



IL350/351/358/359

High Performance Linear Optocoupler for Optical DAA in Telecommunications

Preliminary Data Sheet

FEATURES

- 2.0 mm High SMT 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

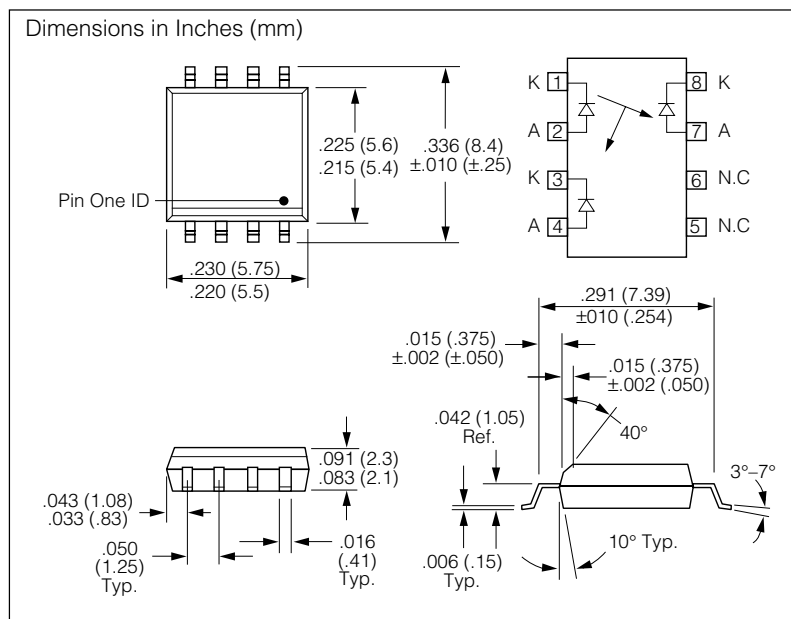
APPLICATIONS

- Optical DAA for V.34 FAX/Modem PCMCIA Cards
- Digital Telephone Line Isolation

DESCRIPTION

The IL350/1/8/9 family of Linear Optocoupler consist of an IRLLED 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 IL350/1/8/9 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.



Absolute Maximum Ratings

Maximum Ratings

Emitter

Reverse Voltage.....	3.0 V
Forward Current	30 mA
Surge Current, Pulse Width < 10 μ s	150 mA
Power Dissipation, $T_A=25^\circ\text{C}$	150 mW
Derate Linearly from 25°C	2.0 mW/ $^\circ\text{C}$

Detector

Reverse Voltage	15 V
Power Dissipation	50 mW
Derate Linearly from 25°C	0.65 mW/ $^\circ\text{C}$
Junction Temperature	100°C

Coupler

Isolation Test Voltage, $t=1.0$ sec.	3000 V _{RMS}
Total Package Power Dissipation	250 mW
Derate Linearly from 25°C	2.8 mW/ $^\circ\text{C}$
Storage Temperature Range.....	-40°C to $+150^\circ\text{C}$
Operating Temperature.....	75°C
Lead Soldering Time at 260°C	10 sec.
Isolation Resistance	
$V_{IO}=500$ V, $T_A=25^\circ\text{C}$	$\geq 10^{12} \Omega$
$V_{IO}=500$ V, $T_A=100^\circ\text{C}$	$\geq 10^{11} \Omega$

Electrical Characteristics $T_A=25^{\circ}\text{C}$

LED Emitter		Symbol	Min.	Typ.	Max.	Units	Test Conditions
Forward Voltage		V_F	—	1.8	2.1	V	$I_F=10\text{ mA}$
Reverse Current		I_R	—	.01	10	μA	$V_R=3.0\text{ V}$
V_F Temperature Coefficient		$\Delta V_F/\Delta^{\circ}\text{C}$	—	-2.2	—	mV/ $^{\circ}\text{C}$	—
Junction Capacitance		C_J	—	TBD	—	pF	$V_F=0\text{ V}$, $f=1.0\text{ MHz}$
Dynamic Resistance		$\Delta V_F/\Delta I_F$	—	6.0	—	W	$I_F=2.5\text{ mA}$ $\Delta I_F=1.0\text{ mA}$
Switching Time IL358/9		t_f	—	40	—	ns	
		t_r	—	40	—	ns	
Detector							
Junction Capacitance		C_J	—	12	—	pF	$V_F=0\text{ V}$, $f=1.0\text{ MHz}$
NEP		—	—	$<4^{-14}$	—	W/ $\sqrt{\text{Hz}}$	$V_{\text{DET}}=0\text{ V}$
AC Characteristics Photovoltaic Mode							
Frequency Response	IL358/9	BW(-3dB)	—	1.0	—	MHz	$I_{P1}=25\text{ }\mu\text{A}$ Modulation current $\Delta I_{P1}=\pm 6.0\text{ }\mu\text{A}$
Phase Response		—	—	45	—	Deg.	
Rise Time		—	—	350	—	ns	
Package							
Input-Output Capacitance		C_{IO}	—	1.0	—	pF	$V_F=0\text{ V}$, $f=1.0\text{ MHz}$
Common Mode Capacitance		C_{cm}	—	0.5	—	pF	$V_F=0\text{ V}$, $f=1.0\text{ MHz}$
Coupled Characteristics							
				K1 at $I_F=2.0\text{ mA}$, $V_D=0\text{ V}$			K3 Bins
				Min.	Typ.	Max.	
IL350				0.003	—	—	A-J
IL351				0.005	—	—	D, E, F, G
IL358				0.008	—	—	C,D, E, F, G, H
IL359				0.008	—	—	E, F

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