



PRODUCT CHANGE NOTIFICATION

Pre-Notification Final Notification

PCN Number:

PCN20181010

Micropac Part Number / Description:

53259-XXX, Power Mosfet Optocoupler SPST Normally Closed

Description of Change:

Electrical Specifications Physical Dimensions Test Method Other

Internal circuit change providing faster switching (turn-on and turn-off) time under most conditions (TA = 25C; current design Ton = 0.19mSec, new design Ton = 0.03mSec, versus specification of Ton < 3mSec; current design Toff = 0.56mSec, new design Toff = 0.01mSec, versus specification of Toff < 1mSec). See attached data summary. No changes to dimensions, form, fit or function. No changes to the specification.

Reason For Change:

To improve electrical switching performance and manufacturing yield.

Change Effectivity:

1 November 2018

Qualification Plan & Results:

MIL-PRF-38534, Group C testing, Table C-Xc successfully completed.

Micropac Contact:

(972)272-3571

Chris Caletka, QA Manager

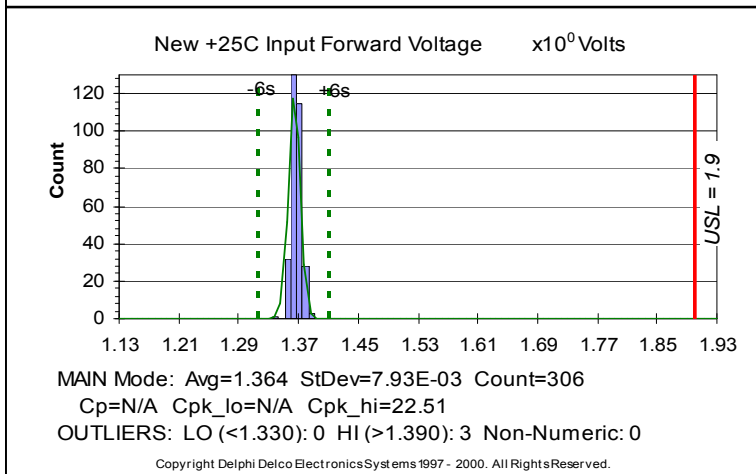
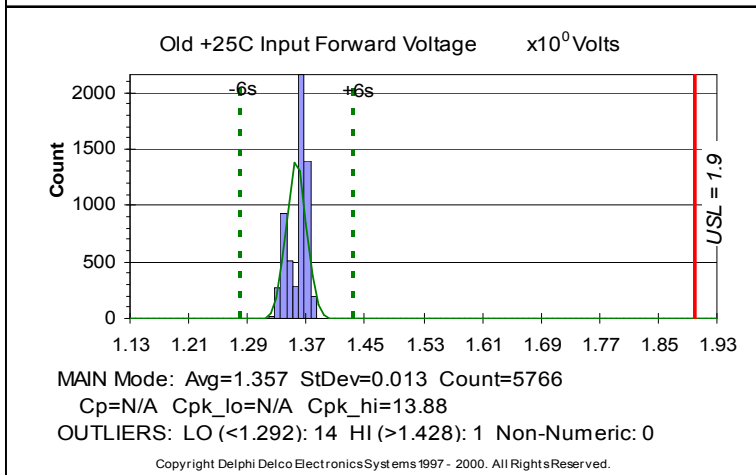
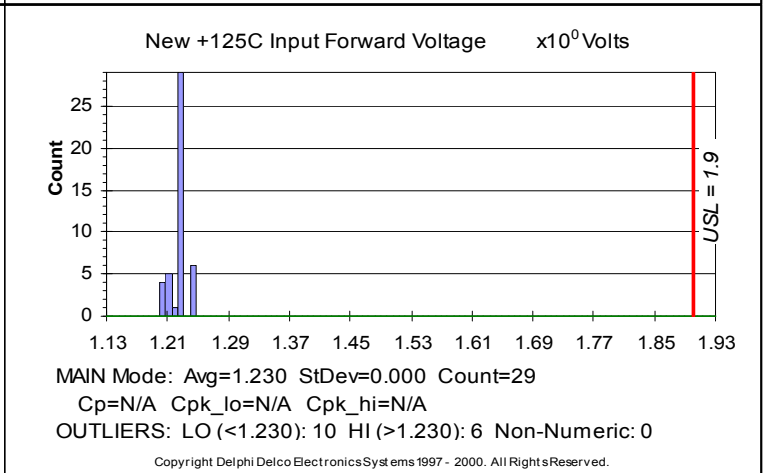
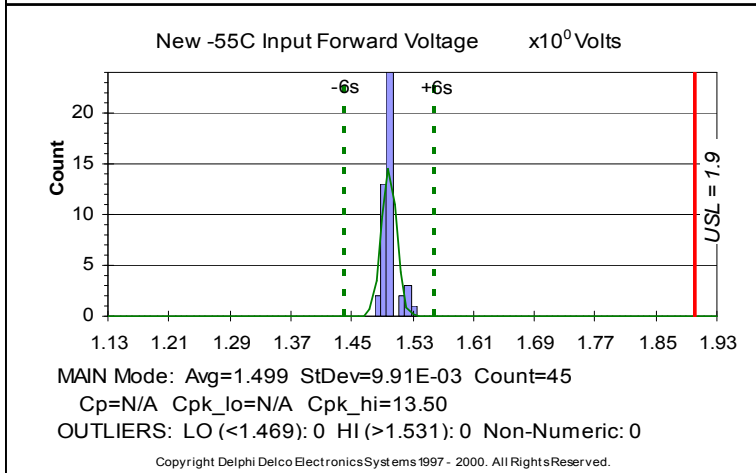
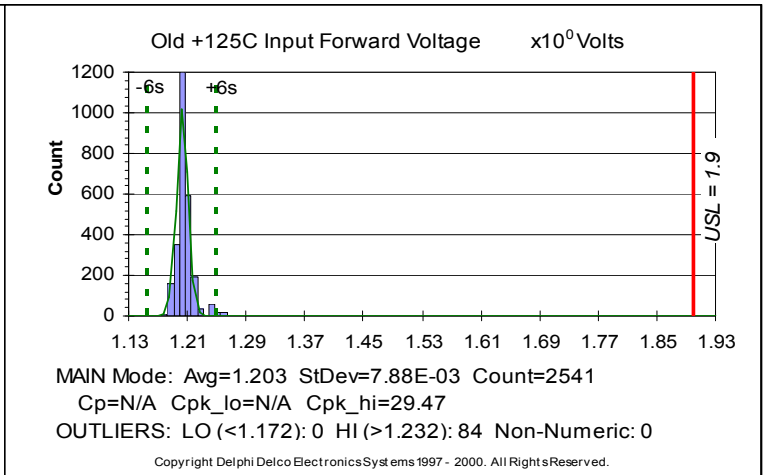
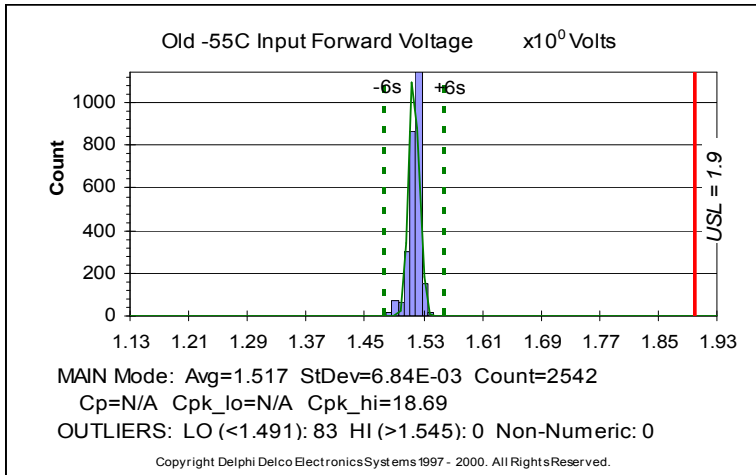
PCN Date:

18 October 2018

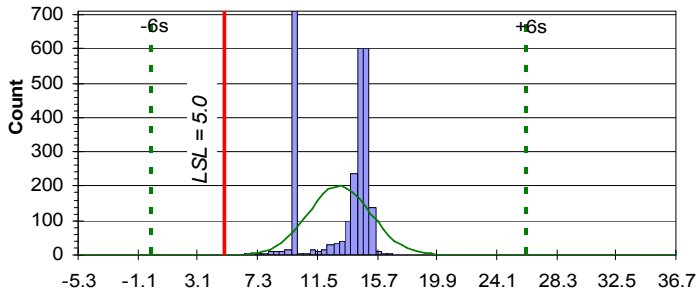
7 pages of graphical output follow this Summary
 Excel File Size (approx.) = 268 KB
 Excel 11.0
 Significance Level (0.05 / 7 Tests) = 7.14E-03

Condition	Condition Name	Area
1	Old -55C	1
2	New -55C	1
3	Old +25C	1
4	New +25C	1
5	Old +125C	1
6	New +125C	1

Test	Name	LSL	USL	Condition	Avg	StDev	Count	Cp	Cpk_lo	Cpk_hi	Lo_Out_<	Lo_Out	Hi_Out_>	Hi_Out	Non_Num	Average Test Pr(2-tail)	Variance Test Pr(2-tail)
1	Input Forward Voltage		1.9	1	1.517	6.84E-03	2,542			18.69	1.491	83	1.545	0	0		
1	Input Forward Voltage		1.9	2	1.499	9.91E-03	45			13.50	1.469	0	1.531	0	0	1.11E-21	1.34E-03
1	Input Forward Voltage		1.9	3	1.357	0.013	5,766			13.88	1.292	14	1.428	1	0	0.000	0.000
1	Input Forward Voltage		1.9	4	1.364	7.93E-03	306			22.51	1.330	0	1.390	3	0	0.000	6.12E-04
1	Input Forward Voltage		1.9	5	1.203	7.88E-03	2,541			29.47	1.172	0	1.232	84	0	0.000	8.22E-13
1	Input Forward Voltage		1.9	6	1.230	0.000	29				1.230	10	1.230	6	0	3.33E-47	
2	Input Reverse Breakdown Voltage	5.0		1	13.051	2.194	2,625		1.22		0.275	0	28.294	0	0		
2	Input Reverse Breakdown Voltage	5.0		2	9.985	0.033	37		50.28		9.804	8	10.176	0	0	3.97E-10	0.000
2	Input Reverse Breakdown Voltage	5.0		3	12.706	2.851	5,782		0.90		-3.458	0	29.397	0	0	1.45E-32	0.000
2	Input Reverse Breakdown Voltage	5.0		4	9.983	0.025	239		67.25		9.871	49	10.109	21	0	4.62E-58	0.000
2	Input Reverse Breakdown Voltage	5.0		5	14.209	3.048	2,625		1.01		-3.739	0	35.674	0	0	2.80E-142	0.000
2	Input Reverse Breakdown Voltage	5.0		6	9.805	0.134	44		11.98		9.365	1	10.355	0	0	1.52E-12	0.000
3	Output Leakage Current		1.00E-05	1	1.36E-06	4.66E-07	2,535			6.18	-3.00E-07	0	2.94E-06	90	0	1.12E-08	0.692
3	Output Leakage Current		1.00E-05	2	1.85E-06	4.47E-07	45			6.08	6.35E-07	0	2.70E-06	0	0	3.21E-187	0.000
3	Output Leakage Current		1.00E-05	3	1.17E-06	8.59E-07	5,539			3.43	-2.22E-06	0	4.35E-06	211	0	1.05E-07	1.05E-11
3	Output Leakage Current		1.00E-05	4	1.21E-06	6.37E-07	308			4.60	-1.53E-06	0	4.15E-06	1	0	9.57E-08	8.44E-03
3	Output Leakage Current		1.00E-05	5	1.31E-06	4.42E-07	2,495			6.55	-2.56E-07	0	2.69E-06	130	0	3.40E-05	0.000
3	Output Leakage Current		1.00E-05	6	9.75E-07	6.36E-08	34			47.30	7.16E-07	5	1.23E-06	6	0		
4	Output On Resistance		50.0	1	12.204	1.338	2,274			9.42	1.318	0	22.348	351	0	2.38E-34	
4	Output On Resistance		50.0	2	5.000	0.000	45				5.000	0	5.000	0	0	0.000	0.000
4	Output On Resistance		50.0	3	25.251	3.182	4,867			2.59	8.049	25	42.816	890	0	8.23E-102	0.000
