ISL70517SEH

Total Dose Testing

TR024
Rev 1.00
February 1, 2017

Introduction

This report provides results of a Total Ionizing Dose (TID) test of the ISL70517SEH instrumentation amplifier. The test was conducted in order to determine the sensitivity of the parts to the total dose environment. Irradiations were performed to 75krad(Si) at 0.01rad(Si)/s under Biased and grounded conditions and were followed by a Biased anneal at +100°C for 168 hours. The dates of the testing, including Biased anneal, were April 6, 2016 to July 22, 2016. No rejects to the SMD parametric limits were encountered.

Related Literature

- For a full list of related documents, visit our website
  - MIL-STD-883 test method 1019
  - ISL70517SEH product page

Part Description

The ISL70517SEH is a differential input, single-ended output instrumentation amplifier designed for precision Analog-to-Digital Converter (ADC) applications. The part operates over a supply range of 8V (±4V) to 36V (±18V) and features a differential input voltage range of ±30V. The output stage has rail-to-rail output drive capability optimized for ADC driver applications. The gain of the ISL70517SEH can be programmed from 0.1 to 10,000 via two external resistors, R_{IN} and R_{FB}. The gain accuracy is determined by the matching of R_{IN} and R_{FB}. The gain resistors use Kelvin sensing, which removes gain error terms due to PC trace resistance. The input and output stages have individual power supply pins, which enable input signals riding on a high common-mode voltage to be level shifted to a low voltage device, such as an A/D converter. The rail-to-rail output stage can be powered from the same supplies as the ADC, which preserves the ADC maximum input dynamic range and eliminates ADC input overdrive.

The companion ISL70617SEH is a differential input, differential output version of the ISL70517SEH. Total ionizing dose test results for the ISL70617SEH are discussed elsewhere.

These versatile amplifiers are suitable for a variety of general purpose applications in addition to ADC applications. Additional features not found in other instrumentation amplifiers enable high levels of DC precision and excellent AC performance. The ISL70517SEH and ISL70617SEH are offered in the 24 Ld ceramic flatpack package and their specifications are ensured across the -55°C to +125°C temperature range. The pinouts and pin description for both parts are shown in Table 1 on page 2. The reader is referred to the relevant Intersil datasheets and other on-line information for further detail.

Test Description

Irradiation Facilities

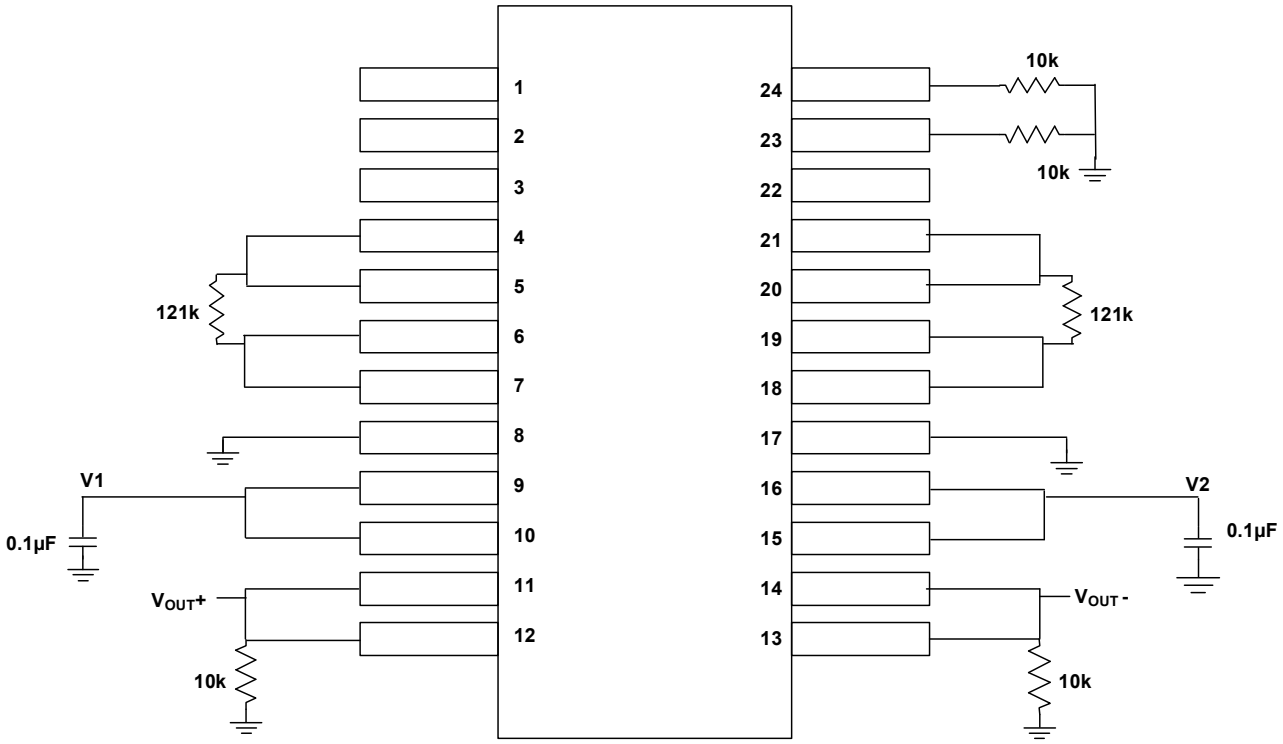
Irradiations were performed using a Hopewell Designs N40 panoramic vault-type low dose rate ^{60}Co irradiator located in the Palm Bay, Florida Intersil facility. The dose rate was 0.0089rad(Si)/s (8.9mrad(Si)/s). The irradiator uses a PbAl spectrum hardening filter to shield the test board and devices under test against low energy secondary gamma radiation.

Test Fixturing

Figure 1 on page 3 shows the configuration and power supply sequencing used for Biased irradiation.

TABLE 1. ISL70517SEH AND ISL70617SEH PINOUTS

PIN NUMBER	ISL70517SEH DESCRIPTION	ISL70617SEH DESCRIPTION
1	No internal connection	No internal connection
2	Internal use, do not connect	Internal use, do not connect
3	Internal use, do not connect	Internal use, do not connect
4	$+R_{FB}$	$+R_{FB}$
5	$+R_{FB}$ sense	$+R_{FB}$ sense
6	$-R_{FB}$ sense	$-R_{FB}$ sense
7	$-R_{FB}$	$-R_{FB}$
8	Ground	Ground
9	V_{CC}	V_{CC}
10	V_{CO}	V_{CO}
11	$+V_{FB}$	$+V_{FB}$
12	V_{OUT}	$+V_{OUT}$
13	No internal connection	$-V_{OUT}$
14	VREF	$-V_{FB}$
15	V_{EO}	V_{EO}
16	V_{EE}	V_{EE}
17	No internal connection	V_{CMO}
18	$-R_{IN}$	$-R_{IN}$
19	$-R_{IN}$ sense	$-R_{IN}$ sense
20	$+R_{IN}$ sense	$+R_{IN}$ sense
21	$+R_{IN}$	$+R_{IN}$
22	Internal use, do not connect	Internal use, do not connect
23	IN-	IN-
24	IN+	IN+
Package Lid	Tied internally to terminal 8 (ground)	Tied internally to terminal 8 (ground)



V1 = +15V

V2 = -15V

All resistors are 1% 1/4W (surface mount resistors)

All capacitors are 10% 50V (surface mount ceramic chip capacitors)

FIGURE 1. ISL70517SEH, ISL70617SEH LDR SCHEMATIC

Characterization Equipment and Procedures

All electrical testing was performed outside the irradiator using production Automated Test Equipment (ATE) with data logging of all parameters at each downpoint. All downpoint electrical testing was performed at room temperature.

Experimental Matrix

Testing proceeded in accordance with the guidelines of MIL-STD-883 Test Method 1019. The experimental matrix consisted of eight samples irradiated under bias and eight samples irradiated with all pins grounded. Six control units were used.

Samples of the ISL70517SEH were drawn from fabrication lot X4J4A and were packaged in the production hermetic 24 Ld ceramic flatpack, Package Outline Drawing (POD) K24.A. The samples were processed through the standard burn-in cycle and were screened to the SMD 5962-15246 limits at room, LOW, and HIGH temperatures before irradiation.

Downpoints

Downpoints were 0krad(Si), 10krad(Si), 30krad(Si), 50krad(Si), and 75krad(Si). The samples were subjected to a high temperature Biased anneal for 168 hours at +100°C following irradiation.

Results

Attributes Data

Testing at low dose rate of the ISL70517SEH is complete and showed no reject devices after irradiation or anneal. Table 2 summarizes the results.

TABLE 2. ISL70517SEH LOW DOSE RATE TOTAL DOSE TEST ATTRIBUTES DATA

PART	RATE	BIAS	SAMPLE SIZE	DOWNPOINT	BIN 1 (Note 1)	REJECTS
ISL70517SEH	0.0089rad(Si)/s	Figure 1	8	Pre-irradiation	8	
				10krad(Si)	8	0
				30krad(Si)	8	0
				50krad(Si)	8	0
				75krad(Si)	8	0
				Anneal, 168 hours at +100°C	8	0
ISL70517SEH	0.0089rad(Si)/s	Grounded	8	Pre-irradiation	8	
				10krad(Si)	8	0
				30krad(Si)	8	0
				50krad(Si)	8	0
				75krad(Si)	8	0
				Anneal, 168 hours at +100°C	8	0

NOTE:

1. Bin 1 indicates a device that passes all pre-irradiation specification limits.

Variables Data

The plots in Figures 2 through 47 show data at all downpoints. The plots show the average tested value of key parameters as a function of total dose for each of the two irradiation conditions, Biased (B) and Unbiased (U). PA on the graphs stands for Post-Anneal. Most of the plots also show error bars at each downpoint, representing the population minimum and maximum. The figure sequence and the symbols of the reported parameters are consistent with those used in (SMD) 5962-15246. All parameters showed excellent stability over irradiation, with no observed dose rate or bias sensitivity.

Variables Data Plots

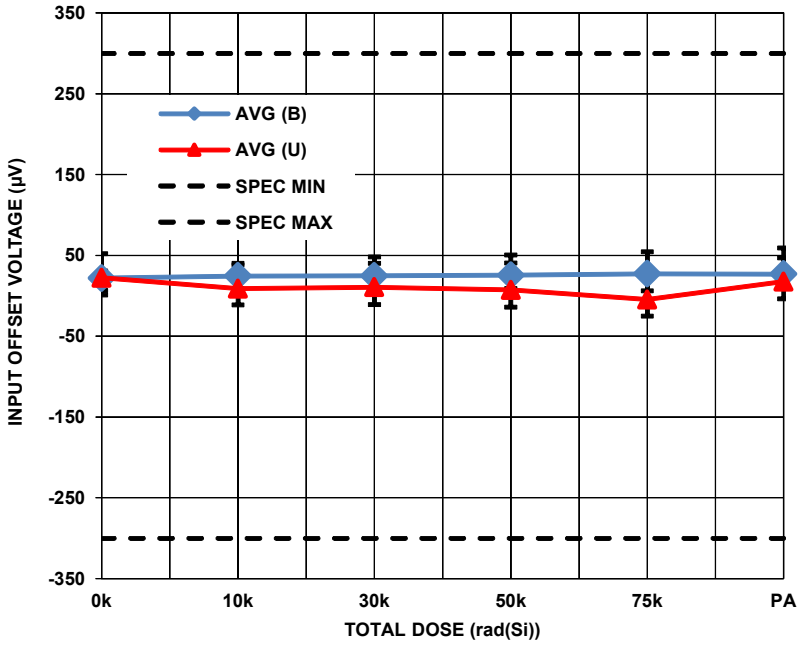


FIGURE 2. ISL70517SEH input amplifier input offset voltage for ±18V supplies as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -300µV to 300µV.

