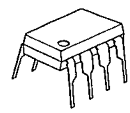
DC/DC CONVERTER CONTROL IC

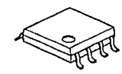
■ GENERAL DESCRIPTION

The NJM2360 is a DC to DC converter control IC. Due to the internalization of a high current output switch, 1.5A switching operations are available. The NJM2360 is designed to be incorporated in step-up, step-down and inverting applications with a minimum number of external components. Output current is limited by an external resistor.

■ PACKAGE OUTLINE



NJM2360D

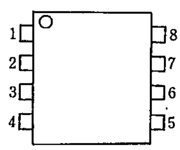


NJM2360M

■ FEATURES

- Operating Voltage (2.5V~40V)
- Low Standby Current
- Current Limiting
- Output Switch Current to 1.5A
- Supply Voltage V^+ 2.5~40V
- Output Voltage V_{OR} 1.25~40V
- Oscillator Frequency f_{OSC} 100Hz~100kHz
- Package Outline DIP8, DMP8
- Bipolar Technology

■ PIN COFIGURATION

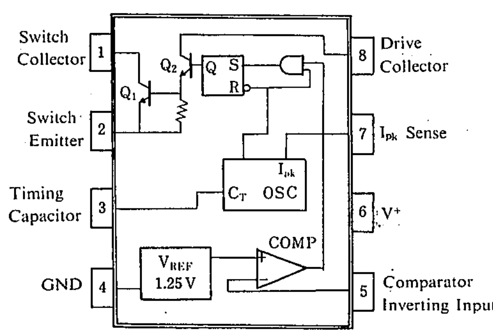


NJM2360D
NJM2360M

PIN FUNCTION

1. C_S
2. E_S
3. C_T
4. GND
5. INV_{IN}
6. V^+
7. S_I
8. C_D

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+	40	V
Comparator Input Voltage Range	V_{IR}	$-0.3 \sim V^+$	V
Power Dissipation	P_D	(DIP8) 700 (DMP8) 600 (note 1)	mW mW
Switch Current	I_{SW}	1.5	A
Operating Temperature Range	T_{opr}	$-40 \sim +85$	℃
Storage Temperature Range	T_{stg}	$-40 \sim +125$	℃

(note 1) At on PC board

■ ELECTRICAL CHARACTERISTICS

● DC Characteristics (V^+=5V, Ta=25℃)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I_{CC}	$5V \leqq V^+ \leqq 40V$, $C_T = 0.001\mu F$ $S_I = V^+$, $INV_{IN} > V_{th}$, $E_S = GND$	—	2.4	3.5	mA

Oscillator

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Charge Current	I_{chg}	$5V \leqq V^+ \leqq 40V$	20	35	50	μA
Discharge Current	I_{dischg}	$5V \leqq V^+ \leqq 40V$	150	200	250	μA
Voltage Swing	V_{OSC}		—	0.5	—	V_{P-P}
Discharge to Charge Current Ratio	I_{dischg}/I_{chg}	$S_I = V^+$	—	6	—	—
Peak Current Sense Voltage	$V_{IPK(sense)}$	$I_{chg} = I_{dischg}$	250	300	350	mV

Output Switch (Note 2)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Saturation Voltage 1	$V_{CE(sat)}1$	Darlington Connection ($C_S = C_D$) $I_{SW} = 1.0A$	—	1.0	1.3	V
Saturation Voltage 2	$V_{CE(sat)}2$	$I_{SW} = 1.0A$, $I_{C(driver)} = 50mA$ (Forced $\beta \fallingdotseq 20$)	—	0.5	0.7	V
DC Current Gain	h_{FE}	$I_{SW} = 1.0A$, $V_{CE} = 5.0V$	35	120	—	—
Collector Off−State Current	$I_{C(off)}$	$V_{CE} = 40V$	—	10	—	nA

Comparator

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Threshold Voltage	V_{th}		1.18	1.25	1.32	V
Input Bias Current	I_{IB}	$V_{IN} = 0V$	—	40	400	nA

Note 2 : Output switch tests are performed under pulsed conditions to minimize power dissipation.

