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## REVISIONS

| P | LTR | DESCRIPTION | DATE | DWN | APVD |
|---|-----|-------------|------|-----|------|
|   | A   | SEE SHEET 1 | —    | —   | —    |

## 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 Vd                                 |
| 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            | 3.2Vdc                                    |

## I/O

|                                       |                      |
|---------------------------------------|----------------------|
| Dielectric strength (min.)            | 1,000V rms           |
| Insulation resistance (min.) @ 500Vdc | 10 <sup>9</sup> ohms |
| Capacitance (max.)                    | 10pF                 |

## Output

|                                                                      |                             |
|----------------------------------------------------------------------|-----------------------------|
| Continuous load current (max.) @ 25°C                                | 2.1Adc (Figure 7)           |
| Continuous load voltage (max.)                                       | 60Vdc                       |
| Transient blocking voltage (max.)                                    | 80Vdc (Note 5)              |
| On resistance (max.) @ T <sub>j</sub> = 25°C, I <sub>L</sub> = 100mA | 0.15 ohm (Note 6, Figure 6) |
| Output voltage drop (max.)                                           | 0.5Vdc                      |
| Leakage current (max.) @ V = 60Vdc                                   | 100µAdc                     |
| Leakage current (max.) @ V = 60Vdc, with switch status               | 2mAdc                       |
| Turn-on time (max.)                                                  | 3 ms (Figure 3)             |
| Turn-off time (max.)                                                 | 1 ms (Figure 3)             |
| dv/dt (min.)                                                         | 100V / µs                   |
| Electrical system spike                                              | 600Vdc (Note 5)             |
| Output chip junction temperature (max.)                              | 125°C                       |
| Thermal resistance (max.), junction to ambient                       | 90°C/W                      |
| Thermal resistance (max.), junction to case                          | 25°C/W                      |

## Status

|                                                      |                            |
|------------------------------------------------------|----------------------------|
| Status supply voltage range                          | 1 - 18Vdc                  |
| Status current (max.) @ V <sub>status</sub> ≤ 0.4Vdc | 600µADC (Figure 5, Note 8) |
| Status leakage current (max.) @ 16Vdc                | 10µAdc                     |
| Status turn-on time (max.)                           | 3.5 ms (Figure 4)          |
| Status turn-off time (max.)                          | 8 ms (Figure 4)            |

## Short Circuit Protection

|                                                       |         |
|-------------------------------------------------------|---------|
| Current surge without tripping (max.), 100ms pulse    | 4.25Adc |
| Overload trip current (max.), 0.5 ms pulse, V = 60Vdc | 10Adc   |
| Trip time (typical), turning on into short            | 400µs   |
| Trip time (typical), shorting while relay is on       | 280µs   |

## Environmental Characteristics

## Ambient Temperature Range —

Operating — -55°C to +105°C

Storage — -55°C to +105°C

## Vibration Resistance —

100 G's, 10-3,000 Hz

## Shock Resistance —

50 G's, 11 ms pulse

## Constant Acceleration Resistance

(Y1 axis) —

5,000 G's

## Mechanical Characteristics

## Weight (approx.) —

.176 oz. (5 grams)

## Materials —

Header — KOVAR

Cover — Nickel

Pins — KOVAR, gold plated

Figure 1 - Maximum Input Current vs. Input Voltage

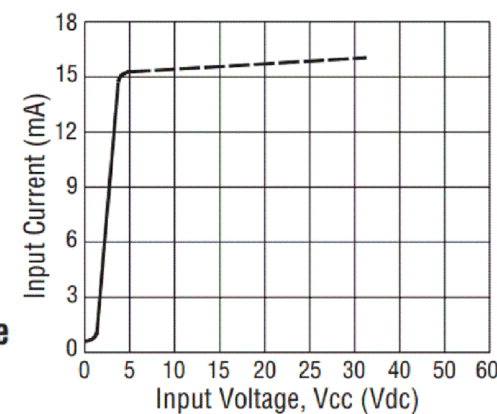


Figure 2 - Series Resistance vs. Vcc Supply Voltage (Note 1)

