



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 -40°C, 25°C, and 85°C.

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



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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	
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SPX2950CN-L-5-0	SPX2954M3-5-0	
SPX2951ACS-3-3	SPX2954M3-L-3-3	
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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	
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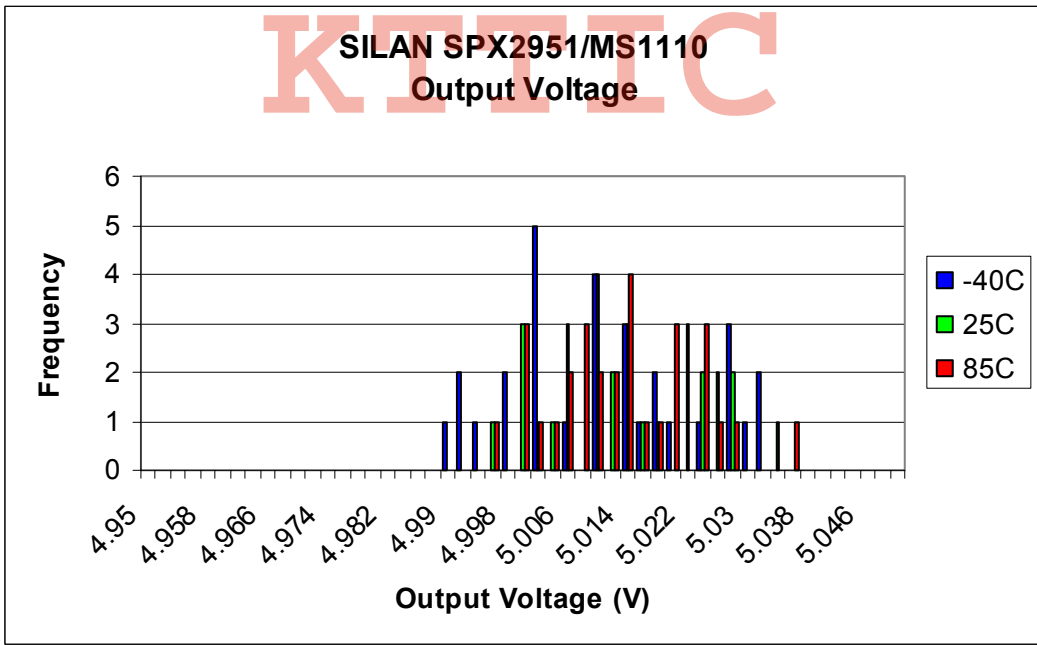
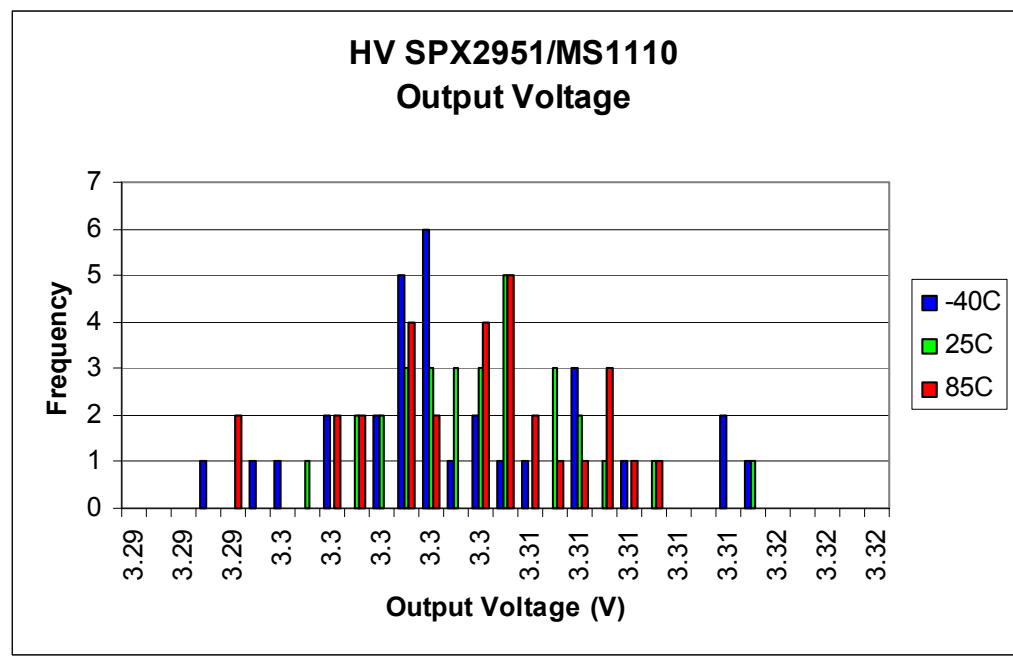
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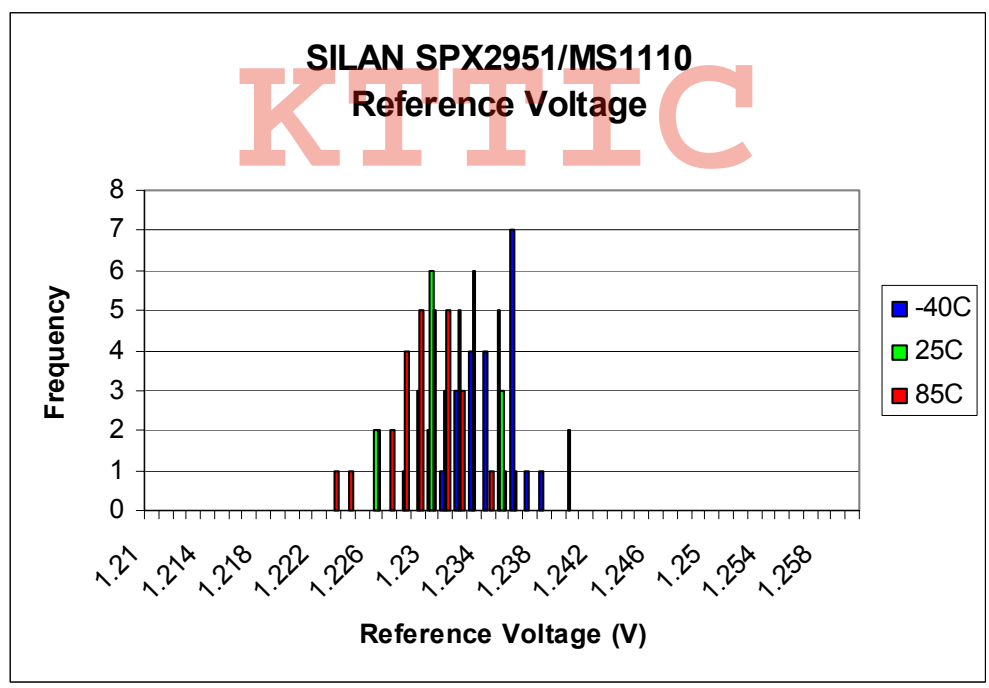
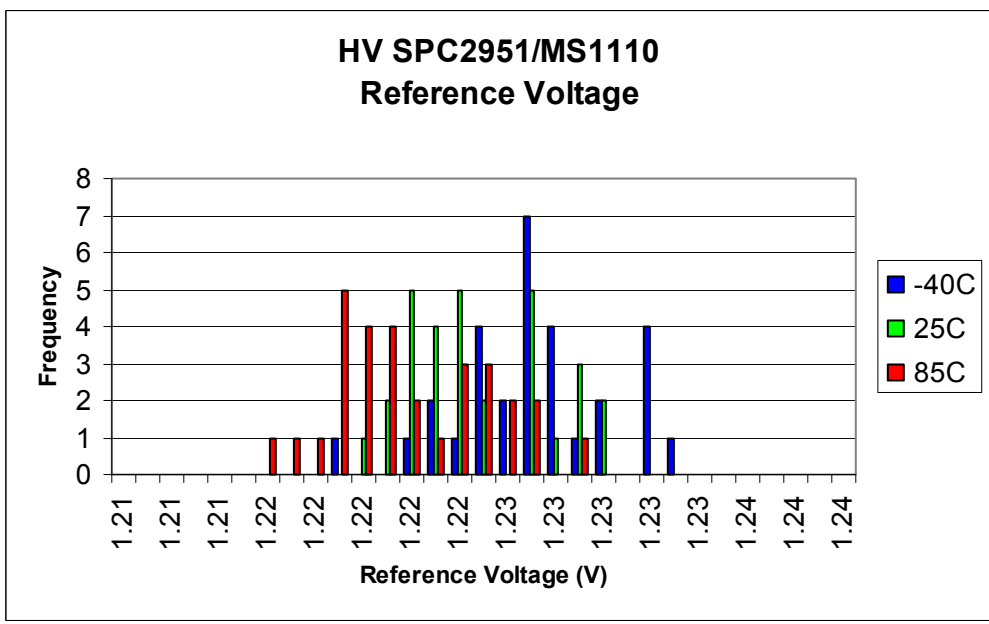
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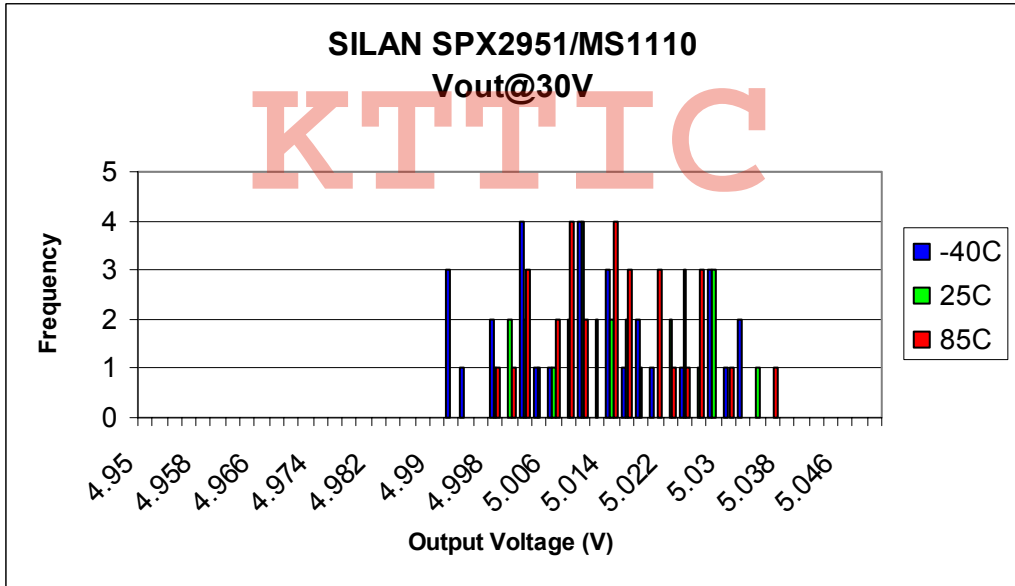
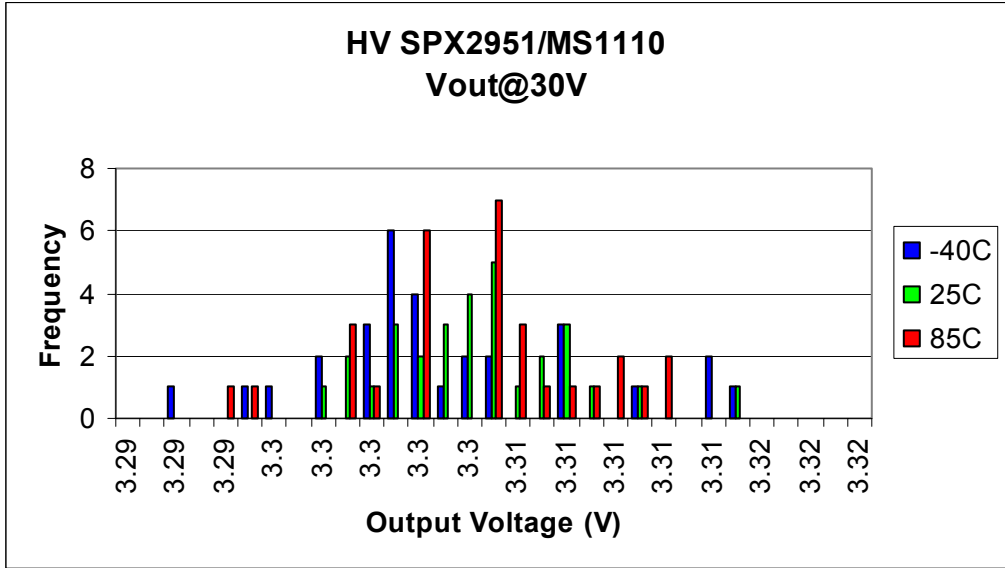


