

# Military/Aerospace/Hi-REL MIL-S-83731 Toggle Switches

## Features/Benefits

- Qualified to MIL-S-83731
- 50  $\mu$  inch selective gold contact plating
- Epoxy sealed terminals for process compatibility
- Rated for logic level to 5 amp resistive loads and 2 amp inductive loads
- Flame retardant housing material
- RoHS compliant and compatible

| Test Requirement                                | MIL-S-83731/9, 10, 13, 14, 15, 16  |
|---|--|
| 1. Strength of Terminal                         | 1 lb. – solder lug   |
| 2. Strength of Actuating Lever Pivot and Stop   | 10 lbs. & 8 lbs. throughout range  |
| 3. Strength of Mounting Means                   | 15 lbs. in. torque on bushing  |
| 4. Dielectric (Sea Level) Indication            | 1000 VAC Group B, 750 VAC after electrical endurance. 500 $\mu$ A max. leakage   |
| 5. Contact Voltage Drop                         | 2.5 millivolt initial, 5.0 millivolt after mechanical endurance @ 2-6 VDC 0.1 amp  |
| 6. Temperature Rise                             | 50° C rise max. @ rated resistive load after endurance test  |
| 7. Short Circuit                                | 10 operations carry 100 amps resistive load @ lowest DC volts  |
| 8. Mechanical Life                              | 20K operations at specified high and low temperatures  |
| 9. Electrical Endurance                         | 10K operations at specified high and low temperatures  |
| 10. Overload                                    | 50 operations @ 150% of rated resistive load   |
| 11. Electrical Endurance at Sea Level           | 10K operations resistive load @ room temperature<br>10K operations inductive load @ room temperature<br>10K operations lamp load @ room temperature<br>Performed on different test samples |
| 12. Vibration                                   | Method 204 of MIL-STD-202, test condition A<br>.06 D. A. or 10 G's 10-500 Hz, 10 usec. max. chatter  |
| 13. Shock                                       | Fuse-method 213 or MIL-STD-202, 10 usec. max. chatter  |
| 14. Salt Spray<br>Test Upon Completion          | 48 hours – method 101 of MIL-STD-202, test condition B<br>10 operations resistive load (toggle sealed switches only)   |
| 15. Moisture Resistance<br>Test Upon Completion | Method 106 of MIL-STD-202<br>100 VDC potential between current carrying parts and panel  |
| 16. Sand & Dust                                 | Method 110 of MIL-STD-202, test condition B<br>6 hours @ 23°C 2.5K operations mechanical life (toggle sealed switches only)  |
| 17. Explosion                                   | MIL-STD-202 method 109, maximum rated DC inductive load (toggle sealed switches only)  |
| 18. Sealing                                     | Toggle seal – 5 operations under 0.5 inches of H <sub>2</sub> O above top of bushing   |
| 19. A.) Toggle Seal<br>B.) Bushing Seal         | (Toggle sealed switches only)<br>(Panel sealed switches only)  |
| 20. Temperature Operation                       | Mechanical life, –25°C to +71°C  |
| 21. Life Low Cur. Level                         | No requirement   |
| 22. Fungus                                      | No requirement   |
| 23. Intermediate Current                        | 20K operations, 35/40 milliamps @ 5 VDC resistive load @ +71°C   |
| 24. Thermal Shock                               | Method 107 of MIL-STD-202 test condition A; 5 cycles @ –55°C/+85°C   |

## RATINGS

### CURRENT RATINGS – HIGH LEVEL

| Current Capacity in Amperes – Per Pole |                 |                |
|--|-----------------|----------------|
| 28V dc                                 | 115V ac, 400 Hz | 125V ac, 60 Hz |
| Lamp Load                              |                 |                |
| 1                                      | 1               | 1              |
| Resistive Load                         |                 |                |
| 5                                      | 5               | 5              |
| Inductive Load                         |                 |                |
| 2                                      | 2               | 2              |

### CURRENT RATINGS – LOGIC LEVEL

|   |
|---|
| 0.5 Volt – Amp (VA) Max. @ 28 V Max. (AC or DC) |
|---|

## MATERIALS

CASE: Diallyl phthalate (DAP) (UL 94 V-0).

BUSHING: Brass, nickel plated.

HOUSING: Stainless steel.

ACTUATOR: Brass, chrome plated.

SWITCH SUPPORT: Brass, tin plated.

TERMINALS: Gold over nickel over copper alloy.

