



# DIONICS-USA INCORPORATED

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## DIH-126      DIH-127      DIH-136

### Power MOSFET N/O SPST Photovoltaic AC-DC Relay

#### Features:

- Low Level Logic Compatibility
- Thermal Protection With Hysteresis
- Optical Isolation to 400VDC
- Low On Resistance, Low Offset Voltage
- Meet 28V DC System Surge and Spike Requirements of Mil STD-704.
- Current Limiting
- Designed To Meet MIL-R-28750
- Y-Level MIL Screening Available

#### Applications:

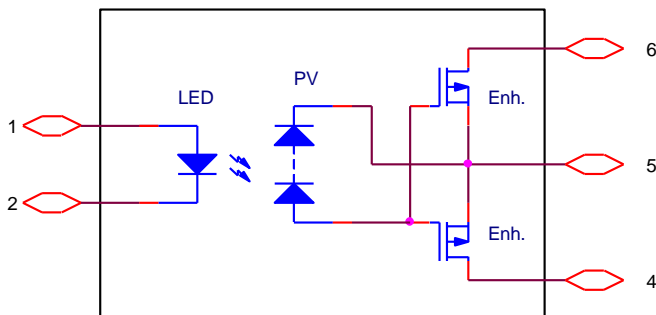
- 28V DC Aircraft Power Control & Distribution
- Motor Control & Power Control
- Aircraft Flight Control Systems
- A.T.E. (Automatic Test Equipment)
- Load Control From Processor I/O Ports
- High-side DC Power Switching
- Power Supply Circuits
- Medical Electronics

#### Description:

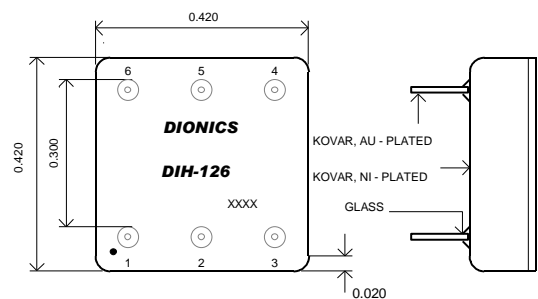
DIH-126, DIH-127 and DIH-136 are State-of-the-Art AC-DC Photovoltaic (PV) Solid State Relays designed for A.T.E. applications where speed, power, on-resistance and leakage current are critical. These PV relays incorporate an infrared LED input, a PV diode array connected to the gates of 2 pairs of power MOSFETs as output and a unique turn-off circuit. The PV diode array is 2 series-connected groups of photosensitive diodes, which are electrically isolated from, but optically coupled to the input LEDs. When activated, each LED emits infrared light toward the PV diode array, which then responds with a self-generated open circuit voltage, Voc, proportional to the LED input current. This Voc, which is floating and completely isolated from any power supply, is applied to the gates of the power MOSFETs. At the proper value of the input LED current, the generated Voc 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-126, DIH-127 and DIH-136 are specific PV relays that are produced from one basic semi-custom design. Options, such as: current limiting, thermal protection, short circuit protection, status indication, constant current input or ultra fast switching may be incorporated into customized versions of these relays

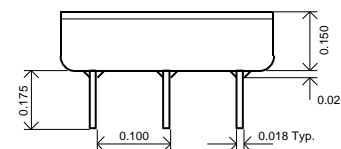
#### \* Equivalent Schematic:



#### \* Package Layout:

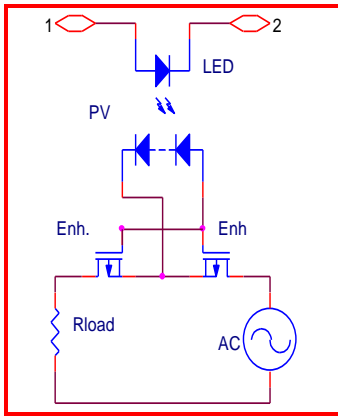


Pin designation						
Pin number	1	2	3	4	5	6
Function	Input +	Input -	Case	Output Drain +	Common Source -	Output Drain +

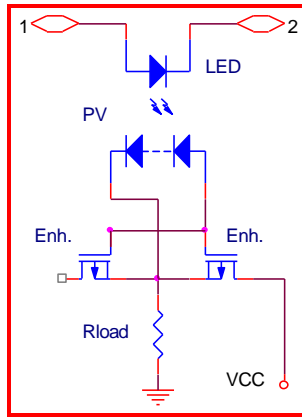


❖ **Electrical Characteristics** (@ 25 °C unless otherwise specified):

