REVISION RECORD

REV	DESCRIPTION	DATE
0	INITIAL RELEASE	09/04/14
A	Changed 'Table IV' to 'Table V' in paragraphs 5.0, 6.2 and 6.3. Added 'Table IV' to paragraph 5.2. Added section 5.8, Die Bonding Pad Locations and Electrical Functions. Added Table A to pg 8. Updated image for Figure 3, Burn-In Circuit. Updated image for Figure 6, Noise Test Circuit. Added Note '11' to Tables I, II and III. Updated the Notes section below Tables I, II and III. Updated entire Table II. Added 'T_A = 25°C' to Table III. Changed Table IV to new table, 'Electrical Test Requirements.' Changed 'RH Element Evaluation Table Qualification of Dice Sales' to Table V. Specification page count went from 15 to 17 pages because of updates.	12/30/14
B	Updated Die Sales table on pg 17.	06/01/15
C	Changed typo RH3080 to RH3083 on pg. 2.	10/23/15
D	To remove SI and change Linear Technology to Analog Device	12/12/20
E	**To remove Philippines from rev page**	**3/19/21**

CAUTION: ELECTROSTATIC DISCHARGE SENSITIVE PART

REVISION	PAGE NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
INDEX	REVISION	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
REVISION	PAGE NO.																	
INDEX	REVISION																	

				ANALOG DEVICES INC.
	ORIG			
	DSGN			TITLE:
	ENGR			**MICROCIRCUIT, LINEAR, RH3083MK**
	MFG			**ADJUSTABLE 2.8A SINGLE RESISTOR**
	CM			**LOW DROPOUT REGULATOR DICE**
	QA			SIZE / CAGE CODE: **64155** / DRAWING NUMBER: **05-08-5744** / REV: **E**
	PROG			
APPLICATION	FUNCT	SIGNOFFS	DATE	CONTRACT:

FOR OFFICIAL USE ONLY

1.0 SCOPE:

1.1 This specification defines the performance and test requirements for a microcircuit processed to a space level manufacturing flow.

2.0 APPLICABLE DOCUMENTS:

2.1 Government Specifications and Standards: the following documents listed in the Department of Defense Index of Specifications and Standards, of the issue in effect on the date of solicitation, form a part of this specification to the extent specified herein.

SPECIFICATIONS:

MIL-PRF-38535	Integrated Circuits (Microcircuits) Manufacturing, General Specification for
MIL-STD-883	Test Method and Procedures for Microcircuits
MIL-STD-1835	Microcircuits Case Outlines

2.2 Order of Precedence: In the event of a conflict between the documents referenced herein and the contents of this specification, the order of precedence shall be this specification, MIL-PRF-38535 and other referenced specifications.

3.0 REQUIREMENTS:

3.1 General Description: This specification details the requirements for the RH3083 LOW DROPOUT REGULATOR DICE and Element Evaluation Test Samples, processed to space level manufacturing flow as specified herein.

3.2 Part Number: **RH3083MK Dice**

3.3 **Special Handling of Dice:** Rad Hard dice require special handling as compared to standard IC dice. Rad Hard dice are susceptible to surface damage due to the absence of silicon nitride passivation that is present on most standard dice. Silicon nitride protects the dice surface from scratches by its hard and dense properties. The passivation on Analog Devices Rad Hard dice is silicon dioxide which is much "softer" than silicon nitride. During the visual and preparation for shipment, ESD safe Tweezers are used and only the edges of the die are touched.

ADI recommends that dice handling be performed with extreme care so as to protect the die surface from scratches. If the need arises to move the die in or out of the chip shipment tray (waffle pack), use an ESD-Safe-Plastic-tipped Bent Metal Vacuum Probe, preferably .020" OD x .010" ID (for use with tiny parts). The wand should be compatible with continuous air vacuums. The tip material should be static dissipative Delrin (or equivalent) plastic.

During die attach, care must be exercised to ensure no tweezers, or other equipment, touch the top of the dice.

3.4 The Absolute Maximum Ratings:
(Note 1) (All voltages relative to V_{OUT})

$V_{CONTROL}$ Pin Voltage	±28V
IN Pin Voltage	18V, -0.3V
No Overload or Short-Circuit	23V, -0.3V
SET Pin Current (Note 6)	±25mA
SET Pin Voltage (Relative to OUT, Note 6)	±10V
Output Short-Circuit Duration	Indefinite
Operating Junction Temperature Range (Notes 2, 10)	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C

3.5 Design, Construction, and Physical Dimensions: Detail design, construction, physical dimensions, and electrical requirements shall be specified herein.

3.6 Outline Dimensions and Pad Functions: Dice outline dimensions, pad functions, and locations shall be specified in **Figure 1**.

3.7 Radiation Hardness Assurance (RHA):

3.7.1 The manufacturer shall perform a lot sample test as an internal process monitor for total dose radiation tolerance. The sample test is performed with MIL-STD-883 TM1019 Condition A as a guideline.

3.7.2 For guaranteed radiation performance to MIL-STD-883, Method 1019, total dose irradiation, the manufacturer will provide certified RAD testing and report through an independent test laboratory when required as a customer purchase order line item.

