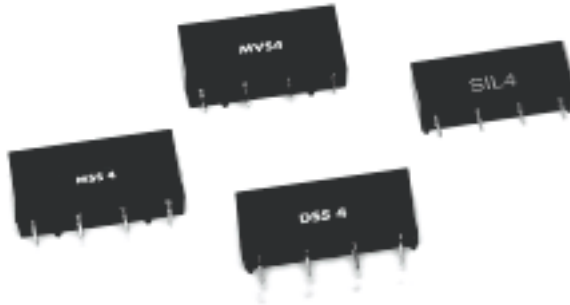




# THE DATASHEET OF DSS41A12





### DESCRIPTION

SRC Devices offers a large selection of molded SIP relays to meet customer applications. The DSS4 was developed several years ago and continues to be the relay of choice for hook switch applications in modems and general purpose applications. The SIL4 is the first of a series of new molded products ideally suited for use in high reliability requirements. Its design centers on a new patent pending process aimed at protecting the hermetically sealed reed switch. When properly protected, the reed switch outperforms most other electromechanical switching devices for operating life (at low signal levels), isolation, low resistance and low operating power.

The high performance MVS4 and MSS4 models provide bounce free operation and offer a more durable contact when switching capacitive or inductive loads. Both are capable of switching loads up to 50 watts.

### FEATURES

- Patent pending process (SIL4)
- High reliability switching
- 3V operate option available
- Quality defect levels <50 PPM (SIL4)
- Long operating life at low levels ( >1 billion operations)
- Capable of switching up to 1000V
- High isolation between input and output (2500V)
- Optional internal diode & N.C. option
- High density board mounting
- Automatic insertion design
- State-of-the-art capsule designs
- Epoxy molded single-in-line package
- FCC68 compatible on MSS4 model

### AGENCY APPROVALS

- UL recognized DSS4 model

### APPLICATIONS

- ATE
- Telecom
- Functional board testers
- Matrix requirements
- Integrated circuit testers
- Instrumentation
- Bare board testers
- Data acquisition

### RATINGS (@ 25° C)

| Parameter           | Min | Typ | Max  | Unit  |
|---------------------|-----|-----|------|-------|
| Switching voltage   |     |     |      |       |
| SIL4/DSS4           |     |     | 200  | Volts |
| MSS4                |     |     | 500  | Volts |
| MVS4                |     |     | 1000 | Volts |
| Switching current   |     |     |      |       |
| SIL4/DSS4           |     |     | 0.5  | Amps  |
| MVS4/MSS4           |     |     | 2    | Amps  |
| Carry current       |     |     |      |       |
| SIL4                |     |     | 1.5  | Amps  |
| DSS4                |     |     | 2    | Amps  |
| MSS4/ MVS4          |     |     | 3    | Amps  |
| Switching frequency |     |     |      |       |
| SIL4/DSS4           |     |     | 500  | Hz    |
| MVS4/MSS4           |     |     | 200  | Hz    |
| Contact resistance  |     |     |      |       |
| SIL4                |     |     | 120  | mΩ    |
| MVS4/MSS4           |     |     | 100  | mΩ    |

(See detailed specifications for more information.)

**SPECIFICATIONS**

**Dry Reed Relay Specifications**

All parameters at 25°C unless otherwise stated.  
Operate voltage, release voltage, and coil resistance will vary by approximately 0.4%/°C as ambient temperature varies.