4	Output On Resistance		50.0	4	9.686	0.566	304			23.73	7.677	4	11.656	1	0	0.000	0.000
4	Output On Resistance		50.0	5	45.019	1.782	1,906			0.93	36.655	261	54.045	458	0	2.16E-33	2.65E-11
4	Output On Resistance		50.0	6	19.044	0.530	45			19.47	17.269	0	21.398	0	0		
5	Output Withstanding Voltage	400.0		1	958.065	188.860	2,625		0.98		-406.418	0	2,086.396	0	0	6.21E-23	
5	Output Withstanding Voltage	400.0		2	420.000	0.000	45				420.000	0	420.000	0	0	2.80E-110	3.50E-08
5	Output Withstanding Voltage	400.0		3	1,014.853	207.082	5,752		0.99		-405.139	0	2,085.139	0	0	1.93E-140	
5	Output Withstanding Voltage	400.0		4	420.000	0.000	289				420.000	15	420.000	5	0	1.000	1.000
5	Output Withstanding Voltage	400.0		5	958.063	188.860	2,625		0.98		-406.418	0	2,086.395	0	0	6.21E-23	
5	Output Withstanding Voltage	400.0		6	420.000	0.000	45				420.000	0	420.000	0	0		
6	Turn-Off Time		1.00E-03	1	4.83E-04	1.43E-04	2,544			1.21	-9.30E-05	0	9.68E-04	81	0	2.38E-21	0.000
6	Turn-Off Time		1.00E-03	2	1.13E-04	7.33E-06	45			40.32	8.17E-05	0	1.42E-04	0	0	0.000	0.000
6	Turn-Off Time		1.00E-03	3	5.65E-04	2.26E-04	5,592			0.64	-5.07E-04	0	1.48E-03	190	0	4.08E-109	0.000
6	Turn-Off Time		1.00E-03	4	1.32E-04	1.06E-05	253			27.23	7.00E-05	0	1.93E-04	56	0	0.000	0.000
6	Turn-Off Time		1.00E-03	5	6.92E-04	2.19E-04	2,590			0.47	-1.12E-04	0	1.33E-03	35	0	1.27E-13	0.000
6	Turn-Off Time		1.00E-03	6	2.39E-04	2.64E-05	41			9.63	1.52E-04	0	3.17E-04	4	0		
7	Turn-On Time		3.00E-03	1	2.25E-04	7.88E-05	2,532			11.74	-1.41E-05	0	4.43E-04	93	0	3.14E-22	0.000
7	Turn-On Time		3.00E-03	2	9.64E-06	9.03E-07	45			1,104.03	6.57E-06	0	1.28E-05	0	0	4.31E-219	7.77E-16
7	Turn-On Time		3.00E-03	3	1.90E-04	6.87E-05	5,672			13.64	-1.84E-04	0	5.18E-04	110	0	1.52E-122	0.000
7	Turn-On Time		3.00E-03	4	3.30E-05	8.29E-06	287			119.24	1.83E-06	0	6.35E-05	22	0	0.000	0.000
7	Turn-On Time		3.00E-03	5	1.13E-04	4.87E-05	2,584			19.75	-9.18E-05	0	2.83E-04	41	0	5.87E-17	0.000
7	Turn-On Time		3.00E-03	6	6.94E-05	5.35E-06	45			182.54	4.45E-05	0	9.61E-05	0	0		



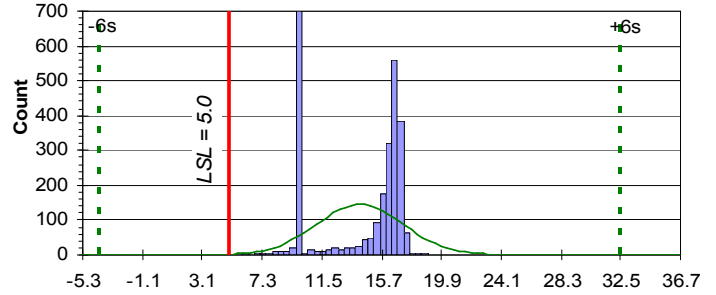
Old -55C Input Reverse Breakdown Voltage $\times 10^0$ Volts



MAIN Mode: Avg=13.051 StDev=2.194 Count=2625
 Cp=N/A Cpk_lo=1.22 Cpk_hi=N/A
 OUTLIERS: LO (<0.275): 0 HI (>28.294): 0 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

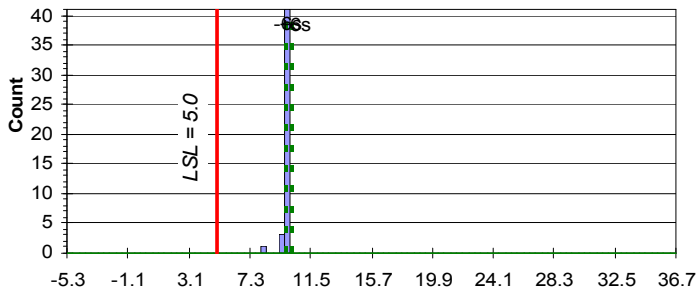
Old +125C Input Reverse Breakdown Voltage $\times 10^0$ Volts