TERMINAL SEAL: Epoxy.

CONTACTS: Gold over nickel over silver over brass.

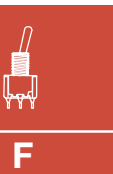
PANEL SEAL: Silicone rubber.

MOUNTING HARDWARE: One hexagon nut, brass with nickel plating; one lockwasher, steel with nickel plating; one locking ring, brass with nickel plating.

**HOW TO ORDER:** Complete part numbers for MIL-S-83731 TOGGLE SWITCHES are shown on pages F–18 through F–21.



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

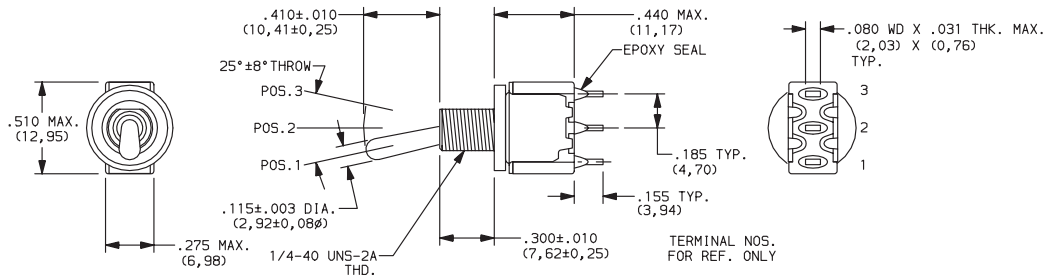


# Military/Aerospace/HI-REL MIL-S-83731 Toggle Switches



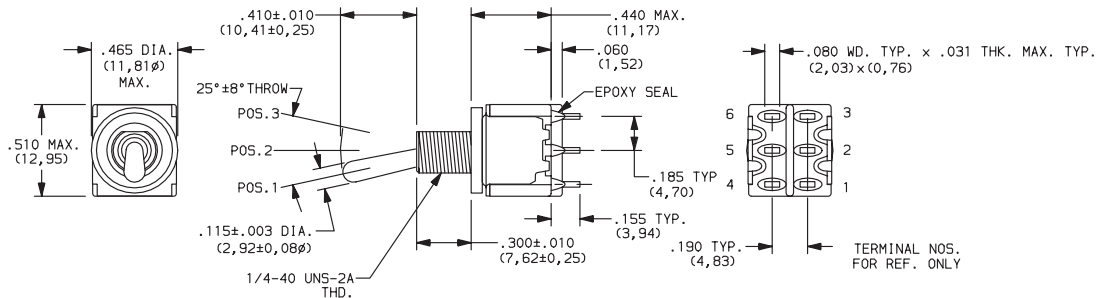
| NO. POLES    | MODEL NO.    | SWITCH FUNCTION |        |        | CONNECTED TERMINALS |        |        | SCHEMATIC |
|--------------|--------------|-----------------|--------|--------|---------------------|--------|--------|-----------|
|              |              | POS. 1          | POS. 2 | POS. 3 | POS. 1              | POS. 2 | POS. 3 |           |
| SP           | M83731/9-211 | ON              | OFF    | ON     | 2-3                 | OPEN   | 2-1    |           |
|              | M83731/9-231 | ON              | NONE   | ON     |                     |        |        |           |
|              | M83731/9-261 | ON              | NONE   | MOM.   |                     |        |        |           |
|              | M83731/9-271 | MOM.            | OFF    | MOM.   |                     |        |        |           |
|              | M83731/9-311 | ON              | OFF    | MOM.   |                     |        |        |           |
| M83731/9-341 | NONE         | ON              | MOM.   | N/A    | 2-3                 | 2-1    |        |           |

