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Evaluation Report

RELIABILITY DEPARTMENT

TEST REPORT NO. TR. 7-0057

J.P.L. Task 37

TEST PERFORMED BY

LIBRASCOPE RELIABILITY DEPARTMENT

ON

2N2369, NPN SILICON

EPITAXIAL TRANSISTORS

MANUFACTURED BY

FAIRCHILD SEMICONDUCTOR

950230

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TABLE OF CONTENTS

TABLE OF CONTENTS (Cont.)

ABSTRACT

This report presents the results of a test program requested by Jet Propulsion Laboratory to determine the effects of a sequence of environments on the electrical parameters of the 2N2369 transistors manufactured by Fairchild Semiconductors. The environments consisted of temperature effects, temperature storage, thermal and mechanical shock, vibration, acceleration, humidity, low temperature and operating life.

Parameters monitored were h_{FE1}, h_{FE2}, $V_{CE(SAT)}$, $V_{BE(SAT)}$, I_{CBO}, BV_{CBO} and BV_{EBO}.

One hundred and twenty transistors were received from Jet Propulsion Laboratory for evaluation. Ten units were set aside to check instrumentation. The 110 remaining were divided into five test groups. Group I was used as control group. Group II was subjected to thermal environments, operating life and low temperature storage. Group III was subjected to thermal and mechanical environments, operating life and acceleration. Group IV was subjected to the mechanical environments, operating life and acceleration. Group V was placed immediately into an operational life test.

Initial electrical parameter measurements were made prior to any environmental testing. Four failures were noted during the initial measurements. Two devices were catastrophic failures and two had degradation failures.

Devices in Groups II and III were then subjected to the temperature effects test. Measurements were made of the parameters while the device was at temperature. There were 13 catastrophic failures during the temperature effects test.

ABSTRACT (Cont.)

Following the temperature effects test, the devices in Groups II and III were subjected to a temperature storage test at an ambient temperature of 200° C for a period of 200 hours. Two failures were noted during the post temperature storage environment. One device was a catastrophic failure and one device had a degradation failure.

Devices in Groups II and III were then subjected to ten cycles of temperature cycling from -55° C to +125° C. Two devices were catastrophic failures following the temperature cycling environment.

Devices in Groups III and IV were subjected to ten shocks each with a 1500 G peak amplitude and a duration of 1 ±. 5 milliseconds in each of two directions for a total of 20 blows. One catastrophic failure was noted at the post environmental data point.

Devices in Groups III and IV were subjected to three, five-minute cycles of 35 G R M S sinusoidal acceleration from 70 to 3000 to 70 cps in each of two axes. One catastrophic failure was noted at the post environmental data point.

Devices in Groups III and IV were subjected to ten cycles of humidity per MIL-STD-202B, Method 106A (excluding Step 7). Six catastrophic failures were noted at the post environmental data point. Surface corrosion was noted on the transistor leads and headers following the humidity test.

All devices were then subjected to 2000 hours of operating life at an ambient temperature of 100° C with a power dissipation of 200 milliwatts. There was a total of sixteen failures during operating life. Seven devices were catastrophic failures and 9 devices had degradation failures. The seven

catastrophic failures were primarily due to collector-base breakdown. The nine degradations were primarily due to I_{CBO} leakage current increasing more than one order of magnitude from the initial value.

Devices in Groups III and IV were then subjected to an acceleration test of 20,000 G's for a period of one minute in each of the three mutually perpendicular axes. Two devices were catastrophic failures following the acceleration test.

The devices in Group II were subjected to a low temperature storage test, -180° C non-operational, for a period of 96 hours. One catastrophic failure was noted during the post environmental data point.

Table 1 is a summary of the failures noted during the environments testing.

TABLE 1

Mode Of Failure Versus Test Group

* NOTE: A device may be a failure on both lead breakage and another parameter.

GROUP	COLLECTOR-BASE CATASTROPHIC	EMITTER-BASE CATASTROPHIC	COLLECTOR-BASE AND EMITTER-BASE CATASTROPHIC	I_{CBO} DEGRADATION	BREAKDOWN VOLTAGE DEGRADATION	BETA DEGRADATION	LEAD BREAKAGE	* TOTAL	%
I	0	1	3	0	0	0	* 2	5	50%
II	9	1	4	0	0	0	0	14	70%
III	1	0	5	0	1	0	1	8	80%
IV	2	0	5	3	1	0	* 2	12	60%
V	2	0	2	4	2	2	0	12	24%
TOTAL	14	2	19	7	4	2	5		

ABSTRACT (Cont.)

Measurement data from this test was analyzed in accordance with JPL Specification ZPP20040. At each measurement point an analysis was performed to determine if a significant change in measurement values had occurred since the measurements were last taken. A significant change could be either a shift in the arithmetic mean and/or the variance (a measure of data dispersion or spread). In the interpretation of the results, it was recognized that a statistically significant finding is not necessarily significant as an engineering result (though significant engineering results based upon measurement data should be statistically significant). In this sense the statistical findings were used to detect possibly significant engineering results, and to confirm engineering results based upon the measurement data.

Histograms were prepared on the initial and final parameter measurements. The histograms provide a quick visualization of the measurement data. They are useful in setting realistic tolerances, and in detecting pronounced non-normality of the measurement distributions (which in turn affect whether or not a statistical result is significant).

This report is engineering oriented. Statistical findings are incorporated with the engineering results.

REPORT DATA

1.0 INTRODUCTION-

1.1 Objectives:

The purpose of testing the Fairchild Semiconductor 2N2369, NPN Silicon Planar Epitaxial Transistor was to gain information on device performance when subjected to a sequence of environment. This information will determine the acceptability of the device.

1.2 Test Plan:

The 120 devices received for testing were inspected for physical anomalies and numbered from 1 to 110 for identification. The remaining ten devices were set aside for use in checking the instrumentation and operating life test circuits.

The devices were inserted into Tektronix transistor adapters during the parameter measurements. No solder connections were made on the devices at any time. A specially designed multiple-package capability fixture made of magnesium was used for the mechanical shock and vibration environments. Extensive research was conducted to determine if any objectionable resonant frequencies existed. Results proved these fixtures had no measureable resonances below 3700 cps.

Parameters monitored after each environmental exposure were as follows:

1. h_{FE1}
2. h_{FE2}
3. $V_{BE(SAT)}$
4. $V_{CE(SAT)}$
5. I_{CBO}
6. BV_{CBO}
7. BV_{EBO}

1.0 INTRODUCTION (Cont.)-

1.2 Test Plan (Cont.):

The preceding parameters will be referred to hereafter in this report as "post environmental measurements".

The initial and final electrical measurements included C_{ob}, $V_{CEO(SUST)}$, the switching times and the post environmental measurements.

Table 1 gives the requirements of these measurements in addition to the electrical characteristics of the devices under test.

All measurements were made at room ambient temperature (25° C ±3° C) and the devices were allowed to stabilize for a minimum of eight hours before any measurements were made, unless otherwise specified.

Prior to the initial measurements the devices were divided into five groups as follows:

Group I - Devices numbered 1-10 inclusive were used as control devices and were measured at each data point.

Group II - Devices numbered 11-30 inclusive were used as thermal environment units.

Group III - Devices numbered 31-40 inclusive were used as thermal and mechanical environment units.

Group IV - Devices numbered 41-60 inclusive were used as mechanical environment units.

Group V - Devices numbered 61-110 inclusive were used as the operating life test units and did not undergo the thermal or mechanical tests.

1.0 INTRODUCTION (Cont.)-

1.2 Test Plan (Cont.):

The devices in Group I through V were subjected to the environments listed in Table 2.

TABLE 1

Electrical Requirements

PARAMETER	SYMBOL	CONDITION	INITIAL		POST ENVI.		UNITS
			MIN.	MAX.	MIN.	MAX.	
Forward Current Gain	h_{FE1}	I_C=10 ma Pulse V_{CE}=1.0V	40	120	-	-	-
	h_{FE2}	I_C=100 ma Pulse V_{CE}=2V	20	-	-	-	-
Saturation Voltages	$V_{BE(SAT)}$	I_C=10 ma I_B=1.0 ma	0.7	0.85	-	.935	V
	$V_{CE(SAT)}$	I_C=10 ma I_B= 1.0 ma	-	0.25	-	.275	V
Capacitance	C_{ob}	V_{CB}=5V I_E=0	-	4	-	-	pf
Leakage Current	I_{CBO}	V_{CB}=20V	-	0.4	-	-	ua
Breakdown Voltage	BV_{CBO}	I_C= 10 ua	40	-	38	-	V
	$V_{CEO(SUST)}$	I_C=10 ma Pulse I_B= 0	15	-	14	-	V
	BV_{EBO}	I_E=10 ua I_C=0	4.5	-	4.0	-	V
Switching Times	τ	I_C=I_{B1}=I_{B2}=10ma	-	13	-	-	n sec.
	T_{on}	I_C=10 ma I_{B1}=3 ma I_{B2}=1.5 ma	-	18	-	-	n sec.

1.0 INTRODUCTION (Cont.)-

1.2 Test Plan (Cont.):

TABLE 1 (Cont.)

PARAMETER	SYMBOL	CONDITION	INITIAL MIN.	INITIAL MAX.	POST ENVI. MIN.	POST ENVI. MAX.	UNITS
Switching Times	T_{off}	I_C=10ma I_{B1}= 3 ma I_{B2}=1.5 ma	-	18	-	-	n sec.

TABLE 2.

Tests To Which Each Group Was Subjected

	Group I	Group II	Group III	Group IV	Group V
Initial Measurements Paragraph 2.2	×	×	×	×	×
Temperature Effects Paragraph 2.3	*	×	×		
Temperature Storage Paragraph 2.4	*	×	×		
Temperature Cycling Paragraph 2.5	*	×	×		
Mechanical Shock Paragraph 2.6	*		×	×	
Vibration Paragraph 2.7	*		×	×	
Humidity Paragraph 2.8	*		×	×	
Operating Life (2000 Hours) Paragraph 2.9	*	×	×	×	×
Final Measurements Paragraph 2.9	*	×	×	×	×
Low Temperature Paragraph 2.10	*	×			

1.0 INTRODUCTION (Cont.)-

1.2 Test Plan (Cont.):

TABLE 2. (Cont.)

	Group I	Group II	Group III	Group IV	Group V
Acceleration Paragraph 2.11	*		×	×	

* The devices in Group I were measured at each data point.

1.2.1 Failure Analysis:

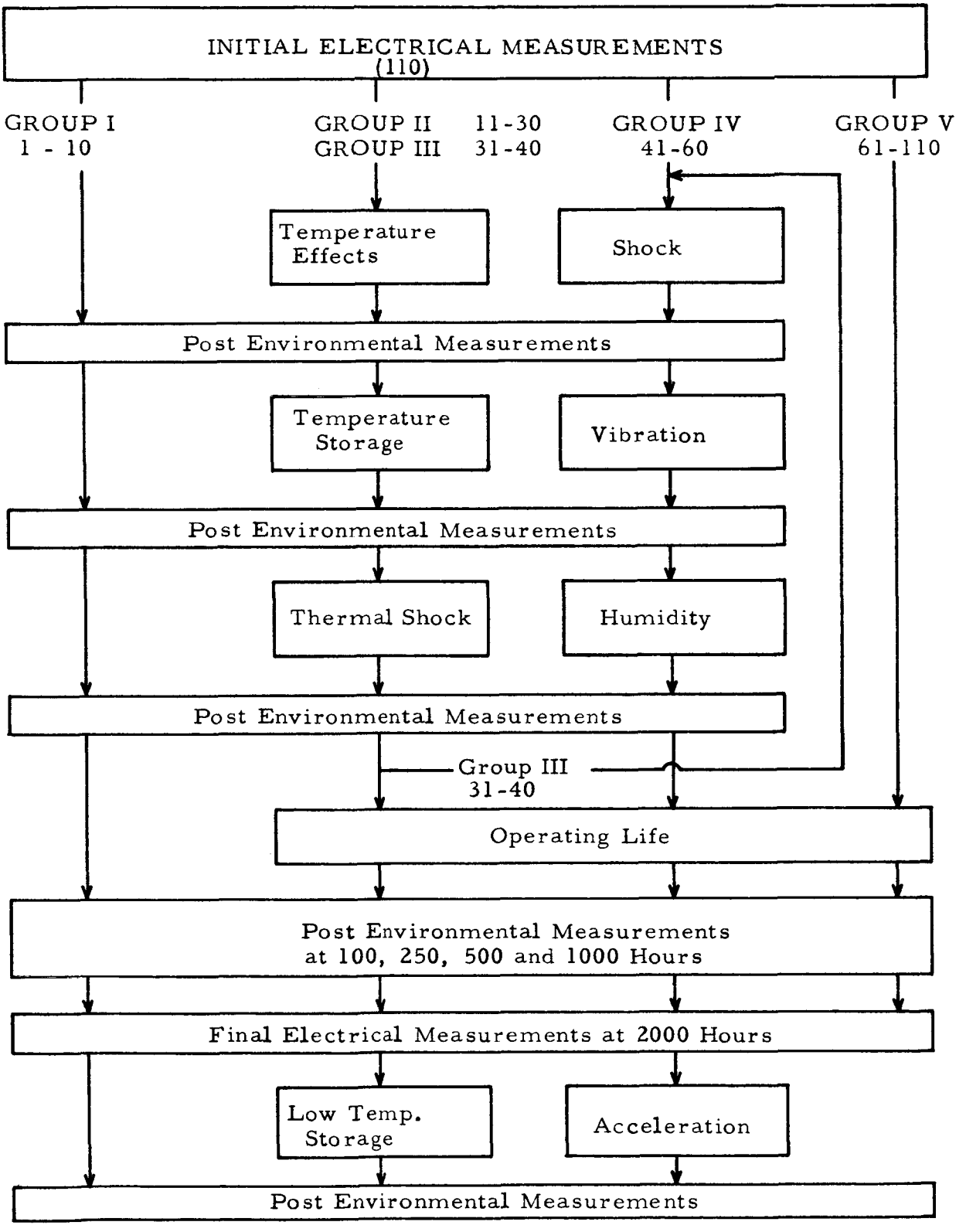
Any device which failed catastrophically was removed from the testing sequence and subjected to failure analysis. A failure description for each failure appears in the conclusions section of this report.

1.2.2 Degradation Criteria:

Current Gain:	h_{FE1}	±20% of the initial measurement value or a minimum Beta of 36 or a maximum Beta of 132.
	h_{FE2}	±20% of the initial measurement value or a minimum Beta of 18.
Leakage Current:		+100% of the maximum specification limit or one order of magnitude change above 10 namps, whichever was smaller.
Breakdown Voltage:		95% of the minimum specification limit.
Saturation Voltage:		+10% increase in maximum specification limit.

2.0 TEST PROCEDURES-

2.1 Test Sequence Flow Diagram:



2.0 TEST PROCEDURES (Cont.)-

2.2 Initial Electrical Parameter Test:

Initial measurements of the electrical parameters were performed per the requirements of Table I, on the Continental Device Corporation test equipment.

2.3 Temperature Effects Test:

The devices in Group II and III were subjected to the temperature effects test as follows: The test devices were mounted into clips on a Continental Device Corporation operating life test board. The board was inserted into a connector on the door of the test chamber. A similar board was inserted into the connector on the outside of the chamber. A shroud was installed over both boards and a flow of dry nitrogen used as a moisture shield.

The devices were subjected to the temperature effects test as shown in Figure 1.

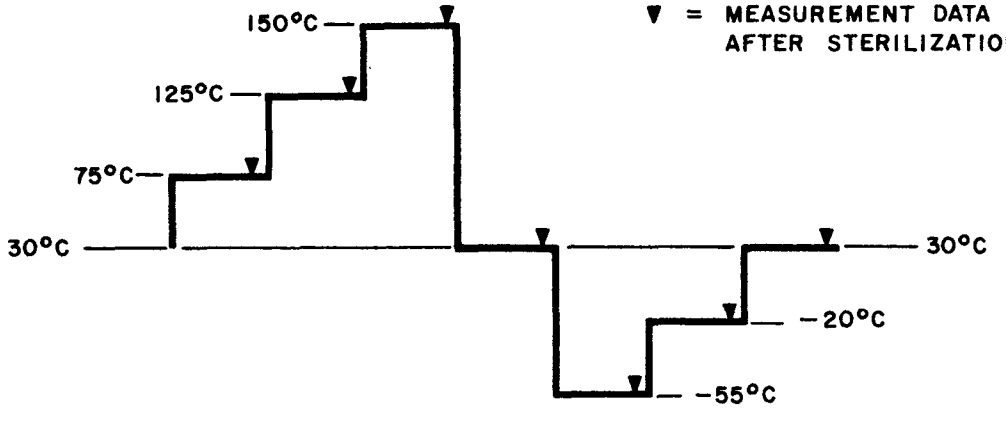


Figure 1. Temperature Effects

2.0 TEST PROCEDURES (Cont.)-

2.4 Temperature Storage Test:

Devices in Group II and III were subjected to an ambient temperature of 200° C ±5° C, non-operating, for a duration of 200 hours. The post environmental measurements were performed at the completion of the temperature storage test.

2.5 Thermal Shock Test:

The transistors in Group II and III were subjected to ten cycles of thermal shock as follows: The devices were exposed to a temperature of -55° C $^{-3^\circ C}_{+0^\circ C}$ for a period of 30 minutes. They were then removed from the extreme cold and immediately placed in a chamber at +125° C $^{+3^\circ C}_{-0^\circ C}$ for a period of 30 minutes.

Transition between chambers was less than two minutes. The sequence from cold to hot is one cycle and was continued for a total of ten cycles. The post environmental measurements were performed at the completion of thermal shock.

2.6 Mechanical Shock Test:

The devices in Group III and IV were subjected to ten impacts, each impact having a 1500 G peak amplitude and a duration of 1 ±.5 milliseconds in both a radial and a longitudinal direction for a total of 20 blows. Post environmental measurements were performed at the completion of the mechanical shock test.

2.7 Vibration Test:

The devices in Group III and IV were securely mounted in a specially designed multiple-package fixture made of magnesium. Extensive research was conducted to determine if any objectionable resonant frequencies existed. Results proved these special

2.0 TEST PROCEDURES (Cont.)-

2.7 Vibration Test (Cont.):

fixtures had no measurable resonances below 3700 cps. The devices were subjected to three cycles of 35 G RMS sinusoidal acceleration swept from 70 to 3000 to 70 cps. The transistors were vibrated in both the radial and longitudinal axes. Vibration time was five minutes per sweep for a total of 15 minutes in each plane. Post environmental measurements were performed at the completion of the vibration test.

2.8 Humidity Test:

The devices in Group III and IV were subjected to ten cycles of humidity per MIL-STD-202B, Method 106A, Figure 106-1 (excluding Step 7). Post environmental measurements were performed at the completion of the humidity test.

2.9 Operating Life Test:

The devices in Group II, III, IV and V were subjected to an operating life test for a period of 2000 hours at a ambient temperature of $100^{\circ}\ ^{+3^{\circ}}_{-0^{\circ}}$ C. The devices were operated in a common base mode with a V_{CB} of 30.8 volts and a I_C of 6.5 milliamps for a maximum power dissipation of 200 milliwatts. The operating life test was interrupted at 100 hours, 250 hours, 500 hours, 1000 hours and 2000 hours for electrical parameter measurements. After each interruption a minimum of eight hours was allowed for stabilization at room ambient temperature before the post environmental measurements were made. At the completion of the 2000 hours life test a minimum

2.0 TEST PROCEDURES (Cont.)-

2.9 Operating Life Test (Cont.):

of 48 hours was allowed for stabilization before the final electrical measurements were made. The final measurements were made before Group II was subjected to the low temperature, and Group III and IV were subjected to acceleration. The life test circuit is included in the Appendix of this report.

2.10 Acceleration Test:

At Jet Propulsion Laboratory the devices in Group III and IV were subjected to an acceleration test of 20,000 G for a period of one minute in each of the three mutually perpendicular planes. Post environmental measurements were made at the completion of the acceleration test.

2.11 Low Temperature Test:

The devices in Group II, non-operational, were subjected to a low temperature test at Jet Propulsion Laboratory. The devices were subjected to an ambient temperature of -180°C for a period of 96 hours. Post environmental parameter measurements were made at the completion of the low temperature test.

3.0 TEST RESULTS-

3.1 Initial Electrical Parameter Test Results:

Initial electrical parameter measurements were within the manufacturer's specification with the exception of four devices. Two devices were catastrophic failures and two devices were below the manufacturer's specification on BV_{CBO}. Table 3 is a summary of the failures noted during the initial parameter measurements.

3.0 TEST RESULTS (Cont.)-

3.1 Initial Electrical Parameter Test Results (Cont.):

TABLE 3

Failures Noted During Initial Parameter Measurements

DEVICE NO.	FAILURE CLASSIFICATION	PARAMETER FAILURE	MEASURED VALUE WHEN FIRST DETECTED	FINAL VALUE
57	Catastrophic	BV_{CBO}	2.4 Volts	--
		BV_{EBO}	2.4 Volts	--
76	Catastrophic	BV_{CBO}	Short	--
		BV_{EBO}	3.4 Volts	--
95	Degradation	BV_{CBO}	34.3 Volts	34.1 Volts
99	Degradation	BV_{CBO}	39.4 Volts	39.6 Volts

3.2 Temperature Effects Test Results:

There were 13 catastrophic failures during the temperature effects test. Secondary breakdown was noted on three of the 13 catastrophic failures. A plot of the mean and 90% confidence limits of the mean is included in the appendix of this report for each of the parameters measured during the temperature effects test. Table 4 is a summary of the failures noted during the temperature effects parameter measurements.

