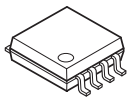
HIGH PRECISION DC/DC CONVERTER CONTROL IC

■GENERAL DESCRIPTION

The **NJM2340** is a high precision DC/DC converter control IC with a current sense amplifier. It offers a low side current sensing which offers a DC/DC converter application with a few external parts and minimum error. The NJM2340 has a high input voltage and is available in small surface mount packages, an 8-lead DMP and MSOP (TVSP). Therefore it is well-suited for various applications.

■PACKAGE OUTLINE



NJM2340M
(DMP8)

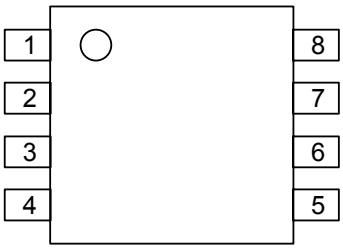
NJM2340RB1
(MSOP8 (TVSP8))

■FEATURES

- ●PWM switching control
- ●Operating Voltage (3.6 to 32V)
- ●Wide Oscillator Range (20kHz to 500 kHz)
- ●Duty Cycle (0% to 100%)
- ●Current Sensing Amplifier
- ●High Precision Reference Voltage Voltage Detect: 1V±1.5%
  Current Detect: 150mV±4%
- ●Bipolar Technology
- ●Package Outline DMP8, MSOP8 (TVSP8)*

*MEET JEDEC MO-187-DA / THIN TYPE

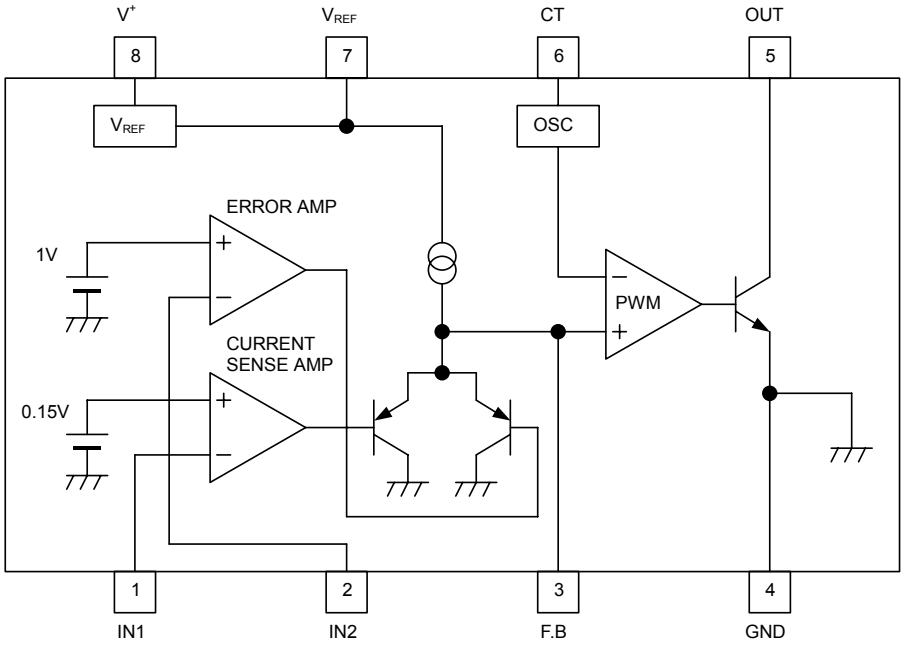
■PIN CONFIGURATION



NJM2340M
NJM2340RB1

Pin Function
1.IN1
2.IN2
3.F.B
4.GND
5.OUT
6.CT
7.V_{REF}
8.V^+

■BLOCK DIAGRAM



■ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Maximum Supply Voltage	V^+	36	V
Output Sink Current	I_{SINK}	15	mA
Power Dissipation	P_D	(DMP8) 300 (MSOP8(TVSP8)) 320	mW
Operating Temperature Range	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-50 to +150	°C

■RECOMMENDED OPERATING CONDITIONS (Ta=25°C)

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	V^+	3.6	32	V
Oscillation Frequency	fosc	20	500	kHz
Oscillator Timing Resistance	R_T	20	100	kΩ