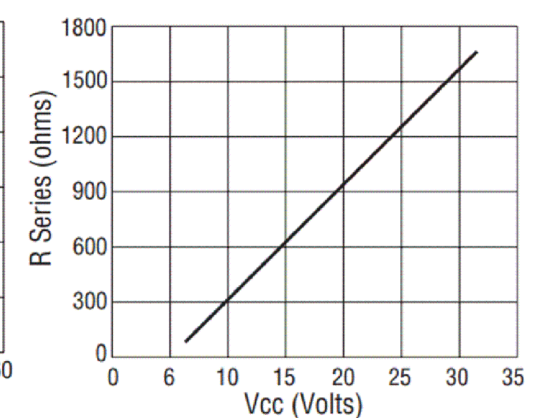


Figure 3 - Turn-on and Turn-off Timing

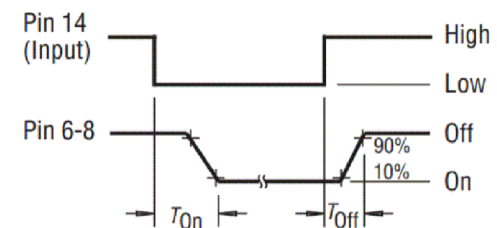


Figure 4 - Output Status Timing

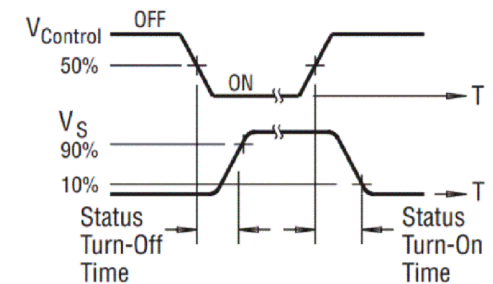


Figure 5 - Status Resistor vs. Status Supply Voltage

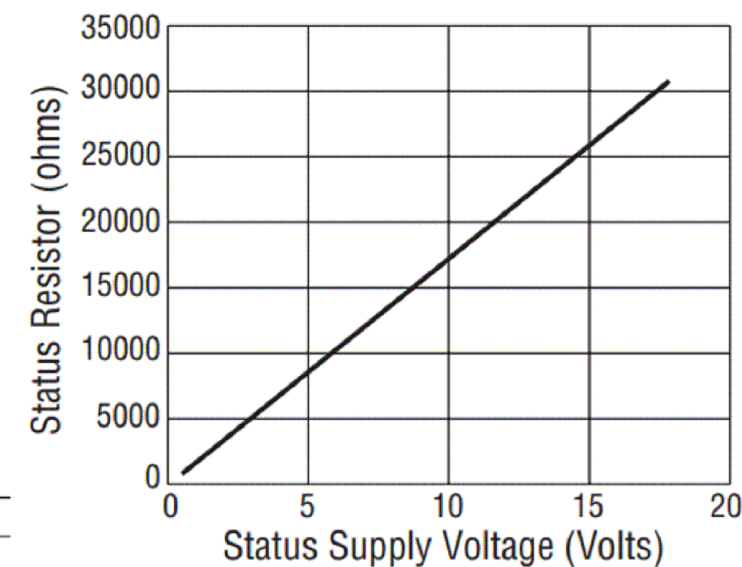
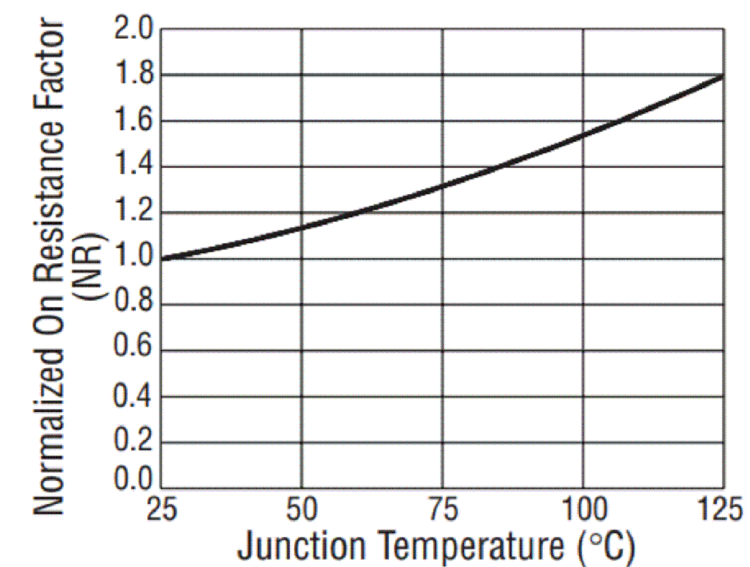


