Product Characterization Report

for the

SPX2951 Family of Products

SPX1121, SPX2950, SPX2951, SPX2954 Products

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Introduction: This product family characterization was done as part of the qualification of Sipex's fabrication site transfer from Sipex's Hillview Fab in Milpitas, CA, to a contract foundry, Silan, in Hangzhou, China. This characterization report summarizes data for key SPX2951 product family characteristics and contains distributions for all parameters. A complete listing of the product numbers covered by the characterization report is included in the "Conclusion" section of this report. A distribution for a given parameter shows different temperature data which are at -40ºC, 25ºC, and 85ºC.

Wafer Fab: Silan
Fab Location: Hangzhou, China
Process: Silan – bp3
MS: 1110

Characterization Procedure:

Silan Lot number(s): SPX2951_SI_CA10092_CHAR
Hillview Lot number(s): SPX2951_HV_AA11215_CHAR
Temperatures: Ambient (25C), 85C, -40C
Tester: TMT3
Test Program: MS1111_33_8L_00_WS_DL (SPX2951AC_QA_TRITEMP)

Data Summary:

Key Parameter Across Temperature Data Summary

Key Parameter	Units	Hillview Fab Distribution Mean	Hillview Fab Distribution Variance	Hillview Fab Cpk (across temp)		Silan Fab Distribution Mean	Silan Fab Distribution Variance	Silan Fab Cpk (across temp)
-40C								
Vout_final	V	3.3027	0.0054	2.3170		5.0101	0.0125	1.3263
Vref_final	V	1.2267	0.0032	3.8118		1.2340	0.0025	>4.0000
Vout@30V	V	3.3026	0.0054	>4.0000		5.0102	0.0125	2.3877
LineReg	%	0.0080	0.0075	0.7985		0.0034	0.0022	2.0758
Vout@150mA	V	3.3020	0.0054	>4.0000		5.0091	0.0125	2.4187
LoadReg	%	0.0193	0.0108	0.9056		0.0200	0.0062	1.6198
Vdrop@100uA	mV	12.5652	2.4256	>4.0000		14.9291	0.3977	>4.0000
Vdrop@150mA	mV	225.1789	27.9540	3.2771		225.8358	17.0622	>4.0000
Ignd@100uA	uA	83.4935	4.8024	>4.0000		77.3599	4.3070	>4.0000
Ignd@150mA	mA	0.7518	0.0241	>4.0000		0.8443	0.0103	>4.0000
current_limit	mA	233.0878	12.1477	2.2799		390.2573	2.2302	>4.0000
Feedback_Bias	nA	17.9398	47.6303	0.2944		15.3806	13.6407	1.0904
Error_leakage	uA	0.0173	0.0036	>4.0000		0.0188	0.0004	>4.0000
S/D_current@2.4V	uA	29.0345	2.6274	2.6599		27.1451	0.3919	>4.0000
S/D_current@30V	uA	452.7932	53.6676	2.1565		426.9224	7.5462	>4.0000
S/D_Reg_ON	V	3.3025	0.0048	2.6006		5.0109	0.0125	1.3132
S/D_Reg_OFF	V	2.1042	1.4080	-0.2851		4.6844	1.2433	-1.0146
ErrorVol	mV	148.2237	23.3722	1.4515		150.4916	6.3663	>4.0000
LowerThresh	mV	69.0935	11.9540	0.7224		58.0837	2.6037	2.3151
ErrorVoh	V	0.6206	0.0489	2.5278		0.6131	0.0459	2.6365
UpperThresh	mV	55.6216	9.2355	0.5638		50.3236	1.7342	1.9843
Hysterisis	mV	13.4720	4.3005	1.1217		7.7601	2.5213	1.1581
Iout_SD	uA	6.9140	0.0998	>4.0000		4.0818	0.0455	>4.0000
25C								
Vout_final	V	3.3035	0.0037	3.2574		5.0127	0.0099	1.5914
Vref_final	V	1.2243	0.0030	3.8539		1.2307	0.0025	5.2648
Vout@30V	V	3.3038	0.0038	>4.0000		5.0133	0.0099	2.9209
LineReg	%	0.0088	0.0073	0.8550		0.0113	0.0028	2.5193
Vout@150mA	V	3.3026	0.0039	>4.0000		5.0109	0.0099	3.0019
LoadReg	%	0.0271	0.0089	1.3905		0.0368	0.0031	>4.0000
Vdrop@100uA	mV	14.9385	0.1141	>4.0000		20.0480	0.1268	>4.0000
Vdrop@150mA	mV	252.8776	1.6220	>4.0000		265.1867	6.7110	>4.0000