3.7.3 Total dose bias circuit is specified in **Figure 2**.

3.8 Wafer (or Dice) Probe: Dice shall be 100% probed at T_A = +25°C to the limits shown in **Table I** herein. All reject dice shall be removed from the lot. This testing is normally performed prior to dicing the wafer into chips. Final specifications after assembly are sample tested during the element evaluation.

3.9 Wafer Lot Acceptance: Wafer lot acceptance shall be in accordance with MIL-PRF-38535, Appendix A, except for the following: Top side glassivation thickness shall be a **minimum of 4KÅ.**

3.10 Wafer Lot Acceptance Report: SEM is performed per MIL-STD-883, Method 2018. Copies of SEM photographs shall be supplied with the Wafer Lot Acceptance Report as part of a Space Data Pack when specified as a customer purchase order line item.

3.11 Traceability: Wafer Diffusion Lot and Wafer traceability shall be maintained through Quality Conformance Inspection.

4.0 QUALITY CONFORMANCE INSPECTION: Quality Conformance Inspection shall consist of the tests and inspections specified herein.

5.0 SAMPLE ELEMENT EVALUATION: A sample from **each wafer supplying dice** shall be assembled and subjected to element evaluation per **Table V** herein.

5.1 100 Percent Visual Inspection: All dice supplied to this specification shall be inspected in accordance with MIL-STD-883, Method 2010, Condition A. All reject dice shall be removed from the lot.

5.2 Electrical Performance Characteristics for Element Evaluation: The electrical performance characteristics shall be as specified in **Table I**, **Table II, Table III and Table IV** herein.

5.3 Sample Testing: Each wafer supplying dice for delivery to this specification shall be subjected to element evaluation sample testing. No dice shall be delivered until all the lot sample testing has been performed and the results found to be acceptable unless the customer supplies a written approval for shipment prior to completion of wafer qualification as specified in this specification.

5.4 Part Marking of Element Evaluation Sample Includes**:**

5.4.1 LTC Logo

5.4.2 LTC Part Number

5.4.3 Date Code

5.4.4 Serial Number

5.4.5 ESD Identifier per MIL-PRF-38535, Appendix A

5.4.6 Diffusion Lot Number

5.4.7 Wafer Number

5.5 Burn-In Requirement: Burn-In circuit for TO-3 package is specified in **Figure 3**.

5.6 Mechanical/Packaging Requirements: Case Outline and Dimensions are in accordance with **Figure 4.**

5.7 Terminal Connections: The terminal connections shall be as specified in **Figure 5.**

5.8 Die Bonding Pad Locations and Electrical Functions: Die layout (X-Y Coordinates) is specified in Table A

5.8.1 Die physical dimensions:

5.8.1.1 Die size: 66 mils x 113 mils

5.8.1.2 Scribe width: 3 mils

5.8.1.3 Die thickness: 12 mils

5.8.2 Interface materials:

5.8.2.1 Bond Pad Opening (BPO): ≥ 112 x 112 μm

5.8.2.2 Top metallization: AlSiCu (98.5%/1%/0.5%)

5.8.2.3 Backside metallization: (Substrate) Alloyed gold layer

5.8.3 Glassivation:

5.8.3.1 Type: SiO_2

5.8.3.2 Thickness: Minimum of 4 kÅ

5.8.4 Substrate: Single crystal silicon

5.8.5 Assembly related information:

5.8.5.1 Substrate potential: OUT

5.8.5.2 BOND-Sensitive

5.8.5.3 Jumper Chip Size: RSense

5.8.5.4 Die Attach: AuSi 30 x 30 x 2 mils

5.8.5.5 Bond wire size: 1.25 mil AlSi

5.9 Lead Material and Finish: The lead material and finish shall be Kovar with hot solder dip (Finish letter A) in accordance with MIL-PRF-38535.

6.0 VERIFICATION (QUALITY ASSURANCE PROVISIONS)

6.1 Quality Assurance Provisions: Quality Assurance provisions shall be in accordance with MIL-PRF-38535. Analog Devices is a QML certified company and all Rad Hard candidates are assembled on qualified Class S manufacturing lines.

6.2 Sampling and Inspection: Sampling and Inspection shall be in accordance with **Table V** herein.

6.3 Screening: Screening requirements shall be in accordance with **Table V** herein.

6.3.1

6.4 Deliverable Data: Deliverable data that will ship with devices when a Space Data Pack is ordered:

6.4.1 Lot Serial Number Sheets identifying all Canned Sample devices accepted through final inspection by serial number.

6.4.2 100% attributes (completed element evaluation traveler).

6.4.3 Element Evaluation variables data, including Burn-In and Op Life

6.4.4 SEM photographs (3.10 herein)

6.4.5 Wafer Lot Acceptance Report (3.9 herein)

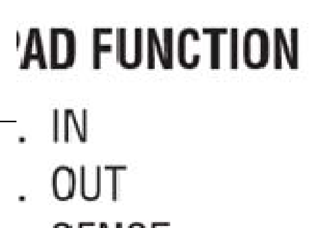
6.4.6 A copy of outside test laboratory radiation report if ordered

