

PWM DC/DC CONVERTER IC

■GENERAL DESCRIPTION

The **NJM2374A** is a PWM DC/DC converter IC.

It features fixed frequency type PWM control for better noise handling and to avoid intermittent oscillation observed in a simplified controller.

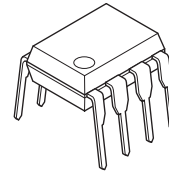
It is suitable for Step-Up, Step-Down and Inverting applications for EMI sensitive application.

■FEATURES

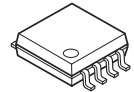
- Operating Voltage (2.5V* to 40V)
- NJM2374AE Operating Voltage (2.5V* to 48V)
- Wide Oscillator Frequency (100Hz to 100kHz)
- Internal High Power Transistor 1.5A (max.)
- Internal Over Current Limit Circuit
- PWM form Switching Power Supply Control
- Bipolar Technology
- Package Outline DIP8, DMP8, SOP8 JEDEC 150mil SSOP14

*Ta =25°C. At low temperature, the minimum voltage is 3.0V.

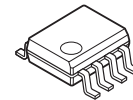
■PACKAGE OUTLINE



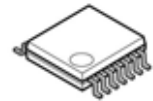
NJM2374AD
(DIP8)



NJM2374AM
(DMP8)

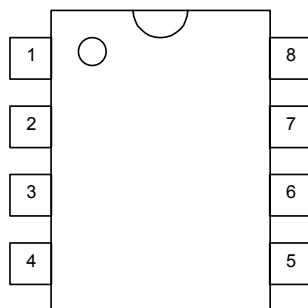


NJM2374AE
(SOP8)



NJM2374AV
(SSOP14)

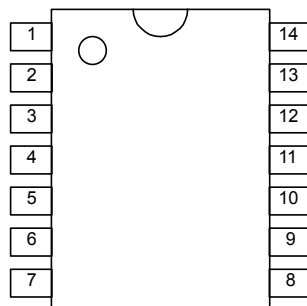
■PIN CONFIGURATION



NJM2374AD
NJM2374AM
NJM2374AE

PIN FUNCTION

- | | |
|-------------------|--------------------|
| 1. C _S | 5. IN ⁺ |
| 2. E _S | 6. V ⁺ |
| 3. C _T | 7. S _I |
| 4. GND | 8. C _D |