MAIN Mode: Avg=14.209 StDev=3.048 Count=2625
 Cp=N/A Cpk_lo=1.01 Cpk_hi=N/A
 OUTLIERS: LO (<-3.739): 0 HI (>35.674): 0 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

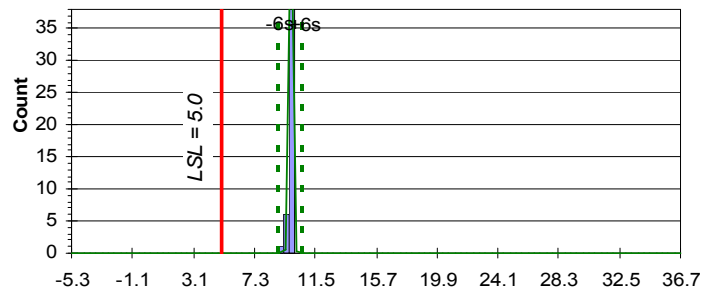
New -55C Input Reverse Breakdown Voltage $\times 10^0$ Volts



MAIN Mode: Avg=9.985 StDev=0.033 Count=37
 Cp=N/A Cpk_lo=50.28 Cpk_hi=N/A
 OUTLIERS: LO (<9.804): 8 HI (>10.176): 0 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

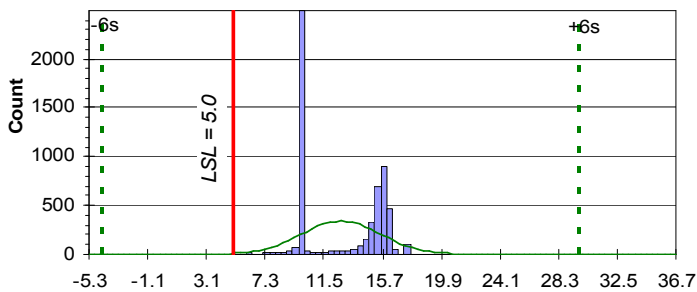
New +125C Input Reverse Breakdown Voltage $\times 10^0$ Volts



MAIN Mode: Avg=9.805 StDev=0.134 Count=44
 Cp=N/A Cpk_lo=11.98 Cpk_hi=N/A
 OUTLIERS: LO (<9.365): 1 HI (>10.355): 0 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

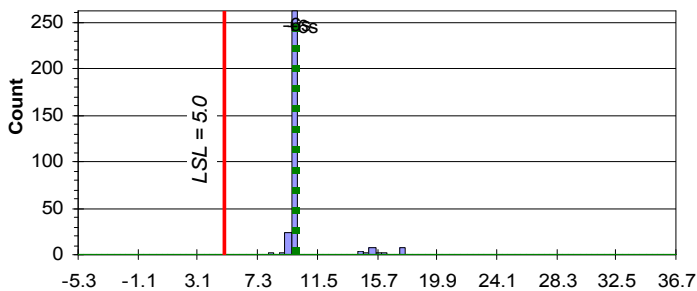
Old +25C Input Reverse Breakdown Voltage $\times 10^0$ Volts



MAIN Mode: Avg=12.706 StDev=2.851 Count=5782
 Cp=N/A Cpk_lo=0.90 Cpk_hi=N/A
 OUTLIERS: LO (<-3.458): 0 HI (>29.397): 0 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

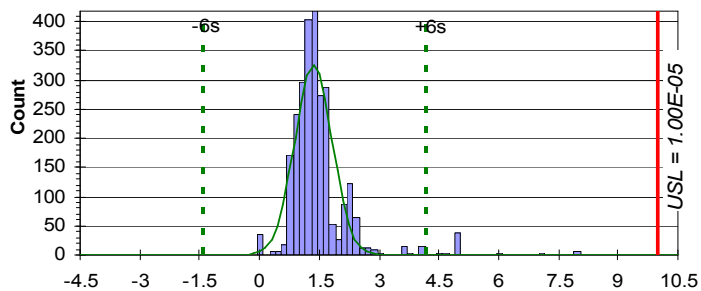
New +25C Input Reverse Breakdown Voltage $\times 10^0$ Volts



MAIN Mode: Avg=9.983 StDev=0.025 Count=239
 Cp=N/A Cpk_lo=67.25 Cpk_hi=N/A
 OUTLIERS: LO (<9.871): 49 HI (>10.109): 21 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

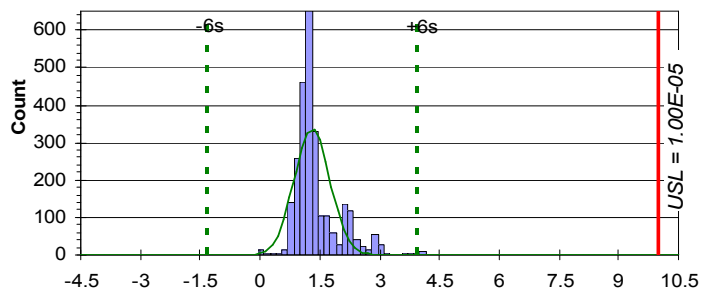
Old -55C Output Leakage Current $\times 10^{-6}$ Amps



MAIN Mode: Avg=1.36E-06 StDev=4.66E-07 Count=2535
 Cp=N/A Cpk_lo=N/A Cpk_hi=6.18
 OUTLIERS: LO (<-3.00E-07): 0 HI (>2.94E-06): 90 Non-Numeric:

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

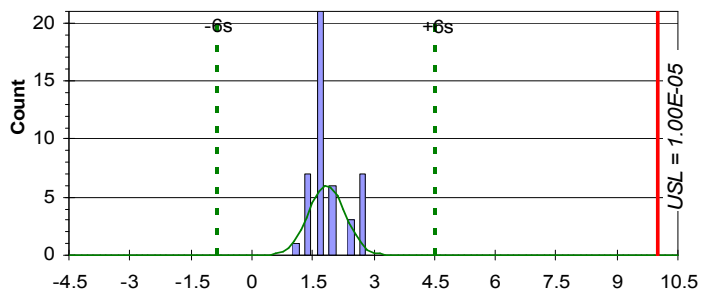
Old +125C Output Leakage Current $\times 10^{-6}$ Amps



