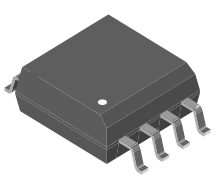
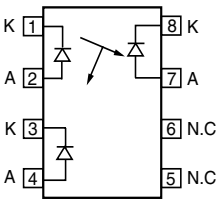
Linear Optocoupler for Optical DAA in Telecommunications, High Performance





i179028

FEATURES

- 2.0 mm high SMD package
- High sensitivity (K1) at low operating LED current
- Couples AC and DC signals
- Low input-output capacitance
- Isolation voltage, 3000 V_{RMS}
- Low distortion
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

DESCRIPTION

The IL350/351/358/359 family of linear optocoupler consist of an IRLED optically coupled to two photodiodes. The emitter mechanically faces both diodes enabling them to receive approximately an equal amount of infrared light. The diodes produce a proportional amount of photocurrents. The ratio of the photocurrents stays constant with high accuracy when either the LED current changes or the ambient temperature changes. Thus one can control the output diode current optically by controlling the input photodiode current.

The IL350/351/358/359 optocouplers can be used with the aid of operational amplifiers in closed loop conditions to achieve highly linear and electrically isolated AC and or DC signal amplifiers.

APPLICATIONS

- Optical DAA for V.34 FAX/modem PCMCIA cards
- Digital telephone line isolation

ORDER INFORMATION

PART	REMARKS
IL350	Couples AC and DC signals
IL351	Couples AC and DC signals
IL358	Couples AC and DC signals
IL359	Couples AC and DC signals

Note

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

ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
Reverse voltage		V_R	3.0	V
Forward current		I_F	30	mA
Surge current	pulse width < 10 ms	I_{FSM}	150	mA
Power dissipation	T_{amb} = 25 °C	P_{diss}	150	mW
Derate linearly from 25 °C			2.0	mW/°C
OUTPUT				
Reverse voltage		V_R	15	V
Power dissipation		P_{diss}	50	mW
Derate linearly from 25 °C			0.65	mW/°C
Junction temperature		T_j	100	°C

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
COUPLER				
Isolation test voltage	t = 1.0 s	V_{ISO}	3000	V_{RMS}
Total package power dissipation		P_{tot}	250	mW
Derate linearly from 25 °C			2.8	mW/°C
Storage temperature range		T_{stg}	- 40 to + 150	°C
Operating temperature		T_{amb}	75	°C
Lead soldering time at 260 °C			10	s
Isolation resistance	V_{IO} = 500 V, T_{amb} = 25 °C	R_{IO}	$\geq 10^{12}$	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C	R_{IO}	$\geq 10^{11}$	Ω

Note

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.

ELECTRICAL CHARACTERISTCS							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT							
Forward voltage	I_F = 10 mA		V_F		1.8	2.1	V
Reverse current	V_R = 3.0 V		I_R		0.01	10	µA
V_F temperature coefficient			$\Delta V_F/\Delta$ °C		- 2.2		mW/°C
Junction capacitance	V_F = 0 V, f = 1.0 MHz		C_j		15		pF
Dynamic resistance	I_F = 2.5 mA, ΔI_F = 1.0 mA		$\Delta V_F/\Delta I_F$		6.0		Ω
Switching time IL358/359	I_F = 2.5 mA, ΔI_F = 1.0 mA		t_f		40		ns
			t_f		40		ns
OUTPUT							
Junction capacitance	V_F = 0 V, f = 1.0 MHz		C_j		12		pF
NEP	V_{DET} = 0 V				$< 4^{-14}$		W/√Hz
COUPLER							
Capacitance (input to output)	V_F = 0 V, f = 1.0 MHz		C_{IO}		1.0		pF
Common mode capacitance	V_F = 0 V, f = 1.0 MHz		C_{CM}		0.5		pF