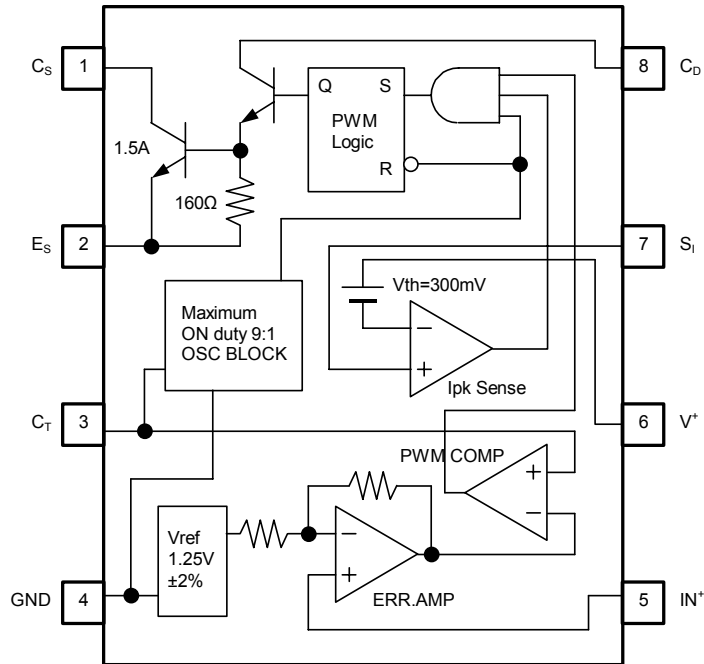
NJM2374AV

PIN FUNCTION

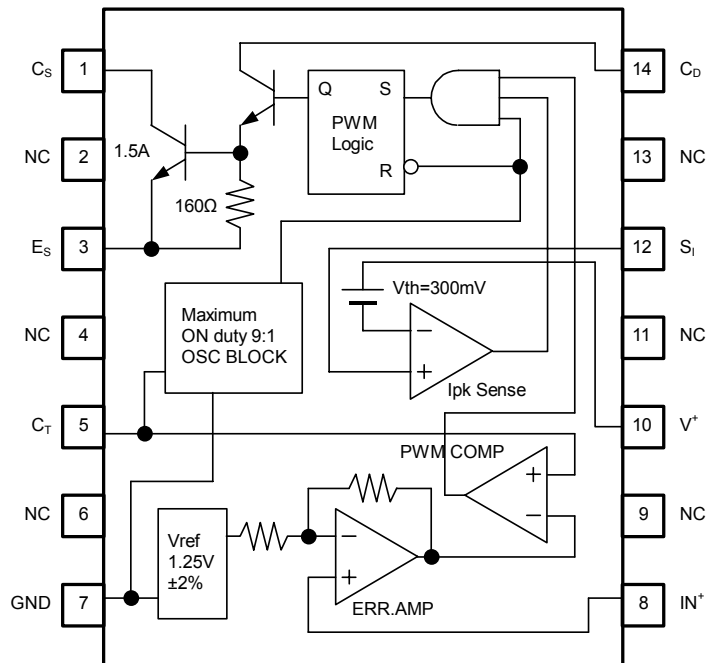
- | | |
|-------------------|--------------------|
| 1. C _S | 8. IN ⁺ |
| 2. NC | 9. NC |
| 3. E _S | 10. V ⁺ |
| 4. NC | 11. NC |
| 5. C _T | 12. S _I |
| 6. NC | 13. NC |
| 7. GND | 14. C _D |

NJM2374A

■BLOCK DIAGRAM



(DIP8, DMP8, SOP8: PACKAGE)



(SSOP14: PACKAGE)

■ABSOLUTE MAXIMUM RATINGS

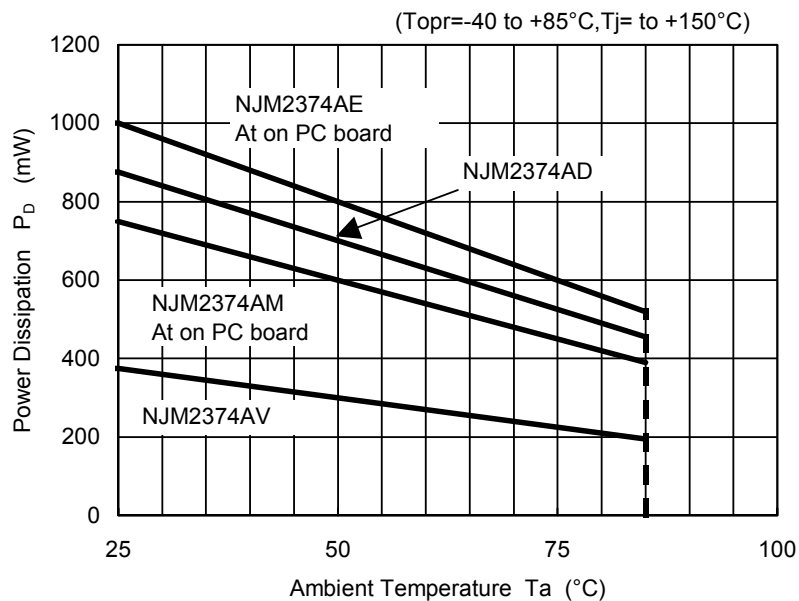
(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Maximum Supply Voltage	V ⁺	40 (NJM2374AE: 48V)	V
Output Switch Current	I _{SW}	1.5	A
Output Switch Voltage	V _{SW}	40 (NJM2374AE: 48V)	V
Comparator Input Voltage	V _{IR}	-0.3 ~ 40 (NJM2374AE: 48V)	V
Power Dissipation	P _D	(DIP8) 875 (DMP8) 750 (note1) (SOP8) 1,000 (note1) (SSOP14) 375	mW
Operating Temperature Range	T _{opr}	-40 ~ +85	°C
Storage Temperature Range	T _{stg}	-50 ~ +150	°C

(note1) At on PC board.

