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JAN TRANSISTOR AND DIODE CHARACTERIZATION TEST PROGRAM

FINAL REPORT
FOR
JANTX DIODE
1N759A

MARCH 1977
Prepared
for

GEORGE C. MARSHALL SPACE FLIGHT CENTER
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Marshall Space Flight Center, Alabama 35812

MSFC/NASA CONTRACT No. NAS8-31944

by
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FORWARD

This report is a statistical summary of the electrical characterization performed on NASA Contract NA8-31944. This is one of a group of thirty-nine (39) such reports prepared on selected JAN and JANTX Transistors and Diodes for the George C. Marshall Space Flight Center, Huntsville, Alabama. The Contracting Officer's Technical Representative was Mr. Howard B. Meeks.

This work was performed by DCA Reliability Laboratory, Special Products Division, Sunnyvale, California under the management of Mr. Robert Starr with the special assistance of Mr. Barry Lorenzo, Mr. Kenneth Radford and Mr. Hiroharu Takeda.

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1.0 INTRODUCTION

The objective of this characterization program is to provide the necessary data to create a new class of 19500 detail specifications "JAN A CLASS".

1.1 SAMPLE SELECTION

Sample selection was made according to the following criteria:

1. Manufacturer or qualified distributor.
2. Two vendors.
3. Two date codes.

1.2 PROCUREMENT GUIDELINES

The general guidelines for procurement were:

1. Two QPL vendors
2. JAN or JANTX
3. Two (2) manufacturing lots (Date Codes), twenty-seven (27) from each lot.

2.0 TECHNICAL SUMMARY

The devices used in this report were JANTX 1N759 Diodes manufactured by Siemens and Texas Instruments.

All data was acquired with three (3) digit accuracy. The data processing and calculation of statistical parameters was performed by the Tektronix S-3260 computer system using four (4) digit display.

2.1 TEST PARAMETERS AND CONDITIONS

2.1.1 I_R V_R = 9.6V (80% of Rated V_Z) T_A = 25°C & 150°C

2.1.2 V_{Z1} I_Z = 20.0mA T_A = 25°C, -65°C & 125°C

2.1.3 V_{Z2} I_Z = 35.0mA T_A = 25°C, -65°C & 125°C

2.1.4 Z_{Z1} I_Z = 20.0mA T_A = 25°C

2.1.5 Z_{Z2} I_Z = 0.25mA T_A = 25°C

2.1.6 Θ_{J-C} T_A = 100°C

2.2 UNIT DEFINITIONS

NAME	SYMBOL	MULTIPLIER
Kilo	K	10^{3}
Milli	M	10^{-3}
Micro	U	10^{-6}
Nano	N	10^{-9}
Pico	P	10^{-12}

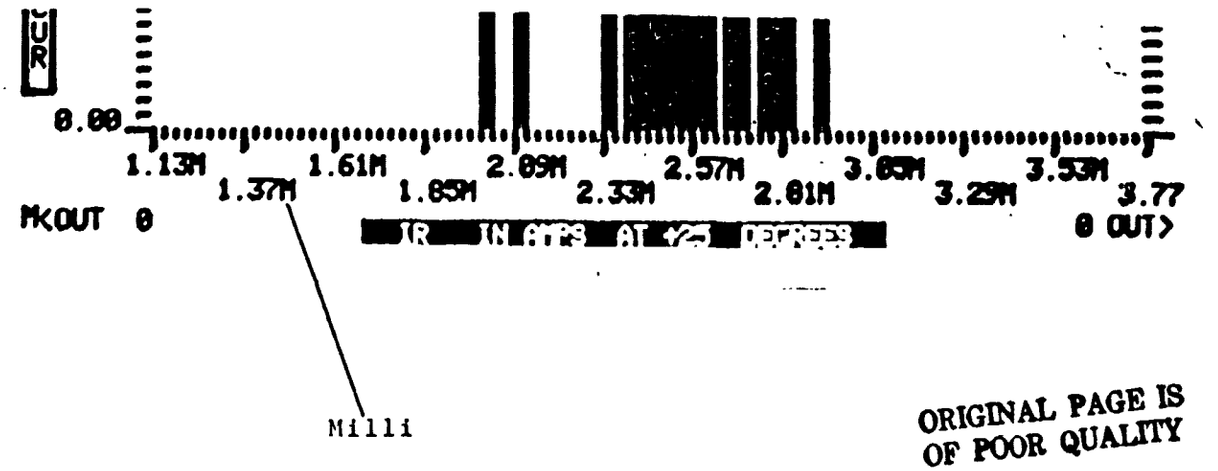
Example using a statistical summary section:

IR IN AMPS AT 25 DEGREES
AT VR=2.64 VOLTS

!MOTO/ 7603!	2.534M	218.7U	2.010M	2.090M	2.780M
!MOTO/ 7550!	2.423M	276.9U	2.010M	2.030M	2.780M
!SIEM/ 7508!	2.997M	426.5U	1.820M	2.490M	3.460M

Milli Micro

Example using a histogram:



Milli

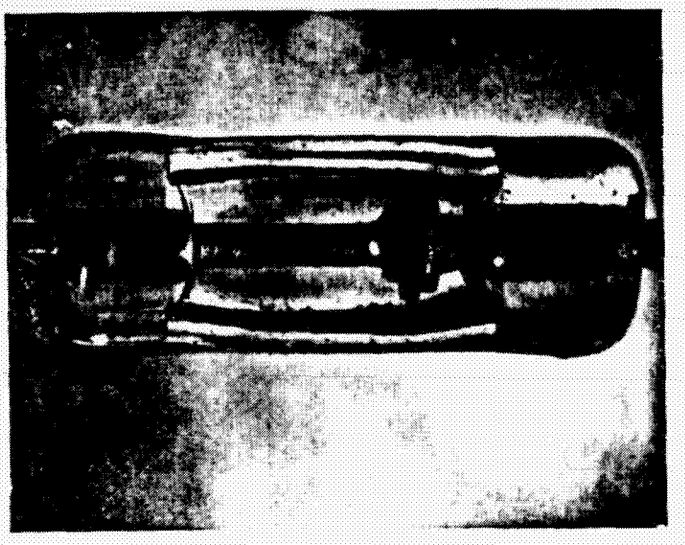


FIGURE 1

Device Number: EO 190-56
15 Diamters
Device Type: IN759A

Typical Internal View
D/C 7530
MFR: Siemens

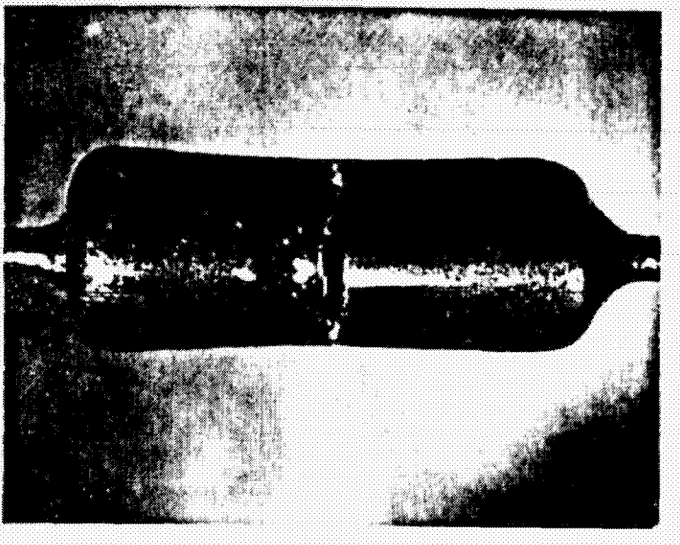


FIGURE 2

Device Number: EO 19145
15 Diameters
Device Type: IN 759A

Typical Internal View
D/C 7506
MFR: Texas Instrument

3.0 STATISTICAL SUMMARY

The Statistical Summary, pages 3-2 to 3-4, are a consolidated presentation of the data acquired formatted for easy Vendor to Vendor and date code to date code analysis. Each parameter is presented with Test Conditions, Mean, Standard Deviation, Lowest Reading, 10% Point (where 10% of all readings are equal to or less than the indicated reading), 90% Point (where 90% of all readings are equal to or less than the indicated reading) and the Highest Reading.

