Component Analysis Report

Sales Order Number: [redacted]
Product Manufacturer: **TEXAS INSTRUMENTS**
Manufacturer Part Number: **REF5025IDGKR**
Customer Part Number: [redacted]
Component Lot Number: [redacted]
Component Lot Quantity: **7,500**
Date Code: **2337**
COO: **TH**
MSL: **2**
Description: **IC VOL REF Series Fixed 10mA Â±0.05% 8-SOP T/R**
Package Type: **8-VSSOP**

Work Order #: **WO188795**
Customer PO #: [redacted]
Service Requested: **AS6081 Leve[redacted]Electrical)**
Customer: [redacted]

Analysis Summary

FAIL - Based on the results of the test performed, the Test Lot exhibited either nonconformities or suspect conditions. These are identified in the comments and/or relevant test section.

Test Services Performed	Sample Size	Quantity Passed	Quantity Failed	Comments	User ID	Date/Time
AS6081 Level C (Electrical)	232	230	2	1	pbagdasa	2024-01-25 04:39

Comments 1: The samples were tested for VOUT at 25 degrees, Vin = 2.7V with a tolerance of 0.05% for the output. The results showed that 2 samples out of 232 have possible condition of an internal short, while the rest of the samples follow datasheet specifications.

Equipment List		
Description	**Unique ID Number**	**Calibration Expiration Date**
Digital Multimeter	NL-ET-004	5 April 2024
Bench Power Supply	NL-ET-007	21 February 2024

Certificate of Quality Conformance

unless otherwise specified, all components listed herewith have been tested and results compared to a combination of original component manufacturer specifications and average lot data. Testing is performed under control of a quality management system and accredited to ISO/IEC 17025:2017. Records of inspection and tests are on file and available for inspection at our facility upon request. This report shall not be reproduced in any format unless reproduction is a complete and true copy of the original.

Approved by Krutika Hirani

January 25, 2024

Date Of Certification

» **AS6081 Level C (Electrical)**

Manufacturer's Specifications

1 Features

- Low temperature drift:
  - High-grade: 3 ppm/°C (maximum)
  - Standard-grade: 8 ppm/°C (maximum)
- High accuracy:
  - High-grade: 0.05% (maximum)
  - Standard-grade: 0.1% (maximum)
- Low noise: 3 $\mu V_{PP}/V$
- Excellent long-term stability:
  - 22 ppm after first 1000 hours (SOIC-8)
  - 50 ppm after first 1000 hours (VSSOP-8)
- High-output current: ±10 mA
- Temperature range: –40°C to 125°C

2 Applications

- Precision data acquisition systems
- Semiconductor test equipment
- Industrial process controls
- Medical instrumentation
- Pressure and temperature transmitters
- Lab and field instrumentation

3 Description

The REF50xx is a family of low-noise, low-drift, very high precision voltage references. These references are capable of both sinking and sourcing current, and have excellent line and load regulation.

Excellent temperature drift (3 ppm/°C) and high accuracy (0.05%) are achieved using proprietary design techniques. These features, combined with very low noise, make the REF50xx family an excellent choice for use in high-precision data acquisition systems.

Each reference voltage is available in both high grade (REF50xxIDGK and REF50xxID) and standard grade (REF50xxAIDGK and REF50xxAID). The reference voltages are offered in 8-pin VSSOP and SOIC packages, and are specified from –40°C to 125°C.

Device Information

PART NUMBER	PACKAGE (1)	BODY SIZE (NOM)
REF50xx	SOIC (8)	4.90 mm × 3.91 mm
	VSSOP (8)	3.00 mm × 3.00 mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

