

POWER MOSFET 7-41-83 PHOTOVOLTAIC RELAYS FOR 28V DC AIRCRAFT APPLICATIONS

SPST/NO
DIH-133
DUAL SPST/NO.
DIH-134
DUAL SPST/NC
DIH-135
SPST/NO
DIH-139

DIONICS

FEATURES

- Low Logic Level Input Compatibility
- Low On Resistance
- Optically Isolated to 400V DC
- Current Limiting
- Thermal Protection With Hysteresis
- Fast Switching Speed
- Meet 28V DC System Surge and Spike Requirements of MIL STD-704
- Designed to Meet Requirements of MIL-R-28750
- Space Efficient Hermetic Packages

APPLICATIONS

- 28 V DC Aircraft Power Control & Distribution
- High Side DC Power Switching
- Load Control From Microprocessor I/O Ports
- Programmable Controllers

DESCRIPTION

The DIH-133, 134, 135 and 139 are State of the Art solid state relays designed for 28V dc aircraft power applications where speed, efficiency, current overload protection and immunity to transient voltages are critical.

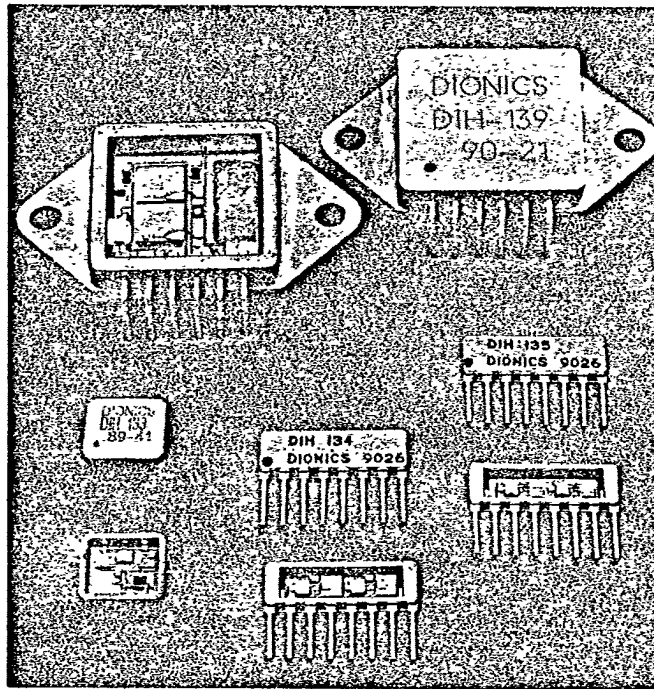
DIH-133, 134 and 139 are normally opened relays capable of continuous currents of 1.0, 0.35 (dual) and 19.0 amps, respectively. DIH-135 is a dual normally closed relay, each channel capable of 0.3A.

All four relays feature MOSFET outputs that are optically isolated from the input using DIONICS-manufactured photovoltaic integrated circuits. They have light emitting diode inputs that control the state of the output power MOSFETS.

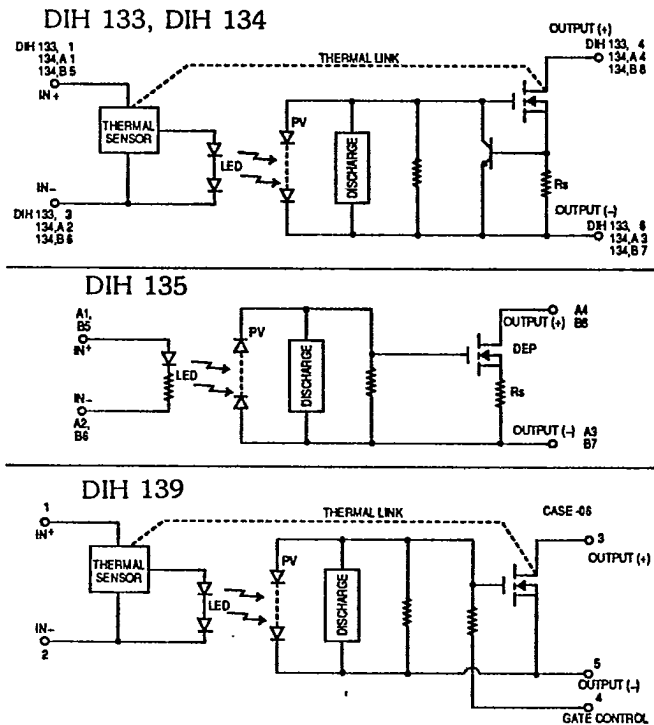
DIH-133 and 134 contain current limiting networks and thermally sensitive integrated circuits that disable the outputs, if the output MOSFETS approach an unsafe operating temperature. Because the thermally sensitive integrated circuits have built-in hysteresis, the output MOSFETS are automatically restarted when a safe temperature is reached. This auto restart feature eliminates the need for system restart signals. If the overload condition continues to exist, the cycle is repeated; if the overload condition is removed, the relay returns to normal operation.

