Internal 34V MOSFET Switching Regulator IC for Buck Converter

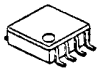
■ GENERAL DESCRIPTION

The **NJW4150** is a switching regulator IC for buck converter with 34V, 450mA MOSFET. It corresponds to high frequency oscillating, wide input voltage and Low ESR Output Capacitor (MLCC). Therefore, the NJW4150 can realize downsizing of applications with a few external parts.

Also, it has a soft start function, over current protection and thermal shutdown circuit.

It is suitable for power supply circuit of Car Accessory, Office Automation Equipment, Industrial Instrument and so on.

■ PACKAGE OUTLINE

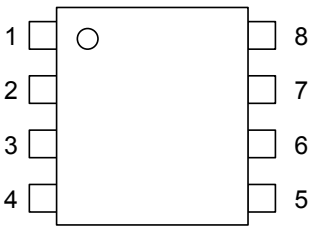


NJW4150RB1

■ FEATURES

- Absolute Maximum Rating 42V
- Operating Voltage Range 6V to 34V
- Switching Current 450mA min.
- PWM switching control
- Applicable for Ceramic Capacitor (MLCC)
- Oscillation Frequency 1MHz typ. (A ver.)
- Soft Start Function 4ms typ.
- Over Current and Thermal Shutdown Protection
- Standby Function
- Package Outline NJW4150RB1 : TVSP8

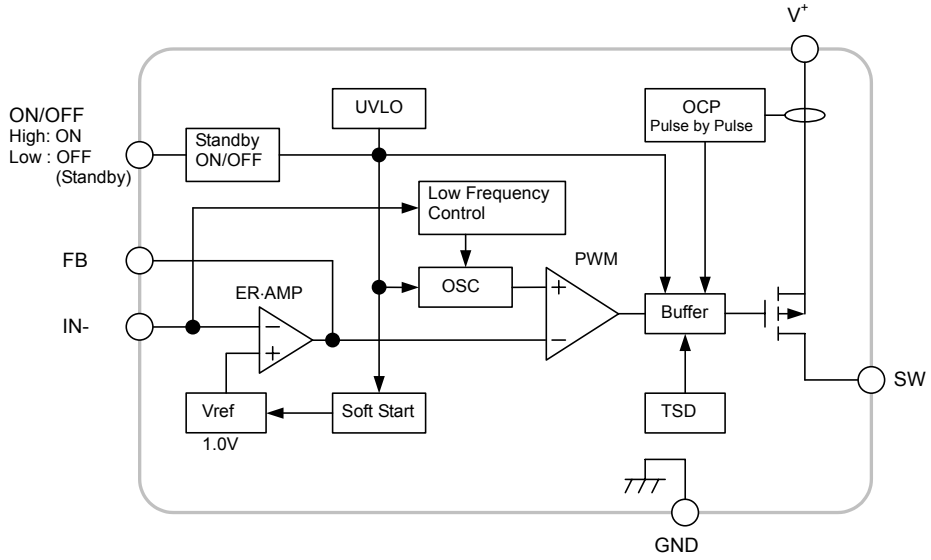
■PIN CONFIGURATION



NJW4150RB1

PIN FUNCTION
1. SW
2. N.C.
3. V^+
4. ON/OFF
5. FB
6. IN-
7. N.C.
8. GND

■BLOCK DIAGRAM



■ PRODUCT VERSION

PART NUMBER	Oscillation Frequency
NJW4150RB1-A	1,000kHz

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	MAXIMUM RATINGS	UNIT
Supply Voltage	V^+	+42	V
SW pin Voltage	V_{SW}	+42	V
IN- pin Voltage	V_{IN-}	-0.3 ~ +6	V
ON/OFF pin Voltage	$V_{ON/OFF}$	+42	V
Power Dissipation	P_D	580 (*1) 780 (*2)	mW
Junction Temperature Range	Tj	-40 ~ +150	°C
Operating Temperature Range	T_{opr}	-40 ~ +85	°C
Storage Temperature Range	T_{stg}	-40 ~ +150	°C

(*1): Mounted on glass epoxy board based on EIA/JEDEC. (76.2mm × 114.3mm × 1.6mm: 2 Layers FR-4)

(*2): Mounted on glass epoxy board based on EIA/JEDEC.