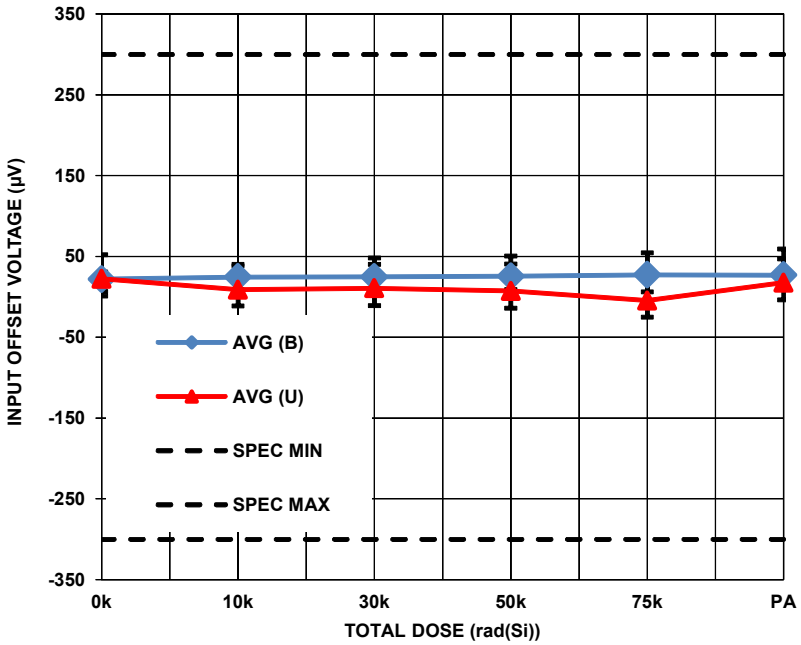


FIGURE 3. ISL70517SEH input amplifier input offset voltage for ±4V supplies as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -300µV to 300µV.

Variables Data Plots (Continued)

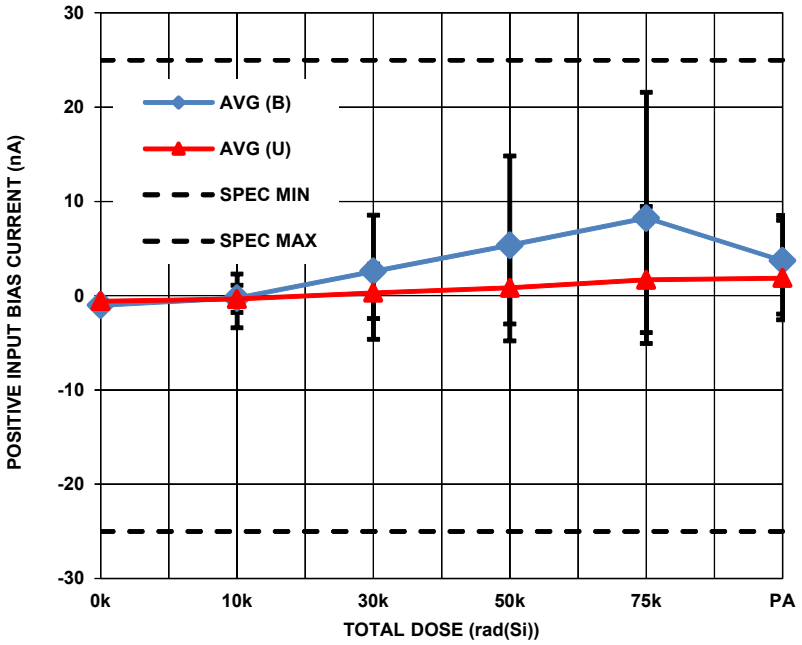


FIGURE 4. ISL70517SEH input amplifier positive input bias current for ±18V supplies as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -25nA to 25nA.

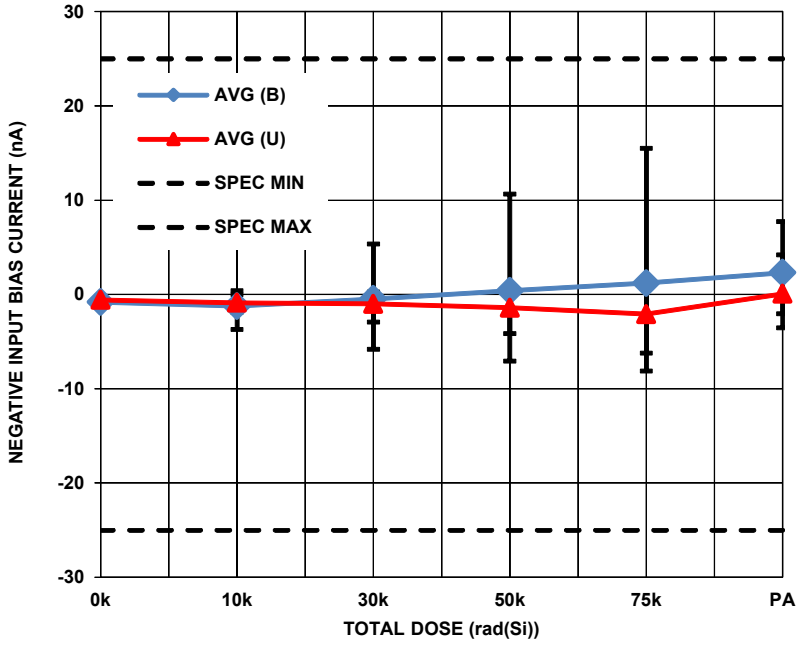


FIGURE 5. ISL70517SEH input amplifier negative input bias current for ±18V supplies as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -25nA to 25nA.

Variables Data Plots (Continued)

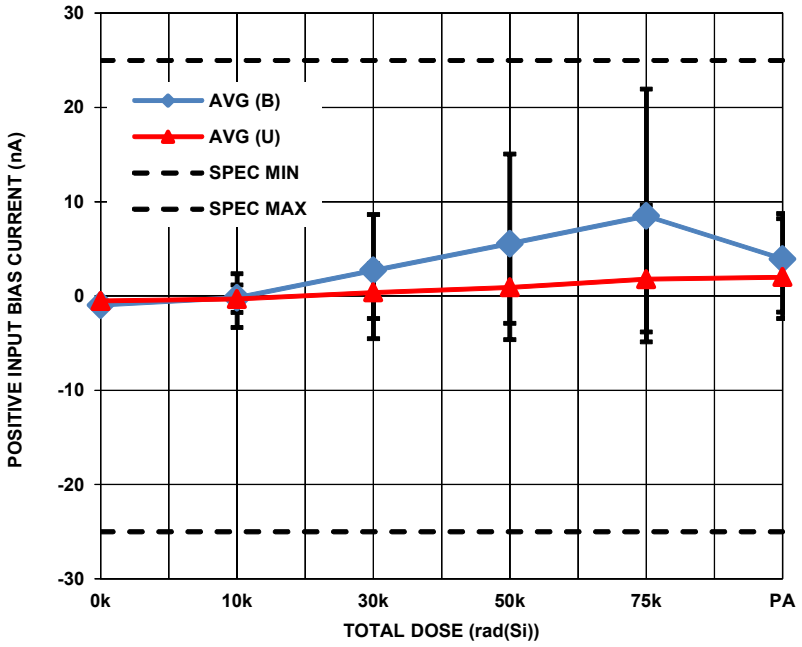


FIGURE 6. ISL70517SEH input amplifier positive input bias current for ±5V supplies as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -25nA to 25nA.

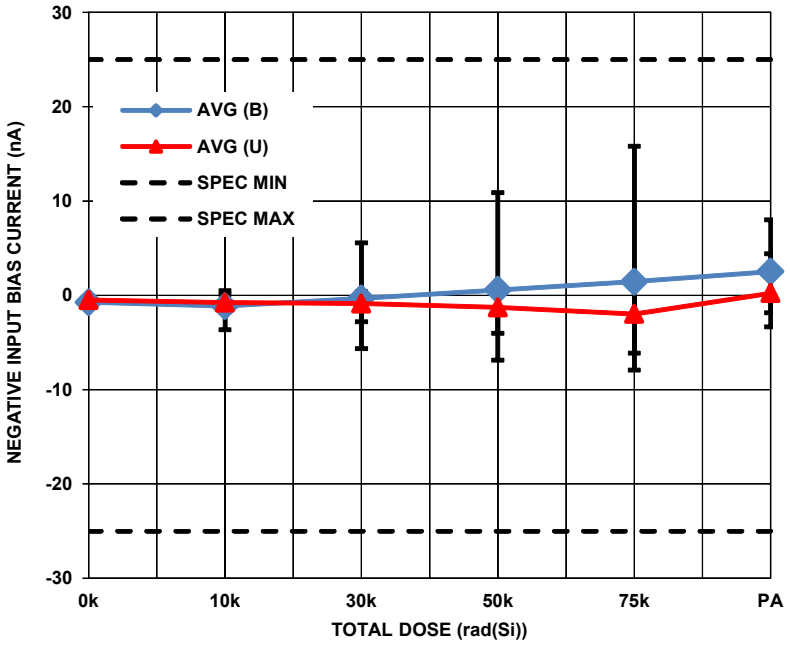


FIGURE 7. ISL70517SEH input amplifier negative input bias current for ±5V supplies as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -25nA to 25nA.

Variables Data Plots (Continued)

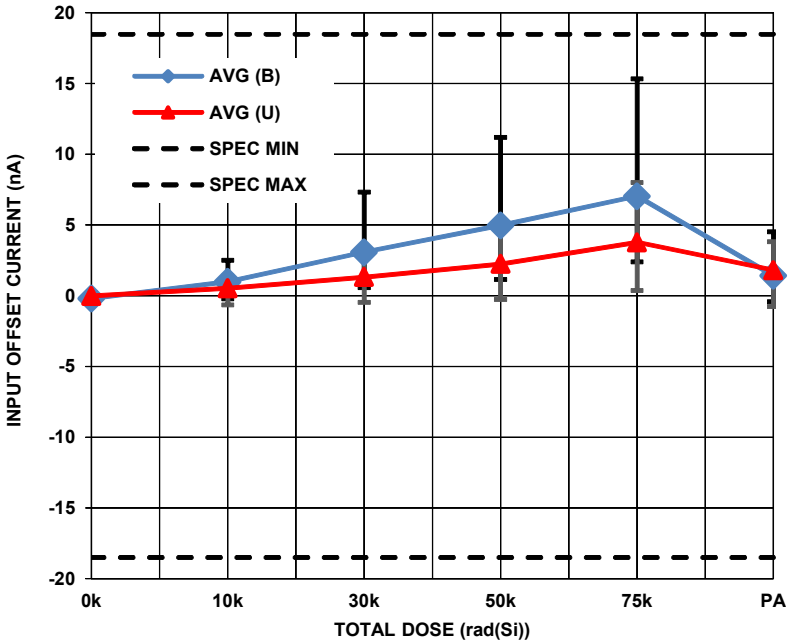


FIGURE 8. ISL70517SEH input amplifier input offset current for ±18V supplies as a function of low dose rate irradiation for the Biased (per Figure 1) and Unbiased (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -18.5nA to 18.5nA.

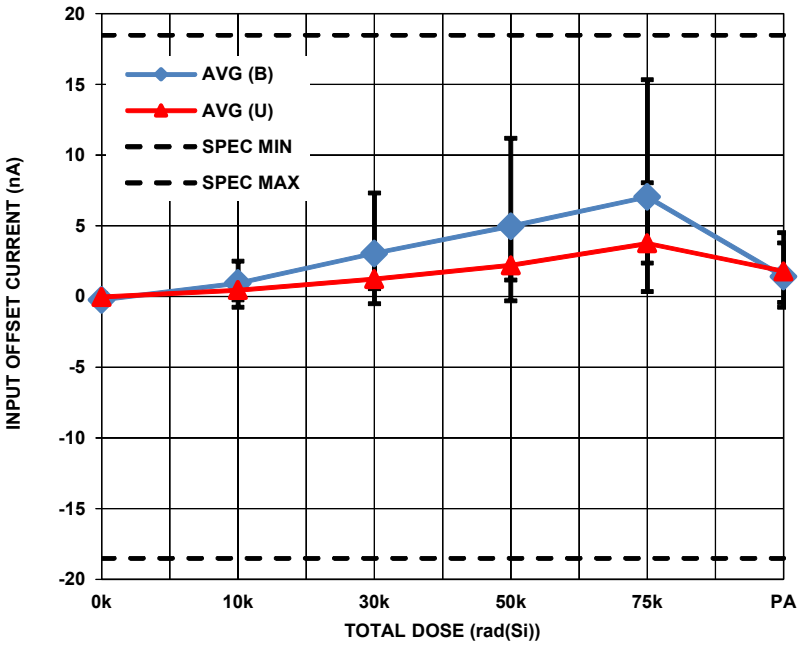


FIGURE 9. ISL70517SEH input amplifier input offset current for ±5V supplies as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -18.5nA to 18.5nA.