Figure 6 - On-Resistance vs. Temperature (Note 6)



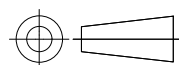
## Status

|                                                      |                            |
|------------------------------------------------------|----------------------------|
| Status supply voltage range                          | 1 - 18Vdc                  |
| Status current (max.) @ V <sub>status</sub> ≤ 0.4Vdc | 600µADC (Figure 5, Note 8) |
| Status leakage current (max.) @ 16Vdc                | 10µAdc                     |
| Status turn-on time (max.)                           | 3.5 ms (Figure 4)          |
| Status turn-off time (max.)                          | 8 ms (Figure 4)            |

## Short Circuit Protection

|                                                       |         |
|-------------------------------------------------------|---------|
| Current surge without tripping (max.), 100ms pulse    | 4.25Adc |
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| Trip time (typical), turning on into short            | 400µs   |
| Trip time (typical), shorting while relay is on       | 280µs   |

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DIMENSIONS:  
INCHES

MATERIAL

TOLERANCES UNLESS  
OTHERWISE SPECIFIED:0 PLC ± —  
1 PLC ± —  
2 PLC ± —  
3 PLC ± —  
4 PLC ± —  
ANGLES ± —  
FINISH —

DWN VM 12SEP2019

CHK RV 12SEP2019

APVD DH 12SEP2019

PRODUCT SPEC

APPLICATION SPEC

WEIGHT —

CUSTOMER DRAWING



TE Connectivity

DS11 SERIES SOLID STATE RELAY

SIZE

CAGE CODE

DRAWING NO

RESTRICTED TO

A3

—

C-DS11-SERIES

SCALE

NTS

SHEET

1 OF 3

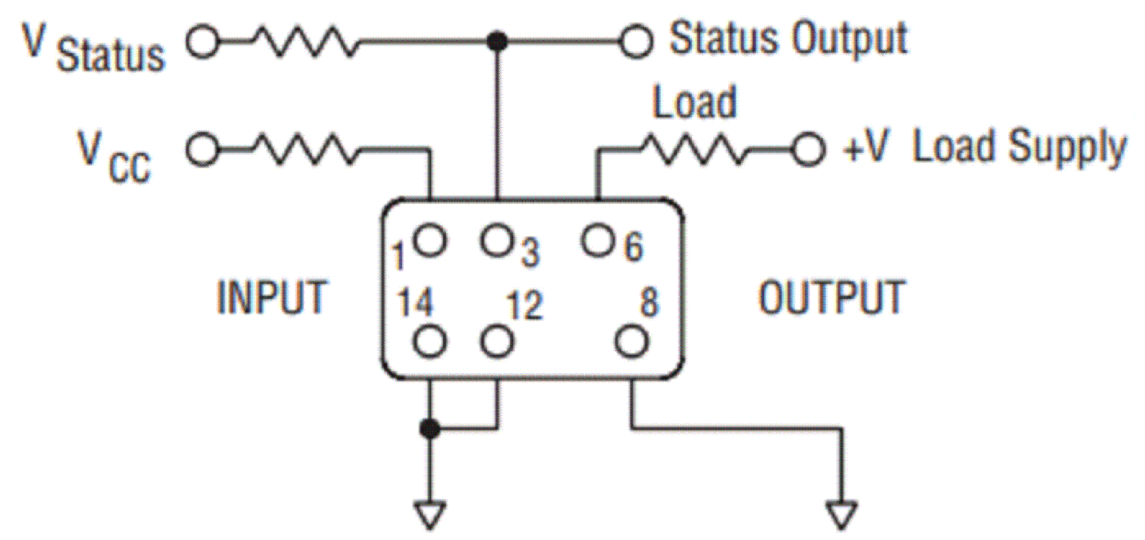
REV

A

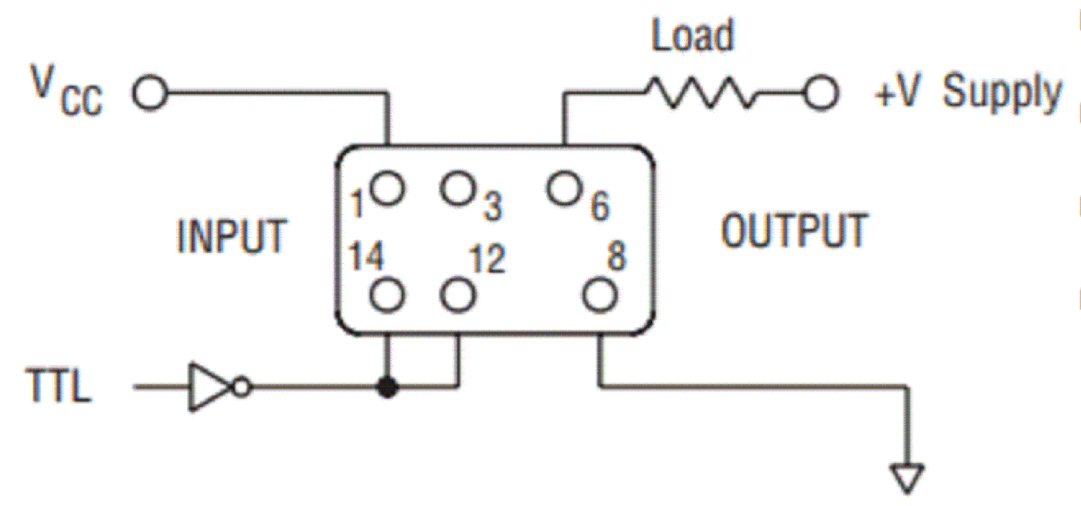
| REVISIONS |     |             |      |     |      |
|-----------|-----|-------------|------|-----|------|
| P         | LTR | DESCRIPTION | DATE | DWN | APVD |
|           | —   | SEE SHEET 1 | —    | —   | —    |

## 2 Terminal Input Configuration

Direct Drive (Status Optional)



TTL Drive



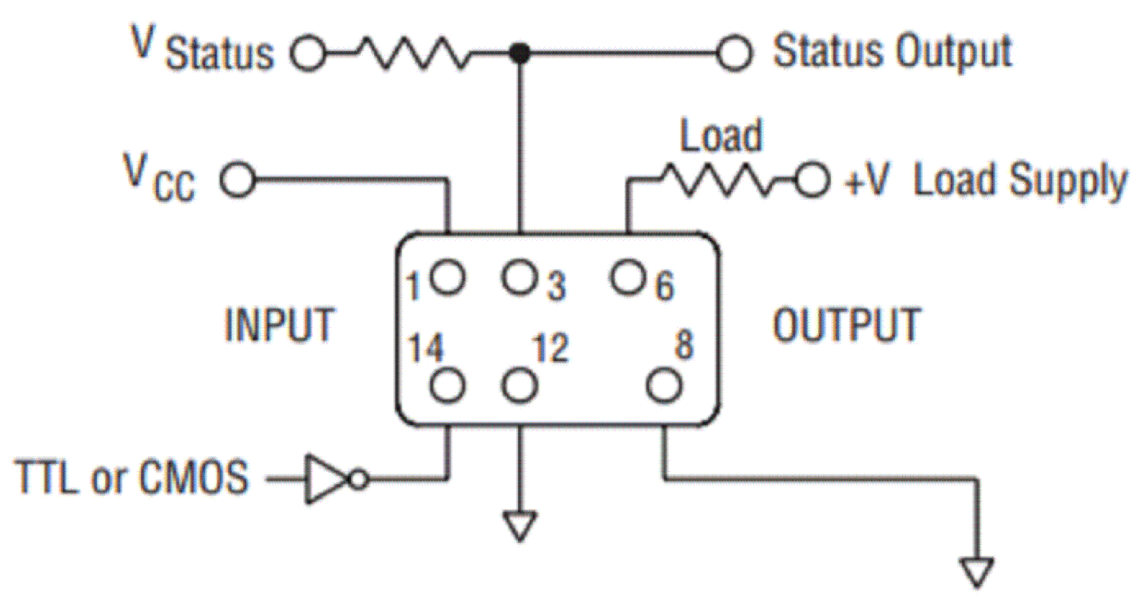
### Product Facts

- Standard options: short circuit/overload protection, switch status and trip status
- Optically coupled all solid state relay
- TTL & CMOS compatible input
- Low on-resistance power MOSFET output
- Tested per MIL-PRF-28750D and approved to DSCC drawing 88062 with “Y” level screening