(76.2 mm× 114.3 mm× 1.6mm: 4 Layers FR-4, Internal foil area: 74.2 × 74.2mm)

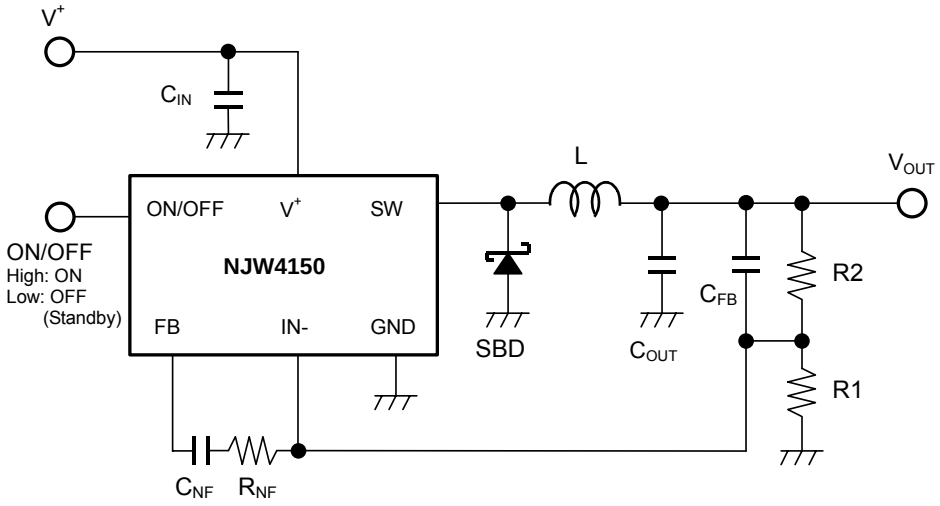
■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V^+	6	–	34	V

■ ELECTRICAL CHARACTERISTICS (V^+=$V_{ON/OFF}$=24V, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Under Voltage Lockout Block						
ON Threshold Voltage	V_{T_ON}	V^+ = L → H	5.6	5.8	6.0	V
OFF Threshold Voltage	V_{T_OFF}	V^+ = H → L	5.4	5.6	5.8	V
Hysteresis Voltage	V_{HYS}		150	200	–	mV
Soft Start Block						
Soft Start Time	T_{SS}	V_B=0.95V	2	4	8	ms
Oscillator Block						
Oscillation Frequency	f_{OSC}	A version V_{IN-}=0.9V, V_{FB}=0.5V	900	1,000	1,100	kHz
Oscillation Frequency OCP operates	f_{OSC_LIM}	V_{IN-}=0V, V_{FB}=0.5V	–	333	–	kHz
Oscillate Supply Voltage Fluctuations	f_{DV}	V^+=6V to 34V	–	1	–	%
Oscillate Temperature Fluctuations	f_{DT}	Ta=-40°C to +85°C	–	5	–	%
Error Amplifier Block						
Reference Voltage	V_B		-1.0%	1.00	+1.0%	V
Input Bias Current	I_B		-0.1	–	0.1	μA
PWM Comparator Block						
Maximum Duty Cycle	$M_{AX}D_{UTY}$	V_{IN-}=0.9V	100	–	–	%
Output Block						
Output ON Resistance	R_{ON}	I_{SW}=300mA	–	1.6	1.8	Ω
Switching Current Limit	I_{LIM}		450	600	750	mA
SW Leak Current	I_{LEAK}	$V_{ON/OFF}$=0V, V^+=42V, V_{SW}=0V	–	–	1	μA
ON/OFF Block						
ON Control Voltage	V_{ON}	$V_{ON/OFF}$= L → H	1.6	–	V^+	V
OFF Control Voltage	V_{OFF}	$V_{ON/OFF}$= H → L	0	–	0.3	V
General Characteristic						
Quiescent Current	I_{DD}	R_L=No Load, V_{IN-}= 0.9V, V_{FB}=0.5V	–	2.3	2.7	mA
Standby Current	I_{DD_STB}	$V_{ON/OFF}$=0V	–	–	40	μA

