

REVISIONS			
LT	DESCRIPTION	DATE	APPROVED
A	Pin detail changed.	2/9/09	Michael A. Radecki

Prepared in accordance with ASME Y14.100

Source Control drawing

REV STATUS OF PAGES	REV	A	A	A	A	A	A	A	A	A								
	PAGES	1	2	3	4	5	6	7	8									

PMIC N/A	<b>PREPARED BY</b> Mark A. Rush	<b>DESIGN ACTIVITY</b> DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OH
Original date of drawing  20 November 2008	<b>CHECKED BY</b>  Mark A. Rush	<b>TITLE</b> SWITCHES, DUAL IN-LINE PACKAGE (DIP), ROCKER ACTUATOR, STANDARD PROFILE, SINGLE POLE, SINGLE THROW STATIONS, SEALED BASE
	<b>APPROVED BY</b> Michael A. Radecki	
	<b>SIZE</b> A	<b>CODE IDENT. NO.</b> 037Z3
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## 1. SCOPE

1.1 Scope. This drawing describes the requirements for switches, dual in-line package (DIP), rocker actuator, standard profile, single pole, single throw stations, sealed base.

1.2 Part or Identifying Number (PIN) The complete PIN is as follows:

<u>09003-</u>	<u>XXX</u>
Drawing number	Dash number See Table 1

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents in sections 3 and 4 of this specification, whether or not they are listed.

### 2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (See 6.2).

#### DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-202 - Electronic and Electrical Components, Test Methods for.

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or <http://assist.daps.dla.mil/> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

## 3. REQUIREMENTS

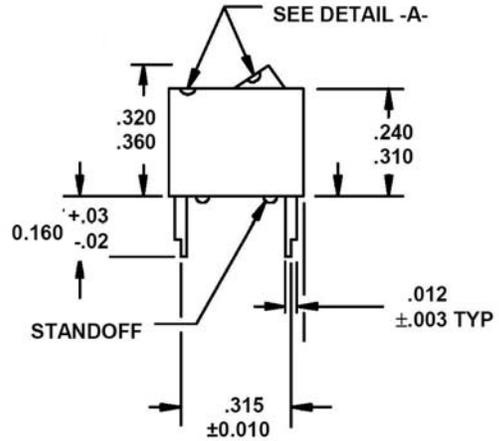
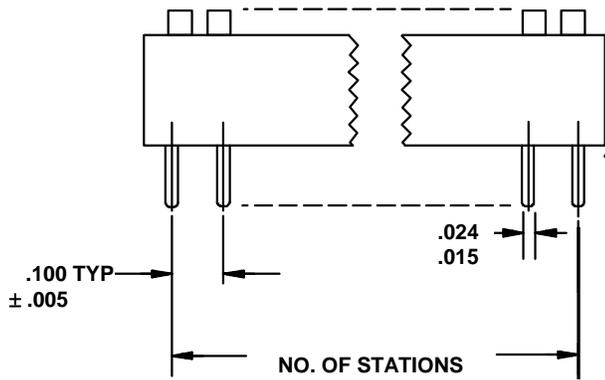
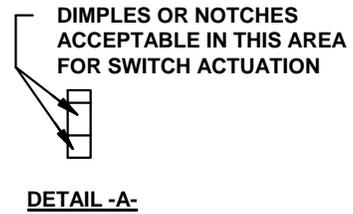
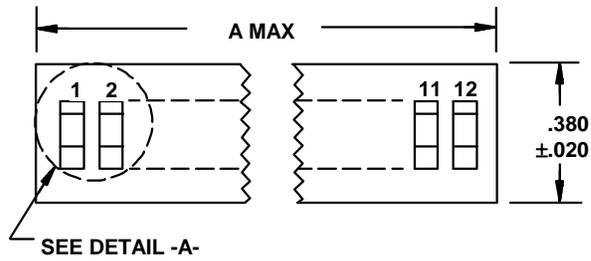
3.1 Item requirements. The individual item requirements shall be as specified herein.

3.2 Interface and physical dimensions. The interface and physical dimensions shall be as specified herein (see figure 1).

3.2.1 Pure tin. The use of pure tin, as an underplate or final finish, is prohibited both internally and externally. Tin content of switch components and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (See 6.4).

3.3 Contact resistance, dry circuit. Switches shall be subjected to 50 mv maximum open circuit at 50 ma maximum. A minimum of 10 readings shall be measured. Initial measurements shall be less than 50 milliohms and 100 milliohms after testing.

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Inches	mm	Inches	mm
.003	0.08	.140	3.56
.005	0.13	.270	6.86
.012	0.30	.300	7.62
.015	0.38	.320	8.13
.020	0.51	.360	9.14
.021	0.53	.380	9.65
.100	2.54		

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.