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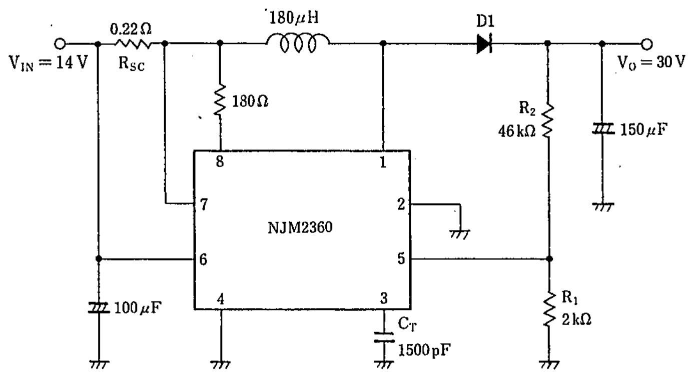
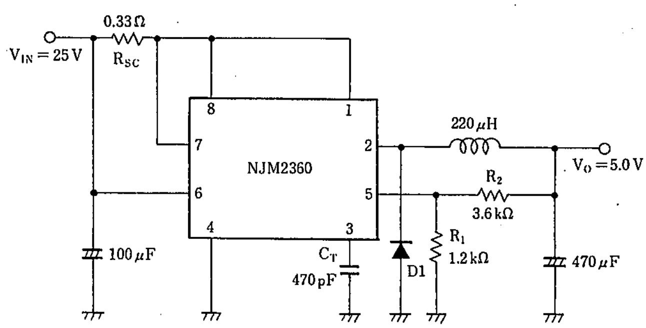
■ TYPICAL APPLICATIONS

1. Step-Up Converter



*D1 : SBD(EK14)

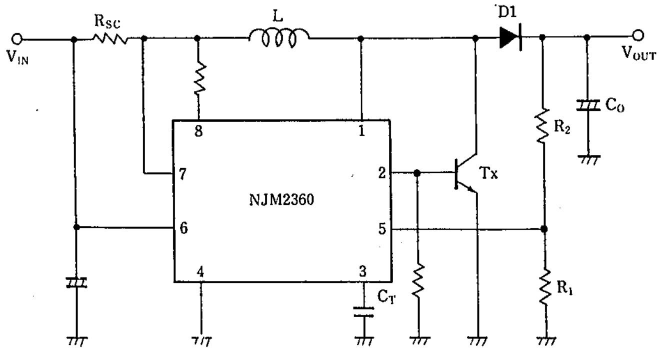
2. Step-Down Converter



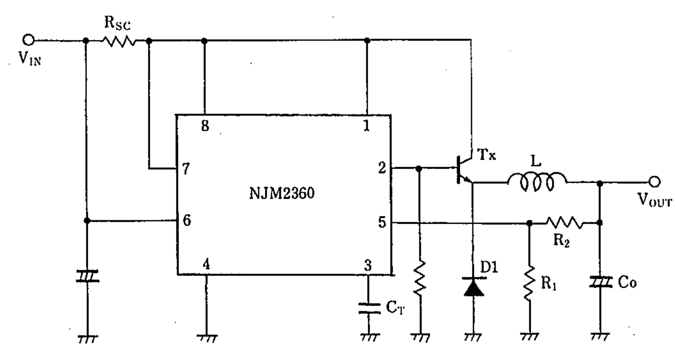
*D1 : SBD(EK14)

■ TYPICAL APPLICATIONS

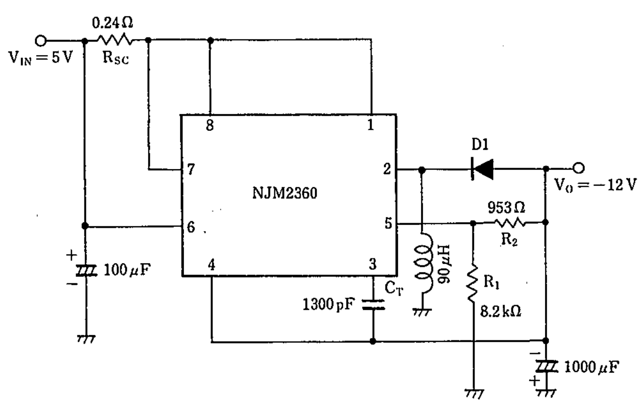
3. Step-Up Converter (High Current)



4. Step-Down Converter (High Current)



5. Inverting Converter



∗D1 : SBD(EK14)