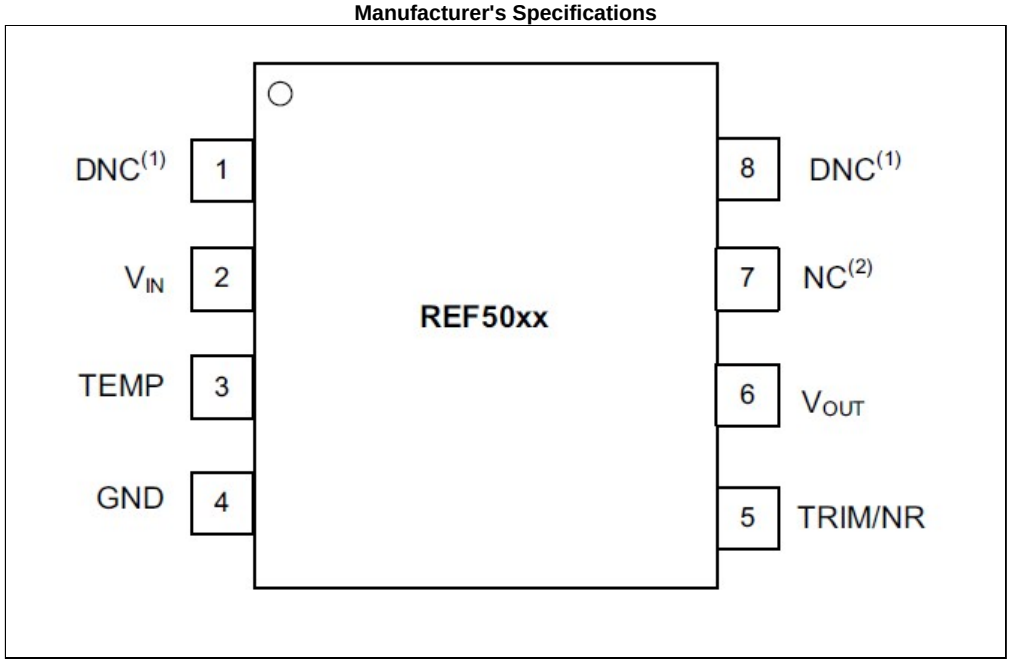
Part Description

Manufacturer's Specifications

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
OUTPUT VOLTAGE						
V_{OUT}	Output voltage	REF5020 (V_{OUT} = 2.048 V)(1), 2.7 V < V_{IN} < 18 V		2.048		V
		REF5025		2.5		
		REF5030		3.0		
		REF5040		4.096		
		REF5045		4.5		
		REF5050		5.0		
		REF5010		10.0		
	Initial accuracy: high grade	All voltage options(1)	–0.05%		0.05%	
	Initial accuracy: standard grade	All voltage options(1)	–0.1%		0.1%	
NOISE						

Part Characteristics

Manufacturer's Specifications



Pin Layout

Electrical Results

Equipment List			
Manufacturer	Description	Asset Tag	Calibration due
KEYSIGHT	DC POWER SUPPLY	NL-ET-007	2/21/2024
KEYSIGHT	DIGITAL MULTIMETER	NL-ET-004	4/5/2024

Equipment List

Electrical Results

Parametric Test Results at 25°C								
Symbol	Parameter	Min Limit	Typical	Max Limit	Min Result	Average Result	Max Results	Pass/Fail
V_{OUT}	Voltage outeput (V)	2.49875	2.5	2.50125	2.2280	2.4980	2.5009	115/1

Parametric Test Results 1

Electrical Results

Parametric Test Results at 25°C								
Symbol	Parameter	Min Limit	Typical	Max Limit	Min Result	Average Result	Max Results	Pass/Fail
V_{OUT}	Voltage outeput (V)	2.49875	2.5	2.50125	2.3757	2.4992	2.5011	115/1

Parametric Test Results 2

Electrical Results

Sample Number	Test Condition: T_A = 25°C ; V_{in} = 2.7 V; V_{out} Spec Min: 2.49875V - Max: 2.50125V Initial Accuracy: Standard Grade All voltage options(tolerance) = +/- 0.05% DC: 2337
1	2.500328
2	2.500277
3	2.500270
4	2.500650
5	2.500688
6	2.500236
7	2.500373
8	2.500290
9	2.500185
10	2.500310
11	2.500348
12	2.500329
13	2.500328
14	2.500273
15	2.500287
16	2.500506
17	2.500292
18	2.500156
19	2.500332
20	2.500363
21	2.500324
22	2.500338
23	2.500270