■**ELECTRICAL CHARACTERISTICS** (V^+=12V,Ta=25°C)

REFERENCE VOLTAGE BLOCK

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{REF}	I_{OR}=1mA	1.98	2.00	2.02	V
Line Regulation	L_{INE}	V^+=3.6 ~ 32V, I_{OR}=1mA	–	4.0	20	mV
Load Regulation	L_{OAD}	I_{OR}=0.1 ~ 5.0mA	–	6.0	40	mV

OSCILLATOR BLOCK

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Oscillation Frequency	f_{OSC}	R_T=27kΩ, C_T=220pF	315	350	385	kHz

CURRENT SENSE AMPLIFIER BLOCK

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Reference Voltage1	V_B1		144	150	156	mV
Input Bias Voltage1	I_B1		–	20	100	nA
Maximum Output Voltage1 (F.B Pin)	$V_{OM+}1$	R_{NF}=100kΩ	–	V_{REF} -0.15	–	V
	$V_{OM-}1$	R_{NF}=100kΩ	0.6	0.75	0.9	V
Maximum Source Current1 (F.B Pin)	$I_{OM}1$	$V_{OM}1$=0.5V	40	85	200	μA

ERROR AMPLIFIER BLOCK

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Reference Voltage2	V_B2		0.985	1.000	1.015	V
Input Bias Voltage2	I_B2		–	20	100	nA
Maximum Output Voltage2 (F.B Pin)	$V_{OM+}2$	R_{NF}=100kΩ	–	V_{REF} -0.15	–	V
	$V_{OM-}2$	R_{NF}=100kΩ	0.6	0.75	0.9	V
Maximum Source Current2 (F.B Pin)	$I_{OM}2$	$V_{OM}2$=0.5V	40	85	200	μA

PWM COMPARATE BLOCK

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Threshold Voltage (F.B Pin)	V_{TH0}	duty·cycle=0% (note)	V_{OM}-	1.0	1.1	V
Input Threshold Voltage (F.B Pin)	V_{TH100}	duty·cycle=100% (note)	–	1.4	–	V

OUTPUT BLOCK

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
L Output Voltage (OUT Pin)	V_{OL}	I_{SINK}=10mA	–	0.5	0.7	V

GENERAL CHARACTERISTICS

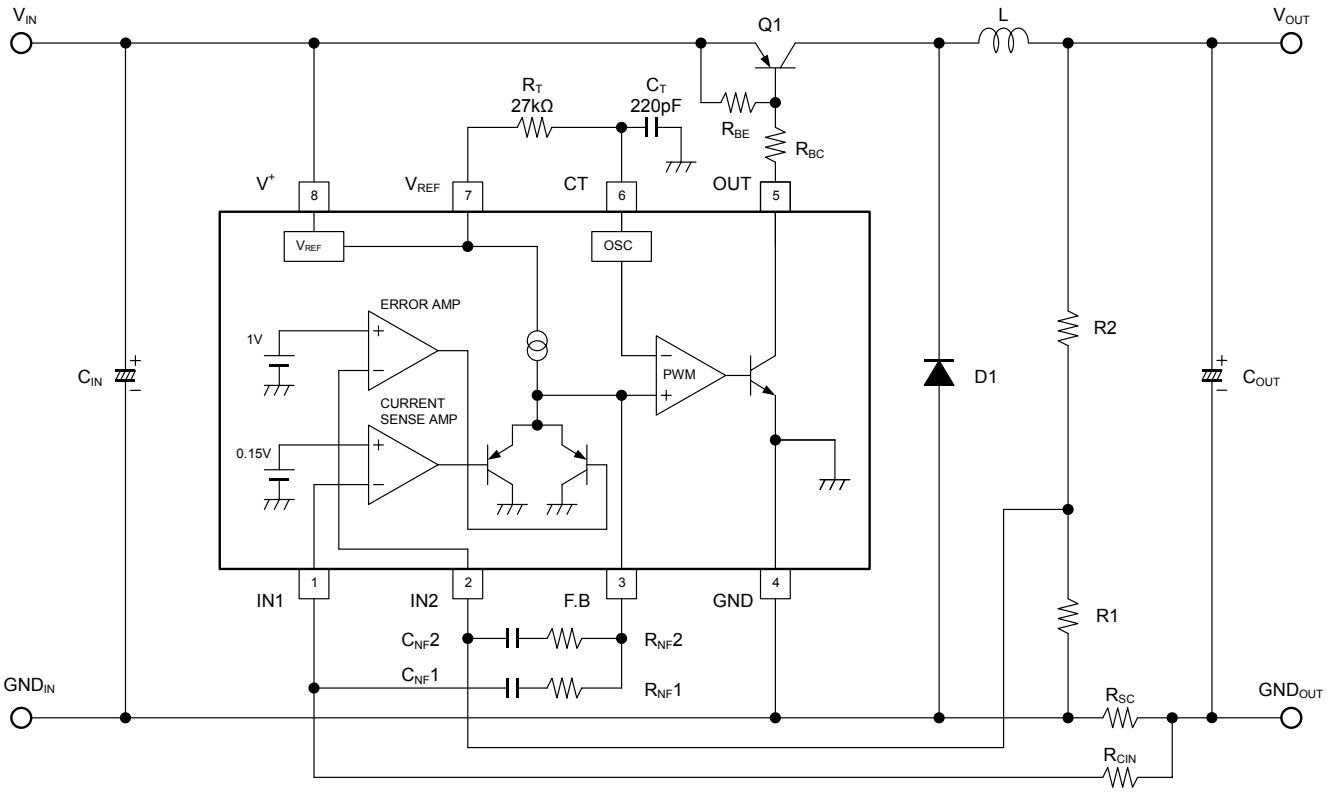
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Average Quiescent Current	I_{CCAV}	R_L=∞, duty·cycle=50%	–	1.5	2.0	mA