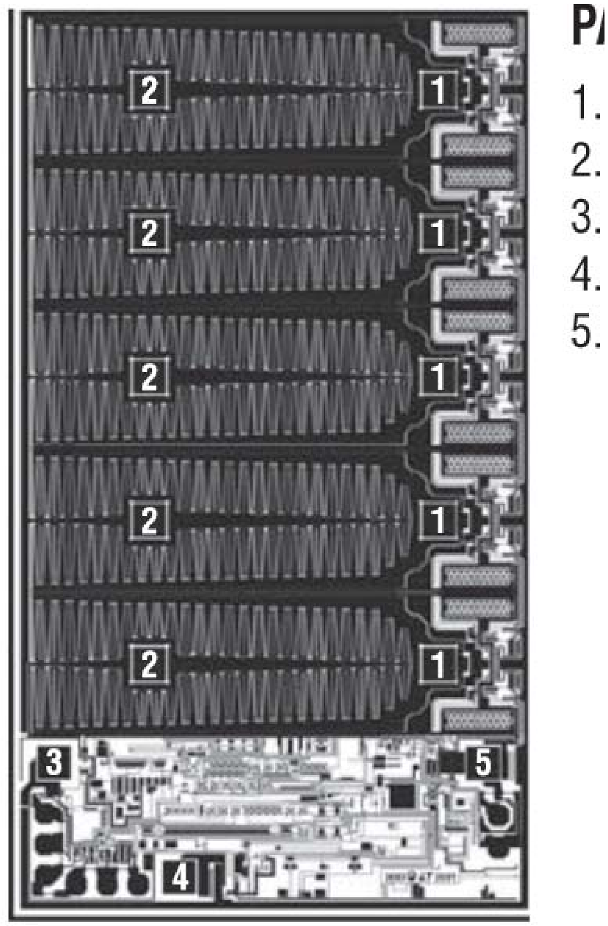
6.4.7 Certificate of Conformance certifying that the devices meet all the requirements of this specification and have successfully completed the mandatory tests and inspections herein.

Note: Items 6. 4.1 and 6. 4.7 will be delivered as a minimum, with each shipment.

7.0 Packaging Requirements: Packaging shall be in accordance with Appendix A of MIL-PRF-38535. All dice shall be packaged in multicavity containers composed of conductive, anti-static, or static dissipative material with an external conductive field shielding barrier.

DICE OUTLINE DIMENSIONS AND PAD FUNCTIONS





66mils x 113mils
Backside metal: Alloyed gold (K) layer
Backside potential: OUT
Tie SENSE to OUT

FIGURE 1

TABLE A. DIE LAYOUT – X-Y COORDINATES

Pad Name	X (µm)	Y (µm)	W (µm)	H (µm)
SENSE	-673	-926.5	100	100
OUT	-382.5	-624.5	100	100
OUT	-382.5	-186	100	100
OUT	-382.5	252.5	100	100
OUT	-382.5	691	100	100
OUT	-382.5	1129.5	100	100
IN	501	1129.5	100	100
IN	501	691	100	100
IN	501	252.5	100	100
IN	501	-186	100	100
IN	501	-624.5	100	100
VCONTROL	636.5	-927.5	100	100
SET	-290.5	-1275.5	100	100

Notes:

1. Origin of coordinates is the centroid of the dice.

TOTAL DOSE BIAS CIRCUIT

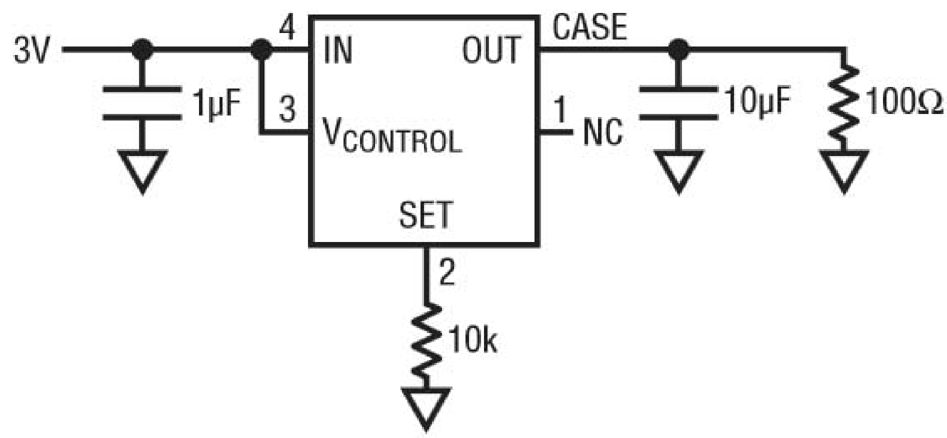


FIGURE 2

BURN-IN CIRCUIT

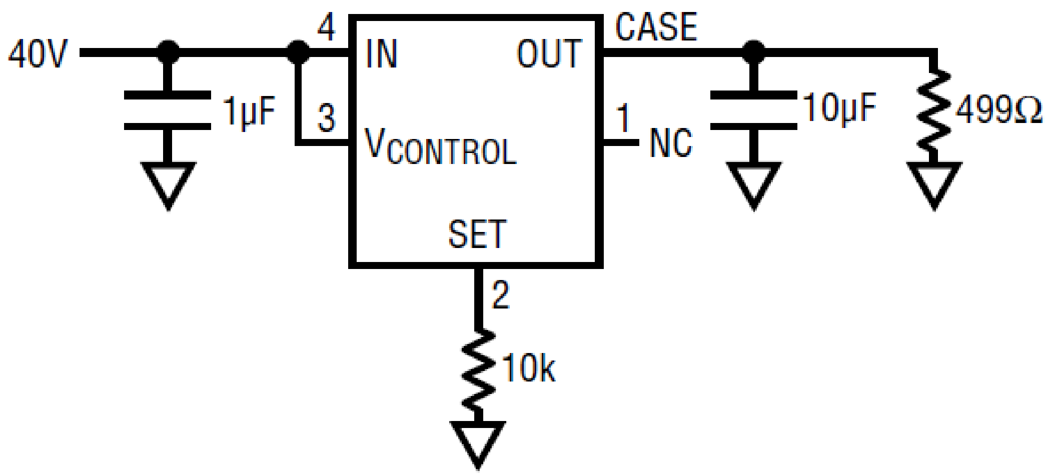


FIGURE 3

(K) TO3 / 4 LEADS CASE OUTLINE

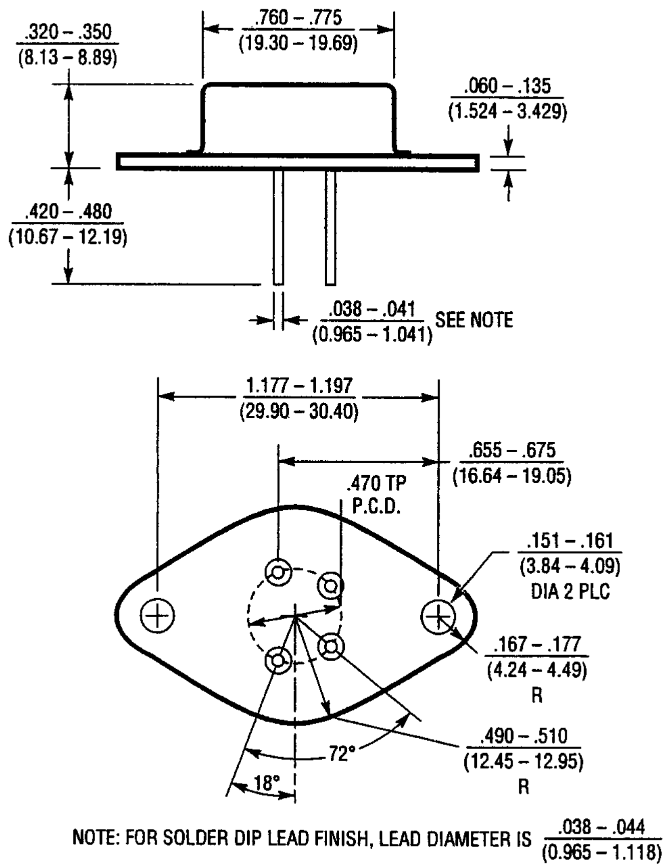


FIGURE 4

TERMINAL CONNECTIONS

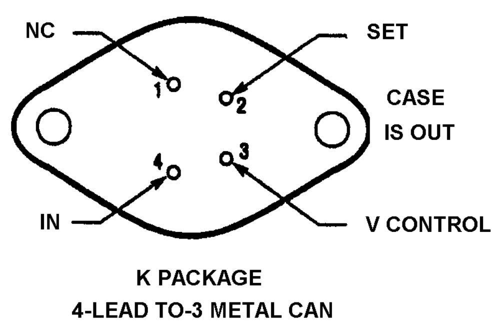
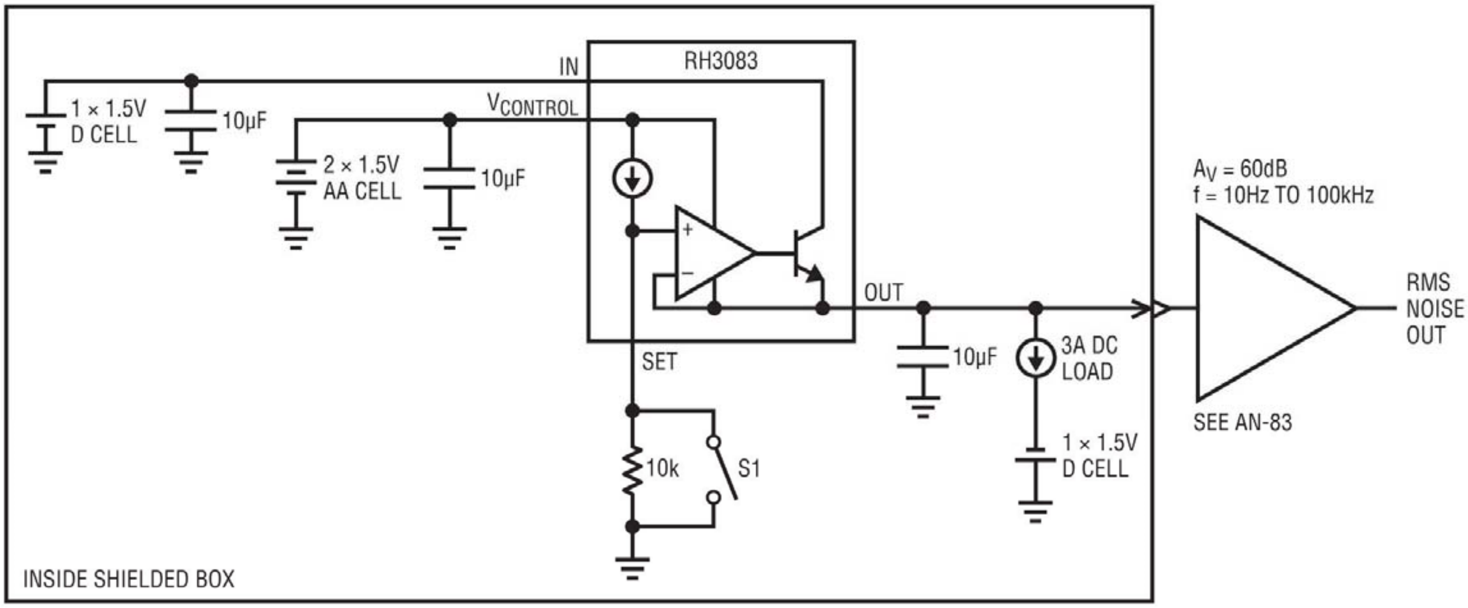