3.0 TEST RESULTS (Cont.)-

3.2 Temperature Effects Test Results (Cont.):

TABLE 4

Failures Noted Following Temperature Effects

DEVICE NO.	FAILURE CLASSIFICATION	WHEN FIRST DETECTED	PARAMETER FAILURE	MEASURED VALUE WHEN DETECTED
11	Catastrophic	30°C (1st)	BV_{CBO}	Short
12	Catastrophic	30°C (1st)	BV_{CBO}	Short
13	Catastrophic	75°C	BV_{CBO} BV_{EBO}	Short Short
14	Catastrophic	30°C (1st)	BV_{EBO}	Short
15	Catastrophic	75°C	BV_{CBO}	Short
21	Catastrophic	175°C	BV_{CBO} BV_{EBO}	Open Open
22	Catastrophic	75°C	BV_{CBO}	Short
23	Catastrophic	75°C	BV_{CBO}	Short
26	Catastrophic	75°C	BV_{CBO}	Short
27	Catastrophic	75°C	BV_{CBO}	Short
28	Catastrophic	75°C	BV_{CBO}	Short
31	Catastrophic	150°C	BV_{CBO} BV_{EBO}	7.35 Volts Short
34	Catastrophic	150°C	BV_{CBO} BV_{EBO}	Short Open

3.0 TEST RESULTS (Cont.) -

3.3 Temperature Storage Test Results:

There were two failures noted at the electrical parameter measurement data point following the temperature storage test. Table 5 is a summary of the failures noted.

TABLE 5

Failures Noted Following Temperature Storage

DEVICE NO.	FAILURE CLASSIFICATION	PARAMETER FAILURE	MEASURED VALUE WHEN DETECTED
29	Catastrophic	BV_{CBO} BV_{EBO}	Short Short
38	Degradation	BV_{CBO}	37.4 Volts

3.4 Thermal Shock Test Results:

There were two catastrophic failures noted at the electrical parameter measurement data point following the thermal shock test. Table 6 is a summary of the failures noted.

TABLE 6

Failures Noted Following Thermal Shock

DEVICE NO.	FAILURE CLASSIFICATION	PARAMETER FAILURE	MEASURED VALUE WHEN DETECTED
8	Catastrophic	BV_{CBO}	Short
17	Catastrophic	BV_{CBO}	Short

3.0 TEST RESULTS (Cont.) -

3.5 Mechanical Shock Test Results:

One catastrophic failure was noted during the post environmental data point. Table 7 is a summary of the failure noted during the mechanical shock test.

TABLE 7

Failures Noted Following Mechanical Shock

DEVICE NO.	FAILURE CLASSIFICATION	PARAMETER FAILURE	MEASURED VALUE WHEN DETECTED
35	Catastrophic	BV_{CBO}	Short

3.6 Vibration Test Results:

One degradation failure was noted during the post environmental data point. Table 8 is a summary of the failure noted during the vibration test.

TABLE 8

Failures Noted Following Vibration

DEVICE NO.	FAILURE CLASSIFICATION	PARAMETER FAILURE	MEASURED VALUE WHEN DETECTED
41	Degradation	BV_{EBO}	3.81

3.7 Humidity Test Results:

Six catastrophic failures were noted at the post environmental measurements. Table 9 is a summary of the failures noted during the humidity test. The devices subjected to the humidity test also were noted as having surface corrosion on the leads and heads.

3.0 TEST RESULTS (Cont.):

3.7 Humidity Test Results (Cont.):

TABLE 9

Failures Noted Following Humidity

DEVICE NO.	FAILURE CLASSIFICATION	PARAMETER FAILURE	MEASURED VALUE WHEN DETECTED
32	Catastrophic	BV_{CBO}	Short
		BV_{EBO}	Short
33	Catastrophic	BV_{CBO}	Short
		BV_{EBO}	Short
42	Catastrophic	BV_{CBO}	Short
		BV_{EBO}	Short
50	Catastrophic	BV_{CBO}	Short
		BV_{EBO}	Short
56	Catastrophic	BV_{CBO}	Short
		BV_{EBO}	Short
59	Catastrophic	BV_{CBO}	Short
		BV_{EBO}	Short

3.8 Operating Life Test Results:

An increase of collector-base leakage (I_{CBO}) was noted throughout the operating life test. There were seven catastrophic and 8 degradation failures during this test. Results of the test are summarized in Table 10 comparing mode of failure versus time.

3.0 TEST RESULTS (Cont.)-

3.8 Operating Life Test Results (Cont.):

TABLE 10

Summary of Operating Life Test Results

DEVICE NO.	FAILURE CLASSIFICATION	PARAMETER FAILURE	MEASURED VALUE WHEN DETECTED	FINAL VALUE
	100-Hour			
36	Catastrophic	Lead	--	--
107	Degradation	h_{FE2}	26.3	30.3
	250-Hour			
47	Degradation	I_{CBO}	150 na	20 na
82	Degradation	I_{CBO}	1030 na	192 na
86	Catastrophic	BV_{CBO}	Short	--
87	Catastrophic	BV_{CBO}	Short	--
	500-Hour			
64	Degradation	I_{CBO}	140 na	88 na
108	Degradation	I_{CBO}	140 na	88 na
		1000-Hour		
46	Catastrophic	BV_{CBO}	Short	--
49	Catastrophic	BV_{CBO}	Short	--
83	Degradation	I_{CBO}	260 na	4 na
96	Degradation	h_{FE1}	39.4	56.2
	2000-Hour			
43	Catastrophic	BV_{CBO}	15 Volts	--

3.0 TEST RESULTS (Cont.)-

3.8 Operating Life Test Results (Cont.):

TABLE 10 (Cont.)

DEVICE NO.	FAILURE CLASSIFICATION	PARAMETER FAILURE	MEASURED VALUE WHEN DETECTED	FINAL VALUE
	2000-Hour (Cont.)			
51	Degradation	I_{CBO}	850 na	--
70	Catastrophic	BV_{CBO}	Short	--

3.9 Acceleration Test Results:

Two catastrophic failures were noted during the post environmental data point. Table 11 is a summary of the failures noted during the acceleration test.

TABLE 11
Failures Noted Following Acceleration

DEVICE NO.	FAILURE CLASSIFICATION	PARAMETER FAILURE	MEASURED VALUE WHEN DETECTED
37	Catastrophic	BV_{CBO} BV_{EBO}	Open
52	Catastrophic	Lead	Open

Device No. 37 was opened and it was found that the base lead was broken free of the dice.

3.10 Low Temperature Test Results:

One catastrophic failure was noted during the post environmental data point. Table 12 is a summary of the mode of failure.

3.0 TEST RESULTS (Cont.)-

3.10 Low Temperature Test Results (Cont.):

TABLE 12

Failures Noted Following Low Temperature

DEVICE NO.	FAILURE CLASSIFICATION	PARAMETER FAILURE	MEASURED VALUE WHEN DETECTED
16	Catastrophic	BV_{CBO}	Short

4.0 FAILURE ANALYSIS-

All devices regarded as failures as a result of the test program were checked on the Tektronix 575 Transistor Curve Tracer. Failure analysis appears under the specific environment sections.

5.0 STATISTICAL INTERPRETATION OF RESULTS-

A result which is statistically significant is one which is significant at a confidence level of 95 per cent. That is, we make a statement that the change observed is due to a cause other than change; we expect this statement to be correct to the extent that if the test were repeated with similar units, the same general result would be obtained 95 per cent of the time.

Often the cause of a statistically significant result is due to a shift in accuracy of the measurement instrument rather than an effect of environmental stress. This can usually be determined by examination of the control unit measurements. In such cases, where the cause of change is instrumentation accuracy rather than environmental effect, the result is not reported as being statistically significant.

5.1 Failures:

Thirteen out of 30 units failed during temperature effects. Eleven of the failures occurred in Group II which would indicate that units in Group II are significantly different from units in Group III, yet both groups should be the same.

Out of 33 units subjected to mechanical and/or thermal stress, eight failures occurred during the first 100 hours of life test. It can not be said that the causative factor of failure were the mechanical and/or thermal stresses, for by 250 hours the control group had proportionately the same number of failures as Group II, III, and IV. Of interest is the proportionately few failures in Group V.

5.0 STATISTICAL INTERPRETATION OF RESULTS (Cont.)-

5.1 Failures (Cont.):

Following 1000 hours of life test it was observed that three units out of 14 had failed in Group IV.

During acceleration, five out of fourteen units failed.

There were no significant changes observed on the following parameters: $V_{BE(SAT)}$, C_{ob}, $V_{CEO(SUST)}$, τ, T_{on}, and T_{off}.

5.2 h_{FE}:

5.2.1 Vibration:

Group IV had a statistically significant mean increase of 1.8 per cent.

5.2.2 Life Test:

100 Hours

Group IV had a statistically significant mean increase of 1.8 per cent. Group V had a statistically significant mean decrease of 4.3 per cent. One unit in Group V had a measurement decrease of 31.3.

250 Hours:

Group IV had a statistically significant mean increase of 2.7 per cent. One unit in Group IV had a measurement increase of 11.9. Group V had a statistically significant mean decrease of 1.5 per cent.

500 Hours

Group II had a statistically significant mean decrease of 2.0 per cent. One unit in Group IV had a decrease of 43.9.

5.0 STATISTICAL INTERPRETATION OF RESULTS (Cont.)-

5.2 h_{FE1} (Cont.):

5.2.2 Life Test (Cont.):

1000 Hours

Groups II, III, and IV had a statistically significant mean increase of 4.3, 3.9, and 5.5 respectively. Group V had a range of change from -25.8 to 14.7.

2000 Hours

Group IV had a statistically significant mean decrease of 3.8 per cent. Group V had a range of change from -36.6 to 27.0.

5.2.3 Acceleration:

Group V had a statistically significant mean decrease of 1.1 per cent.

5.2.4 Low Temperature:

Group II had a statistically significant mean decrease of 1.0 per cent.

5.3 h_{FE2}:

5.3.1 Life Test:

100 Hours

Groups III, IV, and V had a statistically significant mean increase of 0.9, 1.0 and 1.4 per cent respectively.

1000 Hours

Group V had a statistically significant mean increase of 2.7 per cent.

2000 Hours

Groups II, IV, and V had a statistically significant mean decrease of 4.6, 4.4, and 11.1 per cent respectively. The range of

5.0 STATISTICAL INTERPRETATION OF RESULTS (Cont.)-

5.3 h_{FE2} (Cont.):

5.3.1 Life Test (Cont.):

2000 Hours (Cont.)

measurement change for Group V was from -18.1 to 17.0

5.4 $V_{CE(SAT)}$:

5.4.1 Initial:

Group II had one unit with a measurement of 9.3 volts.

5.4.2 Shock:

Group IV had a statistically significant mean increase of 2.5 per cent.

5.4.3 Life Test:

250 Hours

Group V had a statistically significant mean increase of 2.7 per cent.

500 Hours

Group IV had a statistically significant mean increase of 2.8 per cent. Group V had a statistically significant mean decrease of 2.2 per cent.

5.5 BV_{CBO}:

No significant mean changes were observed. Measurement change for individual units ranged from -13.2 volts to 12.4 volts.

5.6 BV_{EBO}:

No significant mean changes were observed. One unit in Group III had an increase of 46.2 volts during or following acceleration.

5.0 STATISTICAL INTERPRETATION OF RESULTS (Cont.)-

5.7 I_{CBO}:

Group V had a significant mean increase of 37.7, 31.9 and 30.9 per cent after 100, 250, and 500 hours of life test respectively.

6.0 CONCLUSIONS-

There was a total of 51 failures noted during the testing program; thirty five were catastrophic failures, seven were degradation failures on I_{CBO}. A summary of mode of failure versus test group is included in Table 13. Of interest is the high percentage of catastrophic failures in the control group (Group I). This group did not see any of the environments the other devices were subjected to, but had four catastrophic failures. A possibility exists that repeated application of breakdown voltages or currents along with the susceptibility of the device to exhibit secondary breakdown may have been the cause of the catastrophic failures. The extremely small geometry of the dice and planar construction prevent anything more than a hypothesis of the cause of the catastrophic failures.

The large percentage of I_{CBO} failures is due to an increase of leakage current greater than one order of magnitude from the initial value.

6.0 CONCLUSIONS (Cont.)-

TABLE 13

Mode Of Failure Versus Test Group

GROUP	COLLECTOR-BASE CATASTROPHIC	EMITTER-BASE CATASTROPHIC	COLLECTOR-BASE AND EMITTER-BASE CATASTROPHIC	I_{CBO} DEGRADATION	BREAKDOWN VOLTAGE DEGRADATION	BETA DEGRADATION	LEAD BREAKAGE	* TOTAL	%
I	0	1	3	0	0	0	2 *	5	50%
II	9	1	4	0	0	0	0	14	70%
III	1	0	5	0	1	0	1	8	80%
IV	2	0	5	3	1	0	2 *	12	60%
V	2	0	2	4	2	2	0	12	24%
TOTAL	14	2	19	7	4	2	5		

* NOTE: A device may be a failure on both lead breakage and another parameter.

APPENDIX 1

This Appendix contains a Description Of Apparatus, Life Test Circuit, Graphs, J. P. L. Format and, Histograms

DESCRIPTION OF APPARATUS-

Leakage Tester, MTD-18-1, Continental Device Corporation

Pulsed V_{SAT} Tester, 53014-3, Continental Device Corporation

Beta Tester, 43013, Continental Device Corporation

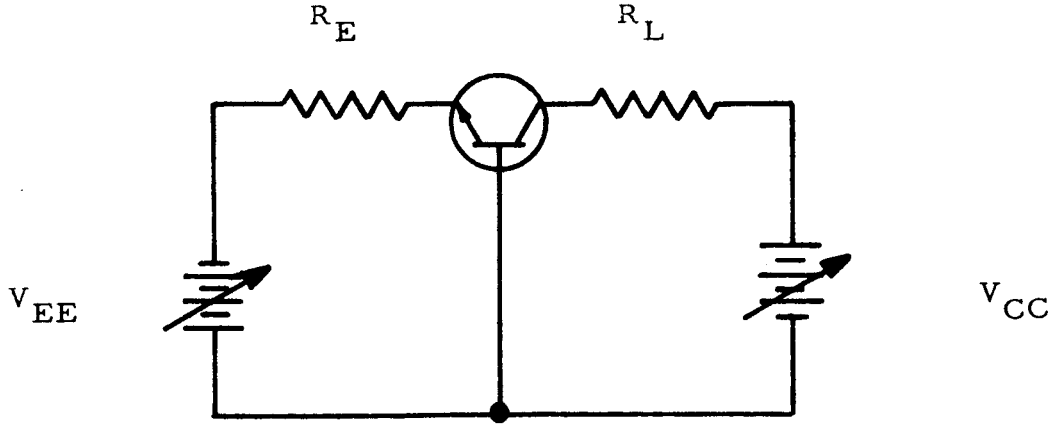
Beta Tester, 43014-1-1, Continental Device Corporation

LV_{CE} Tester, MT-16-2, Continental Device Corporation

Capacitance Bridge, Model 75A-S8, Boonton Electronics Corporation S/N 602

Digital Voltmeter, Model 7300-A, Cimron Corporation S/N 1342

LIFE TEST CIRCUIT



V_{CC} = 64 Volts

V_{EE} = 6.5 Volts

R_L = 5.1 K

R_E = 1.0 K

I_E = 6.5 ma

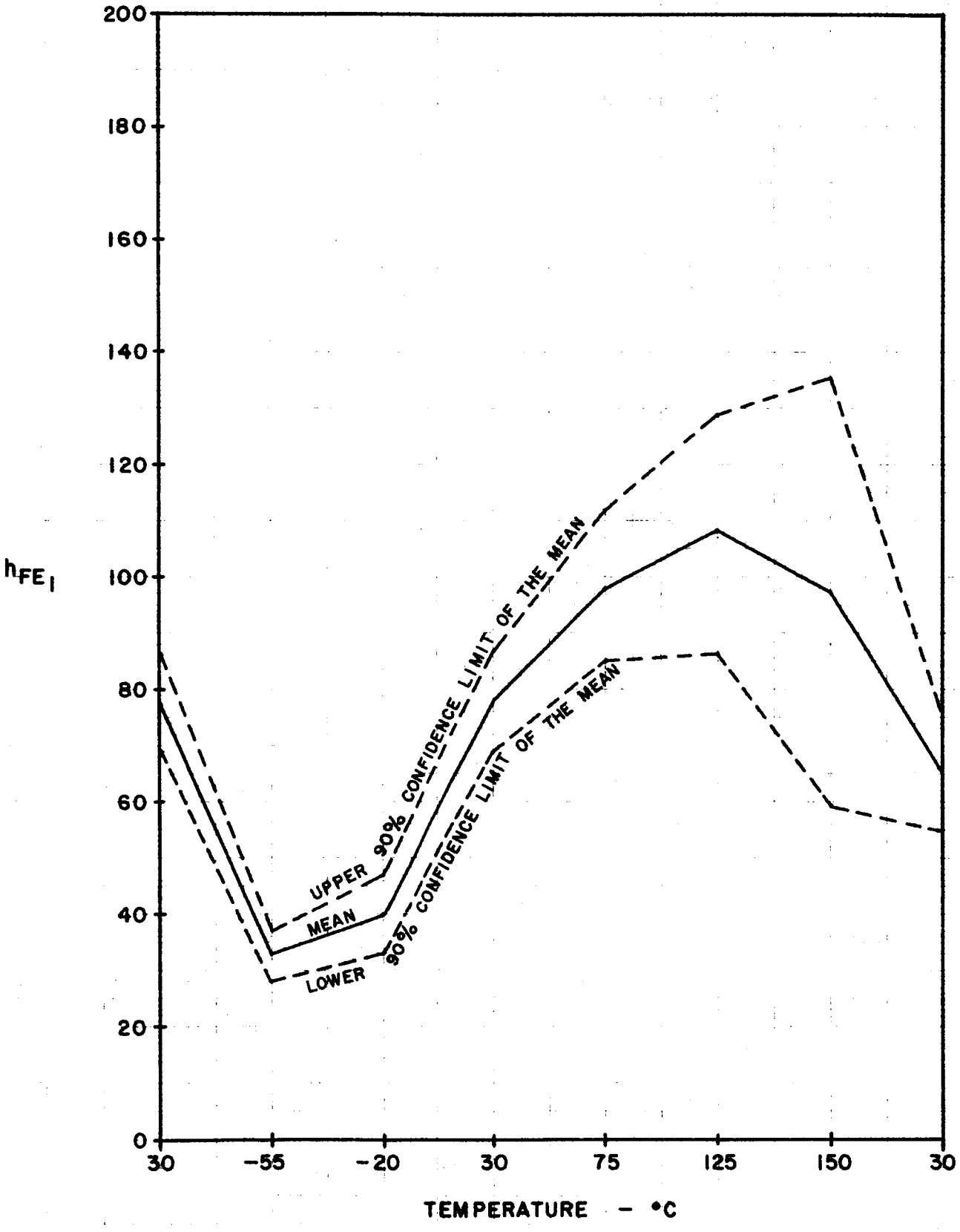
V_{CB} = 30.8 Volts

P_D = 200 mw

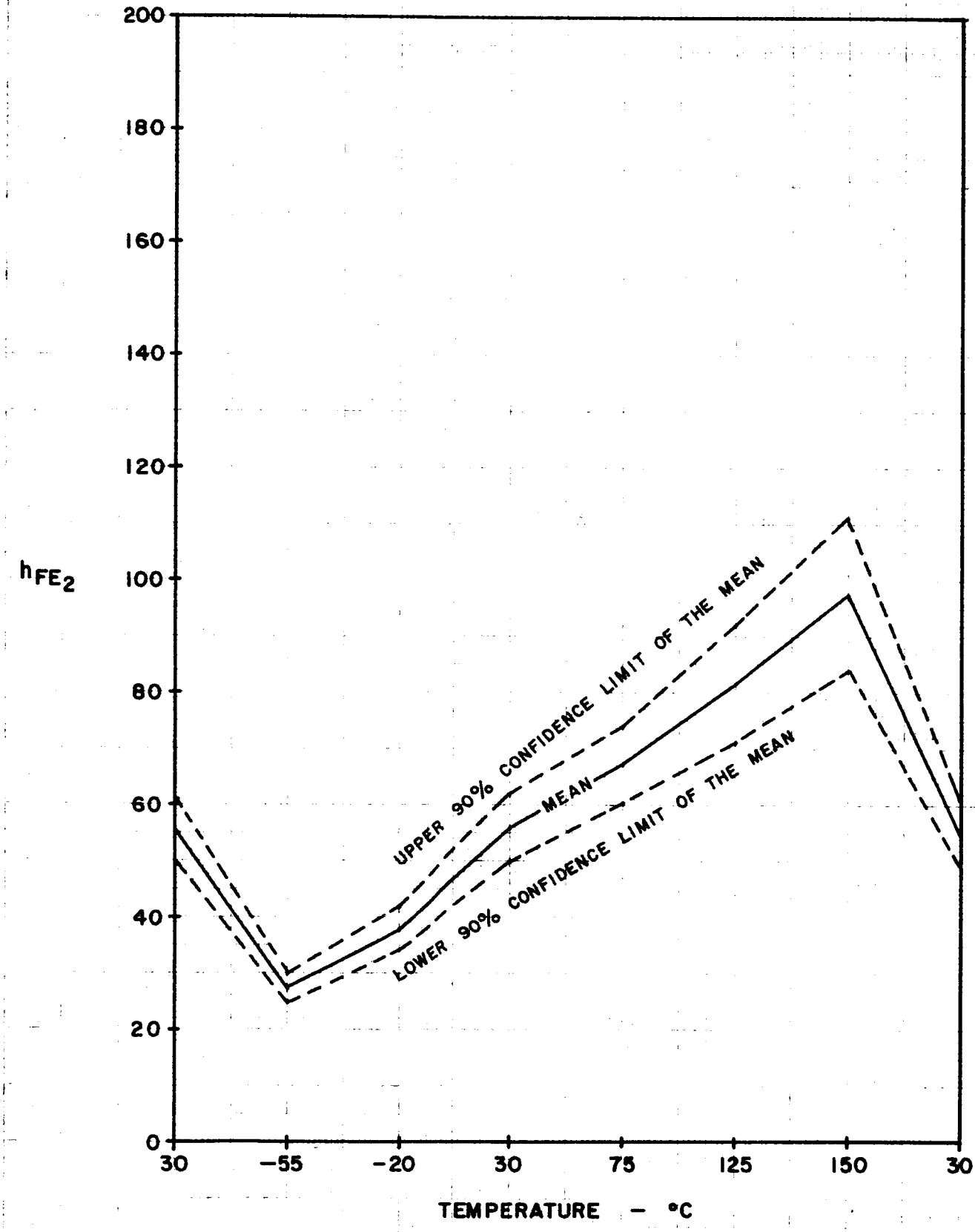
From a statistical approach the Temperature Effects curves are meaningful. Since the calculations of the mean for each test point include the maverick data points, the mean shows a gross effect. Each curve consists of the parameter "mean" and the upper and lower 90 per cent confidence limits of the mean with respect to temperature.