Variables Data Plots (Continued)

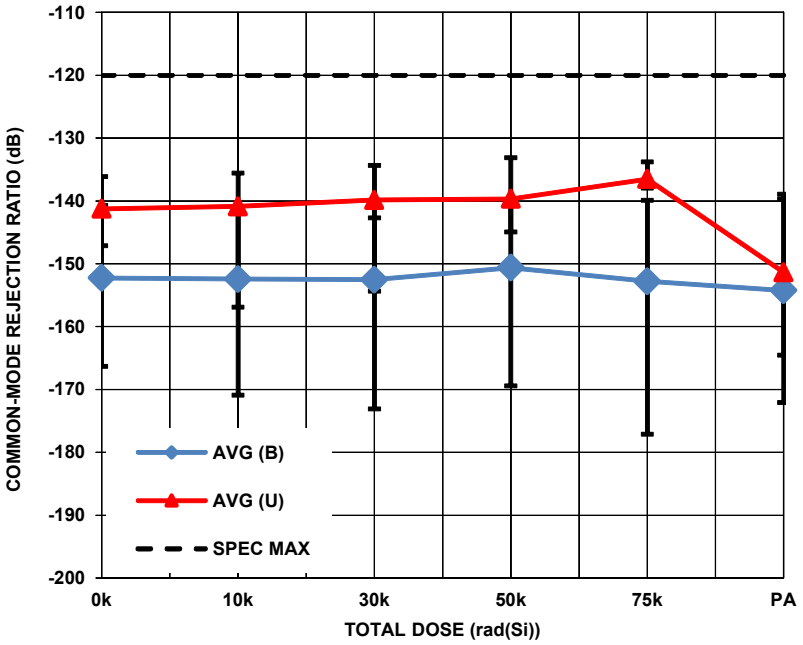


FIGURE 10. ISL70517SEH common-mode rejection ratio, ±15V supplies, gain of 100, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is -120dB maximum.

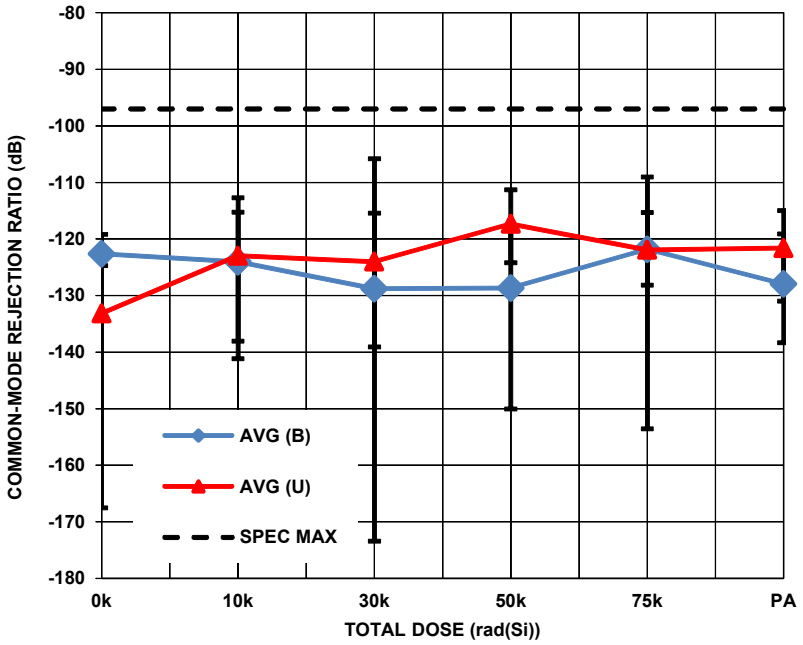


FIGURE 11. ISL70517SEH common-mode rejection ratio, ±15V supplies, gain of 1, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is -97dB maximum.

Variables Data Plots (Continued)

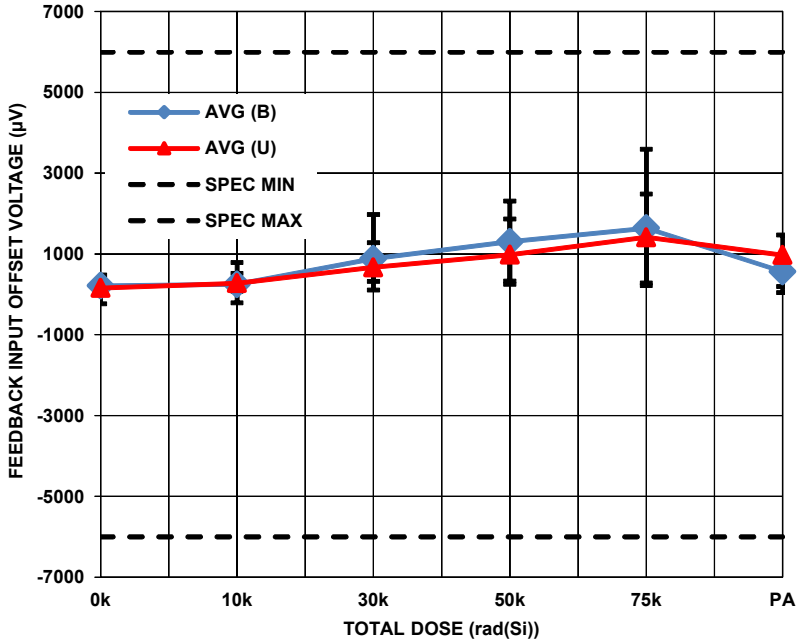


FIGURE 12. ISL70517SEH feedback input offset voltage, ±18V supplies, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -6000µV to 6000µV.

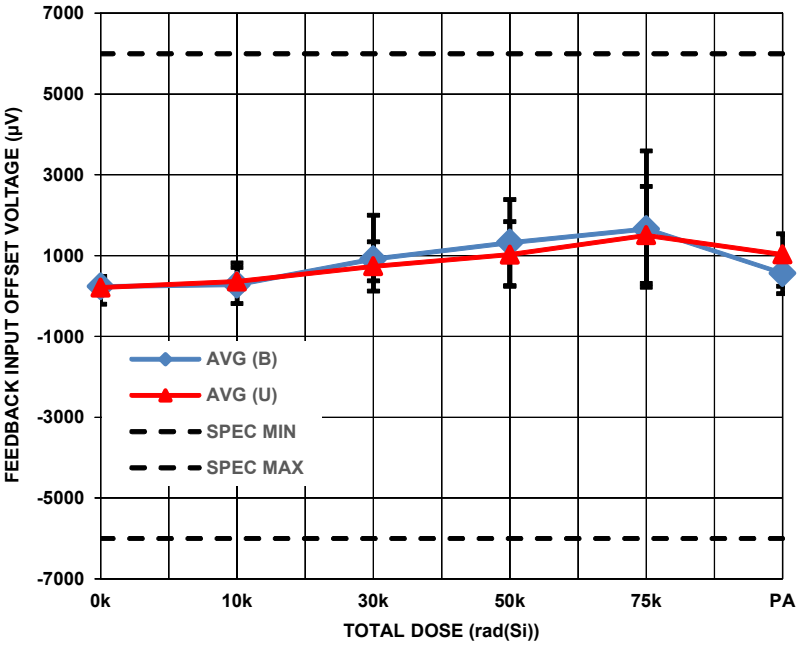


FIGURE 13. ISL70517SEH feedback input offset voltage, ±4V supplies, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -6000µV to 6000µV.

Variables Data Plots (Continued)

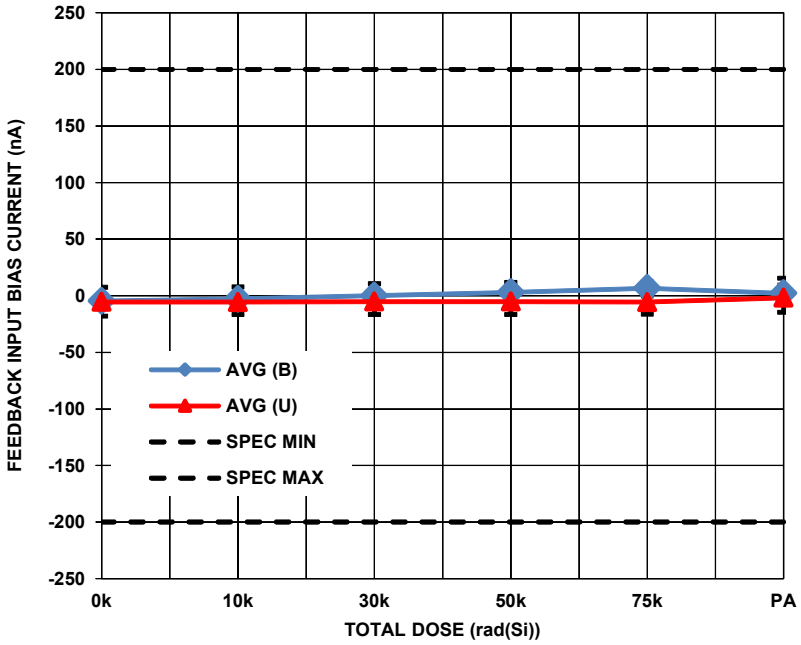


FIGURE 14. ISL70517SEH feedback input bias current, ±18V supplies, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -200nA to 200nA.

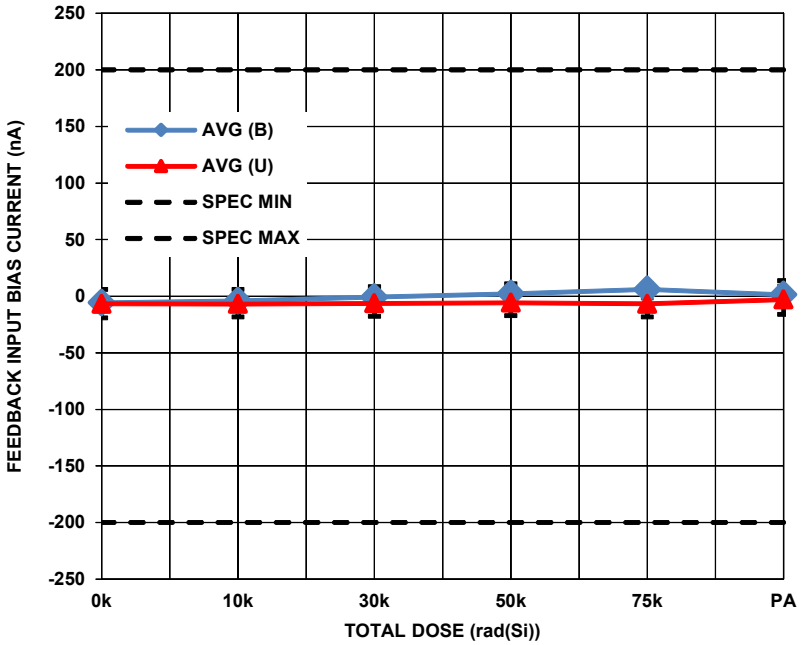


FIGURE 15. ISL70517SEH feedback input bias current, ±4V supplies, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -200nA to 200nA.

Variables Data Plots (Continued)

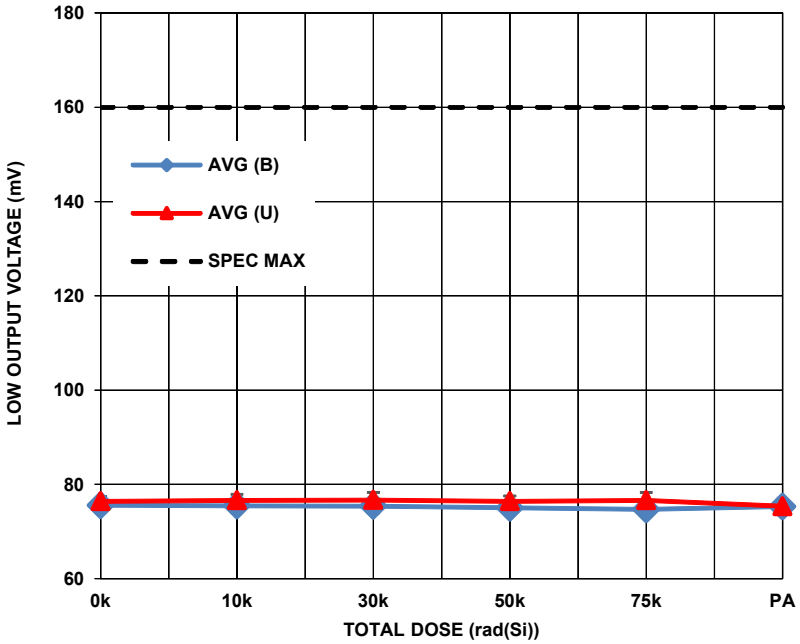


FIGURE 16. ISL70517SEH LOW output voltage with I_{OUT} = 0mA at ±18V supplies as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is 160mV maximum.