DIH-139 also contains the thermally sensitive integrated circuit, but allows for current limiting by providing access to the gate terminal of the output power MOSFET.

The four solid state relays are manufactured in hermetically sealed packages, as shown. They may be screened to military specifications, as required.



EQUIVALENT CIRCUIT

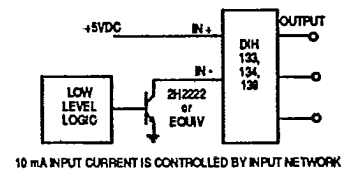


ELECTRICAL SPECIFICATIONS (TA = 25°C Unless Otherwise Specified)

INPUT (CONTROL) CHARACTERISTICS DIH133, DIH134, DIH139 (NO)

TYPICAL INPUT CIRCUIT (DIH 133, 134, 139)

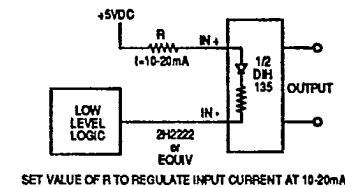
	MIN	TYP	MAX	UNITS
Input Current (Normal Operation) @ 5V		12		mA
(Thermal Shutdown Condition)		4		mA
Control Voltage Range	4.5	5.0	5.5	VDC
Turn OFF Voltage (Max. for Guaranteed OFF)			1.5	VDC
Turn ON Voltage (Min. for Guaranteed ON)	3.5			VDC



INPUT (CONTROL) CHARACTERISTICS DIH135 (NC)

TYPICAL INPUT CIRCUIT (DIH 135)

	MIN	TYP	MAX	UNITS
Input Current @ 5V	5	25	40	mA
Turn ON Voltage (Max, for Guaranteed ON)	1.2			V
Turn OFF Voltage (Min, for Guaranteed OFF @ 10mA)		2.5	3.0	V
(Min, for Guaranteed OFF @ 25mA)		3.00	4.0	V
Reverse Voltage	10			V



OUTPUT CHARACTERISTICS

	DIH-133	DIH-134	DIH-135	DIH-139	UNITS
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	DIH-133	DIH-134	DIH-135	DIH-139	UNITS
Max Load Current					
(Continuous TA = 25°C)	1	0.350	0.300	19	A
(Continuous TA = 75°C)	0.60	0.250	0.250	12	A
(20ms pulse, 1% duty cycle, TA = 25°C)	2.5	0.5	0.5	40	A
Max Blocking Voltage (Non Shorted Output)	80	60	80	200	V
Max Operating Voltage (Shorted Output)	30.3	30.3	—	—	V
Max Operating Voltage (Shorted Output Limited to 5A)				120	V
Max ON State Resistance					
(TA = 25°C, 100mA Load Current)	0.80	3	5		Ω
(TA = 75°C, 100mA Load Current)	1.0	4	7		Ω
(TC = 25°C, 5A Load Current)				0.10	Ω
(TC = 75°C, 5A Load Current)				0.12	Ω
Max OFF State Leakage @ 80% Max Blocking	100	100	100	100	μA
Max Output Capacitance @ 28VDC	160	120	120	2400	Pf
Max Turn ON Time @ TA = 25° C	0.70	0.50	0.50	5.0	msec
Max Turn ON Time @ TA = 75°C	1.0	0.75	0.75	7.0	msec
Max Turn OFF Time @ TA = 25°C	50	50	50	150	μsec
Max Turn OFF Time @ TA = 75°C	40	40	40	120	μsec
Min Transient Protection	100	100	100	100	V/μsec
Min Input/Output Isolation	500	500	500	500	VDC
Min Input/Output Resistance	10 ⁸	10 ⁸	10 ⁸	10 ⁸	Ω
Typical Input/Output Capacitance	10	10	10	10	Pf
Maximum Power Dissipation @ TC = 25°C	1	0.40	0.40	50	W