**SIL4** Instrument-Grade      **DSS4** General Purpose

| PARAMETER   | CONDITIONS   | SYMBOL    | MIN              | TYP              | MAX                 | MIN              | TYP              | MAX  | UNITS  |
|---|--|-----------|------------------|------------------|---------------------|------------------|------------------|------|--|
| <b>Contact Ratings</b>                            |  |           |                  |                  |                     |                  |                  |      |  |
| Switching Voltage                                 | Max DC/PeakAC Resistive                              | $V_L$     | -                | -                | 200                 | -                | -                | 200  | Volts  |
| Switching Current                                 | Max DC/PeakAC Resistive                              | $I_L$     | -                | -                | 0.5                 | -                | -                | 0.5  | Amps   |
| Carry Current                                     | Max DC/PeakAC Resistive                              | $I_C$     | -                | -                | 2                   | -                | -                | 2    | Amps   |
| Contact Rating                                    | Max DC/PeakAC Resistive                              | -         | -                | -                | 10                  | -                | -                | 10   | Watts  |
| Life Expectancy                                   | Signal Level 1.0V 10mA<br>Rated Loads <sup>(1)</sup> | -         | -                | 1000             | -                   | -                | 500              | -    | x10 <sup>6</sup> Ops<br>x10 <sup>6</sup> Ops |
| Static Contact Resistance                         | 50mV, 10mA   | CR        | -                | 95               | 120                 | -                | -                | 150  | mΩ   |
| Dynamic Contact Resistance                        | 0.5V, 50mA at 100Hz,<br>1.5 msec                     | DCR       | -                | -                | 150                 | -                | N/A              | N/A  | mΩ   |
| Contact Material                                  |  | -         | -                | Ru               | -                   | -                | Ru               | -    | -  |
| <b>Relay Specifications</b>                       |  |           |                  |                  |                     |                  |                  |      |  |
| Insulation Resistance                             | Between all isolated pins<br>at 100V, 25°C, 40% RH   | IR        | 10 <sup>12</sup> | 10 <sup>13</sup> | -                   | 10 <sup>10</sup> | 10 <sup>12</sup> | -    | Ω  |
| Capacitance                                       | Across Open Contacts                                 | -         | -                | -                | 0.8                 | -                | -                | 1    | pF   |
| Open Contact to Coil                              |  | -         | -                | 1.2              | -                   | -                | -                | 2    | pF   |
| Dielectric Strength                               | Between Contacts                                     | I/O       | 250              | -                | -                   | 250              | -                | -    | VDC/Peak AC                                  |
|   | Contacts to Coil                                     | I/O       | 2500             | -                | -                   | 1500             | -                | -    | VDC/Peak AC                                  |
| Operate Time,<br>including bounce                 | At Nominal Coil Voltage<br>10Hz Square Wave          | $T^{OP}$  | -                | 0.2              | 0.5                 | -                | 0.25             | 0.5  | ms   |
| Release Time                                      | Zener-Diode Suppression                              | $T_{REL}$ | -                | 0.1              | 0.5                 | -                | 0.15             | 0.5  | -  |
| <b>Environmental Ratings</b>                      |  |           |                  |                  |                     |                  |                  |      |  |
| Storage Temperature                               | T  | $A$       | -55              | -                | +125                | -40              | -                | +105 | °C   |
| Operating Temperature                             | T  | $O$       | -40              | -                | +85                 | -40              | -                | +85  | °C   |
| Soldering Temperature                             | Applied to pins, 10 sec. max.                        | -         | -                | -                | +260 <sup>(2)</sup> | -                | -                | +260 | °C   |
| Vibration Resistance <sup>(3)</sup><br>(Survival) | 5Hz - 2000Hz   | G         | -                | -                | 20                  | -                | -                | 20   | Gs   |
| Shock Resistance<br>(Survival)                    | 11±1ms, 1/2 Sine Wave                                | S         | -                | -                | 100                 | -                | -                | -    | -  |
| Weight  |  | -         | -                | 1.8              | -                   | -                | 1.6              | -    | grams  |

<sup>(1)</sup> Refer to life graphs

<sup>(2)</sup> Capable of surviving infrared solder-reflow process

<sup>(3)</sup> Use caution not to exceed vibration resistance limits while ultrasonically cleaning relays with DYAD switches.  
Contact REMtech Engineering for more details/ recommendations

**SPECIFICATIONS**
**Mercury-Wetted Reed Relays**

All parameters at 25°C unless otherwise stated.

