



TYPE  
PRODUCT SPECIFICATION

NUMBER  
GES-12-054

TITLE  
PLCC (PLASTIC LEADED CHIP CARRIER) SOCKET

PAGE  
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REV  
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AUTHORIZED BY: *aw*  
Johnson Lin

DATE  
12/30/93

1.0 **GENERAL.** PLCC SOCKETS ACCEPT EIA/JEDEC STANDARD PLASTIC J-LEADED CHIP CARRIERS IC'S IN LEAD COUNTS OF 20, 28, 32, 44, 52, 68,84, 100 AND 124. THE CONTACT SYSTEM LOCKS CARRIER LEAD AND PWB, WITH DEVICE LOADED IS 8.00/ .315 HEIGHT FROM PC BOARD FOR THE THROUGH-HOLE(DIP TYPE) VERSION .BUT 4.70/ .185 FOR THE SURFACE MOUNT VERSION.THE LOW INSERTION/LOW-EXTRACTION FORCE SOCKET REQUIRES NO SPECIAL TOOLS FOR INSTALLATION. OTHER FEATURES INCLUDE STANDOFFS FOR CLEANING. A VISUAL ORIENTATION AID. AND SLOTS FOR EXTRACTION TOOL. IN ADDITION, THE THRU.-HOLE VERSION IS DESIGNED TO INTERFACE CHIP CARRIER IC'S HAVING PIN SPACINGS OF 1.27/.050 WITH STANDARD 2.54/.100 GRID HOLE PATTERN ON PC BOARD (.91/.036--1.02/.040 HOLE DIAMETER), AND THE SURFACE MOUNT VERSION USES THE SAME FOOTPRINTS AS THE CHIP CARRIER.THE SPECIFICATION IS COMPOSED OF THE FOLLOWING SECTION.

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2.0 **APPLICABLE DOCUMENTS.** THE FOLLOWING DOCUMENT, OF THE ISSUE IN EFFECT ON THE DATE OF THE LATEST REVISION OF THIS SPECIFICATION, SHALL FORM A PART OF THIS SPECIFICATION TO THE EXTENT SPECIFIED HEREIN.

**MILITARY SPECIFICATIONS**

MIL-M-24519 MOLDING PLASTICS, POLYESTER, THERMOPLASTIC  
MIL-G-45204 GOLD, PLATING, ELECTRODEPOSITED  
MIL-P-81728 PLATING, TIN-LEAD (ELECTRODEPOSITED)  
MIL-C-45662 CALIBRATION SYSTEM REQUIREMENTS

**MILITARY STANDARDS**

MIL-STD-105 SAMPLING PROCEDURES AND TABLES FOR INSPECTION BY ATTRIBUTES  
MIL-STD-202 TEST METHODS FOR ELECTRONIC AND ELECTRICAL COMPONENT PARTS  
MIL-STD-883 TEST METHODS AND PROCEDURES FOR MICROELECTRONICS  
MIL-STD-1344 TEST METHODS FOR ELECTRONIC CONNECTOR

**FEDERAL SPECIFICATION**

QQ-N-290 NICKEL PLATING (ELECTRODEPOSITED)  
QQ-B-750 BRONZE PHOSPHOR, BAR, PLATE, ROD, SHEET, STRIP, FLAT WIRE AND STRUCTURE AND SHAPED SECTIONS