SPDT

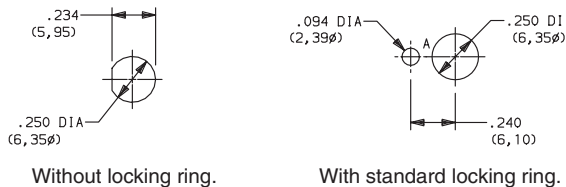


| NO. POLES     | MODEL NO.     | SWITCH FUNCTION |        |         | CONNECTED TERMINALS |         |         | SCHEMATIC |
|---------------|---------------|-----------------|--------|---------|---------------------|---------|---------|-----------|
|               |               | POS. 1          | POS. 2 | POS. 3  | POS. 1              | POS. 2  | POS. 3  |           |
| DP            | M83731/10-211 | ON              | OFF    | ON      | 2-3,5-6             | OPEN    | 2-1,5-4 |           |
|               | M83731/10-231 | ON              | NONE   | ON      |                     |         |         |           |
|               | M83731/10-261 | ON              | NONE   | MOM.    |                     |         |         |           |
|               | M83731/10-271 | MOM.            | OFF    | MOM.    |                     |         |         |           |
|               | M83731/10-311 | ON              | OFF    | MOM.    |                     |         |         |           |
|               | M83731/10-321 | ON              | ON     | ON      |                     |         |         |           |
|               | M83731/10-331 | ON              | ON     | MOM.    |                     |         |         |           |
|               | M83731/10-341 | NONE            | ON     | MOM.    |                     |         |         |           |
| M83731/10-351 | MOM.          | ON              | MOM.   | 2-3,5-6 | 2-3,5-4             | 2-1,5-4 |         |           |

DPDT



### PANEL MOUNTING



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

www.ck-components.com



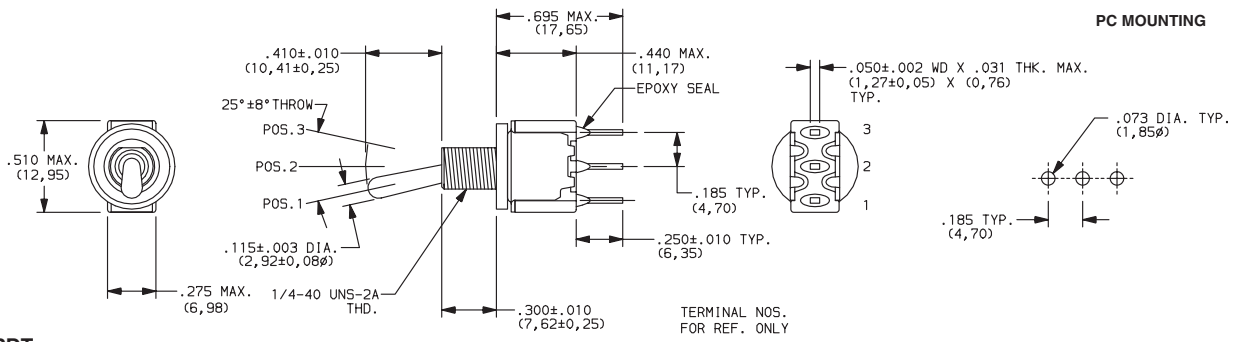
Toggle

F

# Military/Aerospace/Hi-REL MIL-S-83731 Toggle Switches



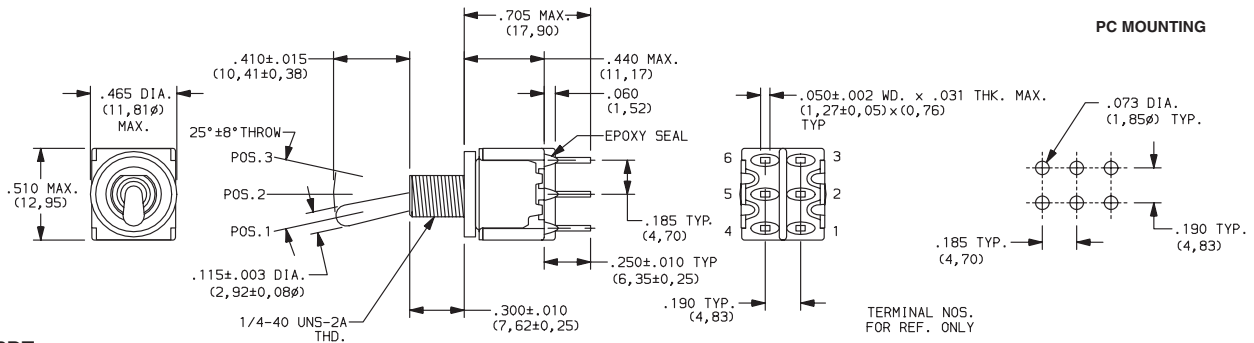
| NO. POLES | MODEL NO.    | SWITCH FUNCTION |        |        | CONNECTED TERMINALS |        |        | SCHEMATIC |
|-----------|--------------|-----------------|--------|--------|---------------------|--------|--------|-----------|
|           |              | POS. 1          | POS. 2 | POS. 3 | POS. 1              | POS. 2 | POS. 3 |           |
|           |              |                 |        |        |                     |        |        |           |
| SP        | M83731/9-212 | ON              | OFF    | ON     | 2-3                 | OPEN   | 2-1    | <br>SPDT  |
|           | M83731/9-232 | ON              | NONE   | ON     |                     |        |        |           |
|           | M83731/9-262 | ON              | NONE   | MOM.   |                     |        |        |           |
|           | M83731/9-272 | MOM.            | OFF    | MOM.   |                     |        |        |           |
|           | M83731/9-312 | ON              | OFF    | MOM.   |                     |        |        |           |
|           | M83731/9-342 | NONE            | ON     | MOM.   | N/A                 | 2-3    | 2-1    |           |