Results Table 1.1

Electrical Results

24	2.500363
25	2.500270
26	2.500251
27	2.500360
28	2.500268
29	2.500251
30	2.500288
31	2.500528
32	2.500401
33	2.500521
34	2.500373
35	2.500535
36	2.500325
37	2.500399
38	2.500349
39	2.500303
40	2.500289
41	2.500275
42	2.500315
43	2.500344
44	2.500330
45	2.500299
46	2.500288
47	2.500311
48	2.500337
49	2.500417
50	2.500225
51	2.500312
52	2.500391
53	2.500169
54	2.500289
55	2.500232

Results Table 1.2

Electrical Results

56	2.500241
57	2.500226
58	2.500320
59	2.500136
60	2.500314
61	2.500371
62	2.500271
63	2.500362
64	2.500305
65	2.500362
66	2.500417
67	2.500389
68	2.500315
69	2.500285
70	2.500362
71	2.500282
72	2.500245
73	2.500311
74	2.500396
75	2.500335
76	2.500479
77	2.500272
78	2.500322
79	2.500334
80	2.500392
81	2.500446
82	2.500268
83	2.500345
84	2.500371
85	2.500272
86	2.500371
87	2.500342
88	2.500431

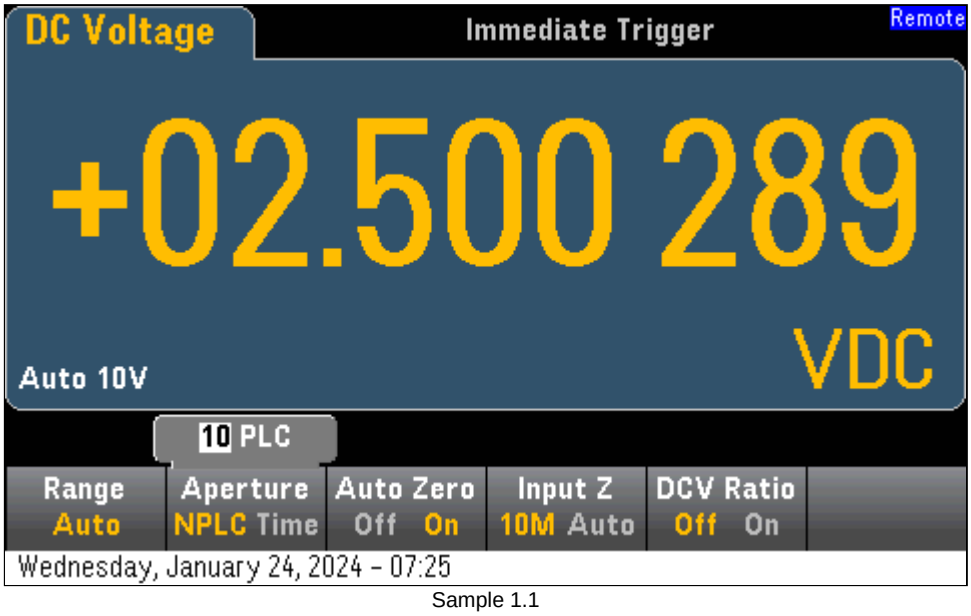
Results Table 1.3

Electrical Results

89	2.500275
90	2.500330
91	2.500359
92	2.500368
93	2.500310
94	2.500317
95	2.500319
96	2.500283
97	2.500343
98	2.500479
99	2.500401
100	2.500409
101	2.500287
102	2.500371
103	2.500402
104	2.500420
105	2.500386
106	2.500401
107	2.500325
108	2.500279
109	2.500364
110	2.500349
111	2.500862
112	2.500334
113	2.500364
114	2.500597
115	2.500365
116	2.228035
Dev	***0.0253***
Min	***2.2280***
Avg	***2.4980***
Max	***2.5009***