From an engineering standpoint the curves do not reflect the typical parameter response.

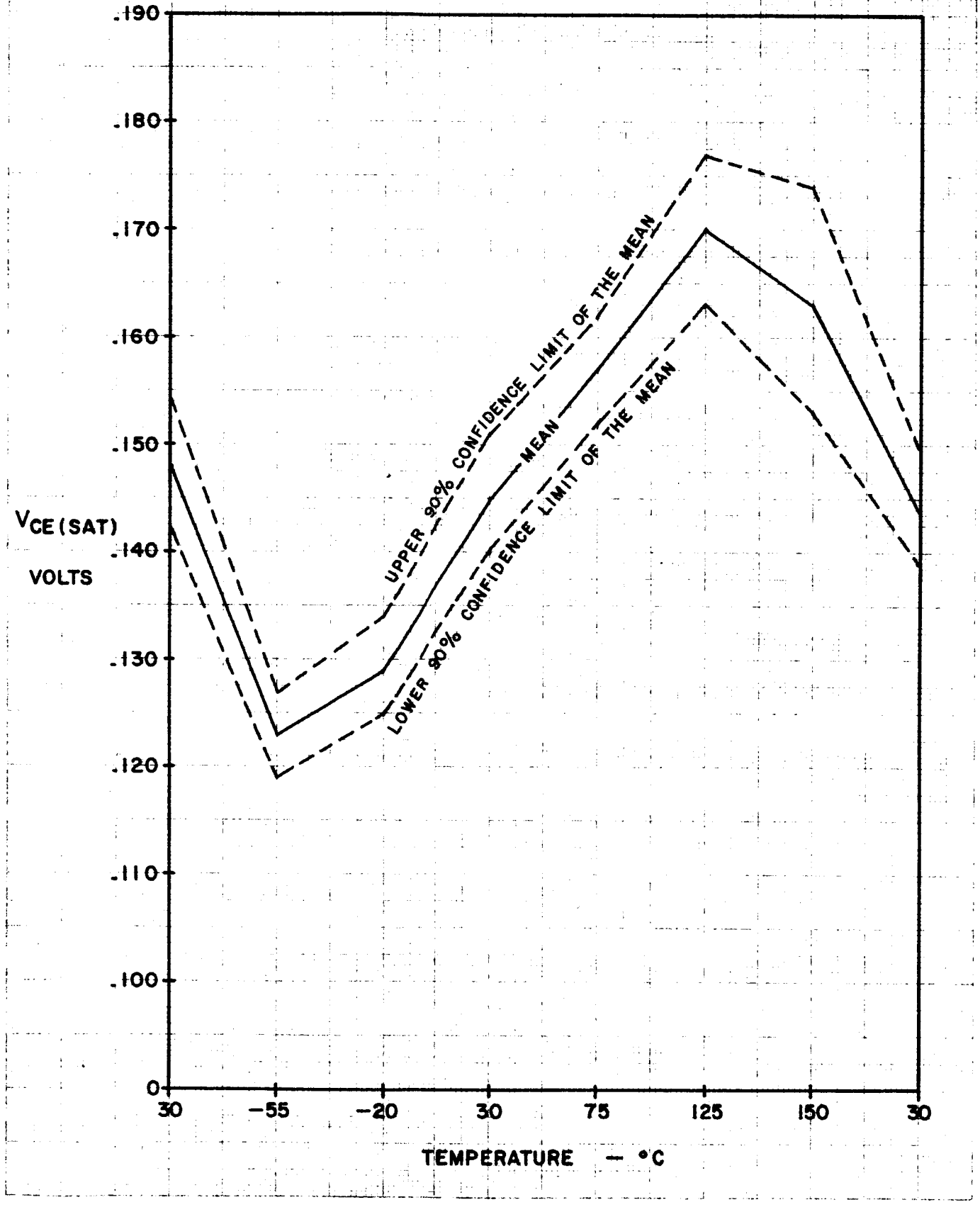
JPL TEST NUMBER A0083 BM (7-0057)
VENDOR FAIRCHILD SEMICONDUCTOR
PART NUMBER 2N2369
PARAMETER h_{FE_1} UNIT NONE
TEMPERATURE EFFECTS TEST

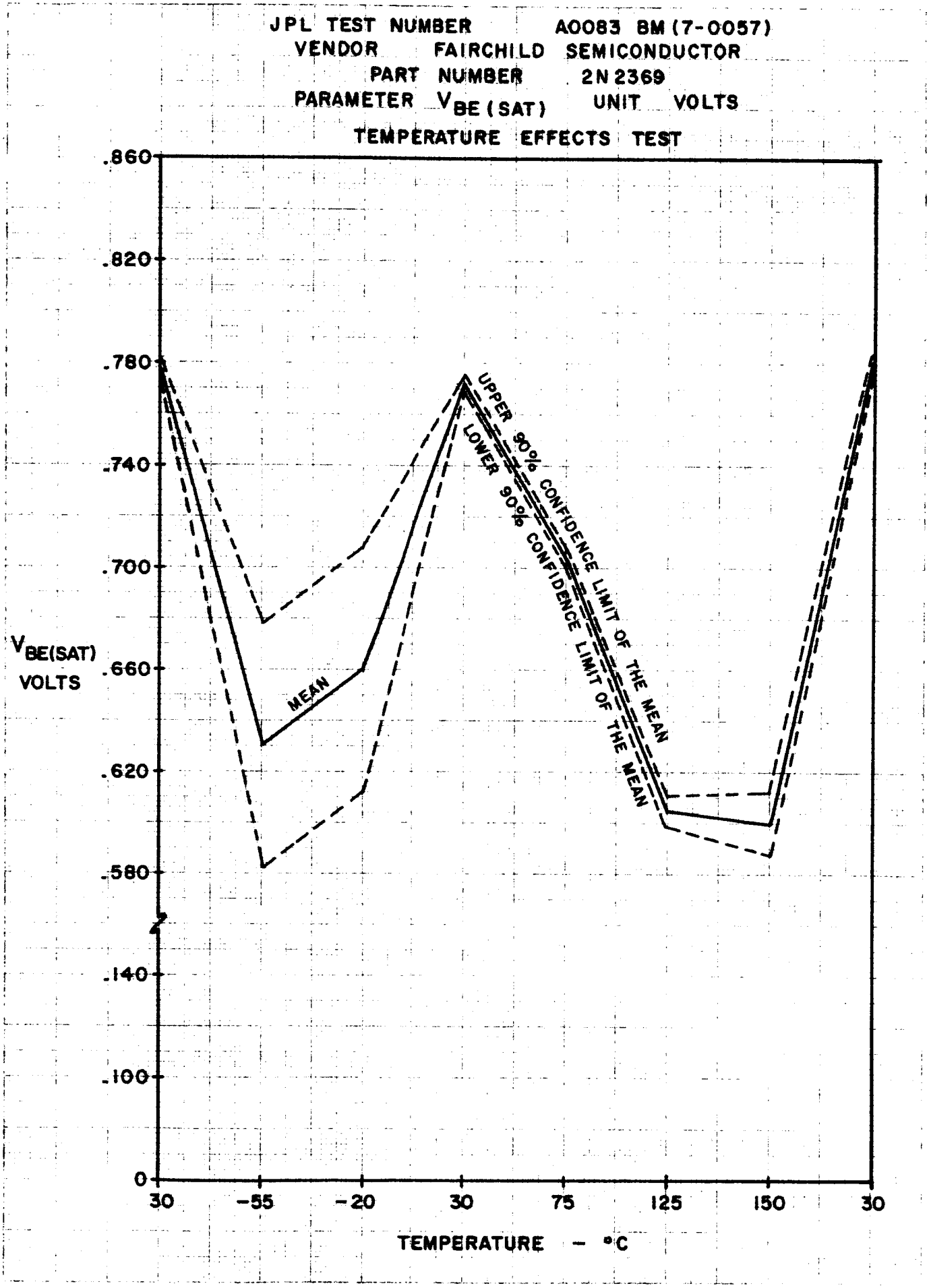


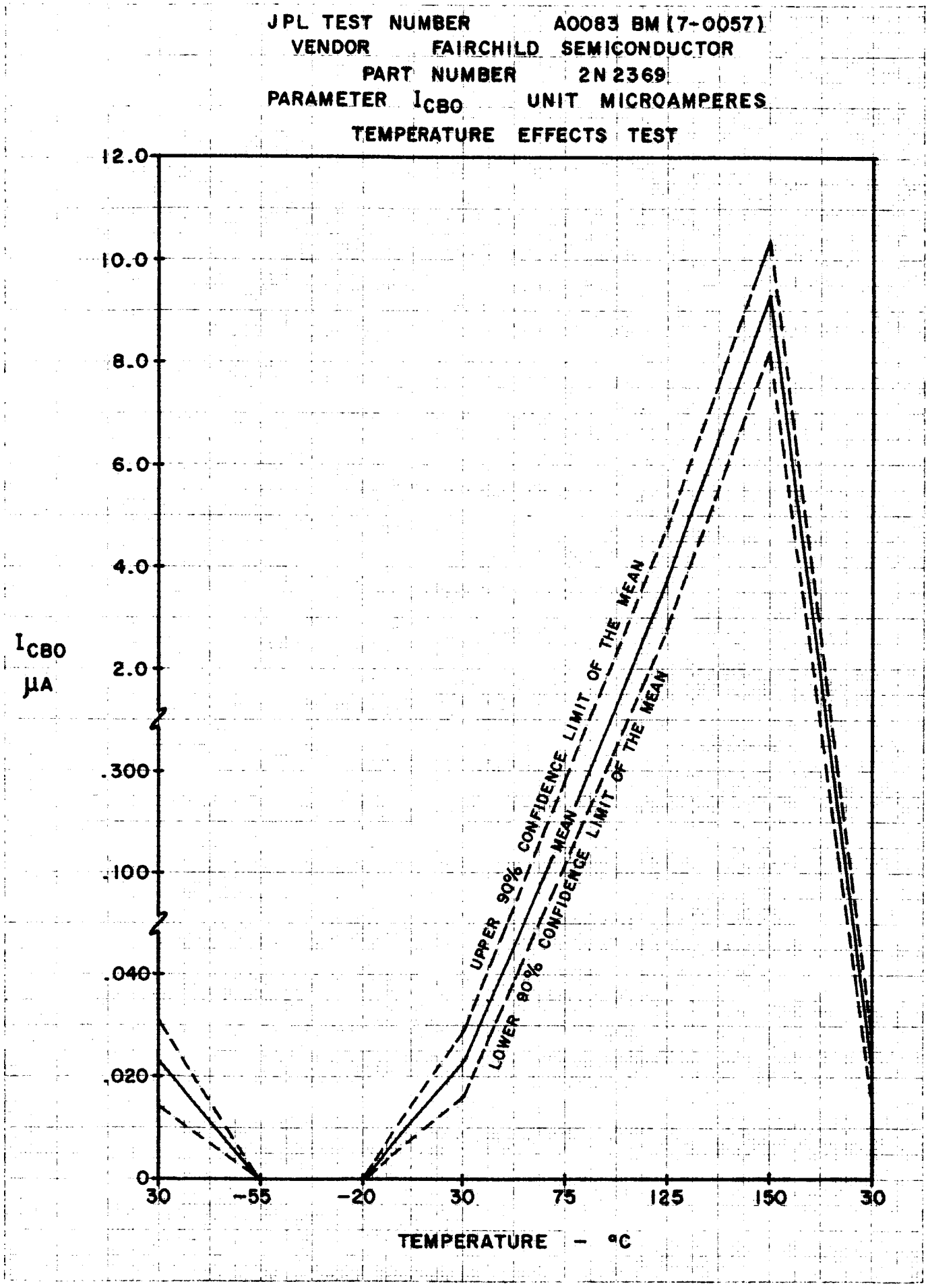
JPL TEST NUMBER A0083 BM (7-0057)
VENDOR FAIRCHILD SEMICONDUCTOR
PART NUMBER 2N2369
PARAMETER h_{FE_2} UNIT NONE
TEMPERATURE EFFECTS TEST

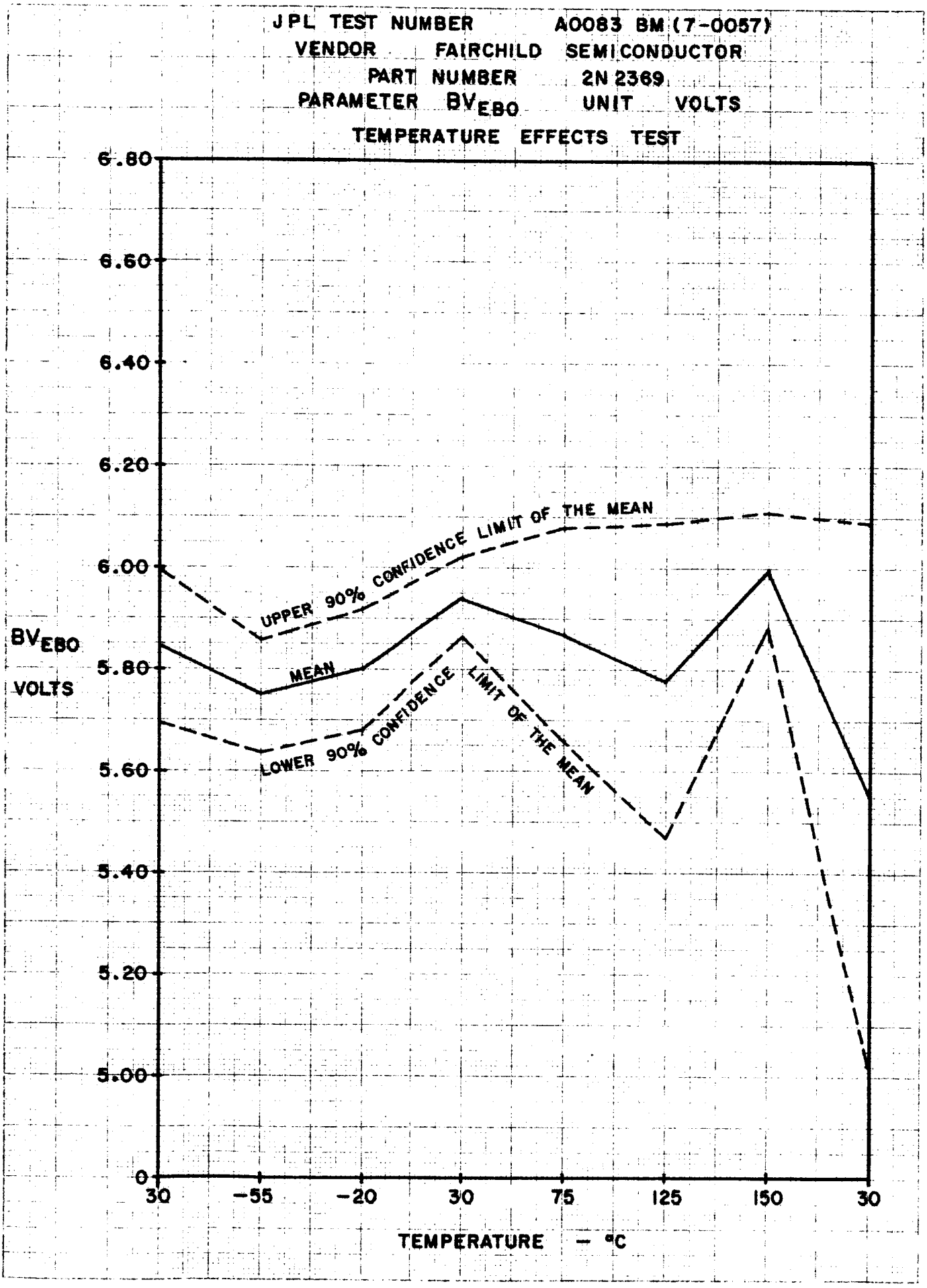


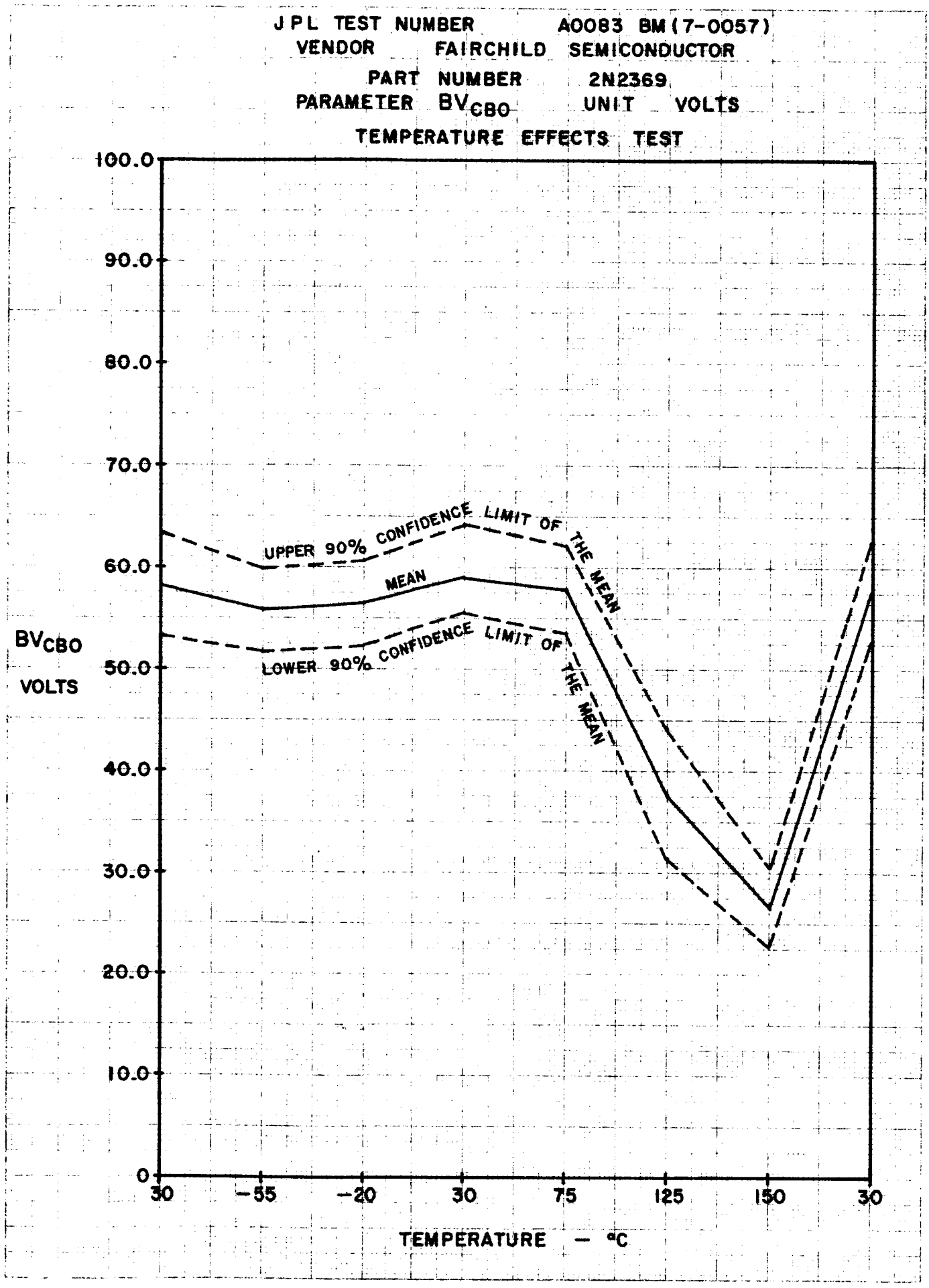
JPL TEST NUMBER A0083 BM(7-0057)
VENDOR FAIRCHILD SEMICONDUCTOR
PART NUMBER 2N 2369
PARAMETER $V_{CE(SAT)}$ UNIT VOLTS
TEMPERATURE EFFECTS TEST