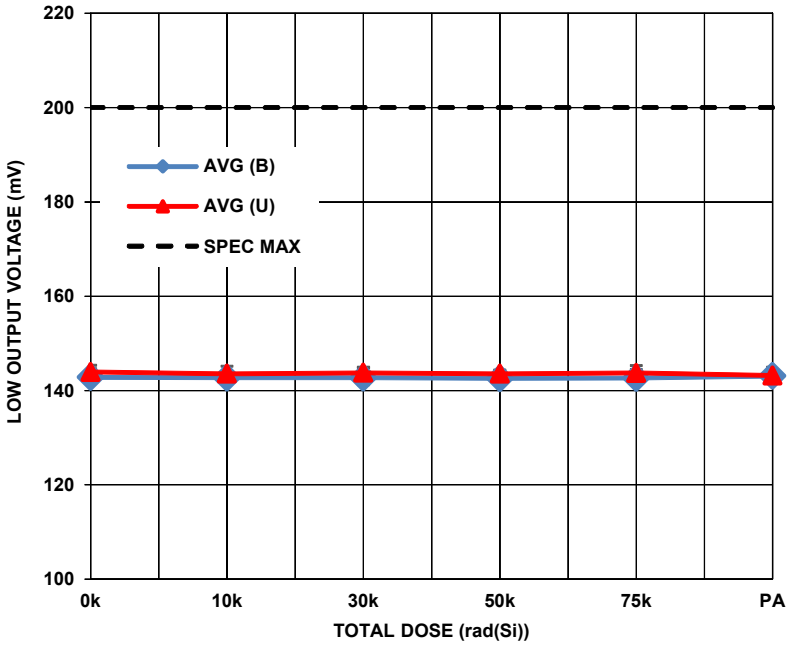


FIGURE 17. ISL70517SEH LOW output voltage with I_{OUT} = 1.5mA at ±18V supplies as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is 200mV maximum.

Variables Data Plots (Continued)

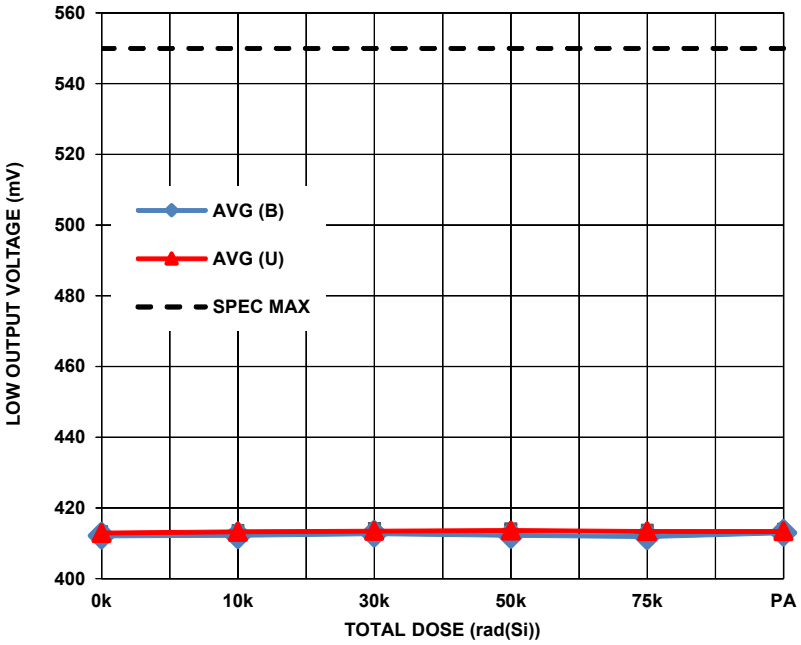


FIGURE 18. ISL70517SEH LOW output voltage with I_{OUT} = 7.5mA at ±18V supplies as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is 550mV maximum.

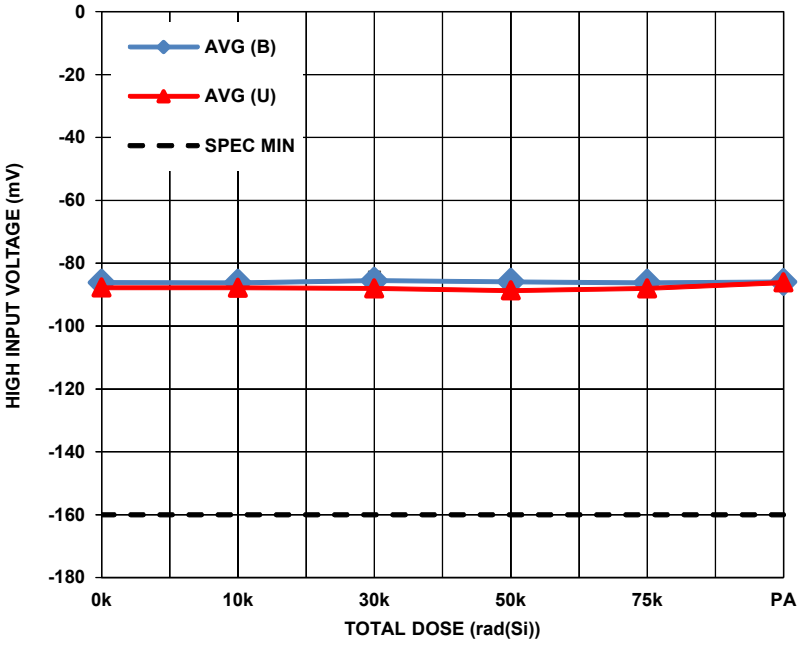


FIGURE 19. ISL70517SEH HIGH output voltage with I_{OUT} = 0mA at ±18V supplies as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is -160mV minimum.

Variables Data Plots (Continued)

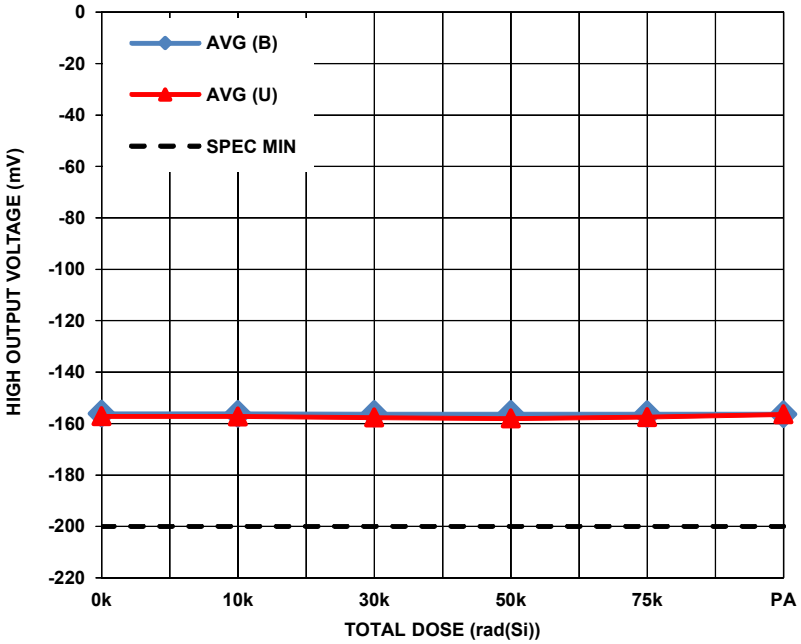


FIGURE 20. ISL70517SEH HIGH output voltage with I_{OUT} = 1.5mA at ±18V supplies as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is -200mV minimum.

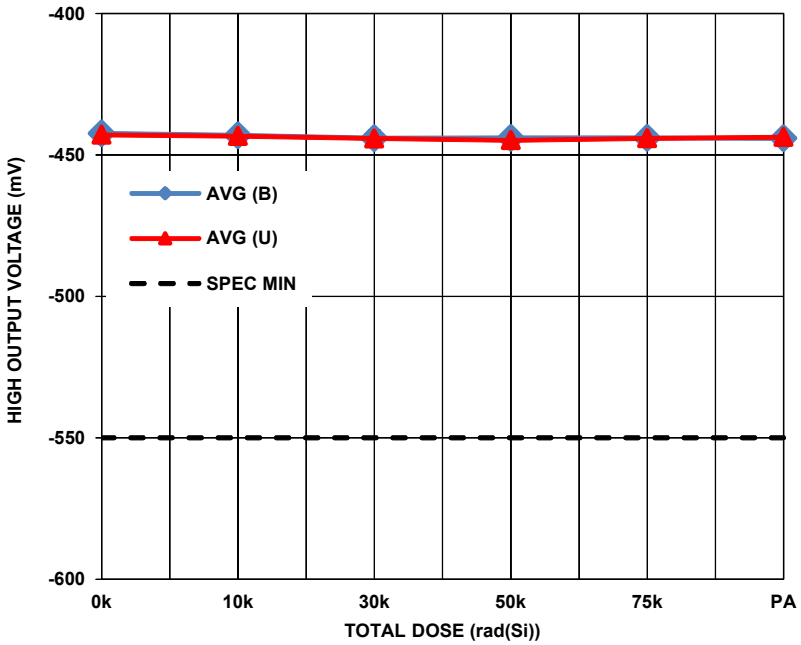


FIGURE 21. ISL70517SEH HIGH output voltage with I_{OUT} = 7.5mA at ±18V supplies as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is -550mV minimum.

Variables Data Plots (Continued)

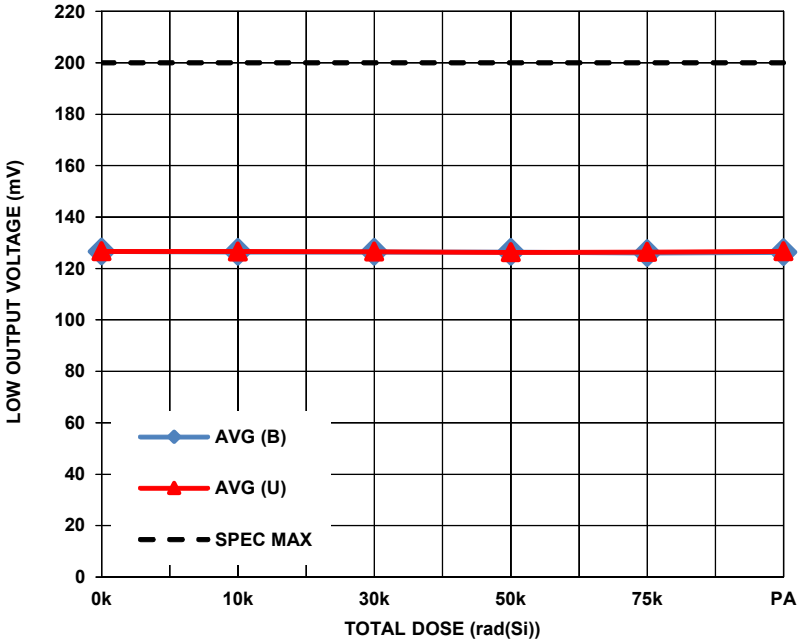


FIGURE 22. ISL70517SEH LOW output voltage with I_{OUT} = 1.5mA at ±4V supplies as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is 200mV maximum.

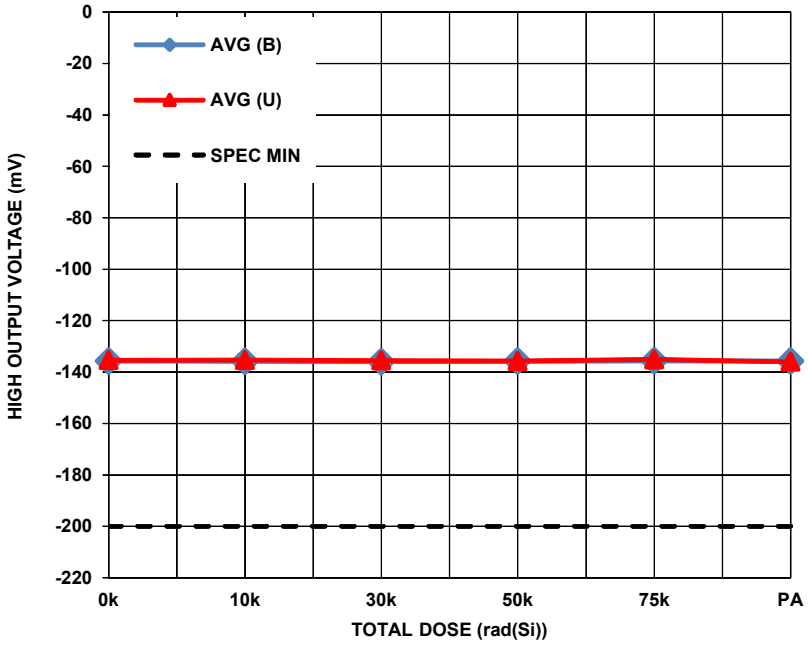


FIGURE 23. ISL70517SEH HIGH output voltage with I_{OUT} = 1.5mA at ±4V supplies as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is -200mV minimum.