**INDUSTRY SPECIFICATION/STANDARDS**


UL-94 TESTS FOR FLAMMABILITY OF PLASTIC MATERIALS

**DUPONT SPECIFICATION**

BUS-19-040 ADHESION BENDING TEST  
BUS-19-002 SOLDERABILITY TEST

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**3.0 REQUIREMENTS**

- 3.1. **DESIGN AND CONSTRUCTION.** SOCKETS SHALL BE OF THE DESIGN CONSTRUCTION AND PHYSICAL DIMENSIONS SPECIFIED ON THE APPLICABLE PRODUCT DRAWING.
- 3.2. **MATERIAL.** THE MATERIAL FOR EACH PART SHALL BE AS SPECIFIED HEREIN, OR EQUIVALENT SUBSTITUTE MATERIAL SHALL MEET THE PERFORMANCE REQUIREMENTS OF THIS SPECIFICATION.
  - 3.2.1. **CONTACTS.** CONTACTS SHALL BE FULL-HARD PHOSPHOR BRONZE IN ACCORDANCE WITH QQ-B-750, COMPOSITION.
  - 3.2.2. **PLASTIC PARTS.** THE PLASTIC BODY AND THE COVER WILL BE 40% GLASS FIBER POLYPHENYLENE SULFIDE, COLOR : BROWN. THE COVER IS FOR THE THROUGH HOLE VERSION ONLY. ALL PLASTIC MATERIAL SHALL BE RATED FLAME RETARDANT V-0 IN ACCORDANCE WITH UL-94.
- 3.3. **FINISH.** THE CONTACT SHALL BE PLATED WITH 100 MICROINCHES MINIMUM TIN-LEAD OVER 40 MICROINCHES MINIMUM NICKEL. BUT THE TIN-LEAD PLATING SHALL BE 150 MICROINCHES MINIMUM AT THE CONTACT AREA.

**3.4 MECHANICAL CHARACTERISTICS**

- 3.4.1. **WORKMANSHIP.** PLCC SOCKETS SHALL BE UNIFORM IN QUALITY AND SHALL BE FREE FROM BURRS, SCRATCHS, CRACKS, VOIDS, CHIPS, BLISTERS, PIN HOLES, SHARP EDGES, AND OTHER DEFECTS THAT WILL ADVERSELY AFFECT LIFE OR SERVICEABILITY.
- 3.4.2. **CONTACT RETENTION.** THE INDIVIDUAL CONTACT RETENTION SHALL NOT BE LESS THAN 10 OUNCES (283 GRAMS) MINIMUM WHILE APPLYING A DOWNWARD AXIAL LOAD TO THE SUPPORT MEMBER OF THE CONTACT.
- 3.4.3. **NORMAL FORCE.** THE INITIAL INDIVIDUAL CONTACT NORMAL FORCE SHOULD NOT BE LESS THAN 5.3 OUNCES (150 GRAMS) WHILE MEASURING WITH THE MINIMUM SIZE OF CH.P-GAGE. THE MEASURING METHOD SEE FIG. 3.

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- 3.4.4. **INSERTION FORCE (CHIP MATING)** : WHEN THE PLCC SOCKET IS SUBJECTED TO 5 ENGAGING CYCLING OF MATING WITH MAXIMUM CHIP-GAGE (#PLCC-GXXX) AT A DOWNWARD AXIAL LOAD, AND THE INSERTION FORCES SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.

<u>POS. NBR</u>	<u>MAXI-CHIP GAGE SIZE(+.000-.001)</u>	<u>POUNDS MAX. (KG)</u>
124	1.695" X 1.695"	55(25)
100	1.395" X 1.395"	44(20)
84	1.195" X 1.195"	33(15)
68	.995" X .995"	26(11.8)
52	.795" X .795"	22(10)
44	.695" X .695"	19(8.6)
32	.495" X .595"	15(6.8)
28	.495" X .495"	15(6.8)
20	.395" X .395"	13(5.9)


- 3.4.5. **WITHDRAWL FORCES (CHIP UNMATING)** : WHEN PLCC SOCKET IS SUBJECTED TO 5 ENGAGING CYCLES OF MATING WITH MAX. CHIP-GAGE (#PLCC-GXXX) AT A AXIAL LOAD. THE WITHDRAWL FORCES SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.

<u>POS. NBR</u>	<u>MINI-CHIP GAGE SIZE (+.000-.001)</u>	<u>POUNDS MIN. (KG)</u>
124	1.685" X 1.685"	9.0(4.1)
100	1.385" X 1.385"	7.0(3.2)
84	1.185" X 1.185"	4.5(2.1)
68	.985" X .985"	4.0(1.8)
52	.785" X .785"	3.5(1.6)
44	.685" X .685"	2.0(0.9)
32	.485" X .585"	1.5(0.7)
28	.485" X .485"	1.1(0.5)
20	.385" X .385"	1.1(0.5)

- 3.4.6 **DURABILITY** . AFTER 25 MATING CYCLES WITH MAX-CHIP GAGE AT A RATE OF .5 INCH/MINUTES. THERE SHALL BE NO DAMAGE TO THE HOUSING OR CONTACTS. THE PLCC SOCKET SHALL ALSO MEET THE PARAGRAPH 3.5.3 REQUIREMENTS.

