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DIG-1185 Photovoltaic MOSFET / IGBT Driver

Features:

- Optically Isolated
- Constructed For Surface Mount Assembly
- Suitable For Manual or Automatic Placement
- Sturdy Construction, Immune To Handling Damage
- Fast Turn On, Turn Off & Active Gate Discharge
- Dielectrically Isolated PV IC Construction
- High Open Circuit Voltage Up To 20V
- High Isolation Resistance

Applications:

- MOSFET/IGBT Driver
- Medical Implant Application
- Medical Solid-State Relays
- A.T.E. (Automatic Test Equipment)
- Medical Test Equipment
- Isolation Amplifiers
- Load Control From Microprocessor I/O Ports
- Thermocouple Open Detectors

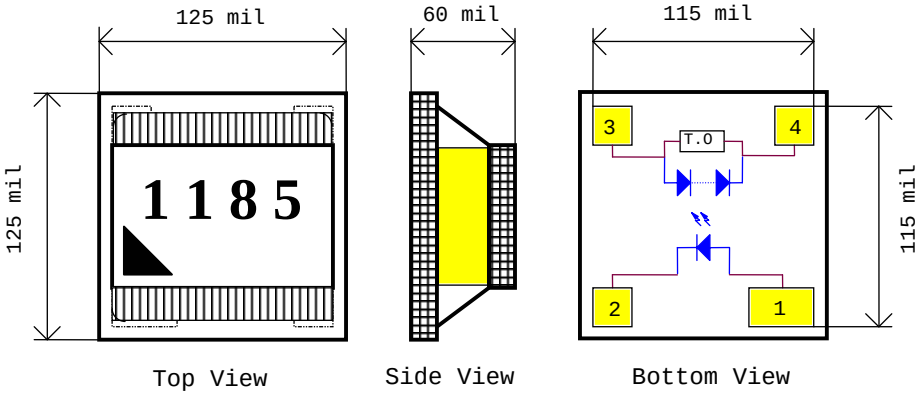
Description:

The DIG-1185 Photovoltaic is a State-of- the-Art, optically coupled floating power source used primarily to control MOSFET/IGBT's when electrical isolation between input and output is required. It is particularly well suited for Medical implant applications.

In addition to the infrared LED and photovoltaic (PV) diode array, each of the DIG-1185 devices contains circuitry that rapidly discharges the power MOSFET/IGBT gate when the LED is deactivated. The unique rapid discharge feature of the DIG-1185 makes it particularly useful for high side switching of MOSFET/IGBT's in Medical applications, DC motor control and switching regulator applications. The rugged design features a hard ceramic top, 2 hard sides and of course a hard ceramic bottom. Therefore, it is ideal for manual and automatic vacuum pencil assembly methods, with handling damage almost impossible. Construction of the DIG-1185 permits either assembly with terminal pads down, using conducting epoxy or inverted with terminal pads up, non-conducting epoxy-bonded to the substrate and completed with standard T/C wire-bonding to the top terminal pads.

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 (V_{oc}) and disabling the turn off circuitry. The self-limiting photovoltaic output of the diode array is floating and therefore, can be safely applied directly to the MOSFET/IGBT, regardless of the source potential of the MOSFET/IGBT. When the LED is deactivated, the active turn-off circuit discharges the capacitive input of the MOSFET/IGBT. The active turn-off circuitry is designed such that the turn-off time of the MOSFET/IGBT is relatively independent of the input capacitance over a range of 300 to 5000 pF.

DIG-1185 Layout:



DIG-1185 Configuration:

Pad Number	Function	Size (Inches)
1	+ Input	0.030 x 0.050
2	- Input	0.030 x 0.030
3	+ V_o	0.030 x 0.030
4	- V_o	0.030 x 0.030

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❖ Absolute Maximum Ratings (T_a = 25 ± 2 ^{0}C)		
LED Forward Current	Steady State	100 mA
LED Forward Current	Peak 10% Duty Cycle	250 mA
LED Reverse Voltage		10V
Output Discharge Current		15mA
Operating Temperature Range		-55^{0}C to 125 ^{0}C
Storage Temperature		-55^{0}C to 150 ^{0}C

Electrical Characteristics (T_a =25 ± 2 ^{0}C Unless otherwise specified)

Parameter & Test Condition	Symbol	Min.	Max.	Unit
Open Circuit Voltage I_{led} = 30 mA; R_{load} = 10 MΩ	V_{oc}	15.0	20.0	**V**
Short Circuit Current[§] I_{led} = 30 mA	I_{sc}	20.0	-	**µA**
LED Forward Voltage* I_f = 250 mA	V_{fled}	-	1.80	**V**
LED Reverse Current V_r = -5V	I_{rled}	-	10.0	**µA**
Off State Voltage I_{off} = 10 µA; I_{led} = 0 mA	V_{off}	-	0.75	**V**
Isolation Voltage T_{test} = 1 sec; I_{iso} < 100 µA	V_{iso}	1000	-	**VDC**
Turn-On Time* I_{led} = 200 mA; R_{load} = 10 MΩ; C_{load} = 1500pF ± 2%; V_{oc} to reach 15.0 V	T_{on}	-	120	**µs**
Turn-Off Time* I_{led} = 200 mA; R_{load} = 10 MΩ C_{load} = 1500 pF ± 2%; V_{oc} to reach 2.0 V	T_{off}	-	5.0	**µs**

[§] *Please contact the factory for higher I_{sc} requirements*
** Pulse test, PW ≤10 ms*
Note: R_{load} = 10 MΩ is input impedance in a voltage measuring probe