Variables Data Plots (Continued)

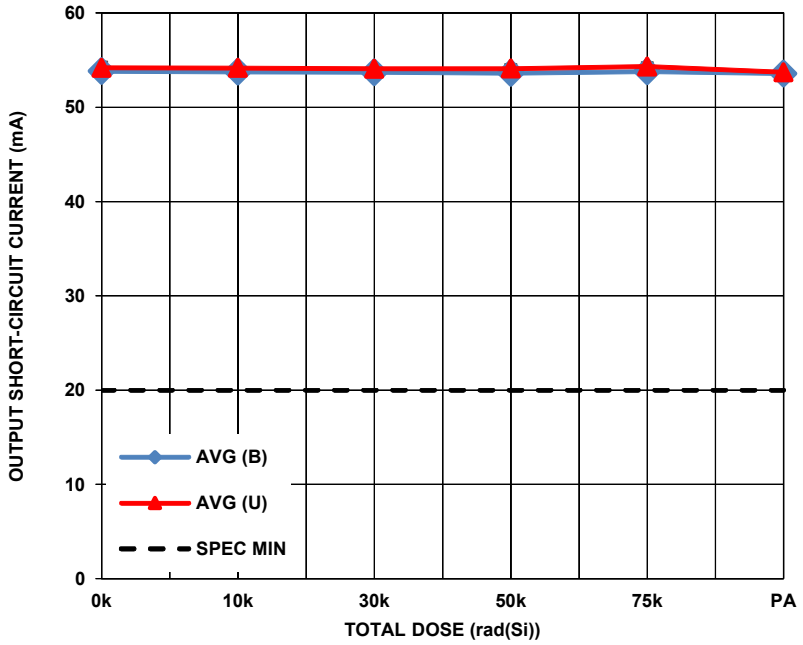


FIGURE 24. ISL70517SEH output short-circuit current, sinking, at ±18V, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is 20mA minimum.

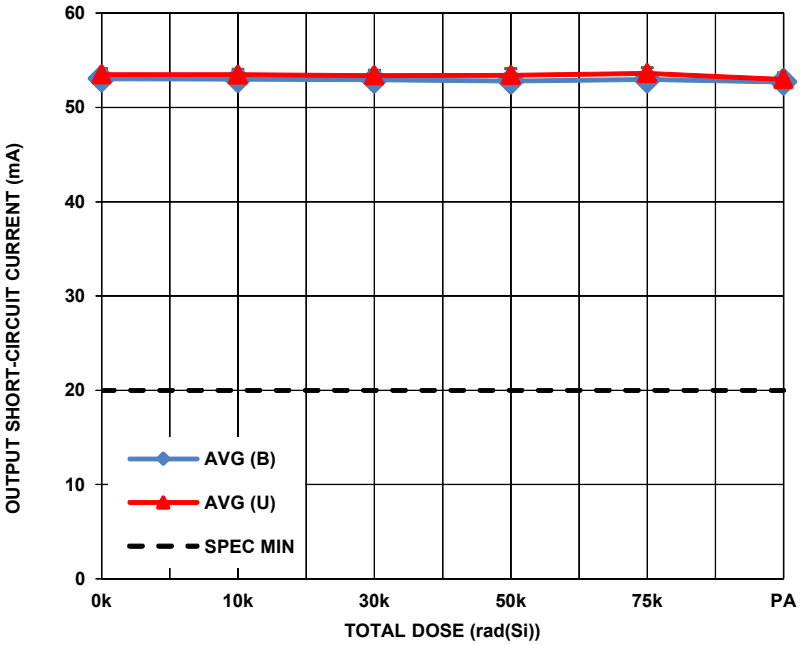


FIGURE 25. ISL70517SEH output short-circuit current, sinking, at ±5V, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is 20mA minimum.

Variables Data Plots (Continued)

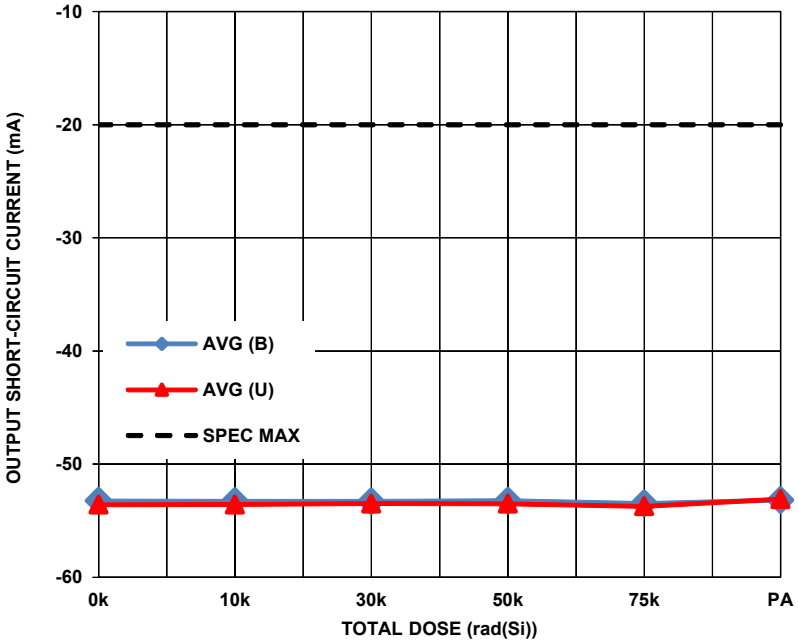


FIGURE 26. ISL70517SEH output short-circuit current, sourcing, at ±18V, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is -20mA maximum.

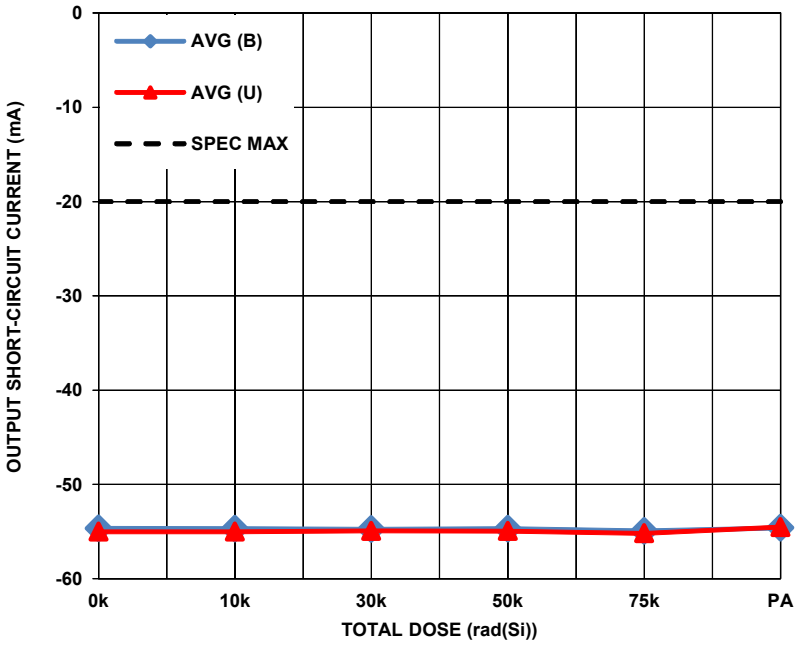


FIGURE 27. ISL70517SEH output short circuit current, sourcing at ±5V, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is -20mA maximum.

Variables Data Plots (Continued)

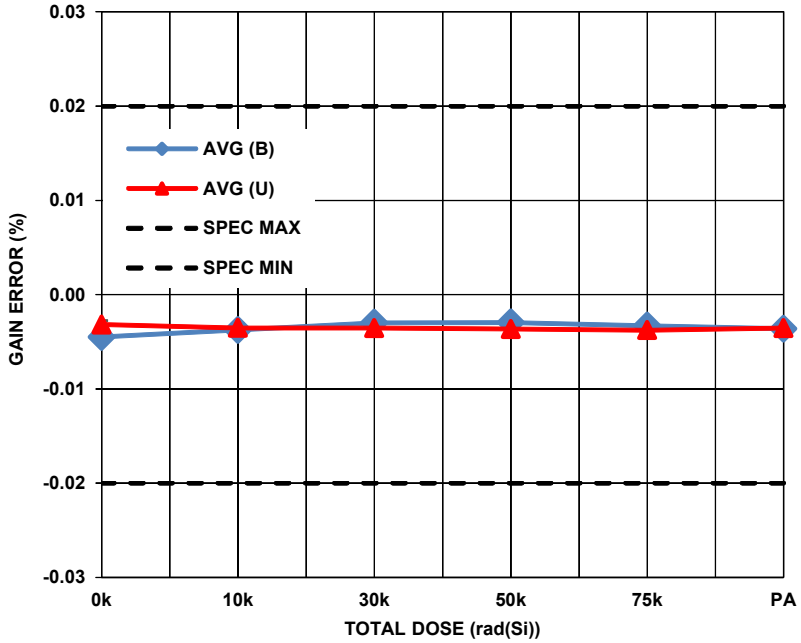


FIGURE 28. ISL70517SEH gain error at ±18V, V_{OUT} = ±10V, R_{FB} = 121k, Gain = 1, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -0.02% to 0.02%.

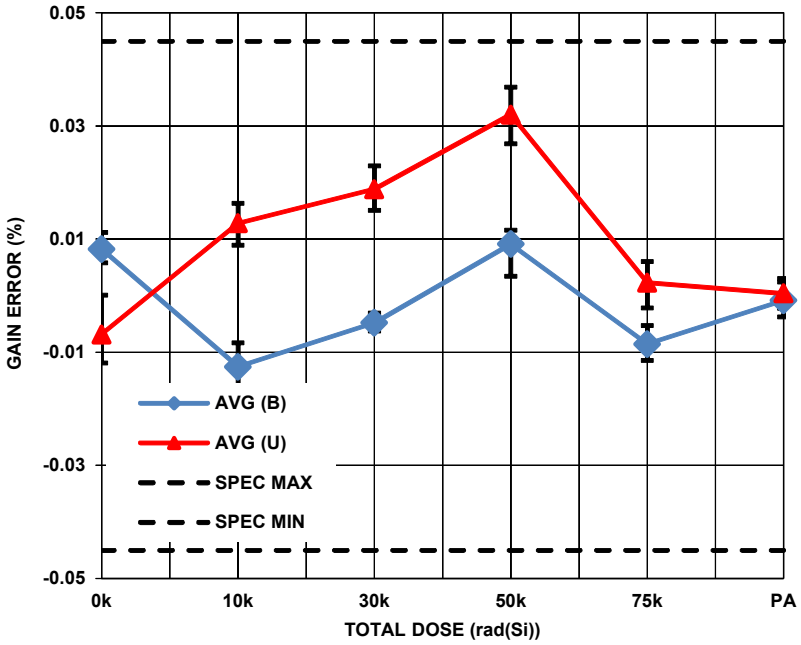


FIGURE 29. ISL70517SEH gain error at ±18V, V_{OUT} = ±10V, R_{FB} = 121k, Gain = 100, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -0.045% to 0.045%.

Variables Data Plots (Continued)

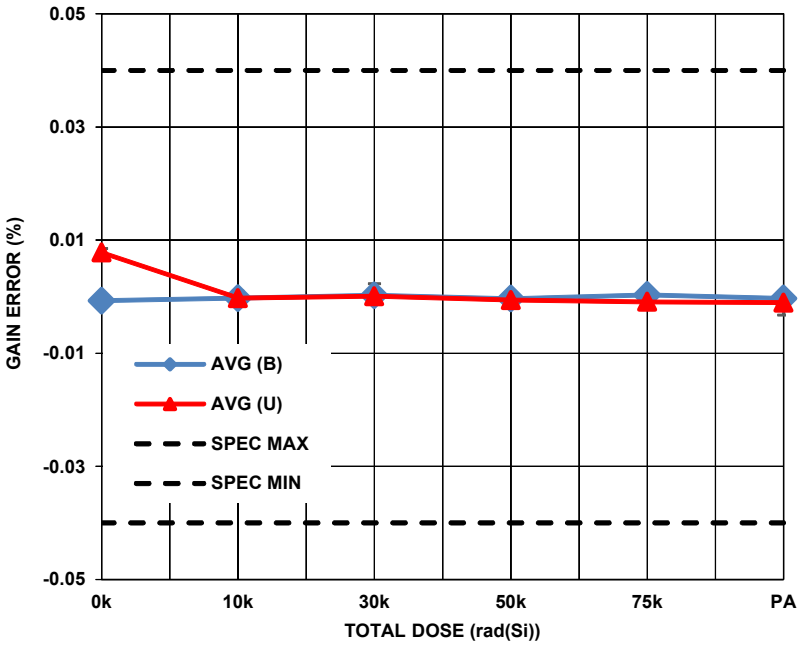


FIGURE 30. ISL70517SEH gain error at ±18V, V_{OUT} = ±2.5V, R_{FB} = 30.1k, Gain = 1, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -0.04% to 0.04.