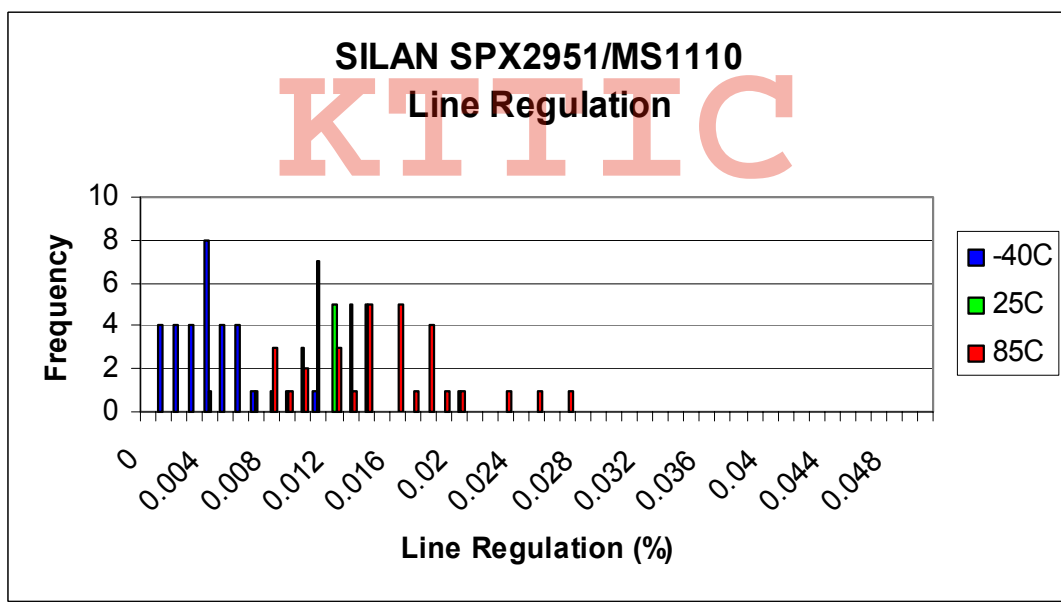
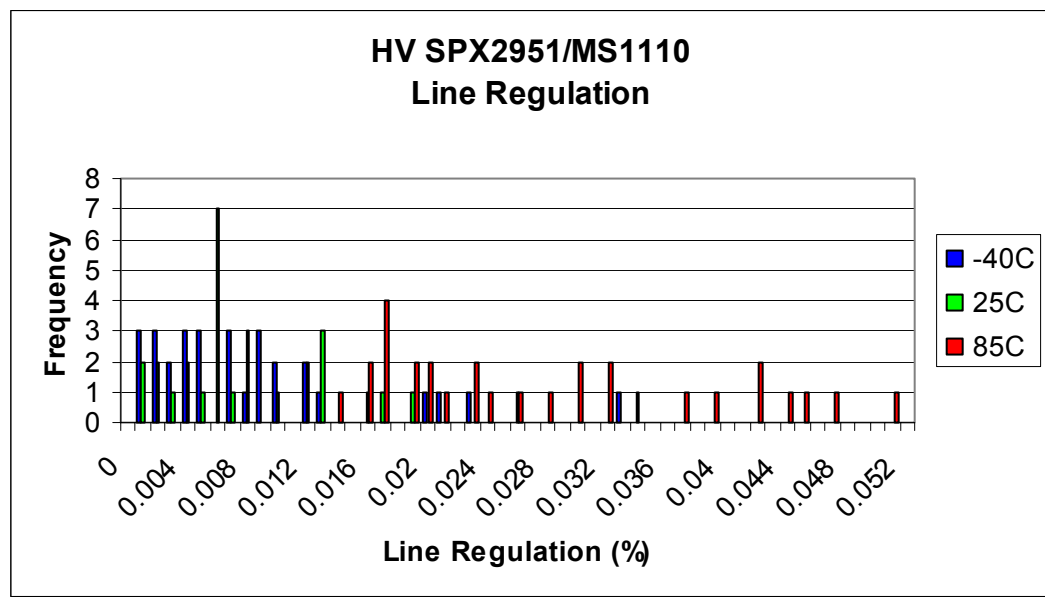
Appendix A
Characterization Data Histograms

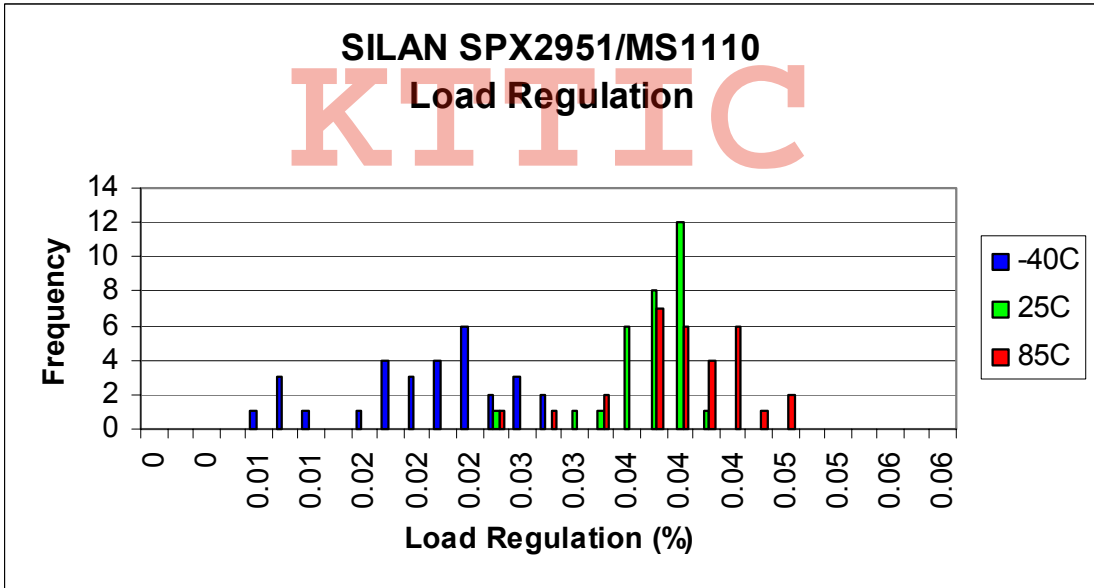
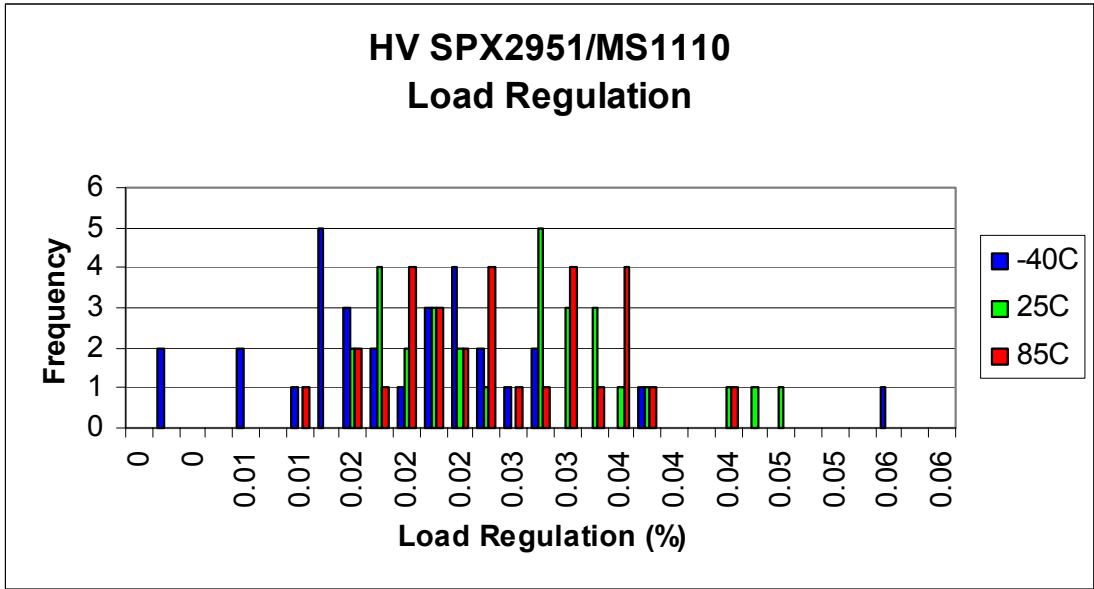
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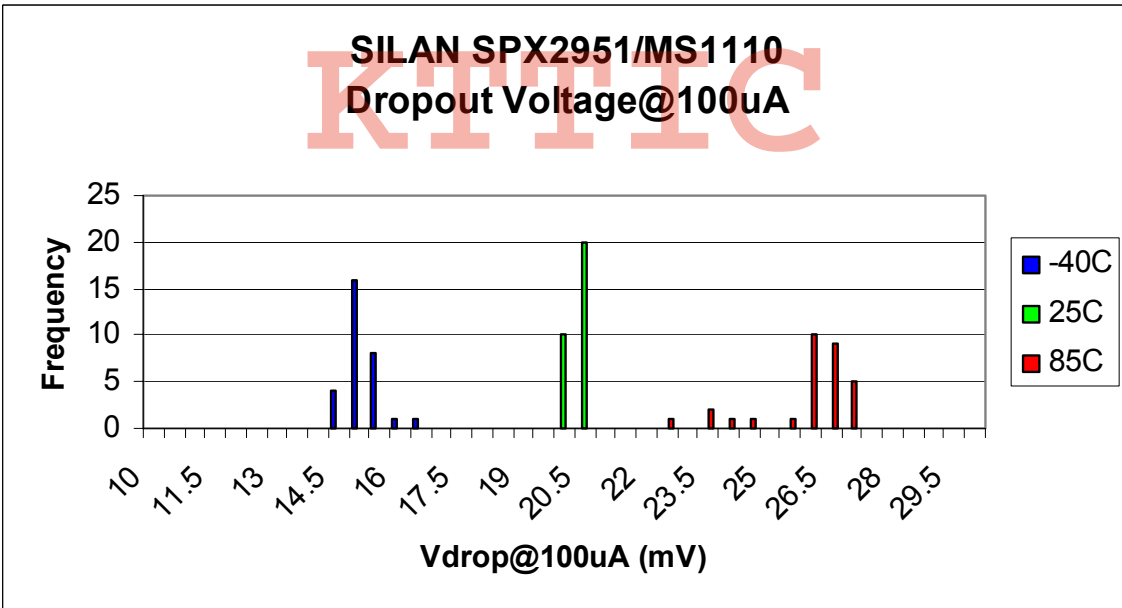
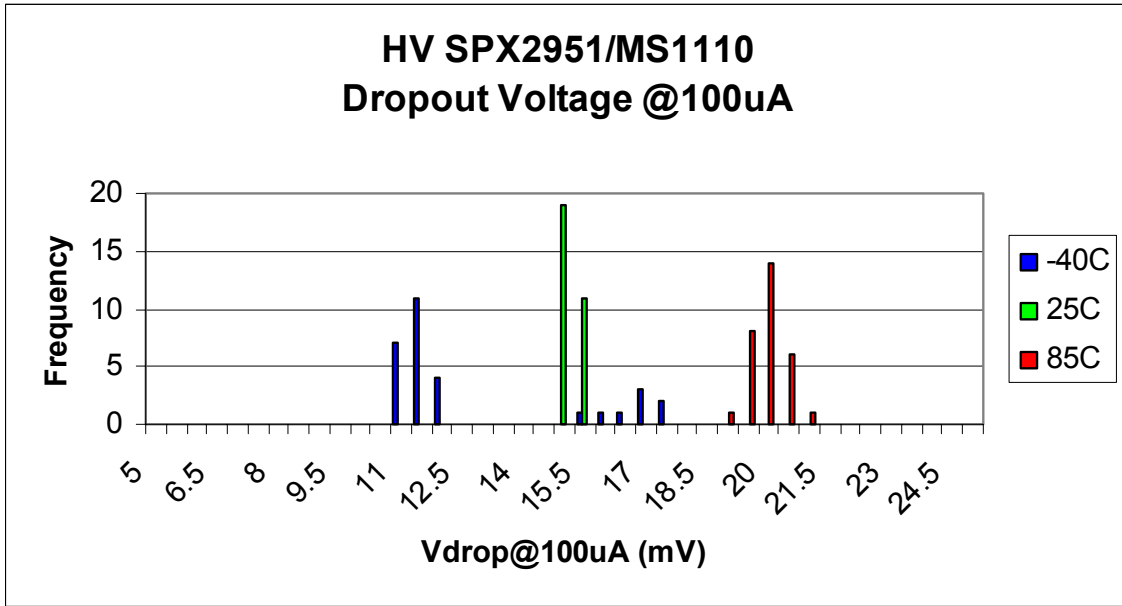