**MVS4**  
 High Power/Reliability  
 Position-Sensitive<sup>(3)</sup>  
 Hg-Wetted

**MSS4**  
 Non-Position-Sensitive  
 Hg-Wetted

| PARAMETER                       | CONDITIONS                                      | SYMBOL    | MIN              | TYP              | MAX                 | MIN             | TYP              | MAX  | UNITS                |
|---------------------------------|---|-----------|------------------|------------------|---------------------|-----------------|------------------|------|----------------------|
| <b>Contact Ratings</b>          |   |           |                  |                  |                     |                 |                  |      |                      |
| Switching Voltage               | Max DC/PeakAC Resistive                         | $V_L$     | -                | -                | 1000 <sup>(1)</sup> | -               | -                | 500  | Volts                |
| Switching Current               | Max DC/PeakAC Resistive                         | $I_L$     | -                | -                | 2                   | -               | -                | 2    | Amps                 |
| Carry Current                   | Max DC/PeakAC Resistive                         | $I_C$     | -                | -                | 3                   | -               | -                | 3    | Amps                 |
| Contact Rating                  | Max DC/PeakAC Resistive                         | -         | -                | -                | 50 <sup>(4)</sup>   | -               | -                | 50   | Watts                |
| Life Expectancy                 | Signal Level 1.0V 10mA                          | -         | -                | 1000             | -                   | -               | 200              | -    | x10 <sup>6</sup> Ops |
|                                 | 50V, 1A   | -         | -                | 2                | -                   | -               | -                | -    | x10 <sup>6</sup> Ops |
|                                 | 500V, 100mA                                     | -         | -                | 50               | -                   | -               | -                | -    | x10 <sup>6</sup> Ops |
| Static Contact Resistance       | Rated Loads <sup>(2)</sup>                      | -         | -                | 7                | -                   | -               | 7                | -    | x10 <sup>6</sup> Ops |
|                                 |   | CR        | -                | -                | 100                 | -               | -                | 100  | mΩ                   |
| Contact Material                | -   | -         | -                | Hg               | -                   | -               | Hg               | -    | -                    |
| Hg Content                      | -   | -         | -                | 40               | -                   | -               | 16               | -    | mgram                |
| <b>Relay Specifications</b>     |   |           |                  |                  |                     |                 |                  |      |                      |
| Insulation Resistance           | Between all isolated pins at 100V, 25°C, 40% RH | IR        | 10 <sup>10</sup> | 10 <sup>12</sup> | -                   | 10 <sup>8</sup> | 10 <sup>10</sup> | -    | Ω                    |
| Capacitance                     | Across Open Contacts                            | -         | -                | 0.8              | -                   | -               | -                | 2    | pF                   |
|                                 | Upper Contact to Coil                           | -         | -                | 2.2              | -                   | -               | -                | 4    | pF                   |
|                                 | Closed Contact to Coil                          | -         | -                | 3.3              | -                   | -               | -                | -    | pF                   |
| Dielectric Strength             | Between Contacts                                | I/O       | 2000             | -                | -                   | 2000            | -                | -    | VDC/Peak AC          |
|                                 | Contacts to Coil                                | I/O       | 2500             | -                | -                   | 1400            | -                | -    | VDC/Peak AC          |
| Operate Time, no bounce         | At Nominal Coil Voltage<br>10Hz Square Wave     | $T_{OP}$  | -                | -                | 2.5                 | -               | -                | 1.75 | ms                   |
| Release Time                    | Zener-Diode Suppression                         | $T_{REL}$ | -                | -                | 2.5                 | -               | -                | 1.5  | ms                   |
| <b>Environmental Ratings</b>    |   |           |                  |                  |                     |                 |                  |      |                      |
| Storage Temperature             | T   | $T_A$     | -40              | -                | +105                | -40             | -                | +105 | °C                   |
| Operating Temperature           | T   | $T_O$     | -38              | -                | +85                 | -38             | -                | +75  | °C                   |
| Soldering Temperature           | Applied to pins, 10 sec. max.                   | -         | -                | -                | +260                | -               | -                | +260 | °C                   |
| Vibration Resistance (Survival) | 10Hz - 500Hz                                    | G         | -                | -                | 10                  | -               | -                | 10   | Gs                   |
| Shock Resistance (Survival)     | 11±1ms, 1/2 Sine Wave                           | S         | -                | -                | 30                  | -               | -                | 30   | Gs                   |
| Weight                          | -   | -         | -                | 2.2              | -                   | -               | 2.4              | -    | grams                |

<sup>(1)</sup> Current limited up to 5mA, typical 20 million operations; for further life information, consult factory.