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3.4.7. **ADHESION BENDING TEST.** THE CONTACT AFTER BENDING 90 DEGREE, THE PLATING AT THE BENDING POINT, SHALL NOT PEELED OFF. TO BE CHECKED AT 10X MICROSCOPE. IN ACCORDANCE WITH BUS-19-040 SPECIFICATION.

3.4.8. **SOLDERABILITY TEST.** THE CONTACT LEADS SHALL HAVE A SOLDER COVERAGE OF 95% MINIMUM IN ACCORDANCE WITH BUS-19-002 SPECIFICATION.

**3.5. ELECTRICAL CHARACTERISTICS.**

3.5.1. **RATING CURRENT :** 1.0A, AC/DC.

3.5.2. **RATING VOLTAGE :** 120V, AC/DC.

3.5.3. **TERMINATION RESISTANCE, DRY CIRCUIT (LOW LEVEL).** WHEN TESTED IN ACCORDANCE WITH MIL-STD-1344, METHOD 3002, THE RESISTANCE SHALL NOT EXCEED 30 AND 20 MILLIOHMS MAXIMUM INITIAL FOR THE "THROUGH-HOLE" AND "SMT" TYPE INDIVIDUALLY. DELTA R = 6 MILLIOHMS MAXIMUM. WHEN MEASURED RESISTANCE OF SOCKET WITH DUMMY CHIP CARRIER AT 50MV OPEN CIRCUIT AT 100 MA MAXIMUM. AFTER DURABILITY, THE CONTACT RESISTANCE SHALL NOT EXCEED THE INITIAL VALUE BY MORE THAN 30 PERCENT. THE MEASURING POINTS SEE FIG. 2.

3.5.4. **DIELECTRIC WITHSTANDING VOLTAGE.** WHEN TESTED IN ACCORDANCE WITH MIL-STD-1344, METHOD 3001, THERE SHALL BE NO BREAKDOWN OF INSULATION OF FLUSHOVER AT 600 VAC (RMS), 60 HZ, ONE MINUTE HOLD. AND THE TESTING POINTS ARE BETWEEN ADJACENT CIRCUITS OF UNMATED SOCKET ASSEMBLY



3.5.5. **INSULATION RESISTANCE.** WHEN TESTED IN ACCORDANCE WITH MIL-STD-1344, METHOD 3003, THE INSULATION RESISTANCE SHALL BE A MINIMUM OF 10,000 MEGOHMS. THE TESTING POINTS ARE BETWEEN ADJACENT CIRCUITS OF UNMATED SOCKET ASSEMBLY.

3.5.6. **CAPACITANCE.** WHEN TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 305, ONE PICO FARAD MAXIMUM. THE TESTING POINTS ARE BETWEEN CIRCUITS AT 20 RANDOM LOCATIONS OF UNMATED SOCKET ASSEMBLY.

3.5.7. **INDUCTANCE :**  
 SELF : 5.0 nH MAXIMUM AT 500 KHZ.  
 MUTUAL : 1.0 nH MAXIMUM AT 500 KHZ.

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**3.6. ENVIROMENTAL CONDITIONS**

3.6.1. **OPERATING TEMPERATURE RANGE**, -55 TO 125 DEGREE C FOR "40% GF PPS".


3.6.2. **VIBRATION**, WHEN SUBJECTED MATED SOCKET TO 15 G'S, 10-2,000 HZ WITH 100 MA CURRENT APPLIED PER MIL-STD-1344, METHOD 2005, TEST CONDITION III. THERE SHALL NO PHYSICAL OR MECHANICAL DAMAGE TO THE SOCKET DURING VIBRATION. THERE SHALL BE NO DISCONTINUITIES GREATER THAN ONE MICROSECOND, .015 INCH MAXIMUM UPWARD DISPLACEMENT OF CHIP CARRIER FROM FULLY INSTALLED POSITION.

3.6.3. **PHYSICAL SHOCK**, WHEN SUBJECTED MATED SOCKET TO 100 G'S SAWTOOTH IN 6 MILLISECONDS, ONE SHOCK IN EACH DIRECTION APPLIED ALONG THE MUTUALLY PERPENDICULAR PLANES TOTAL 6 SHOCKS PER MIL-STD-1344, METHOD 2004, TEST G. THERE SHALL BE NO DISCONTINUITY OF THE TEST CIRCUIT GREATER THAN ONE MICROSECOND. .015 INCH MAXIMUM UPWARD DISPLACEMENT OF CHIP CARRIER FROM FULLY INSTALLED POSITION. AND DELTA R = 6 MILLIOHMS MAXIMUM, TERMINATION RESISTANCE, DRY CIRCUIT.