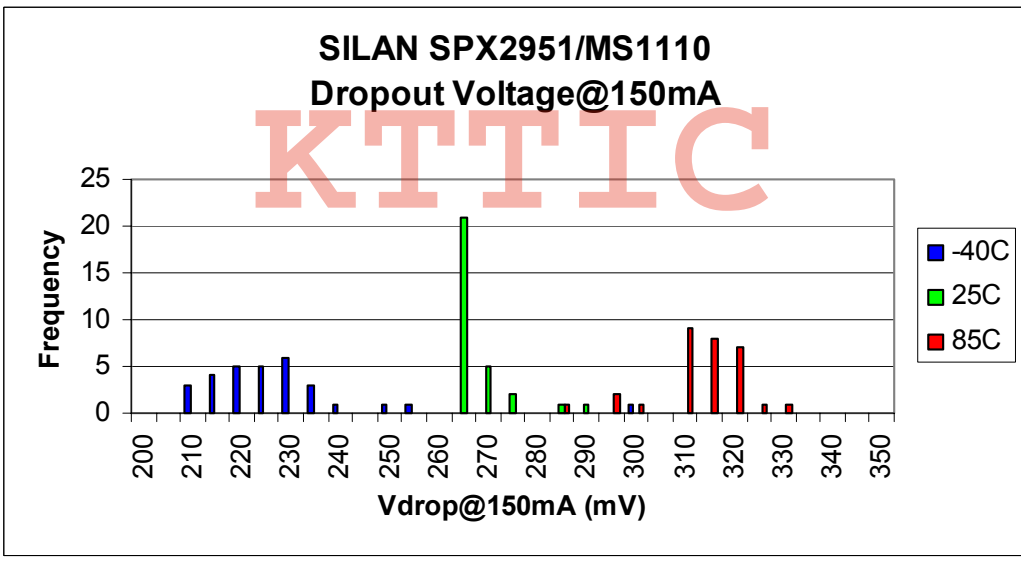
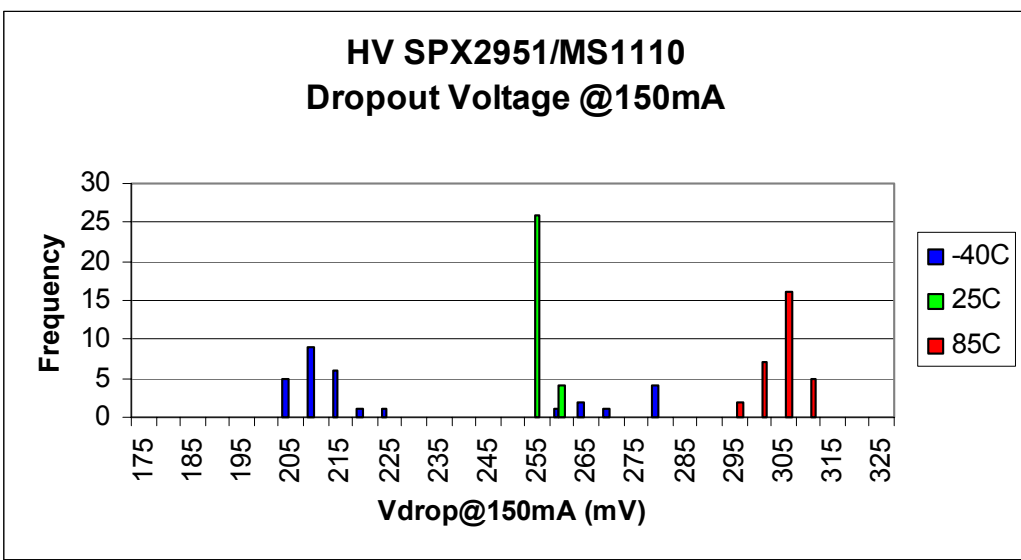


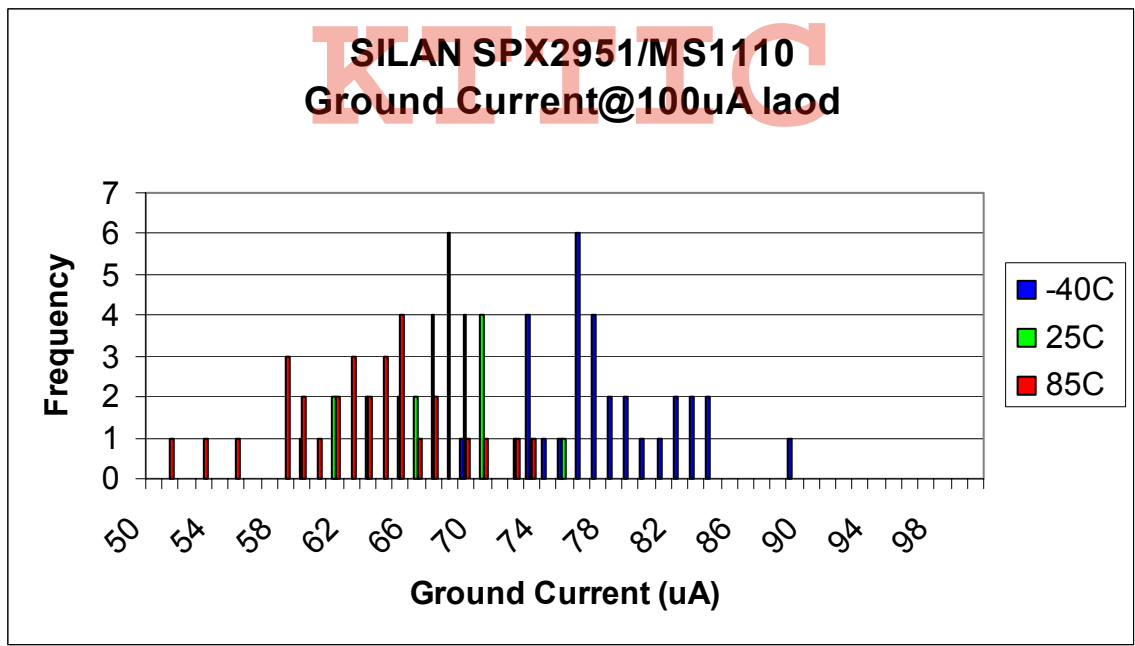
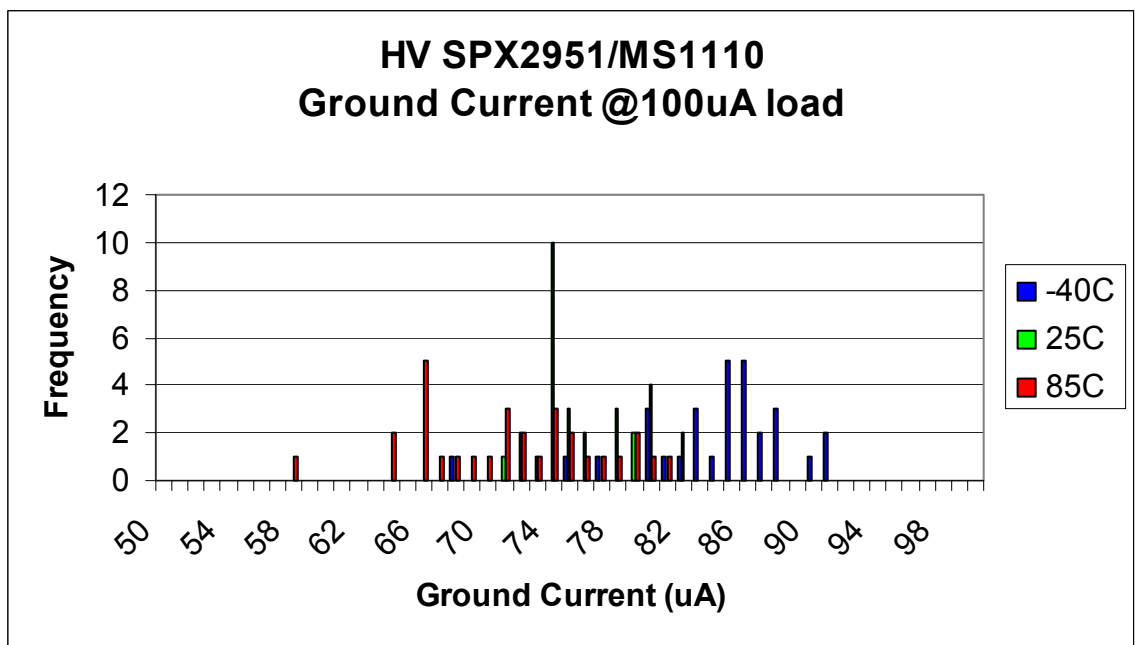


