

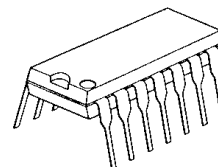
DC/DC CONVERTER CONTROL IC WITH CURRENT SENSE AMPLIFIER

■GENERAL DESCRIPTION

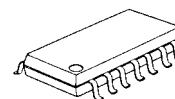
The **NJM2383** is a low voltage operation DC/DC converter control IC featuring high side current protection, soft start and standby functions.

It is suitable for power module application and on-board regulators.

■PACKAGE OUTLINE



NJM2383D



NJM2383M

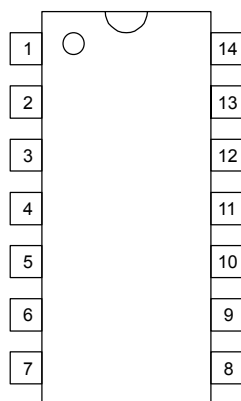


NJM2383V

■FEATURES

- PWM switching control
- Operating Voltage (3.6 to 32V)
- Wide Oscillator Range (5 to 350 kHz)
- ON/OFF Circuit (High Active)
- Current Sensing Amplifier
- Soft-Start Function
- UVLO(Under Voltage Lockouts)
- Bipolar Technology
- Package Outline DIP14, DMP14, SSOP10