JPL TEST NUMBER A0083 BM (7-0057)
VENDOR FAIRCHILD SEMICONDUCTOR
PART NUMBER 2N2369
PARAMETER $V_{BE(SAT)}$ UNIT VOLTS
TEMPERATURE EFFECTS TEST
.860
.820
.780
.740
.700
.660
.620
.580
.140
.100
0
$V_{BE(SAT)}$ VOLTS
MEAN
UPPER 90% CONFIDENCE LIMIT OF THE MEAN
LOWER 90% CONFIDENCE LIMIT OF THE MEAN
30
-55
-20
30
75
125
150
30
TEMPERATURE - °C


JPL TEST NUMBER A0083 BM (7-0057)
VENDOR FAIRCHILD SEMICONDUCTOR
PART NUMBER 2N2369
PARAMETER I_{CBO} UNIT MICROAMPERES
TEMPERATURE EFFECTS TEST
I_{CBO} μA
12.0
10.0
8.0
6.0
4.0
2.0
.300
.100
.040
.020
0
UPPER 90% CONFIDENCE LIMIT OF THE MEAN
MEAN
LOWER 90% CONFIDENCE LIMIT OF THE MEAN
30
-55
-20
30
75
125
150
30
TEMPERATURE - °C


JPL TEST NUMBER A0083 BM (7-0057)
VENDOR FAIRCHILD SEMICONDUCTOR
PART NUMBER 2N 2369
PARAMETER BV_{EBO} UNIT VOLTS
TEMPERATURE EFFECTS TEST
6.80
6.60
6.40
6.20
6.00
5.80
5.60
5.40
5.20
5.00
0
BV_{EBO}
VOLTS
UPPER 90% CONFIDENCE LIMIT OF THE MEAN
MEAN
LOWER 90% CONFIDENCE LIMIT OF THE MEAN
30
-55
-20
30
75
125
150
30
TEMPERATURE — °C


JPL TEST NUMBER A0083 BM(7-0057)
VENDOR FAIRCHILD SEMICONDUCTOR
PART NUMBER 2N2369
PARAMETER BV_{CBO} UNIT VOLTS
TEMPERATURE EFFECTS TEST
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
BV_{CBO} VOLTS
UPPER 90% CONFIDENCE LIMIT OF THE MEAN
MEAN
LOWER 90% CONFIDENCE LIMIT OF THE MEAN
30
-55
-20
30
75
125
150
30
TEMPERATURE — °C

Group No. 1

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Hfe 1

MULTIPLIER: 1 UNIT: None NOMINAL VALUE: None LOWER LIMIT: 40.0 UPPER LIMIT: 120.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						8-10-63								
57.143	81.466	119.05	5.7210								10	0	0	0
						8-27-63								
57.803	81.187	119.05	5.7579	1.013	-1.1793	-.27958	.91579	.21156	-.34437	-1.322	10	0	0	0
						9-5-63								
56.497	80.050	119.05	5.7560	1.001	-2.5025	-1.1371	.00000	.23049	-1.4205	-4.933	10	0	0	0
						9-26-63								
57.803	81.080	114.94	5.4112	1.132	-4.1052	1.0304	2.5025	.58722	1.2709	1.755	10	0	0	0
						10-8-63								
57.803	80.666	113.64	5.3415	1.026	-1.3061	-.41394	.00000	.13827	-.51316	-2.994	10	0	0	0
						10-9-63								
56.180	78.232	111.11	5.2079	1.052	-3.5613	-2.4336	-1.5244	.20607	-3.1107	-11.810	10	0	0	0
						10-14-63								
57.143	79.559	112.36	5.2802	1.028	.37408	1.3267	2.1011	.16204	1.6676	8.188	10	0	0	0
						10-15-63								
56.497	77.670	111.11	5.6387	1.026	-1.2484	-.62805	.00000	.11180	-.80861	-5.617	9	0	0	1
						10-16-63								
56.818	78.236	114.94	6.7522	1.275	-.70027	.32651	3.8314	.51369	.41734	.636	8	0	0	1
						10-29-63								
56.497	77.637	111.11	6.3927	1.116	-3.8314	-.59873	.70027	.48875	-.77119	-1.225	8	0	0	0
						11-5-63								
56.818	79.729	112.36	7.3879	1.169	.32100	.78622	1.7470	.19844	.98611	3.962	7	0	0	1
						11-12-63								
56.818	78.877	111.11	8.5760	1.155	-1.4125	-.80704	.00000	.21754	-1.0232	-3.710	6	0	0	1
						11-26-63								
56.180	78.059	111.11	8.5848	1.002	-1.7149	-.81791	.00000	.25469	-1.0478	-3.211	6	0	0	0
						12-2-63								
56.818	78.826	112.36	8.6763	1.021	.45346	.76697	1.2484	.10992	.97299	6.978	6	0	0	0
						12-17-63								
55.866	76.881	109.89	10.328	1.181	-2.4694	-1.1813	-.73466	.32403	-1.5366	-3.646	5	0	0	1
						1-30-64								
56.497	77.101	108.70	10.086	1.049	-1.1945	.21976	.84951	.36324	.28503	.605	5	0	0	0
						2-10-64								
56.818	77.742	109.89	10.254	1.034	.32100	.64076	1.1944	.16851	.82422	3.803	5	0	0	0
						4-2-64								
56.497	77.513	109.89	10.340	1.017	-.45347	-.22881	.00000	.09578	-.29519	-2.389	5	0	0	0

1

Group No. 2

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Hfe 1

MULTIPLIER: 1 UNIT: None NOMINAL VALUE: None LOWER LIMIT: 40.0 UPPER LIMIT: 120.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
57.471	79.375	109.89	3.3917								20	0	0	0
						Post Temp. Storage (10-8-63)								
62.500	80.940	104.17	5.7969	1.168	-3.5029	-.62693	3.3069	.80814	-.77455	-.776	8	0	0	12
						Post Temp. Cycling (10-14-63)								
61.350	79.514	103.09	5.7543	1.015	-1.9608	-1.4268	-.81142	.14067	-1.7944	-10.143	8	0	0	0
						Oper. Life Hrs. = 100 (11-5-63)								
62.112	80.615	103.09	6.8041	1.223	-2.0952	.16937	1.6835	.51431	.21010	.329	7	0	0	1
						Oper. Life Hrs. = 250 (11-12-63)								
60.976	79.699	102.04	6.6843	1.036	-1.9225	-.91530	.00000	.24765	-1.1484	-3.696	7	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
59.524	77.319	98.039	6.3588	1.105	-4.0238	-2.3806	-.64516	.50799	-3.0790	-4.686	7	0	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
60.606	79.588	102.04	6.4974	1.044	.00000	2.2698	4.0016	.55776	2.8519	4.069	7	0	0	0
						Oper. Life Hrs. = 2000 (1-30-64)								
60.976	79.110	101.01	6.4741	1.007	-1.6234	-.47843	1.3008	.40771	-.60476	-1.173	7	0	0	0
						Low Temperature (4-2-64)								
60.606	81.664	100.00	6.7978	1.058	-1.0101	-.40640	.00000	.15898	-.49766	-2.556	6	0	0	1

Group No. 3

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Hfe 1

MULTIPLIER: 1 UNIT: None NOMINAL VALUE: None LOWER LIMIT: 40.0 UPPER LIMIT: 120.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
61.728	92.431	116.28	6.4146								10	0	0	0
						Post Temp. Storage (10-8-63)								
62.112	94.257	126.58	8.5643	1.426	-2.6427	1.5812	14.223	1.8728	1.6775	.844	8	1	0	2
						Shock (10-9-63)								
59.524	94.337	120.48	8.3159	1.212	-6.1004	-3.8607	-2.2618	.57872	-4.0925	-6.671	7	1	0	1
						Post Temp. Cycling (10-14-63)								
60.606	96.113	123.46	8.5328	1.053	1.0822	1.7756	2.9748	.27988	1.8474	6.344	7	1	0	0
						Vibration (10-15-63)								
60.241	94.913	121.95	8.3724	1.039	-2.3127	-1.1998	-.36510	.23166	-1.2642	-5.179	7	1	0	0
						Humidity (10-29-63)								
59.524	93.929	120.48	8.2581	1.028	-1.4693	-.98421	-.54466	.12425	-1.0478	-7.921	7	1	0	0
						Oper. Life Hrs. = 100 (11-5-63)								
58.480	85.173	108.70	12.263	1.260	-3.1069	-1.5804	.00000	.67474	-1.8555	-2.342	4	0	0	3
						Oper. Life Hrs. = 250 (11-12-63)								
59.172	85.753	107.53	12.439	1.029	-1.1687	.58026	3.2901	.98174	.67667	.591	4	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
57.803	83.518	105.26	11.864	1.099	-4.3421	-2.2346	-.96454	.75312	-2.6756	-2.967	4	0	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
60.606	86.521	107.53	12.292	1.074	1.4570	3.0023	5.4860	.87285	3.4701	3.440	4	0	0	0
						Oper. Life Hrs. = 2000 (1-30-64)								
59.172	84.667	107.53	11.873	1.072	-5.4861	-1.8532	.00000	1.2470	-2.1889	-1.486	4	0	0	0
						Acceleration (2-10-64)								
59.880	80.961	102.04	21.080	1.576	.00000	.35432	.70863	.35432	.43764	1.000	2	0	0	2
						Low Temperature (4-2-64)								
58.824	80.432	102.04	21.609	1.051	-1.0567	-.52836	.00000	.52836	-.65690	-1.000	2	0	0	0

Group No. 4

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Hfe 1

MULTIPLIER: 1 UNIT: None NOMINAL VALUE: None LOWER LIMIT: 40.0 UPPER LIMIT: 120.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
55.249	79.995	103.09	2.8597								19	0	0	1
						Shock (10-9-63)								
52.910	77.242	100.00	2.8046	1.040	-4.5813	-2.7528	-1.9050	.12835	-3.5638	-21.448	19	0	0	0
						Vibration (10-15-63)								
53.476	78.096	101.01	2.8299	1.018	.40312	.85425	1.7801	.08168	1.0938	10.458	19	0	0	0
						Humidity (10-29-63)								
34.602	75.414	100.00	3.7195	1.637	-31.187	-2.3909	.00000	1.6975	-3.1704	-1.409	18	0	1	1
						Oper. Life Hrs. = 100 (11-5-63)								
53.191	77.751	98.039	3.1321	1.813	-3.2795	-.61646	3.9682	.59720	-.79287	-1.032	14	0	0	4
						Oper. Life Hrs. = 250 (11-12-63)								
52.632	79.101	102.04	3.4921	1.243	-1.7470	1.3505	11.905	.90339	1.7073	1.495	14	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
27.027	73.681	99.010	4.8408	1.922	-43.895	-5.4199	-.46597	2.9798	-7.3558	-1.819	14	0	1	0
						Oper. Life Hrs. = 1000 (12-17-63)								
52.910	79.764	102.04	4.3017	1.612	1.1655	3.9824	8.9198	.72876	4.9927	5.465	11	0	0	3
						Oper. Life Hrs. = 2000 (1-30-64)								
52.083	74.719	92.593	3.6819	1.502	-6.4173	-2.8178	1.3008	.76177	-3.7711	-3.699	10	0	0	1
						Acceleration (2-10-64)								
51.813	72.918	92.593	5.0932	1.340	-.62491	-.19865	.46596	.14522	-.27242	-1.368	7	0	0	3

Group No. 5

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Hfe 1

MULTIPLIER: 1 UNIT: None NOMINAL VALUE: None LOWER LIMIT: 40.0 UPPER LIMIT: 120.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
54.945	79.076	121.95	2.3006								49	1	0	1
						Oper. Life Hrs. = 100 (8-27-63)								
34.014	75.799	117.65	2.4012	1.089	-31.346	-3.2775	3.2938	.65706	-4.3240	-4.988	49	0	1	0
						Oper. Life Hrs. = 250 (9-5-63)								
33.445	73.474	113.64	2.3616	1.034	-5.4572	-2.3252	4.2571	.23706	-3.1647	-9.808	49	0	1	0
						Oper. Life Hrs. = 500 (9-26-63)								
35.088	74.284	121.95	2.5041	1.078	-1.7004	1.3985	8.3148	.25928	1.8826	5.394	47	1	1	2
						Oper. Life Hrs. = 1000 (10-16-63)								
39.370	73.046	121.95	2.6581	1.127	-25.769	-1.2378	14.664	.88140	-1.6946	-1.404	47	1	1	0
						Oper. Life Hrs. = 2000 (12-3-63)								
32.051	74.276	121.95	2.9624	1.216	-36.605	1.4845	27.009	1.4034	1.9987	1.058	46	1	1	1

Group No. 1

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Hfe 2

MULTIPLIER: 1 UNIT: None NOMINAL VALUE: None LOWER LIMIT: 20.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						8-9-63								
32.258	45.066	66.667	3.1741								10	0	0	0
						8-27-63								
32.258	45.045	66.667	3.1653	1.006	-1.5385	-.02157	1.3227	.21375	-.04789	-.101	10	0	0	0
						9-10-63								
32.258	45.045	66.667	3.1653	1.000	.00000	.00000	.00000	.00000	.00000		10	0	0	0
						9-26-63								
40.000	53.878	76.923	3.4830	1.211	6.5217	8.8338	11.111	.48798	16.396	18.103	10	0	0	0
						10-8-63								
40.000	53.802	76.923	3.4298	1.031	-2.9240	-.07595	2.1645	.38264	-.14116	-.198	10	0	0	0
						10-9-63								
40.000	53.370	76.923	3.5273	1.058	-2.1645	-.43290	.00000	.28860	-.81114	-1.500	10	0	0	0
						10-14-63								
40.000	54.660	83.333	3.8836	1.212	.00000	1.2904	6.4103	.65401	2.3607	1.973	10	0	0	0
						10-15-63								
40.000	54.173	76.923	3.7724	1.178	-6.4103	-.38736	2.9240	.81896	-.71505	-.473	9	0	0	1
						10-16-63								
40.000	54.627	76.923	4.1844	1.094	-2.9240	-.36550	.00000	.36550	-.66908	-1.000	8	0	0	1
						10-29-63								
40.000	54.086	76.923	4.3264	1.069	-2.1645	-.54113	.00000	.35425	-1.0005	-1.528	8	0	0	0
						11-5-63								
41.667	54.841	76.923	4.7939	1.074	.00000	.54731	2.1645	.35744	.99800	1.531	7	0	0	1
						11-12-63								
40.000	55.767	76.923	5.6410	1.187	-2.1645	-.63853	.00000	.40892	-1.1450	-1.561	6	0	0	1
						11-26-63								
45.455	61.379	83.333	5.7770	1.049	4.5454	5.6120	6.9444	.37863	9.1433	14.822	6	0	0	0
						12-2-63								
45.455	64.102	90.909	6.9762	1.458	.00000	2.7230	7.5757	1.3388	4.2480	2.034	6	0	0	0
						12-17-63								
40.000	55.809	76.923	6.9086	1.224	-13.986	-8.6132	-4.5454	1.7049	-15.433	-5.052	5	0	0	1
						1-30-64								
43.478	60.174	83.333	7.4235	1.155	2.6316	4.3655	6.4103	.63892	7.2547	6.833	5	0	0	0
						2-10-64								
47.619	65.381	90.909	8.0806	1.185	2.6316	5.2069	7.5757	.84951	7.9639	6.129	5	0	0	0
						4-2-64								
47.619	65.381	90.909	8.0806	1.000	.00000	.00000	.00000	.00000	.00000		5	0	0	0

Group No. 2

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Hfe 2

MULTIPLIER: 1 UNIT: None NOMINAL VALUE: None LOWER LIMIT: 20.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
30.303	41.283	62.500	1.6928								20	0	0	0
						Post Temp. Storage (10-8-63)								
34.483	49.068	62.500	3.0781	1.323	2.2247	8.8129	12.500	1.0954	17.961	8.046	8	0	0	12
						Post Temp. Cycling (10-14-63)								
34.483	49.068	62.500	3.0781	1.000	.00000	.00000	.00000	.00000	.00000		8	0	0	0
						Oper. Life Hrs. = 100 (11-5-63)								
34.483	48.523	62.500	3.4598	1.105	-2.6316	-.75188	.00000	.48534	-1.5495	-1.549	7	0	0	1
						Oper. Life Hrs. = 250 (11-12-63)								
34.483	47.956	58.824	3.0603	1.278	-3.6765	-.56698	2.6316	.79793	-1.1823	-.711	7	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
40.000	53.587	66.667	3.4004	1.235	2.1645	5.6310	7.8432	.64847	10.508	8.683	7	0	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
34.483	49.807	62.500	3.3704	1.018	-6.1919	-3.7799	2.3809	1.0964	-7.5891	-3.448	7	0	0	0
						Oper. Life Hrs. = 2000 (1-30-64)								
37.037	51.970	66.667	3.6536	1.175	-2.3809	2.1628	4.1667	.79985	4.1617	2.704	7	0	0	0
						Low Temperature (4-2-64)								
41.667	57.820	71.429	4.2898	1.182	3.6765	5.1250	6.9444	.49194	8.8637	10.418	6	0	0	1

Group No. 3

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Hfe 2

MULTIPLIER: 1 UNIT: None NOMINAL VALUE: None LOWER LIMIT: 20.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
37.037	52.967	71.429	3.8193								10	0	0	0
						Post Temp. Storage (10-8-63)								
43.478	67.145	100.00	6.8144	2.547	6.4412	13.725	28.571	2.5871	20.440	5.305	8	0	0	2
						Shock (10-9-63)								
43.478	67.349	100.00	7.0989	1.053	-6.4103	-2.5852	.00000	1.0203	-3.8386	-2.534	7	0	0	1
						Post Temp. Cycling (10-14-63)								
43.478	70.720	100.00	7.2489	1.043	.00000	3.3702	6.4103	.99035	4.7655	3.403	7	0	0	0
						Vibration (10-15-63)								
43.478	70.720	100.00	7.2489	1.000	.00000	.00000	.00000	.00000	.00000		7	0	0	0
						Humidity (10-29-63)								
40.000	65.127	100.00	8.0043	1.219	-18.824	-5.5924	.00000	2.4173	-8.5869	-2.313	7	0	0	0
						Oper. Life Hrs. = 100 (11-5-63)								
43.478	61.115	76.923	7.8491	1.820	.00000	.00000	.00000	.00000	.00000		4	0	0	3
						Oper. Life Hrs. = 250 (11-12-63)								
43.478	59.925	76.923	7.4054	1.123	-4.7619	-1.1905	.00000	1.1905	-1.9866	-1.000	4	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
47.619	66.675	83.333	8.2021	1.227	4.1408	6.7498	10.256	1.2757	10.124	5.291	4	0	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
43.478	62.718	83.333	9.0036	1.205	-6.1919	-3.9568	.00000	1.3860	-6.3089	-2.855	4	0	0	0
						Oper. Life Hrs. = 2000 (1-30-64)								
45.455	65.317	83.333	8.8933	1.025	.00000	2.5987	5.4945	1.1413	3.9786	2.277	4	0	0	0
						Acceleration (2-10-64)								
		50.000				Not Analyzed					1	0	0	3
						Low Temperature (4-2-64)								
		47.619				Not Analyzed					1	0	0	0

Group No. 4

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Hfe 2

MULTIPLIER: 1 UNIT: None NOMINAL VALUE: None LOWER LIMIT: 20.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
30.303	45.260	62.500	1.9256								19	0	0	1
						Shock (10-9-63)								
34.483	53.011	71.429	2.2538	1.370	2.2247	7.7505	11.204	.47674	14.621	16.257	19	0	0	0
						Vibration (10-15-63)								
34.483	53.896	71.429	2.1832	1.066	.00000	.88544	3.6765	.28757	1.6429	3.079	19	0	0	0
						Humidity (10-29-63)								
24.390	50.705	71.429	2.7887	1.546	-23.229	-3.4073	.00000	1.6185	-6.7198	-2.105	18	0	0	1
						Oper. Life Hrs. = 100 (11-5-63)								
34.483	53.662	71.429	2.7507	1.322	.00000	.00000	.00000	.00000	.00000		14	0	0	4
						Oper. Life Hrs. = 250 (11-12-63)								
34.483	54.957	76.923	3.2546	1.400	.00000	1.2951	10.256	.80373	2.3566	1.611	14	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
38.462	59.846	83.333	3.6333	1.246	-8.3333	4.8883	7.8432	1.0788	8.1682	4.531	14	0	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
38.462	56.703	83.333	4.0719	1.077	-7.8432	-2.6592	3.2680	.90395	-4.6896	-2.942	12	0	0	2
						Oper. Life Hrs. = 2000 (1-30-64)								
37.037	56.205	76.923	3.6855	1.332	-3.2680	1.9228	7.8432	.97436	3.4211	1.973	11	0	0	1
						Acceleration (2-10-64)								
41.667	60.633	90.909	5.7256	1.755	-7.8432	6.0762	18.797	2.7826	10.021	2.184	8	0	0	3