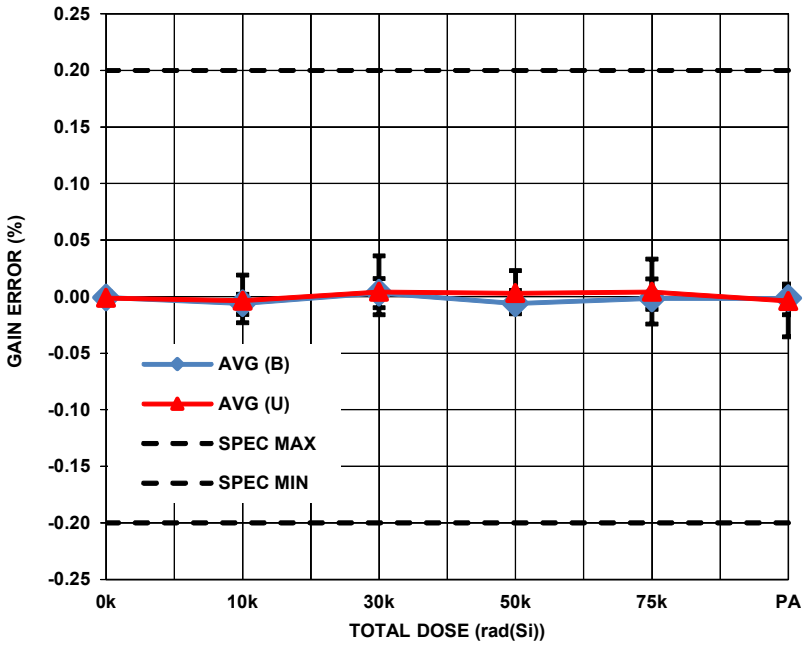


FIGURE 31. ISL70517SEH gain error with the input amplifier at ±4V and the output amplifier at ±1.5V, V_{OUT} = ±0.1V, R_{FB} = 121k, Gain = 1, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -0.2% to 0.2%.

Variables Data Plots (Continued)

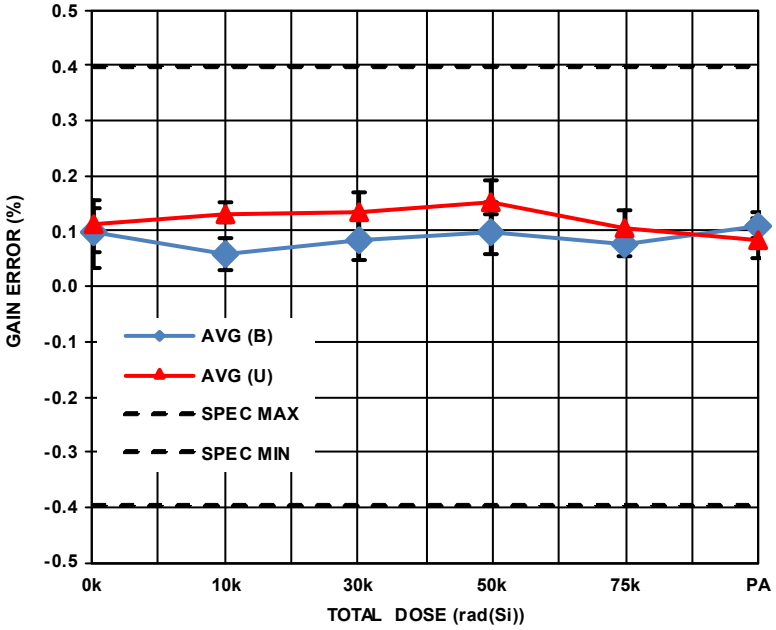


FIGURE 32. ISL70517SEH gain error with the input amplifier at ±4V and the output amplifier at ±1.5V, V_{OUT} = ±1.25V, R_{FB} = 121k, Gain = 100, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -0.4% to 0.4%.

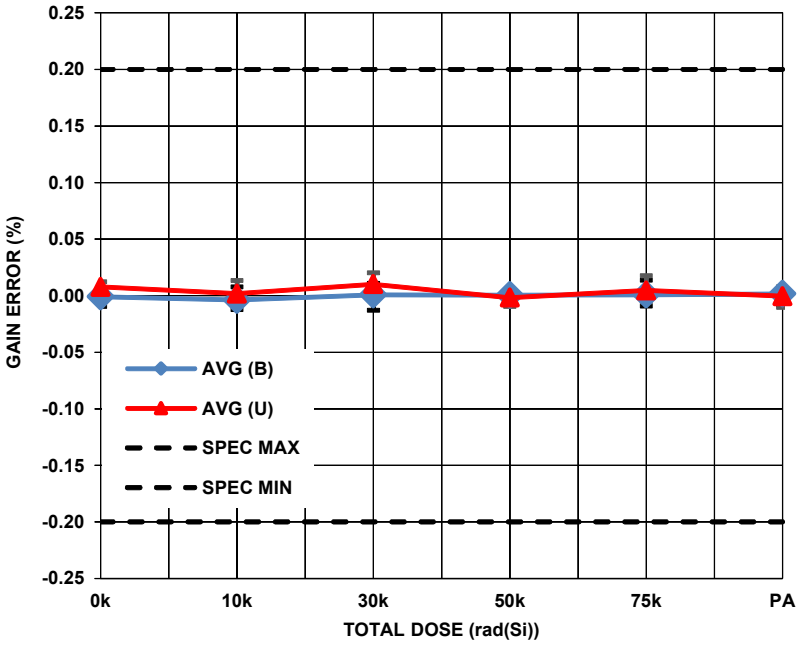


FIGURE 33. ISL70517SEH gain error with the input amplifier at ±4V and the output amplifier at ±1.5V, V_{OUT} = ±0.1V, R_{FB} = 30.1k, Gain = 1, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -0.2% to 0.2%.

Variables Data Plots (Continued)

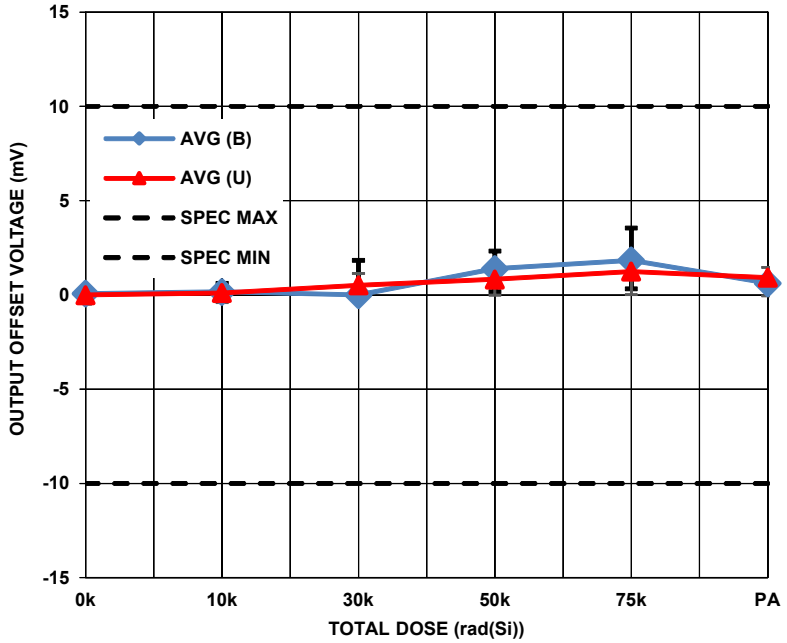


FIGURE 34. ISL70517SEH output offset voltage at ±18V, R_{FB} = 30.1k, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -10mV to 10mV.

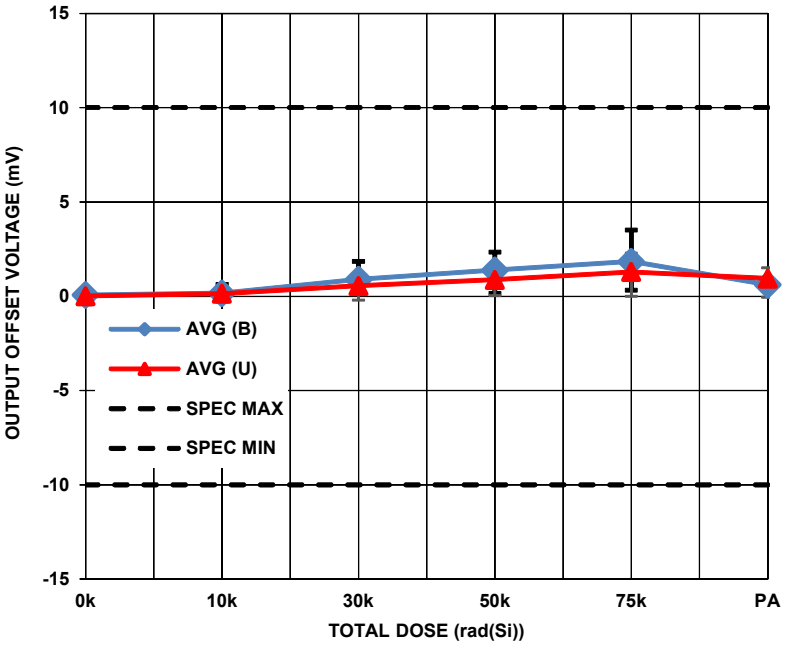


FIGURE 35. ISL70517SEH output offset voltage at ±5V, R_{FB} = 30.1k, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -10mV to 10mV.

Variables Data Plots (Continued)

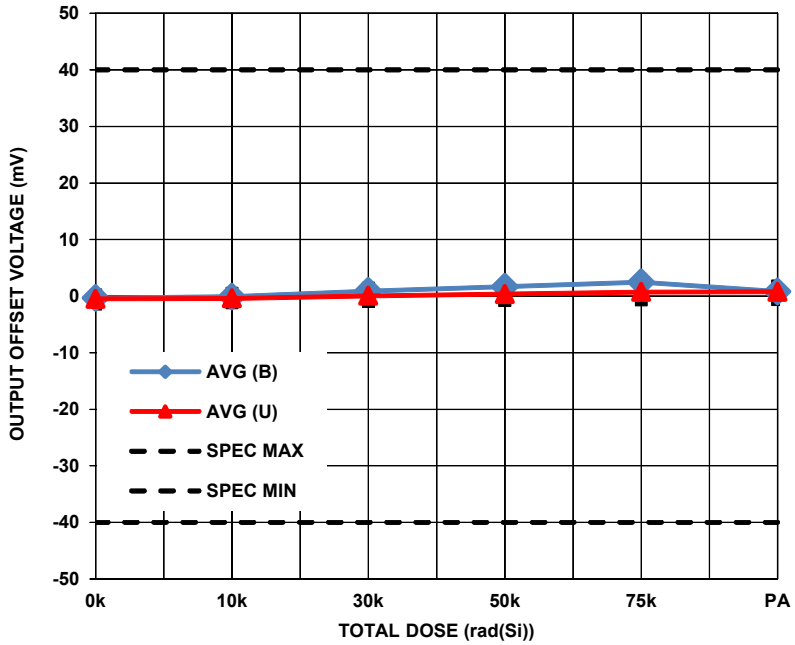


FIGURE 36. ISL70517SEH output offset voltage at ±18V, R_{FB} = 121k, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -40mV to 40mV.