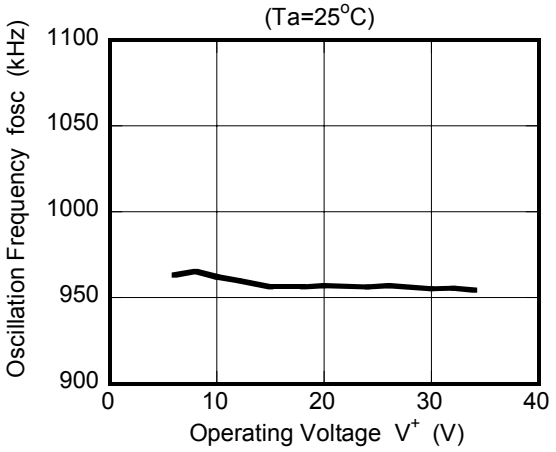
■ TYPICAL APPLICATIONS



■TYPICAL CHARACTERISTICS

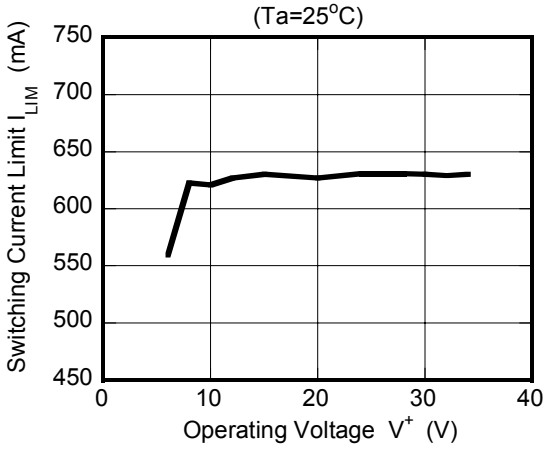
Oscillation Frequency vs. Operating Voltage

(Ta=25°C)



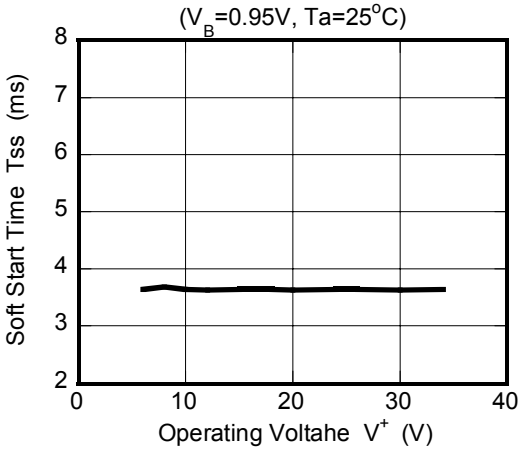
Switching Current Limit vs. Operating Voltage

(Ta=25°C)



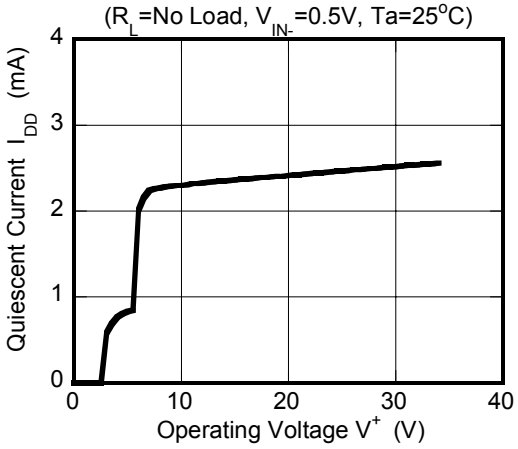
Soft Start Time vs. Operating Voltage

(VB=0.95V, Ta=25°C)



Quiescent Current vs. Operating Voltage

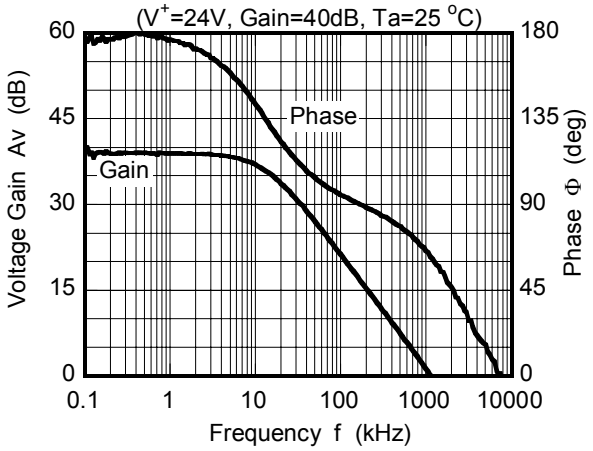
(RL=No Load, VIN-=0.5V, Ta=25°C)