3.6.4. **THERMAL SHOCK**, WHEN SUBJECTED SOCKET AND MATED CHIP CARRIER TO 25 CYCLES BETWEEN OPERATING TEMPERATURE RANGE PER MIL-STD-202, METHOD 107, TEST CONDITION B1, THERE SHALL BE NO EVIDENCE OF CRACKING OR CRAZING OF THE BODY OR OTHER PHYSICAL DAMAGE, AND DELTA R = 6 MILLIOHMS MAXIMUM TERMINATION RESISTANCE DRY CIRCUIT.

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**3.6.5 HUMIDITY TEMPERATURE CYCLING** WHEN SUBJECTED SOCKET AND MATED CHIP CARRIER TO 10 HUMIDITY TEMPERATURE CYCLES BETWEEN 25 TO 65 DEGREE C AT 95% RH PER MIL-STD-1344, METHOD 1002, TYPE II (EXCEPT STEPS 7A AND 7B). THE INSULATION RESISTANCE SHALL BE NO LESS THAN 1,000 MEGOHMS, AND DELTA R = 6 MILLIOHMS MAXIMUM COMPARED WITH THE INITIAL TERMINATION RESISTANCE, DRY CIRCUIT.

**3.6.6 HYDROGEN SULFIDE (H<sub>2</sub>S) ATMOSPHERE** AFTER EXPOSE OF THE MATED CHIP CARRIER TO MOIST CONTAMINATED ENVIROMENT, THE LOW LEVEL CIRCUIT RESISTANCE SHALL NOT EXCEED THE INITIAL VALUE BY MORE THAN 30% (SEE PARAGRAPH 3.5.3). THE FOLLOWING DETAILS SHALL APPLY :

- (a) TEST MEDIUM ----- 3 ppm H<sub>2</sub>S IN AIR
- (b) TEST TEMPERATURE ----- +40 DEGREE C
- (c) TEST DURATION ----- 48 HOURS

**3.6.7 SOLVENT RESISTANCE** THE PLCC SOCKETS SHALL BE CAPABLE OF BEING TOTALLY IMMERSSES IN TRICHOETHYLENE AND/OR AQUEOUS SOLUTION FOR 90 SECONDS AND ALLOWED TO DRY AT ROOM TEMPERATURE FOR THIRTY MINUTES. THERE SHALL BE NO EVIDENCE OF SWELLING, CRACKING DIMENSIONAL CHANGE, OR ANY OTHER DEFECT THAT WOULD AFFECT THE FUNCTION AND SERVICE OF THE PLCC SOCKET.

**4.0 QUALITY ASSURANCE PROVISIONS**

**4.1 QUALIFICATION TESTING**

**4.4.1 SAMPLE SELECTION** SOCKETS SHALL BE PREPARED IN ACCORDANCE WITH APPLICABLE INSTRUCTION SHEETS, THEY SHALL BE SELECTED AT RADOM FROM CURRENT PRODUCTION. TEST GROUPS 1,3,4,5,6,7, AND 8 SHALL CONSIST OF 2 SOCKETS PER GROUP. TEST GROUP 2 SHALL CONSIST OF 4 SOCKETS (2 FOR DISCONTINUITY TESTING, 2 FOR TERMINATION RESISTANCE), TEST GROUP 9 SHALL CONSIST OF 8 SOCKETS. TOTAL OF 26 SOCKETS, 10 MATING CHIP CARRIERS AND 10 TEST BOARDS ARE REQUIRED FOR TESTING.

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4.1.2. TESTING SEQUENCE. QUALIFICATION INSPECTION SHALL BE VERIFIED BY TESTING SAMPLES AS SPECIFIED IN FIGURE 1.