(note) Duty·Cycle is defined as follows:

Duty·Cycle=0%: IC output transistor is OFF.

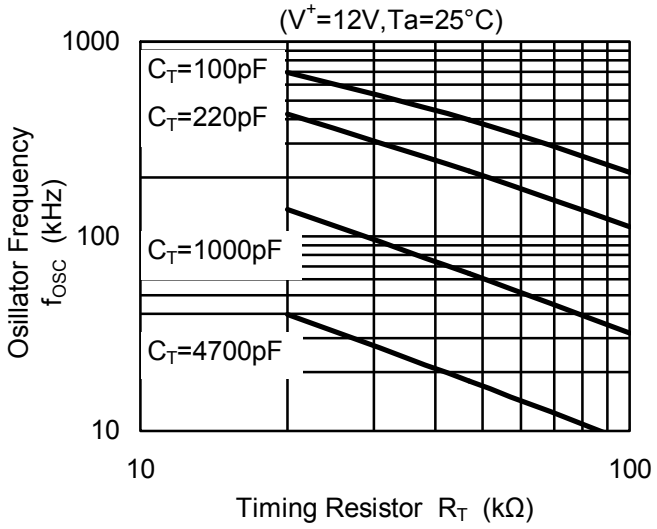
Duty·Cycle=100%: IC output transistor is ON.