Error Amplifier Block

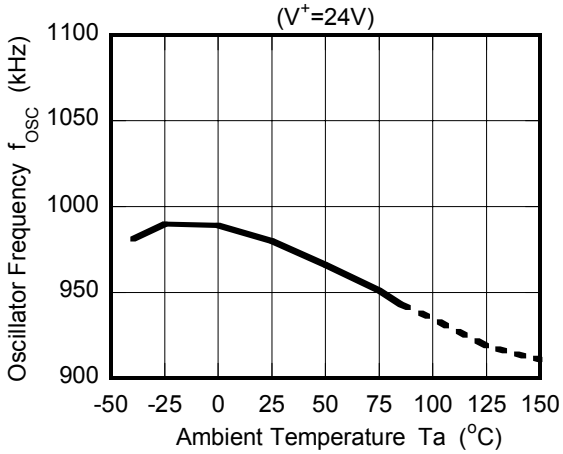
Voltage Gain, Phase vs. Frequency

(V+=24V, Gain=40dB, Ta=25 °C)

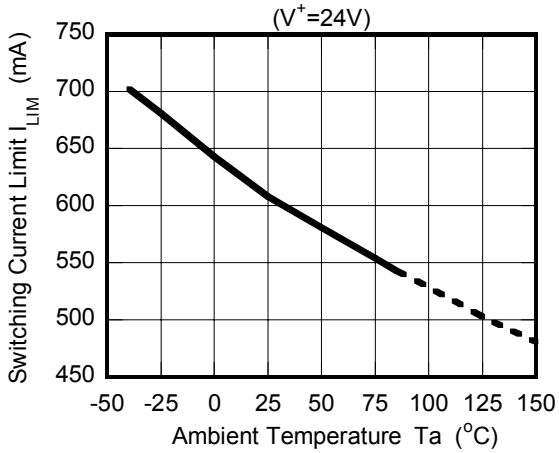


■TYPICAL CHARACTERISTICS

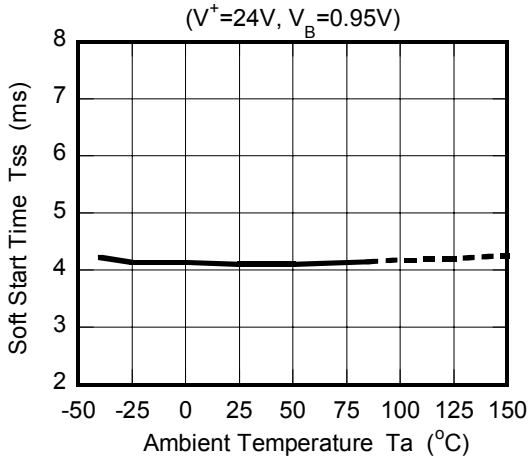
Oscillator Frequency vs. Temperature



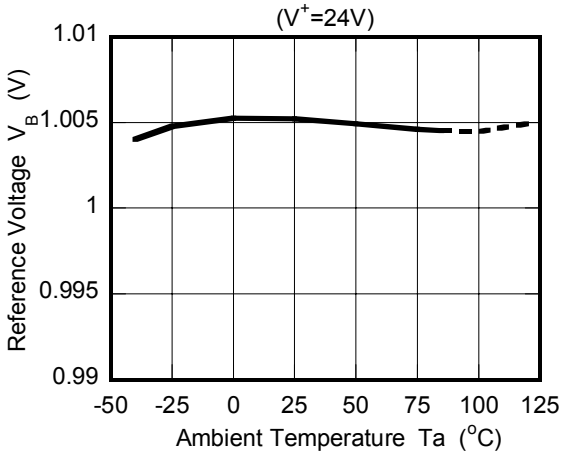
Switching Current Limit vs. Temperature



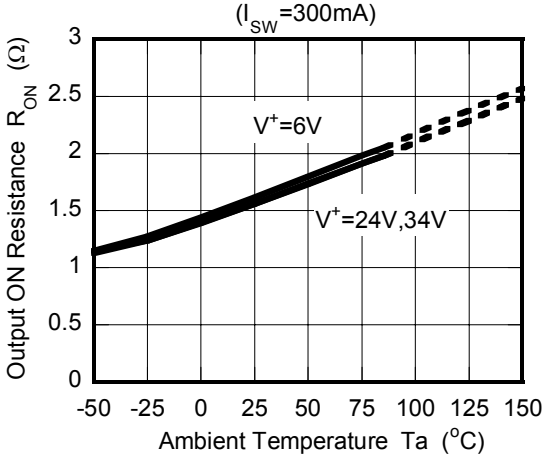
Soft Start Time vs. Temperature



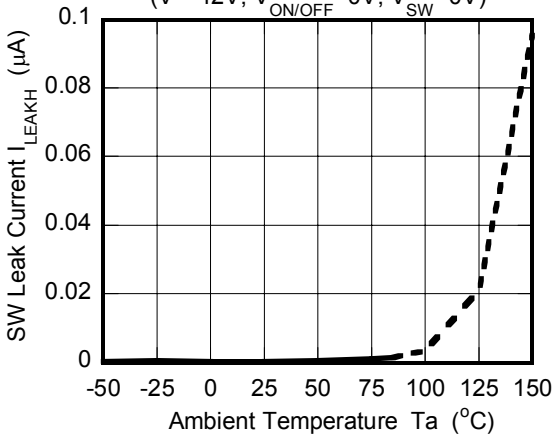