■PIN CONFIGURATION

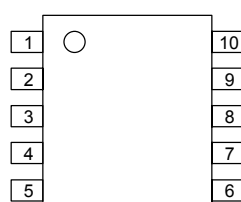


NJM2383D

NJM2383M

PIN FUNCTION

1.NC	8.NC
2.IN ⁻ 1	9. V ⁺
3.IN ⁻ 2	10.CS
4.F.B	11.CT
5.GND	12.REF
6.OUT	13.ON/OFF
7.NC	14.NC



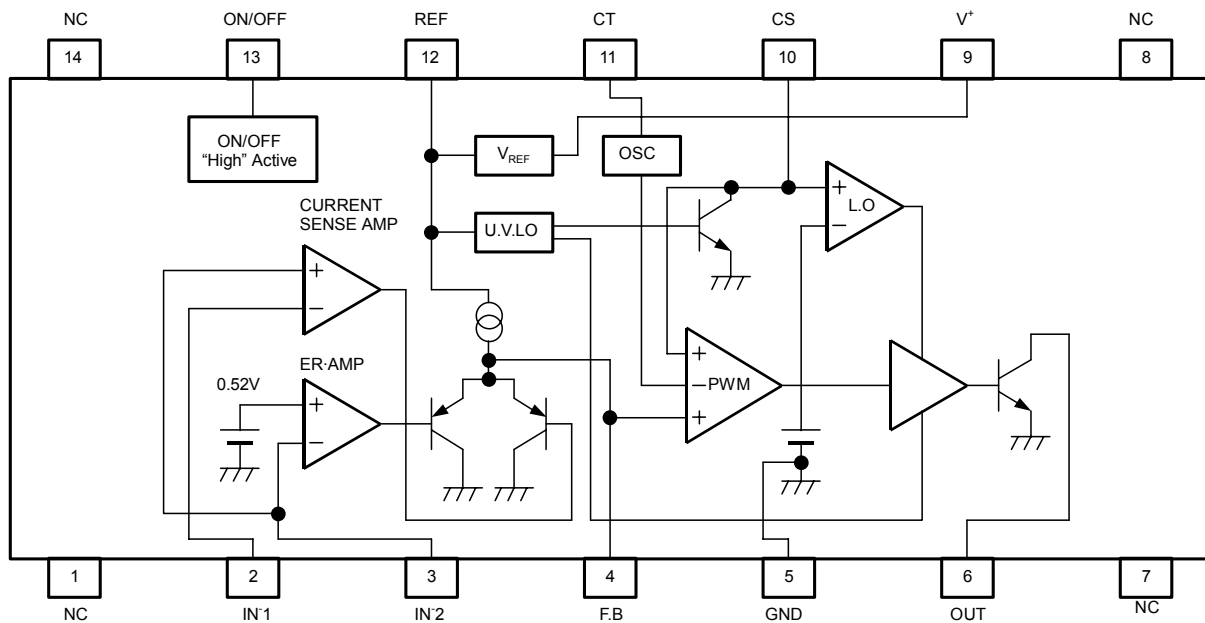
NJM2383V

PIN FUNCTION

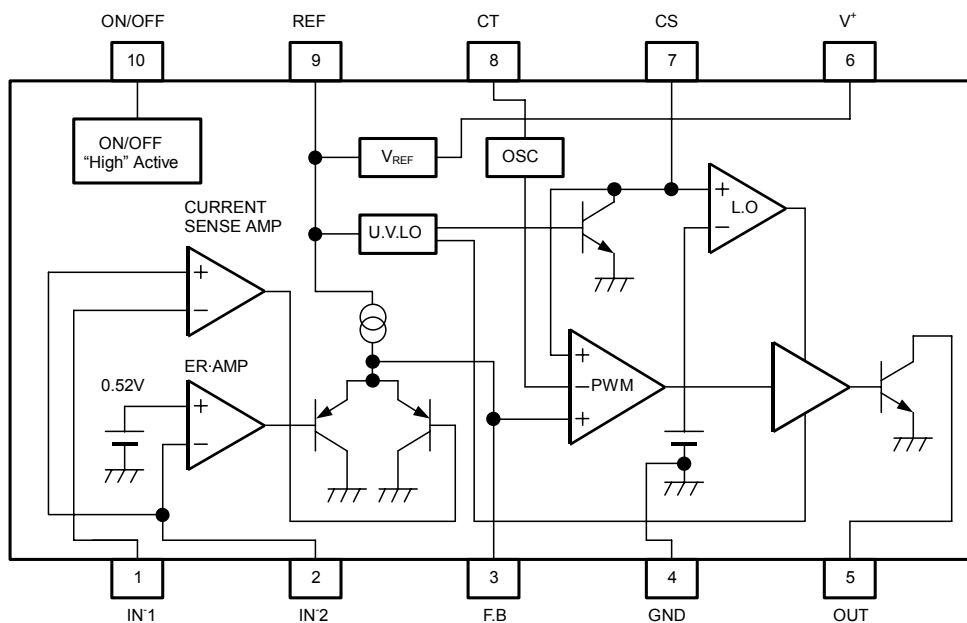
1.IN ⁻ 1	6. V ⁺
2.IN ⁻ 2	7.CS
3.F.B	8.CT
4.GND	9.REF
5.OUT	10.ON/OFF

NJM2383

■BLOCK DIAGRAM



(Package: DIP14, DMP14)



(Package: SSOP10)

■ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	MAXIMUM RATINGS	UNIT
Input Voltage	V^+	36	V
Reference Output Current	I_{OR}	10	mA
Output Sink Current	I_{SINK}	200	mA
Differential Input Voltage	V_{ID}	2.5	V
Common Mode Input Voltage	V_{IC}	-0.3 ~ 2.5	V
ON/OFF Control Voltage	$V_{ON/OFF}$	-0.3 ~ 36 (note)	V
Power Dissipation	P_D	(DIP 14) 700 (DMP 14) 300 (SSOP 10) 250	mW
Operating Temperature Range	T_{OPR}	-40 ~ +85	°C
Storage Temperature Range	T_{STG}	-50 ~ +150	°C

(note) When the supply voltage is less than 36V, the absolute maximum input voltage is equal to the supply voltage.

■ELECTRICAL CHARACTERISTICS ($V^+=6V, R_T=33k\Omega, C_T=1000pF, V_{ON/OFF}=3V, Ta=25^\circ C$)

REFERENCE VOLTAGE BLOCK

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{REF}	$I_{OR}=1mA$	2.45	2.50	2.55	V
Line Regulation	L_{INE}	$V^+=3.6 \sim 32V, I_{OR}=1mA$	—	6.8	20.7	mV
Load Regulation	L_{OAD}	$I_{OR}=0.1 \sim 5.0mA$	—	5	30	mV

OSCILLATOR BLOCK

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Oscillation Frequency	f_{OSC}	$R_T=33k\Omega, C_T=1000pF$	85	105	125	kHz
Oscillate Fluctuations1 (Line Fluctuations)	f_{dV}	$V^+=3.6 \sim 32V$	—	1	—	%
Oscillate Fluctuations2 (Temp Fluctuations)	f_{dT}	$Ta=-40 \sim 85^\circ C$	—	5	—	%

CURRENT SENSE AMPLIFIER BLOCK

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage1	V_{IO1}		—	2	7	mV
Input Offset Current1	I_{IO1}		—	5	—	nA
Input Bias Current1	I_{B1}		—	20	100	nA
Open Loop Gain1	A_{V1}		—	90	—	dB
Gain Bandwidth Product1	G_{B1}		—	0.6	—	MHz
Input Common Mode Voltage Ratio1	V_{ICM1}		—	0 ~ $V_{REF}-0.8$	—	V
Maximum Output Voltage1 (F.B Pin)	V_{OM-1}	$R_{NF}=100k\Omega$	—	—	1	V
Maximum Source Current1 (F.B Pin)	I_{OM+1}	$V_{OM}=0.5V$	40	85	200	μA