Group No. 5

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Hfe 2

MULTIPLIER: 1 UNIT: None NOMINAL VALUE: None LOWER LIMIT: 20.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
29.412	42.905	66.667	1.1077								49	0	0	1
						Oper. Life Hrs. = 100 (8-27-63)								
26.316	43.534	71.429	1.2630	1.300	-10.721	.62803	4.7619	.30925	1.4426	2.031	49	0	0	0
						Oper. Life Hrs. = 250 (9-5-63)								
26.316	43.332	71.429	1.2972	1.055	-13.196	-.20176	2.9240	.29760	-.46561	-.678	49	0	0	0
						Oper. Life Hrs. = 500 (9-26-63)								
31.250	52.374	90.909	1.6683	1.586	4.9342	9.0048	19.480	.39048	17.193	23.061	47	0	0	2
						Oper. Life Hrs. = 1000 (10-16-63)								
32.258	53.827	100.00	1.9052	1.304	-10.101	1.4531	10.417	.52465	2.6995	2.770	47	0	0	0
						Oper. Life Hrs. = 2000 (12-3-63)								
30.303	55.592	100.00	2.0468	1.130	-18.100	1.9533	17.045	.85085	3.5136	2.296	46	0	0	1

Group No. 1

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Vbe(sat)

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: .700 UPPER LIMIT: .935

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						8-21-63								
.76000	.78500	.80000	.00341								10	0	0	0
						8-27-63								
.78000	.78800	.80000	.00199	2.929	-.01000	.00300	.03000	.00367	.38071	.818	10	0	0	0
						9-5-63								
.78000	.78600	.80000	.00221	1.231	-.01000	-.00200	.01000	.00200	-.25445	-1.000	10	0	0	0
						9-26-63								
.76000	.76800	.78000	.00249	1.269	-.03000	-.01800	-.01000	.00249	-2.3438	-7.216	10	0	0	0
						10-8-63								
.77000	.77900	.79000	.00233	1.142	.00000	.01100	.02000	.00180	1.4121	6.128	10	0	0	0
						10-9-63								
.77000	.78000	.79000	.00150	2.433	-.01000	.00100	.01000	.00180	.12820	.557	10	0	0	0
						10-14-63								
.77000	.77600	.79000	.00221	2.185	-.01000	-.00400	.00000	.00163	-.51546	-2.449	10	0	0	0
						10-15-63								
.77000	.77778	.79000	.00222	1.098	.00000	.00222	.01000	.00147	.28571	1.512	9	0	0	1
						10-16-63								
.76000	.77625	.79000	.00324	1.886	-.02000	-.00125	.01000	.00295	-.16103	-.424	8	0	0	1
						10-29-63								
.75000	.77500	.79000	.00423	1.702	-.03000	-.00125	.02000	.00479	-.16129	-.261	8	0	0	0
						11-5-63								
.77000	.78000	.79000	.00219	4.273	.00000	.00143	.01000	.00143	.18315	1.000	7	0	0	1
						11-12-63								
.77000	.78000	.79000	.00258	1.198	.00000	.00000	.00000	.00000	.00000		6	0	0	1
						11-26-63								
.77000	.77667	.79000	.00333	1.660	-.01000	-.00333	.00000	.00211	-.42918	-1.581	6	0	0	0
						12-2-63								
.77000	.78000	.79000	.00258	1.660	.00000	.00333	.01000	.00211	.42735	1.581	6	0	0	0
						12-17-63								
.77000	.77800	.79000	.00374	1.745	-.01000	-.00200	.00000	.00200	-.25707	-1.000	5	0	0	1
						1-30-64								
.78000	.78600	.80000	.00399	1.141	.00000	.00800	.01000	.00200	1.0178	4.000	5	0	0	0
						2-10-64								
.78000	.78600	.80000	.00399	1.000	.00000	.00000	.00000	.00000	.00000		5	0	0	0
						4-2-64								
.78000	.78600	.80000	.00399	1.000	.00000	.00000	.00000	.00000	.00000		5	0	0	0

Group No. 2

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Vbe(sat)

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: .700 UPPER LIMIT: .935

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
.31000	.76000	.79000	.02372								20	0	1	0
						Post Temp. Storage (10-8-63)								
.77000	.78250	.79000	.00250	225.611	-.01000	-.00250	.01000	.00313	-.31949	-.798	8	0	0	12
						Post Temp. Cycling (10-14-63)								
.78000	.78125	.79000	.00126	3.951	-.01000	-.00125	.01000	.00295	-.16000	-.424	8	0	0	0
						Oper. Life Hrs. = 100 (11-5-63)								
.77000	.77857	.78000	.00144	1.152	-.01000	-.00286	.00000	.00184	-.36697	-1.549	7	0	0	1
						Oper. Life Hrs. = 250 (11-12-63)								
.77000	.78143	.79000	.00260	3.264	-.01000	.00286	.01000	.00286	.36563	1.000	7	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
.78000	.78429	.79000	.00202	1.667	.00000	.00286	.01000	.00184	.36430	1.549	7	0	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
.77000	.77714	.78000	.00185	1.183	-.01000	-.00714	.00000	.00184	-.91912	-3.873	7	0	0	0
						Oper. Life Hrs. = 2000 (1-30-64)								
.78000	.79000	.80000	.00217	1.365	.01000	.01286	.02000	.00184	1.6275	6.971	7	0	0	0
						Low Temperature (4-2-64)								
.78000	.78833	.79000	.00163	2.050	-.01000	-.00167	.00000	.00167	-.21142	-1.000	6	0	0	1

Group No. 3

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Vbe(sat)

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: .700 UPPER LIMIT: .935

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
.77000	.78000	.79000	.00258								10	0	0	0
						Post Temp. Storage (10-8-63)								
.76000	.77500	.78000	.00328	1.292	-.01000	-.00500	.00000	.00189	-.64516	-2.646	8	0	0	2
						Shock (10-9-63)								
.77000	.78000	.79000	.00309	1.290	.00000	.00571	.01000	.00202	-.73260	2.828	7	0	0	1
						Post Temp. Cycling (10-14-63)								
.76000	.77143	.78000	.00340	1.217	-.02000	-.00857	.00000	.00261	-1.1111	-3.286	7	0	0	0
						Vibration (10-15-63)								
.76000	.79143	.84000	.00962	7.986	-.01000	.02000	.07000	.00976	2.5271	2.049	7	0	0	0
						Humidity (10-29-63)								
.76000	.77571	.78000	.00298	10.433	-.06000	-.01571	.01000	.00922	-2.0258	-1.704	7	0	0	0
						Oper. Life Hrs. = 100 (11-5-63)								
.77000	.77750	.78000	.00252	2.453	.00000	.00000	.00000	.00000	.00000		4	0	0	3
						Oper. Life Hrs. = 250 (11-12-63)								
.76000	.77750	.79000	.00750	8.902	-.01000	.00000	.01000	.00577	.00000	.000	4	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
.77000	.77500	.78000	.00289	6.724	-.01000	-.00250	.01000	.00479	-.32259	-.522	4	0	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
.76000	.77000	.78000	.00578	3.989	-.01000	-.00500	.00000	.00289	-.64935	-1.732	4	0	0	0
						Oper. Life Hrs. = 2000 (1-30-63)								
.78000	.78750	.79000	.00249	5.376	.01000	.01750	.03000	.00479	2.2222	3.656	4	0	0	0
						Acceleration (2-10-64)								
.77000	.77250	.77500	.00248	2.014	-.02000	-.01750	-.01500	.00250	-2.2654	-7.000	2	0	0	2
						Low Temperature (4-2-64)								
.77000	.78000	.79000	.00998	16.147	-.00500	.00750	.02000	.01250	.96154	.600	2	0	0	0

Group No. 4

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Vbe(sat)

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: .700 UPPER LIMIT: .935

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
.77000	.78158	.79000	.00175								19	0	0	1
						Shock (10-9-63)								
.77000	.77842	.79000	.00158	1.223	-.02000	-.00316	.01000	.00172	-.40568	-1.837	19	0	0	0
						Vibration (10-15-63)								
.76000	.78631	.82000	.00414	6.830	-.01000	.00789	.05000	.00463	1.0040	1.707	19	0	0	0
						Humidity (10-29-63)								
.76000	.77722	.79000	.00178	5.698	-.05000	-.00944	.01000	.00446	-1.2152	-2.116	18	0	0	1
						Oper. Life Hrs. = 100 (11-5-63)								
.76000	.77214	.79000	.00281	1.940	-.02000	-.00643	.01000	.00269	-.83256	-2.386	14	0	0	4
						Oper. Life Hrs. = 250 (11-12-63)								
.77000	.77643	.79000	.00170	2.740	-.01000	.00429	.02000	.00202	.55198	2.121	14	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
.77000	.77571	.79000	.00173	1.032	-.02000	-.00071	.01000	.00195	-.09208	-.366	14	0	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
.64000	.76417	.78000	.01138	37.214	-.13000	-.01167	.01000	.01093	-1.5267	-1.067	12	0	1	2
						Oper. Life Hrs. = 2000 (1-30-64)								
.77000	.78182	.79000	.00182	42.643	-.01000	.01818	.14000	.01234	2.3256	1.473	11	0	0	1
						Acceleration (2-10-64)								
.76000	.78500	.80000	.00500	5.487	-.02000	.00125	.02000	.00441	.15923	.284	8	0	0	3

Group No. 5

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Vbe(sat)

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: .700 UPPER LIMIT: .935

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
.77000	.78673	.81000	.00114								49	0	0	1
						Oper. Life Hrs. = 100 (8-27-63)								
.77000	.78796	.80000	.00108	1.106	-.02000	.00122	.02000	.00122	.15540	1.000	49	0	0	0
						Oper. Life Hrs. = 250 (9-5-63)								
.77000	.78816	.80000	.00146	1.813	-.03000	.00020	.01000	.00141	.02589	.144	49	0	0	0
						Oper. Life Hrs. = 500 (9-26-63)								
.76000	.77000	.78000	.00089	2.819	-.03000	-.01894	.01000	.00133	-2.4593	-14.196	47	0	0	2
						Oper. Life Hrs. = 1000 (10-16-63)								
.77000	.78064	.79000	.00093	1.088	.00000	.01064	.02000	.00077	1.3628	13.821	47	0	0	0
						Oper. Life Hrs. = 2000 (12-3-63)								
.77000	.77935	.79000	.00105	1.258	-.01000	-.00130	.00000	.00050	-.16736	-2.598	46	0	0	1

Group No. 1

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Vce(sat)

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: .275

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						8-21-63								
.12000	.14300	.16000	.00396								10	0	0	0
						8-27-63								
.12000	.14300	.17000	.00423	1.142	-.01000	-.00000	.01000	.00149	-.00001	-.000	10	0	0	0
						9-5-63								
.11000	.13200	.16000	.00442	1.093	-.02000	-.01100	.00000	.00180	-8.3333	-6.128	10	0	0	0
						9-26-63								
.13000	.14800	.17000	.00389	1.294	.01000	.01600	.02000	.00163	10.811	9.798	10	0	0	0
						10-8-63								
.13000	.14300	.17000	.00367	1.124	-.01000	-.00500	.00000	.00167	-3.4965	-3.000	10	0	0	0
						10-9-63								
.12000	.14300	.17000	.00423	1.330	-.01000	-.00000	.01000	.00149	-.00000	-.000	10	0	0	0
						10-14-63								
.12000	.14200	.16000	.00359	1.388	-.01000	-.00100	.00000	.00100	-.70423	-1.000	10	0	0	0
						10-15-63								
.12000	.14222	.17000	.00465	1.509	.00000	.00111	.01000	.00111	.78125	1.000	9	0	0	1
						10-16-63								
.12000	.14000	.16000	.00423	1.361	-.01000	-.00125	.00000	.00125	-.89286	-1.000	8	0	0	1
						10-29-63								
.12000	.14000	.16000	.00423	1.000	.00000	.00000	.00000	.00000	.00000		8	0	0	0
						11-5-63								
.12000	.14000	.16000	.00488	1.167	.00000	.00000	.00000	.00000	.00000		7	0	0	1
						11-12-63								
.12000	.13333	.16000	.00615	1.360	-.01000	-.00667	.00000	.00211	-5.0000	-3.162	6	0	0	1
						11-26-63								
.12000	.13500	.16000	.00619	1.015	.00000	.00167	.01000	.00167	1.2346	1.000	6	0	0	0
						12-2-63								
.12000	.13667	.16000	.00667	1.159	.00000	.00167	.01000	.00167	1.2195	1.000	6	0	0	0
						12-17-63								
.11000	.13000	.16000	.00837	1.312	-.01000	-.00400	.00000	.00245	-3.0769	-1.633	5	0	0	1
						1-30-64								
.12000	.13600	.16000	.00748	1.250	.00000	.00600	.01000	.00245	4.4117	2.449	5	0	0	0
						2-10-64								
.12000	.13600	.16000	.00748	1.000	.00000	.00000	.00000	.00000	.00000		5	0	0	0
						4-2-64								
.13000	.14000	.16000	.00548	1.867	.00000	.00400	.01000	.00245	2.8571	1.633	5	0	0	0

Group No. 2

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Vce(sat)

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: .275

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (9-10-63)								
.12000	.60850	9.3300	.45904								20	1	0	0
						Post Temp. Storage (10-8-63)								
.14000	.15375	.16000	.00324	50217.4	-.01000	-.00125	.00000	.00125	-.81301	-1.000	8	0	0	12
						Post Temp. Cycling (10-14-63)								
.14000	.15375	.16000	.00324	1.000	.00000	.00000	.00000	.00000	.00000		8	0	0	0
						Oper. Life Hrs. = 100 (11-5-63)								
.14000	.15143	.16000	.00340	1.037	-.01000	-.00143	.00000	.00143	-.94340	-1.000	7	0	0	1
						Oper. Life Hrs. = 250 (11-12-63)								
.13000	.14286	.15000	.00360	1.118	-.01000	-.00857	.00000	.00143	-6.0000	-6.000	7	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
.13000	.14571	.15000	.00297	1.461	.00000	.00286	.01000	.00184	1.9608	1.549	7	0	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
.13000	.14286	.15000	.00360	1.461	-.01000	-.00286	.00000	.00184	-2.0000	-1.549	7	0	0	0
						Oper. Life Hrs. = 2000 (1-30-64)								
.13000	.14714	.16000	.00359	1.000	.00000	.00429	.01000	.00202	2.9126	2.121	7	0	0	0
						Low Temperature (4-2-64)								
.13000	.14833	.16000	.00401	1.069	.00000	.00000	.00000	.00000	.00000		6	0	0	1

Group No. 3

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Vce(sat)

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: .275

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
.12000	.17100	.45000	.03125								10	1	0	0
						Post Temp. Storage (10-8-63)								
.12000	.14125	.16000	.00581	36.218	.00000	.00250	.01000	.00164	1.7699	1.528	8	0	0	2
						Shock (10-9-63)								
.12000	.13714	.16000	.00522	1.416	-.01000	-.00143	.00000	.00143	-1.0417	-1.000	7	0	0	1
						Post Temp. Cycling (10-14-63)								
.12000	.13714	.16000	.00522	1.000	.00000	.00000	.00000	.00000	.00000		7	0	0	0
						Vibration (10-15-63)								
.13000	.17000	.22000	.01431	7.525	.00000	.03286	.10000	.01629	19.328	2.017	7	0	0	0
						Humidity (10-29-63)								
.13000	.14286	.18000	.00747	3.671	-.09000	-.02714	.01000	.01643	-19.000	-1.652	7	0	0	0
						Oper. Life Hrs. = 100 (11-5-63)								
.13000	.13750	.16000	.00750	1.735	-.01000	-.00250	.00000	.00250	-1.8182	-1.000	4	0	0	3
						Oper. Life Hrs. = 250 (11-12-63)								
.12000	.13000	.15000	.00707	1.125	-.01000	-.00750	.00000	.00250	-5.7692	-3.000	4	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
.13000	.13750	.16000	.00750	1.125	.00000	.00750	.01000	.00250	5.4545	3.000	4	0	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
.11000	.12750	.15000	.00854	1.296	-.02000	-.01000	.00000	.00408	-7.8431	-2.449	4	0	0	0
						Oper. Life Hrs. = 2000 (1-30-64)								
.13000	.14000	.16000	.00707	1.458	.01000	.01250	.02000	.00250	8.9286	5.000	4	0	0	0
						Acceleration (2-10-64)								
.13000	.14500	.16000	.01500	2.250	.00000	.00000	.00000	.00000	.00000		2	0	0	2
						Low Temperature (4-2-64)								
.13000	.14500	.16000	.01500	1.000	.00000	.00000	.00000	.00000	.00000		2	0	0	0

Group No. 4

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Vce(sat)

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: .275

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
.13000	.14158	.16000	.00233								19	0	0	1
						Shock (10-9-63)								
.13000	.14526	.17000	.00221	1.107	.00000	.00368	.01000	.00114	2.5362	3.240	19	0	0	0
						Vibration (10-15-63)								
.13000	.15789	.23000	.00629	8.071	-.01000	.01263	.09000	.00634	8.0000	1.991	19	0	0	0
						Humidity (10-29-63)								
.13000	.14778	.19000	.00358	3.263	-.09000	-.01167	.05000	.00805	-7.8947	-1.449	18	0	0	1
						Oper. Life Hrs. = 100 (11-5-63)								
.12000	.14143	.17000	.00345	1.378	-.02000	-.00286	.01000	.00194	-2.0202	-1.472	14	0	0	4
						Oper. Life Hrs. = 250 (11-12-63)								
.11000	.13429	.15000	.00327	1.118	-.02000	-.00714	.00000	.00163	-5.3192	-4.372	14	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
.13000	.14000	.16000	.00332	1.029	.00000	.00571	.02000	.00173	4.0816	3.309	14	0	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
.12000	.13636	.15000	.00310	1.459	-.01000	-.00273	.00000	.00141	-2.0000	-1.936	11	0	0	3
						Oper. Life Hrs. = 2000 (1-30-64)								
.13000	.14100	.16000	.00314	1.066	.00000	.00400	.01000	.00163	2.8369	2.449	10	0	0	1
						Acceleration (2-10-64)								
.13000	.15000	.17000	.00617	2.696	-.01000	.00857	.03000	.00595	5.7143	1.441	7	0	0	3

Group No. 5

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Vce(sat)

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: .275

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
.13000	.14592	.16000	.00133								49	0	0	1
						Oper. Life Hrs. = 100 (8-27-63)								
.12000	.14735	.17000	.00145	1.184	-.01000	.00143	.01000	.00071	.96953	2.000	49	0	0	0
						Oper. Life Hrs. = 250 (9-5-63)								
.12000	.14020	.16000	.00192	1.756	-.02000	-.00714	.02000	.00127	-5.0946	-5.620	49	0	0	0
						Oper. Life Hrs. = 500 (9-26-63)								
.13000	.15277	.17000	.00154	1.622	.00000	.01277	.03000	.00104	8.3565	12.270	47	0	0	2
						Oper. Life Hrs. = 1000 (10-16-63)								
.13000	.14638	.16000	.00137	1.258	-.01000	-.00638	.01000	.00077	-4.3605	-8.279	47	0	0	0
						Oper. Life Hrs. = 2000 (12-3-63)								
.12000	.14152	.16000	.00161	1.349	-.02000	-.00478	.01000	.00086	-3.3794	-5.531	46	0	0	1

Group No. 1

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: BVcbo

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: 38.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						8-10-63								
50.190	57.961	81.370	2.7502								10	0	0	0
						8-27-63								
49.200	56.880	80.200	2.7054	1.033	-4.1400	-1.0810	.40000	.37402	-1.9005	-2.890	10	0	0	0
						9-5-63								
50.000	57.620	81.100	2.7549	1.037	-1.8000	.74000	4.1000	.45023	1.2843	1.644	10	0	0	0
						9-26-63								
51.300	58.740	82.200	2.7668	1.009	.30000	1.1200	3.5000	.34667	1.9067	3.231	10	0	0	0
						10-8-63								
50.700	58.010	81.100	2.7198	1.035	-1.4000	-.73000	-.20000	.10333	-1.2584	-7.065	10	0	0	0
						10-9-63								
51.100	58.340	81.100	2.6930	1.020	.00000	.33000	.60000	.06155	.56565	5.361	10	0	0	0
						10-14-63								
51.100	58.389	81.100	3.0109	1.125	-.50000	-.11111	.00000	.05386	-.19029	-2.063	9	0	0	1
						10-15-63								
51.100	58.444	81.100	3.0100	1.001	.00000	.05555	.29999	.03768	.09505	1.474	9	0	0	0
						10-16-63								
51.100	58.675	81.000	3.3912	1.128	-.10000	.01250	.20000	.03504	.02130	.357	8	0	0	1
						10-29-63								
51.100	58.650	81.100	3.4083	1.010	-.20000	-.02500	.10000	.03660	-.04263	-.683	8	0	0	0
						11-5-63								
51.200	58.557	81.200	3.9287	1.163	-.20000	.07143	.20000	.05216	.12198	1.369	7	0	0	1
						11-12-63								
51.100	54.750	60.300	1.3130	10.445	-.10000	-.03333	.19999	.04944	-.06088	-.674	6	0	0	1
						11-26-63								
50.400	54.333	58.900	1.1987	1.200	-1.4000	-.41667	-.10000	.21972	-.76687	-1.896	6	0	0	0
						12-3-63								
51.000	54.633	60.100	1.2987	1.174	.00000	.30000	1.2000	.20494	.54911	1.464	6	0	0	0
						12-17-63								
51.100	53.600	55.500	.83571	2.898	-.10000	.06000	.10000	.04000	.11194	1.500	5	0	0	1
						1-30-64								
51.200	53.680	55.700	.85308	1.042	.00000	.08000	.19999	.03742	.14903	2.138	5	0	0	0
						2-10-64								
51.100	53.660	55.800	.87109	1.043	-.10000	-.02000	.10000	.03742	-.03727	-.535	5	0	0	0
						4-2-64								
51.000	53.560	55.700	.87102	1.000	-.10000	-.10000	-.10000	.00000	-.18671	.000	5	0	0	0