■TYPICAL APPLICATION

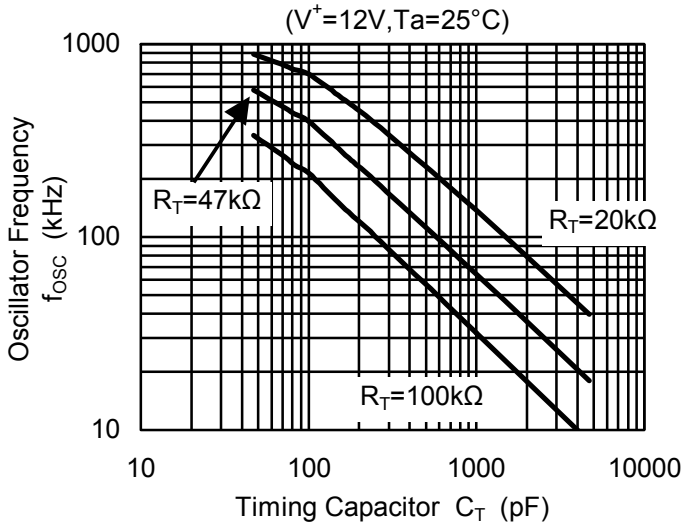


■TIPICAL CHARACTERISTICS

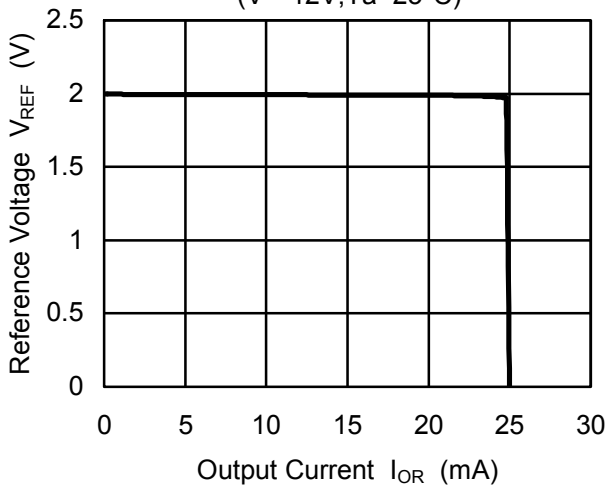
Oscillator Frequency vs. Timing Resistor
(V^+=12V,Ta=25°C)



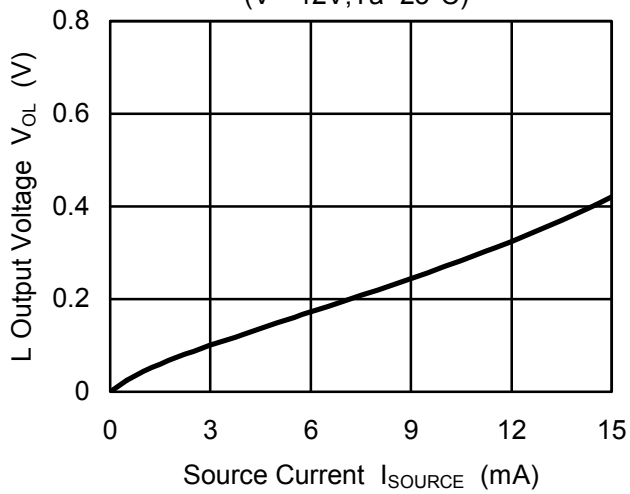
Oscillator Frequency vs. Timing Capacitor
(V^+=12V,Ta=25°C)



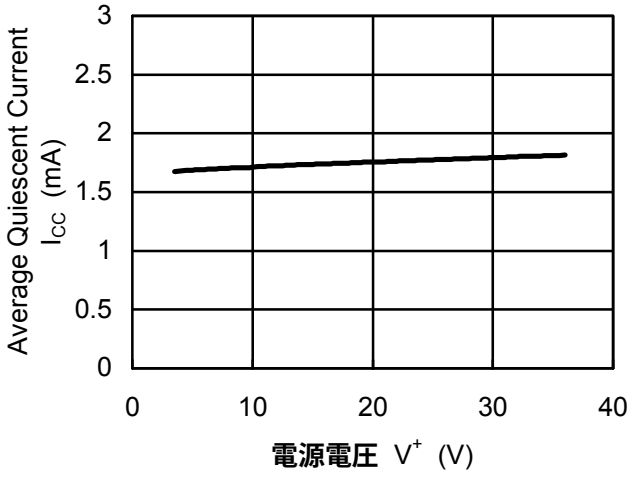
Reference Voltage vs. Output Current
(V^+=12V,Ta=25°C)



L Output Voltage vs. Source Current
(V^+=12V,Ta=25°C)