TEST OR	TEST GROUP								
	1	2	3	4	5	6	7	8	9
	TEST SEQUENCE								
-EXAMINATION OF PRODUCT	1	1	1	1	1	1	1	1	1
-TERMINATION RESISTANCE	2,6	2,5		2,4,6		2,4			
-DIELECTRIC WITHSTANDING VOLTAGE					3,7				
-INSULATION RESISTANCE					2,6				
-CAPACITANCE									
-VIBRATION							2		
-PHYSICAL SHOCK		3							
-CONTACT RETENTION		4							
-CHIP INSERTION FORCE			2						
-CHIP WITHDRAWL FORCE	3								
-DURABILITY	4								
-SOLDERABILITY	5								
-THERMAL SHOCK								2	
-HUMIDITY TEMPERATURE CYCLING				3	4				
				5	5				
-HYDROGEN SULFIDE									
-SOLVENT RESISTANCE						3			2

FIGURE 1. SOCKET QUALIFICATION TESTS AND SEQUENCES

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**4.1.3. ACCEPTANCE.**

- (a) REQUIREMENTS PUT ON TEST SAMPLES, AS INDICATED IN THE REQUIREMENTS PORTION OF ABOVE MENTIONED. EXIST AS EITHER THE UPPER OR LOWER STATISTICAL TOLERANCE LIMIT (95% CONFIDENCE, 99% RELIABILITY). ALL SAMPLE TESTED IN ACCORDANCE WITH THIS SPECIFICATION SHALL MEET THE STATED TOLERANCE LIMIT. ALSO THE VISUAL AND MECHANICAL EXAMINATION SHALL MEET THE MAJOR : 0.25% AND THE MINOR : 0.65% AQL REQUIREMENTS.
- (b) FAILURES ATTRIBUTED TO EQUIPMENT, TEST SETUP, OR OPERATOR DEFICIENCIES SHALL NOT DISQUALIFY THE PRODUCT, WHEN PRODUCT FAILURE OCCURES, CORRECTIVE ACTION SHALL BE TAKEN AND SAMPLES RESUBMITTED FOR QUALIFICATION.

**4.2. REQUALIFICATION.** REQUALIFICATION SHALL BE ESTABLISHED BY THE COGNIZANT DIVISIONAL ENGINEERING FUNCTION AND MAY CONSIST OF ALL OR ANY PART OF THE OVERALL QUALIFICATION PROGRAM PROVIDED THAT IT IS CONDUCTED WITHIN THE REQUIRED TIME PERIOD.

**4.3. QUALITY CONFORMANCE INSPECTION.** THE APPLICABLE DUPONT INSPECTION PLAN WILL SPECIFY THE SAMPLING ACCEPTABLE QUALITY LEVEL TO BE USED DIMENSIONAL AND FUNCTIONAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE APPLICABLE PRODUCT DRAWING AND THIS SPECIFICATION.

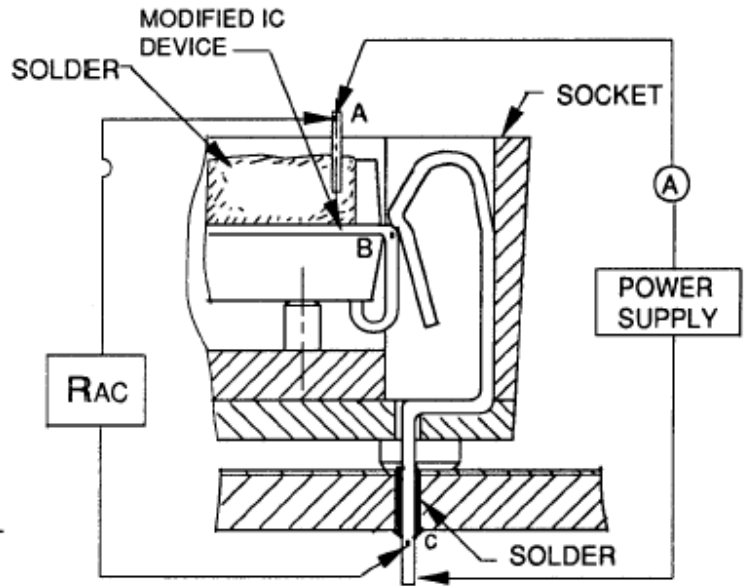
**5.0 PACKAGING AND SHIPPING.**

**5.1. PACKING.** THE PACKING AND PACKAGING SHALL BE IN ACCORDANCE WITH THE INDUSTRY STANDARD PRACTICE IN A MANNER TO INSURE CARRIER ACCEPTANCE AND SAFE DELIVERY TO DESTINATION PER DES-14-522 PACKAGING SPECIFICATION ( WITH PVC TUBE PACKAGING).

