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DIH-129, DIH-149, DIH-169 Power MOSFET N/O SPST Photovoltaic AC-DC Relay

Features:

- Low Level Logic Compatibility
- Thermal Protection With Hysteresis
- Optical Isolation to 650VAC
- 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:

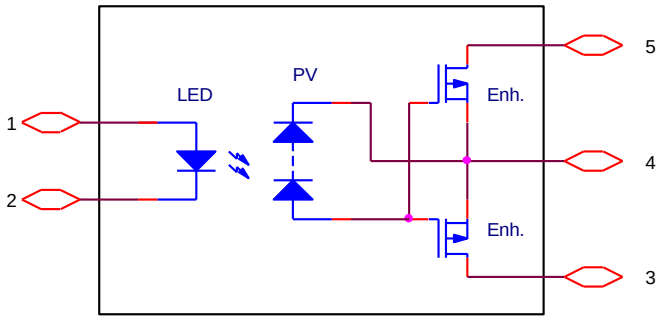
- 28V DC Aircraft Power Control & Distribution
- Motor Control & Power Control
- Aircraft Flight Control Systems
- A.T.E. (Automatic Test Equipment)
- Load Control From Processor I/O Ports
- High-side DC Power Switching
- Power Supply Circuits
- Medical Electronics

Description:

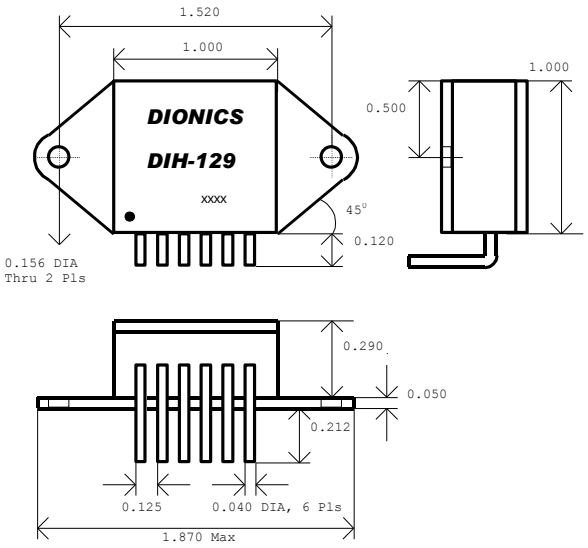
DIH-129, DIH-149 and DIH-169 are State-of-the-Art AC-DC Photovoltaic (PV) Solid State Relays designed for power management applications where speed, power, on-resistance and leakage current are critical. These PV relays incorporate an infrared LED input, a PV diode array connected to the gates of 2 pairs 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-129, DIH-149 and DIH-169 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 -	Output Drain +	Common Source -	Output Drain +	Case

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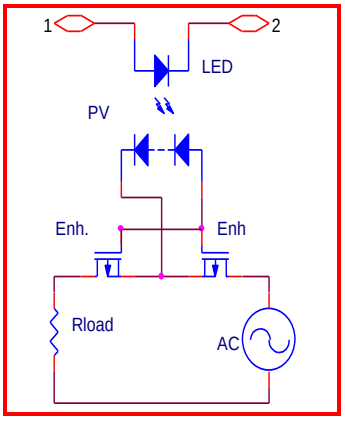
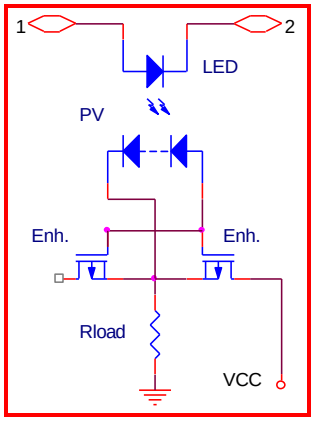
❖ ***Electrical Characteristics*** (@ 25 ^{0} C unless otherwise specified):

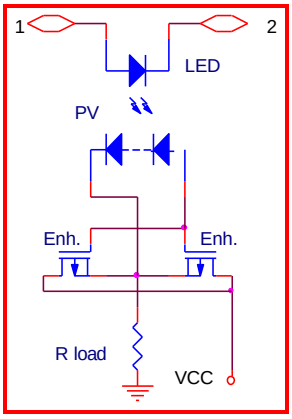
AC-DC Wiring Config. (1)



DC Wiring Config. (2)
Single MOSFET



DC Wiring Config. (3)
Parallel MOSFETs

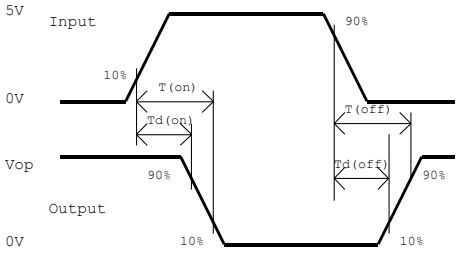


❖ *Input Characteristics*	*Condition*	*Min.*	*Typ.*	*Max*	*Unit*
Turn-On Current	I_{load} = 1A	–	5	10	mA
Turn-Off Current		1.2	–	–	V
Forward Voltage Drop	Input Current = 10mA	–	3.9	4.3	V
	Input Current = 25mA	–	5.0	5.5	V
Reverse Voltage	Reverse Current = 10μA	10	–	–	V

❖ *Output Characteristics*	*AC-DC Wiring Config.(1)*			*DC Wiring Config.(2)*			*DC Wiring Config.(3)*			*Unit*
	DIH-129	DIH-149	DIH-169	DIH-129	DIH-149	DIH-169	DIH-129	DIH-149	DIH-169	
Max. Load Current (In Free Air and I_{in} = 50 mA)	16	10	6	19	12	7	25	17	10	A
Load Current (20ms Pulse, 1% Duty)	40	25	15	48	30	18	60	42	25	A
Load Voltage (I_{load} = 10μA)	±200	±400	±600	+200	+400	+600	+200	+400	+600	V
On Resistance (I_{in} = 25mA; I_{load} = 5A)	0.15	0.40	1.2	0.08	0.20	0.60	0.05	0.10	0.30	Ω
Typical Output Capacitance (Bias Voltage= 50V)	1200	600	250	2400	1200	500	4800	2400	1000	pF
$I_{leakage}$ @180V; 350V; 550V (129/149/169)	100	100	100	100	100	100	200	200	200	μA
Output Offset Voltage (I_{in} = 25mA)	250	250	250	250	250	250	250	250	250	μV
Turn-On Time @I_{load} = 5A	5	9	16	5	9	16	5	9.5	16	ms
Turn-Off Time @I_{load} = 5A	150	350	1000	150	350	1000	200	450	1150	μs

❖ *Environmental Conditions:*

Operating Temp. :	-20 to 85 ^{0}C (Comm.)
(Y-Level Mil.)	-55 to 125 ^{0}C
Storage Temp. :	-20 to 85 ^{0}C (Comm.)
(Y-Level Mil.)	-55 to 125 ^{0}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:	22 Grams



❖ General Characteristics:

Minimum Input/Output Isolation:	650 VAC
Minimum Input/Output Resistance:	10 ^{8} Ohms
Typical Input/Output capacitance:	10pF
Typical Thermal Resistance:	2^{0}C/W
Min. Transient Protection Capability (dv /dt):	100V/μs
Maximum Power Dissipation @ 25 ^{0}C:	50 W

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