MAIN Mode: Avg=1.31E-06 StDev=4.42E-07 Count=2495
 Cp=N/A Cpk_lo=N/A Cpk_hi=6.55
 OUTLIERS: LO (<-2.56E-07): 0 HI (>2.69E-06): 130 Non-

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

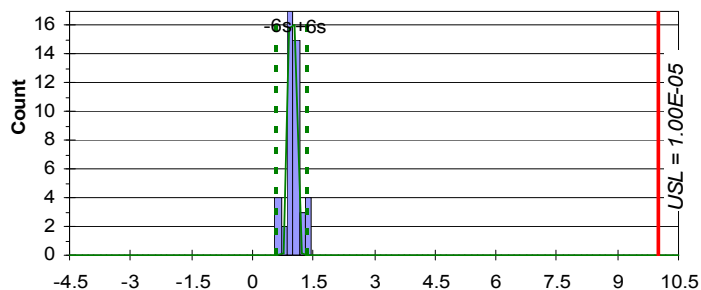
New -55C Output Leakage Current $\times 10^{-6}$ Amps



MAIN Mode: Avg=1.85E-06 StDev=4.47E-07 Count=45
 Cp=N/A Cpk_lo=N/A Cpk_hi=6.08
 OUTLIERS: LO (<6.35E-07): 0 HI (>2.70E-06): 0 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

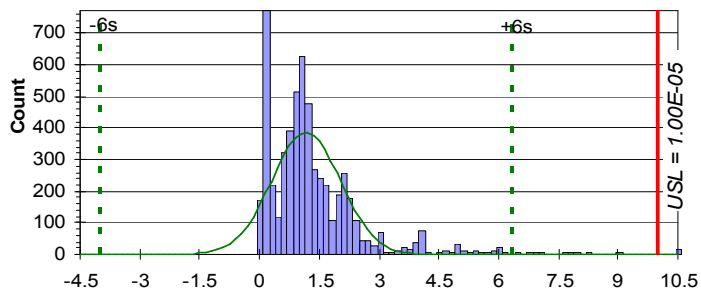
New +125C Output Leakage Current $\times 10^{-6}$ Amps



MAIN Mode: Avg=9.75E-07 StDev=6.36E-08 Count=34
 Cp=N/A Cpk_lo=N/A Cpk_hi=47.30
 OUTLIERS: LO (<7.16E-07): 5 HI (>1.23E-06): 6 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

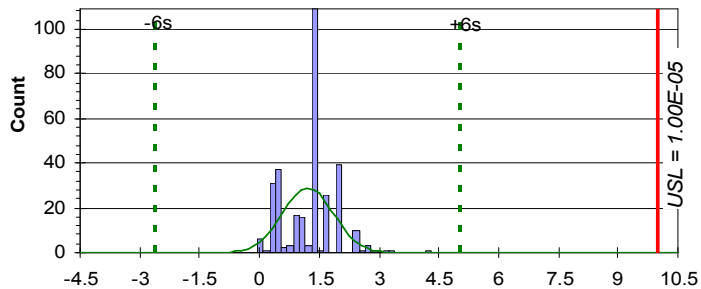
Old +25C Output Leakage Current $\times 10^{-6}$ Amps



MAIN Mode: Avg=1.17E-06 StDev=8.59E-07 Count=5539
 Cp=N/A Cpk_lo=N/A Cpk_hi=3.43
 OUTLIERS: LO (<-2.22E-06): 0 HI (>4.35E-06): 211 Non-