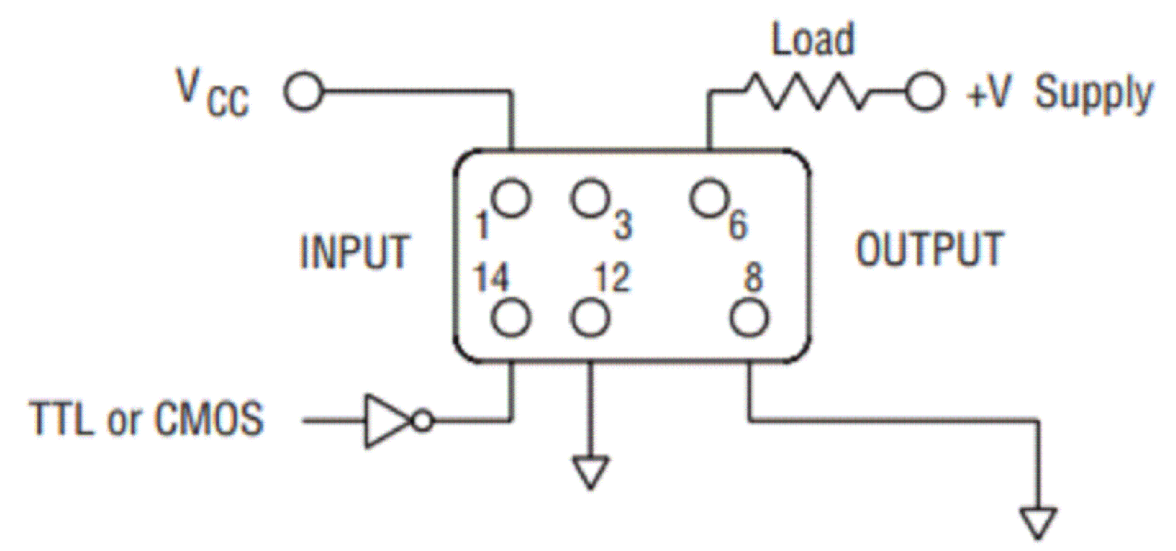


## 3 Terminal Input Configuration

With Output Status



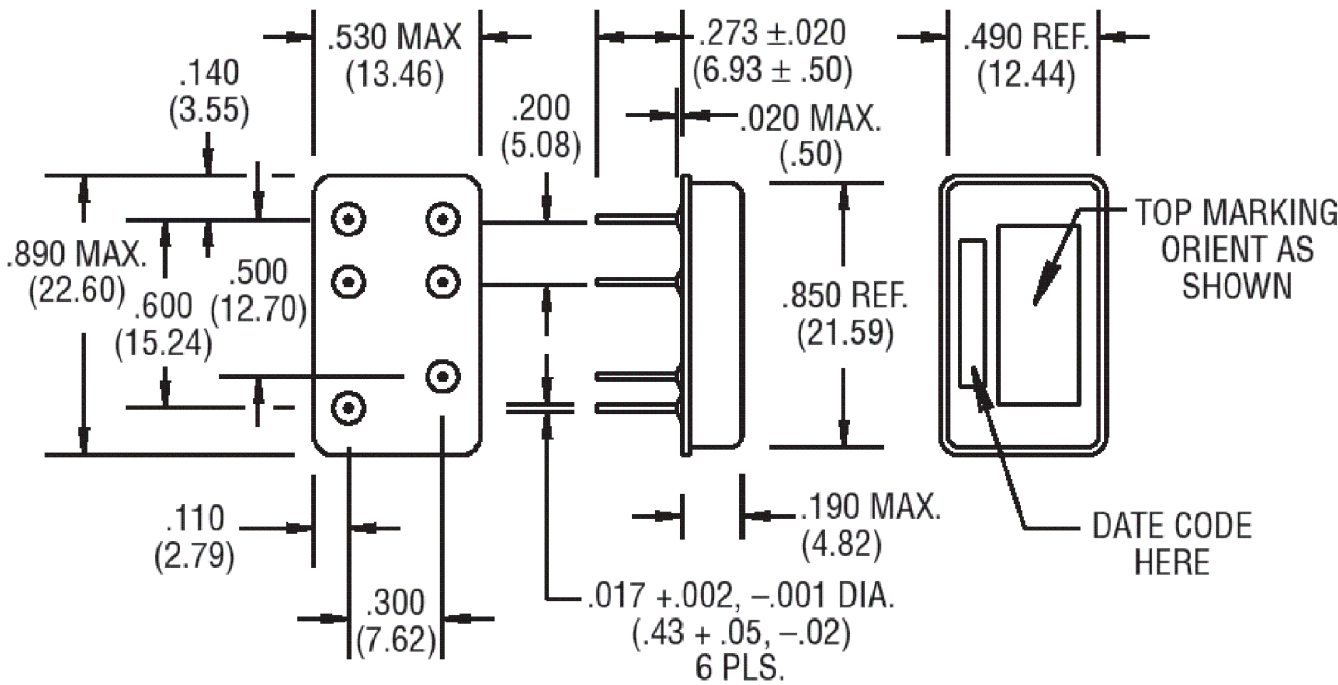
Without Output Status



| DS11-1Y   | 88062-008 | Basic relay                                         |
|-----------|-----------|-----------------------------------------------------|
| DS11-1000 | 88062-004 | Relay w/ short circuit protection                   |
| DS11-1001 | 88062-006 | Relay w/ switch status                              |
| DS11-1002 | 88062-002 | Relay w/ short circuit protection and switch status |
| DS11-1003 | N/A       | Relay w/ short circuit protection and trip status   |

|                                        |  |                                        |                                    |              |       |
|----------------------------------------|--|----------------------------------------|------------------------------------|--------------|-------|
| THIS DRAWING IS A CONTROLLED DOCUMENT. |  | DWN VM 12SEP2019                       | TE Connectivity                    |              |       |
|                                        |  | CHK RV 12SEP2019                       |                                    |              |       |
|                                        |  | APVD DH 12SEP2019                      | NAME DS11 SERIES SOLID STATE RELAY |              |       |
| DIMENSIONS: INCHES                     |  | TOLERANCES UNLESS OTHERWISE SPECIFIED: |                                    |              |       |
|                                        |  | 0 PLC ± —                              |                                    |              |       |
|                                        |  | 1 PLC ± —                              |                                    |              |       |
|                                        |  | 2 PLC ± —                              |                                    |              |       |
|                                        |  | 3 PLC ± —                              |                                    |              |       |
