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INCORPORATED

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OPTO-ISOLATED PHOTOVOLTAIC ISO-GATE™ MOSFET DRIVERS

DIG-11-06-030 ***DIG-12-08-010***
DIG-11-06-150 ***DIG-12-08-045***
DIG-11-08-050 ***DIG-12-06-100***
DIG-12-06-025 ***DIG-12-06-250***

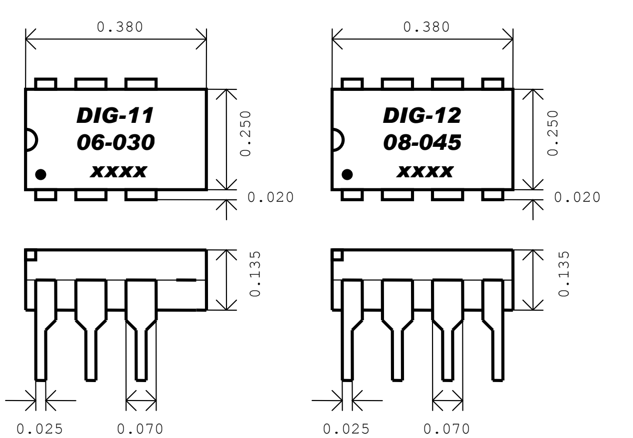
Features:
- Completely Isolated Voltage Signal Generation
- Dielectrically Isolated
- Logic Circuit Compatibility
- High Open Circuit Voltage
- High Operating Temperature
- Fast Response Time
- High Isolation Resistance
- Excellent Input/Output Linearity
- Self Limiting Gate Voltage

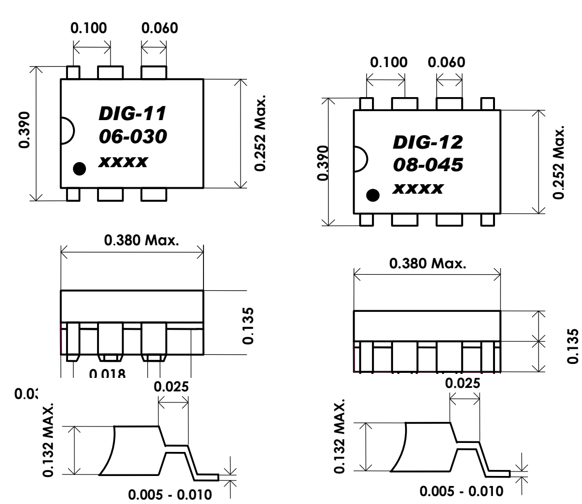
Applications:
- Gate Drive For MOS devices
- Gate Drive For SCR
- Solid-State Relays
- Interface Between Logic Circuits & External Loads
- A.T.E. (Automatic Test Equipment)
- Switching Equipment
- Isolation Amplifiers
- Load Control From Microprocessor I/O Ports
- Thermocouple Open Detectors

Description:
The photovoltaic MOSFET driver is a State-of- the-Art, optically coupled floating power source used primarily to control MOSFETs when electrical isolation between input and output is required. The ISO-GATE™ is a state-of-the-art opto-isolator incorporating DIONICS' photovoltaic (PV) diode arrays and an infrared LED. The diode array is a unique I.C. consisting of series-connected photovoltaic diodes. The diodes are completely isolated from each other and from their common substrate by means of SiO_2 Dielectric Isolation (DI). These photovoltaic output chips are electrically isolated but optically coupled to the LED.

The typical input circuit to the LED is a limiting resistor connected in series with the LED. When activated, the LED emits infrared light towards the photovoltaic diode array, which then responds by generating an open circuit voltage (Voc). This Voc is floating and is therefore completely isolated. The Voc value depends on the LED input drive and load impedance. DIONICS, Inc offers a wide variety of package styles including low-cost plastic Mini-DIP's, high reliability TO-5 metal cans, 8-pin ceramic side brazed DIP's and ceramic chip carriers for hybrid manufacturers. Other custom packages and custom designs are also available. Surface mount gull wing packages are also available.

- ***Group I***: **DIG-11-06-030; DIG-11-06-150; DIG-11-08-050**.
- ***Group II***: **DIG-12-06-025; DIG-12-06-100; DIG-12-06-250; DIG-12-08-010; DIG-12-08-045**.