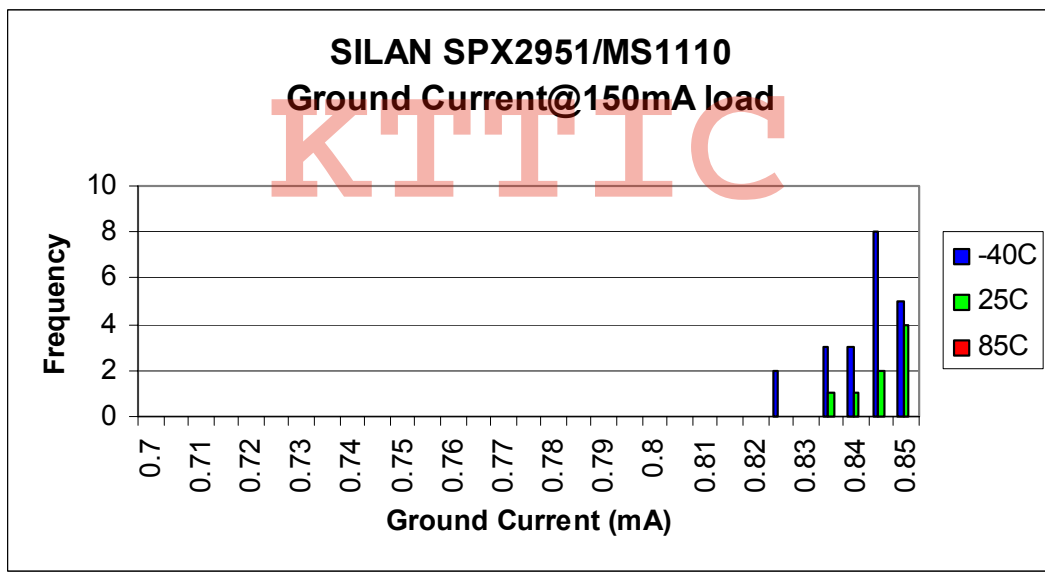
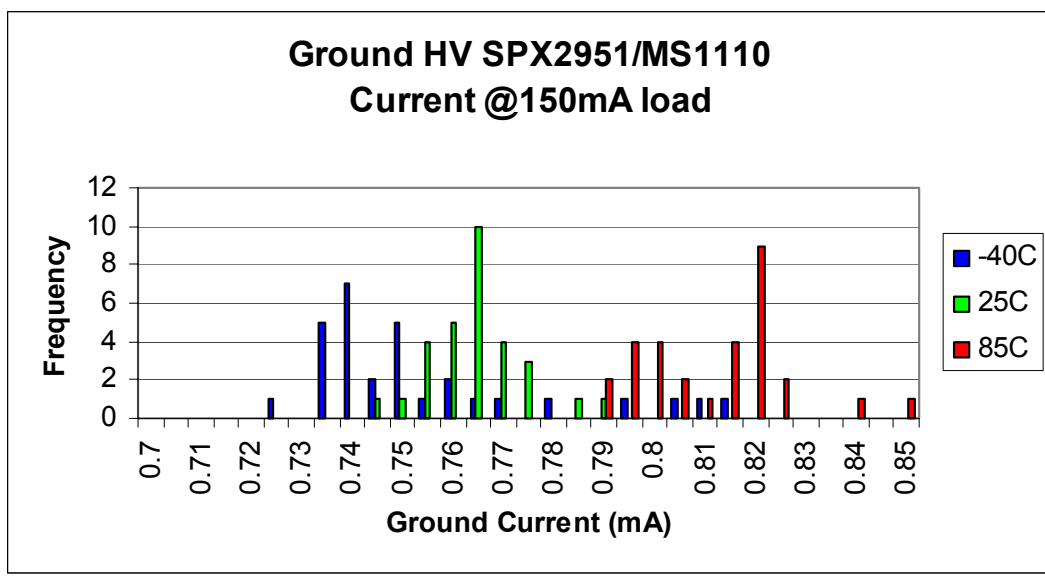


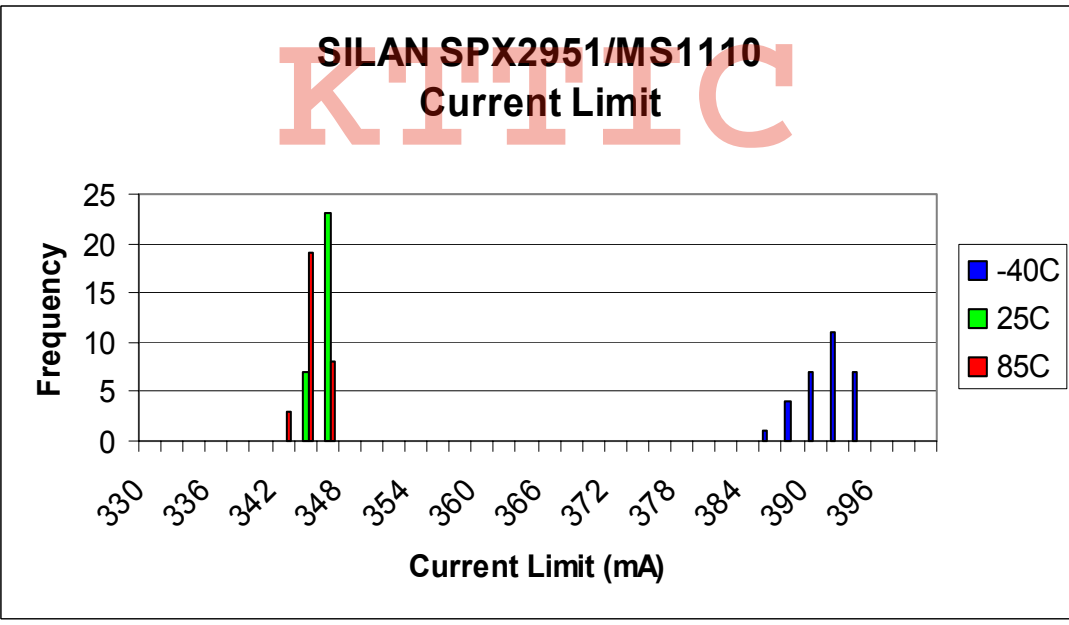
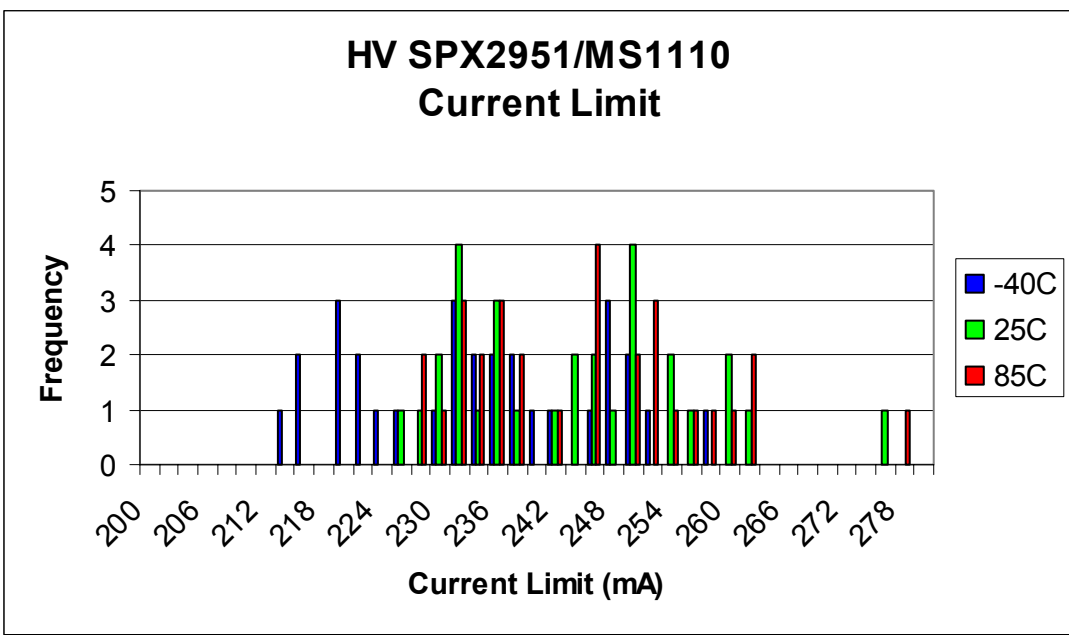


