



ELECTRONICS, INC.
44 FARRAND STREET
BLOOMFIELD, NJ 07003
(973) 748-5089
<http://www.nteinc.com>

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: $\pm 2\%$
- 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 Voltage Difference, $V_1 - V_7$	50V
Negative Output DC Voltage, V_7	-1V
Negative Output Peak Voltage ($t = 0.1\mu s$, $f = 100kHz$), 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 ($T_C \leq +90^\circ C$), 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: ($T_J = +25^{\circ}\text{C}$, $V_i = 35\text{V}$ unless otherwise specified)

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

Pin Connection Diagram (Front View)