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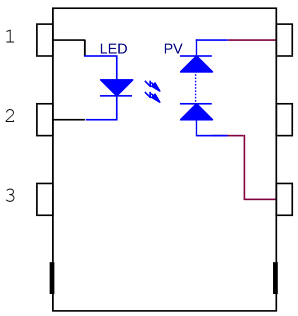
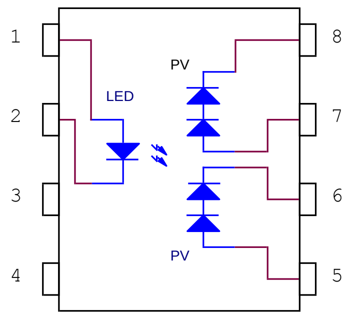
Group I and Group II Equivalent Circuits:



Group I



Group II

❖ **Pin Designation**		
Pin Number	**Group *I***	**Group *II***
1	Input +	Input +
2	Input -	Input -
3	Not Connected	Not Connected
4	Not Connected	Not Connected
5	Not Connected	Output1+
6	Output +	Output1-
7	Not Connected	Output2+
8	Output -	Output2-

❖ ***Absolute Maximum Ratings (T_a = 25°C)***		
LED Forward Current	Steady State	100 Ma
LED Forward Current	Peak 10% Duty Cycle	250 Ma
LED Forward Voltage	I_f = 20Ma	1.7V*
LED Reverse Current	V_r = 3V	100µA
LED Reverse Voltage		5V
Output Forward Voltage	I_f = 10µA	20V
Lead Soldering Time	At 260°C	10 sec
Storage Temperature		-50 to 125°C
Power Dissipation		150 Mw

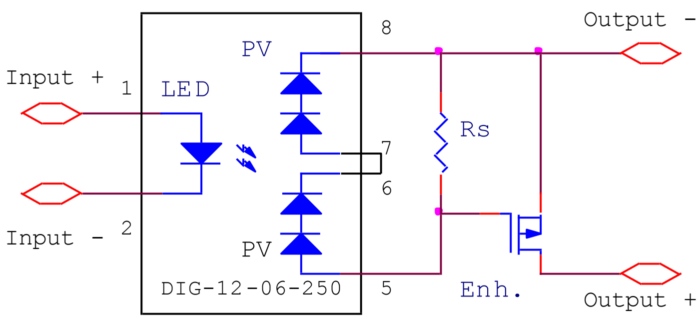
** Note: DIG-12-08-045, DIG-12-06-100 and DIG-12-06-250 are rated @ 3.4 V Max. (2.9 V Typ.)*

❖ *Individual Channel Electrical Characteristics (T_a =25°C)*

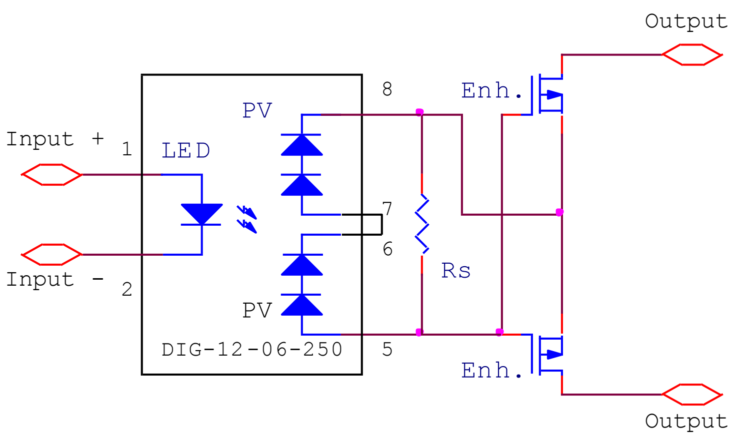
		MODEL NUMBERS DIG -																
		12-08-010		**12-06-025**		**12-08-045**		**12-06-100**		**12-06-250**		**11-06-030**		**11-08-050**		**11-06-150**		
Parameter	**Symbol**	**Min.**	**Typ.**	**Min.**	**Typ.**	**Min.**	**Typ.**	**Min.**	**Typ.**	**Min.**	**Typ.**	**Min.**	**Typ.**	**Min.**	**Typ.**	**Min.**	**Typ.**	**Unit**
Open Circuit Voltage																		
I_{led} = 2Ma			8.0		6.5		8.0		6.0		6.0		5.5		9.0		6.0	**V**
I_{led} = 10Ma	$\mathbf{V_{oc}}$	8.0	9.0	6.5	7.5	8.5	9.0	6.5	7.0	6.5	7.3	6.0	6.5	7.5	10.0	6.5	7.0	**V**
I_{led} = 30Ma		9.0	10.0	7.0	8.3	9.5	10.0	7.5	7.8	7.5	8.0	6.5	7.0	8.5	11.0	7.5	8.0	**V**
Short Circuit Current																		
I_{led} = 2Ma			0.5		1.0		1.0		2.0		3.0		1.1		2.0		3.0	**µA**
I_{led} = 10Ma	$\mathbf{I_{sc}}$	1.35	3.0	3.0	6.0	4.0	8.0	8.0	12.0	12.5	25.0	1.0	7.0	4.0	13.0	10.0	18.0	**µA**
I_{led} = 30Ma		4.0	9.0	9.0	20.0	12.0	25.0	30.0	40.0	37.5	75.0	3.5	20.0	12.0	40.0	30.0	55.0	**µA**
Turn-On Time I_f = 50 Ma; C = 10Pf P.W = 100us; f =1kHz; R_s = 10MΩ	$\mathbf{T_{on}}$	-	3.0	-	10.0	-	8.0	-	3.0	-	3.0	-	8.0	-	5.0	-	3.0	**µs**
Temp. Coefficient (Channels in Series)	**Θ**	-	-100	-	-80	-	-100	-	-80	-	-80	-	-40	-	-50	-	-40	**Mv/°C**
Isolation Voltage I_{iso} = 50µA @ 2 sec	$\mathbf{V_{iso}}$	2500																**VDC**
Operating Temp. (Channels in Series)	$\mathbf{T_{op}}$	-50°C To +100°C																
Turn-Off Time I_f = 50 Ma; C = 10Pf P.W = 100us; F =1kHz; R_s = 10MΩ	$\mathbf{T_{off}}$	The Photovoltaic array stops generating current within one microsecond of the trailing edge of LED current the discharge time is solely dependent upon discharge circuitry and capacitive load.																