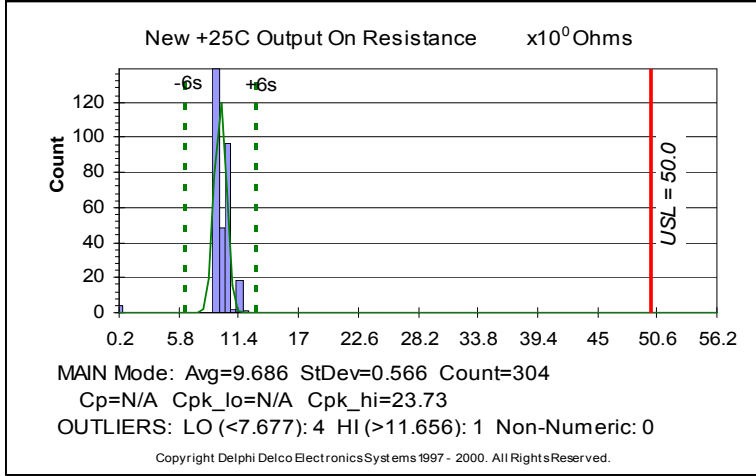
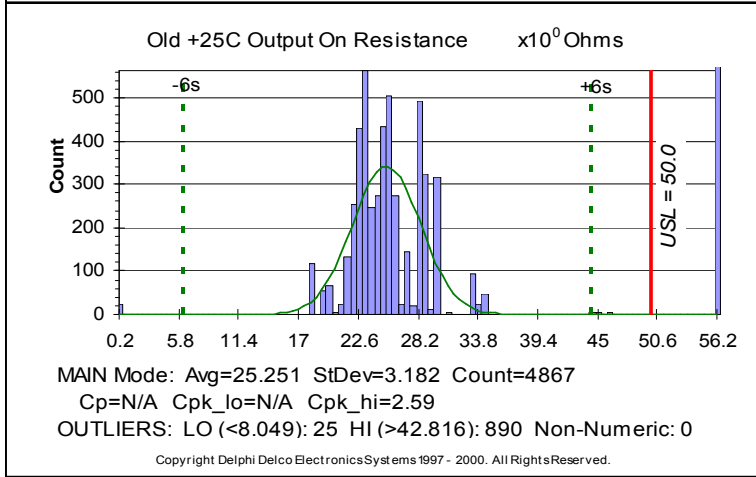
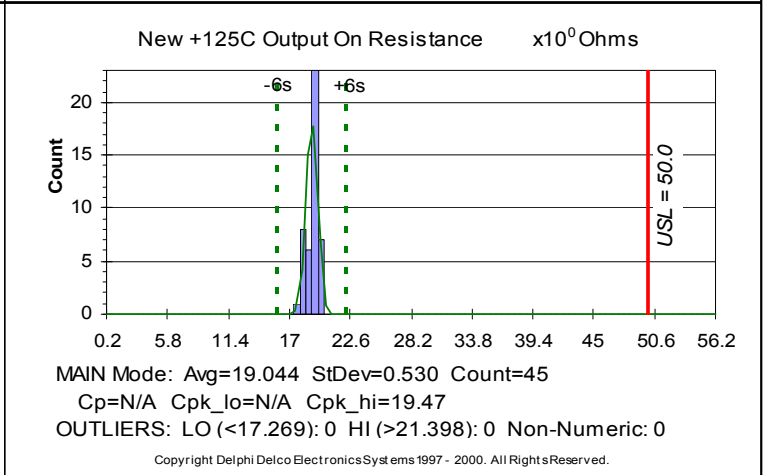
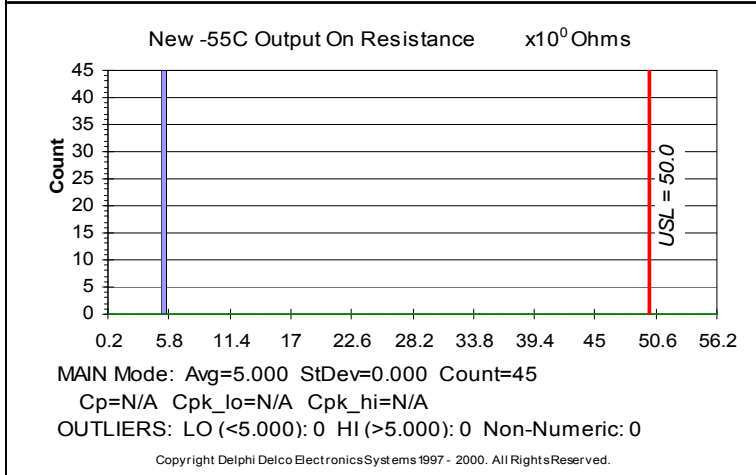
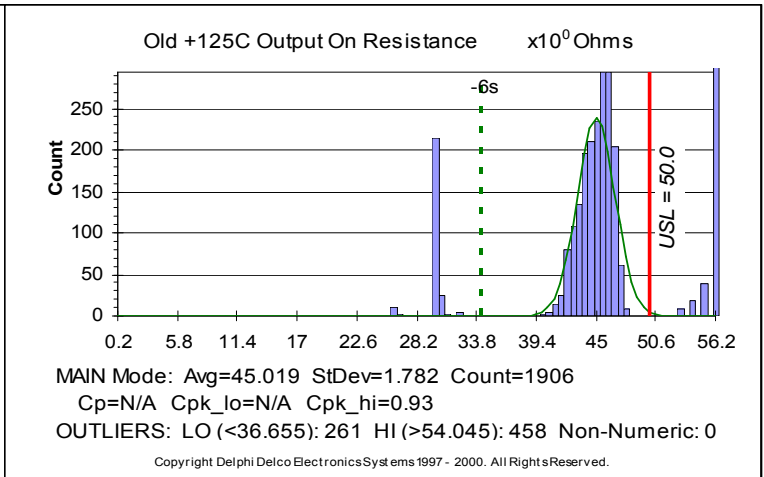
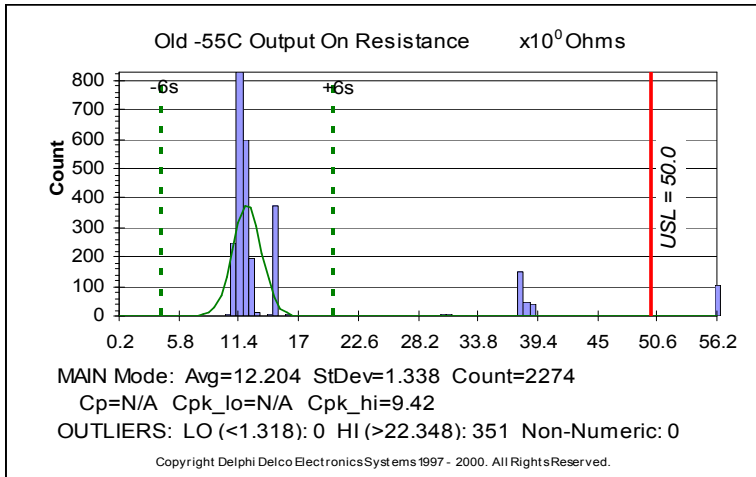
Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

New +25C Output Leakage Current $\times 10^{-6}$ Amps

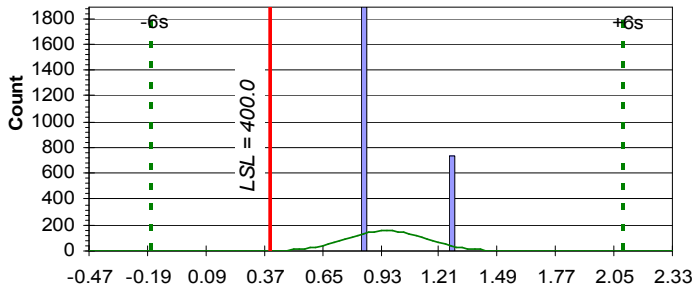


MAIN Mode: Avg=1.21E-06 StDev=6.37E-07 Count=308
 Cp=N/A Cpk_lo=N/A Cpk_hi=4.60
 OUTLIERS: LO (<-1.53E-06): 0 HI (>4.15E-06): 1 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.