FIGURE 1. Dimensions and configuration.

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TABLE I. Dash numbers and characteristics 1/

Dash number	Number of stations	Dimension "A" inches (mm)
022	2	.280 (7.11)
023	3	.380 (9.65)
024	4	.480 (12.19)
025	5	.580 (14.73)
026	6	.680 (17.27)
027	7	.780 (19.81)
028	8	.880 (22.35)
029	9	.980 (24.89)
030	10	1.080 (27.43)
031	11	1.180 (29.97)
032	12	1.280 (32.51)

1/ For cross reference of MIL-PRF-83504, DSCC 09003, and approved source part numbers see 6.3

3.4 Insulation resistance. Test between a minimum of 10 sets of open switches and a minimum of 10 sets of adjacent closed switch contacts. A test voltage of 100 vdc shall be applied for two minutes before resistance is measured. Measurement shall be 1000 megohms minimum.

3.5 Dielectric withstanding voltage. Test between a minimum of 10 sets of open switches and a minimum of 10 sets of adjacent closed switch contacts. Apply 500 vdc dielectric withstanding voltage for 1 minute. 1 ma maximum leakage current. No flashover or corona shall occur.

3.6 Electrical stability. Subject switch to 50 vdc at 1.0 ampere maximum current until temperature stabilizes. When three readings at five minute intervals are the same, the measured temperature rise shall not exceed 30°C from ambient.

3.7 Capacitance. Test between a minimum of 10 adjacent closed switch circuits. With a frequency of 100kHz applied the capacitance shall not exceed 5 picofarads.

3.8 Solderability. Contact post shall have a minimum of 95% coverage when subjected to immersion in active flux (5 to 10 seconds), allowed to drain (5 to 20 seconds), immersed in molten 60/40 or 63/37 tin lead solder (3 to 5 seconds), and then cleaned using isopropyl alcohol.

3.9 Vibration. Switch shall be subjected to 20 G's, 10-2000 Hz with 100 ma current applied. The vibrations frequency shall be varied logarithmically between the limits and returned to 10 Hz in 20 minutes. The cycle shall be performed 12 times in each of three mutually perpendicular planes, for a total vibration time of 12 hours. There shall be no discontinuities of 10 microseconds or longer in duration. No physical damage shall occur.

3.10 Physical Shock. Switch shall be subjected to 50 G's half-sine shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. There shall be no discontinuities of 10 microseconds or longer in duration. No physical damage shall occur.

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3.11 Resistance to soldering heat. There shall be no physical damage to switch inserted into PC board and immersed in solder bath at 260°C for 10 seconds, switch in the OFF position.

3.12 Terminal strength, pull test. Subject 10 random switch terminals to an axial pull of 2 pounds. No physical damage shall occur.

3.13 Terminal strength, bend test. Subject 10 random switch terminals to two 45° bend cycles, per MIL-STD-202, method 211, condition B. No physical damage shall occur.

3.14 Durability. Switch shall be mounted and subjected to 2000 cycles of actuation with a resistive load of 24 vdc and 25 ma maximum current applied. No physical damage shall occur.

3.15 Actuation force. Switch shall be mounted and force applied to actuators. 24 ounces maximum per switch actuator initially and after durability. Switch shall be able to withstand a total actuation force of 3 pounds without resulting in improper operation or switch damage.

3.16 Thermal Shock. Subject switches in the ½ ON and ½ OFF condition to 5 non-operating cycles between -55°C and 105°C. Each cycle shall consist of 30 minutes of each temperature with 5 minute transition between temperatures. No physical damage shall occur.

3.17 Humidity-temperature cycling. Subject switch to humidity between 90 and 100% relative humidity (RH) while temperature cycles between 25°C and 65°C twice in 24 hours. 10 cycles are to be completed. Measure insulation resistance during recovery period.

3.18 Temperature life. Subject switches in the ON condition to temperature life conditions. No physical damage shall occur.

3.19 Mixed flowing gas. Subject switches in ON condition to environmental class II for 20 days. Class II is defined as a temperature of 30°C and a relative humidity of 70% with pollutants of Cl<sub>2</sub> at 10 ±2 ppb, NO<sub>2</sub> at 200 ±50 ppb, and H<sub>2</sub>S at 10 ±2 ppb.

3.20 Marking. As a minimum, marking shall be include manufacturer's name or CAGE code and date code (except -022 and -023 due to space constraints).

3.21 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be an approved source of supply.

3.22 Manufacturer eligibility: To be eligible for listing as an approved source of supply a manufacturer shall perform group A and group B inspections specified herein on a sample of parts agreed upon by the manufacturer and DSCC-VA.