<sup>(2)</sup> Refer to MH4 (MVS4) & MYAD (MSS4) life graphs.

<sup>(3)</sup> Vertical mounting required. Pin #1 is up.

<sup>(4)</sup> Derate to 5 watts when switching voltages >500V.

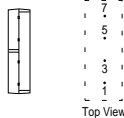
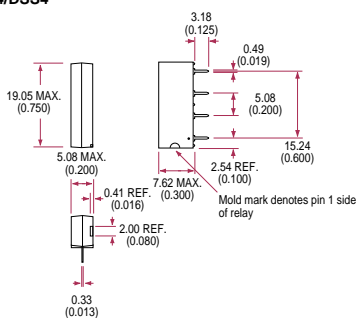
**COIL SPECIFICATIONS**

| Part #      | Contact Form | Coil Voltage |     |     | Coil Resistance |      |      | Operate Voltage        |     |      | Release Voltage        |     |     | Nominal Input Power |     |     |
|-------------|--------------|--------------|-----|-----|-----------------|------|------|------------------------|-----|------|------------------------|-----|-----|---------------------|-----|-----|
|             |              | Min          | Typ | Max | Min             | Typ  | Max  | Min                    | Typ | Max  | Min                    | Typ | Max | Min                 | Typ | Max |
|             |              | Volts        |     |     | $\Omega$        |      |      | Volts                  |     |      | Volts                  |     |     | mW                  |     |     |
|             |              |              |     |     | +/- 10% (25°C)  |      |      | Must operate by (25°C) |     |      | Must release by (25°C) |     |     |                     |     |     |
|             |              |              |     |     |                 |      |      |                        |     |      |                        |     |     |                     |     |     |
| SIL41A03(B) | 1-Form-A     |              | 3   | 6   | 135             | 150  | 165  |                        |     | 2.25 | 0.3                    |     |     |                     |     | 60  |
| SIL41A05(B) | 1-Form-A     |              | 5   | 10  | 450             | 500  | 550  |                        |     | 3.75 | 0.4                    |     |     |                     |     | 50  |
| SIL41A12(B) | 1-Form-A     |              | 12  | 16  | 900             | 1000 | 1100 |                        |     | 8.6  | 1.5                    |     |     |                     |     | 144 |
| SIL41A24(B) | 1-Form-A     |              | 24  | 30  | 1800            | 2000 | 2200 |                        |     | 17.5 | 2.5                    |     |     |                     |     | 288 |
| SIL41B05(B) | 1-Form-B     |              | 5   | 6   | 450             | 500  | 550  |                        |     | 3.75 | 0.8                    |     |     |                     |     | 50  |
| SIL41B12(B) | 1-Form-B     |              | 12  | 14  | 900             | 1000 | 1100 |                        |     | 9    | 1.5                    |     |     |                     |     | 144 |
| SIL41B24(B) | 1-Form-B     |              | 24  | 29  | 1800            | 2000 | 2200 |                        |     | 18   | 2.5                    |     |     |                     |     | 288 |
| DSS41A05    | 1-Form-A     |              | 5   | 10  | 450             | 500  | 550  |                        |     | 3.75 | 0.8                    |     |     |                     |     | 50  |
| DSS41A12    | 1-Form-A     |              | 12  | 16  | 900             | 1000 | 1100 |                        |     | 8.6  | 1.5                    |     |     |                     |     | 144 |
| DSS41A24    | 1-Form-A     |              | 24  | 30  | 1800            | 2000 | 2200 |                        |     | 17.5 | 2.5                    |     |     |                     |     | 288 |
| DSS41B05    | 1-Form-B     |              | 5   | 10  | 450             | 500  | 550  |                        |     | 3.75 | 0.8                    |     |     |                     |     | 50  |
| DSS41B12    | 1-Form-B     |              | 12  | 16  | 900             | 1000 | 1100 |                        |     | 9    | 1                      |     |     |                     |     | 144 |
| DSS41B24    | 1-Form-B     |              | 24  | 30  | 1935            | 2150 | 2365 |                        |     | 18   | 2                      |     |     |                     |     | 268 |
| MVS41A05(B) | 1-Form-A     |              | 5   | 7   | 94.5            | 105  | 116  |                        |     | 3.75 | 0.5                    |     |     |                     |     | 238 |
| MVS41A12(B) | 1-Form-A     |              | 12  | 15  | 450             | 500  | 550  |                        |     | 9    | 1                      |     |     |                     |     | 288 |
| MVS41A24(B) | 1-Form-A     |              | 24  | 30  | 1935            | 2150 | 2365 |                        |     | 18   | 2.0                    |     |     |                     |     | 268 |
| MSS41A05    | 1-Form-A     |              | 5   | 10  | 126             | 140  | 154  |                        |     | 3.75 | 0.5                    |     |     |                     |     | 179 |
| MSS41A12    | 1-Form-A     |              | 12  | 16  | 450             | 500  | 550  |                        |     | 9    | 1                      |     |     |                     |     | 288 |
| MSS41A24    | 1-Form-A     |              | 24  | 30  | 1935            | 2150 | 2365 |                        |     | 18   | 2                      |     |     |                     |     | 268 |