**5.2. PACKAGING MARKING.** EACH SHIPPING CONTAINER SHALL BE CLEARLY MARKED WITH THE NAME OF THE CONTENTS, THE AMOUNT OF CONTAINED, THE CONTRACT ORDER NUMBER, THE DUPONT PART NUMBER, THE NAME OF THE CONTRACTOR, AND THE NAME OF THE RECEIVING PART, AS LISTED IN THE PROCUREMENT DOCUMENT,

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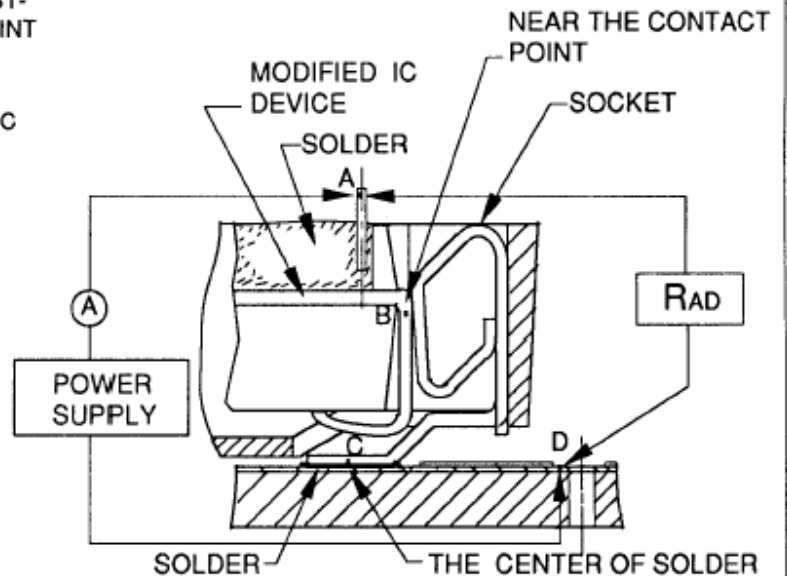
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FOR THE THROUGH HOLE VERSION

REMARK :

- 1.) FOR THE THROUGH-HOLE TYPE, THE CONTACT RESISTANCE SHALL BE MEASURED BETWEEN POINT B AND C. THE FORMULA IS  $R_{BC} = R_{AC} - R_{AB}$ .
- 2.) FOR THE SMT TYPE, THE CONTACT RESISTANCE SHALL BE MEASURED BETWEEN POINT B AND C. THE FORMULA IS  $R_{BC} = R_{AD} - (R_{AB} + R_{CD})$ .
- 3.) THE OUTSIDE DIMENSIONS OF MODIFIED IC DEVICE SHOULD MEET "JEDEC" SPEC. #MO-047AA-AH OR #MO-052AE.
- 4.) SOLDER : 63% TIN 37% LEAD.