Note

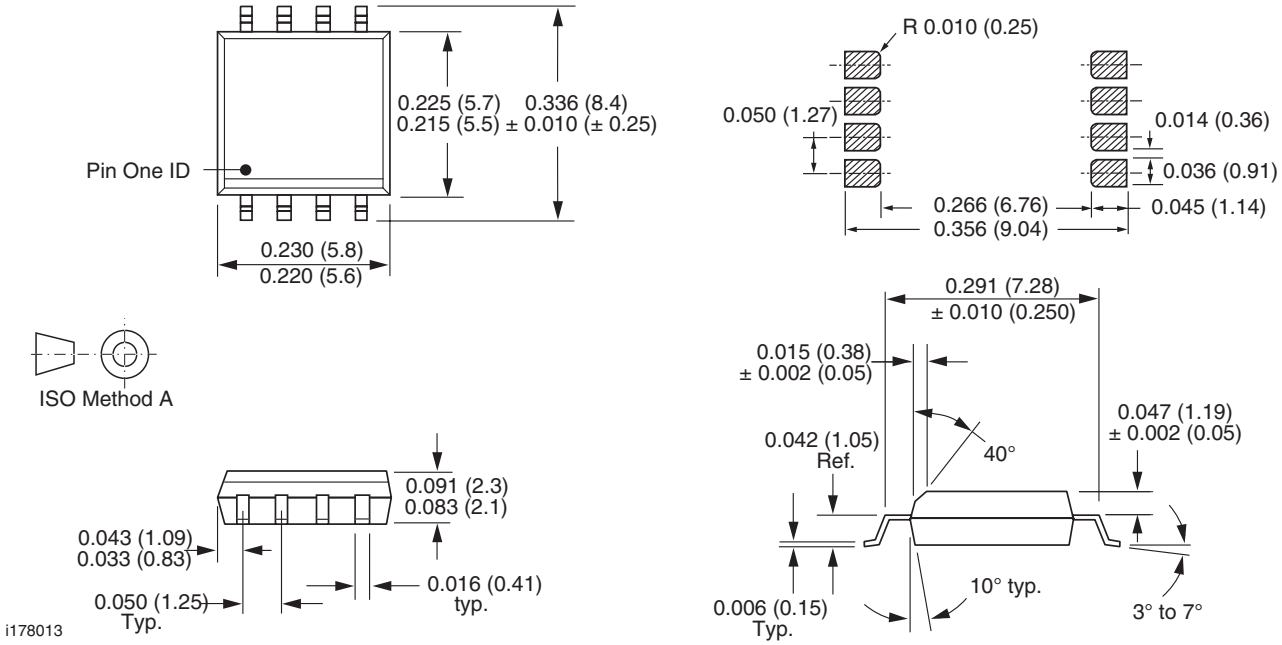
T_{amb} = 25 °C, unless otherwise specified.
Minimum and maximum values were tested requierements. Typical values are characteristics of the device and are the result of engineering evaluations. Typical values are for information only and are not part of the testing requirements.

SWITCHING CHARACTERISTICS - AC CHARACTERISTICS PHOTOVOLTAIC MODE							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Frequency response	I_{P1} = 25 µA, modulation current ΔI_P = ± 6.0 µA	IL358	BW (- 3 db)		1.0		MHz
		IL359	BW (- 3 db)		1.0		MHz
Phase response	I_{P1} = 25 µA, modulation current ΔI_P = ± 6.0 µA				45		°
Rise time	I_{P1} = 25 µA, modulation current ΔI_P = ± 6.0 µA				350		ns

BIN TABLE		
BIN	**MIN.**	**MAX.**
A	0.557	0.626
B	0.620	0.696
C	0.690	0.773
D	0.765	0.859
E	0.851	0.955
F	0.945	1.061
G	1.051	1.181
H	1.169	1.311
I	1.297	1.456
J	1.442	1.618

COUPLED CHARACTERISTICS		
PART NUMBER	**K1 AT I_F = 2 mA, V_O = 0 V MIN.**	**K3 BINS**
IL350	0.003	A to J
IL351	0.005	D, E, F, G
IL358	0.008	C, D, E, F, G, H
IL359	0.008	D, E, F, G

PACKAGE DIMENSIONS in inches (millimeters)



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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