



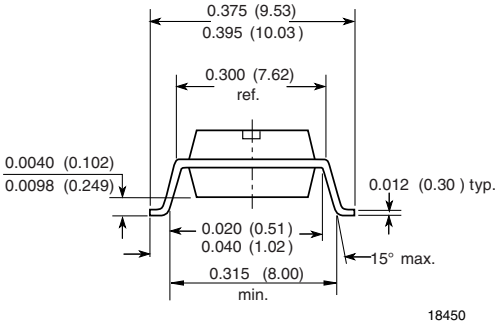
Option 6



Option 7



Option 9



OZONE DEPLETING SUBSTANCES POLICY STATEMENT

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively.
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA.
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

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