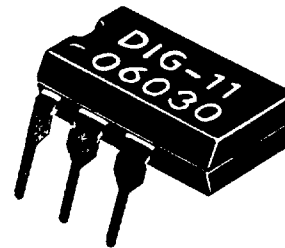


OPTO-ISOLATED ISO-GATE MOSFET DRIVERS

DIONICS

DIG-11-06-030
DIG-11-08-050
DIG-11-06-150



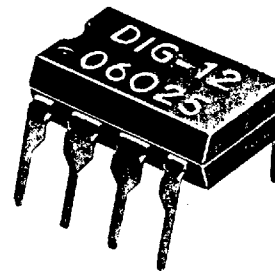
FEATURES

- Completely isolated voltage signal generation
- Dielectric Isolation
- Logic Circuit Compatibility
- High Open Circuit Voltage
- High Operating Temperature
- Fast response time
- High Isolation Resistance
- Excellent Input/Output Linearity

APPLICATIONS

- Gate drive for MOS devices
- Gate drive for SCR
- Solid State Relays
- Interface between logic circuits and external loads
- Automatic test equipment (ATE)
- Switching equipment
- Isolation amplifiers
- Thermocouple Open Detectors

DIG-12-08-010
DIG-12-06-025
DIG-12-08-045
DIG-12-06-100
DIG-12-06-250
DIH 124



DESCRIPTION

The Iso-Gate™ device is a state of the art opto-isolator incorporating Dionics' photovoltaic 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 SiO₂ 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 current 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, V_{OC} . This V_{OC} is floating and is therefore completely isolated. The value depends on the LED input drive and load impedance.

A wide variety of package styles provides design flexibility. Standard packages include low-cost plastic mini-DIPs, high reliability TO-5 metal cans, 8 pin ceramic side brazed DIPs and ceramic chip carriers for hybrid manufacturers. Other custom packages are also available.

ABSOLUTE MAXIMUM RATING (T_A = 25°C)

EMITTER

Forward Current (Continuous)	100mA
Forward Current (peak)	250mA
Reverse Voltage	5V
Power Dissipation	150mW

TOTAL DEVICE

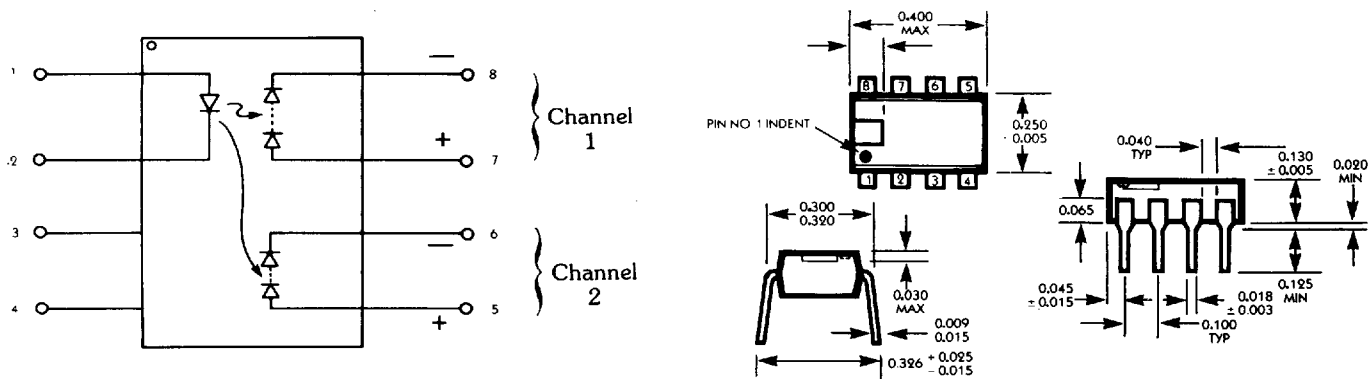
Storage Temperature	-50°C to 125°C
Lead Soldering Time (at 260°C)	10s.

GENERAL CHARACTERISTICS (T_A = 25°C)

EMITTER	TYP.	MAX.	UNIT	DETECTOR	TYP.	MAX.	UNIT
Forward Voltage** (I _F = 20mA)	1.45	1.70	V	Forward Voltage (per channel) (I _F = 10μA)	—	20	V
Reverse Current (V _R = 3V)	—	100	μA	Reverse Voltage (I _R = 1μA)	800	—	V

