IL388

High Performance Linear Optocoupler for Optical DAA in Telecommunications

FEATURES

- **2.3 mm High SMT Package**
- **High Sensitivity (K1) at Low Operating LED Current**
- **Couples AC and DC Signals**
- **Low Input-Output Capacitance**
- **Isolation Voltage, 2500 VDC, 1 second**
- **Low Distortion, below –80 db**
- **0.4 mm Internal Insulation Thickness**

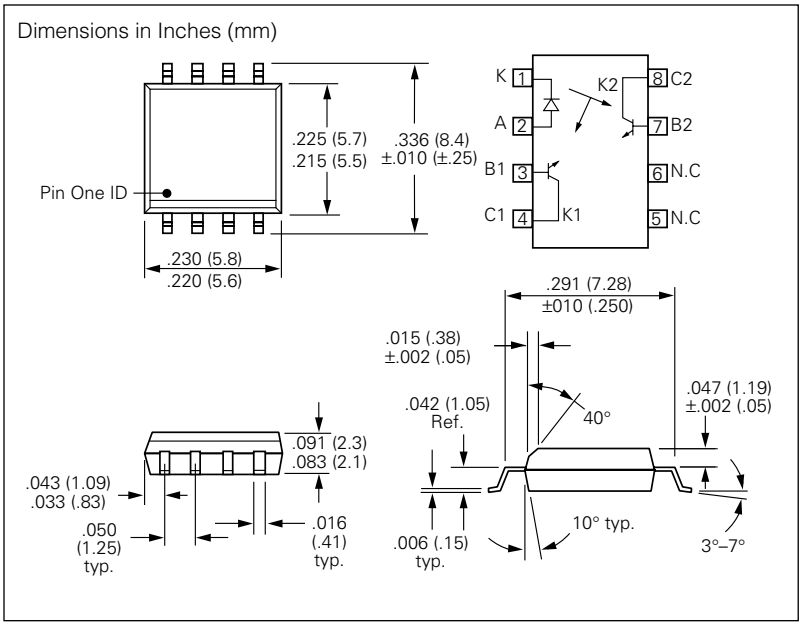
APPLICATIONS

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

DESCRIPTION

The IL388 family of Linear Optocoupler consist of an IRLED optically coupled to two photodiodes. The emitter is located such that both photodiodes 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 IL388 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

Emitter	**Sym**	**Min.**	**Max.**	**Units**
Reverse Voltage	V_R	—	3.0	V
Forward Current	I_F	—	30	mA
Surge Current Pulse Width <10 μs	I_{PK}	—	150	mA
Power Dissipation, T_A=25°C	P_{LED}	—	150	mW
Derate Linearly from 25°C	—	—	2.0	mW/°C
Junction Temperature	T_J	—	100	°C
Detector (each)				
Reverse Voltage	V_R	—	15	V
Power Dissipation	P	—	50	mW
Derate Linearly from 25°C	—	—	0.65	mW/°C
Junction Temperature	T_J	—	100	°C
Coupler				
Isolation Test Voltage	V_{ISOL}	2500	—	V_{DC}
Total Package Power Dissipation	P_t	—	250	mW
Derate Linearly from 25°C	—	—	2.8	mW/°C
Storage Temperature	T_S	–40	150	°C
Operating Temperature	T_{op}	0	75	°C
Lead Soldering Time at 260°C	—	—	10	sec.
Isolation Resistance V_{IO}=500 V, T_A=25°C V_{IO}=500 V, T_A=100°C	—	 10^{12} Ω 10^{11} Ω	—	—

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=10 mA
Detector						
Junction Capacitance	C_J	—	12	—	pF	V_F=0 V, f=1.0 MHz
AC Characteristics Photovoltaic Mode						
Frequency Response	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	**Min.**	**Typ.**	**Max.**	**Units**
K_1 at I_F=2.0 mA, V_D=0 V	0.007	—	—	—
THD at f_0=316, I_{PI}=35 µA, V_D=0 V	–83	—	—	db
$K_3=K_2/K_1$, I_F=2.0 mA, V_D=0 V	0.690	—	1.311	—

Bin table for K_3

Bin	**Min.**	**Max.**
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