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DIH-128 Power MOSFET SPST Photovoltaic AC-DC N/O Relay

Features:

- Low Level Logic Compatibility
- Optical Isolation to 400VDC
- Low On Resistance, Low Offset Voltage
- Low Off-State Leakage Current.
- High Speed Switching Response.
- High Transient Immunity, No False Turn on
- Hermetically Sealed 6-Pin Mini DIP Foot Print
- Designed To Meet MIL-R-28750
- Y-Level MIL-Screening Available (**DIH-128Y**)

Applications:

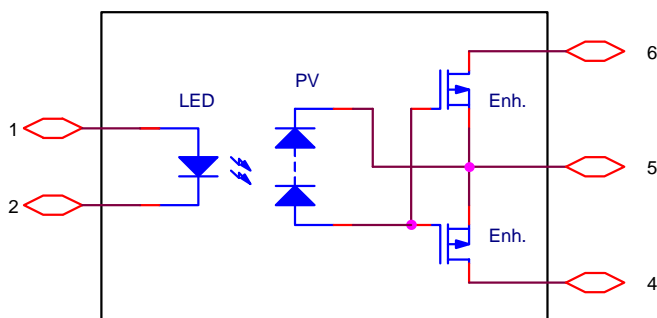
- Replacement of Mechanical Relays
- Motor Control & Power Control
- Aircraft Flight Control Systems
- A.T.E. (Automatic Test Equipment)
- Load Control From Processor I/O Ports
- High-side DC Power Switching
- Power Supply Circuits
- Medical Electronics

Description:

The DIH-128 is a State-of-the-Art Photovoltaic Solid State Relay designed for A.T.E. applications where speed, on-resistance and leakage current are critical. These photovoltaic relays incorporate an infrared LED input, a photovoltaic (PV) diode array including a unique turn-off circuit connected to the gates of a pair of high voltage MOSFETs as output. The photovoltaic diode array is a series-connected group of photosensitive diodes, which are electrically isolated from, but optically coupled to, the input LED. Input/Output isolation is rated at 400 VDC.

When activated, the LED emits infrared light toward the photovoltaic diode array, which then responds with a self-generated open circuit voltage, V_{oc} , proportional to the LED input current. This V_{oc} , which is floating and completely isolated from any power supply, is applied to the Gates of the MOSFETs. At the proper value of the input LED current, the generated V_{oc} is sufficient to turn on the MOSFETs and cause the relay to conduct. The MOSFET outputs provide thermal stability, immunity from false turn-on, and low offset voltage.

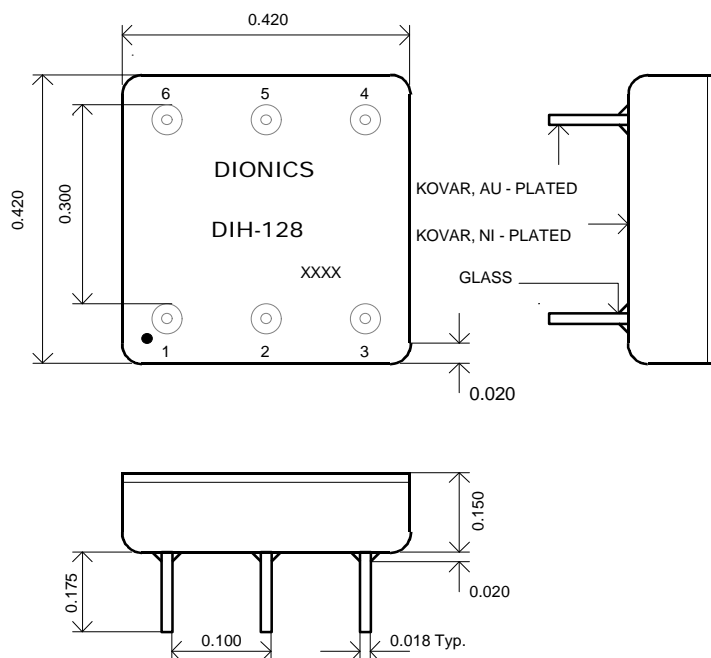
* DIH-128 Schematic



❖ Pin Designation

Pin number	Function
1	Input +
2	Input -
3	Case
4	Output Drain
5	Output Common Source
6	Output Drain

* Package Lay out:

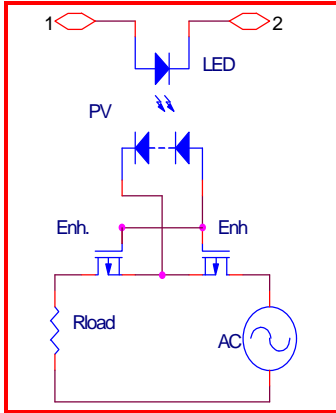


DIH-128: Power MOSFET SPST Photovoltaic AC-DC Relay

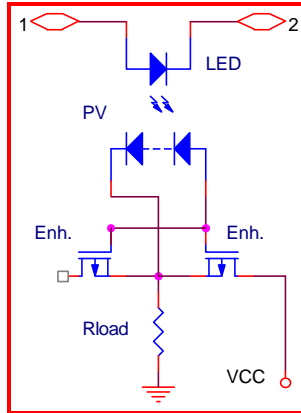
Electrical Characteristics (@ 25 °C unless otherwise specified):

Wiring Configuration:

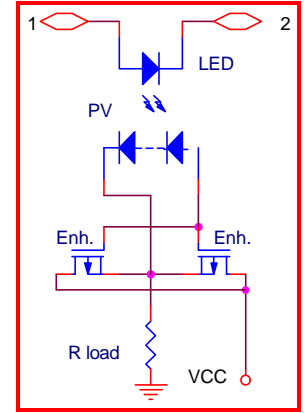
AC-DC Wiring Config. (1)



DC Wiring Config. (2)
Single MOSFET



DC Wiring Config. (3)
Parallel MOSFETs



❖ <i>Input Characteristics</i>	Condition	Min.	Typ.	Max	Units
Turn-On Current	100 mA load	—	5	10	mA
Turn-Off Current		1.2	—	—	V
Forward Voltage Drop	Input Current = 10mA	—	2.2	2.7	V
	Input Current = 25mA	—	2.6	2.9	V
Reverse Voltage	Reverse Current = 10μA	10	—	—	V

❖ <i>Output Characteristics</i>	AC-DC Wiring Config. (1)	DC Wiring Config. (2)	DC Wiring Config. (3)	Unit
Load Current (Continuous in Free Air)	600	600	1200	mA
On Resistance ($I_{in} = 15\text{mA}$, $V_{op} = 30\text{V}$)	1.0	0.5	0.25	Ohm
Typical Output Capacitance (Bias Voltage= 50V)	80	160	320	pF
Off-State Leakage @ 250V	10	10	20	μA
Output Offset Voltage ($I_{in} = 15\text{mA}$)	250	250	250	μV
Turn-On Time*	500	500	500	μs
Turn-Off Time*	70	70	70	μs
Load Voltage ($I_l = 10\text{mA}$)	250	250	250	V

* $I_{led} = 25\text{ mA}$; $f = 100\text{ Hz}$; $Pulse\ Width = 100\text{ ms}$; $I_{load} = 600\text{ mA}$

❖ Environmental Conditions:

Operating Temp. : -20 to 85 °C (Comm.)
(Y-Level Mil.) -55 to 125 °C

Storage Temp. : -20 to 85 °C (Comm.)
(Y-Level Mil.) -55 to 125 °C

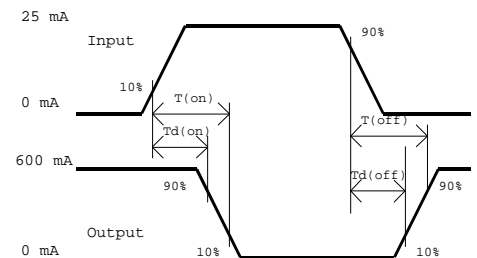
Shock: (Y-Level Mil.) 50 G, MIL-STD-202
Method 202

Hermeticity: Gross Leak (Comm.)
10⁻⁵ atm cc/sec
(Y-Level Mil.) Fine Leak
5x10⁻⁸ atm cc/sec

Vibration: (Y-Level Mil.) 20G, 10 to 2000 Hz

Acceleration: (Y-Level Mil.) 100 G

Weight: 1.5 Grams



❖ General Characteristics:

Minimum Input/Output Isolation: 400 VDC
Minimum Input/Output Resistance: 10⁸ Ohms
Typical Input/Output capacitance: 10pF
Typical Thermal Resistance: 15mW/°C
Min. Transient Protection Capability (dv /dt): 100V/μs
Maximum Power Dissipation @ 25 °C: 1W