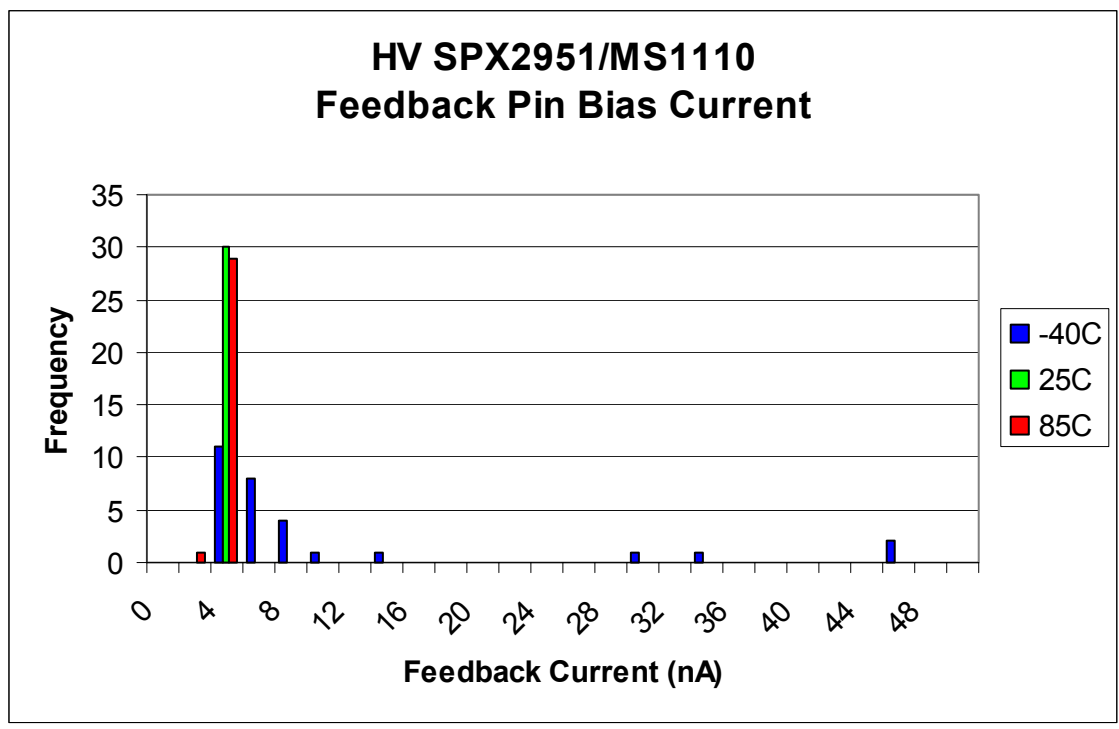




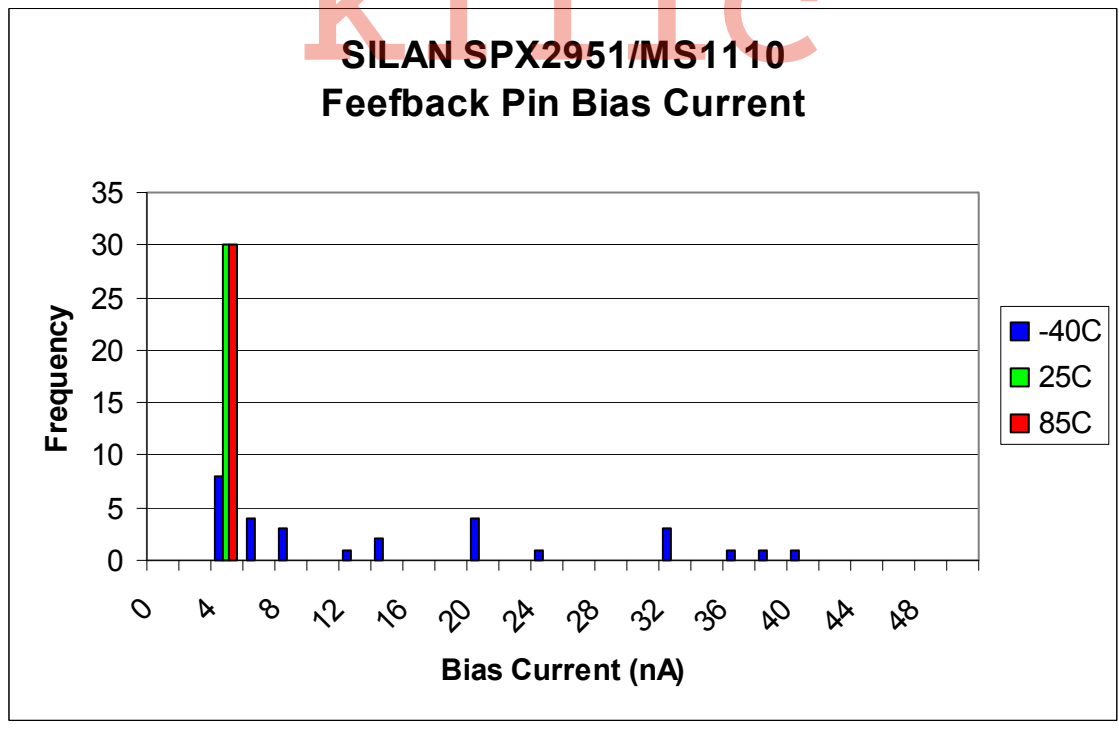


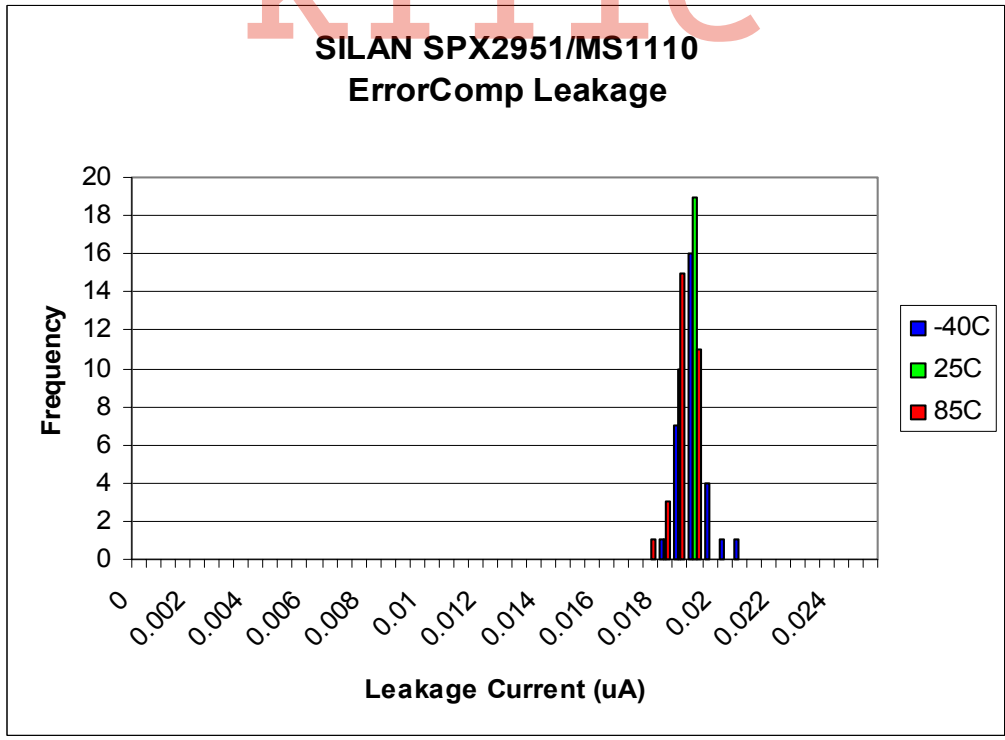
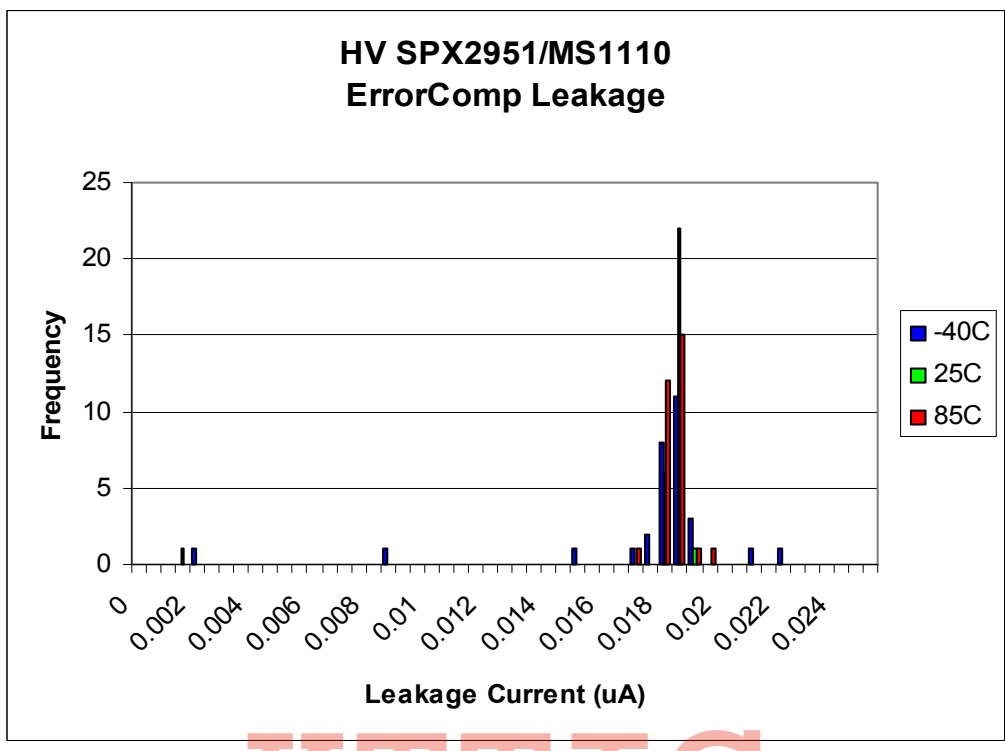