In the case of Step-Down and Inverting Conversion with the internal power transistor, the Output Voltage must be set lower than 6V(-6V).

■POWER DISSIPATION vs. AMBIENT TEMPERATURE



In the case of SSOP packaging, the power dissipation should carefully be considered when designing this parts.

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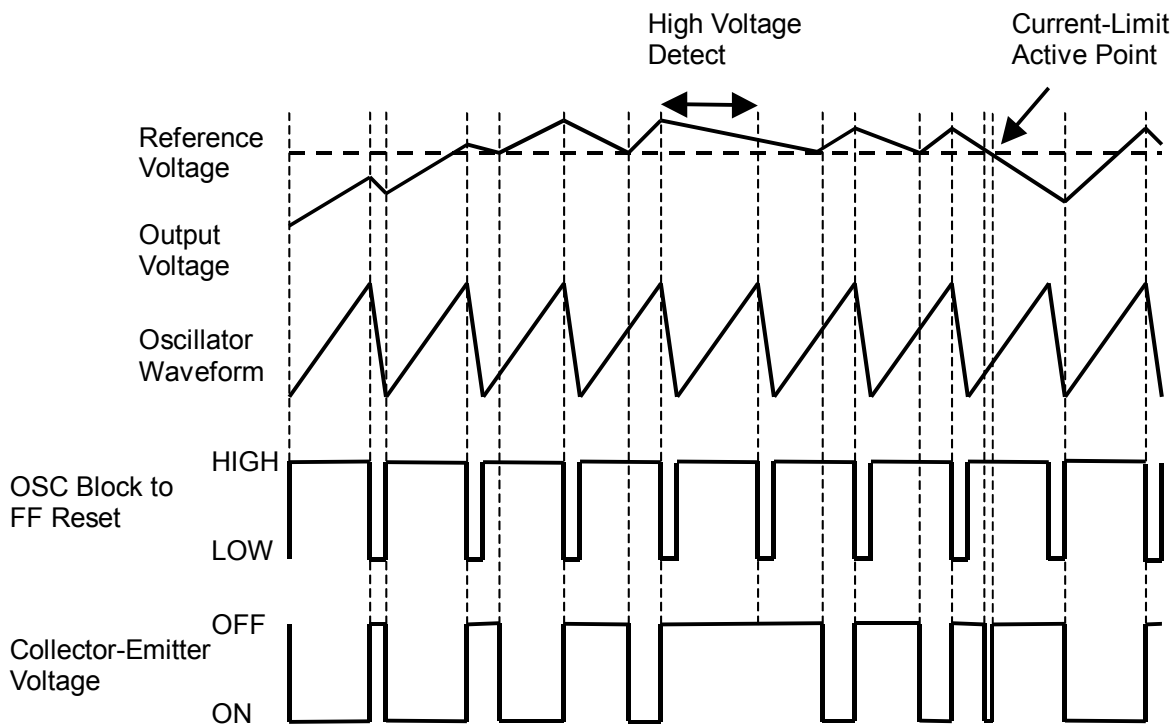
■ELECTRICAL CHARACTERISTICS

DC Characteristics ($V^+=5V$, $T_a=25^\circ C$)