|                                        |  | 4 PLC ± —                              |                                    |              |       |
|                                        |  | ANGLES ± —                             |                                    |              |       |
| MATERIAL                               |  | FINISH                                 |                                    |              |       |
|                                        |  |                                        |                                    |              |       |
| CUSTOMER DRAWING                       |  |                                        | SCALE NTS                          | SHEET 2 of 3 | REV A |

Figure 9 - Outline Dimensions



Notes

- 2 terminal input configuration is compatible with CMOS or open collector TTL (with pull-up resistor). 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 from the curve.
- Input transitions to be ≤ 1ms duration, and input direct drive should be "bounceless contact" type.
- Vcc = 5Vdc for all tests unless otherwise specified.
- All DS11 Series relays may drive loads connected to either positive or negative referenced power supply lines. Reversing polarity of output may cause permanent damage. Inductive loads must be diode suppressed.
- Transient blocking voltage and electrical system spike tests are performed per MIL-STD-704 (28VDC systems).
- To determine the maximum on-resistance at any given junction temperature, multiply on-resistance at 25°C (0.15 ohm) by normalized on-resistance factor from curve (Fig. 6).
- Overload testing per MIL-R-28750 is constrained to the limits imposed by the short circuit protection requirements of this specification and DSCC drawing 88062. Load circuit series inductance for "load shorted" mode of operation to be limited to 50mH max. Maximum repetition rate into a shorted load should not exceed 10 Hz.
- Proper operation of the status feedback requires a status pull-up resistor. See Fig. 5 for status resistor value.