**DIG-12-06-100 and DIG-12-06-250 are rated at 3.40V (max)

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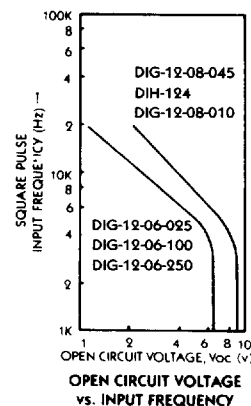
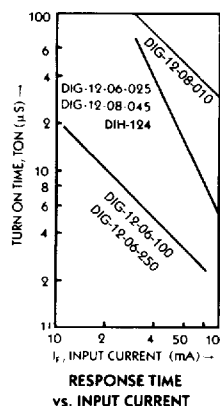
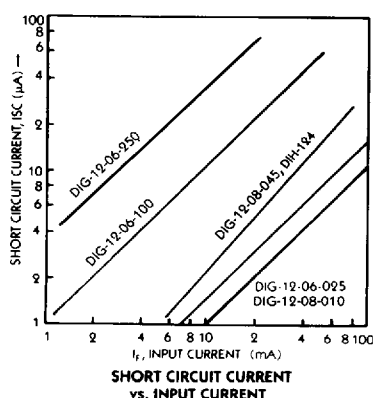
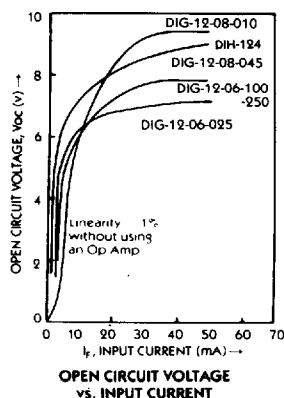


Coupled Characteristics (T _A = 25° C)	Symbol	INDIVIDUAL CHANNEL										Unit
		DIG-12-08-010		DIG-12-06-025		DIG-12-08-045 DIH-124		DIG-12-06-100		DIG-12-06-250		
		MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	
Open Circuit Voltage @ I _F = 2mA @ I _F = 10mA @ I _F = 30mA	V _{OC}	6.0	8.0	5.0	6.5	7.0	8.0	5.0	6.0	5.0	6.0	V
		8.0	9.0	6.5	7.5	8.5	9.0	6.5	7.0	6.5	7.3	V
		9.0	10.0	7.0	8.3	9.5	10.0	7.0	7.8	7.5	8.0	V
Short Circuit Current @ I _F = 2ma @ I _F = 10mA @ I _F = 30mA	I _{SC}	.20	0.5	.50	1.0	.60	1.0	1.0	2.0	2.0	3.0	μA
		1.35	3.0	3.00	6.0	4.00	8.0	8.0	12.0	15.0	25.0	μA
		4.00	9.0	9.00	20.0	12.00	25.0	30.0	40.0	55.0	75.0	μA
On Time @ I _F = 50 mA, P _w = 100 μS, f = 1KHz R _{SHUNT} = 10 Meg, C = 10 pf	t _{ON}	—	3.0	—	10.0	—	8.0	—	3.0	—	3.0	μS
Off Time @ I _F = 50 mA, P _w = 100 μS, f = 1 KHz R _{SHUNT} = 10 Meg, C = 10 pf	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.										
Operating Temperature (Channel In Series)	T _(op)	-50° to 100°C		-50° to 100° C		-50° to 100° C		-50° to 100° C		-50° to 100° C		°C
Temperature Coefficient (Channels in Series)	θ	—100		-80		-100		-80		-80		mV/° C
Isolation Voltage @ I _{ISO} = 1 μA	V _{ISO}	2500 —		2500 —		2500 5000 *		2500 —		2500 —		VDC