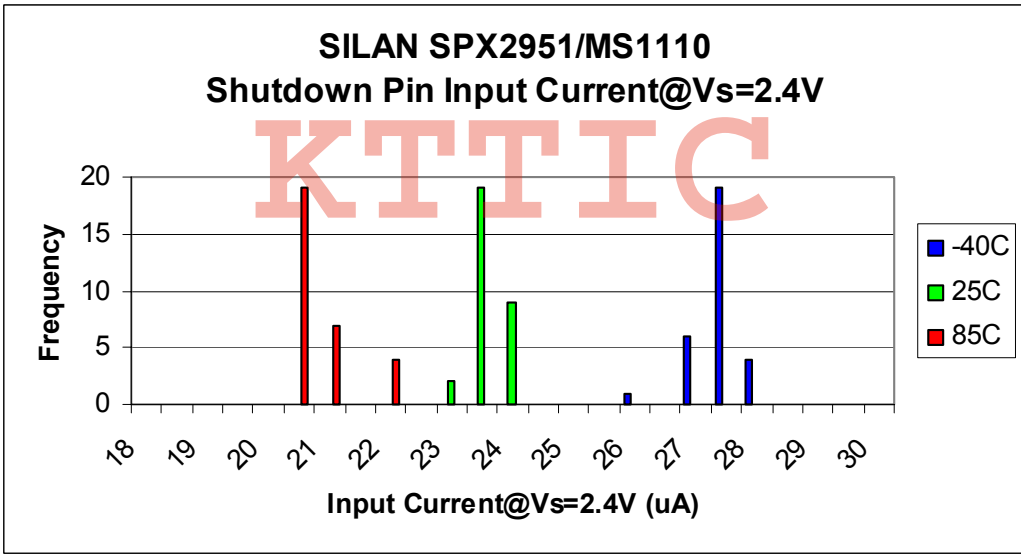
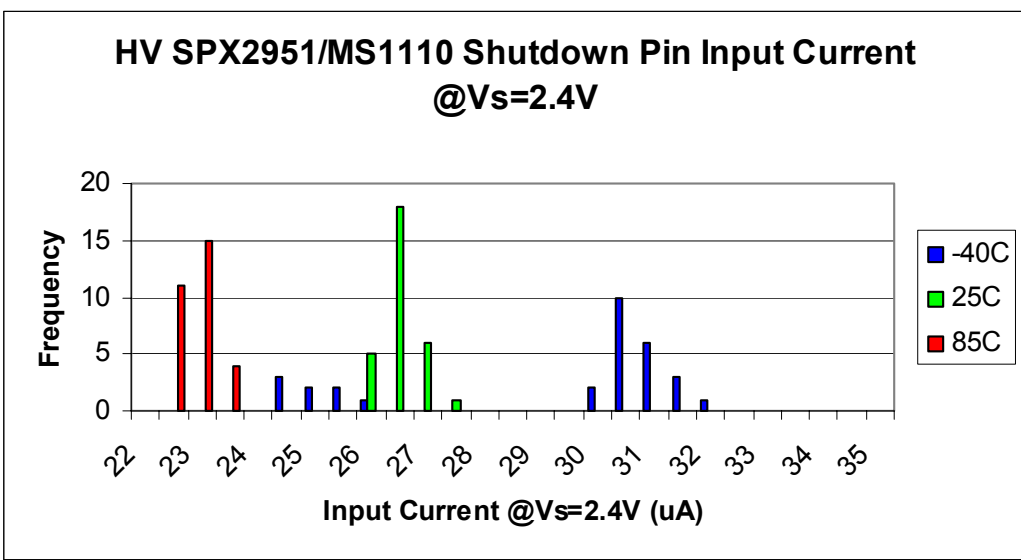


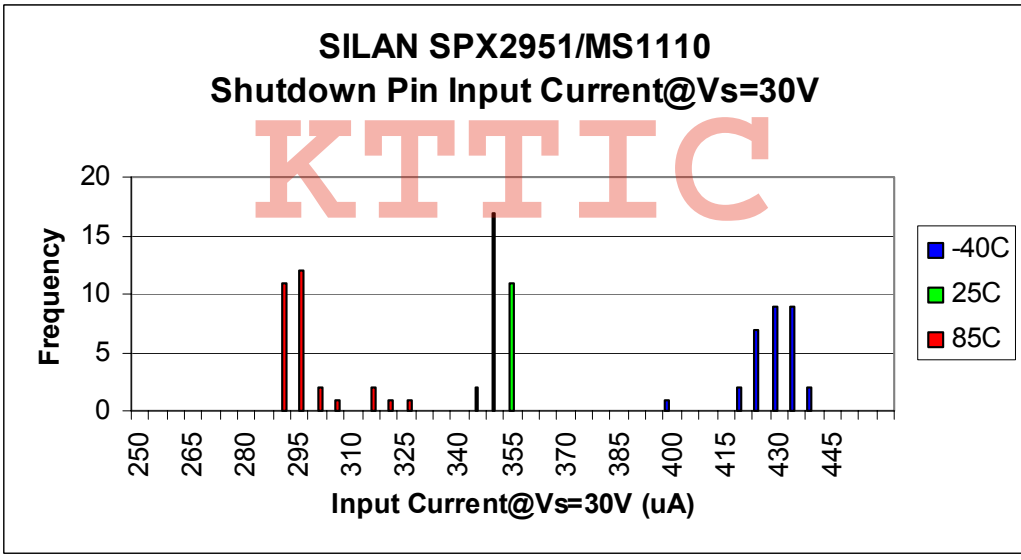
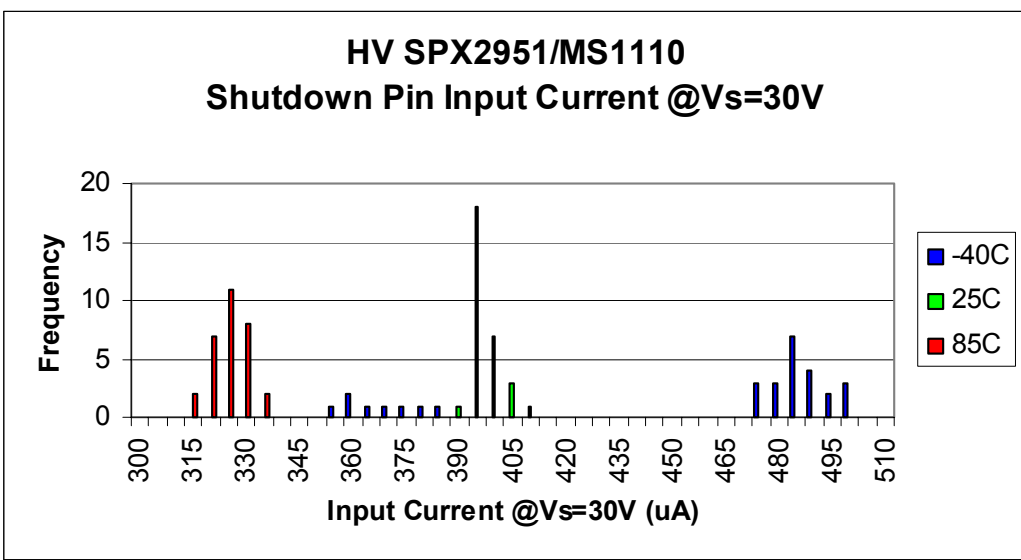


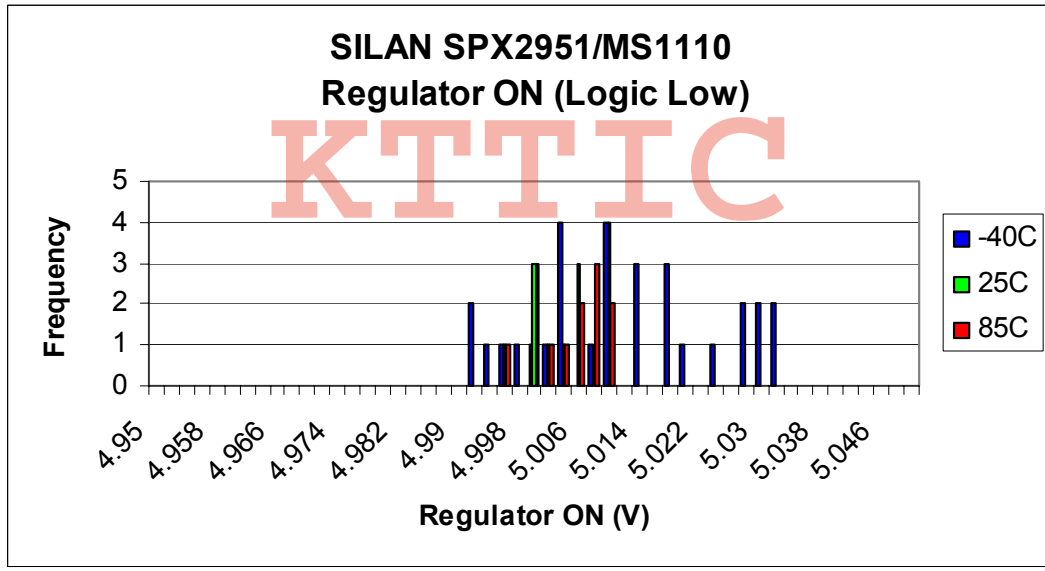
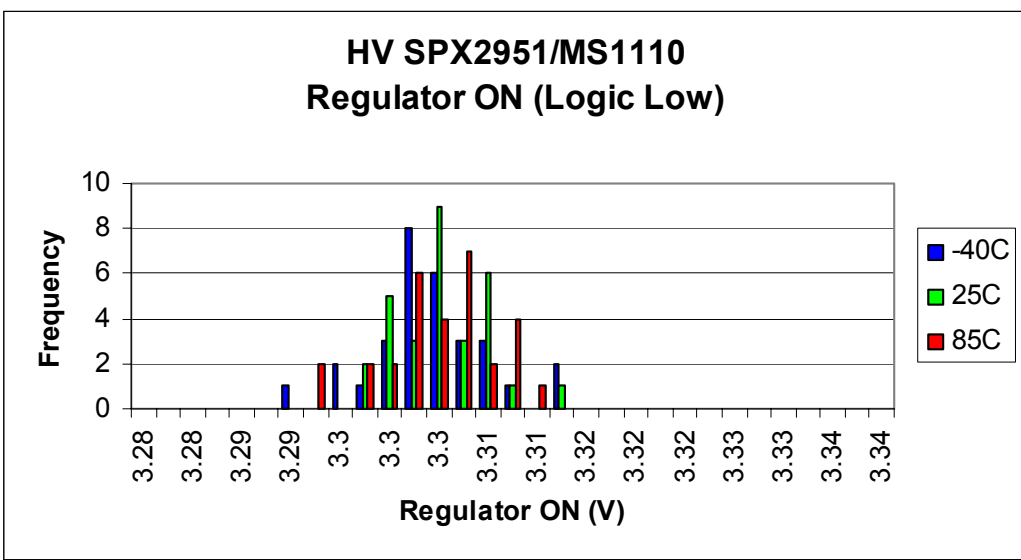
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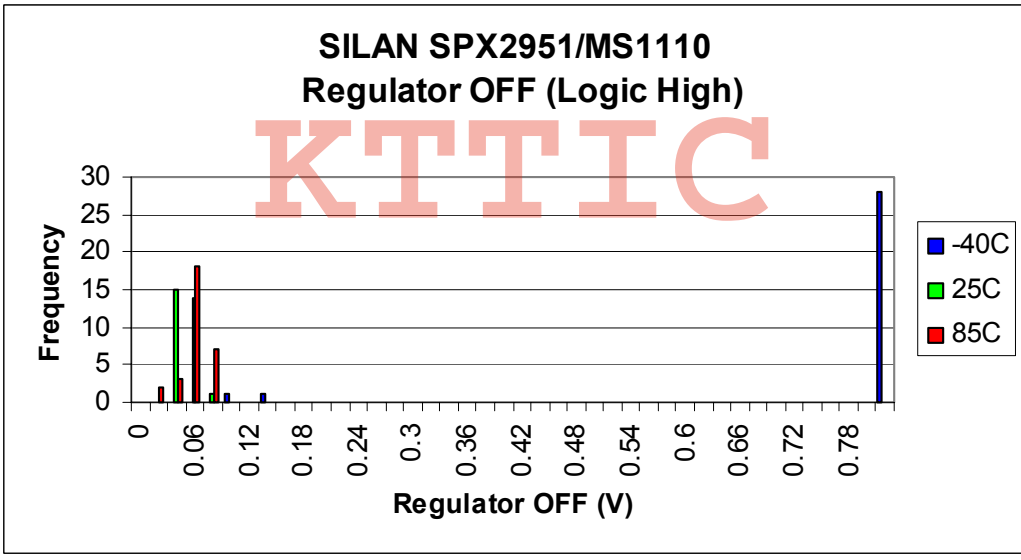
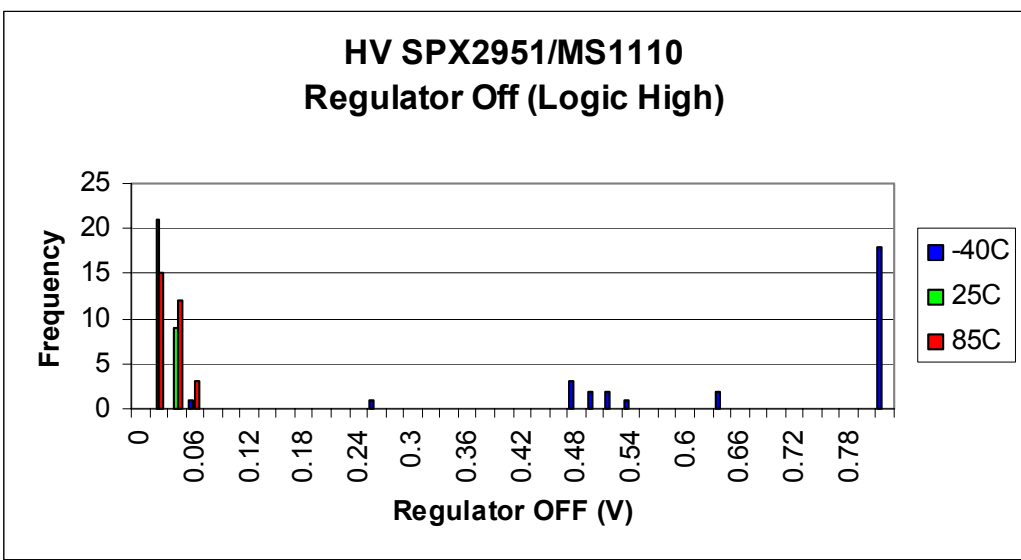