Figure 7 - Temperature Derating Curve

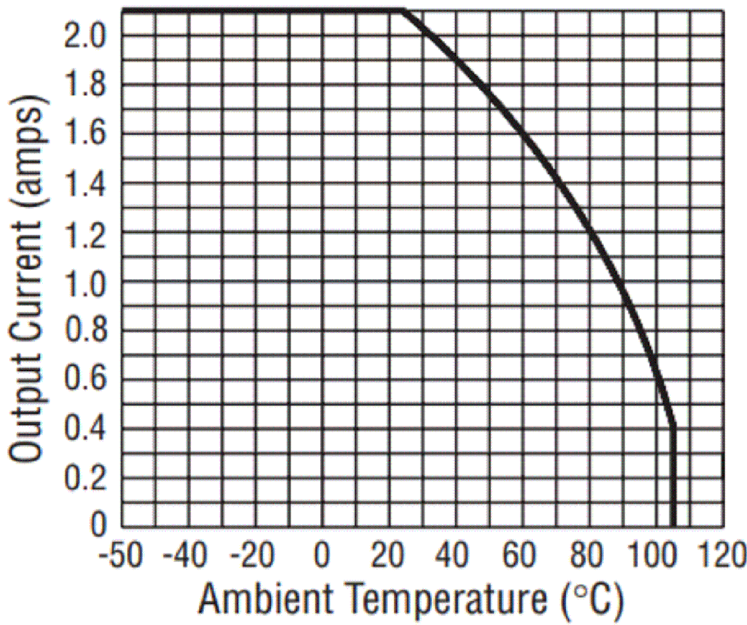
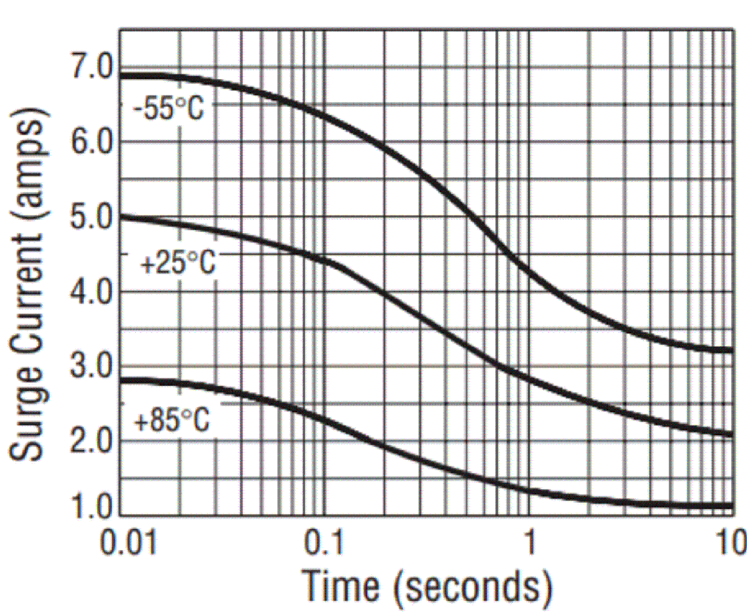
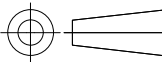


Figure 8 - Maximum Surge Current Without Tripping



ALL DIMENSIONS ARE IN INCHES(MM)

|                                                                                       |                                           |               |           |                                                                                                                                       |           |                               |        |               |   |
|---------------------------------------------------------------------------------------|-------------------------------------------|---------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------|--------|---------------|---|
| THIS DRAWING IS A CONTROLLED DOCUMENT.                                                |                                           | DWN<br>VM     | 12SEP2019 | <div><div></div><div>TE Connectivity</div></div> |           |                               |        |               |   |
|                                                                                       |                                           | CHK<br>RV     | 12SEP2019 |                                                                                                                                       |           |                               |        |               |   |
| DIMENSIONS:<br>INCHES                                                                 | TOLERANCES UNLESS<br>OTHERWISE SPECIFIED: | APVD<br>DH    | 12SEP2019 | NAME                                                                                                                                  |           |                               |        |               |   |
|  | 0 PLC ± -                                 | PRODUCT SPEC  |           |                                                                                                                                       |           | DS11 SERIES SOLID STATE RELAY |        |               |   |
|                                                                                       | 1 PLC ± -                                 |               |           |                                                                                                                                       |           |                               |        |               |   |
|                                                                                       | 2 PLC ± -                                 |               |           |                                                                                                                                       |           |                               |        |               |   |
|                                                                                       | 3 PLC ± -                                 |               |           |                                                                                                                                       |           |                               |        |               |   |
| 4 PLC ± -                                                                             | APPLICATION SPEC                          |               |           |                                                                                                                                       |           |                               |        |               |   |
| ± -                                                                                   |                                           | RESTRICTED TO |           |                                                                                                                                       |           |                               |        |               |   |
| MATERIAL                                                                              | FINISH                                    | WEIGHT        |           | SIZE                                                                                                                                  | CAGE CODE | DRAWING NO                    |        | RESTRICTED TO |   |
| -                                                                                     | -                                         | -             |           | A3                                                                                                                                    | -         | C-DS11-SERIES                 |        | -             |   |
| CUSTOMER DRAWING                                                                      |                                           |               |           | SCALE                                                                                                                                 | NTS       | SHEET                         | 3 of 3 | REV           | A |

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