Reference Voltage vs. Temperature



Output ON Resistance vs. Temperature

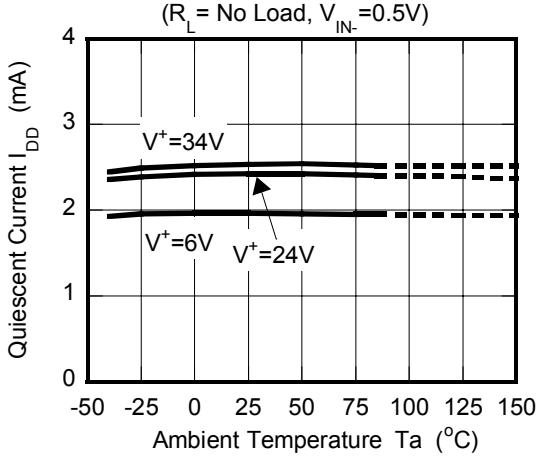


SW Leak Current vs. Temperature

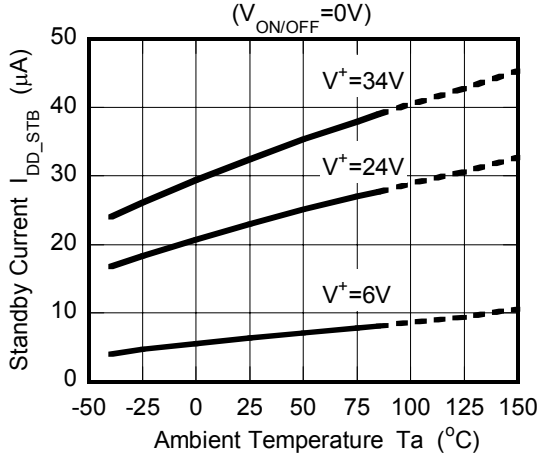


■TYPICAL CHARACTERISTICS

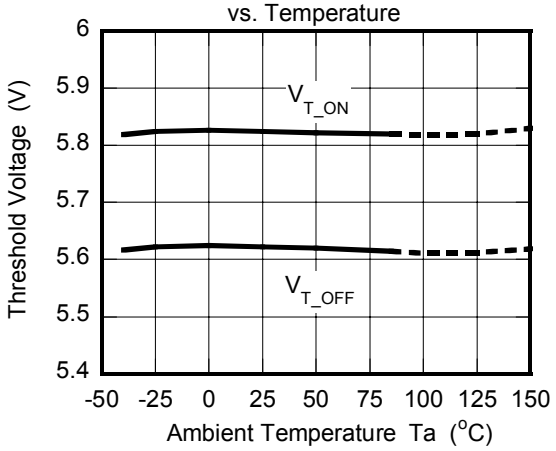
Quiescent Current vs. Temperature
(R_L = No Load, V_{IN-}=0.5V)



Standby Current vs. Temperature
($V_{ON/OFF}$=0V)



Under Voltage Lockout Block
vs. Temperature



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