FIGURE 5

NOISE TEST CIRCUIT



ERROR AMPLIFIER NOISE = RMS NOISE OUT/60dB WHEN S1 CLOSED

REFERENCE CURRENT NOISE =

$$\frac{\sqrt{\left(\frac{\text{RMS NOISE OUT (S1 OPEN)}}{60\text{dB}}\right)^2 - \left(\frac{\text{RMS NOISE OUT (S1 CLOSED)}}{60\text{dB}}\right)^2 - (3.98\mu V_{RMS})^2}}{10k\Omega}$$

FIGURE 6

TABLE I. DICE/DWF ELECTRICAL TEST LIMITS

T_A = 25°C (Notes 2, 5, 8, 9, 11)

PARAMETER	CONDITIONS	MIN	MAX	UNITS
SET Pin Current (Note 6)	V_{IN} = 1V, $V_{CONTROL}$ = 2V, I_{LOAD} = 1mA	49.5	50.5	µA
Output Offset Voltage (V_{OUT} – V_{SET})	V_{IN} = 1V, $V_{CONTROL}$ = 2V, I_{LOAD} = 1mA	–2	2	mV
Load Regulation, I_{SET}	I_{LOAD} = 1mA to 50mA	–30	30	nA
Load Regulation, V_{OS}	I_{LOAD} = 1mA to 50mA	–0.5	0.5	mV
Line Regulation, I_{SET}	V_{IN} = 1V to 23V, $V_{CONTROL}$ = 2V to 25V, I_{LOAD} = 1mA	–5	5	nA/V
Line Regulation, V_{OS}	V_{IN} = 1V to 23V, $V_{CONTROL}$ = 2V to 25V, I_{LOAD} = 1mA	–0.008	0.008	mV/V
Minimum Load Current (Note 3)	V_{IN} = 1V, $V_{CONTROL}$ = 2V V_{IN} = 23V, $V_{CONTROL}$ = 25V		0.5 1	mA mA
$V_{CONTROL}$ Dropout Voltage (Note 4)	V_{IN} = 1V, I_{LOAD} = 50mA		1.4	V
V_{IN} Dropout Voltage (Note 4)	$V_{CONTROL}$ = 2V, I_{LOAD} = 50mA		25	mV
$V_{CONTROL}$ Pin Current (Note 5)	V_{IN} = 1V, $V_{CONTROL}$ = 2V, I_{LOAD} = 50mA		6.5	mA

Note 1: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating condition for extended periods may affect device reliability and lifetime.

Note 2: Unless otherwise specified, all voltages are with respect to V_{OUT}. The RH3083MK DICE is tested and specified under pulse load conditions such that $T_J \cong T_A$.

Note 3: Minimum load current is equivalent to the quiescent current of the part. Since all quiescent and drive current is delivered to the output of the part, the minimum load current is the minimum current required to maintain regulation.

Note 4: Dropout results from either of minimum control voltage, $V_{CONTROL}$, or minimum input voltage, V_{IN}, both specified with respect to V_{OUT}. These specifications represent the minimum input-to-output differential voltage required to maintain regulation.

Note 5: The $V_{CONTROL}$ pin current is the drive current required for the output transistor. This current tracks output current with roughly a 1:60 ratio. The minimum value is equal to the quiescent current of the device.

Note 6: The SET pin is clamped to the output with diodes through 1k resistors. These resistors and diodes only carry current under transient overloads.

Note 7: Adding a small capacitor across the reference current resistor lowers output noise. Adding this capacitor bypasses the resistor shot noise and reference current noise; output noise is then equal to error amplifier noise (see LT®3083 Data Sheet and Application Note 83).

Note 8: Dice are probe tested at 25°C to the limits shown in Table 1. Except for high current tests, dice are tested under low current conditions which assure full load current specifications when assembled.

Note 9: Dice that are not qualified by Linear Technology with a can sample are guaranteed to meet specifications of Table 1 only. Dice qualified by Linear Technology with a can sample meet specifications in all tables.

Note 10: This IC includes overtemperature protection that is intended to protect the device during momentary overload conditions. Junction temperature exceeds the maximum operating junction temperature when overtemperature protection is active. Continuous operation above the specified maximum operating junction temperature may impair device reliability.

Note 11: Please refer to LT3083 standard product data sheet for Typical Performance Characteristics, Pin Functions, Applications Information, and Typical Applications.