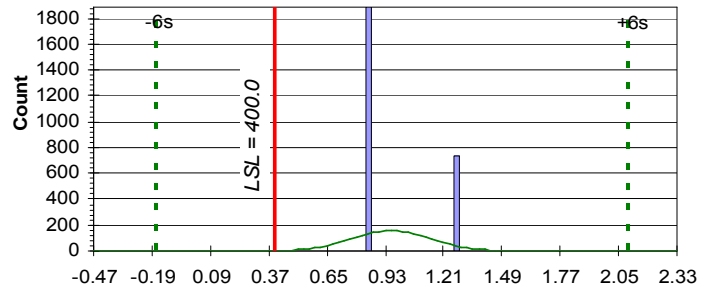
Old -55C Output Withstanding Voltage $\times 10^3$ Volts



MAIN Mode: Avg=958.065 StDev=188.860 Count=2625
 Cp=N/A Cpk_lo=0.98 Cpk_hi=N/A
 OUTLIERS: LO (<-406.418): 0 HI (>2,086.396): 0 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

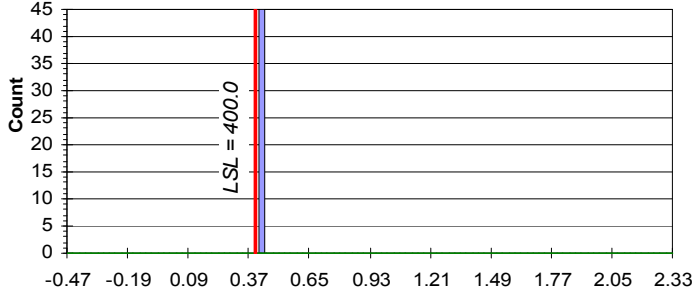
Old +125C Output Withstanding Voltage $\times 10^3$ Volts



MAIN Mode: Avg=958.063 StDev=188.860 Count=2625
 Cp=N/A Cpk_lo=0.98 Cpk_hi=N/A
 OUTLIERS: LO (<-406.418): 0 HI (>2,086.395): 0 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

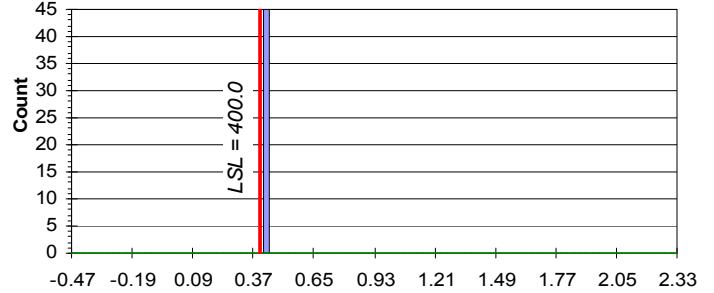
New -55C Output Withstanding Voltage $\times 10^3$ Volts



MAIN Mode: Avg=420.000 StDev=0.000 Count=45
 Cp=N/A Cpk_lo=N/A Cpk_hi=N/A
 OUTLIERS: LO (<420.000): 0 HI (>420.000): 0 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

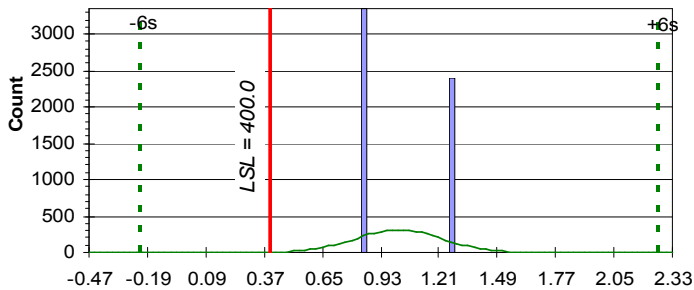
New +125C Output Withstanding Voltage $\times 10^3$ Volts



MAIN Mode: Avg=420.000 StDev=0.000 Count=45
 Cp=N/A Cpk_lo=N/A Cpk_hi=N/A
 OUTLIERS: LO (<420.000): 0 HI (>420.000): 0 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

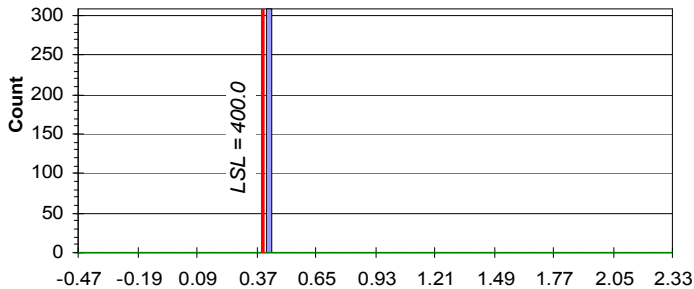
Old +25C Output Withstanding Voltage $\times 10^3$ Volts



MAIN Mode: Avg=1,014.853 StDev=207.082 Count=5752
 Cp=N/A Cpk_lo=0.99 Cpk_hi=N/A
 OUTLIERS: LO (<-405.139): 0 HI (>2,085.139): 0 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

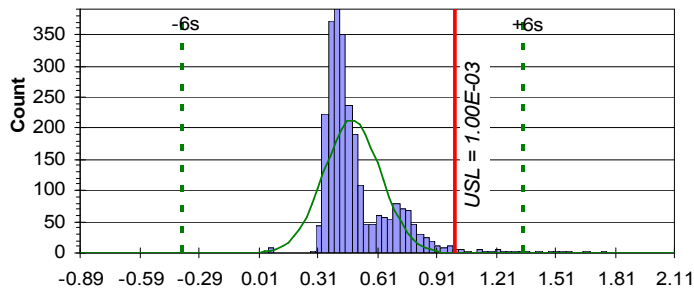
New +25C Output Withstanding Voltage $\times 10^3$ Volts