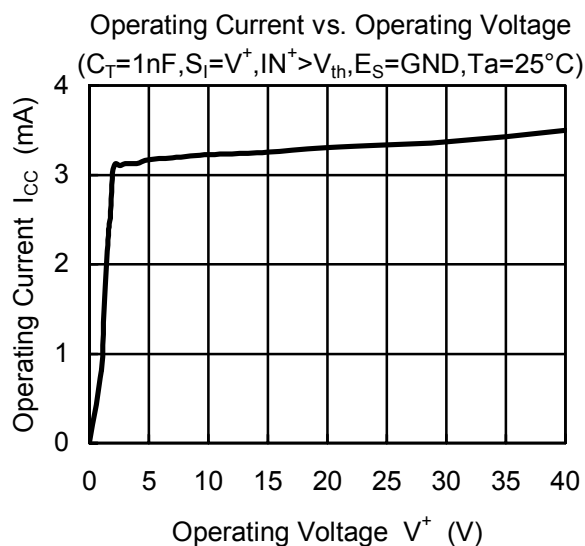
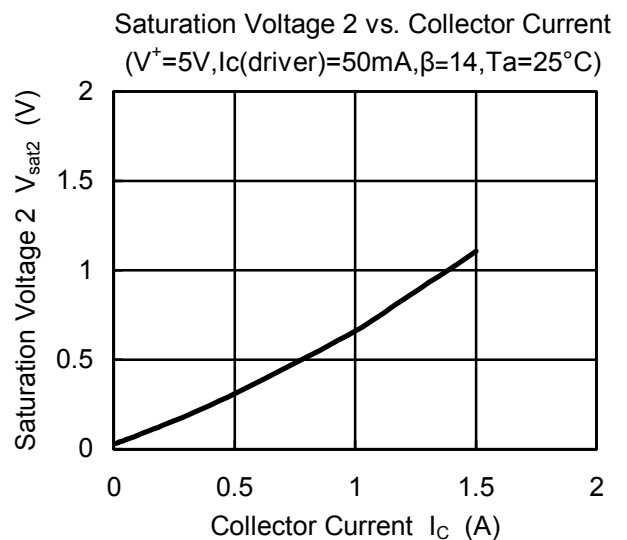
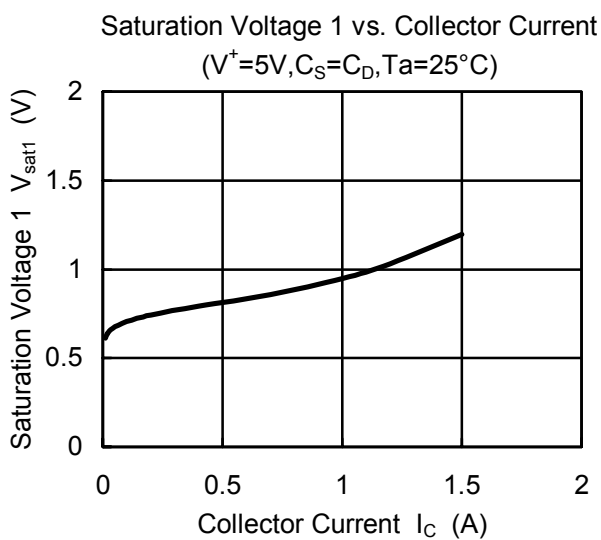
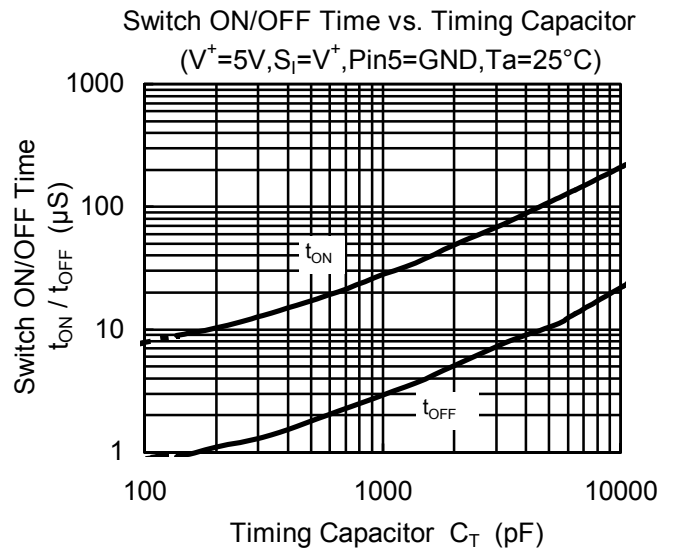
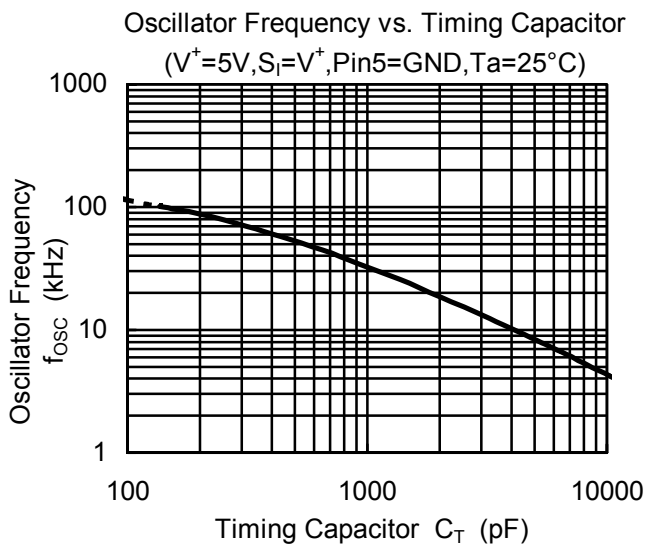
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Operating Current 1	I_{CC1}	$C_T=1nF$, $S_I=V^+$, $IN^+ > V_{th}$, $E_S=GND$	–	2.8	4.0	mA
Operating Current 2 (NJM2374AE Only)	I_{CC2}	$V^+=48V$, $C_T=1nF$, $S_I=V^+$, $IN^+ > V_{th}$, $E_S=GND$	–	3.4	4.5	mA
Charge Current	I_{chg}		12	20	30	μA
Discharge Current	I_{dis}		110	180	300	μA
Voltage Swing	V_{OSC}		–	0.5	–	V_{P-P}
Discharge to Charge Current Ratio	I_{ratio}	$S_I=V^+$	–	9	–	–
Peak Current Sense Voltage	V_{ipk}	$I_{chg}=I_{dis}$	250	300	350	mV
Saturation Voltage 1	V_{sat1}	Darlington Connection ($C_S=C_D$), $I_{SW}=0.7A$	–	1.0	1.3	V
Saturation Voltage 2	V_{sat2}	$I_{SW}=0.7A$, $I_c(driver)=50mA$ (Forced $\beta \approx 14$)	–	0.5	0.7	V
Output Transistor Bias Resistance	R_{bias}		–	160	–	Ω
DC Voltage Gain	h_{FE}	$I_{SW}=0.7A$, $V_{CE}=5.0V$	35	120	–	–
Collector Off-State Current	$I_{C(off)}$	$V_{CE}=40V$ (NJM2374AE: $V_{CE}=48V$)	–	10	–	nA
Threshold Voltage	V_{th}		1.225	1.250	1.275	V
Input Bias Current	I_B	$IN^+=0V$	–	40	400	nA

