



OPTICALLY-ISOLATED PHOTOVOLTAIC ISO-GATE™ MOSFET DRIVER

DIG-11-15-25

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:

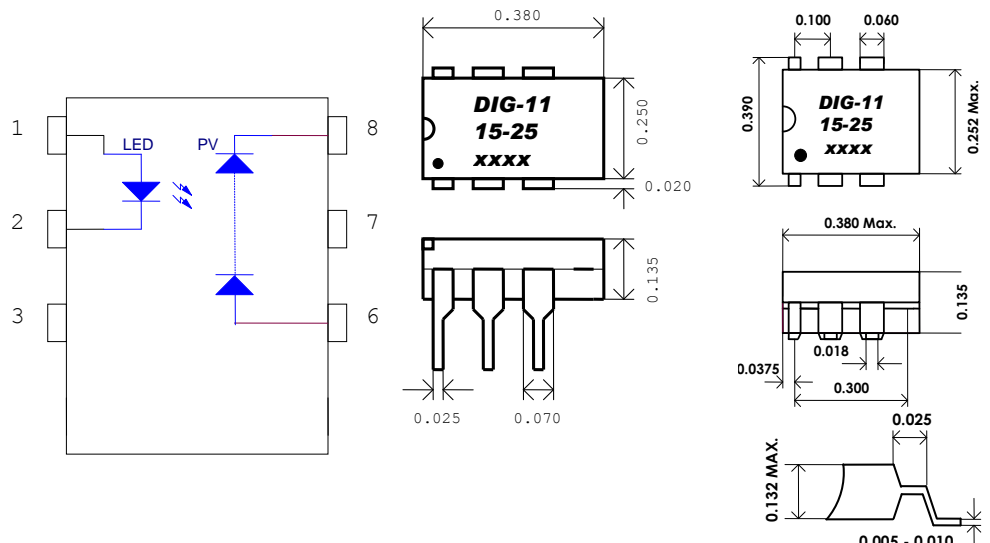
- Gate Drive For MOS devices
- Gate Drive For SCR
- Solid-State Relays
- Interface Between Logic Circuits & External Loads
- A.T.E. (Automatic Test Equipment)
- Switching Equipment
- Isolation Amplifiers
- Load Control From Microprocessor I/O Ports
- Thermocouple Open Detectors

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 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 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.

Pin Designation	
Pin Number	
1	Input +
2	Input -
3	Not Connected
4	Not Connected
5	Not Connected
6	Output +
7	Not Connected
8	Output -



DIG-11-15-25 MOSFET Driver

❖ Absolute Maximum Ratings ($T_a = 25\text{ }^\circ\text{C}$)		
LED Forward Current	Steady State	100 mA
LED Forward Current	Peak 10% Duty Cycle	150 mA
LED Reverse Voltage		10V
Output Discharge Current		15mA
Operating Temperature Range	Plastic D.I.P	-50 to 100 $^\circ\text{C}$
Operating Temperature Range	Side Braze D.I.P	-50 to 125 $^\circ\text{C}$
Storage Temperature		-50 to 125 $^\circ\text{C}$
Power Dissipation		100 mW

❖ Electrical Characteristics ($T_a = 25\text{ }^\circ\text{C}$ Unless otherwise specified)

<i>Model Number</i>	<i>DIG-11-15-25</i>				<i>Unit</i>
Parameter & Test Condition	Symbol	Min.	Typ.	Max.	
Open Circuit Voltage	V_{oc}				
$I_{led} = 2\text{mA}$			10.0		V
$I_{led} = 10\text{mA}$		14.5	15.0	17.5	V
$I_{led} = 30\text{ mA}; 50\% \text{ Duty Cycle}$		15.0	16.0	17.5	V
Short Circuit Current	I_{sc}				
$I_{led} = 2\text{mA}$			3.0		μA
$I_{led} = 10\text{mA}$		8.0	12.0	-	μA
$I_{led} = 30\text{ mA}; 50\% \text{ Duty Cycle}$		25.0	30.0	-	μA
LED Forward Voltage	V_f				
$I_f = 20\text{mA}$		-	1.3	1.7	V
LED Reverse Current	I_r				
$V_r = 5\text{V}$		0.1	10.0	-	μA
Isolation Voltage	V_{iso}	2500	-	-	VDC
Temp. Coefficients	$\ominus V$	-	60	-	$\text{mV} / ^\circ\text{C}$
$I_{led} = 10\text{mA}$	$\ominus I$	-	0.5	-	$\%I / ^\circ\text{C}$
Turn-On Time	T_{on}				
$I_{led} = 30\text{ mA}$		-	100	-	μs
$C=1500\text{pF}; V_{oc} \text{ to } 50\%$					
Turn-Off Time	T_{off}				
$I_f = 50\text{ mA}; C = 10\text{pF}$		The Photovoltaic array stops generating current within one microsecond of the trailing edge of the LED current. The discharge time is solely dependent upon discharge circuitry and capacitive load.			
$P.W = 100\mu\text{s};$ $f = 1\text{kHz}; R_s = 10\text{M}\Omega$					