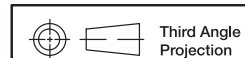
SPDT



| NO. POLES     | MODEL NO.     | SWITCH FUNCTION |        |         | CONNECTED TERMINALS |         |         | SCHEMATIC |
|---------------|---------------|-----------------|--------|---------|---------------------|---------|---------|-----------|
|               |               | POS. 1          | POS. 2 | POS. 3  | POS. 1              | POS. 2  | POS. 3  |           |
|               |               |                 |        |         |                     |         |         |           |
| DP            | M83731/10-212 | ON              | OFF    | ON      | 2-3,5-6             | OPEN    | 2-1,5-4 | <br>DPDT  |
|               | M83731/10-232 | ON              | NONE   | ON      |                     |         |         |           |
|               | M83731/10-262 | ON              | NONE   | MOM.    |                     |         |         |           |
|               | M83731/10-272 | MOM.            | OFF    | MOM.    |                     |         |         |           |
|               | M83731/10-312 | ON              | OFF    | MOM.    | 2-3,5-6             | 2-3,5-4 | 2-1,5-4 |           |
|               | M83731/10-322 | ON              | ON     | ON      |                     |         |         |           |
|               | M83731/10-332 | ON              | ON     | MOM.    |                     |         |         |           |
|               | M83731/10-342 | NONE            | ON     | MOM.    | N/A                 | 2-3,5-6 | 2-1,5-4 |           |
| M83731/10-352 | MOM.          | ON              | MOM.   | 2-3,5-6 | 2-3,5-4             | 2-1,5-4 |         |           |



DPDT



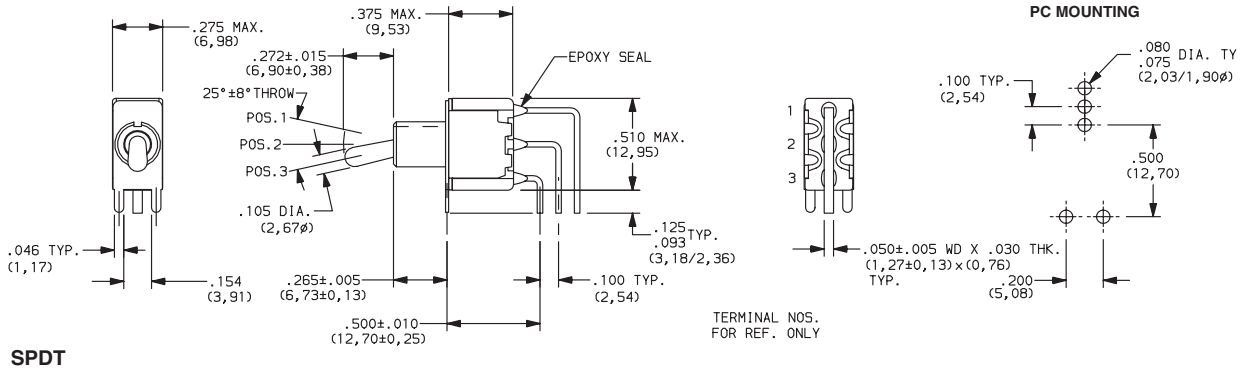
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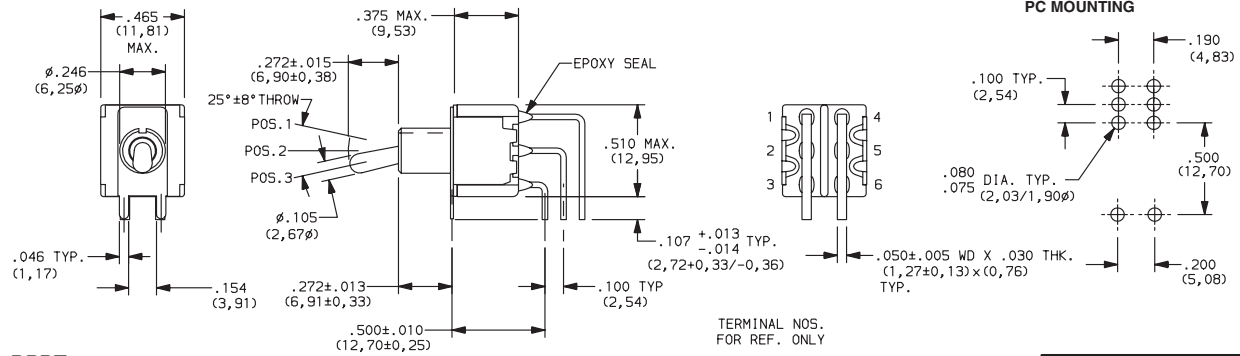
# Military/Aerospace/Hi-REL MIL-S-83731 Toggle Switches