NJM2383

■ ELECTRICAL CHARACTERISTICS ($V^+=6V$, $R_T=33k\Omega$, $C_T=1000pF$, $V_{ON/OFF}=3V$, $T_a=25^\circ C$)

ERROR AMPLIFIER BLOCK

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Reference Voltage ₂	V_{B2}		0.51	0.52	0.53	V
Input Bias Current ₂	I_{B2}		–	5	100	nA
Open Loop Gain ₂	A_{v2}		–	90	–	dB
Gain Bandwidth Product ₂	G_{B2}		–	0.6	–	MHz
Maximum Output Voltage ₂ (F.B Pin)	V_{OM-2}	$R_{NF}=100k\Omega$	–	–	1	V
Maximum Source Current ₂ (F.B Pin)	I_{OM+2}	$V_{OM}=0.5V$	40	85	200	μA

PWM COMPARE BLOCK

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Threshold Voltage (F.B Pin)	V_{TH0}	duty·cycle=0% (note)	–	1.65	1.75	V
Input Threshold Voltage (F.B Pin)	V_{TH100}	duty·cycle=100% (note)	–	2.10	–	V

SOFT START CIRCUIT BLOCK

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Bias Current (CS Pin)	I_{BCS}	CS Pin=1.8V	–	250	650	nA
Input Threshold Voltage (CS Pin)	V_{THCS0}	duty·cycle=0% (note)	–	0.25	0.35	V
Input Threshold Voltage (CS Pin)	V_{THCS50}	duty·cycle=100% (note)	–	0.7	–	V

UNDER VOLTAGE LOCKOUT BLOCK

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
ON Threshold Voltage	V_{THON}		–	2.70	–	V
OFF Threshold Voltage	V_{THOFF}		–	2.52	–	V
Hysteresis Voltage	V_{HYS}		60	180	–	mV

OUTPUT BLOCK

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
L Output Voltage (OUT Pin)	V_{OL}	Output Sink Current=100mA	–	0.25	0.65	V

■ELECTRICAL CHARACTERISTICS ($V^+=6V, R_T=33k\Omega, C_T=1000pF, V_{ON/OFF}=3V, T_a=25^\circ C$)

ON/OFF BLOCK

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
OFF Threshold Voltage (ON/OFF Pin)	V_{OFF}		–	–	0.3	V
ON Threshold Voltage (ON/OFF Pin)	V_{ON}		1.1	–	–	V
Input Bias Current (ON/OFF Pin)	$I_{ON/OFF}$	$V_{ON/OFF}=3V$	–	100	120	μA