MAIN Mode: Avg=420.000 StDev=0.000 Count=289
 Cp=N/A Cpk_lo=N/A Cpk_hi=N/A
 OUTLIERS: LO (<420.000): 15 HI (>420.000): 5 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

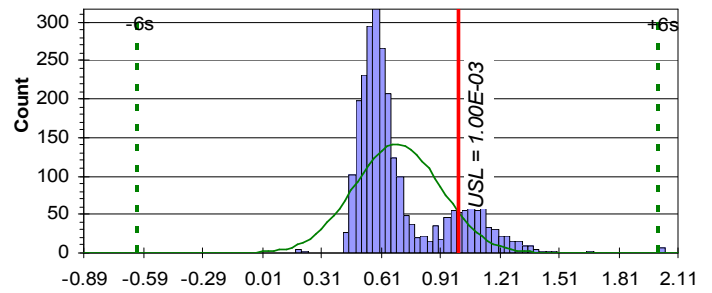
Old -55C Turn-Off Time $\times 10^{-3}$ Seconds



MAIN Mode: Avg=4.83E-04 StDev=1.43E-04 Count=2544
 Cp=N/A Cpk_lo=N/A Cpk_hi=1.21
 OUTLIERS: LO (<-9.30E-05): 0 HI (>9.68E-04): 81 Non-Numeric:

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

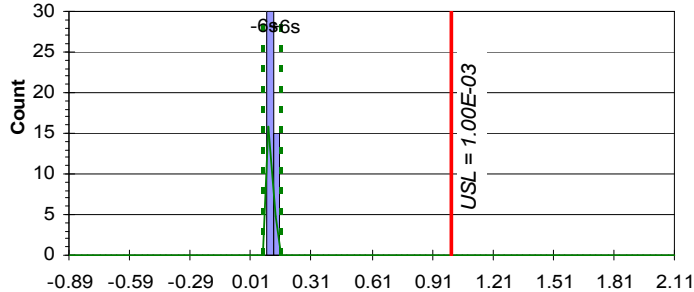
Old +125C Turn-Off Time $\times 10^{-3}$ Seconds



MAIN Mode: Avg=6.92E-04 StDev=2.19E-04 Count=2590
 Cp=N/A Cpk_lo=N/A Cpk_hi=0.47
 OUTLIERS: LO (<-1.12E-04): 0 HI (>1.33E-03): 35 Non-Numeric:

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

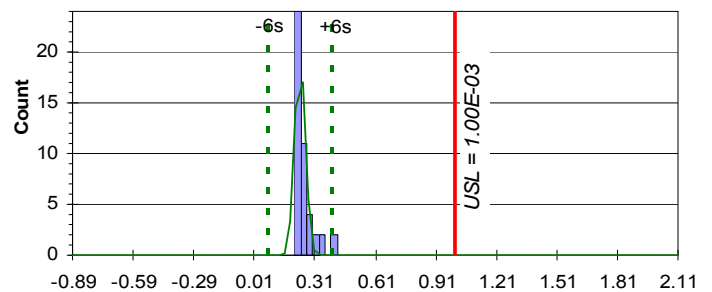
New -55C Turn-Off Time $\times 10^{-3}$ Seconds



MAIN Mode: Avg=1.13E-04 StDev=7.33E-06 Count=45
 Cp=N/A Cpk_lo=N/A Cpk_hi=40.32
 OUTLIERS: LO (<8.17E-05): 0 HI (>1.42E-04): 0 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

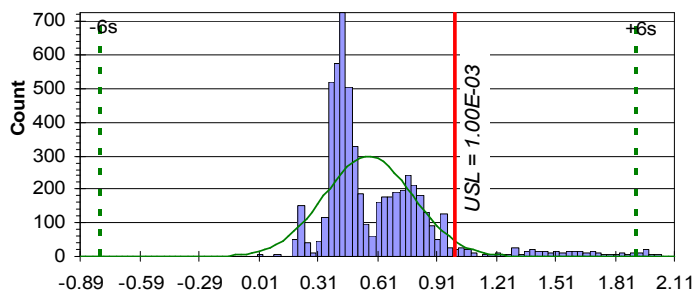
New +125C Turn-Off Time $\times 10^{-3}$ Seconds



MAIN Mode: Avg=2.39E-04 StDev=2.64E-05 Count=41
 Cp=N/A Cpk_lo=N/A Cpk_hi=9.63
 OUTLIERS: LO (<1.52E-04): 0 HI (>3.17E-04): 4 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

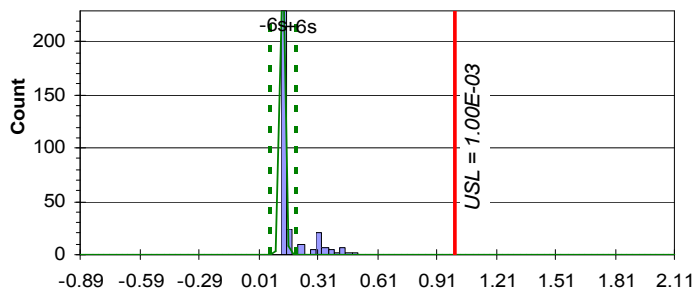
Old +25C Turn-Off Time $\times 10^{-3}$ Seconds



MAIN Mode: Avg=5.65E-04 StDev=2.26E-04 Count=5592
 Cp=N/A Cpk_lo=N/A Cpk_hi=0.64
 OUTLIERS: LO (<-5.07E-04): 0 HI (>1.48E-03): 190 Non-

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

New +25C Turn-Off Time $\times 10^{-3}$ Seconds



MAIN Mode: Avg=1.32E-04 StDev=1.06E-05 Count=253
 Cp=N/A Cpk_lo=N/A Cpk_hi=27.23
 OUTLIERS: LO (<7.00E-05): 0 HI (>1.93E-04): 56 Non-Numeric: 0

Copyright Delphi Delco Electronics Systems 1997 - 2000. All Rights Reserved.