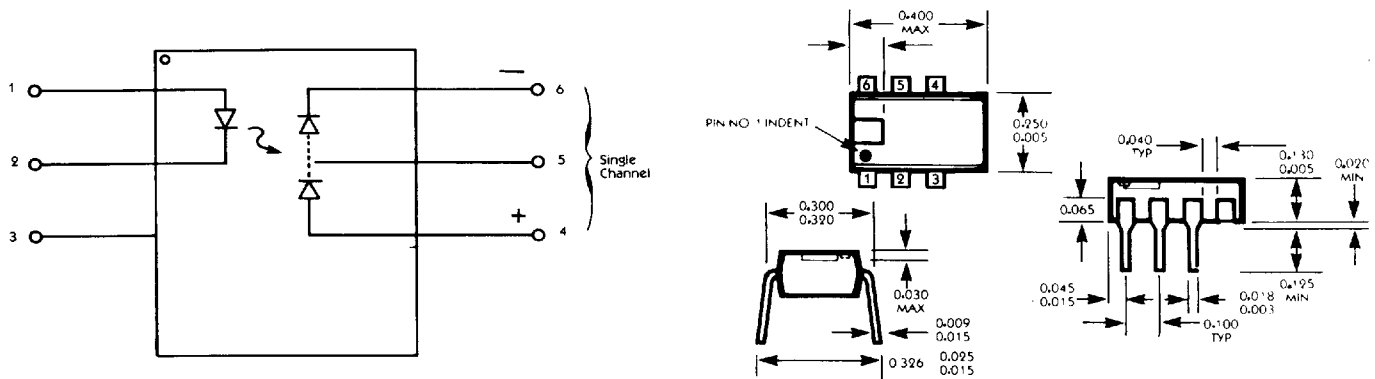
* DIH-124

Typical Characteristics

DIG-12-08-010, DIG-12-06-025, DIG-12-08-045, DIG-12-06-100, DIG-12-06-250, DIH-124

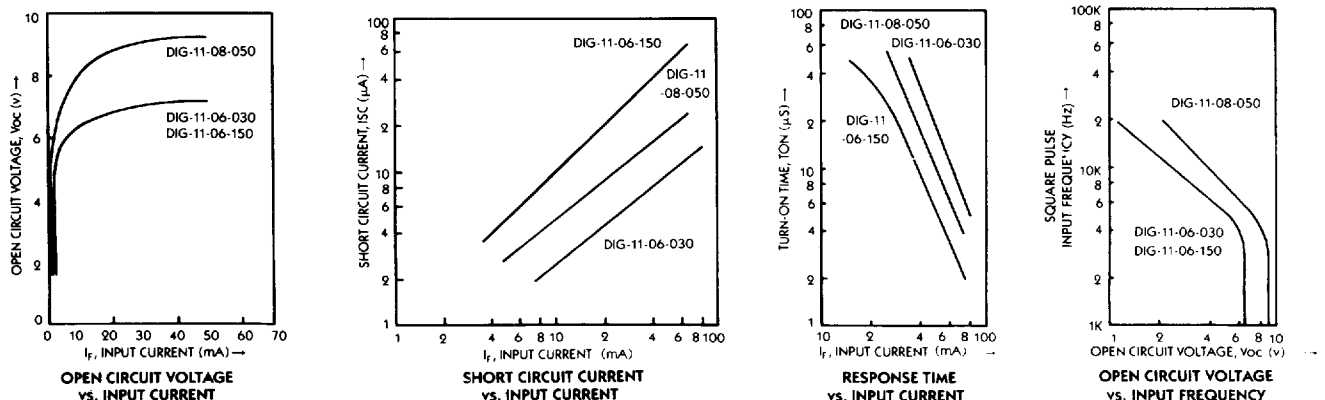


DIG-11-06-030, DIG-11-08-050, DIG-11-06-150



Coupled Characteristics ($T_A = 25^\circ \text{C}$)	Symbol	DIG-11-06-030		DIG-11-08-050		DIG-11-06-150		Unit
		MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	
Open Circuit Voltage @ $I_F = 2\text{mA}$ @ $I_F = 10\text{mA}$ @ $I_F = 30\text{mA}$	V_{OC}	4.5	5.5	6.5	9.0	5.0	6.0	V
		6.0	6.5	7.5	10.0	6.5	7.0	V
		6.5	7.0	8.5	11.0	7.5	8.0	V
Short Circuit Current @ $I_F = 2\text{mA}$ @ $I_F = 10\text{mA}$ @ $I_F = 30\text{mA}$	I_{SC}	0.15	0.4	.60	2.0	1.5	3.0	μA
		1.0	3.0	4.00	13.0	10.0	18.0	μA
		3.5	9.0	12.00	40.0	30.0	55.0	μA
On Time @ $I_F = 50\text{ mA}$, $P_w = 100\text{ }\mu\text{S}$, $f = 1\text{ KHz}$ $R_{SHUNT} = 10\text{ Meg}$, $C = 10\text{ pf}$	t_{ON}	—	8.0	—	5.0	—	3.0	μS
Off Time @ $I_F = 50\text{ mA}$, $P_w = 100\text{ }\mu\text{S}$, $f = 1\text{ KHz}$ $R_{SHUNT} = 10\text{ Meg}$, $C = 10\text{ pf}$	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.						
Operating Temperature	$T_{(op)}$	-50° to 80°		-50° to 90°		-50° to 80°		$^\circ\text{C}$
Temperature Coefficient	θ	-40		-50		-40		$\text{mV}/^\circ\text{C}$
Isolation Voltage @ $I_{ISO} = 1\text{ }\mu\text{A}$	V_{ISO}	2500 —		2500 —		2500 —		VDC

