FEATURER

- Small size and weight
- High-reliability design
- Hermetically sealed
- High transient immunity
- Long life
- Low-power consumption
- Reverse Polarity Protection

PRINCIPLE TECHNICAL CHARACTERISTICS

Seal: Hermetic Tested per MIL-STD-883, Method 1014 Condition B, C
Finish: per MIL-T-10727
Terminals:
TDH 7051 (Tin Lead Plate)
TDH 7050 (Gold Plate)
Weight: 3.0 Ounce max.

APPLICATION NOTE:

101

APPLICABLE SOCKET:

SO-1056-8691

DESCRIPTION

The TDH-7050/51 Time Delay Relays have been designed with thick film hybrid microelectronics timing circuits and MIL-R-83536 relays, packaged in a hermetically sealed military style enclosure. The TDH-7050/51 series are designed to withstand severe environmental conditions encountered in military/aerospace applications. These relays are suited for use in power control, communication circuits and many other applications where power switching and high reliability are required over a wide temperature range.

Export Control Regulation: EAR 99 - These commodities, technology or software are exported from the United States in accordance with the Export Administration Regulations. Diversion contrary to U.S. law is prohibited.
## Input (Control) Parameters

<table>
<thead>
<tr>
<th>Timing:</th>
<th>Operate Fixed Period 0.1 to 600 Seconds [6] ±10% [1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Operation, Time Delay on</td>
<td></td>
</tr>
<tr>
<td>b. Method</td>
<td></td>
</tr>
<tr>
<td>c. Range</td>
<td></td>
</tr>
<tr>
<td>d. Accuracy</td>
<td></td>
</tr>
<tr>
<td>Recycle Time</td>
<td>50 ms, Max [5]</td>
</tr>
<tr>
<td>Operations: (X1-X2)</td>
<td></td>
</tr>
<tr>
<td>a. Input &amp; Control Voltage</td>
<td>20-30 Vdc</td>
</tr>
<tr>
<td>b. Operating Current</td>
<td>150 mA, Max @ +25° C</td>
</tr>
<tr>
<td>Transients:</td>
<td></td>
</tr>
<tr>
<td>a. Positive, MIL-STD-704A, Figure9, Limit 1</td>
<td>+80 Volts Max</td>
</tr>
<tr>
<td>b. Spike, MIL-STD-704A, 0-10 µs</td>
<td>±600 Volts Max</td>
</tr>
<tr>
<td>c. Self-Generated</td>
<td>±50 Volts Max</td>
</tr>
<tr>
<td>d. Susceptibility</td>
<td>+80; -600 Volts Max</td>
</tr>
</tbody>
</table>

Electromagnetic Interference Per MIL-STD-461A

Power Loss

500 Microseconds [2]

## Output (Load) Parameters

<table>
<thead>
<tr>
<th>Contact Form</th>
<th>4 PDT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Rating:</td>
<td>10 Amperes</td>
</tr>
<tr>
<td>a. Resistive</td>
<td>8 Amperes</td>
</tr>
<tr>
<td>b. Inductive</td>
<td>4 Amperes</td>
</tr>
<tr>
<td>c. Motor</td>
<td>2 Amperes</td>
</tr>
<tr>
<td>d. Lamp</td>
<td></td>
</tr>
</tbody>
</table>

Dielectric Strength:

| a. @ Sea Level, 60 Hz | 1000 Vrms [4] |
| b. @ 80,000 ft., 60 Hz | 350 Vrms     |

Insulation Resistance @ 500 Vdc

1000 MΩ [4]

## GENERAL CHARACTERISTICS

Ambient Temperatures Range:

| Operating  | -55 to +125° C |
| Non-Operating | -65 to +125° C |

Vibration:

| a. Sinusoidal, 10-3000 Hz | 30 G |
| b. Random: 50-2000 Hz, MIL-STD-810 | 0.4 G²/Hz |