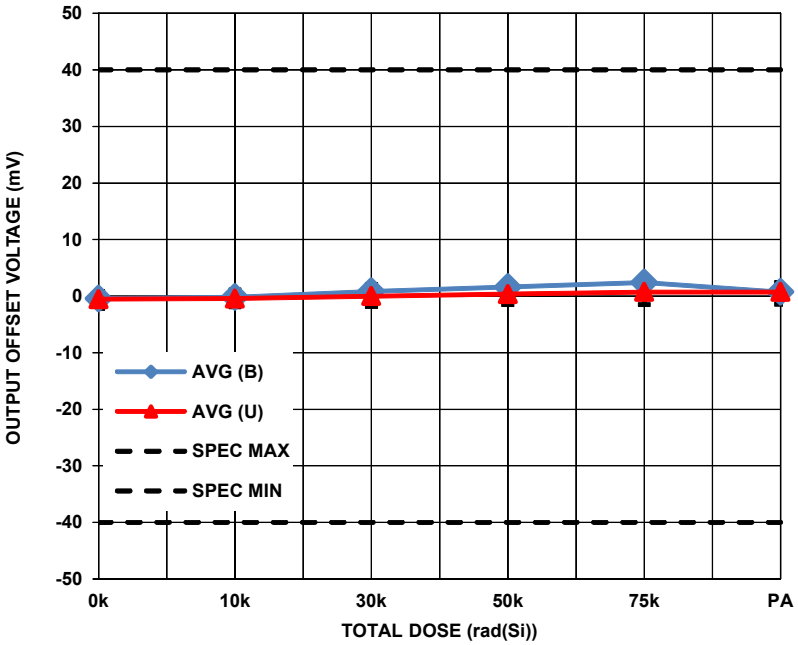


FIGURE 37. ISL70517SEH output offset voltage at ±5V, R_{FB} = 121k, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limits are -40mV to 40mV.

Variables Data Plots (Continued)

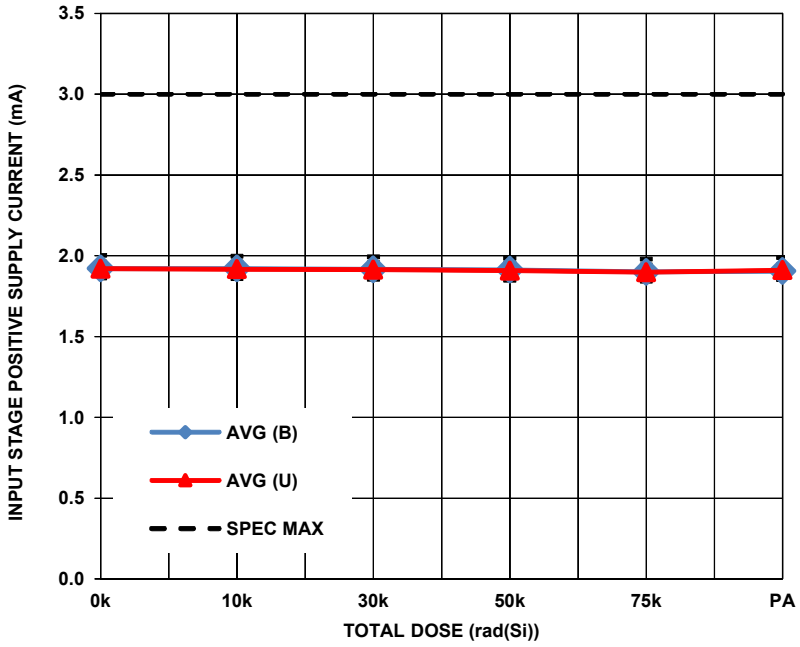


FIGURE 38. ISL70517SEH input stage positive supply current (I_{CC}) at ±4V, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is 3.0mA maximum.

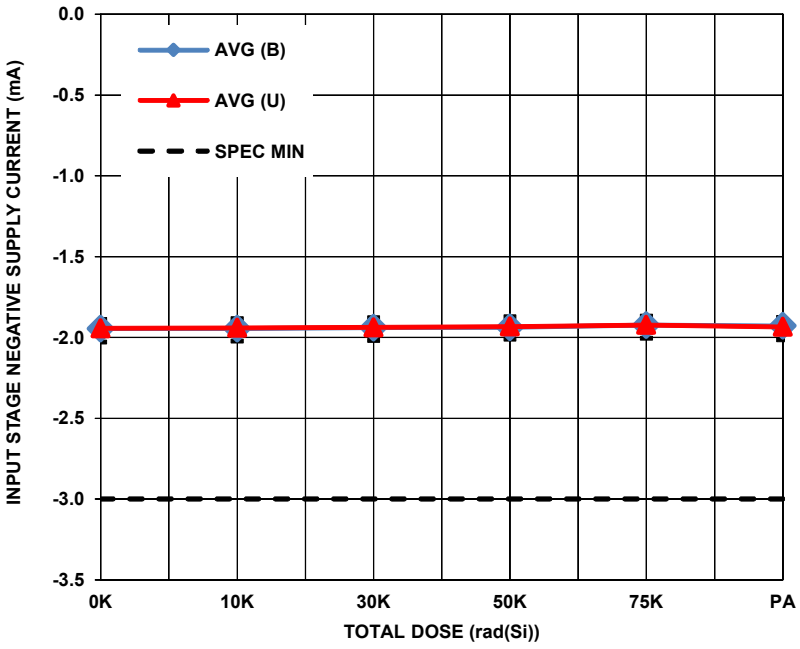


FIGURE 39. ISL70517SEH input stage negative supply current (I_{EE}) at ±4V, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is -3.0mA minimum.

Variables Data Plots (Continued)

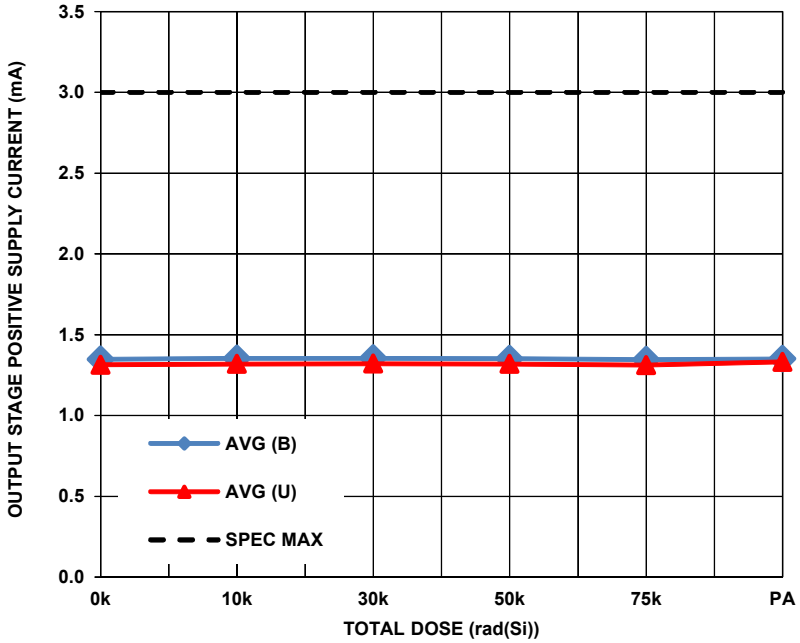


FIGURE 40. ISL70517SEH output stage positive supply current (I_{CO}) at ±4V, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is 3.0mA maximum.

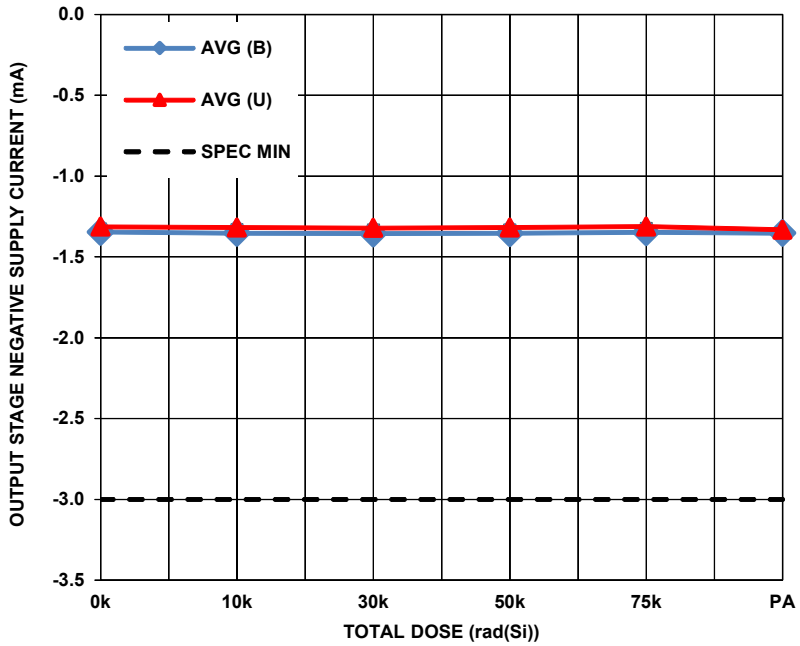


FIGURE 41. ISL70517SEH output stage negative supply current (I_{EO}) at ±4V, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is -3.0mA minimum.

Variables Data Plots (Continued)

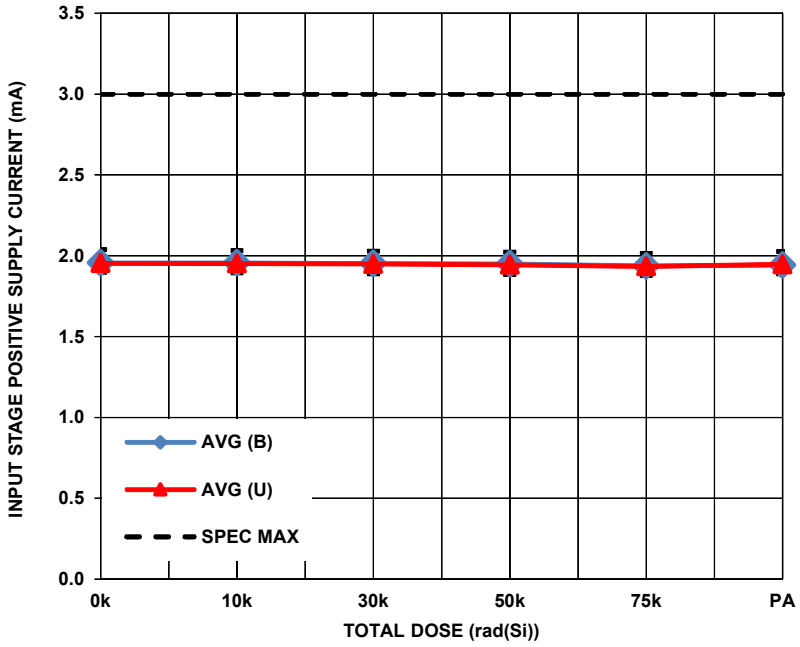


FIGURE 42. ISL70517SEH input stage positive supply current (I_{CC}) at ±18V, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is 3.0mA maximum.

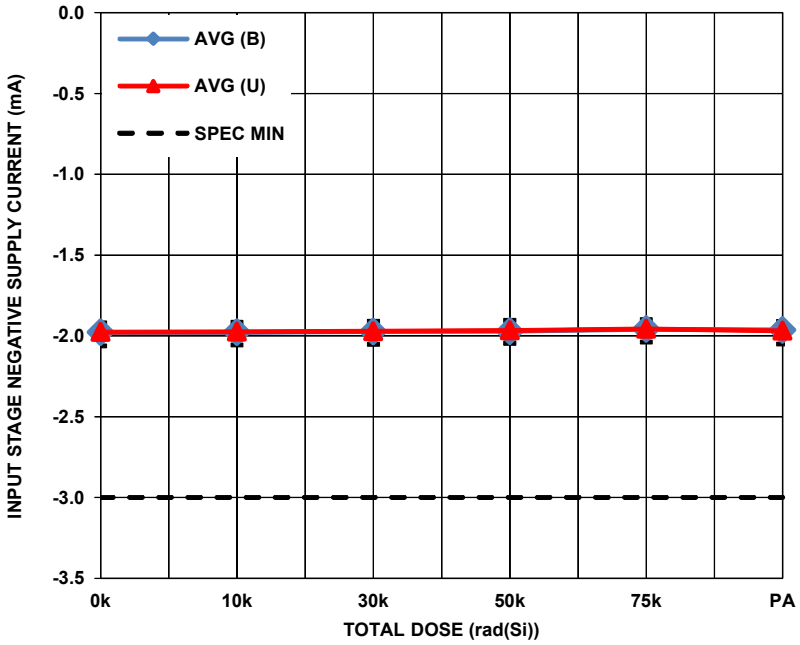


FIGURE 43. ISL70517SEH input stage negative supply current (I_{EE}) at ±18V, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is -3.0mA minimum.