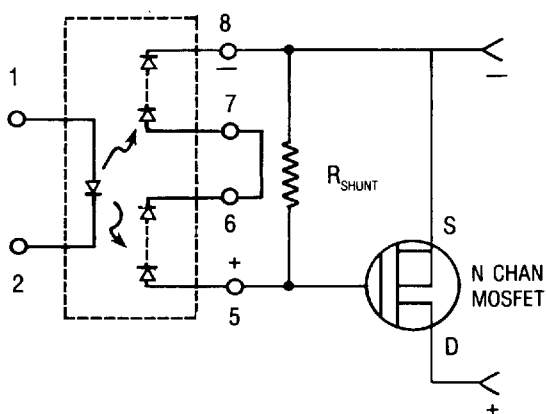
Typical Characteristics (DIG-11-06-030, 11-08-050, 11-06-150)



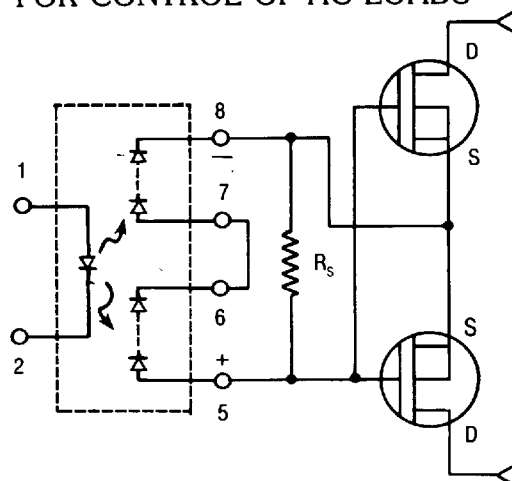
ISO-GATE Device Applications

Direct Gate Driver for MOSFETs

FOR CONTROL OF DC LOADS

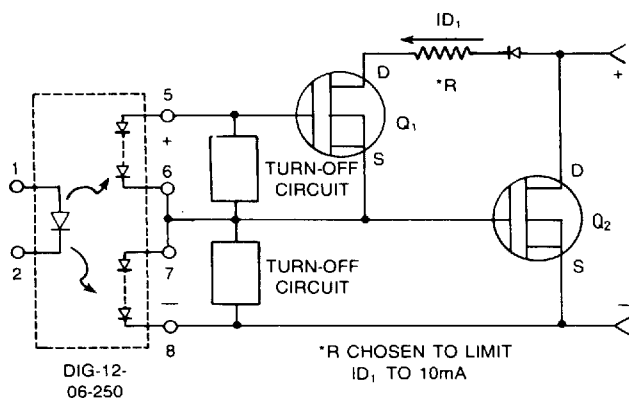


FOR CONTROL OF AC LOADS

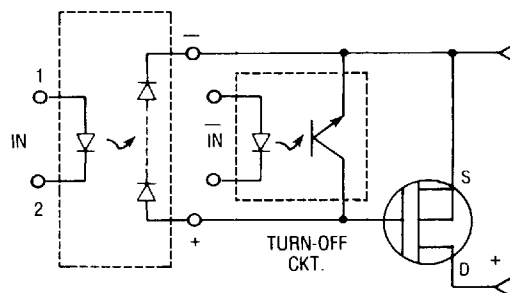


R_{SHUNT} can be adjusted to obtain optimum values of t_{ON} and t_{OFF} . Typically, the optimum R_{SHUNT} varies from 1 Megohm for DIG-12-06-250 to about 10 Megohm for DIG-12-06-025

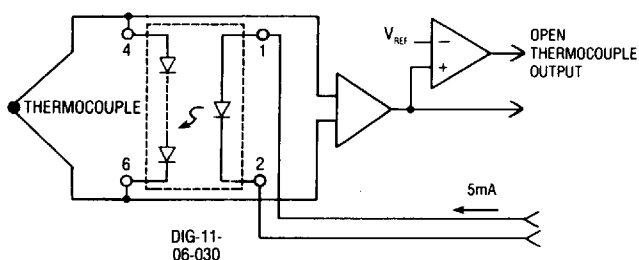
HIGH SPEED TURN-ON



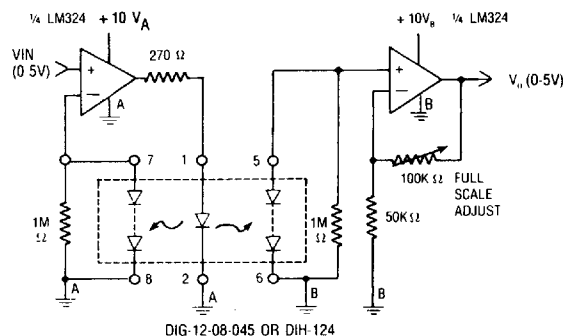
OPTO-TRANSISTOR FOR HIGH SPEED TURN-OFF



OPEN THERMOCOUPLE DETECTOR



ISOLATION AMPLIFIER



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