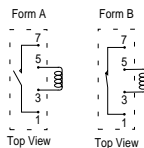
**MECHANICAL DIMENSIONS**

DIMENSIONS  
mm  
(inches)

SIL4/DSS4

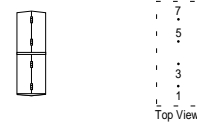
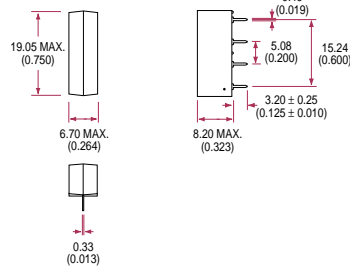


SIL4/DSS4 Pinout

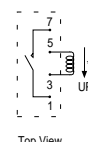


For Form B or diode options, coil polarity (pin #3 positive) must be observed.

MVS4/MSS4

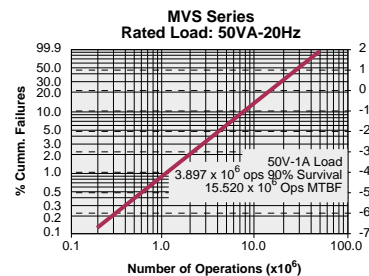
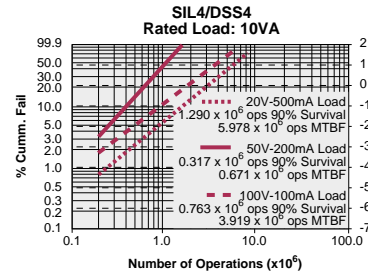
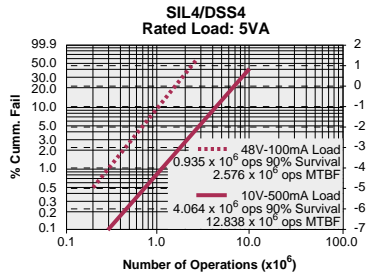


MVS4/MSS4 Pinout

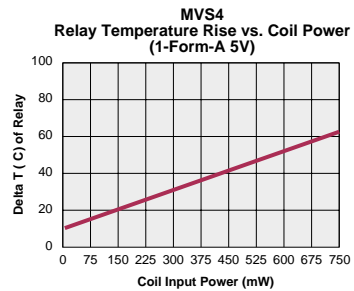
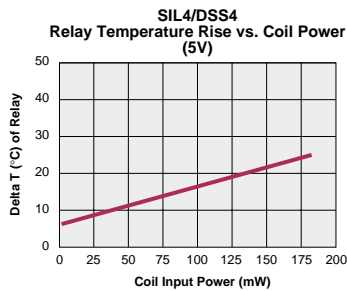


\* MVS4 only must be mounted vertically with pin #1 up.