Shock @ 6 ± 1 MS, 1/2 Sine, 3 Axis

100 G

Acceleration, in any Axis

15 G

Life at Rated Resistive Load; Minimum

100,000 operations

## NUMBERING SYSTEM

<table>
<thead>
<tr>
<th>Plug-in Terminal</th>
<th>Solder Hook Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDH-7050 - 1001</td>
<td>TDH-7051 - 1001</td>
</tr>
<tr>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
</tbody>
</table>

1. Model Number.
2. Pin Style Number.
3. Timing Range, Fixed: 100 milliseconds to 600 seconds. (See Note 6).
NOTES

[1] The accuracy specification applies for any combination of operating temperature and voltage. For units with a timing range less than 1 second, add ±10 milliseconds to the ±10% tolerance.

[2] Transient and power loss specification are based on a maximum duty cycle of 1/50.

[3] EMI test limits will not be exceeded during the timing interval or when continuously energized under steady state conditions, per paragraph 3.23, MIL-PRF-83726C.

[4] Terminals X1 and X2 must be connected together during the test. Dielectric withstanding voltage and insulation resistance are measured at sea level between all mutually insulated terminals and between all terminals and case.

[5] Recycle time is defined as the maximum time power must be removed from terminal X1 to assure that a new cycle can be completed within the specified timing tolerance.

[6] A four digit number defines the time delay in seconds (or milliseconds).

The first three digits are significant figures, used to define the specific time delay. The fourth digit represents the number of zeros to follow the first three digits.

Examples:
- 1001 = 1 second (1,000 milliseconds)
- 2502 = 25 seconds (25,000 milliseconds)
- 5000 = 0.5 seconds (500 milliseconds)
DERATING OF CONTACTS FOR DC VOLTAGES
ABOVE NOMINAL RATING

To establish a standard for the derating of relay contacts is, at best, a subjective practice. Limitations are governed by the type of relay, contact gap, maximum voltage capabilities of the relay contact system, and the contact material.

The most common method is to derate the contacts by use of the Power Formula, using the known current and voltage.

This method is valid only for **Resistive Loads**, and is an approximation only; keeping in mind the limitations mentioned above.

\[
\text{Power} = IE = (\text{Current} \times \text{Voltage})
\]

\[
I_2 E_2 = \frac{2}{3} I_1 E_1
\]

**Example:**

A designer is working with a 55 volt DC system and has a relay rated at 10 amps resistive at 28 volts DC. What is the maximum current that can be switched at 55 Vdc.

\[
I_1 = 10 \text{ Amperes} \\
E_1 = 28 \text{ VDC} \\
E_2 = 55 \text{ VDC}
\]

\[
I_2 = ? \text{ (Current ratings at 55 VDC Resistive)}
\]

\[
I_2 E_2 = 2 I_1 E_1 / 3
\]

\[
I_2 = 2 I_1 E_1 / E_2^3
\]

\[
= 2 (10 \times 28) / 55 \times 3
\]

\[
= 560 / 165
\]

\[
I_2 = 3.4 \text{ Amperes at 55VDC}
\]

In addition, the user should always be concerned about the following:

1. Derating contacts that are rated for less than 10 Amperes at nominal voltage.
2. Derating contacts for use in system voltages above 130 Volts DC.
ENGINEERING DATA SHEET

SO-1056-8691
RELAY SOCKET
12 AMP

BASIC SOCKET SERIES DESIGNATION FOR:

Series KL
Series TDH-7050, TDH-7060, TDH-7070

MEETS THE REQUIREMENTS OF:

MIL-DTL-12883

GENERAL CHARACTERISTICS

1. Supplied with mounting hardware No. 16 contacts, No. 16 crimp.
2. Standard tolerances \( \pm 0.01; \pm 0.005 \)
3. Weight \( 0.118 \) lb. max
4. Temperature range\( -70^\circ C \) to \( +125^\circ C \)

Data sheets are for initial product selection and comparison. Contact Esterline Power Systems prior to choosing a component.

Date of issue: 8/09