(note) Output switch tests are performed under pulsed conditions to minimize power dissipation.

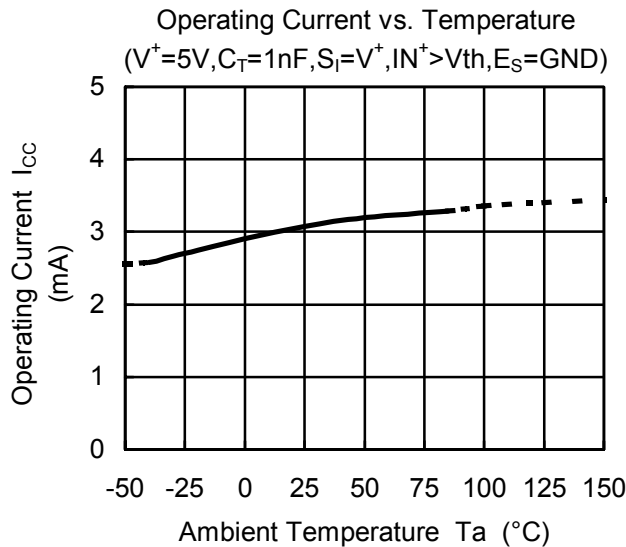
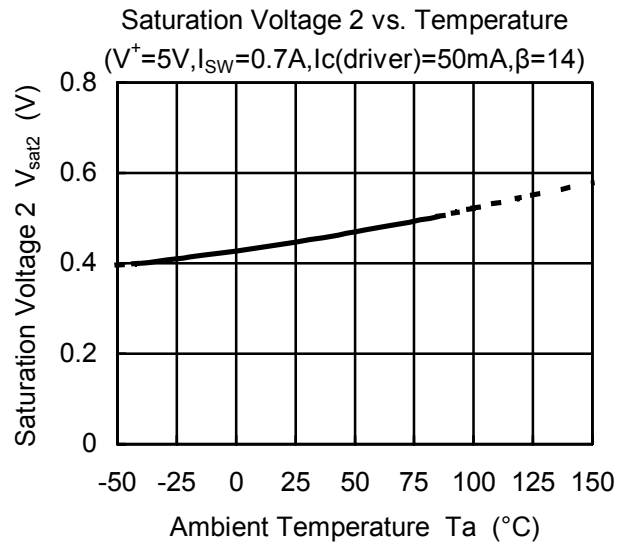
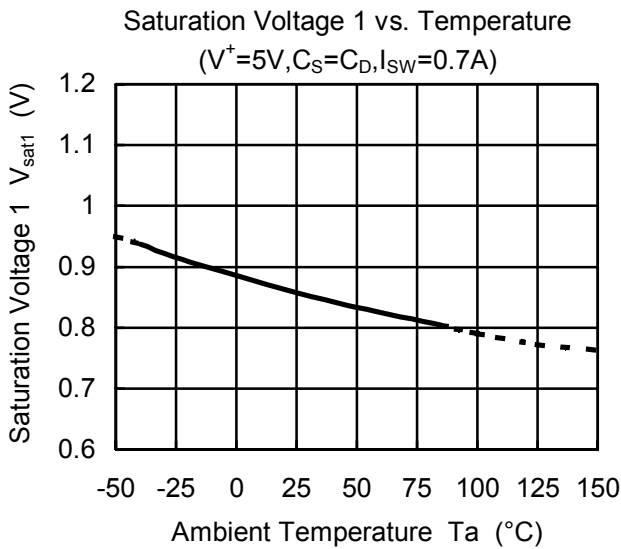
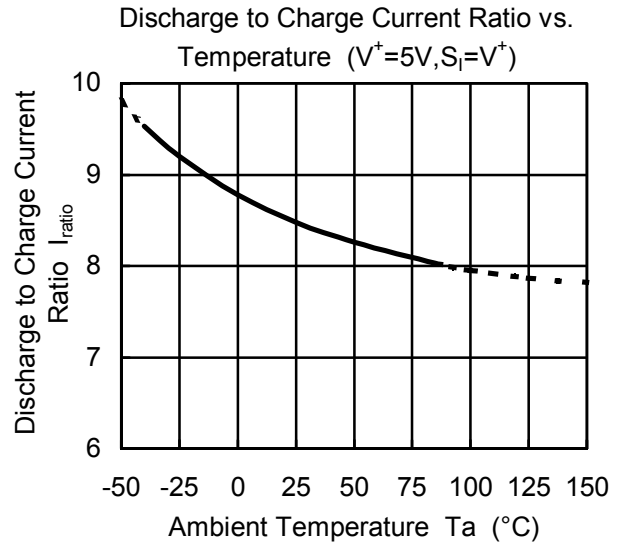
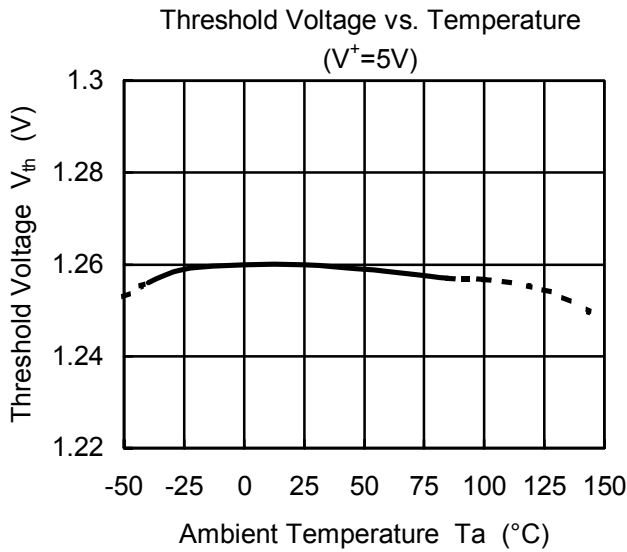
■TIMING CHART