**PERFORMANCE GRAPHS**

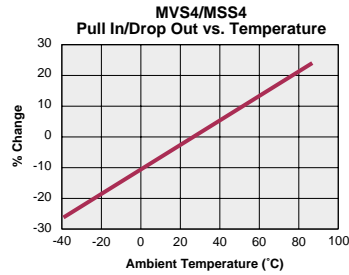


**Relay Internal Temperature Rise vs. Power**

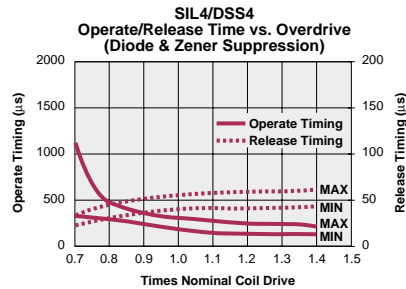
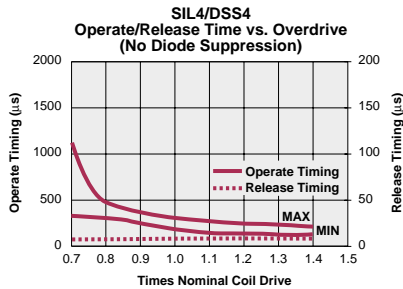
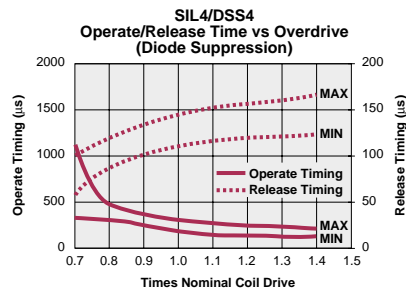
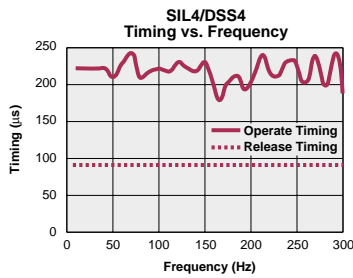


**PERFORMANCE GRAPHS**

**Pull In/Drop Out vs. Temperature**



**Operate/Release Time Characteristics**



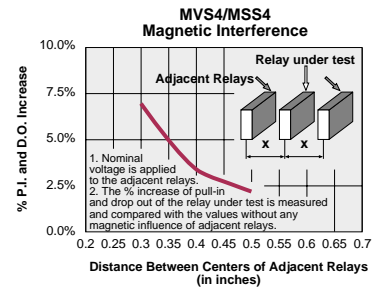
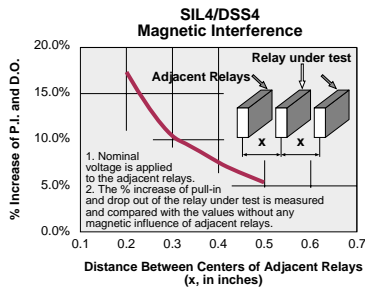
**MAGNETIC INTERFERENCE**

If relays are inserted in close proximity, the pickup and dropout voltages will be affected by the magnetic flux produced when the coils are energized.

In general, worst-case magnetic interaction conditions for pull-in voltage in a matrix exist when all relay fields have the same polarity and all of the fields are from adjacent relays (See figure).

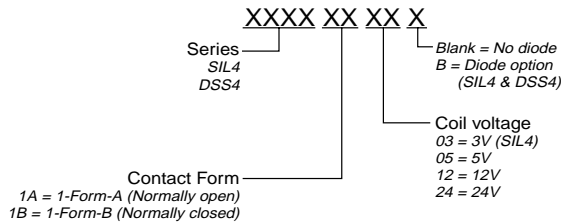
The direction of the parameter shift is determined by whether the stray flux aids or bucks the flux produced by the coil of the relay under consideration.

To calculate the change in pull-in voltage and dropout voltage, multiply the percent change shown by the relay's nominal voltage. For example, if the percent change in pull-in voltage is 14% for a 5V nominal relay, the pull-in voltage will increase by 0.7 volts.



**ORDERING INFORMATION**

A complete part number is represented by the digits below.



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