TABLE II. ELECTRICAL CHARACTRISTICS (Pre-irradiation)

(Notes 2, 9, 11)

PARAMETER	CONDITIONS	T_A = 25°C MIN	T_A = 25°C MAX	SUB-GROUP	−55°C < T_A < 125°C MIN	−55°C < T_A < 125°C MAX	SUB-GROUP	UNITS
SET Pin Current (Note 6)	V_{IN} = 1V, $V_{CONTROL}$ = 2V, I_{LOAD} = 1mA	49.5	50.5	1	49	51.5	2, 3	µA
Output Offset Voltage ($V_{OUT} – V_{SET}$)	V_{IN} = 1V, $V_{CONTROL}$ = 2V, I_{LOAD} = 1mA	−4	4	1	−6	6	2, 3	mV
Load Regulation, I_{SET}	I_{LOAD} = 1mA to 2.8A	−200	200	1	−300	300	2, 3	nA
Load Regulation, V_{OS}	I_{LOAD} = 5mA to 2.8A	−3	3	1	−4	4	2, 3	mV
Line Regulation, I_{SET}	V_{IN} = 1V to 23V, $V_{CONTROL}$ = 2V to 25V, I_{LOAD} = 1mA	−8	8	1				nA/V
	V_{IN} = 1V to 23V, $V_{CONTROL}$ = 2V to 25V, I_{LOAD} = 5mA				−10	10	2, 3	nA/V
Line Regulation, V_{OS}	V_{IN} = 1V to 23V, $V_{CONTROL}$ = 2V to 25V, I_{LOAD} = 1mA	−0.02	0.02	1				mV/V
	V_{IN} = 1V to 23V, $V_{CONTROL}$ = 2V to 25V, I_{LOAD} = 5mA				−0.05	0.05	2, 3	mV/V
Minimum Load Current (Note 3)	V_{IN} = 1V, $V_{CONTROL}$ = 2V		0.5	1		5	2, 3	mA
	V_{IN} = 23V, $V_{CONTROL}$ = 25V		1	1		5	2, 3	mA
$V_{CONTROL}$ Dropout Voltage (Note 4)	V_{IN} = 1V, I_{LOAD} = 0.1A		1.4	1		1.55	2, 3	V
	V_{IN} = 1V, I_{LOAD} = 1A		1.45	1		1.6	2, 3	V
	V_{IN} = 1V, I_{LOAD} = 2.8A		1.5	1		1.65	2, 3	V
V_{IN} Dropout Voltage (Note 4)	$V_{CONTROL}$ = 2V, I_{LOAD} = 0.1A		35	1		35	2, 3	mV
	$V_{CONTROL}$ = 2V, I_{LOAD} = 1A		220	1		280	2, 3	mV
	$V_{CONTROL}$ = 2V, I_{LOAD} = 2.8A		650	1		750	2, 3	mV
$V_{CONTROL}$ Pin Current (Note 5)	V_{IN} = 1V, $V_{CONTROL}$ = 2V, I_{LOAD} = 0.1A		10	1		10	2, 3	mA
	V_{IN} = 1V, $V_{CONTROL}$ = 2V, I_{LOAD} = 1A		35	1		40	2, 3	mA
	V_{IN} = 1V, $V_{CONTROL}$ = 2V, I_{LOAD} = 2.8A		80	1		90	2, 3	mA
Current Limit	V_{IN} = 5V, $V_{CONTROL}$ = 5V, V_{SET} = 0V, V_{OUT} = −0.1V	2.8		1	2.8		2, 3	A
Error Amplifier RMS Output Noise (Note 7)	I_{LOAD} = 500mA, 10Hz ≤ f ≤100kHz, C_{OUT} = 10µF, C_{SET} = 0.1µF	TYP = 40		1				$µV_{RMS}$
Reference Current RMS Output Noise (Note 7)	10Hz ≤ f ≤100kHz	TYP = 1		1				nA_{RMS}

Note 1: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating condition for extended periods may affect device reliability and lifetime.

Note 2: Unless otherwise specified, all voltages are with respect to V_{OUT}. The RH3083MK DICE is tested and specified under pulse load conditions such that $T_J \cong T_A$.

Note 3: Minimum load current is equivalent to the quiescent current of the part. Since all quiescent and drive current is delivered to the output of the part, the minimum load current is the minimum current required to maintain regulation.

Note 4: Dropout results from either of minimum control voltage, $V_{CONTROL}$, or minimum input voltage, V_{IN}, both specified with respect to V_{OUT}. These specifications represent the minimum input-to-output differential voltage required to maintain regulation.

Note 5: The $V_{CONTROL}$ pin current is the drive current required for the output transistor. This current tracks output current with roughly a 1:60 ratio. The minimum value is equal to the quiescent current of the device.

Note 6: The SET pin is clamped to the output with diodes through 1k resistors. These resistors and diodes only carry current under transient overloads.

Note 7: Adding a small capacitor across the reference current resistor lowers output noise. Adding this capacitor bypasses the resistor shot noise and reference current noise; output noise is then equal to error amplifier noise (see LT®3083 Data Sheet and Application Note 83).

Note 8: Dice are probe tested at 25°C to the limits shown in Table 1. Except for high current tests, dice are tested under low current conditions which assure full load current specifications when assembled.