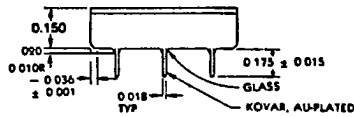
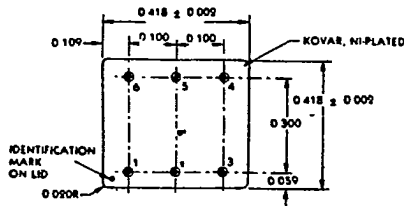
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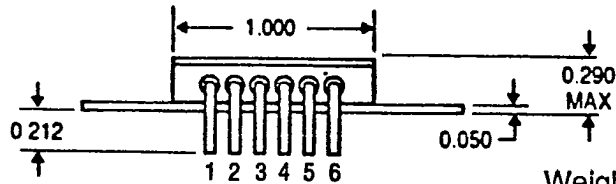
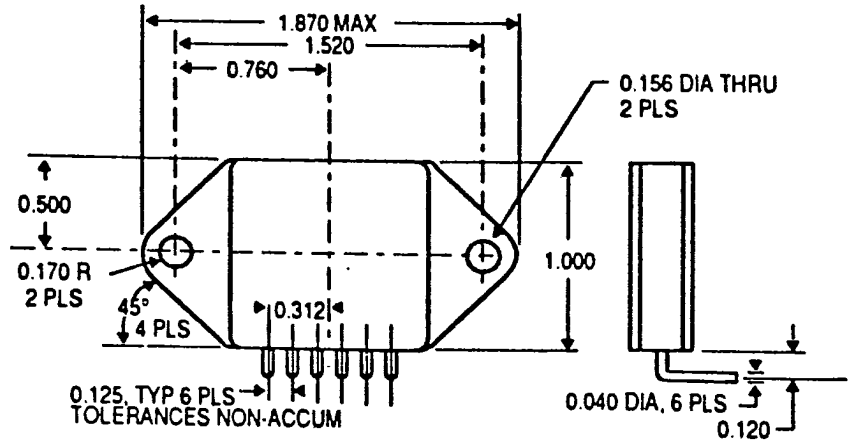
PACKAGE DRAWINGS

DIH 139

DIH 133

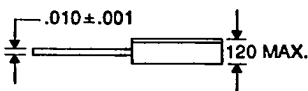
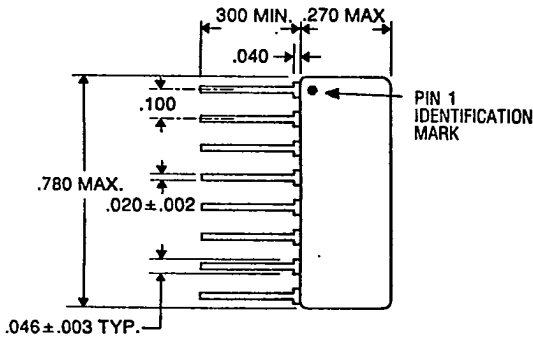


Weight 1.5 grams



Weight 22 grams

DIH 134, 135



Weight 1.5 grams

THERMAL CHARACTERISTICS
DIH133, DIH134, DIH139

	MIN	TYP	MAX	UNITS
Operating Temp (Ambient)	-55		+75	°C
(Case)	-55		+90	°C
Junction Temp (Operate)	-55		+95	°C
Thermal-Tripping Temperature, Junction		130		°C
-Recovery Temperature, Junction		100		°C
Thermal Hysteresis		30		°C
Thermal Resistance				
θ _{jA} DIH-133		100		°C/W
θ _{jA} DIH-134		200		°C/W
θ _{jA} DIH-135		200		°C/W
θ _{jA} DIH-139		2		°C/W

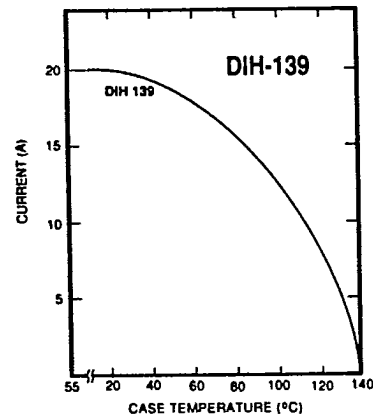
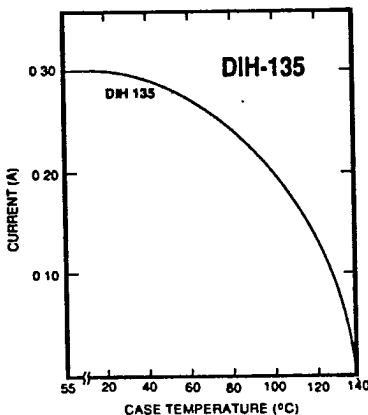
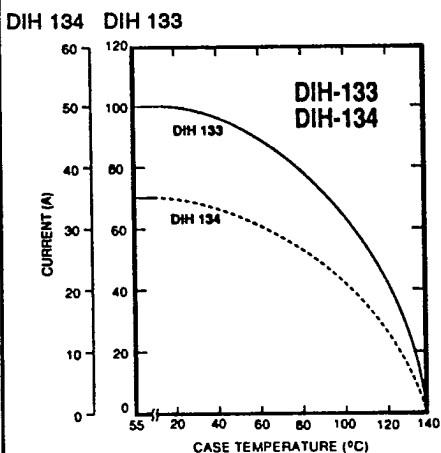
ENVIRONMENTAL RATINGS