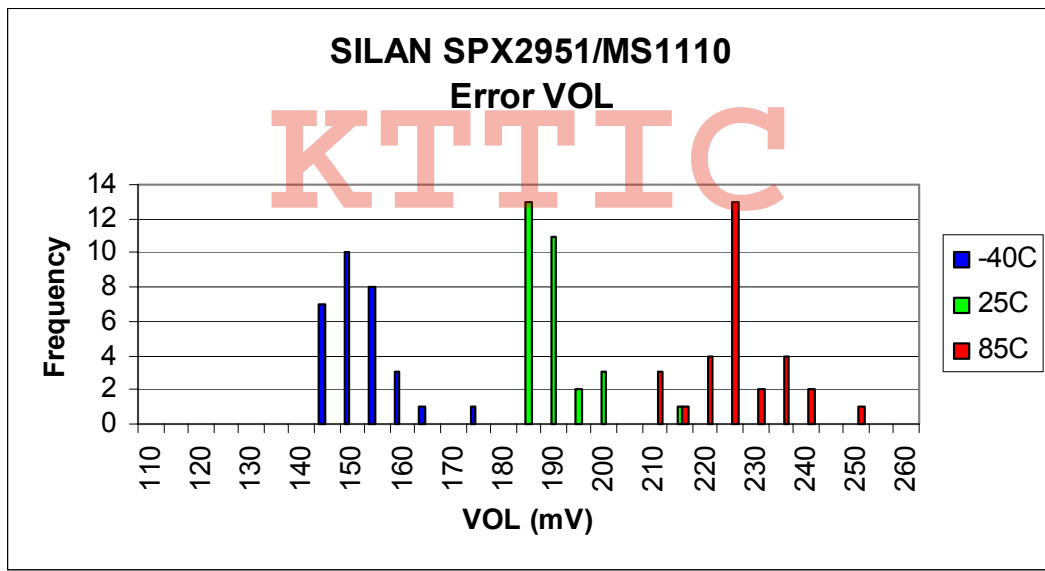
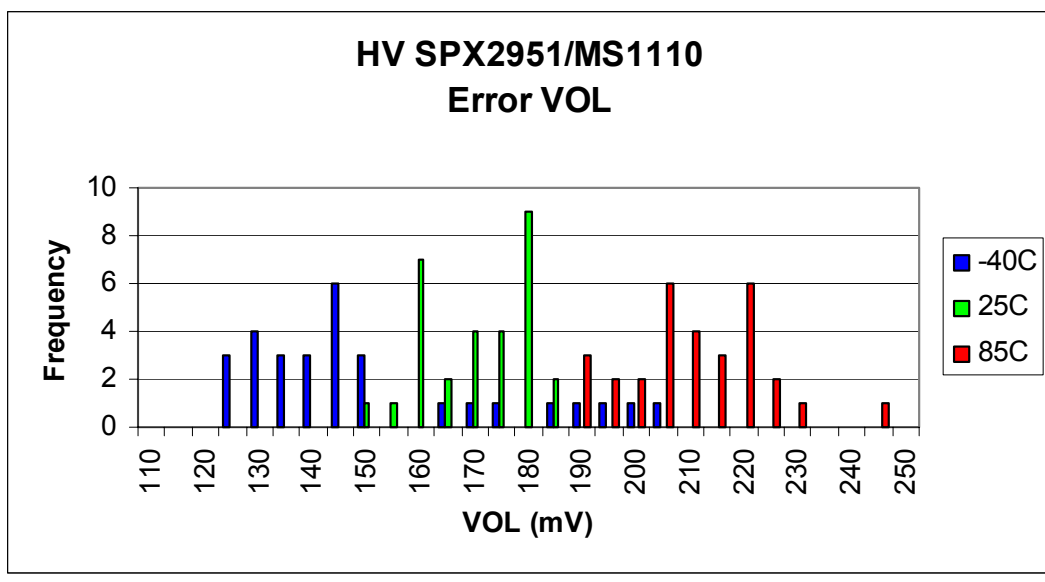


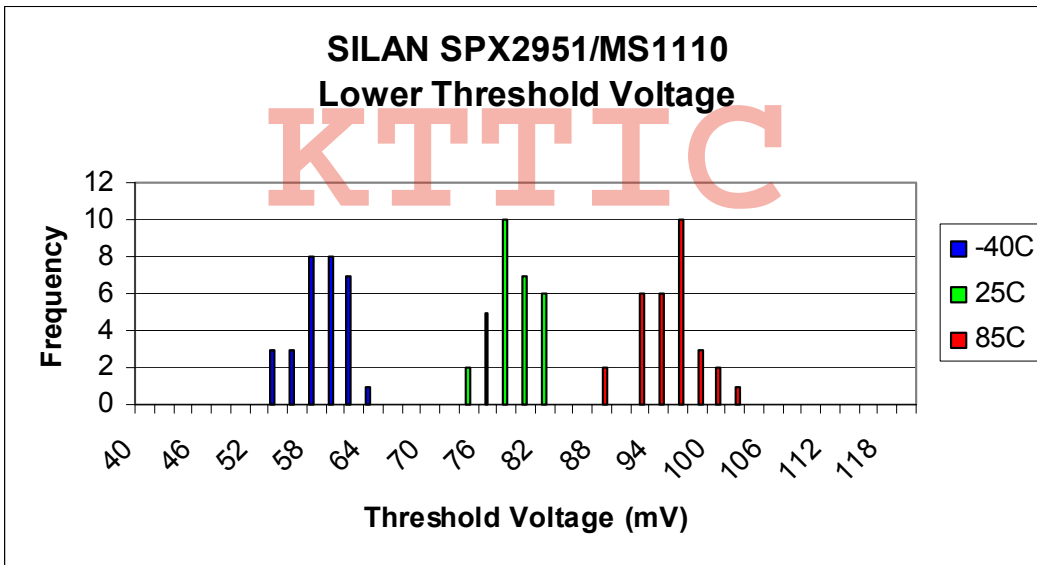
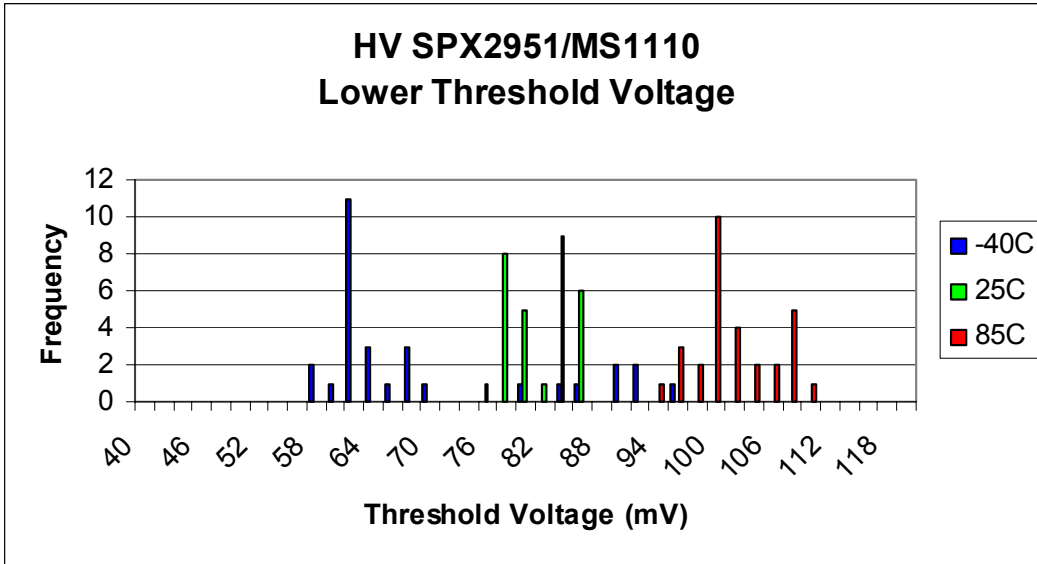