It should be noted the Mean presented in the summary may vary slightly from that presented on the Histograms due to a slight variation in the data base used for calculation.

EXAMPLE:

SIEMENS:	I_R	V_R = 9.6V	T_A = 25°C
Summary:	MEAN	5.713N	
Histogram:	MEAN	4.717N	

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PART NUMBER :1N759

VENDOR :SIEMENS DATE CODE : 7530

VENDOR :TEXAS INS. DATE CODE : 7506

VEND / DC	MEAN	STD. DEV.	LOW PT	10% PT	90% PT	HIGH PT.
IF IN AMPS AT 25 DEGREES AT VR=9.0 VOLTS						
SIEM/ 7530	5.713N	26.34N	10.00P	50.00P	5.080N	186.0N
T.I./ 7506	75.35N	102.4N	11.40N	13.90N	144.0N	579.0N
IF IN AMPS AT 150 DEGREES AT VR=9.0 VOLTS						
SIEM/ 7530	87.12N	206.5N	16.10N	24.00N	75.10N	1.380U
T.I./ 7506	1.343U	2.164U	248.0N	356.0N	2.180U	15.70U
VZ1 IN VOLTS AT 25 DEGREES AT IZT=20.0 MA						
SIEM/ 7530	12.31	182.2M	11.90	11.97	12.54	12.58
T.I./ 7506	12.20	204.5M	11.84	11.91	12.50	12.66
VZ1 IN VOLTS AT -65 DEGREES AT IZ1=20.0 MA						
SIEM/ 7530	11.26	149.9M	10.92	10.97	11.46	11.49
T.I./ 7506	11.21	181.0M	10.91	10.97	11.44	11.65

DCA RELIABILITY LABORATORY

PART NUMBER :1N759

VEND / DC	MEAN	STD. DEV.	LOW PT	10% PT	90% PT	HIGH PT.
VZ1 IN VOLTS AT 125 DEGREES AT IZT=20.0 MA						
SIEM/ 7530	12.78	200.9M	12.33	12.39	13.03	13.17
T.I./ 7506	12.80	260.2M	12.42	12.48	13.08	13.82
VZ2 IN VOLTS AT 25 DEGREES AT IZT=35.0 MA						
SIEM/ 7530	12.70	201.4M	12.22	12.34	12.96	13.00
T.I./ 7506	12.57	259.4M	12.06	12.19	12.83	13.21
VZ2 IN VOLTS AT -65 DEGREES AT IZT=35.0 MA						
SIEM/ 7530	11.50	162.9M	11.10	11.20	11.71	11.76
T.I./ 7506	11.43	223.2M	11.05	11.16	11.70	11.99
VZ2 IN VOLTS AT 125 DEGREES AT IZT=35.0 MA						
SIEM/ 7530	13.06	203.0M	12.61	12.67	13.32	13.36
T.I./ 7506	13.12	265.8M	12.69	12.80	13.50	13.78
ZZ1 IN OHMS AT 25 DEGREES AT IZ=20.0 MA						
SIEM/ 7530	4.158	995.0M	1.600	2.900	5.400	6.300
T.I./ 7506	1.141	862.7M	610.0M	710.0M	1.720	5.390

DCA RELIABILITY LABORATORY

PART NUMBER :1N759

VEND / DC	MEAN	STD. DEV.	LOW PT	10% PT	90% PT	HIGH PT.
ZZ/ IN OHMS AT 25 DEGREES AT IZ=0.25 MA						
SIEM/ 7530	40.40	32.60	5.000	7.000	78.00	154.0
T.I./ 7506	27.86	43.23	3.000	3.000	97.00	153.0
θ -J-C IN DEG/W AT 100 DEGREES (JUNCTION TO CASE)						
SIEM/ 7530	136.5	6.429	125.7	127.5	145.6	147.0
T.I./ 7506	143.4	3.400	133.3	139.4	147.6	150.3