| NO. POLES     | MODEL NO.     | SWITCH FUNCTION |        |        | CONNECTED TERMINALS |        |        | SCHEMATIC |
|---------------|---------------|-----------------|--------|--------|---------------------|--------|--------|-----------|
|               |               | POS. 1          | POS. 2 | POS. 3 | POS. 1              | POS. 2 | POS. 3 |           |
|               |               |                 |        |        |                     |        |        |           |
| SP            | M83731/13-211 | ON              | OFF    | ON     | 2-3                 | OPEN   | 2-1    | <br>SPDT  |
|               | M83731/13-231 | ON              | NONE   | ON     |                     |        |        |           |
|               | M83731/13-261 | ON              | NONE   | MOM.   |                     |        |        |           |
|               | M83731/13-271 | MOM.            | OFF    | MOM.   |                     |        |        |           |
|               | M83731/13-311 | ON              | OFF    | MOM.   |                     |        |        |           |
| M83731/13-341 | NONE          | ON              | MOM.   | N/A    | 2-3                 | 2-1    |        |           |



| NO. POLES     | MODEL NO.     | SWITCH FUNCTION |        |        | CONNECTED TERMINALS |         |         | SCHEMATIC |
|---------------|---------------|-----------------|--------|--------|---------------------|---------|---------|-----------|
|               |               | POS. 1          | POS. 2 | POS. 3 | POS. 1              | POS. 2  | POS. 3  |           |
|               |               |                 |        |        |                     |         |         |           |
| DP            | M83731/14-211 | ON              | OFF    | ON     | 2-3,5-6             | OPEN    | 2-1,5-4 | <br>DPDT  |
|               | M83731/14-231 | ON              | NONE   | ON     |                     |         |         |           |
|               | M83731/14-261 | ON              | NONE   | MOM.   |                     |         |         |           |
|               | M83731/14-271 | MOM.            | OFF    | MOM.   |                     |         |         |           |
|               | M83731/14-311 | ON              | OFF    | MOM.   |                     |         |         |           |
|               | M83731/14-321 | ON              | ON     | ON     |                     |         |         |           |
|               | M83731/14-331 | ON              | ON     | MOM.   |                     |         |         |           |
|               | M83731/14-341 | NONE            | ON     | MOM.   |                     |         |         |           |
| M83731/14-351 | MOM.          | ON              | MOM.   | N/A    | 2-3,5-6             | 2-1,5-4 |         |           |



Toggle



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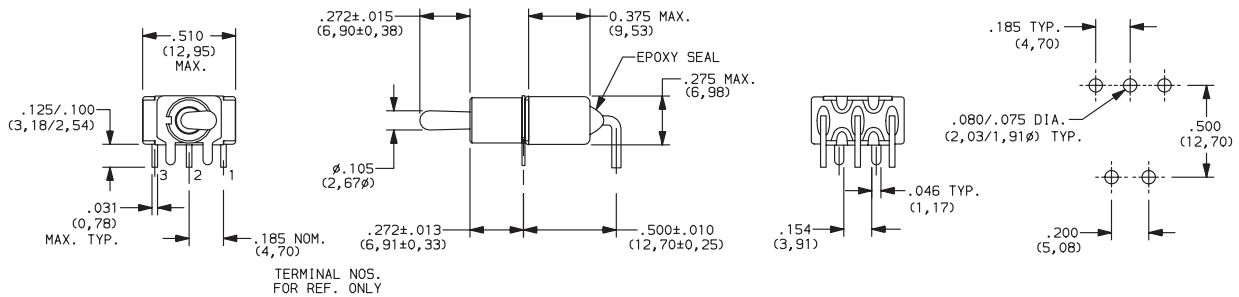