Group No. 2

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: BVcbo

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: 38.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
41.590	59.444	84.220	2.6832								20	0	0	0
						Post Temp. Storage (10-8-63)								
48.500	63.750	83.500	4.2386	1.002	-.74000	.28625	4.5000	.67522	.44902	.424	8	0	0	12
						Post Temp. Cycling (10-14-63)								
48.800	64.557	83.800	4.8633	1.152	.19999	.38571	.60000	.05084	.59747	7.586	7	0	0	1
						Oper. Life Hrs. = 100 (11-5-63)								
51.900	66.143	84.200	4.3346	1.259	.19999	1.5857	9.2000	1.2693	2.3974	1.249	7	0	0	0
						Oper. Life Hrs. = 250 (11-12-63)								
51.800	65.943	84.100	4.3550	1.009	-.60000	-.20000	-.10000	.06901	-.30329	-2.898	7	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
51.700	65.014	83.900	4.3745	1.009	-3.5000	-.92857	.40000	.63008	-1.4283	-1.474	7	0	0	0
						Oper. Life Hrs.= 1000 (12-17-63)								
51.800	65.886	84.000	4.3653	1.004	-.40000	.87143	3.5000	.63423	1.3226	1.374	7	0	0	0
						Oper. Life Hrs. = 2000 (1-30-64)								
51.800	66.086	84.200	4.3653	1.011	.00000	.20000	.90000	.11952	.30263	1.673	7	0	0	0
						Low Temperature (4-2-64)								
56.300	68.317	83.900	4.2624	1.210	-.30000	-.15000	.00000	.04282	-.21956	-3.503	6	0	0	1

Group No. 3

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: BVcbo

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: 38.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
41.700	56.001	69.030	3.2785								10	0	0	0
						Post Temp. Storage (10-8-63)								
37.400	53.275	67.700	3.9826	1.181	-4.3000	-.26250	3.1000	.71912	-.49273	-.365	8	0	1	2
						Shock (10-9-63)								
38.000	54.571	68.300	4.4886	1.111	.20000	.45714	.60000	.05281	.83769	8.656	7	0	0	1
						Post Temp. Cycling (10-14-63)								
40.100	54.800	68.200	4.3087	1.085	-.10000	.22857	2.1000	.31222	.41710	.732	7	0	0	0
						Vibration (10-15-63)								
37.500	54.500	68.300	4.5344	1.107	-2.6000	-.30000	.10000	.38359	-.55046	-.782	7	0	1	0
						Humidity (10-29-63)								
40.400	50.580	66.300	4.5956	1.363	-.20000	.66000	2.9000	.58873	1.3049	1.121	5	0	0	2
						Oper. Life Hrs. = 100 (11-5-63)								
37.400	48.825	66.500	6.2128	1.462	-3.0000	-.62500	.20000	.79202	-1.2801	-.789	4	0	1	1
						Oper. Life Hrs. = 250 (11-12-63)								
37.100	48.675	66.400	6.2436	1.010	-.30000	-.15000	-.10000	.05000	-.30817	-3.000	4	0	1	0
						Oper. Life Hrs. = 500 (11-26-63)								
37.900	47.650	61.900	5.0724	1.515	-4.5000	-1.0250	.80000	1.1828	-2.1511	-.867	4	0	1	0
						Oper. Life Hrs. = 1000 (12-17-63)								
39.800	49.325	66.400	5.8551	1.332	.10000	1.6750	4.5000	1.0282	3.3958	1.629	4	0	0	0
						Oper. Life Hrs. = 2000 (1-30-64)								
38.100	48.975	66.500	6.1109	1.089	-1.7000	-.35000	.10000	.45000	-.71465	-.778	4	0	0	0
						Acceleration (2-10-64)								
36.900	40.950	45.000	4.0500	4.553	-1.2000	-.65000	-.10000	.55000	-1.5873	-1.182	2	0	1	2
						Low Temperature (4-2-64)								
36.700	40.850	45.000	4.1500	1.050	-.20000	-.10000	.00000	.10000	-.24480	-1.000	2	0	1	0

Group No. 4

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: BVcbo

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: 30.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
38.140	53.969	80.260	2.4434								19	0	0	1
						Shock (10-9-63)								
38.000	54.189	80.000	2.4915	1.040	-1.1000	.22000	3.2000	.22323	.40598	.986	19	0	0	0
						Vibration (10-15-63)								
38.100	53.921	80.200	2.5788	1.071	-2.6000	-.26842	.30000	.18888	-.49781	-1.421	19	0	0	0
						Humidity (10-29-63)								
38.100	56.093	80.000	3.1894	1.127	-.20000	.41429	3.3000	.26120	.73857	1.586	14	0	0	5
						Oper. Life Hrs. = 100 (11-5-63)								
38.200	56.064	80.200	3.1053	1.055	-3.9000	-.02857	1.7000	.31890	-.05097	-.090	14	0	0	0
						Oper. Life Hrs. = 250 (11-12-63)								
38.100	55.393	80.100	3.2623	1.104	-5.8000	-.67143	-.10000	.40280	-1.2121	-1.667	14	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
38.000	55.457	79.900	3.0430	1.149	-2.7000	.06428	7.4000	.59583	.11592	.108	14	0	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
38.100	55.883	80.100	3.5571	1.171	-.90000	.50833	2.6000	.24816	.90963	2.048	12	0	0	2
						Oper. Life Hrs. = 2000 (1-30-64)								
38.100	56.964	80.200	3.7907	1.041	-1.1000	.09091	1.5000	.17810	.15959	.510	11	0	0	1
						Acceleration (2-10-64)								
38.100	60.787	80.000	4.7079	1.122	-.20000	.57500	4.7000	.59032	.94592	.974	8	0	0	3

Group No. 5

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: BVcbo

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: 38.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
34.320	53.628	70.620	1.0587								49	0	1	1
						Oper. Life Hrs. = 100 (8-27-63)								
34.200	53.249	70.700	1.0257	1.065	-9.6600	-.37898	1.6800	.21186	-.71171	-1.789	49	0	1	0
						Oper. Life Hrs. = 250 (9-5-63)								
34.000	53.466	69.700	1.1012	1.106	-2.1000	.33829	5.5000	.18517	.63273	1.827	47	0	1	2
						Oper. Life Hrs. = 500 (9-26-63)								
34.700	54.486	75.900	1.1436	1.078	-3.1000	1.0204	12.400	.32408	1.8728	3.149	47	0	1	0
						Oper. Life Hrs. = 1000 (10-16-63)								
34.200	53.898	75.700	1.1454	1.003	-13.200	-.58851	.19999	.28164	-1.0919	-2.090	47	0	1	0
						Oper. Life Hrs. = 2000 (12-3-63)								
39.600	54.284	75.500	1.0969	1.139	-.80000	-.09111	1.1000	.04043	-.16784	-2.254	45	0	0	2

Group No. 1

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: BVebo

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: 4.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						8-10-63								
5.0000	5.9160	6.1800	.11019								10	0	0	0
						8-27-63								
4.9900	5.9270	6.1800	.11237	1.040	-.01000	.01100	.06000	.00623	.18559	1.766	10	0	0	0
						9-9-63								
4.9800	5.9280	6.1800	.11422	1.033	-.01000	.00100	.02000	.00314	.01687	.318	10	0	0	0
						9-26-63								
5.5700	6.0270	6.2000	.06086	3.522	.01000	.09900	.59000	.05638	1.6426	1.756	10	0	0	0
						10-8-63								
4.9900	5.8080	6.1600	.14109	5.375	-1.0400	-.21900	-.03000	.10530	-3.7707	-2.080	10	0	0	0
						10-9-63								
5.0000	5.9380	6.1900	.11285	1.563	.01000	.13000	1.0300	.10006	2.1893	1.299	10	0	0	0
						10-14-63								
4.9800	5.9350	6.1900	.11508	1.040	-.02000	-.00300	.01000	.00300	-.05055	-1.000	10	0	0	0
						10-15-63								
5.0200	5.9378	6.1900	.12451	1.054	.00000	.00556	.04000	.00444	.09356	1.250	9	0	0	1
						10-16-63								
5.0300	5.9587	6.1900	.13746	1.083	-.01000	-.00125	.01000	.00227	-.02098	-.552	8	0	0	1
						10-29-63								
5.0200	5.9575	6.1900	.13866	1.018	-.01000	-.00125	.00000	.00125	-.02098	-1.000	8	0	0	0
						11-5-63								
5.0100	5.9633	6.1900	.19180	1.435	-.01000	.00333	.01000	.00333	.05590	1.000	6	0	0	2
						11-12-63								
5.0400	5.9683	6.1900	.18683	1.054	.00000	.00500	.03000	.00500	.08378	1.000	6	0	0	0
						11-26-63								
5.0100	5.9583	6.1900	.19094	1.044	-.03000	-.01000	.00000	.00447	-.16784	-2.236	6	0	0	0
						12-2-63								
5.0000	5.9567	6.1900	.19260	1.018	-.01000	-.00167	.00000	.00167	-.02798	-1.000	6	0	0	0
						12-17-63								
5.0000	5.9200	6.2000	.23144	1.203	.00000	.01000	.02000	.00316	.16892	3.162	5	0	0	1
						1-30-64								
5.0100	5.9160	6.1900	.22777	1.032	-.01000	-.00400	.01000	.00400	-.06762	-1.000	5	0	0	0
						2-10-64								
5.0100	5.9200	6.2000	.22915	1.012	-.01000	.00400	.01000	.00400	.06757	1.000	5	0	0	0
						4-2-64								
5.0400	5.9220	6.1900	.22181	1.067	-.01000	.00200	.03000	.00800	.03377	.250	5	0	0	0

Group No. 2

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: BVebo

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: 4.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
					Initial (8-10-63)									
4.6900	5.9445	6.3500	.07713								20	0	0	0
					Post Temp. Storage (10-8-63)									
5.6300	5.9787	6.3400	.07642	2.547	-.08000	-.02875	.00000	.00854	-.48087	-3.365	8	0	0	12
					Post Temp. Cycling (10-14-63)									
5.6500	6.0062	6.3600	.07653	1.003	.02000	.02750	.04000	.00250	.45785	11.000	8	0	0	0
					Oper. Life Hrs. = 100 (11-5-63)									
5.5800	6.0057	6.3700	.09693	1.404	-.07000	.00143	.02000	.01204	.02378	.119	7	0	0	1
					Oper. Life Hrs. = 250 (11-12-63)									
5.7300	6.0229	6.3600	.08070	1.443	-.02000	.01714	.15000	.02265	.28463	.757	7	0	0	0
					Oper. Life Hrs. = 500 (11-26-63)									
5.7000	6.0014	6.3500	.07880	1.049	-.11000	-.02143	.04000	.01724	-.35706	-1.243	7	0	0	0
					Oper. Life Hrs. = 1000 (12-17-63)									
5.6600	6.0114	6.3600	.08779	1.241	-.04000	.01000	.11000	.01799	.16635	.556	7	0	0	0
					Oper. Life Hrs. = 2000 (1-30-64)									
5.6900	6.0186	6.3500	.08429	1.085	-.01000	.00714	.04000	.00778	.11868	.918	7	0	0	0
					Low Temperature (4-2-64)									
5.7100	6.0283	6.3600	.09931	1.190	.00000	.00833	.02000	.00307	.13823	2.712	6	0	0	1

Group No. 3

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: BVebo

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: 4.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
5.6800	5.9100	6.0900	.04708								10	0	0	0
						Post Temp. Storage (10-8-63)								
5.5700	5.8287	5.9900	.05460	1.076	-.15000	-.03750	.00000	.01709	-.64336	-2.195	8	0	0	2
						Shock (10-9-63)								
5.6100	5.8586	6.0300	.06058	1.077	.02000	.03571	.06000	.00528	.60960	6.762	7	0	0	1
						Post Temp. Cycling (10-14-63)								
5.6400	5.8443	6.0300	.05788	1.095	-.08000	-.01429	.03000	.01343	-.24444	-1.064	7	0	0	0
						Vibration (10-15-63)								
5.6400	5.8543	6.0300	.05645	1.052	.00000	.01000	.04000	.00655	.17081	1.528	7	0	0	0
						Humidity (10-29-63)								
5.6400	5.9000	6.0300	.06839	1.048	-.01000	-.00200	.00000	.00200	-.03390	-1.000	5	0	0	2
						Oper. Life Hrs. = 100 (11-5-63)								
5.6400	5.9200	6.0200	.09346	1.494	-.01000	.02750	.11000	.02780	.46453	.989	4	0	0	1
						Oper. Life Hrs. = 250 (11-12-63)								
5.6200	5.9100	6.0200	.09675	1.072	-.02000	-.01000	.00000	.00577	-.16921	-1.732	4	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
5.6600	5.9250	6.0400	.08894	1.183	-.01000	.01500	.04000	.01041	.25316	1.441	4	0	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
5.6000	5.9100	6.0300	.10370	1.359	-.06000	-.01500	.02000	.01708	-.25381	-.878	4	0	0	0
						Oper. Life Hrs. = 2000 (1-30-64)								
5.6200	5.9050	6.0300	.09559	1.177	-.05000	-.00500	.02000	.01555	-.08468	-.322	4	0	0	0
						Acceleration (2-10-64)								
6.0000	6.0200	6.0400	.01990	46.172	.01000	.01000	.01000	.00000	.16611		2	0	0	2
						Low Temperature (4-2-64)								
6.0000	6.0150	6.0300	.01518	1.717	-.01000	-.00500	.00000	.00500	-.08312	-1.000	2	0	0	0

Group No. 4

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: BVebo

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: 4.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
4.5000	5.7837	6.1700	.09629								19	0	0	1
						Shock (10-9-63)								
4.5600	5.7847	6.1800	.09363	1.058	-.04000	.00105	.06000	.00464	.01819	.227	19	0	0	0
						Vibration (10-15-63)								
3.8100	5.7016	6.1900	.13939	2.216	-1.7800	-.08316	.04000	.09430	-1.4585	-.882	19	0	1	0
						Humidity (10-29-63)								
4.3600	5.7800	6.1600	.13501	1.447	-.24000	-.02500	.00000	.01676	-.43253	-1.491	14	0	0	5
						Oper. Life Hrs. = 100 (11-5-63)								
5.1000	5.8514	6.1900	.10057	1.802	-.01000	.07143	.74000	.05222	1.2207	1.368	14	0	0	0
						Oper. Life Hrs. = 250 (11-12-63)								
5.1600	5.8308	6.1600	.10221	1.043	-.08000	-.00923	.09000	.01034	-.15831	-.892	13	0	0	1
						Oper. Life Hrs. = 500 (11-26-63)								
5.1500	5.8900	6.1900	.09074	1.269	-.01000	.05923	.53000	.04055	1.0056	1.461	13	0	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
5.1700	5.8636	6.1600	.10104	1.049	-.46000	-.05727	.02000	.04193	-.97675	-1.366	11	0	0	2
						Oper. Life Hrs. = 2000 (1-30-64)								
5.1700	5.8810	6.1900	.10132	1.094	-.01000	.02800	.20000	.01999	.47611	1.401	10	0	0	1
						Acceleration (2-10-64)								
5.1700	5.9014	6.1400	.12527	1.070	.00000	.01429	.05000	.00612	.24207	2.336	7	0	0	3

Group No. 5

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: BVebo

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: 4.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
4.8400	5.9251	6.2900	.03852								49	0	0	1
						Oper. Life Hrs. = 100 (8-27-63)								
5.2100	5.9561	6.2900	.03194	1.454	-.14000	.03102	.37000	.01314	.52081	2.361	49	0	0	0
						Oper. Life Hrs. = 250 (9-5-63)								
5.2100	5.9534	6.3000	.03164	1.019	-.71000	-.00265	.21000	.01606	-.04456	-.165	49	0	0	0
						Oper. Life Hrs. = 500 (9-26-63)								
5.0300	5.8972	6.3100	.04886	2.287	-.99000	-.06532	.35000	.04594	-1.1076	-1.422	47	0	0	2
						Oper. Life Hrs. = 1000 (10-16-63)								
5.1800	5.9723	6.2800	.02931	2.779	-.25000	.07511	1.0000	.04682	1.2576	1.604	47	0	0	0
						Oper. Life Hrs. = 2000 (12-3-63)								
5.1000	5.9217	6.2700	.03716	1.573	-1.0100	-.04891	.08000	.02395	-.82599	-2.042	46	0	0	1

Group No.

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Icbo

MULTIPLIER: 1 UNIT: Micro-amperes NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: .4

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						8-10-63								
.01000	.04300	.20000	.01764								10	0	0	0
						8-27-63								
.00300	.04150	.21300	.02164	1.504	-.03500	-.00150	.09000	.01162	-3.6145	-.129	10	0	0	0
						9-5-63								
.00100	.03310	.23800	.02296	1.126	-.10100	-.00840	.02500	.01061	-25.378	-.792	10	0	0	0
						9-26-63								
.00400	.04730	.32000	.03065	1.782	.00300	.01420	.08200	.00772	30.021	1.840	10	0	0	0
						10-8-63								
.00300	.03670	.25000	.02390	1.645	-.07000	-.01060	.00000	.00679	-28.883	-1.561	10	0	0	0
						10-9-63								
.00400	.04140	.28100	.02687	1.264	.00000	.00470	.03100	.00299	11.353	1.574	10	0	0	0
						10-14-63								
.00600	.03390	.23000	.02195	1.499	-.05100	-.00750	.00400	.00497	-22.124	-1.508	10	0	0	0
						10-15-63								
.00300	.03689	.24000	.02557	1.222	-.00500	.00089	.01000	.00130	2.4096	.686	9	0	0	1
						10-16-63								
.00300	.03562	.23000	.02779	1.050	-.01000	-.00162	.00000	.00121	-4.5614	-1.344	8	0	0	1
						10-29-63								
.00300	.03375	.21800	.02634	1.113	-.01200	-.00188	.00000	.00146	-5.5556	-1.287	8	0	0	0
						11-5-63								
.00300	.04443	.26000	.03595	1.629	.00000	.00700	.04200	.00585	15.756	1.197	7	0	0	1
						11-12-63								
.00300	.00750	.01200	.00152	650.765	-.00300	-.00100	.00000	.00052	-13.333	-1.936	6	0	0	1
						11-26-63								
.00110	.00585	.01300	.00167	1.207	-.01090	-.00165	.00100	.00186	-28.205	-.888	6	0	0	0
						12-3-63								
.00300	.00717	.01100	.00119	1.958	-.00300	.00132	.00990	.00180	18.372	.730	6	0	0	0
						12-17-63								
.00300	.00820	.01500	.00193	2.183	.00000	.00180	.00500	.00086	21.951	2.092	5	0	0	1
						1-30-64								
.00300	.00760	.01400	.00181	1.147	-.00100	-.00060	.00000	.00024	-7.8947	-2.449	5	0	0	0
						2-10-64								
.00300	.00760	.01400	.00181	1.000	.00000	.00000	.00000	.00000	.00000		5	0	0	0
						4-2-64								
.00300	.00680	.01300	.00169	1.148	-.00100	-.00080	.00000	.00020	-11.765	-4.000	5	0	0	0

Group No. 2

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Icbo

MULTIPLIER: 1 UNIT: Micro-amperes NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: .4

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
.00090	.01403	.09000	.00445								20	0	0	0
						Post Temp. Storage (10-8-63)								
.00300	.02887	.11000	.01198	2.900	.00200	.00676	.02000	.00221	23.420	3.065	8	0	0	12
						Post Temp. Cycling (10-14-63)								
.00400	.02600	.10800	.01202	1.006	-.00800	-.00288	.00100	.00101	-11.058	-2.853	8	0	0	0
						Oper. Life Hrs. = 100 (11-5-63)								
.00700	.03014	.09600	.01245	1.064	-.05600	.00229	.07600	.01479	7.5829	.155	7	0	0	1
						Oper. Life Hrs. = 250 (11-12-63)								
.00600	.03143	.12200	.01586	1.621	-.00900	.00129	.02600	.00426	4.0909	.302	7	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
.00700	.03257	.12900	.01677	1.119	-.00100	.00114	.00700	.00101	3.5088	1.131	7	0	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
.00900	.03986	.15800	.02064	1.514	.00000	.00729	.02900	.00389	18.280	1.873	7	0	0	0
						Oper. Life Hrs. = 2000 (1-30-64)								
.00900	.04214	.16000	.02110	1.045	.00000	.00229	.01200	.00166	5.4237	1.379	7	0	0	0
						Low Temperature (4-2-64)								
.00800	.04467	.15000	.02263	1.015	-.01000	-.00267	.00100	.00161	-5.9702	-1.661	6	0	0	1