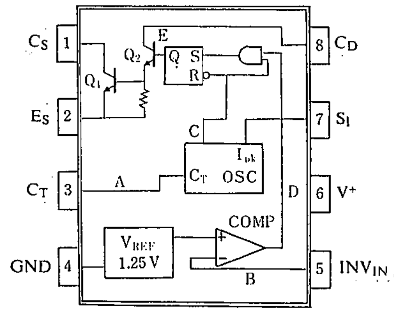


Fig.1 Block Diagram

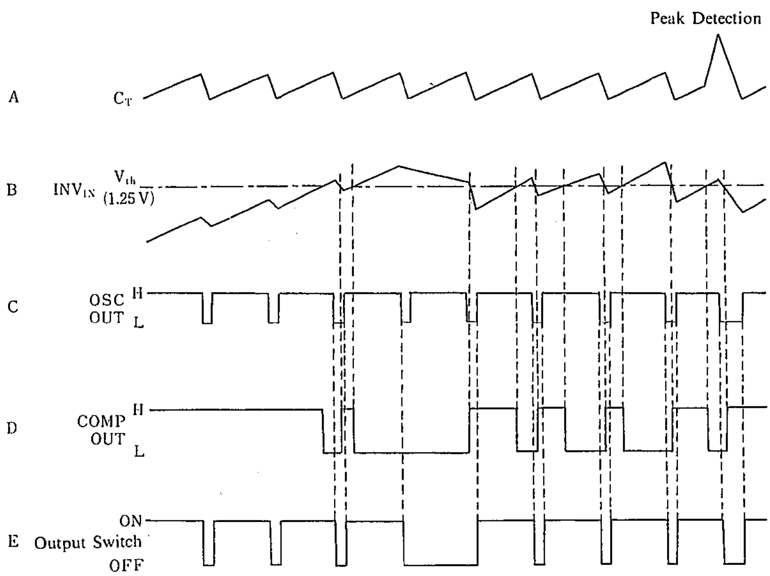
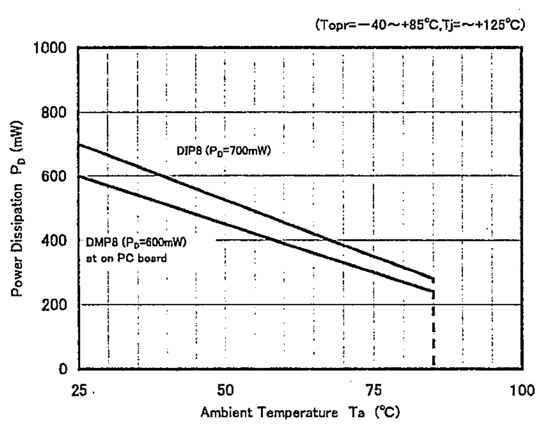


Fig. 2 Timing Chart

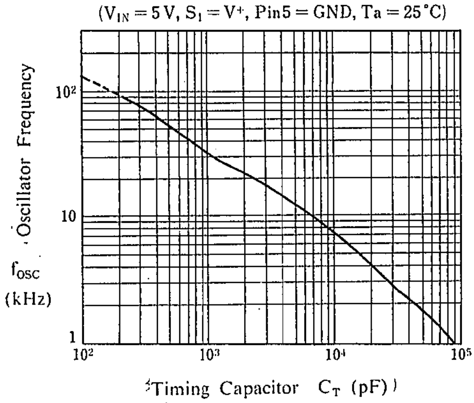
■ POWER DISSIPATION VS. TEMPERATURE



■ TYPICAL CHARACTERISTICS

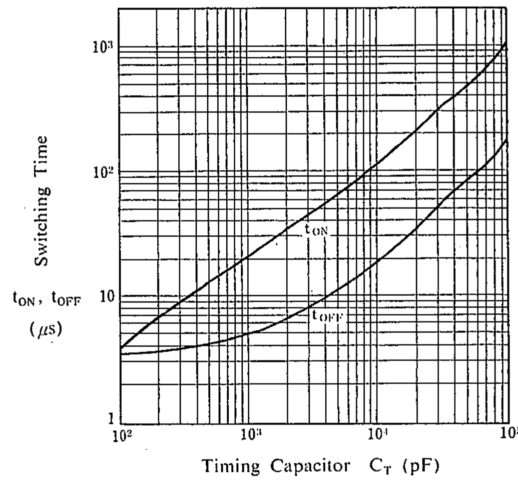
Oscillator Frequency vs. Timing Capacitor

(V_{IN} = 5 V, S_1 = V^+, Pin5 = GND, Ta = 25°C)