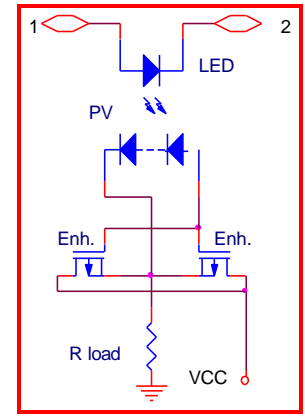
AC-DC Wiring Config. (1)



DC Wiring Config. (2)  
Single MOSFET



DC Wiring Config. (3)  
Parallel MOSFETs

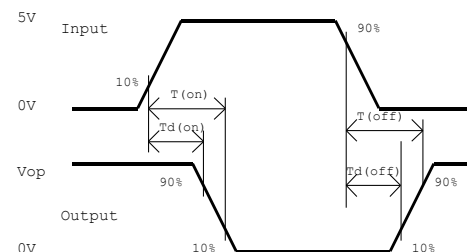


❖ <b>Input Characteristics</b>	<b>Condition</b>	<b>Min.</b>	<b>Typ.</b>	<b>Max</b>	<b>Unit</b>
Turn-On Current	$I_{load} = 100\text{mA}$	–	5	10	mA
Turn-Off Voltage		1.2	–	–	V
Forward Voltage Drop	Input Current = 10mA	–	2.2	2.6	V
	Input Current = 25mA	–	2.6	3.0	V
Reverse Voltage	Reverse Current = 10 $\mu$ A	10	–	–	V

❖ <b>Output Characteristics</b>	<b>AC-DC Wiring Config.(1)</b>			<b>DC Wiring Config.(2)</b>			<b>DC Wiring Config.(3)</b>			<b>Unit</b>
	DIH-126	DIH-127	DIH-136	DIH-126	DIH-127	DIH-136	DIH-126	DIH-127	DIH-136	
Max. Load Current ( In Free Air and $I_{in} = 50\text{ mA}$ )	1.0	0.30	1.25	1.20	0.35	1.65	1.55	0.55	2.10	A
Load Current (20ms Pulse, 1% Duty Cycle)	10.0	1.5	12.0	11.0	1.7	13.0	16.0	2.5	18.0	A
Load Voltage ( $I_{load} = 10\mu\text{A}$ )	$\pm 200$	$\pm 400$	$\pm 100$	+200	+400	+100	+200	+400	+100	V
On Resistance ( $I_{in} = 15\text{mA}$ , Load @5A)	0.80	8.00	0.60	0.40	4.00	0.30	0.20	2.00	0.15	$\Omega$
Typical Output Capacitance (Bias Voltage= 50V)	80	25	80	160	50	160	320	100	320	pF
$I_{leakage}$ @180V; 350V; 80V (DIH-126/127/136)	0.20	0.05	0.40	0.20	0.05	0.40	0.40	0.10	0.80	$\mu\text{A}$
Output Offset Voltage ( $I_{in} = 15\text{mA}$ )	250	250	250	250	250	250	250	250	250	$\mu\text{V}$
$T_{on}$ Time @1A; 0.3A; 1.25A (126/127/136)	550	250	800	550	250	800	650	300	900	$\mu\text{s}$
$T_{off}$ Time @1A; 0.3A; 1.25A (126/127/136)	70	70	70	70	70	70	70	70	70	$\mu\text{s}$

❖ **Environmental Conditions:**

<b>Operating Temp. :</b>	-20 to 85 °C (Comm.)
(Y-Level Mil.)	-55 to 125 °C
<b>Storage Temp. :</b>	-20 to 85 °C (Comm.)
(Y-Level Mil.)	-55 to 125 °C
<b>Shock:</b> (Y-Level Mil.)	50 G, MIL-STD-202 Method 202
<b>Hermeticity:</b>	Gross Leak (Comm.)
(Y-Level Mil.)	10 <sup>-5</sup> atm cc/sec
	Fine Leak
	5x10 <sup>-8</sup> atm cc/sec
<b>Vibration:</b> (Y-Level Mil.)	20G, 10 to 2000 Hz
<b>Acceleration:</b> (Y-Level Mil.)	100 G
<b>Weight:</b>	1.5 Grams



❖ **General Characteristics:**

Minimum Input/Output Isolation:	400 VDC
Minimum Input/Output Resistance:	10 <sup>8</sup> Ohms
Typical Input/Output capacitance:	10pF
Typical Thermal Resistance:	15mW/ °C
Min. Transient Protection Capability (dv /dt ):	100V/ $\mu\text{s}$
Maximum Power Dissipation @ 25 °C:	1 W