Group No. 3

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Icbo

MULTIPLIER: 1 UNIT: Micro-amperes NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: .4

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
.00090	.01109	.03000	.00329								10	0	0	0
						Post Temp. Storage (10-8-63)								
.00600	.01575	.03700	.00362	1.036	-.00900	.00326	.01100	.00208	20.714	1.570	8	0	0	2
						Shock (10-9-63)								
.00600	.01300	.02400	.00258	2.245	-.00100	.00029	.00300	.00052	2.1978	.548	7	0	0	1
						Post Temp. Cycling (10-14-63)								
.00500	.01814	.06200	.00758	8.625	-.00200	.00514	.03800	.00550	28.346	.936	7	0	0	0
						Vibration (10-15-63)								
.00500	.01257	.02300	.00255	8.823	-.04200	-.00557	.00200	.00608	-44.318	-.917	7	0	0	0
						Humidity (10-29-63)								
.00700	.01940	.04200	.00623	4.259	.00000	.00740	.02200	.00438	38.144	1.691	5	0	0	2
						Oper. Life Hrs. = 100 (11-5-63)								
.00900	.02325	.04600	.00831	1.422	.00200	.00950	.02300	.00497	40.860	1.910	4	0	0	1
						Oper. Life Hrs. = 250 (11-12-63)								
.00900	.02300	.04700	.00876	1.110	-.00200	-.00025	.00100	.00063	-1.0870	-.397	4	0	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
.00900	.02550	.05200	.00987	1.271	.00000	.00250	.00500	.00119	9.8039	2.100	4	0	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
.01000	.03375	.07300	.01421	2.074	.00100	.00825	.02100	.00442	24.444	1.865	4	0	0	0
						Oper. Life Hrs. = 2000 (1-30-64)								
.01200	.03600	.07800	.01472	1.072	-.00200	.00225	.00500	.00155	6.2500	1.454	4	0	0	0
						Acceleration (2-10-64)								
.03200	.05100	.07000	.01900	1.200	-.00800	-.00500	-.00200	.00300	-9.8039	-1.667	2	0	0	2
						Low Temperature (4-2-64)								
.03100	.05150	.07200	.02050	1.164	-.00100	.00050	.00200	.00150	.97087	.333	2	0	0	0

Group No. 4

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Icbo

MULTIPLIER: 1 UNIT: Micro-amperes NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: .4

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
.00300	.03226	.16000	.01057								19	0	0	1
						Shock (10-9-63)								
.00700	.03974	.17400	.01139	1.162	-.00400	.00747	.02100	.00131	18.808	5.706	19	0	0	0
						Vibration (10-15-63)								
.00700	.03847	.16000	.01062	1.151	-.01400	-.00126	.01800	.00141	-3.2832	-.899	19	0	0	0
						Humidity (10-29-63)								
.00800	.03336	.15200	.01051	1.385	-.14600	-.00421	.04200	.01157	-12.634	-.364	14	0	0	5
						Oper. Life Hrs. = 100 (11-5-63)								
.01800	.10471	.50000	.03478	10.947	-.01900	.07136	.34800	.02742	68.145	2.602	14	1	0	0
						Oper. Life Hrs. = 250 (11-12-63)								
.02000	.11443	.68000	.04611	1.757	-.05300	.00971	.18000	.01422	8.4894	.683	14	1	0	0
						Oper. Life Hrs. = 500 (11-26-63)								
.01800	.12757	.78000	.05262	1.302	-.01800	.01314	.10000	.00840	10.302	1.564	14	1	0	0
						Oper. Life Hrs. = 1000 (12-17-63)								
.02300	.14942	.79900	.06307	1.232	-.00300	.01583	.06500	.00627	10.597	2.526	12	1	0	2
						Oper. Life Hrs. = 2000 (1-30-64)								
.01100	.14773	.85000	.07461	1.283	-.11000	-.01091	.05100	.01227	-7.3846	-.889	11	1	0	1
						Acceleration (2-10-64)								
.00600	.07900	.22800	.03217	7.397	-.03200	-.00812	.00100	.00381	-10.285	-2.130	8	0	0	3

Group No. 5

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Icbo

MULTIPLIER: 1 UNIT: Micro-amperes NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: .4

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-10-63)								
.00090	.03551	.39000	.01005								49	0	0	1
						Oper. Life Hrs. = 100 (8-27-63)								
.00000	.05696	.65000	.01404	1.953	-.05500	.02145	.26000	.00698	37.664	3.076	49	1	0	0
						Oper. Life Hrs. = 250 (9-5-63)								
.00600	.08566	1.0300	.02236	2.433	-.00800	.02732	.38000	.00815	31.893	3.353	47	1	0	2
						Oper. Life Hrs. = 500 (9-26-63)								
.01300	.12398	1.1000	.02465	1.215	.00300	.03832	.11600	.00433	30.908	8.847	47	1	0	0
						Oper. Life Hrs. = 1000 (10-16-63)								
.00800	.11066	.96000	.02421	1.037	-.25500	-.01332	.39500	.01230	-12.036	-1.083	47	2	0	0
						Oper. Life Hrs. = 2000 (12-3-63)								
.00300	.06780	.23200	.00965	6.431	-.76800	-.04313	.20700	.02166	-63.610	-1.991	46	0	0	1

Group No. 1

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Cob

MULTIPLIER: 1 UNIT: Pico-farads NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 4.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-12-63)								
2.3000	2.4200	2.6000	.03888								10	0	0	0
						Final (1-30-64)								
2.3000	3.0833	5.9000	.56593	127.139	.00000	.63333	3.6000	.59367	20.541	1.067	6	1	0	4

Group No. 2

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Cob

MULTIPLIER: 1 UNIT: Pico-farads NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 4.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-8-63)								
2.2000	2.3850	2.6000	.03102								20	0	0	0
						Final (1-30-64)								
2.2000	2.4000	2.7000	.06172	1.386	.00000	.04286	.10000	.02020	1.7857	2.121	7	0	0	13

Group No. 3

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Cob

MULTIPLIER: 1 UNIT: Pico-farads NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 4.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-8-63)								
2.2000	2.4300	2.6000	.03959								10	0	0	0
						Final (1-30-64)								
2.3000	2.4750	2.6000	.06292	1.010	-.10000	-.02500	.00000	.02500	-1.0101	-1.000	4	0	0	6

Group No. 4

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Cob

MULTIPLIER: 1 UNIT: Pico-farads NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 4.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-8-63)								
2.2000	2.4158	2.5000	.01914								19	0	0	1
						Final (1-30-64)								
2.2000	2.6462	4.5000	.17083	54.508	.00000	.23846	2.1000	.16662	9.0116	1.431	13	1	0	6

Group No. 5

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Cob

MULTIPLIER: 1 UNIT: Pico-farads NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 4.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-8-63)								
2.2000	2.4714	2.8000	.01913								49	0	0	1
						Final (1-30-64)								
2.2000	2.5042	3.7000	.03247	2.764	-.40000	.03404	1.0000	.02457	1.3594	1.385	47	0	0	2

Group No. 1

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Vceo(sust)

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: 14.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-8-63)								
15.700	20.740	33.300	1.7259								10	0	0	0
						Final (1-30-64)								
18.900	21.160	27.900	1.7087	2.041	2.9000	3.0800	3.2000	.05832	14.556	52.816	5	0	0	5

Group No. 2

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Vceo(sust)

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: 14.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-8-63)								
15.500	21.165	31.200	1.1481								20	0	0	0
						Final (1-30-64)								
18.600	25.314	33.600	2.3903	1.517	2.3000	2.7429	3.2000	.13427	10.835	20.428	7	0	0	13

Group No. 3

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Vceo(sust)

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: 14.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-8-63)								
15.500	18.090	23.000	.83887								10	0	0	0
						Final (1-30-64)								
18.800	20.825	25.500	1.5676	1.397	3.0000	3.1500	3.3000	.06453	15.126	48.813	4	0	0	6

Group No. 4

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Vceo(sust)

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: 14.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-8-63)								
16.200	19.805	31.800	.89167								19	0	0	1
						Final (1-30-64)								
12.500	22.415	34.600	1.5238	1.998	-4.7000	2.1154	4.5000	.67765	9.4372	3.122	13	0	1	6

Group No. 5

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Vceo(sust)

MULTIPLIER: 1 UNIT: Volts NOMINAL VALUE: None LOWER LIMIT: 14.0 UPPER LIMIT: None

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-8-63)								
14.700	18.341	26.700	.35793								49	0	0	1
						Final (1-30-64)								
17.800	21.587	29.600	.36773	1.009	1.8000	3.2065	4.9000	.06553	14.854	48.928	46	0	0	3

Group No. 1

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: T

MULTIPLIER: 1 UNIT: Nano-seconds NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 13.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-12-63)								
.70000	.96000	1.0000	.03055								10	0	0	0
						Final (2-5-64)								
.90000	.98000	1.0000	.02000	4.667	.00000	.04000	.20000	.04000	4.0816	1.000	5	0	0	5

Group No. 2

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: T

MULTIPLIER: 1 UNIT: Nano-seconds NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 13.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-12-63)								
.90000	.98500	1.1000	.01313								20	0	0	0
						Final (2-5-64)								
1.0000	1.0143	1.1000	.01429	2.414	-.10000	.01429	.10000	.02608	1.4084	.548	7	0	0	13

Group No. 3

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: T

MULTIPLIER: 1 UNIT: Nano-seconds NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 13.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-12-63)								
.90000	.99000	1.1000	.01795								10	0	0	0
						Final (2-5-64)								
1.0000	1.0250	1.1000	.02500	1.289	.00000	.05000	.10000	.02887	4.8780	1.732	4	0	0	6

Group No. 4

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: T

MULTIPLIER: 1 UNIT: Nano-seconds NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 13.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-12-63)								
.90000	1.0105	1.1000	.01509								19	0	0	1
						Final (2-5-64)								
.90000	.98889	1.0000	.01111	3.895	-.10000	-.00000	.10000	.02357	-.00000	-.000	9	0	0	10

Group No. 5

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: T

MULTIPLIER: 1 UNIT: Nano-seconds NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 13.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-12-63)								
.90000	.99592	1.1000	.00770								49	0	0	1
						Final (2-5-64)								
.90000	.99348	1.1000	.00787	1.019	-.20000	-.00217	.10000	.01098	-.21882	-.198	46	0	0	3

Group No. 1

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Ton

MULTIPLIER: 1 UNIT: Nano-seconds NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 12.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-12-63)								
4.9000	5.2300	5.7000	.07310								10	0	0	0
						Final (2-5-64)								
4.8000	6.6167	7.1000	.36461	14.929	-.40000	1.3833	2.0000	.36735	20.907	3.766	6	0	0	4

Group No. 2

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Ton

MULTIPLIER: 1 UNIT: Nano-seconds NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 12.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-12-63)								
4.7000	5.2050	5.7000	.06004								20	0	0	0
						Final (2-5-64)								
6.7000	7.0857	7.5000	.11430	1.269	1.8000	1.9857	2.1000	.04040	28.024	49.146	7	0	0	13

Group No. 3

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Ton

MULTIPLIER: 1 UNIT: Nano-seconds NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 12.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-12-63)								
5.0000	5.1400	5.5000	.04762								10	0	0	0
						Final (1-30-64)								
5.9000	6.9000	7.4000	.33912	20.289	.90000	1.7500	2.1000	.28723	25.362	6.093	4	0	0	6

Group No. 4

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Ton

MULTIPLIER: 1 UNIT: Nano-seconds NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 12.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-12-63)								
4.7000	5.1895	5.8000	.05967								19	0	0	1
						Final (2-5-64)								
7.0000	7.2400	7.7000	.05999	1.880	1.8000	2.0200	2.4000	.05538	27.901	36.476	10	0	0	9

Group No. 5

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Ton

MULTIPLIER: 1 UNIT: Nano-seconds NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 12.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-12-63)								
4.6000	5.0877	5.6000	.04275								49	0	0	1
						Final (1-30-64)								
7.0000	7.3298	7.7000	.03163	1.904	1.7000	2.2340	2.5000	.02321	30.479	96.239	47	0	0	2

Group No. 1

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Toff

MULTIPLIER: 1 UNIT: Nano-seconds NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 18.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-12-63)								
5.1000	6.2900	9.4000	.37960								10	0	0	0
						Final (2-5-64)								
8.7000	9.9833	10.800	.34777	1.986	2.6000	3.9667	4.5000	.28829	39.733	13.759	6	0	0	4

Group No. 2

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Toff

MULTIPLIER: 1 UNIT: Nano-seconds NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 18.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-12-63)								
4.8000	6.3000	8.4000	.22361								20	0	0	0
						Final (2-5-64)								
9.8000	11.314	12.900	.41658	1.215	4.3000	4.8429	5.6000	.16310	42.803	29.692	7	0	0	13

Group No. 3

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Toff

MULTIPLIER: 1 UNIT: Nano-seconds NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 18.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-12-63)								
4.6000	6.1100	8.0000	.39199								10	0	0	0
						Final (2-5-64)								
8.0000	9.5500	11.800	.81803	1.742	3.4000	4.0250	4.6000	.25290	42.147	15.915	4	0	0	6

Group No. 4

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Toff

MULTIPLIER: 1 UNIT: Nano-seconds NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 18.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-12-63)								
4.6000	5.7632	8.1000	.24783								19	0	0	1
						Final (2-5-64)								
7.7000	10.433	14.200	.52949	2.883	3.1000	4.5250	6.1000	.24219	43.371	18.684	12	0	0	7

Group No. 5

JPL TEST NUMBER: 7-0057 VENDOR: FAIRCHILD SEMICONDUCTOR PART NUMBER: 2N 2369 PARAMETER: Toff

MULTIPLIER: 1 UNIT: Nano-seconds NOMINAL VALUE: None LOWER LIMIT: None UPPER LIMIT: 18.0

Min.	Mean	Max.	StD.	F	MinD.	MeanD.	MaxD.	StdD.	P.C.	t	No.	NU	NL	NC
						Initial (8-12-63)								
4.4000	5.4143	7.6000	.12171								49	0	0	1
						Final (2-5-64)								
7.5000	10.228	13.900	.23382	3.540	1.9000	4.8106	6.4000	.12830	47.036	37.495	47	0	0	2

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

INITIAL HISTOGRAM -- Hfe 1 -- None

t	x	n	
-4.75	.3389547 e 01	0	
-4.25	.1153460 e 02	0	
-3.75	.1967965 e 02	0	
-3.25	.2782469 e 02	0	
-2.75	.3596975 e 02	0	
-2.25	.4411479 e 02	0	
-1.75	.5225983 e 02	2	xx
-1.25	.6040488 e 02	13	xxxxxxxxxxxxx
-.75	.6854993 e 02	25	xxxxxxxxxxxxxxxxxxxxxxxxx
-.25	.7669498 e 02	22	xxxxxxxxxxxxxxxxxxxxxx
.25	.8484002 e 02	18	xxxxxxxxxxxxxxxxxx
.75	.9298507 e 02	8	xxxxxxxx
1.25	.1011301 e 03	7	xxxxxxx
1.75	.1092752 e 03	9	xxxxxxxxx
2.25	.1174202 e 03	3	xxx
2.75	.1255652 e 03	1	x
3.25	.1337103 e 03	0	
3.75	.1418553 e 03	0	
4.25	.1500003 e 03	0	
4.75	.1581454 e 03	0	
5.25	.1662904 e 03	0	

mean	.8076749 e 02
standard deviation	.1629009 e 02
failures	2

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

FINAL HISTOGRAM -- Hfe 1 -- None

t	x	n	
-4.75	-.1751451 e 02	0	
-4.25	-.7778454 e 01	0	
-3.75	.1957592 e 01	0	
-3.25	.1169364 e 02	0	
-2.75	.2142970 e 02	0	
-2.25	.3116575 e 02	2	xx
-1.75	.4090180 e 02	0	
-1.25	.5063785 e 02	4	xxxx
-.75	.6037390 e 02	22	xxxxxxxxxxxxxxxxxxxxxx
-.25	.7010995 e 02	11	xxxxxxxxxxx
.25	.7984599 e 02	14	xxxxxxxxxxxxxx
.75	.8958204 e 02	9	xxxxxxxxx
1.25	.9931809 e 02	3	xxx
1.75	.1090541 e 03	4	xxxx
2.25	.1187901 e 03	4	xxxx
2.75	.1285262 e 03	0	
3.25	.1382623 e 03	0	
3.75	.1479983 e 03	0	
4.25	.1577343 e 03	0	
4.75	.1674704 e 03	0	
5.25	.1772064 e 03	0	

mean	.7497796 e 02
standard deviation	.1947210 e 02
failures	37

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

INITIAL HISTOGRAM -- Life 2 -- None

t	x	n	
-4.75	.1785335 e 01	0	
-4.25	.6244858 e 01	0	
-3.75	.1070439 e 02	0	
-3.25	.1516392 e 02	0	
-2.75	.1962345 e 02	0	
-2.25	.2408298 e 02	0	
-1.75	.2854251 e 02	3	xxx
-1.25	.3300204 e 02	9	xxxxxxxxx
-.75	.3746157 e 02	21	xxxxxxxxxxxxxxxxxxxxx
-.25	.4192110 e 02	33	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
.25	.4638063 e 02	15	xxxxxxxxxxxxxxx
.75	.5084015 e 02	11	xxxxxxxxxxx
1.25	.5529968 e 02	4	xxxx
1.75	.5975921 e 02	5	xxxxx
2.25	.6421873 e 02	3	xxx
2.75	.6867825 e 02	3	xxx
3.25	.7313778 e 02	1	x
3.75	.7759730 e 02	0	
4.25	.8205683 e 02	0	
4.75	.8651635 e 02	0	
5.25	.9097587 e 02	0	

mean	.4415086 e 02
standard deviation	.8919057 e 01
failures	2

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

FINAL HISTOGRAM -- Hfe 2 -- None

t	x	n	
-4.75	-.9790922 e 01	0	
-4.25	-.2872383 e 01	0	
-3.75	.4046152 e 01	0	
-3.25	.1096469 e 02	0	
-2.75	.1788323 e 02	0	
-2.25	.2480177 e 02	0	
-1.75	.3172031 e 02	2	xx
-1.25	.3863884 e 02	9	xxxxxxxxx
-.75	.4555738 e 02	14	xxxxxxxxxxxxxx
-.25	.5247592 e 02	19	xxxxxxxxxxxxxxxxxxx
.25	.5939446 e 02	12	xxxxxxxxxxxx
.75	.6631300 e 02	6	xxxxxx
1.25	.7323153 e 02	2	xx
1.75	.8015007 e 02	8	xxxxxxxx
2.25	.8706859 e 02	0	
2.75	.9398713 e 02	0	
3.25	.1009057 e 03	1	x
3.75	.1078242 e 03	0	
4.25	.1147427 e 03	0	
4.75	.1216612 e 03	0	
5.25	.1285798 e 03	0	

mean	.5593519 e 02
standard deviation	.1383708 e 02
failures	37

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

INITIAL HISTOGRAM -- Vbe(sat) -- Volts

t	x	n	
-4.75	.5598512 e 00	1	x
-4.25	.5830344 e 00	0	
-3.75	.6062175 e 00	0	
-3.25	.6294007 e 00	0	
-2.75	.6525839 e 00	0	
-2.25	.6757671 e 00	0	
-1.75	.6989502 e 00	0	
-1.25	.7221334 e 00	0	
-.75	.7453166 e 00	0	
-.25	.7684997 e 00	57	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
.25	.7916829 e 00	49	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
.75	.8148661 e 00	1	x
1.25	.8380493 e 00	0	
1.75	.8612324 e 00	0	
2.25	.8844155 e 00	0	
2.75	.9075987 e 00	0	
3.25	.9307819 e 00	0	
3.75	.9539650 e 00	0	
4.25	.9771481 e 00	0	
4.75	.1000331 e 01	0	
5.25	.1023514 e 01	0	

mean	.7800913 e 00
standard deviation	.4636634 e-01
failures	2

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

FINAL HISTOGRAM -- Vbe(sat) -- Volts

t	x	n	
-4.75	.7453586 e 00	0	
-4.25	.7491779 e 00	0	
-3.75	.7529972 e 00	0	
-3.25	.7568166 e 00	0	
-2.75	.7606359 e 00	0	
-2.25	.7644553 e 00	0	
-1.75	.7682746 e 00	14	xxxxxxxxxxxxxx
-1.25	.7720940 e 00	0	
-.75	.7759133 e 00	0	
-.25	.7797326 e 00	35	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
.25	.7835519 e 00	0	
.75	.7873713 e 00	0	
1.25	.7911906 e 00	22	xxxxxxxxxxxxxxxxxxxxxx
1.75	.7950100 e 00	0	
2.25	.7988293 e 00	2	xx
2.75	.8026487 e 00	0	
3.25	.8064679 e 00	0	
3.75	.8102873 e 00	0	
4.25	.8141066 e 00	0	
4.75	.8179260 e 00	0	
5.25	.8217453 e 00	0	

