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MS14 Series Military Solid State Relay With Bi-Directional Output to 240mA & 400V

Product Facts

- **1000V optical isolation protects control and driver circuitry from load transients.**
- **Buffered/current limited input for direct drive from CMOS or TTL logic.**
- **Power MOSFET output chips for low voltage drop and virtually no offset voltage.**
- **90 & 240mA output current options.**
- **100 & 400V output voltage options.**
- **Subminiature hermetically sealed .100 grid package.**
- **Screened per "Y" level of MIL-PRF-28750D or CII "W" level.**
- **Direct replacement for TELEDYNE M92F series**

MS14 series subminiature SSRs employ state of the art photo-voltaic optical isolation providing 1000Vrms input/output isolation and back to back power MOSFET output chips for ultra-reliable high speed switching of AC, DC and bipolar DC loads up to 240mA at load voltages up to 400Vdc. The input is current regulated and buffered to minimize power dissipation and permit driving the relay direct from CMOS or TTL. The relay is packaged in a custom hermetically sealed low-profile .100 grid package which conserves space for high density PC board circuitry.

CII Part No.	DSCC Dwg. No.	Output Rating
MS14-1Y*	N/A	±90mA / 400V
MS14-2Y*	N/A	±180mA / 200V
MS14-3Y*	87034-001 (qualification pending)	±240mA / 100V

* Note: "W" suffix denotes screening to CII "W" level.

Environmental Characteristics

Ambient Temperature Range:
Operating: -55°C to +105°C.
Storage: -55°C to +125°C.

Vibration Resistance:
100 G's, 10-3,000 Hz.

Shock Resistance:
1,500 G's, 0.5 ms pulse.

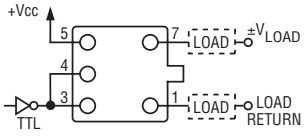
Constant Acceleration Resistance:
5,000 G's.

Mechanical Characteristics

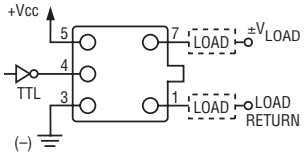
Weight (max.):
.07 oz. (2 grams)

Materials:
Case: DIP, hermetically sealed.
Pins: Copper, gold plated

2 Terminal Input Configuration



3 Terminal Input Configuration



Electrical Specifications (-55°C to +105°C unless otherwise specified)

Input (2 terminal configuration)	
Input supply voltage range (Vcc)	3.8 - 32 Vdc (Notes 1 & 2, Figures 1 & 2)
Input current (max.) @ 5Vdc	15mAdc (Notes 1 & 2, Figures 1 & 2)
Must turn-on voltage	3.8Vdc
Must turn-off voltage	1.5Vdc
Reverse voltage protection	-32Vdc
Input (3 terminal configuration)	
Control voltage range	0 - 18 Vdc
Control current (max.)	250µAdc @ 5V, 1mA @ 18V
Input supply voltage range (Vcc)	3.8 - 32 Vdc (Notes 1 & 2, Figures 1 & 2)
Input current (max.) @ 5Vdc	15mAdc (Notes 1 & 2, Figures 1 & 2)
Must turn-on voltage	0.3Vdc
Must turn-off voltage	2.8Vdc
Schmitt hysterisis (min.)	1.0Vdc
I/O	
Dielectric Strength (min.)	1,000V rms
Insulation Resistance (min.) @ 500Vdc	10^9 ohms
Capacitance (max.)	10pF
Output	
Continuous load current (max.) @ 25°C: MS14-1	±90mA (Note 5, Figure 4)
Continuous load current (max.) @ 25°C: MS14-3	±240mA (Note 5, Figure 4)
Continuous load voltage, DC max. or ACpk: MS14-1	±100V
Continuous load voltage, DC max. or ACpk: MS14-3	±400V
On resistance (max.) @ T_j = 25°C, I_L = 100ma: MS14-1	50 ohms (Note 6, Figure 5)
On resistance (max.) @ T_j = 25°C, I_L = 100ma: MS14-3	8 ohms (Note 6, Figure 5)
Off-state leakage current (max.) @ V_L = 80% max. rated	±50µAdc
Turn-on time (max.)	1 ms (Figure 3)
Turn-off time (max.)	1 ms (Figure 3)
Junction temperature (max.)	150°C

Catalog 9-1773439-2
Revised 4-05

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Dimensions are in inches and millimeters unless otherwise specified. Values in brackets are metric equivalents.

Dimensions are shown for reference purposes only. Specifications subject to change.