# Military/Aerospace/Hi-REL MIL-S-83731 Toggle Switches



| NO. POLES | MODEL NO.     | SWITCH FUNCTION |        |        | CONNECTED TERMINALS |        |        | SCHEMATIC |
|-----------|---------------|-----------------|--------|--------|---------------------|--------|--------|-----------|
|           |               | POS. 1          | POS. 2 | POS. 3 | POS. 1              | POS. 2 | POS. 3 |           |
|           |               |                 |        |        |                     |        |        |           |
| SP        | M83731/15-211 | ON              | OFF    | ON     | 2-3                 | OPEN   | 2-1    | <br>SPDT  |
|           | M83731/15-231 | ON              | NONE   | ON     |                     |        |        |           |
|           | M83731/15-261 | ON              | NONE   | MOM.   |                     |        |        |           |
|           | M83731/15-271 | MOM.            | OFF    | MOM.   |                     |        |        |           |
|           | M83731/15-311 | ON              | OFF    | MOM.   |                     |        |        |           |
|           | M83731/15-341 | NONE            | ON     | MOM.   |                     |        |        |           |

### PC MOUNTING

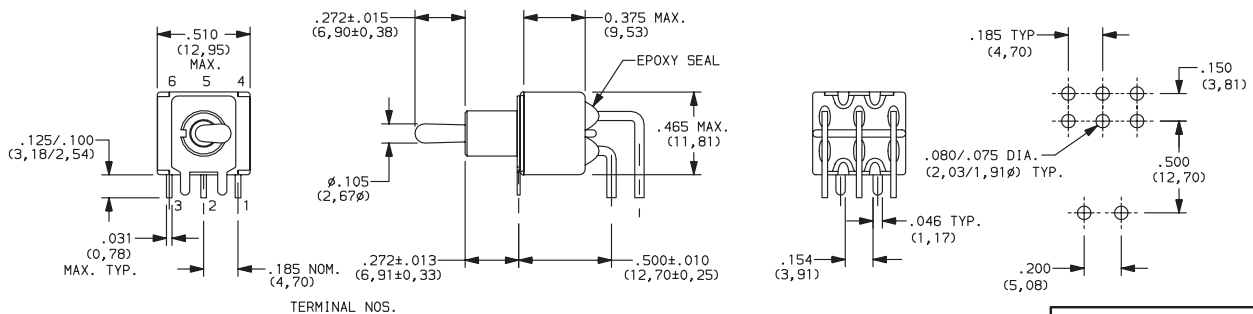


### SPDT

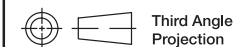


| NO. POLES     | MODEL NO.     | SWITCH FUNCTION |        |         | CONNECTED TERMINALS |         |         | SCHEMATIC |
|---------------|---------------|-----------------|--------|---------|---------------------|---------|---------|-----------|
|               |               | POS. 1          | POS. 2 | POS. 3  | POS. 1              | POS. 2  | POS. 3  |           |
|               |               |                 |        |         |                     |         |         |           |
| DP            | M83731/16-211 | ON              | OFF    | ON      | 2-3,5-6             | OPEN    | 2-1,5-4 | <br>DPDT  |
|               | M83731/16-231 | ON              | NONE   | ON      |                     |         |         |           |
|               | M83731/16-261 | ON              | NONE   | MOM.    |                     |         |         |           |
|               | M83731/16-271 | MOM.            | OFF    | MOM.    |                     |         |         |           |
|               | M83731/16-311 | ON              | OFF    | MOM.    |                     |         |         |           |
|               | M83731/16-321 | ON              | ON     | ON      |                     |         |         |           |
|               | M83731/16-331 | ON              | ON     | MOM.    |                     |         |         |           |
|               | M83731/16-341 | NONE            | ON     | MOM.    |                     |         |         |           |
| M83731/16-351 | MOM.          | ON              | MOM.   | 2-3,5-6 | 2-3,5-4             | 2-1,5-4 |         |           |

### PC MOUNTING



### DPDT



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Toggle