Variables Data Plots (Continued)

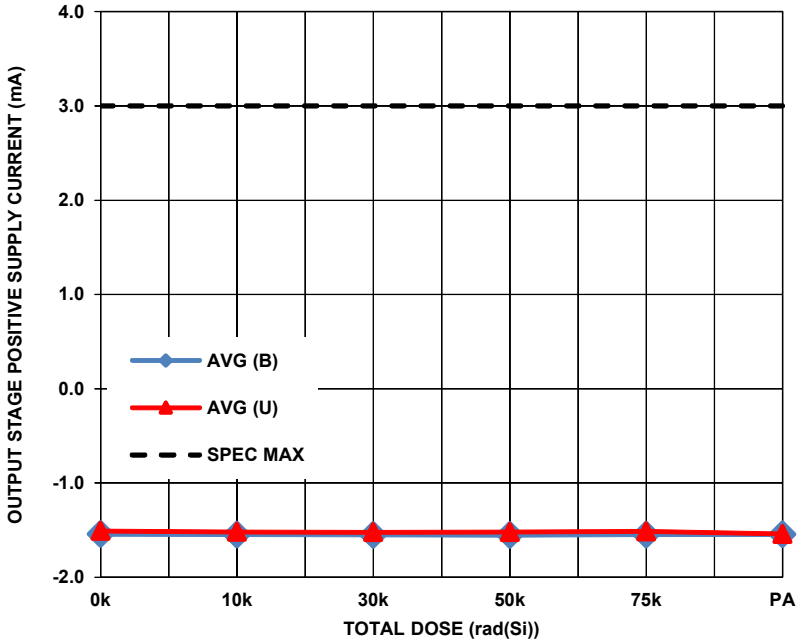


FIGURE 44. ISL70517SEH output stage positive supply current (I_{CO}) at ±18V, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is 3.0mA maximum.

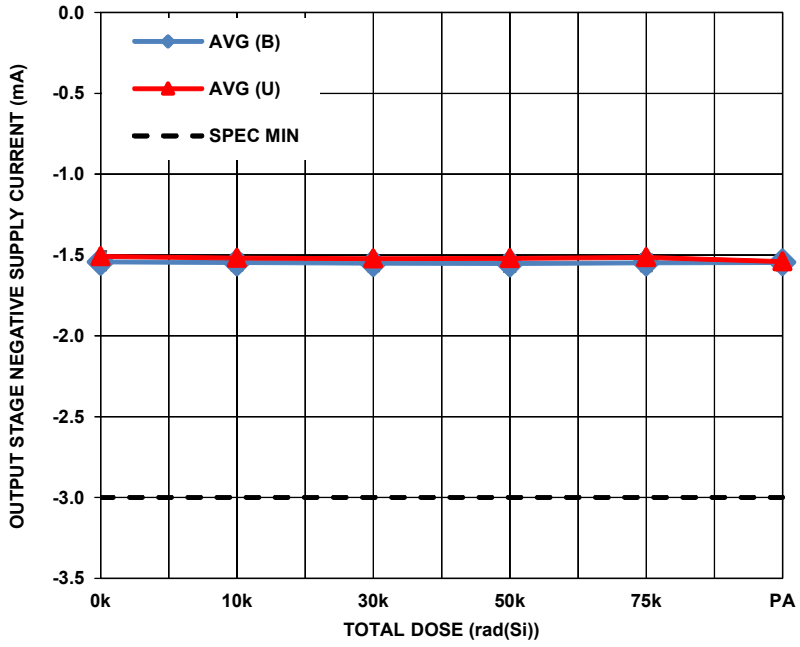


FIGURE 45. ISL70517SEH output stage negative supply current (I_{EO}) at ±18V, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is -3.0mA minimum.

Variables Data Plots (Continued)

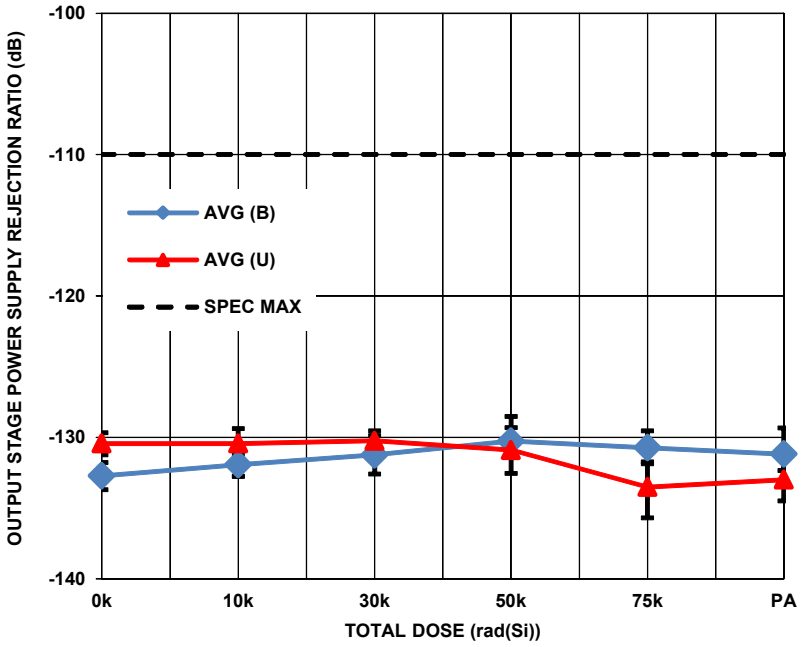


FIGURE 46. ISL70517SEH input stage power supply rejection ratio, ±4V to ±18V, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is -110dB maximum.

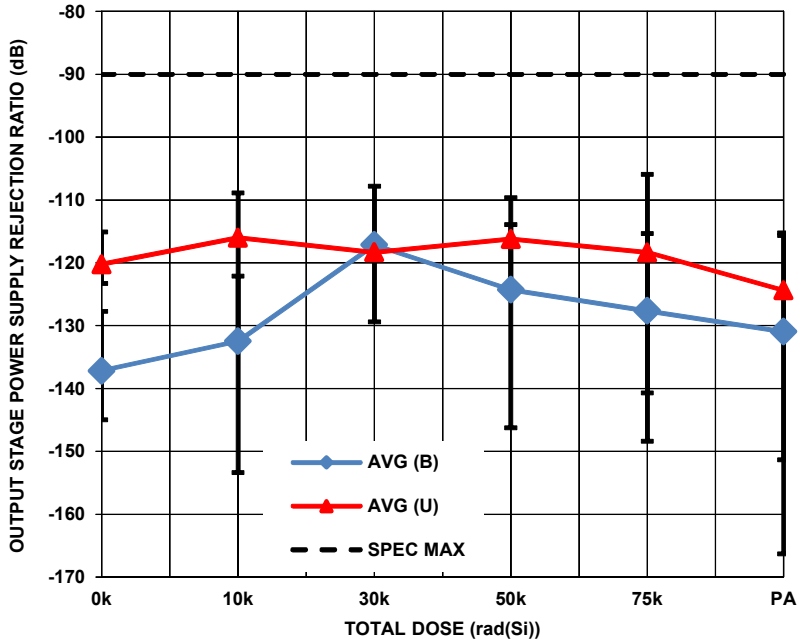


FIGURE 47. ISL70517SEH output stage power supply rejection ratio, ±1.5V to ±18V, as a function of low dose rate irradiation for the Biased (B) (per Figure 1) and Unbiased (U) (all pins grounded) cases. The error bars represent the minimum and maximum measured values. The post-irradiation SMD limit is -90dB maximum.

Conclusion

This report documents the results of a Total Ionizing Dose (TID) test of the ISL70517SEH instrumentation amplifier. The test was conducted in order to determine the sensitivity of the parts to the low dose rate total dose environment as found in nearly all space applications. Parts were tested to 75krad(Si) at .01rad(Si)/ Biased and Unbiased conditions and were then subjected to a high temperature Biased anneal at +100°C for 168 hours. ATE characterization testing showed no rejects to the SMD Group A parametric limits (indicated by a Bin 1 category) after Biased and grounded irradiation at low dose rate and after the 168 hours +100°C Biased anneal. Attributes data are presented in Table 2, while variables data are plotted in Figures 2 through 47. No meaningful differences between Biased and Unbiased irradiation were noted and the samples showed no significant response to the high temperature anneal.

TABLE 3. REPORTED PARAMETER

FIGURE	PARAMETER	LIMIT, LOW	LIMIT, HIGH	UNITS	NOTES
2	Input Offset Voltage	-300	300	µV	±18V
3	Input Offset Voltage	-300	300	µV	±4V
4	Positive Input Bias Current	-25	25	nA	±18V
5	Negative Input Bias Current	-25	25	nA	±18V
6	Positive Input Bias Current	-25	25	nA	±5V
7	Negative Input Bias Current	-25	25	nA	±5V
8	Input Offset Current	-18.5	18.5	nA	±18V
9	Input Offset Current	-18.5	18.5	nA	±5V
10	Common Mode Rejection Ratio	-	-120	dB	Gain = 100
11	Common Mode Rejection Ratio	-	-97	dB	Gain = 1
12	Feedback Input Offset Voltage	-6000	6000	µV	±18V
13	Feedback Input Offset Voltage	-6000	6000	µV	±4V
14	Feedback Input Bias Current	-200	200	nA	±18V
15	Feedback Input Bias Current	-200	200	nA	±4V
16	Low Output Voltage	-	160	mV	±18V, I_{OUT} = 0mA
17	Low Output Voltage	-	200	mV	±18V, I_{OUT} = 1.5mA
18	Low Output Voltage	-	550	mV	±18V, I_{OUT} = 7.5mA
19	High Output Voltage	-160	-	mV	±18V, I_{OUT} = 0mA
20	High Output Voltage	-200	-	mV	±18V, I_{OUT} = 1.5mA
21	High Output Voltage	-550	-	mV	±18V, I_{OUT} = 7.5mA
22	Low Output Voltage	-	200	mV	V_{CC} = 4V, V_{EE} = -4V, V_{CO} = 1.5V, V_{EO} = -1.5V, I_{OUT} = 1.5mA
23	High Output Voltage	-200	-	mV	
24	Output Short Circuit Current, Sinking	20	-	mA	±18V
25	Output Short Circuit Current, Sinking	20	-	mA	±5V
26	Output Short Circuit Current, Sourcing	-	-20	mA	±18V
27	Output Short Circuit Current, Sourcing	-	-20	mA	±5V
28	Gain Error	-0.02	0.02	%	V_{OUT} = ±10V, R_{FB} = 121k, G = 1
29	Gain Error	-0.045	0.045	%	V_{OUT} = ±10V, R_{FB} = 121k, G = 100
30	Gain Error	-0.04	0.04	%	V_{OUT} = ±2.5V, R_{FB} = 30.1k, G = 1
31	Gain Error, Low Supply Voltage	-0.2	0.2	%	V_{OUT} = ±0.1V, R_{FB} = 121k, G = 1
32	Gain Error, Low Supply Voltage	-0.4	0.4	%	V_{OUT} = ±1.25V, R_{FB} = 121k, G = 100
33	Gain Error, Low Supply Voltage	-0.2	0.2	%	V_{OUT} = ±0.1V, R_{FB} = 30.1k, G = 1
34	Output Offset Voltage	-10	10	mV	±18V, R_{FB} = 30.1k

TABLE 3. REPORTED PARAMETER (Continued)

FIGURE	PARAMETER	LIMIT, LOW	LIMIT, HIGH	UNITS	NOTES
35	Output Offset Voltage	-10	10	mV	±5V, R_{FB} = 30.1k
36	Output Offset Voltage	-40	40	mV	±18V, R_{FB} = 121k
37	Output Offset Voltage	-40	40	mV	±5V, R_{FB} = 121k
38	Supply Current, I_{CC}	-	3.0	mA	±4V
39	Supply Current, I_{EE}	-3.0	-	mA	±4V
40	Supply Current, I_{CO}	-	3.0	mA	±4V
41	Supply Current, I_{EO}	-3.0	-	mA	±4V
42	Supply Current, I_{CC}	-	3.0	mA	±18V
43	Supply Current, I_{EE}	-3.0	-	mA	±18V
44	Supply Current, I_{CO}	-	3.0	mA	±18V
45	Supply Current, I_{EO}	-3.0	-	mA	±18V
46	Power Supply Rejection Ratio	-	-110	dB	Input stage PSRR
47	Power Supply Rejection Ratio	-	-90	dB	Output stage PSRR

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