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 01-800-733-8926
C. America: 52-55-5-729-0425

South America: 55-11-3611-1514
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-141-810-8967

MS14 Series Military Solid State Relay (Continued)

Figure 1 -
Max. Input Current vs. Input Voltage

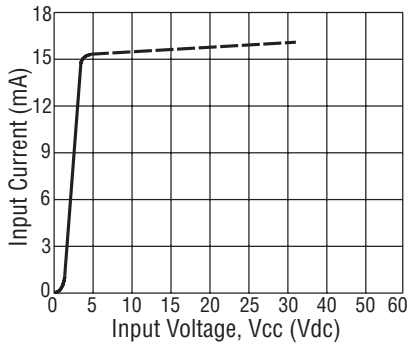


Figure 2 -
Series Res. vs. Vcc Supply Voltage (Note 1)

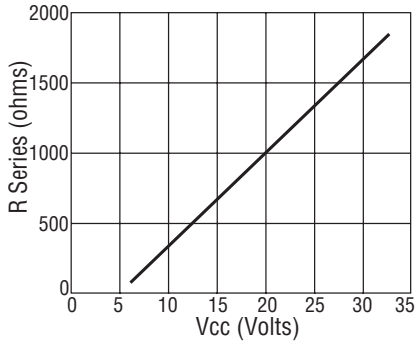


Figure 3 -
Output Turn-on and Turn-off Timing

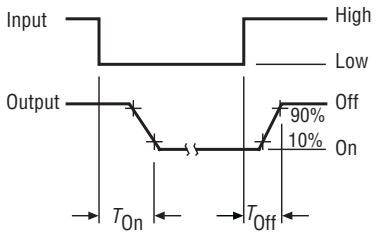


Figure 4 -
Temperature Derating Curve

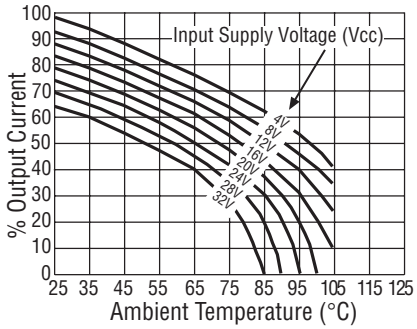


Figure 5 -
On-Resistance vs. Temperature (Note 6)

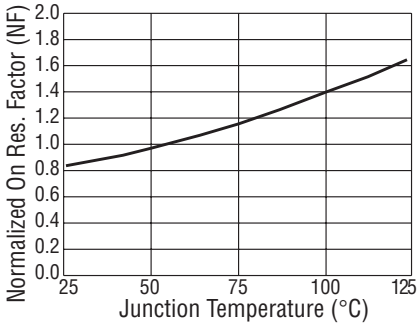


Figure 6 -
Simplified Circuit

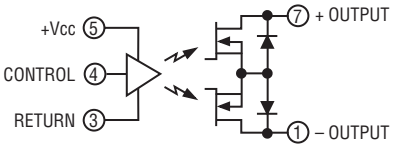
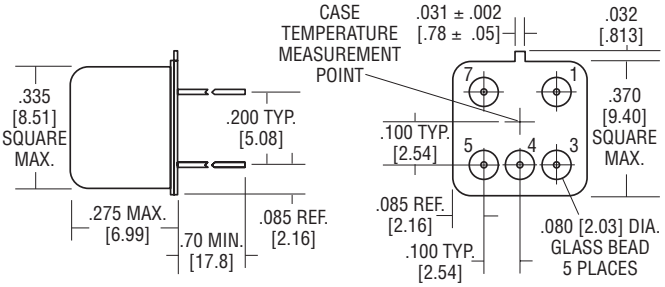


Figure 7 - Outline Dimensions



Unless otherwise specified, tolerances are:
±0.010 [0.25] for 2 place decimals
±0.005 [0.13] for 3 place decimals

Terminal numbers are for reference only and do not appear on the header.

Notes

1. 2 terminal input configuration is compatible with CMOS or open collector TTL (with pull-up resistor).
2. For Vcc levels above 6Vdc, a series limiting resistor is required. See Fig. 2 for resistor value. Use standard resistor value equal to or less than value form the curve.
3. Vcc = 5Vdc for all tests unless otherwise specified.
4. All MS14 Series relays may drive loads connected to either positive or negative referenced power supply lines. Inductive loads must be diode suppressed.
5. If an input series current limiting resistor is used, derating of output current vs. Vcc is not necessary. Curve for 4V applies.
6. On-resistance at any ambient temperature other than 25°C can be computed as follows:
R (@ any T) = R (@ +25°C) x $e^{0.006}$, where T = new temperature – 25°C, e = 2.7182818 .

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