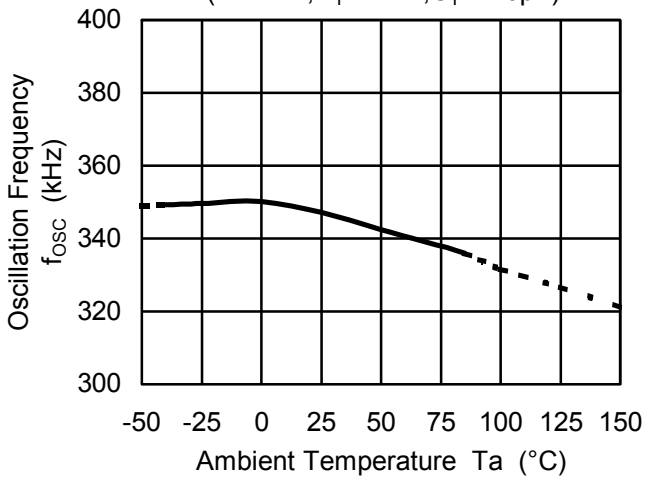


Average Quiescent Current
(R_L= ∞ ,duty·cycle=50%,Ta=25°C)

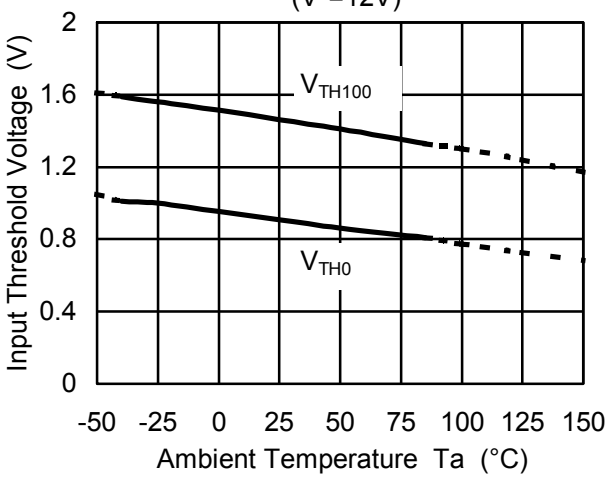


■TIPICAL CHARACTERISTICS

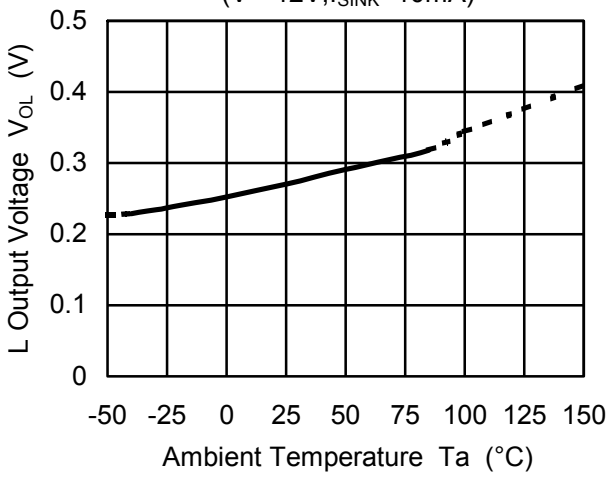
Oscillation Frequency vs. Temperature
(V^+=12V,R_T=27kΩ,C_T=220pF)



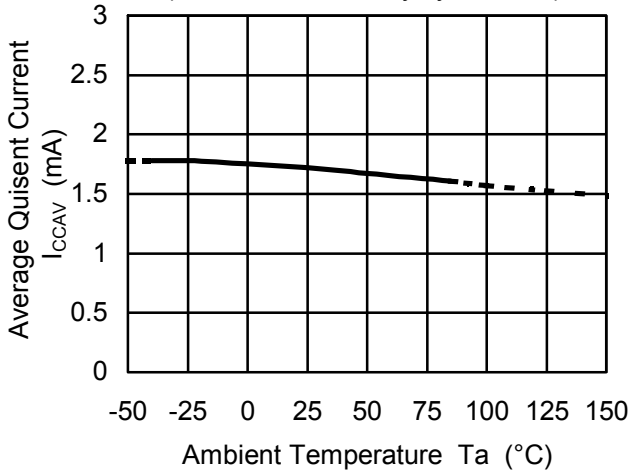
Input Threshold Voltage vs. Temperature
(V^+=12V)



L Level Output Voltage vs. Temperaure
(V^+=12V,I_{SINK}=10mA)



Average Quisent Current vs. Temperature
(V^+=12V,R_L= ∞ ,duty·cycle=50%)



Reference Voltage **1,2 vs. Temperaure**
(V^+=12V)