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NTE7107
Integrated Circuit
Switching Regulator, 2.5A

Description:

The NTE7107 is a monolithic power regulator in a 7–Lead Staggered SIP type package delivering 2.5A at a voltage variable from 5V to 40V in step down configuration. Features of this device include current limiting, soft start, thermal protection, and 0 to 100% duty cycle for continuous operation mode. Efficient operation at switching frequencies up to 150kHz allows a reduction in the size and cost of external components.

Features:

- 2.5A Output Current
- 5.1V to 40V Output Voltage Range
- Precise ON–Chip Reference: ±2%
- High Switching Frequency
- Very High Efficiency: Up to 90%
- Very Few External Components
- Soft Start
- Internal Limiting Current
- Thermal Shutdown

Absolute Maximum Ratings:

Input Voltage, V_1 . . . . . 50V
Input to Output Voltatge Difference, $V_1 - V_7$ 50V
Negative Output DC Voltage, V_7 . . . . . –1V
Negative Output Peak Voltage (t = 0.1μs, f = 100kHz), V_7 . . . . . –5V
Voltage at Pin3 and Pin6, V_3, V_6 . . . . . 5.5V
Voltage at Pin2, V_2 . . . . . 7V
Pin3 Sink Current, I_3 . . . . . 1mA
Pin5 Source Current, I_5 . . . . . 20mA
Power Dissipation ($T_C \leq +90°C$), P_{tot} 15W
Operating Junction Temperature Range, T_J . . . . . –40° to +150°C
Storage Temperature Range, T_{stg} . . . . . –40° to +150°C
Maximum Thermal Resistance, Junction–to–Case, R_{thJC} . . . . . 4°C/W
Maximum Thermal Resistance, Junction–to–Ambient, R_{thJA} . . . . . 50°C/W

Electrical Characteristics: (T_J = +25°C, V_i = 35V unless otherwise specified)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Dynamic Characteristics							
Output Voltage Range	V_o	V_i = 46V, I_o = 1A		V_{ref}	–	40	V
Input Voltage Range	V_i	V_o = V_{ref} to 36V, I_o = 2.5A		9	–	46	V
Line Regulation	ΔV_o	V_i = 10V to 40V, V_o = V_{ref}, I_o = 1A		–	15	50	mV
Load Regulation	ΔV_o	V_o = V_{ref}, I_o = 0.5A to 2A		–	10	30	mV
Internal Reference Voltage (Pin2)	V_{ref}	V_i = 9V to 46V, I_o = 1A		5.0	5.1	5.2	V
Average Temperature Coefficient of Reference Voltage	$\frac{\Delta V_{ref}}{\Delta T}$	T_J = 0° to +125°C, I_o = 1A		–	0.4	–	mV/°C
Dropout Voltage	V_d	I_o = 2A		–	1.4	3.0	V
Maximum Operating Load Current	I_{om}	V_i = 9V to 46V, V_o = V_{ref} to 36V		2.5	–	–	A
Current Limiting Threshold (PIn7)	I_{7L}	V_i = 9V to 46V, V_o = V_{ref} to 36V		3.0	–	4.5	A
Input Average Current	I_{SH}	V_i = 46V, Output Short Circuit		–	30	60	mA
Efficiency	η	f = 100kHz, I_o = 2A	V_o = V_{ref}	–	75	–	%
			V_o = 12V	–	85	–	%
Supply Voltage Ripple Rejection	SVR	ΔV_i = 2V, f_{ripple} = 100Hz, V_o = V_{ref}, I_o = 1A		50	56	–	dB
Switching Frequency	f			85	100	115	kHz
Voltage Stability of Switching Frequency	$\frac{\Delta f}{\Delta V_i}$	V_i = 9V to 46V		–	0.5	–	%
Temperature Stability of Switching Frequency	$\frac{\Delta f}{\Delta T_J}$	T_J = 0 to +125°C		–	1	–	%
Maximum Operating Switching Frequency	f_{max}	V_o = V_{ref}, I_o = 2A		120	150	–	kHz
Thermal Shutdown Junction Temperature	T_{sd}			–	150	–	°C
DC Characteristics							
Quiescent Drain Current	I_{1Q}	100% Duty Cycle, Pin5 and Pin7 Open	V_i = 46V	–	30	40	mA
		0% Duty Cycle		–	15	20	mA
Output Leakage Current	$-I_{7L}$	0% Duty Cycle		–	–	1	mA
Soft Start							
Source Current	I_{6SO}			100	130	150	µs
Sink Current	I_{6SI}			50	70	120	µs
Error Amp							
High Level Output Voltage	V_{3H}	V_2 = 4.7V, I_3 = 100µA		3.5	–	–	V
Low Level Output Voltage	V_{3L}	V_2 = 5.3V, I_3 = 100µA		–	–	0.5	V
Sink Output Current	I_{3SI}	V_2 = 5.3V		100	150	–	µA
Source Output Current	$-I_{3SO}$	V_2 = 4.7V		100	150	–	µA
Input Bias Current	I_2	V_2 = 5.2V		–	2	10	µA
DC Open Loop Gain	G_v	V_3 = 1V to 3V		46	55	–	dB
Oscillator							
Oscillator Source Current	$-I_5$			5	–	–	mA

Pin Connection Diagram
(Front View)