


DESCRIPTION

The RH1573 is a regulator driver IC designed to provide a solution for applications requiring high current, low dropout and fast transient response. When driving an external PNP power transistor, this device provides load current up to 5A with a dropout voltage as low as 0.35V. The RH1573 circuitry is designed for extremely fast transient response. This greatly reduces bulk storage capacitance when the regulator is used in applications with fast, high current load transients. The RH1573 uses a time-delayed latching overcurrent protection technique that requires no external sense resistor. Base drive is limited for instantaneous protection, and a time-delayed latch protects the regulator from continuous short circuits.

ABSOLUTE MAXIMUM RATINGS

(Note 1)

Input Pin Voltage (V_{IN} to GND)	10V
Drive Pin Voltage (V_{DRIVE} to GND)	10V
Output Pin Voltage (V_{OUT} to GND)	10V
Shutdown Pin Voltage (V_{SHDN} to GND).....	10V
Operating Junction Temperature Range	-55°C to 125°C
Storage Temperature Range.....	-65°C to 150°C

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TABLE 1: ELECTRICAL CHARACTERISTICS (Preirradiation)

PARAMETER	CONDITIONS	NOTES	T _A = 25°C			SUB-GROUP	-55°C ≤ T _A ≤ 125°C			SUB-GROUP	UNITS
			MIN	TYP	MAX		MIN	TYP	MAX		
Reference Voltage	I _{DRIVE} = 20mA, T _J = 25°C	2	1.252	1.265	1.278	1					V
	5mA < I _{DRIVE} < 250mA, 3V < V _{IN} < 7V, 1.5V < V _{DRIVE} < 7V	2					1.225	1.265	1.305	2, 3	V
Line Regulation (V _{FB})	I _{DRIVE} = 20mA, 3V < V _{IN} < 7V			0.17	2	1			2	2, 3	mV
Load Regulation (V _{FB})	ΔI _{DRIVE} = 20mA to 250mA				18	1			40	2, 3	mV
FB Pin Bias Current	V _{FB} = 1.265V			0.8	4	1			6	2, 3	μA
DRIVE Pin Current	V _{FB} = 1.35V, V _{DRIVE} = 7V				1.2	1			2	2, 3	mA
	V _{FB} = 1.15V, V _{DRIVE} = 1.5V		290			1	230			2, 3	mA
DRIVE Pin Saturation Voltage	I _{DRIVE} = 20mA, V _{FB} = 1.15V			0.12	0.2	1			0.3	2, 3	V
	I _{DRIVE} = 250mA, V _{FB} = 1.15V			0.73	1.0	1			1.4	2, 3	V
SHDN Pin Threshold Voltage			1	1.3	1.5	1	1		1.6	2, 3	V
SHDN Pin Current	V _{SHDN} = 5V			200	300	1			350	2, 3	μA
LATCH Pin Latch-Off Threshold Voltage			1	1.4	1.8	1	0.8		2.3	2, 3	V
LATCH Pin Charging Current			4	7	10	1	2		14	2, 3	μA
LATCH Pin Latching Current				0.65	0.85	1			0.85	2, 3	mA
V _{IN} - V _{OUT} Differential Threshold for Latch Disable			0.55	0.7	0.8	1	0.4		1.1	2, 3	V
Input Quiescent Current	V _{IN} = 7V			1.7	2.8	1			3.5	2, 3	mA
Minimum Input Voltage for Bias Operation			2.4			1	2.8			2, 3	V

TABLE 2: ELECTRICAL CHARACTERISTICS (Postirradiation)

PARAMETER	CONDITIONS	NOTES	10KRAD(Si)		20KRAD(Si)		50KRAD(Si)		100KRAD(Si)		200KRAD(Si)		UNITS
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
Reference Voltage	I _{DRIVE} = 20mA, T _J = 25°C	2	1.252	1.278	1.252	1.278	1.249	1.281	1.245	1.285	1.239	1.291	V
Line Regulation (V _{FB})	I _{DRIVE} = 20mA, 3V < V _{IN} < 7V			2.1		2.2		2.5		3		4	mV
Load Regulation (V _{FB})	I _{DRIVE} = 20mA to 250mA			19		20		22		25		30	mV
FB Pin Bias Current	V _{FB} = 1.265V			4.2		4.5		5		6		7	μA
DRIVE Pin Current	V _{FB} = 1.35V, V _{DRIVE} = 7V			1.3		1.4		1.7		2.2		3	mA
	V _{FB} = 1.15V, V _{DRIVE} = 1.5V		290			288		285		275		260	mA
DRIVE Pin Saturation Voltage	I _{DRIVE} = 20mA, V _{FB} = 1.15V			0.2		0.21		0.23		0.25		0.3	V
	I _{DRIVE} = 250mA, V _{FB} = 1.15V			1		1.02		1.05		1.1		1.2	V
SHDN Pin Threshold Voltage			1	1.5		1.5		1.52		1.55		1.6	V
SHDN Pin Current	V _{SHDN} = 5V			300		300		300		300		300	μA

TABLE 2: ELECTRICAL CHARACTERISTICS (Postirradiation)

PARAMETER	CONDITIONS	NOTES	10KRAD(Si)		20KRAD(Si)		50KRAD(Si)		100KRAD(Si)		200KRAD(Si)		UNITS
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
LATCH Pin Latch-Off Threshold Voltage			1	1.9	1	2	0.9	2.1	0.8	2.2	0.8	2.2	V
LATCH Pin Charging Current			4.4	10	4.4	10	4.2	10.5	4	11	4	11	μA
LATCH Pin Latching Current				0.85		0.85		0.85		0.85		0.85	mA
$V_{IN} - V_{OUT}$ Differential Threshold for Latch Disable			0.5	0.81	0.5	0.82	0.48	0.85	0.45	0.9	0.4	1	V
Input Quiescent Current	$V_{IN} = 7V$			2.8		2.8		2.85		2.9		3.1	mA
Minimum Input Voltage for Bias Operation			2.4		2.4		2.4		2.4		2.4		V

TABLE 3: POST BURN-IN ENDPOINTS AND DELTA LIMITS REQUIREMENTS $T_A = 25^\circ\text{C}$

PARAMETER	CONDITIONS	NOTES	ENDPOINT LIMITS		DELTA LIMITS		UNITS
			MIN	MAX	MIN	MAX	
Reference Voltage	$I_{DRIVE} = 20\text{mA}$, $V_{IN} = 5V$		1.252	1.278	-0.005	0.005	V
DRIVE Pin Current	$V_{FB} = 1.15V$, $V_{DRIVE} = 1.5V$		280		-10	10	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: Operating conditions are limited by maximum junction temperature. The regulated feedback or output voltage specification will not apply for all possible combinations of input voltage, drive voltage and drive current. When operating at maximum drive current, the drive voltage range must be limited. When operating at maximum input and drive voltage, the drive current must be limited.

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TABLE 4: 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.

TOTAL DOSE BIAS CIRCUIT