Note 9: Dice that are not qualified by Linear Technology with a can sample are guaranteed to meet specifications of Table 1 only. Dice qualified by Linear Technology with a can sample meet specifications in all tables.

Note 10: This IC includes overtemperature protection that is intended to protect the device during momentary overload conditions. Junction temperature exceeds the maximum operating junction temperature when overtemperature protection is active. Continuous operation above the specified maximum operating junction temperature may impair device reliability.

Note 11: Please refer to LT3083 standard product data sheet for Typical Performance Characteristics, Pin Functions, Applications Information, and Typical Applications.

TABLE III. ELECTRICAL CHARACTERISTICS (Post-irradiation)

T_A = 25°C (Notes 2, 9, 11)

PARAMETER	CONDITIONS	10KRads(Si) MIN	10KRads(Si) MAX	20KRads(Si) MIN	20KRads(Si) MAX	50KRads(Si) MIN	50KRads(Si) MAX	100KRads(Si) MIN	100KRads(Si) MAX	200KRads(Si) MIN	200KRads(Si) MAX	UNITS
SET Pin Current (Note 6)	V_{IN} = 1V, $V_{CONTROL}$ = 2V, I_{LOAD} = 1mA	49	51	49	51	49	51	49	51	49	51	µA
Output Offset Voltage ($V_{OUT} - V_{SET}$)	V_{IN} = 1V, $V_{CONTROL}$ = 2V, I_{LOAD} = 1mA	–4.5	4.5	–4.5	4.5	–4.5	4.5	–4.5	4.5	–4.5	4.5	mV
Load Regulation, I_{SET}	I_{LOAD} = 1mA to 2.8A	–300	300	–300	300	–300	300	–300	300	–300	300	nA
Load Regulation, V_{OS}	I_{LOAD} = 5mA to 2.8A	–3.5	3.5	–3.5	3.5	–3.5	3.5	–3.5	3.5	–3.5	3.5	mV
Line Regulation, I_{SET}	V_{IN} = 1V to 23V, $V_{CONTROL}$ = 1V to 25V, I_{LOAD} = 1mA	–10	10	–10	10	–10	10	–10	10	–10	10	nA/V
Line Regulation, V_{OS}	V_{IN} = 1V to 23V, $V_{CONTROL}$ = 1V to 25V, I_{LOAD} = 1mA	–0.025	0.025	–0.025	0.025	–0.025	0.025	–0.03	0.03	–0.04	0.04	mV/V
Minimum Load Current (Note 3)	V_{IN} = 1V, $V_{CONTROL}$ = 2V V_{IN} = 23V, $V_{CONTROL}$ = 25V		0.5 1		0.5 1		0.5 1		0.5 1		0.5 1	mA mA
$V_{CONTROL}$ Dropout Voltage (Note 4)	V_{IN} = 1V, I_{LOAD} = 0.1A V_{IN} = 1V, I_{LOAD} = 1A V_{IN} = 1V, I_{LOAD} = 2.8V		1.41 1.46 1.51		1.41 1.46 1.51		1.42 1.47 1.52		1.43 1.48 1.53		1.45 1.5 1.55	V V V
V_{IN} Dropout Voltage (Note 4)	$V_{CONTROL}$ = 2V, I_{LOAD} = 0.1A $V_{CONTROL}$ = 2V, I_{LOAD} = 1A $V_{CONTROL}$ = 2V, I_{LOAD} = 2.8A		35 225 655		40 225 655		40 225 655		45 225 660		45 230 670	mV mV mV
$V_{CONTROL}$ Pin Current (Note 5)	V_{IN} = 1V, $V_{CONTROL}$ = 2V, I_{LOAD} = 0.1A V_{IN} = 1V, $V_{CONTROL}$ = 2V, I_{LOAD} = 1A V_{IN} = 1V, $V_{CONTROL}$ = 2V, I_{LOAD} = 2.8A		10.1 36 82		10.1 37 83		10.2 38 85		10.5 40 90		11 45 100	mA mA mA
Current Limit	V_{IN} = 5V, $V_{CONTROL}$ = 5V, V_{SET} = 0V, V_{OUT} = –0.1V	2.8		2.8		2.8		2.8		2.8		A
Error Amplifier RMS Output Noise (Note 7)	I_{LOAD} = 500mA, 10Hz ≤ f ≤100kHz, C_{OUT} = 10µF, C_{SET} = 0.1µF	TYP = 40		TYP = 40		TYP = 40		TYP = 40		TYP = 40		μV_{RMS}
Reference Current RMS Output Noise (Note 7)	10Hz ≤ f ≤100kHz	TYP = 1		TYP = 1		TYP = 1		TYP = 1		TYP = 1		nA_{RMS}

Note 1: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating condition for extended periods may affect device reliability and lifetime.

Note 2: Unless otherwise specified, all voltages are with respect to V_{OUT}. The RH3083MK DICE is tested and specified under pulse load conditions such that $T_J \cong T_A$.

Note 3: Minimum load current is equivalent to the quiescent current of the part. Since all quiescent and drive current is delivered to the output of the part, the minimum load current is the minimum current required to maintain regulation.

Note 4: Dropout results from either of minimum control voltage, $V_{CONTROL}$, or minimum input voltage, V_{IN}, both specified with respect to V_{OUT}. These specifications represent the minimum input-to-output differential voltage required to maintain regulation.