■ TYPICAL CHARACTERISTICS

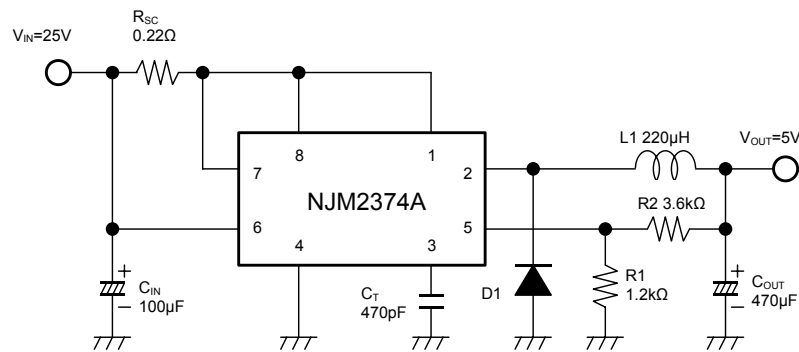


■ TYPICAL CHARACTERISTICS



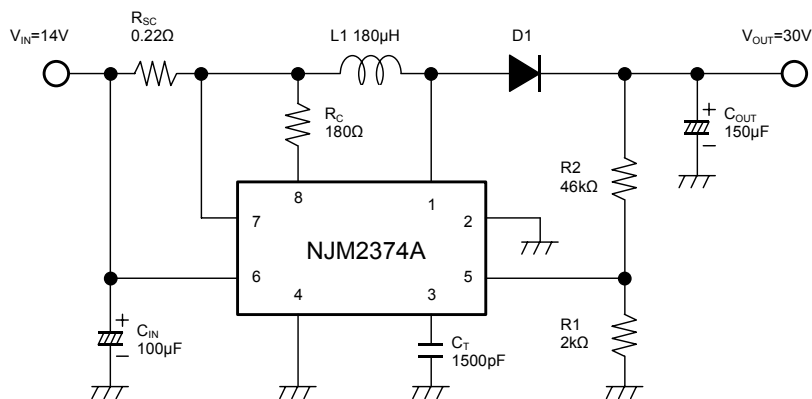
■ TYPICAL APPLICATIONS

Step-Down Converter

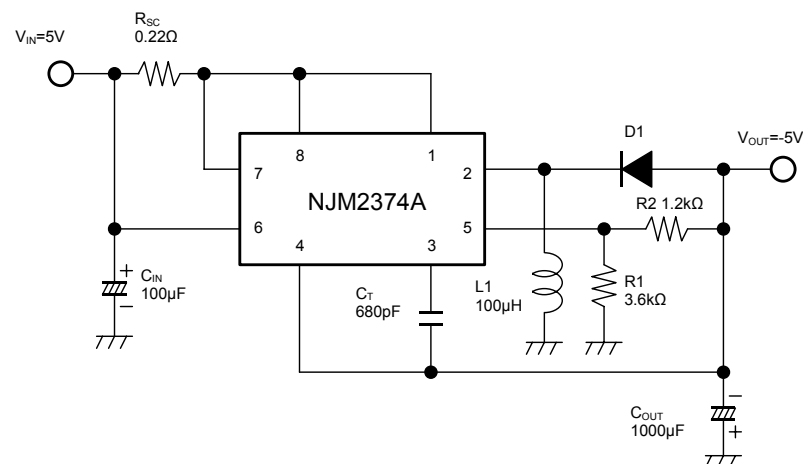


In the case of Step-Down Conversion with the internal power transistor, the Output Voltage must be set lower than 6V.

Step-Up Converter



Inverting Converter



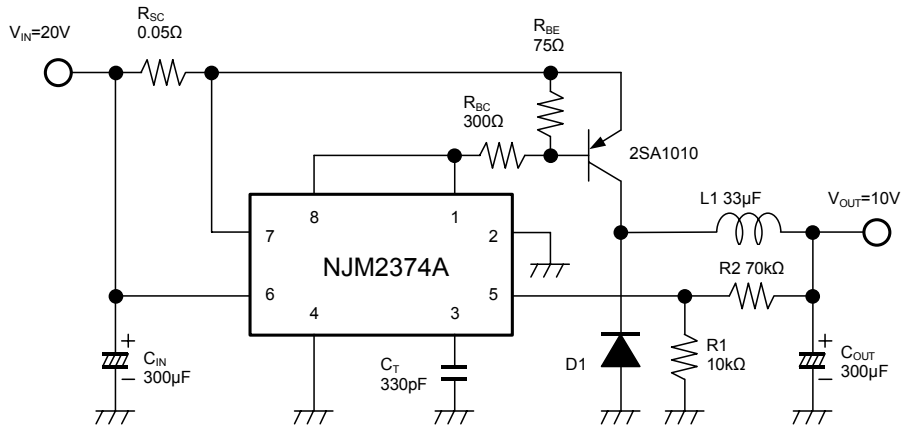