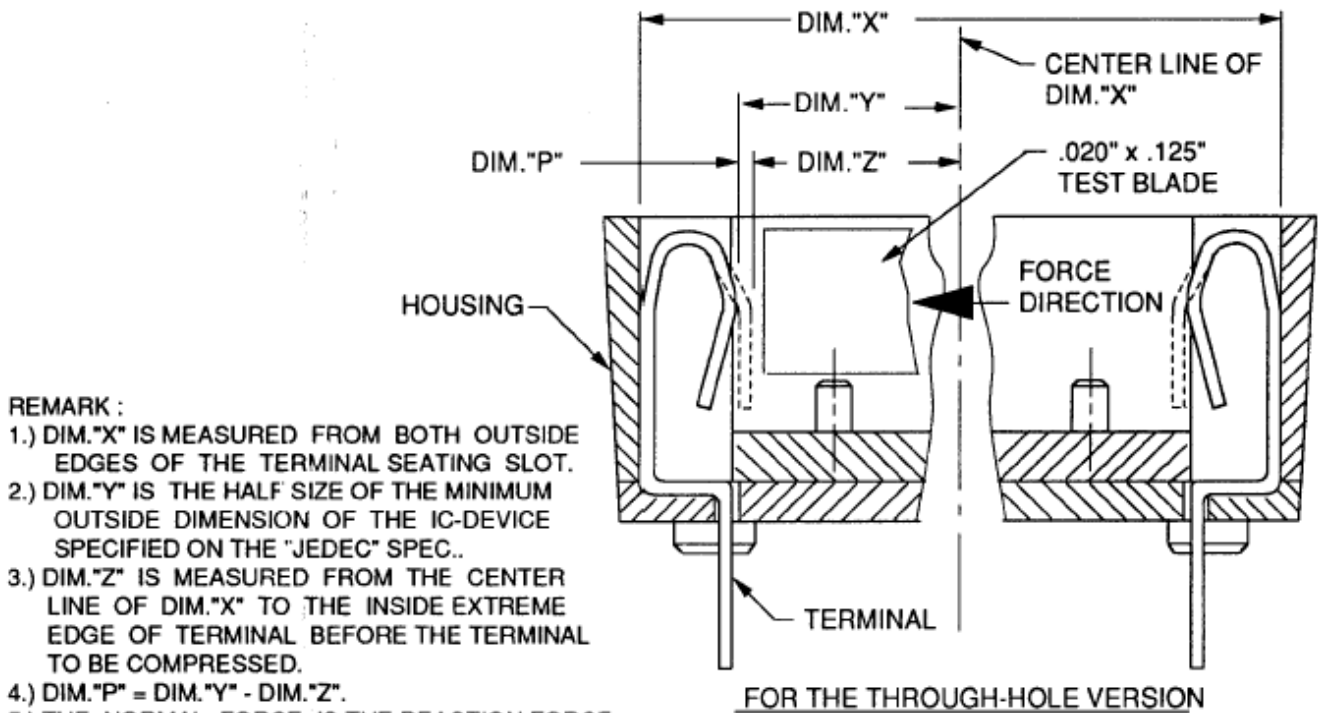


FOR THE SURFACE MOUNT VERSION

FIGURE.2 RESISTANCE MEASUREMENT POINTS

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**REMARK :**

- 1.) DIM."X" IS MEASURED FROM BOTH OUTSIDE EDGES OF THE TERMINAL SEATING SLOT.
- 2.) DIM."Y" IS THE HALF SIZE OF THE MINIMUM OUTSIDE DIMENSION OF THE IC-DEVICE SPECIFIED ON THE "JEDEC" SPEC..
- 3.) DIM."Z" IS MEASURED FROM THE CENTER LINE OF DIM."X" TO THE INSIDE EXTREME EDGE OF TERMINAL BEFORE THE TERMINAL TO BE COMPRESSED.
- 4.) DIM."P" = DIM."Y" - DIM."Z".
- 5.) THE NORMAL FORCE IS THE REACTION FORCE WHILE THE TEST BLADE APPLIED A DIM."P" DEFLECTION IN THE HORIZONTAL DIRECTION.

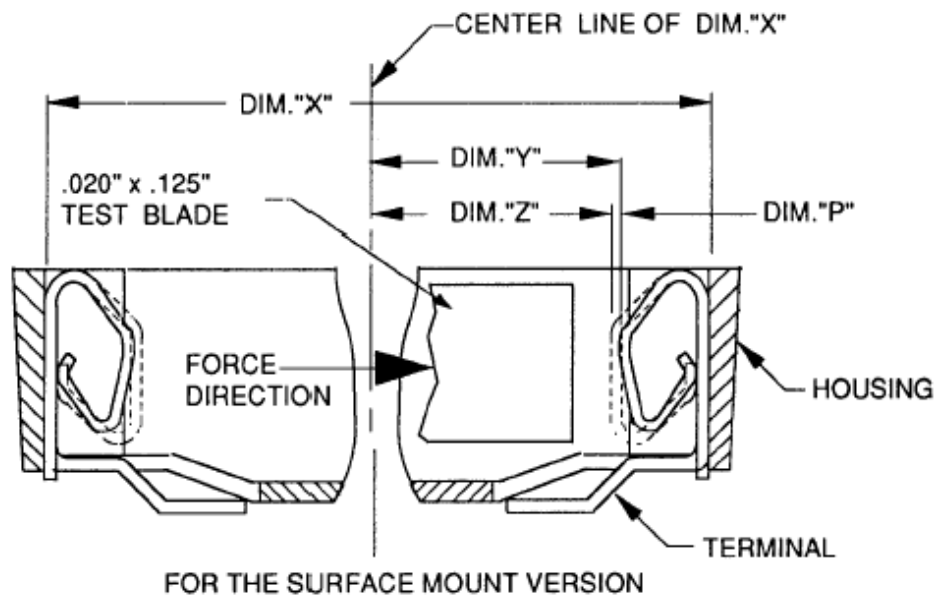


FIGURE.3 NORMAL FORCE MEASUREMENT



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