Ignd@100uA	uA	75.5562	3.0723	>4.0000		66.8962	3.5412	>4.0000
Ignd@150mA	mA	0.7622	0.0094	>4.0000		0.8574	0.0104	>4.0000
current_limit	mA	242.8846	12.2397	2.5296		344.7174	0.7029	>4.0000
Feedback_Bias	nA	2.5474	0.1435	>4.0000		3.6272	0.1557	>4.0000
Error_leakage	uA	0.0176	0.0031	>4.0000		0.0186	0.0003	>4.0000
S/D_current@2.4V	uA	26.2828	0.3034	>4.0000		23.3522	0.2098	>4.0000
S/D_current@30V	uA	395.2545	4.1977	>4.0000		348.8928	3.2533	>4.0000
S/D_Reg_ON	V	3.3032	0.0038	3.2370		5.0127	0.0099	1.5963
S/D_Reg_OFF	V	0.0173	0.0068	>4.0000		0.0401	0.0103	>4.0000
ErrorVol	mV	168.5186	9.2873	2.9245		187.5889	6.6149	3.1450
LowerThresh	mV	80.8591	3.3722	1.3978		77.5868	2.2578	2.5709
ErrorVoh	V	0.5548	0.0400	2.5416		0.5568	0.0424	2.4133
UpperThresh	mV	65.5786	2.0154	4.2304		64.2390	1.5977	>4.0000
Hysterisis	mV	15.2805	3.5883	1.5124		13.3478	2.5151	1.9016
Iout_SD	uA	7.1381	0.0937	>4.0000		4.2380	0.0305	>4.0000
85C								
Vout_final	V	3.3029	0.0044	2.7906		5.0121	0.0096	1.6669
Vref_final	V	1.2215	0.0033	3.1747		1.2288	0.0026	>4.0000
Vout@30V	V	3.3039	0.0045	>4.0000		5.0128	0.0096	3.0392
LineReg	%	0.0293	0.0153	0.8572		0.0147	0.0048	1.7174
Vout@150mA	V	3.3021	0.0044	>4.0000		5.0101	0.0095	3.1446
LoadReg	%	0.0259	0.0077	1.5577		0.0392	0.0048	3.4422
Vdrop@100uA	mV	19.7549	0.4553	>4.0000		25.6580	1.1184	>4.0000
Vdrop@150mA	mV	301.6537	3.1559	>4.0000		309.9847	9.2594	>4.0000
Ignd@100uA	uA	70.9431	5.6023	>4.0000		62.2040	5.1005	>4.0000
Ignd@150mA	mA	0.8097	0.0141	>4.0000		0.9196	0.0190	>4.0000
current_limit	mA	243.8141	12.3360	2.5350		343.4084	1.0131	>4.0000
Feedback_Bias	nA	2.6383	0.2702	>4.0000		3.6387	0.1901	>4.0000
Error_leakage	uA	0.0181	0.0004	884.2185		0.0184	0.0003	>4.0000
S/D_current@2.4V	uA	22.6225	0.3307	>4.0000		20.5607	0.5195	>4.0000
S/D_current@30V	uA	323.0525	5.1990	>4.0000		294.0571	9.6418	>4.0000
S/D_Reg_ON	V	3.3029	0.0044	2.7858		5.0121	0.0096	1.6632
S/D_Reg_OFF	V	0.0234	0.0149	>4.0000		0.0494	0.0163	>4.0000
ErrorVol	mV	207.9936	12.8539	1.0893		223.5485	9.2490	0.9533
LowerThresh	mV	100.8686	4.3140	-0.4535		93.8973	3.1944	0.1151
ErrorVoh	V	0.4833	0.0514	1.5140		0.3377	0.2267	0.1289
UpperThresh	mV	78.0600	2.6649	2.1189		53.1027	35.4363	0.1233
Hysterisis	mV	22.8086	4.2697	1.8587		11.5700	7.8811	0.5317
Iout_SD	uA	6.4879	0.1392	>4.0000		4.2639	0.0561	>4.0000

Conclusion:

Characterization data over temperature and Vcc range show datasheet parameters meet the spec. Cpk's for most parameters are comparable between Hillview and Silan although many show a strong temperature dependence that tends to produce lower Cpk's in this analysis.

The performance of SP2951 parts fabricated at Silan are comparable to the current SPX2951 parts built from the Hillview fab.

This characterization report applies to the following SPX2951 family of product part numbers:

SPX1121M3-3-3	**SPX2954AN-L-3-3**	**SPX2954U-3-3**
SPX1121M3-5-0	**SPX2954AN-L-5-0**	**SPX2954U-5-0**
SPX1121M3-L-3-3	**SPX2954AS-3-3**	**SPX2954U-L-3-3**
SPX1121M3-L-5-0	**SPX2954AS-5-0**	**SPX2954U-L-5-0**
SPX1121N-3-3	**SPX2954AS-L-3-3**	
SPX1121N-5-0	**SPX2954AS-L-5-0**	
SPX1121N-L-3-3	**SPX2954AT-3-3**	
SPX1121N-L-5-0	**SPX2954AT-5-0**	
SPX2950ACN-3-3	**SPX2954AT-L-3-3**	
SPX2950ACN-5-0	**SPX2954AT-L-5-0**	
SPX2950ACN-L-3-3	**SPX2954AU-3-3**	
SPX2950ACN-L-5-0	**SPX2954AU-5-0**	
SPX2950CN-3-3	**SPX2954AU-L-3-3**	
SPX2950CN-5-0	**SPX2954AU-L-5-0**	
SPX2950CN-L-3-3	**SPX2954M3-3-3**	
SPX2950CN-L-5-0	**SPX2954M3-5-0**	
SPX2951ACS-3-3	**SPX2954M3-L-3-3**	
SPX2951ACS-5-0	**SPX2954M3-L-5-0**	
SPX2951ACS-L-3-3	**SPX2954N-3-3**	
SPX2951ACS-L-5-0	**SPX2954N-5-0**	
SPX2951CS-3-3	**SPX2954N-L-3-3**	
SPX2951CS-5-0	**SPX2954N-L-5-0**	
SPX2951CS-L-3-3	**SPX2954S-3-3**	
SPX2951CS-L-5-0	**SPX2954S-5-0**	
SPX2954AM3-3-3	**SPX2954S-L-3-3**	
SPX2954AM3-5-0	**SPX2954S-L-5-0**	
SPX2954AM3-L-3-3	**SPX2954T-3-3**	
SPX2954AM3-L-5-0	**SPX2954T-5-0**	
SPX2954AN-3-3	**SPX2954T-L-3-3**	
SPX2954AN-5-0	**SPX2954T-L-5-0**	

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Appendix A
Characterization Data Histograms