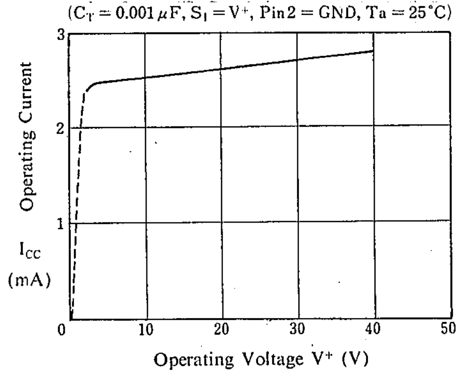
Switching Time vs. Timing Capacitor

(V_{IN} = 5 V, S_1 = V^+, Pin5 = GND, Ta = 25°C)



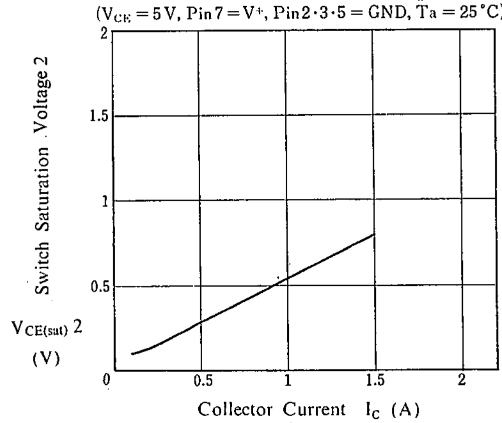
Operating Current vs. Operating Voltage

(C_T = 0.001 μF, S_1 = V^+, Pin2 = GND, Ta = 25°C)



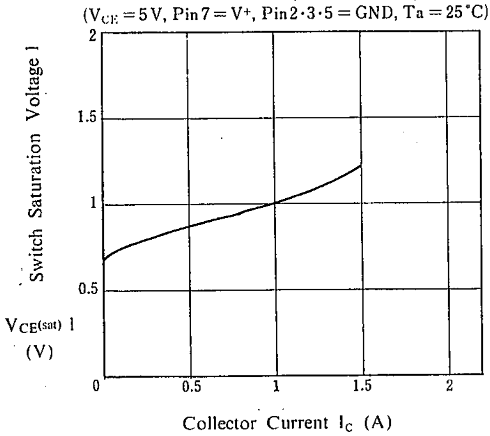
Switch Saturation Voltage 2 vs. Collector Current ($\beta \doteqdot 20$)

(V_{CE} = 5 V, Pin7 = V^+, Pin2·3·5 = GND, Ta = 25°C)



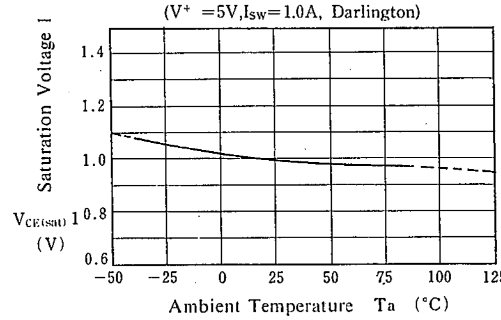
Switch Saturation Voltage 1 vs. Collector Current (Darlington)

(V_{CE} = 5 V, Pin7 = V^+, Pin2·3·5 = GND, Ta = 25°C)



Saturation Voltage 1 vs. Temperature

(V^+ = 5V, I_{SW} = 1.0A, Darlington)