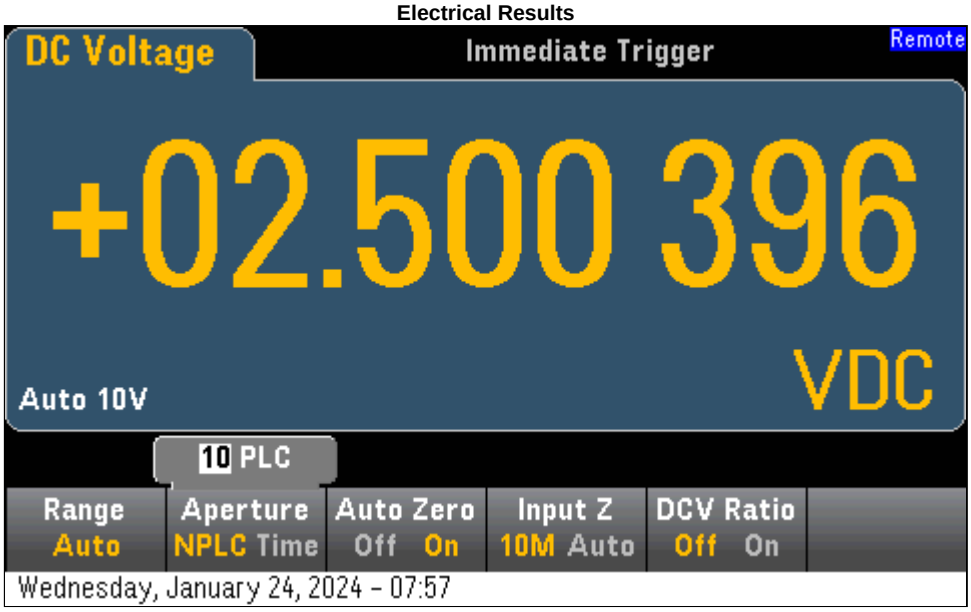
Results Table 1.4

Electrical Results



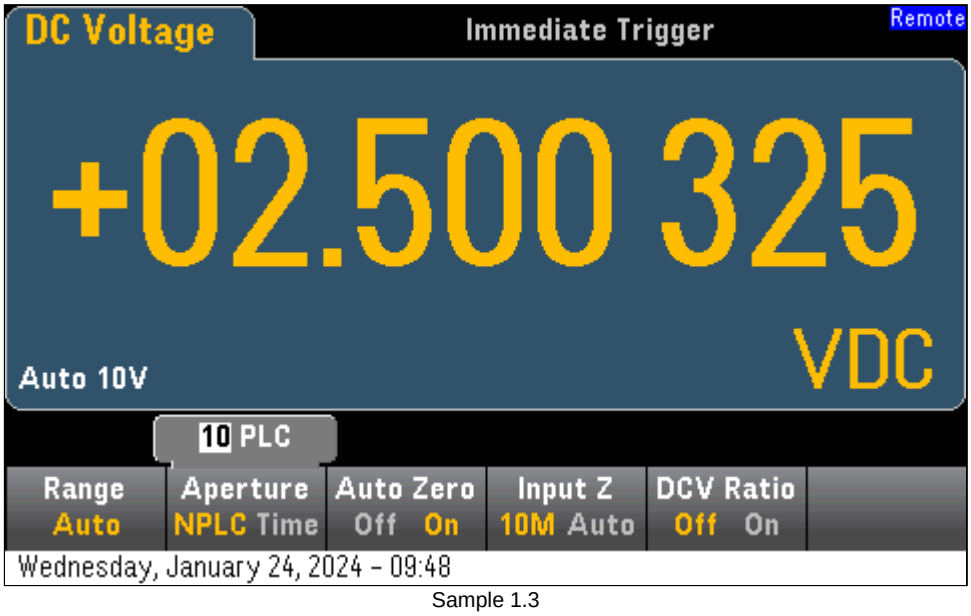
Sample 1.1

Electrical Results



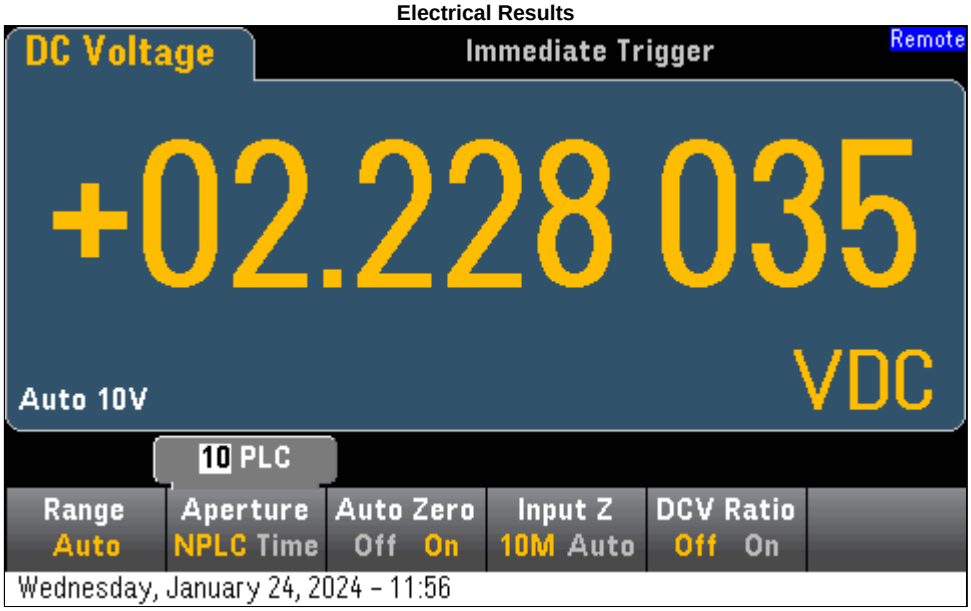
Sample 1.2

Electrical Results



Sample 1.3

Electrical Results



Failed Sample 1

Electrical Results

Sample Number	Test Condition: T_A = 25°C ; V_{in} = 2.7 V; V_{out} Spec Min: 2.49875V - Max: 2.50125V Initial Accuracy: Standard Grade All voltage options(tolerance) = +/- 0.05%
	DC: 2337
1	2.500210
2	2.500183
3	2.500221
4	2.500261
5	2.500137
6	2.500154
7	2.500282
8	2.500216
9	2.500208
10	2.500128
11	2.500138
12	2.500219
13	2.500222
14	2.500223
15	2.500175
16	2.500211
17	2.500268
18	2.500160
19	2.500234
20	2.500186
21	2.500331
22	2.500149

Results Table 2.1

Electrical Results

23	2.500293
24	2.500158
25	2.500114
26	2.500178
27	2.500216
28	2.500262
29	2.500199
30	2.500162
31	2.500127
32	2.500189
33	2.500230
34	2.500125
35	2.500154
36	2.500091
37	2.500156
38	2.500133
39	2.500138
40	2.500208
41	2.500158
42	2.500419
43	2.500143
44	2.500142
45	2.500269
46	2.500231
47	2.500212
48	2.500464
49	2.500236
50	2.500187
51	2.500303
52	2.500183
53	2.500224
54	2.500134
55	2.500699

Results Table 2.2

Electrical Results

56	2.500236
57	2.500283
58	2.500170
59	2.500163
60	2.500467
61	2.375748
62	2.500145
63	2.500311
64	2.500278
65	2.500284
66	2.500270
67	2.500285
68	2.500198
69	2.500277
70	2.500237
71	2.500278
72	2.500208
73	2.500191
74	2.500219
75	2.500233
76	2.500311
77	2.500222
78	2.500116
79	2.500164
80	2.500242
81	2.500179
82	2.500356
83	2.500220
84	2.500309
85	2.500266
86	2.500154
87	2.500439
88	2.500244