Note 5: The $V_{CONTROL}$ pin current is the drive current required for the output transistor. This current tracks output current with roughly a 1:60 ratio. The minimum value is equal to the quiescent current of the device.

Note 6: The SET pin is clamped to the output with diodes through 1k resistors. These resistors and diodes only carry current under transient overloads.

Note 7: Adding a small capacitor across the reference current resistor lowers output noise. Adding this capacitor bypasses the resistor shot noise and reference current noise; output noise is then equal to error amplifier noise (see LT®3083 Data Sheet and Application Note 83).

Note 8: Dice are probe tested at 25°C to the limits shown in Table 1. Except for high current tests, dice are tested under low current conditions which assure full load current specifications when assembled.

Note 9: Dice that are not qualified by Linear Technology with a can sample are guaranteed to meet specifications of Table 1 only. Dice qualified by Linear Technology with a can sample meet specifications in all tables.

Note 10: This IC includes overtemperature protection that is intended to protect the device during momentary overload conditions. Junction temperature exceeds the maximum operating junction temperature when overtemperature protection is active. Continuous operation above the specified maximum operating junction temperature may impair device reliability.

Note 11: Please refer to LT3083 standard product data sheet for Typical Performance Characteristics, Pin Functions, Applications Information, and Typical Applications.

TABLE IV. ELECTRICAL TEST REQUIREMENTS

MIL-STD-883 TEST REQUIREMENTS	SUBGROUP
Final Electrical Test Requirements (Method 5004)	1*, 2, 3
Group A Test Requirements (Method 5005)	1, 2, 3
Group B and D for Class S, End Point Electrical Parameters (Method 5005)	1, 2, 3

*PDA applies to subgroup 1. See PDA Test Notes.

PDA Test Notes

The PDA is specified as 5% based on failures from Group A, Subgroup 1, tests after cooldown as the final electrical test in accordance with method 5004 of MIL-STD-883. The verified failures of Group A, Subgroup 1, after burn-in divided by the total number of devices submitted for burn-in in that lot shall be used to determine the percent for the lot.

Linear Technology Corporation reserves the right to test to tighter limits than those given.

TABLE V. RH ELEMENT EVALUATION TABLE QUALIFICATION OF DICE SALE

RH CANNED SAMPLE TABLE FOR QUALIFYING DICE SALES

SUBGROUP	CLASS K/S	CLASS V	CLASS H/B	OPERATION	MIL-STD-883 METHOD	MIL-STD-883 CONDITION	QUANTITY (ACCEPT NUMBER)
1	X	X		SEM	2018	N/A	REF. METHOD 2018 FOR S/S
2	X	X	X	ELEMENT ELECTRICAL (WAFER SORT @ 25°C)			100%
3	X	X	X	ELEMENT VISUAL (2nd OP)	2010	A	100%
4	X	X	X	INTERNAL VISUAL (3rd OP)	2010	A	ASSEMBLED PARTS ONLY
	X	X		DIE SHEAR MONITOR	2019		
	X	X		BOND PULL MONITOR	2011		
5	X	X		STABILIZATION BAKE	1008	C	ASSEMBLED PARTS ONLY
	X	X		TEMPERATURE CYCLE	1010	C	
	X	X		CONSTANT ACCELERATION	2001	E	
	X	X		FINE LEAK	1014	A	
	X	X		GROSS LEAK	1014	C	
6	X	X		FIRST ROOM ELECTRICAL - READ & RECORD (REPLACE ANY ASSEMBLY-RELATED REJECTS)			45(0)
	X	X		PRE BURN-IN ELECT. READ & RECORD @ +125°C or +150°C, -55°C			
	X	X		BURN-IN: +125°C/240 hrs. or +150°C/120 hrs.	1015	+ 125°c MINIMUM 240 HOURS	
	X	X		POST BURN-IN ELECT. READ & RECORD @ 25°C			
	X	X		POST BURN-IN ELECT. READ & RECORD @ +125°C or +150°C, -55°C			
		X		TOTAL IRRADIATION DOSE	1019	A	
	X	X		PRE OP-LIFE ELECTRICAL @ 25°C READ & RECORD			
	X	X		OPERATING LIFE: +125°C/1000 hrs. or +150°C/500 hrs.	1005	+ 125°c MINIMUM 1000 HOURS	
	X	X		POST OP-LIFE ELECT. (R & R @ 25°C, +125°C OR +150°C, -55°C			
7	X	X	X	WIRE BOND EVALUATION	2011		15(0) OR 25(1) - # of wires

NOTE: LTC is not qualified to process to MIL-PRF-38534. This is an LTC imposed element evaluation that follows MIL-STD-883 test methods and conditions. Please note the quantity and accept number from Sample Size Series of 5%, accept on 0, and note that the actual sample and accept number does not begin until Subgroup 6 OP-LIFE.

NOTE: Tests within Subgroup 5 may be performed in any sequence.

NOTE: LTC's radiation tolerance (RH) die has a topside glassivation thickness of 4KA minimum.

NOTE: Sample sizes on the travelers may be larger than that indicated in the above table; however, the larger sample size is to accommodate extra units for replacement devices in the event of equipment or operator error and for assembly related rejects in Subgroup 6, and for Wire Bond Evaluation, Surgroup 7. The larger sample size is at all times kept segregated and, if used for qualification, has all the required processing imposed.