Typical Applications

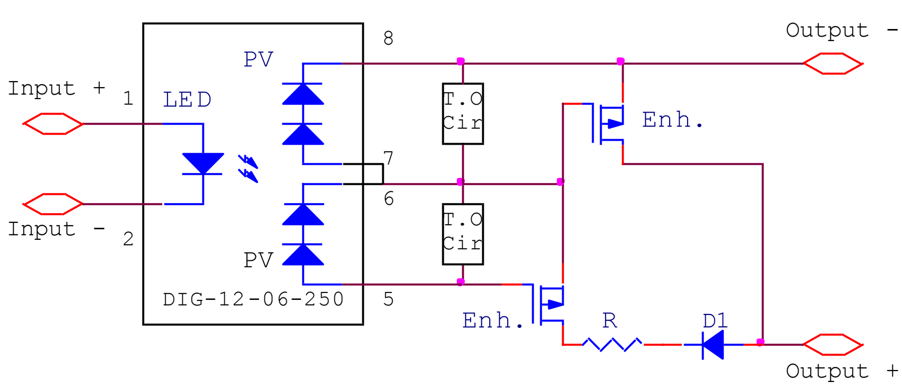
1. *Power MOSFET Photovoltaic SPST N/O DC Relays*



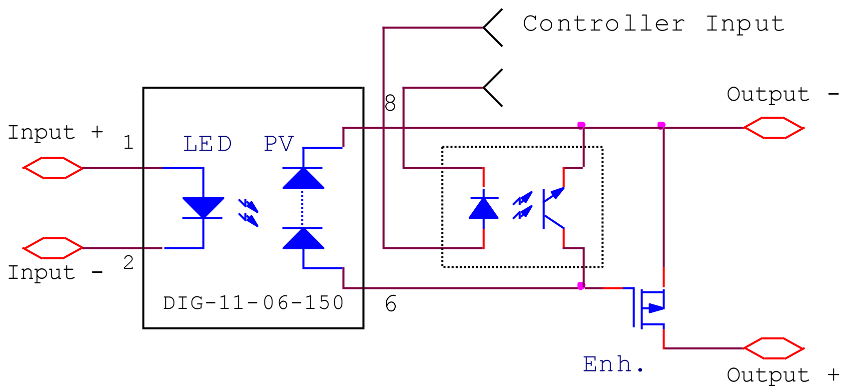
2. *Power MOSFET SPDT Photovoltaic SPST N/O AC-DC Relays:*



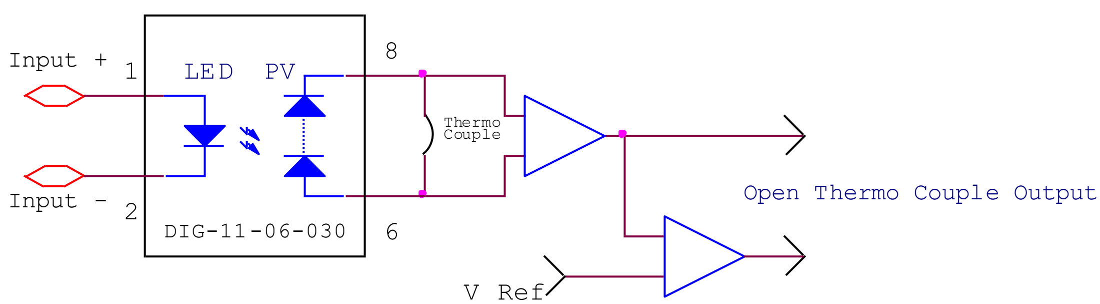
3. *Power MOSFET Photovoltaic SPST N/O Relays With High Speed Turn-Off:*



4. *Power MOSFET Photovoltaic SPST N/O Relays With Opto-Transitor for High Speed Turn-Off:*



5. *Open Thermocouple Detector:*



6. *Isolation Amplifier:*