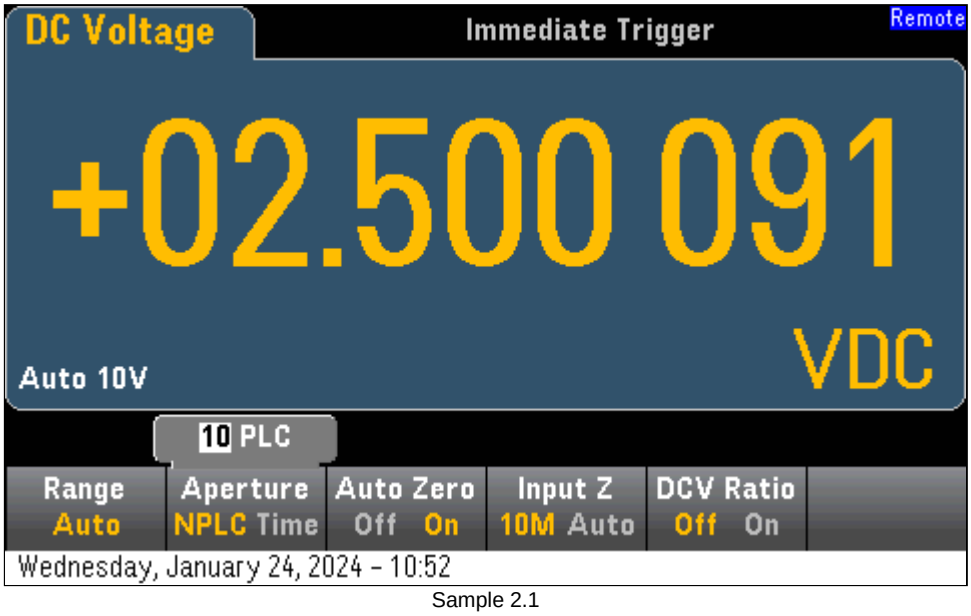
Results Table 2.3

Electrical Results

89	2.500236
90	2.500265
91	2.500269
92	2.500303
93	2.500313
94	2.500293
95	2.501094
96	2.500273
97	2.500211
98	2.500330
99	2.500195
100	2.500197
101	2.500248
102	2.500173
103	2.500231
104	2.500206
105	2.500101
106	2.500202
107	2.500265
108	2.500283
109	2.500141
110	2.500176
111	2.500178
112	2.500193
113	2.500294
114	2.500254
115	2.500352
116	2.500237
Dev	***0.0116***
Min	***2.3757***
Avg	***2.4992***
Max	***2.5011***