In the case of Inverting Conversion with the internal power transistor, the Output Voltage must be set lower than -6V.

D1 use to schottky diode.

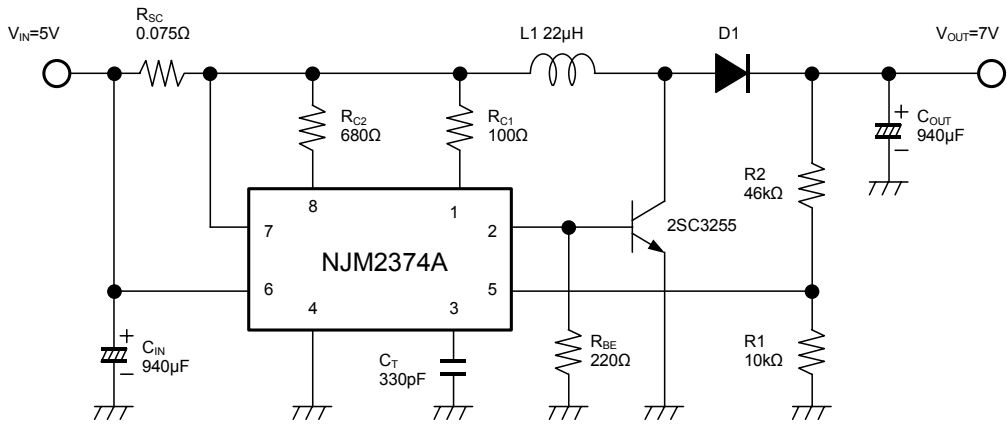
In the case of SSOP packaging, the power dissipation should carefully be considered when designing this parts.

NJM2374A

Step-Down Converter (High Current)



Step-Up Converter (High Current)



D1 use to schottky diode.

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