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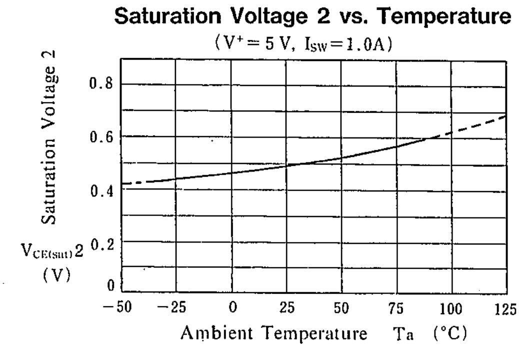
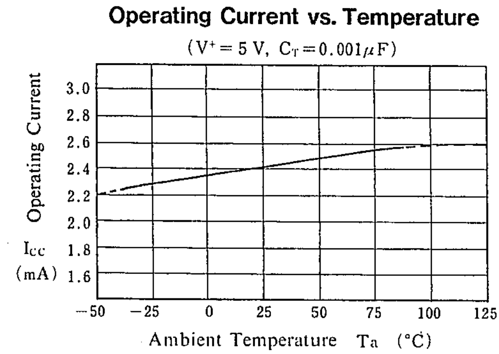
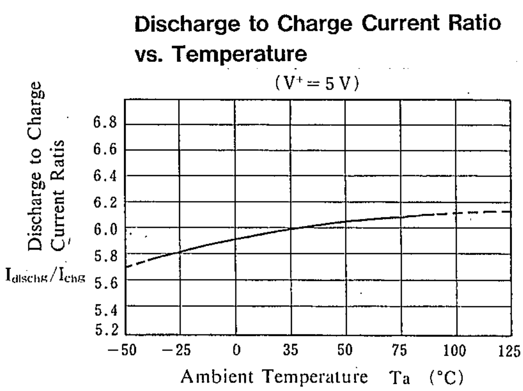
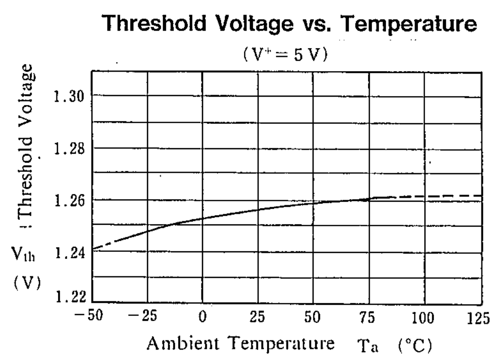
■ TYPICAL CHARACTERISTICS









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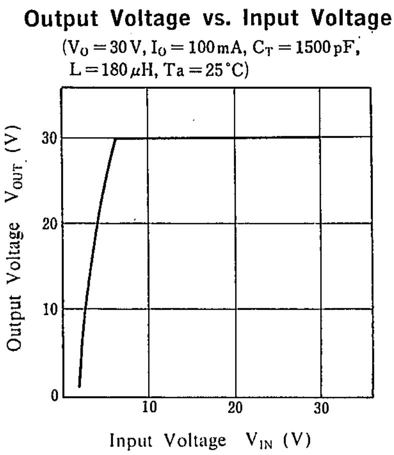
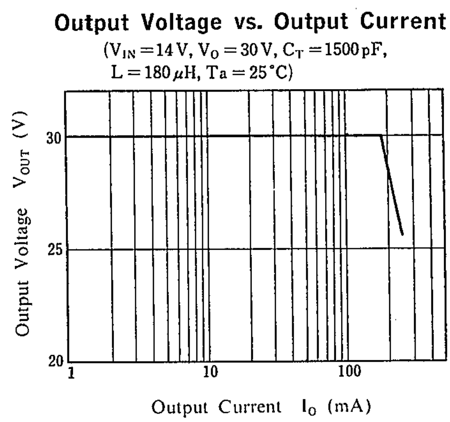
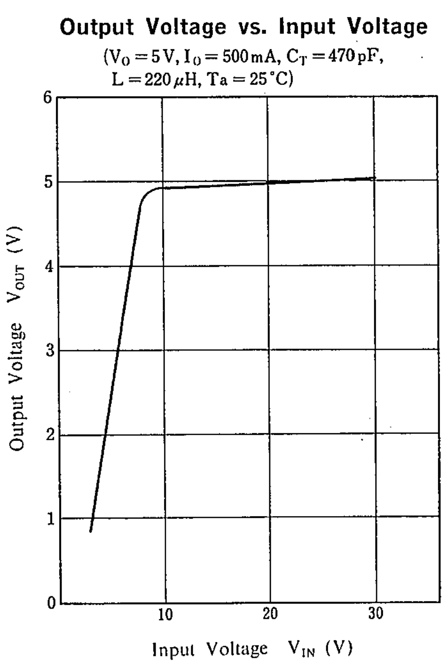
■ TYPICAL CHARACTERISTICS (Application)

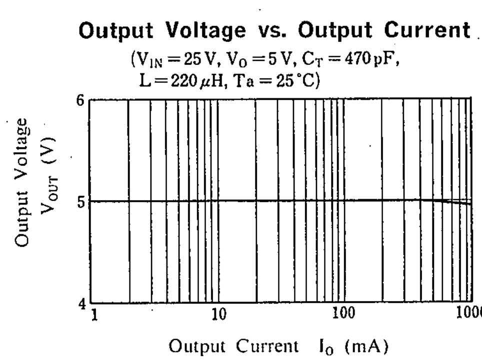
1. Step-Up Converter





2. Step-Down Converter





MEMO

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