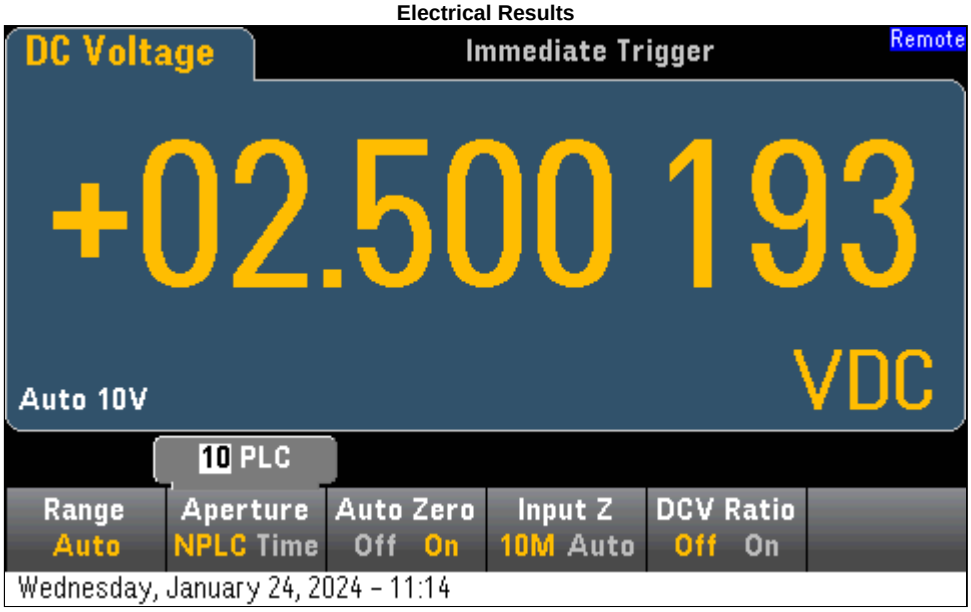
Results Table 2.4

Electrical Results



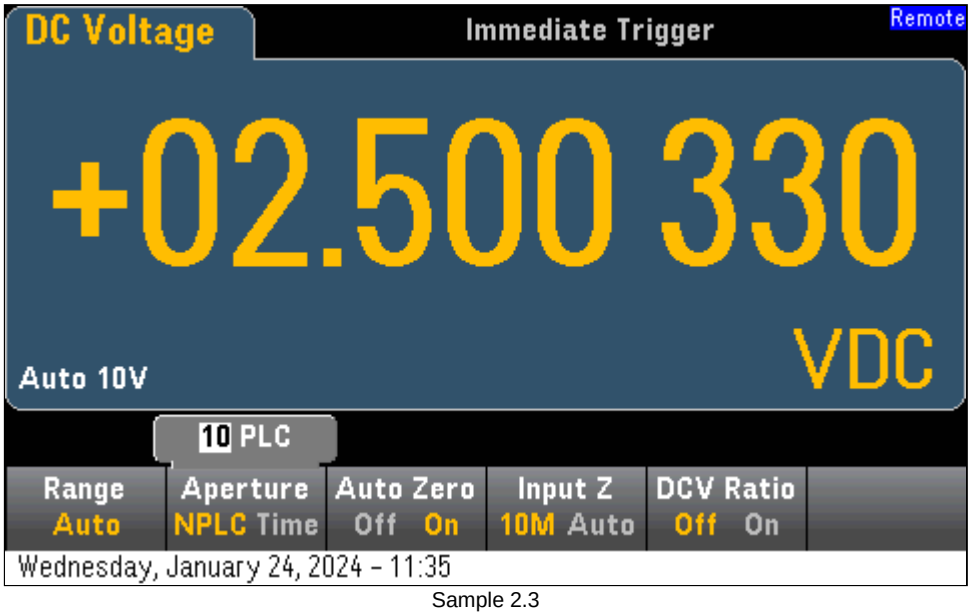
Sample 2.1

Electrical Results



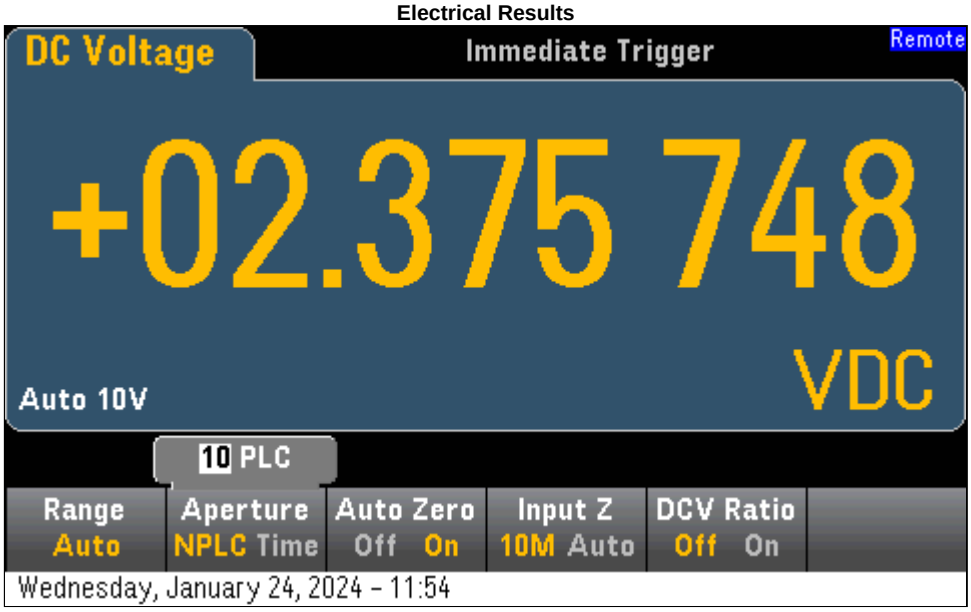
Sample 2.2

Electrical Results



Sample 2.3

Electrical Results



Failed Sample 2

END OF REPORT