Storage Temperature	-55 to +125°C (mil)
Shock	50G, MIL 202 (mil)
Hermeticity	Fine Leak 5 x 10 ⁻⁸ atm cc/sec (mil) Gross Leak 10 ⁻⁵ atm cc/sec (comm)
Vibration	20G, 10 to 2000 Hz (mil)

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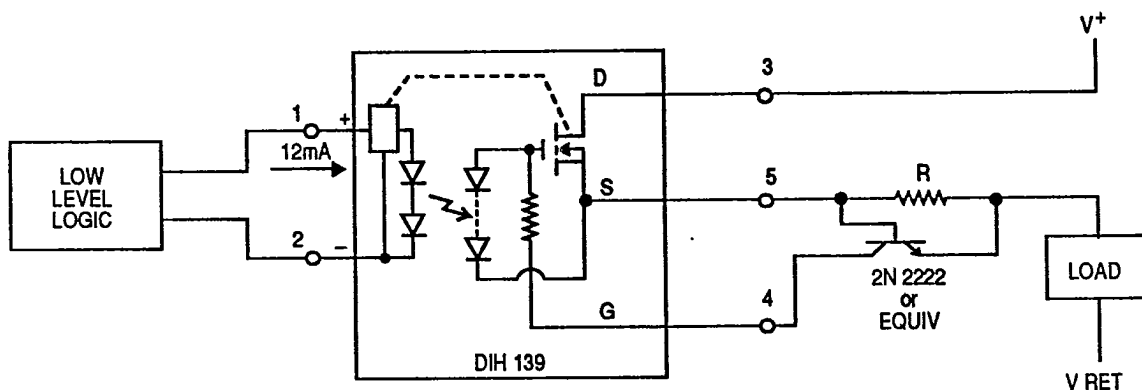
DIONICS

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TYPICAL APPLICATION OF DIH 139

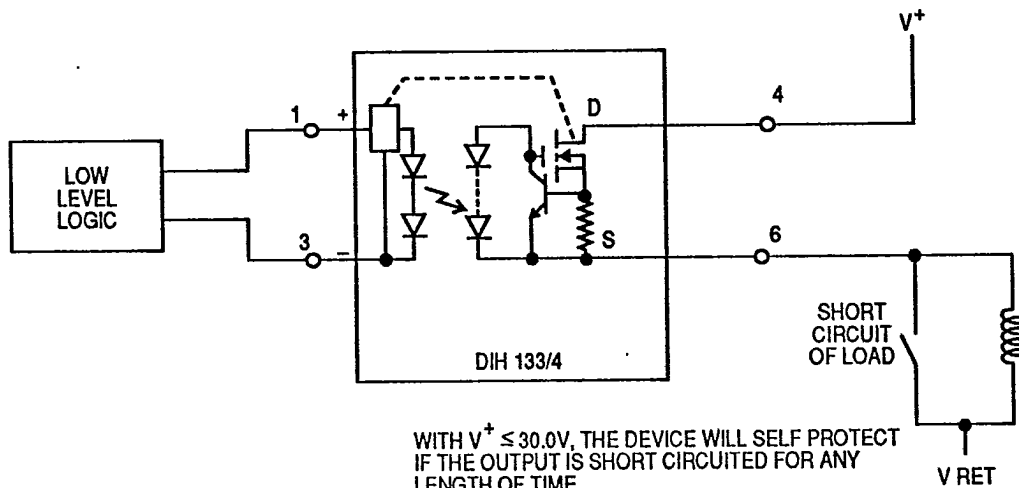
(High Side Switching of DC Load With Current Limiting)



SET R FOR .6V @ DESIRED CURRENT LIMIT

TYPICAL APPLICATION OF DIH 133 or DIH 134

(High Side Switching of DC Load)



WITH $V^+ \leq 30.0V$, THE DEVICE WILL SELF PROTECT IF THE OUTPUT IS SHORT CIRCUITED FOR ANY LENGTH OF TIME

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