3.23 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.24 Workmanship. The switch shall be uniform in quality and free from defects that will affect life, or serviceability.

#### 4. VERIFICATION

4.1 Qualification inspection. Qualification inspection is not required.

4.2 Conformance inspection.

4.2.1 Inspection of product for delivery. Inspection of product for delivery shall consist of all tests specified in group A.

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4.2.2 Group A inspection. Group A inspection shall consist of the tests specified in table II in the order shown.

TABLE II. Group A inspection

Inspection	Requirement paragraph	Sampling procedure
Interface and physical dimensions.	3.2	5 samples 0 failures
Marking	3.20	
Workmanship	3.23	

4.2.3 Group B inspection. Group B inspection shall consist of the tests specified in table III in the order shown.

TABLE III. Group B inspection

Test or Examination	Requirement Paragraph	Sample Number						
		1	2	3	4	5	6	7
		Test Sequence <u>1/</u>						
Examination of product	3.2	1, 7	1, 8	1, 7	1, 5	1, 5	1, 3	1, 4
Contact resistance, dry circuit	3.2	3, 5			2, 4	2, 4		
Insulation resistance	3.4		2, 6					
Dielectric withstanding voltage	3.5		3, 7					
Electrical stability <u>2/</u>	3.6			6				
Capacitance	3.7			2				
Solderability	3.8						2	
Vibration	3.9							2
Physical shock	3.10							3
Resistance to soldering heat <u>3/</u>	3.11			5				
Terminal strength, pull test	3.12			3				
Terminal strength, bend test	3.13			4				
Durability	3.14	4						
Actuation force	3.15	2, 6						
Thermal shock	3.16		4					
Humidity-temperature cycling	3.17		5					
Temperature life	3.18					3		
Mixed flow gas	3.19				3			

1/ Numbers indicate sequence in which test shall be performed for each sample.

2/ Test only 1 switch.

3/ Reserve only 1 switch for electrical stability test.

4.2.4 Certificate of compliance. A certificate of compliance for group B inspection requirements is acceptable, instead of performing group B inspection.

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Switches conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. This drawing is intended exclusively to prevent the proliferation of unnecessary duplicate specifications, drawings, and stock catalog listings. When a military specification exists and the product covered by this drawing has been qualified for listing, this drawing becomes obsolete and will not be used for new design.

6.2 Ordering data. The contract or purchase order should specify the following:

- a. Complete PIN (see 1.2).
- b. Requirements for delivery of one copy of the conformance inspection data or certificate of compliance that parts have passed conformance inspection with each shipment of parts by the manufacturer.
- c. Requirements for notification of change of product to acquiring activity, if applicable.
- d. Requirements for packaging and packing.

6.3 Part Number Cross Reference

<u>MIL-PRF-83504</u>	<u>DSCC 09003</u>	<u>Tyco 1/</u>
M83504/1-022	09003-022	2-435640-9
M83504/1-023	09003-023	3-435640-0
M83504/1-024	09003-024	435640-2
M83504/1-025	09003-025	435640-3
M83504/1-026	09003-026	435640-4
M83504/1-027	09003-027	435640-1
M83504/1-028	09003-028	435640-5
M83504/1-029	09003-029	435640-6
M83504/1-030	09003-030	435640-7
M83504/1-031	09003-031	
M83504/1-032	09003-032	3-435640-2

1/ Parts must be purchased to the DSCC PIN to assure that all performance requirements and tests are met.

6.4 Tin whisker growth. The use of alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead, by mass, have shown to inhibit the growth of tin whiskers. For additional information on this matter, refer to ASTM-B545 (Standard Specification for Electrodeposited Coatings of Tin).

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6.5 Users of record. Coordination of this document for future revisions is coordinated only with the approved sources of supply and the users of record of this document. Requests to be added as a recorded user of this drawing should be in writing to: Defense Supply Center, Columbus (DSCC), ATTN: DSCC-VAT, Post Office Box 3990, Columbus, OH 43218-3990, or by e-mail to [switch@dla.mil](mailto:switch@dla.mil).

6.6 Approved sources of supply. Approved sources of supply are listed herein. Additional sources will be added as they become available. For assistance in the use of this drawing, contact Defense Supply Center, Columbus, ATTN: DSCC-VAT, Post Office Box 3990, Columbus, OH 43218-3990, or by e-mail to [switch@dla.mil](mailto:switch@dla.mil).

<u>Vendor</u>	<u>Vendor CAGE</u>	<u>Vendor name and address</u>
A	00779	Tyco Electronics Corporation P.O. Box 3608 Harrisburg, PA 17105-3608  Plant: Hermosillo, Mexico

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