IL350/351/358/359

High Performance Linear Optocoupler for Optical DAA in Telecommunications

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

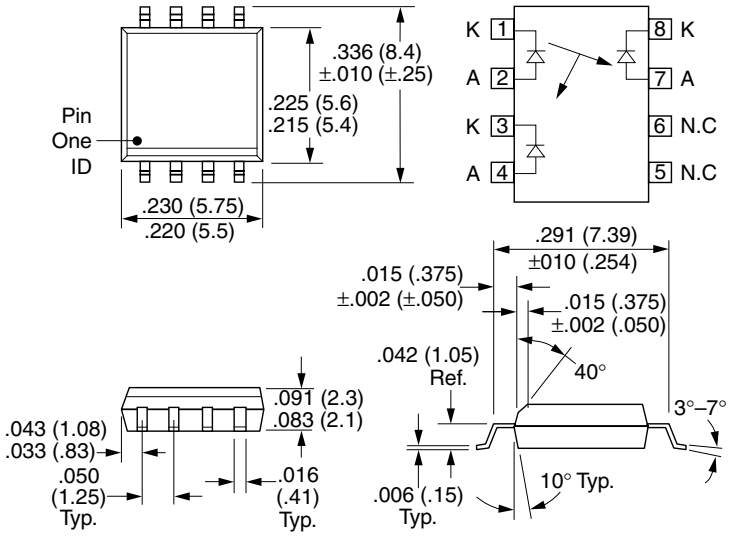
- **Optical DAA for V.34 FAX/Modem PCMCIA Cards**
- **Digital Telephone Line Isolation**

DESCRIPTION

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

Dimensions in Inches (mm)



Absolute Maximum Ratings

Maximum Ratings

Emitter

Reverse Voltage ..... 3.0 V
Forward Current ..... 30 mA
Surge Current, Pulse Width <10 µs ..... 150 mA
Power Dissipation, T_A=25°C ..... 150 mW
Derate Linearly from 25°C ..... 2.0 mW/°C

Detector

Reverse Voltage ..... 15 V
Power Dissipation ..... 50 mW
Derate Linearly from 25°C ..... 0.65 mW/°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/°C
Storage Temperature Range ..... –40°C to +150°C
Operating Temperature ..... 75°C
Lead Soldering Time at 260°C ..... 10 sec.
Isolation Resistance
V_{IO}=500 V, T_A=25°C ..... $\geq 10^{12}\ \Omega$
V_{IO}=500 V, T_A=100°C ..... $\geq 10^{11}\ \Omega$

Electrical Characteristics T_A=25°C

LED Emitter		**Symbol**	**Min.**	**Typ.**	**Max.**	**Units**	**Test Conditions**
Forward Voltage		V_F	—	1.8	2.1	V	I_F=10 mA
Reverse Current		I_R	—	.01	10	µA	V_R=3.0 V
V_F Temperature Coefficient		$\Delta V_F/\Delta$°C	—	–2.2	—	mV/°C	—
Junction Capacitance		C_J	—	15	—	pF	V_F=0 V, f=1.0 MHz
Dynamic Resistance		$\Delta V_F/\Delta I_F$	—	6.0	—	Ω	I_F=2.5 mA ΔI_F=1.0 mA
Switching Time IL358/9		t_f	—	40	—	ns	
		t_r	—	40	—	ns	
Detector							
Junction Capacitance		C_J	—	12	—	pF	V_F=0 V, f=1.0 MHz
NEP		—	—	$<4^{-14}$	—	W/√Hz	V_{DET}=0 V
AC Characteristics Photovoltaic Mode							
Frequency Response	IL358/9	BW(–3dB)	—	1.0	—	MHz	I_{P1}=25 µA Modulation current ΔIP1=±6.0 µA
Phase Response		—	—	45	—	Deg.	
Rise Time		—	—	350	—	ns	
Package							
Input-Output Capacitance		C_{IO}	—	1.0	—	pF	V_F=0 V, f=1.0 MHz
Common Mode Capacitance		C_{cm}	—	0.5	—	pF	V_F=0 V, f=1.0 MHz
Coupled Characteristics							

	K1 at I_F=2.0 mA, V_D=0 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