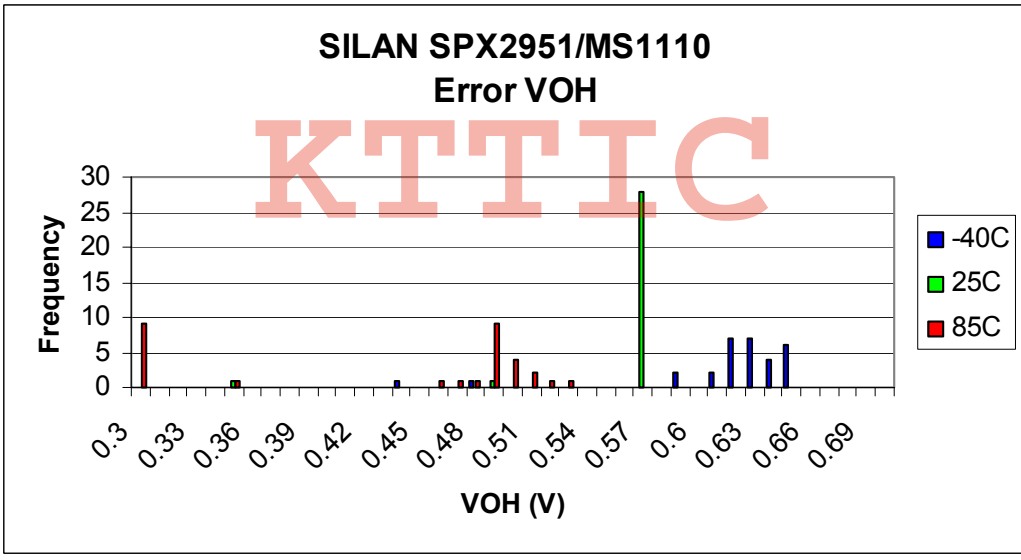
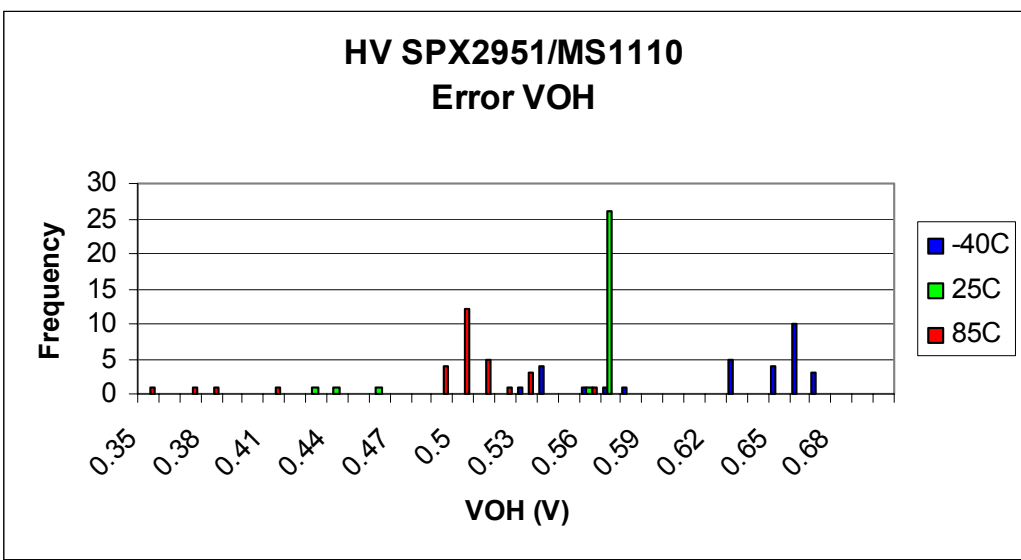


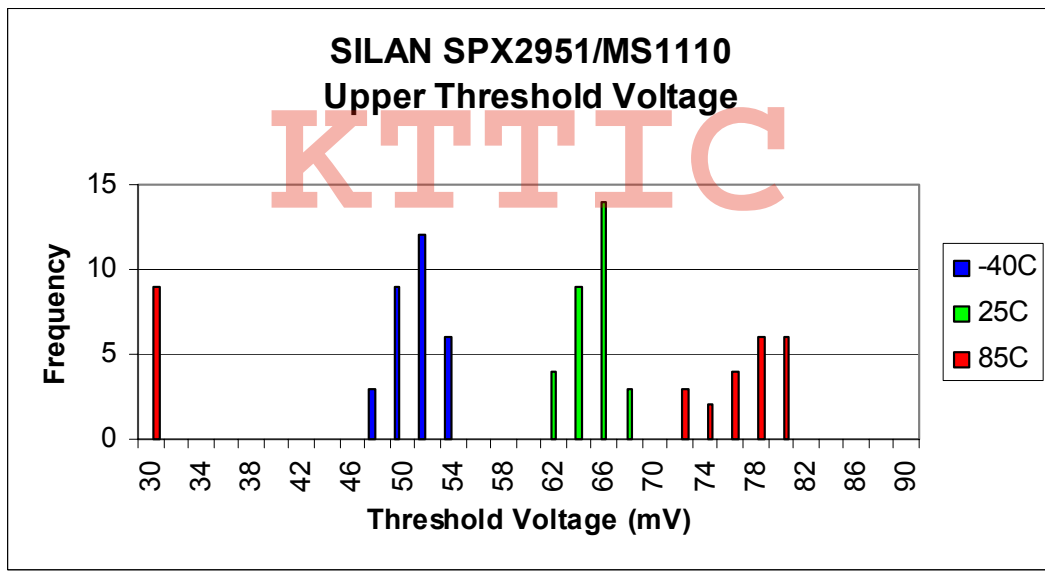
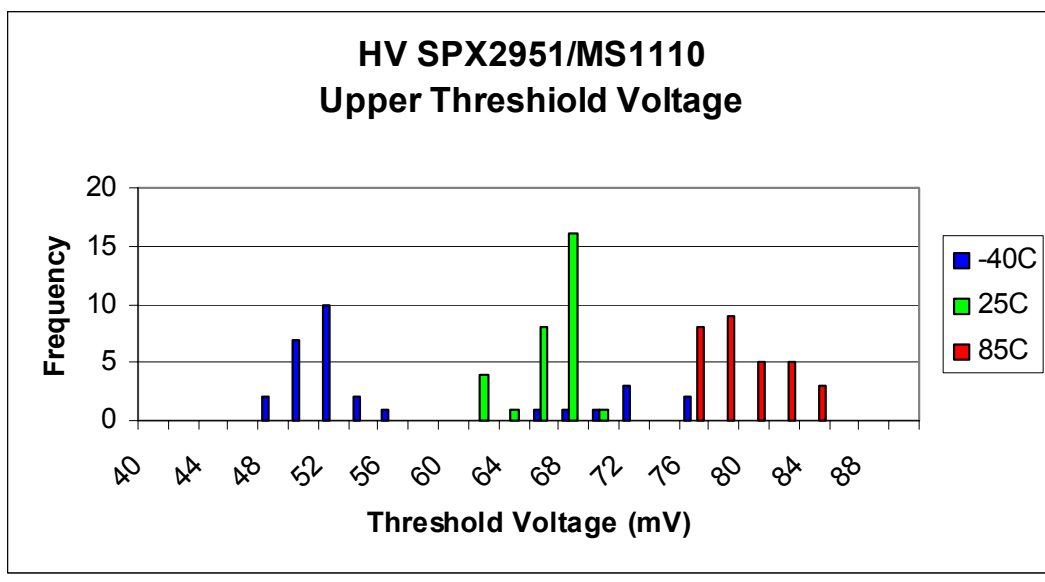


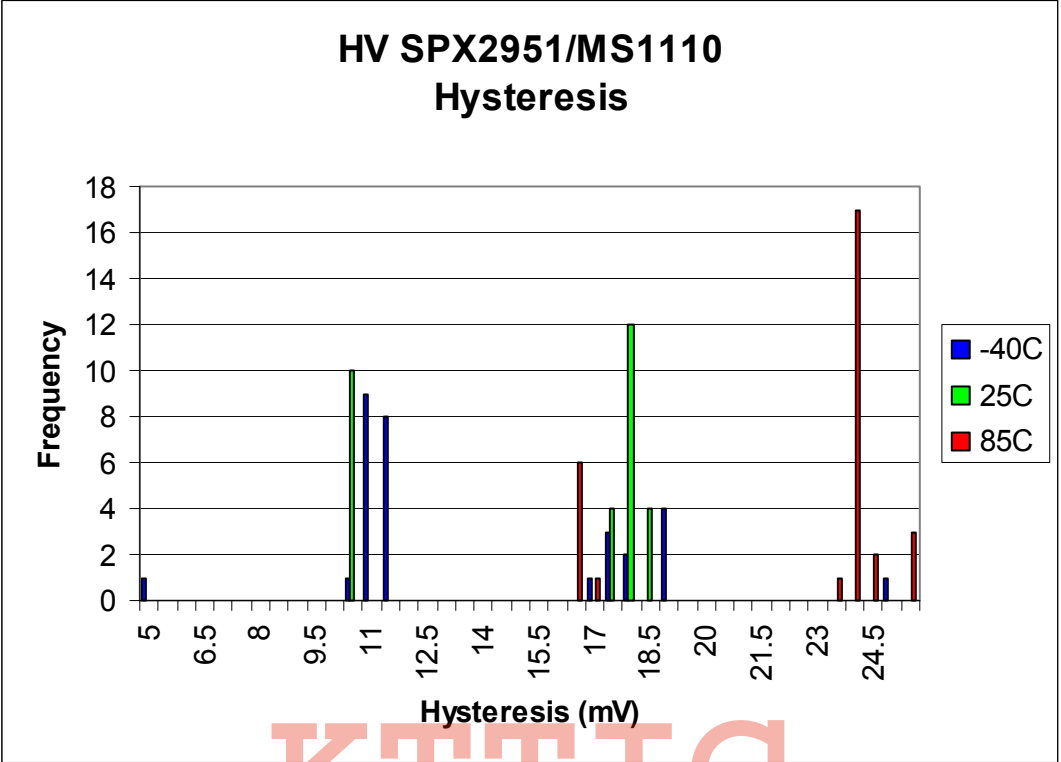












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