mean	.7816423 e 00
standard deviation	.7638679 e-02
failures	37

7-0057

FAIRCHILD SEMIDCONDUCTOR -- 2N 2369

INITIAL HISTOGRAM -- Vce(sat) -- Volts

t	x	n	
-4.75	-.3966641 e 01	0	
-4.25	-.3524588 e 01	0	
-3.75	-.3082534 e 01	0	
-3.25	-.2640480 e 01	0	
-2.75	-.2198427 e 01	0	
-2.25	-.1756373 e 01	0	
-1.75	-.1314319 e 01	0	
-1.25	-.8722659 e 00	0	
-.75	-.4302124 e 00	0	
-.25	.1184109 e-01	106	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
.25	.4538947 e 00	1	x
.75	.8959482 e 00	0	
1.25	.1338001 e 01	0	
1.75	.1780055 e 01	0	
2.25	.2222108 e 01	0	
2.75	.2664161 e 01	0	
3.25	.3106214 e 01	0	
3.75	.3548267 e 01	0	
4.25	.3990320 e 01	0	
4.75	.4432373 e 01	0	
5.25	.4874427 e 01	1	x

mean	.2328674 e 00
standard deviation	.8841071 e 00
failures	2

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

FINAL HISTOGRAM -- Vce(sat) -- Volts

t	x	n	
-4.75	.8788939 e-01	0	
-4.25	.9356213 e-01	0	
-3.75	.9923485 e-01	0	
-3.25	.1049076 e 00	0	
-2.75	.1105803 e 00	0	
-2.25	.1162531 e 00	0	
-1.75	.1219258 e 00	6	xxxxxx
-1.25	.1275985 e 00	13	xxxxxxxxxxxxx
-.75	.1332713 e 00	0	
-.25	.1389440 e 00	26	xxxxxxxxxxxxxxxxxxxxxxxxxxx
.25	.1446167 e 00	0	
.75	.1502895 e 00	18	xxxxxxxxxxxxxxxxxx
1.25	.1559622 e 00	0	
1.75	.1616349 e 00	10	xxxxxxxxxx
2.25	.1673076 e 00	0	
2.75	.1729804 e 00	0	
3.25	.1786531 e 00	0	
3.75	.1843258 e 00	0	
4.25	.1899986 e 00	0	
4.75	.1956713 e 00	0	
5.25	.2013440 e 00	0	

mean	.1417804 e 00
standard deviation	.1134546 e-01
failures	37

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

INITIAL HISTOGRAM -- BVcbo -- Volts

t	x	n	
-4.75	.1027877 e 02	0	
-4.25	.1302671 e 02	0	
-3.75	.1977466 e 02	0	
-3.25	.2452259 e 02	0	
-2.75	.2927053 e 02	0	
-2.25	.3401847 e 02	1	x
-1.75	.3876641 e 02	3	xxx
-1.25	.4351435 e 02	12	xxxxxxxxxxxx
-.75	.4826229 e 02	19	xxxxxxxxxxxxxxxxxxx
-.25	.5301023 e 02	28	xxxxxxxxxxxxxxxxxxxxxxxxxxxx
.25	.5775817 e 02	15	xxxxxxxxxxxxxxx
.75	.6250611 e 02	12	xxxxxxxxxxxx
1.25	.6725405 e 02	11	xxxxxxxxxxx
1.75	.7200198 e 02	3	xxx
2.25	.7674992 e 02	1	x
2.75	.8149785 e 02	2	xx
3.25	.8624579 e 02	1	x
3.75	.9099372 e 02	0	
4.25	.9574166 e 02	0	
4.75	.1004896 e 03	0	
5.25	.1052375 e 03	0	

mean	.5538420 e 02
standard deviation	.9495879 e 01
failures	2

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

FINAL HISTOGRAM -- BVcbo -- Volts

t	x	n	
-4.75	.1083612 e 02	0	
-4.25	.1553800 e 02	0	
-3.75	.2023987 e 02	0	
-3.25	.2494174 e 02	0	
-2.75	.2964362 e 02	0	
-2.25	.3434550 e 02	0	
-1.75	.3904737 e 02	4	xxxx
-1.25	.4374924 e 02	5	xxxxx
-.75	.4845112 e 02	13	xxxxxxxxxxxxx
-.25	.5315300 e 02	19	xxxxxxxxxxxxxxxxxxx
.25	.5785487 e 02	13	xxxxxxxxxxxxx
.75	.6255674 e 02	7	xxxxxxx
1.25	.6725861 e 02	7	xxxxxxx
1.75	.7196049 e 02	0	
2.25	.7666235 e 02	2	xx
2.75	.8136423 e 02	1	x
3.25	.8606610 e 02	1	x
3.75	.9076796 e 02	0	
4.25	.9546983 e 02	0	
4.75	.1001717 e 03	0	
5.25	.1048736 e 03	0	

mean	.5550393 e 02
standard deviation	.9403748 e 01
failures	38

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

INITIAL HISTOGRAM -- BVebo -- Volts

t	x	n	
-4.75	.4350807 e 01	0	
-4.25	.4518437 e 01	1	x
-3.75	.4686067 e 01	1	x
-3.25	.4841697 e 01	1	x
-2.75	.5003327 e 01	3	xxx
-2.25	.5164956 e 01	1	x
-1.75	.5326586 e 01	1	x
-1.25	.5488216 e 01	3	xxx
-.75	.5649846 e 01	9	xxxxxxxxx
-.25	.5811476 e 01	14	xxxxxxxxxxxxxx
.25	.5973105 e 01	45	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
.75	.6134735 e 01	25	xxxxxxxxxxxxxxxxxxxxxxxxx
1.25	.6296365 e 01	4	xxxx
1.75	.6457994 e 01	0	
2.25	.6619624 e 01	0	
2.75	.6781253 e 01	0	
3.25	.6942883 e 01	0	
3.75	.7104512 e 01	0	
4.25	.7266142 e 01	0	
4.75	.7427772 e 01	0	
5.25	.7589401 e 01	0	

mean	.5892290 e 01
standard deviation	.3232595 e 00
failures	2

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

FINAL HISTOGRAM -- BVebo -- Volts

t	x	n	
-4.75	.4718444 e 01	0	
-4.25	.4846449 e 01	0	
-3.75	.4974455 e 01	1	x
-3.25	.5102460 e 01	0	
-2.75	.5230466 e 01	3	xxx
-2.25	.5358471 e 01	0	
-1.75	.5486477 e 01	1	x
-1.25	.5614483 e 01	3	xxx
-.75	.5742488 e 01	6	xxxxxx
-.25	.5870494 e 01	13	xxxxxxxxxxxxx
.25	.5998499 e 01	27	xxxxxxxxxxxxxxxxxxxxxxxxxxxxx
.75	.6126505 e 01	14	xxxxxxxxxxxxxx
1.25	.6254510 e 01	4	xxxx
1.75	.6382515 e 01	1	x
2.25	.6510521 e 01	0	
2.75	.6638526 e 01	0	
3.25	.6766531 e 01	0	
3.75	.6894537 e 01	0	
4.25	.7022542 e 01	0	
4.75	.7150547 e 01	0	
5.25	.7278553 e 01	0	

mean	.5934497 e 01
standard deviation	.2560110 e 00
failures	37

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

INITIAL HISTOGRAM -- Icbo -- Micro Amperes

t	x	n	
-4.75	-.2322775 e 00	0	
-4.25	-.2047438 e 00	0	
-3.75	-.1772102 e 00	0	
-3.25	-.1496764 e 00	0	
-2.75	-.1221428 e 00	0	
-2.25	-.9460906 e-01	0	
-1.75	-.6707541 e-01	0	
-1.25	-.3954173 e-01	0	
-.75	-.1200805 e-01	12	xxxxxxxxxxxx
-.25	.1552562 e-01	66	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
.25	.4305929 e-01	18	xxxxxxxxxxxxxxxxxx
.75	.7059296 e-01	2	xx
1.25	.9812663 e-01	2	xx
1.75	.1256603 e 00	1	x
2.25	.1531939 e 00	2	xx
2.75	.1807275 e 00	2	xx
3.25	.2082612 e 00	2	xx
3.75	.2357948 e 00	0	
4.25	.2633285 e 00	0	
4.75	.2908621 e 00	0	
5.25	.3183958 e 00	1	x

mean	.2929242 e-01
standard deviation	.5506735 e-01
failures	2

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

FINAL HISTOGRAM -- Icbo -- Micro-amperes

t	x	n	
-4.75	-.4661177 e 00	0	
-4.25	-.4095243 e 00	0	
-3.75	-.3529307 e 00	0	
-3.25	-.2963372 e 00	0	
-2.75	-.2397438 e 00	0	
-2.25	-.1831503 e 00	0	
-1.75	-.1265568 e 00	0	
-1.25	-.6996327 e-01	0	
-.75	-.1336982 e-01	21	xxxxxxxxxxxxxxxxxxxxx
-.25	.4322366 e-01	32	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
.25	.9981714 e-01	9	xxxxxxxxx
.75	.1564106 e 00	3	xxx
1.25	.2130041 e 00	6	xxxxxx
1.75	.2695975 e 00	1	x
2.25	.3261909 e 00	0	
2.75	.3827844 e 00	0	
3.25	.4393778 e 00	0	
3.75	.4959712 e 00	0	
4.25	.5525646 e 00	0	
4.75	.6091580 e 00	0	
5.25	.6657515 e 00	1	x

mean	.7152033 e-01
standard deviation	.1131870 e 00
failures	37

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

INITIAL HISTOGRAM -- Cob -- Pico-farads

t	x	n	
-4.75	.1828392 e 01	0	
-4.25	.1892458 e 01	0	
-3.75	.1956524 e 01	0	
-3.25	.2020590 e 01	0	
-2.75	.2084657 e 01	0	
-2.25	.2148723 e 01	0	
-1.75	.2212789 e 01	7	xxxxxxx
-1.25	.2276856 e 01	22	xxxxxxxxxxxxxxxxxxxxxx
-.75	.2340922 e 01	0	
-.25	.2404988 e 01	28	xxxxxxxxxxxxxxxxxxxxxxxxxxxx
.25	.2469054 e 01	32	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
.75	.2533121 e 01	0	
1.25	.2597187 e 01	14	xxxxxxxxxxxxxx
1.75	.2661253 e 01	0	
2.25	.2725319 e 01	4	xxxx
2.75	.2789385 e 01	1	x
3.25	.2853451 e 01	0	
3.75	.2917517 e 01	0	
4.25	.2981583 e 01	0	
4.75	.3045650 e 01	0	
5.25	.3109716 e 01	0	

mean	.2437021 e 01
standard deviation	.1281524 e 00
failures	2

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

FINAL HISTOGRAM -- Cob -- Pico-farads

t	x	n	
-4.75	.2033111 e 00	0	
-4.25	.4516283 e 00	0	
-3.75	.6999448 e 00	0	
-3.25	.9482619 e 00	0	
-2.75	.1196579 e 01	0	
-2.25	.1444895 e 01	0	
-1.75	.1693212 e 01	0	
-1.25	.1941529 e 01	0	
-.75	.2189845 e 01	17	xxxxxxxxxxxxxxxxx
-.25	.2438163 e 01	37	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
.25	.2686479 e 01	19	xxxxxxxxxxxxxxxxxxx
.75	.2934796 e 01	0	
1.25	.3183113 e 01	1	x
1.75	.3431429 e 01	0	
2.25	.3679746 e 01	1	x
2.75	.3928062 e 01	0	
3.25	.4176378 e 01	0	
3.75	.4424695 e 01	1	x
4.25	.4673011 e 01	0	
4.75	.4921328 e 01	0	
5.25	.5169645 e 01	1	x

mean	.2562321 e 01
standard deviation	.4966335 e 00
failures	33

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

INITIAL HISTOGRAM -- Vceo(sust) -- Volts

t	x	n	
-4.75	.1120517 e 01	0	
-4.25	.3034327 e 01	0	
-3.75	.4948131 e 01	0	
-3.25	.6861940 e 01	0	
-2.75	.8775750 e 01	0	
-2.25	.1068956 e 02	0	
-1.75	.1260336 e 02	0	
-1.25	.1451717 e 02	1	x
-.75	.1643098 e 02	38	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
-.25	.1834478 e 02	30	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
.25	.2025859 e 02	19	xxxxxxxxxxxxxxxxxx
.75	.2217240 e 02	6	xxxxxx
1.25	.2408621 e 02	5	xxxxx
1.75	.2600001 e 02	3	xxx
2.25	.2791381 e 02	1	x
2.75	.2982762 e 02	1	x
3.25	.3174142 e 02	3	xxx
3.75	.3365523 e 02	1	x
4.25	.3556904 e 02	0	
4.75	.3748284 e 02	0	
5.25	.3939664 e 02	0	

mean	.1930169 e 02
standard deviation	.3827614 e 01
failures	2

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

FINAL HISTOGRAM -- Vceo(sust) -- Volts

t	x	n	
-4.75	.3978656 e 01	0	
-4.25	.5876604 e 01	0	
-3.75	.7774559 e 01	0	
-3.25	.9672514 e 01	0	
-2.75	.1157047 e 02	1	x
-2.25	.1346842 e 02	0	
-1.75	.1536638 e 02	0	
-1.25	.1726433 e 02	1	x
-.75	.1916228 e 02	22	xxxxxxxxxxxxxxxxxxxxxx
-.25	.2106023 e 02	24	xxxxxxxxxxxxxxxxxxxxxxxx
.25	.2295819 e 02	12	xxxxxxxxxxxx
.75	.2485614 e 02	7	xxxxxxx
1.25	.2675409 e 02	0	
1.75	.2865205 e 02	4	xxxx
2.25	.3055000 e 02	1	x
2.75	.3244795 e 02	1	x
3.25	.3434590 e 02	2	xx
3.75	.3624386 e 02	0	
4.25	.3814180 e 02	0	
4.75	.4003975 e 02	0	
5.25	.4193771 e 02	0	

mean	.2200921 e 02
standard deviation	.3795906 e 01
failures	35

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

INITIAL HISTOGRAM -- T -- Nano-seconds

t	x	n	
-4.75	.6969861 e 00	1	x
-4.25	.7281022 e 00	0	
-3.75	.7592184 e 00	0	
-3.25	.7903346 e 00	0	
-2.75	.8214507 e 00	0	
-2.25	.8525670 e 00	0	
-1.75	.8836830 e 00	0	
-1.25	.9147992 e 00	19	xxxxxxxxxxxxxxxxxxx
-.75	.9459153 e 00	0	
-.25	.9770315 e 00	0	
.25	.1008148 e 01	74	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
.75	.1039264 e 01	0	
1.25	.1070380 e 01	0	
1.75	.1101496 e 01	14	xxxxxxxxxxxxxx
2.25	.1132612 e 01	0	
2.75	.1163728 e 01	0	
3.25	.1194844 e 01	0	
3.75	.1225961 e 01	0	
4.25	.1257077 e 01	0	
4.75	.1288193 e 01	0	
5.25	.1319309 e 01	0	

mean	.9925896 e 00
standard deviation	.6223230 e-01
failures	2

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

FINAL HISTOGRAM -- T -- Nano-seconds

t	x	n	
-4.75	.7624699 e 00	0	
-4.25	.7870281 e 00	0	
-3.75	.8115864 e 00	0	
-3.25	.8361446 e 00	0	
-2.75	.8607028 e 00	0	
-2.25	.8852611 e 00	0	
-1.75	.9098193 e 00	10	xxxxxxxxxx
-1.25	.9343775 e 00	0	
-.75	.9589357 e 00	0	
-.25	.9834940 e 00	0	
.25	.1008052 e 01	54	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
.75	.1032611 e 01	0	
1.25	.1057169 e 01	0	
1.75	.1081727 e 01	0	
2.25	.1106285 e 01	7	xxxxxxx
2.75	.1130843 e 01	0	
3.25	.1155401 e 01	0	
3.75	.1179960 e 01	0	
4.25	.1204518 e 01	0	
4.75	.1229076 e 01	0	
5.25	.1253634 e 01	0	

mean .9957731 e 00
standard deviation .4911644 e-01
failures 39

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

INITIAL HISTOGRAM -- Ton -- Nano-seconds

t	x	n	
-4.75	.3853446 e 01	0	
-4.25	.3989435 e 01	0	
-3.75	.4125425 e 01	0	
-3.25	.4261414 e 01	0	
-2.75	.4397404 e 01	0	
-2.25	.4533393 e 01	6	xxxxxx
-1.75	.4669383 e 01	7	xxxxxxx
-1.25	.4805372 e 01	7	xxxxxxx
-.75	.4941361 e 01	12	xxxxxxxxxxxx
-.25	.5077351 e 01	13	xxxxxxxxxxxxx
.25	.5213340 e 01	22	xxxxxxxxxxxxxxxxxxxxxx
.75	.5349329 e 01	31	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
1.25	.5485318 e 01	6	xxxxxx
1.75	.5621307 e 01	1	x
2.25	.5757297 e 01	3	xxx
2.75	.5893286 e 01	0	
3.25	.6029275 e 01	0	
3.75	.6165264 e 01	0	
4.25	.6301254 e 01	0	
4.75	.6437243 e 01	0	
5.25	.6573232 e 01	0	

mean	.5145345 e 01
standard deviation	.2719786 e 00
failures	2

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

FINAL HISTOGRAM -- Ton -- Nano-seconds

t	x	n	
-4.75	.5312537 e 01	1	x
-4.25	.5512637 e 01	0	
-3.75	.5712738 e 01	0	
-3.25	.5912839 e 01	1	x
-2.75	.6112939 e 01	0	
-2.25	.6313040 e 01	0	
-1.75	.6513141 e 01	0	
-1.25	.6713241 e 01	2	xx
-.75	.6913342 e 01	10	xxxxxxxxxx
-.25	.7113442 e 01	27	xxxxxxxxxxxxxxxxxxxxxxxxxxxx
.25	.7313543 e 01	12	xxxxxxxxxxxx
.75	.7513643 e 01	17	xxxxxxxxxxxxxxxxx
1.25	.7713744 e 01	4	xxxx
1.75	.7913845 e 01	0	
2.25	.8113945 e 01	0	
2.75	.8314045 e 01	0	
3.25	.8514146 e 01	0	
3.75	.8714246 e 01	0	
4.25	.8914346 e 01	0	
4.75	.9114447 e 01	0	
5.25	.9314547 e 01	0	

mean	.7213493 e 01
standard deviation	.4002011 e 00
failures	36

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

INITIAL HISTOGRAM -- Toff -- Nano-seconds

t	x	n	
-4.75	.8117279 e 00	0	
-4.25	.1335247 e 01	0	
-3.75	.1858767 e 01	0	
-3.25	.2382286 e 01	0	
-2.75	.2905805 e 01	0	
-2.25	.3429325 e 01	0	
-1.75	.3952844 e 01	0	
-1.25	.4476363 e 01	11	xxxxxxxxxxx
-.75	.4999883 e 01	30	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
-.25	.5523402 e 01	20	xxxxxxxxxxxxxxxxxxxx
.25	.6046921 e 01	21	xxxxxxxxxxxxxxxxxxxxx
.75	.6570441 e 01	7	xxxxxxx
1.25	.7093959 e 01	9	xxxxxxxxx
1.75	.7627478 e 01	6	xxxxxx
2.25	.8140997 e 01	3	xxx
2.75	.8664515 e 01	0	
3.25	.9188034 e 01	1	x
3.75	.9711553 e 01	0	
4.25	.1023407 e 02	0	
4.75	.1075859 e 02	0	
5.25	.1128211 e 02	0	

mean	.5785161 e 01
standard deviation	.1047038 e 01
failures	2

7-0057

FAIRCHILD SEMICONDUCTOR -- 2N 2369

FINAL HISTOGRAM -- Toff -- Nano-seconds

t	x	n	
-4.75	.2851599 e 01	0	
-4.25	.3636193 e 01	0	
-3.75	.4420786 e 01	0	
-3.25	.5205379 e 01	0	
-2.75	.5989972 e 01	0	
-2.25	.6774565 e 01	0	
-1.75	.7559160 e 01	2	xx
-1.25	.8343753 e 01	10	xxxxxxxxxx
-.75	.9128346 e 01	14	xxxxxxxxxxxxxx
-.25	.9912939 e 01	19	xxxxxxxxxxxxxxxxxxx
.25	.1069753 e 02	8	xxxxxxxx
.75	.1148213 e 02	11	xxxxxxxxxxx
1.25	.1226672 e 02	5	xxxxx
1.75	.1305131 e 02	4	xxxx
2.25	.1383590 e 02	3	xxx
2.75	.1462049 e 02	0	
3.25	.1540509 e 02	0	
3.75	.1618968 e 02	0	
4.25	.1697427 e 02	0	
4.75	.1775886 e 02	0	
5.25	.1854346 e 02	0	

mean	.1030524 e 02
standard deviation	.1569186 e 01
failures	34