GENERAL CHARACTERISTICS

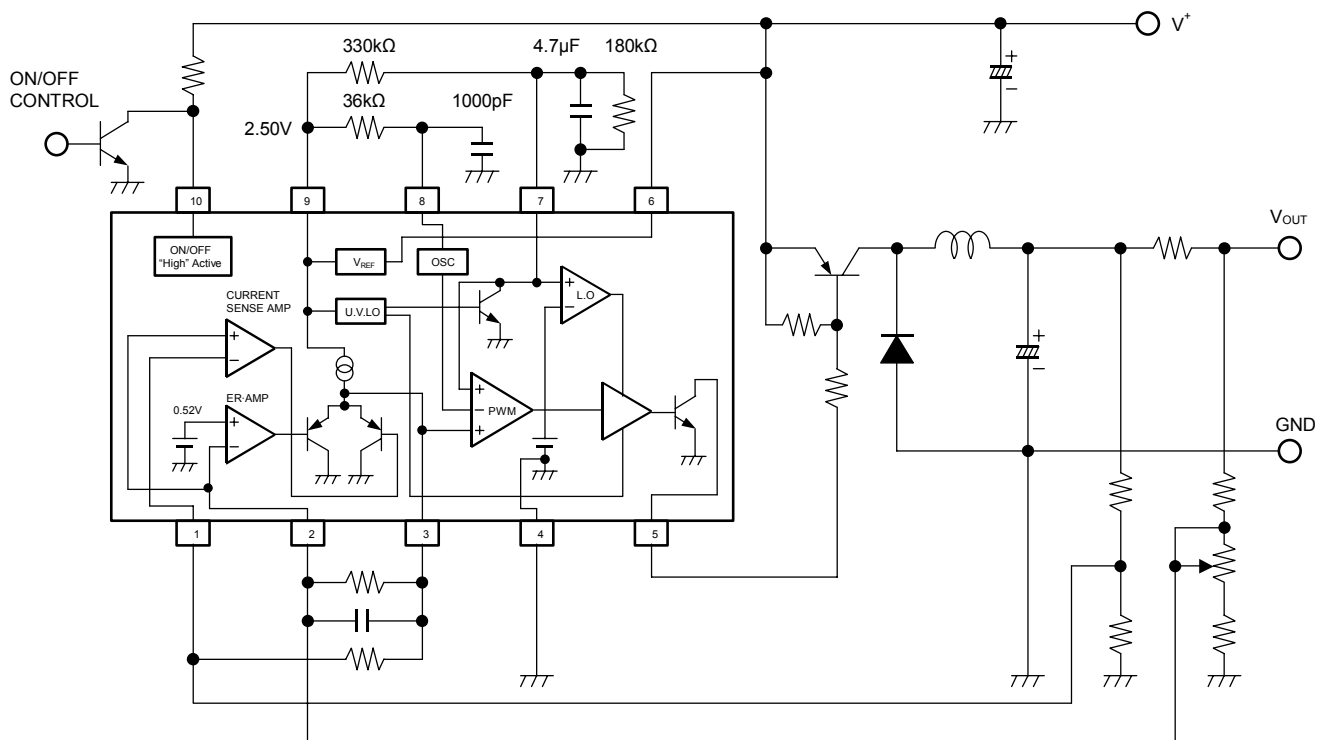
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Stand-by Current	I_{CCSTBY}	Stand-by Mode, $V_{ON/OFF}=0V$	–	12	20	μA
Latch Mode Threshold Voltage (CS Pin)	V_{THLA}		1.2	1.5	1.8	V
Quiescent Current	I_{CCLA}	Latch Mode	–	1.6	2.2	mA
Average Quiescent Current	I_{CCAV}	$RL = \infty$, duty-cycle=50%	–	5.5	10	mA

(note) Duty-Cycle is defined as follows:

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

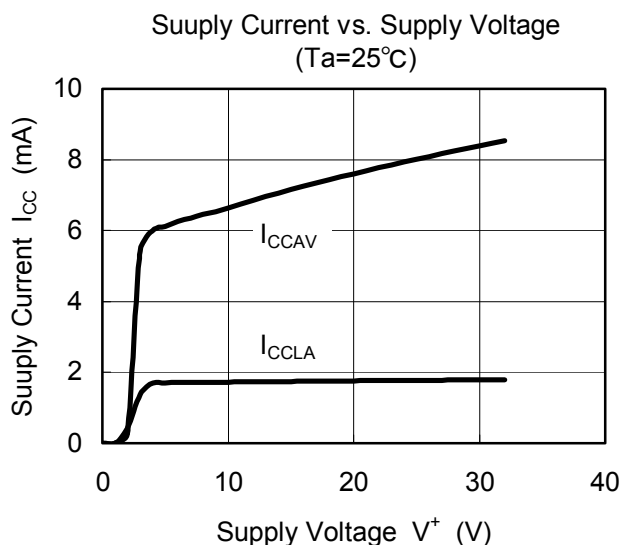
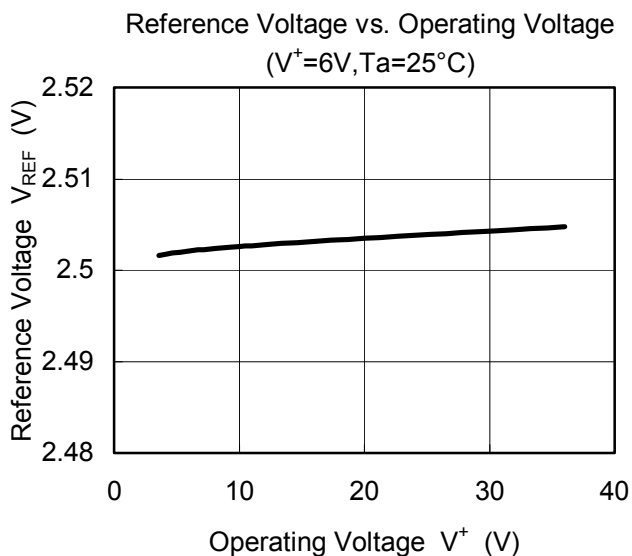
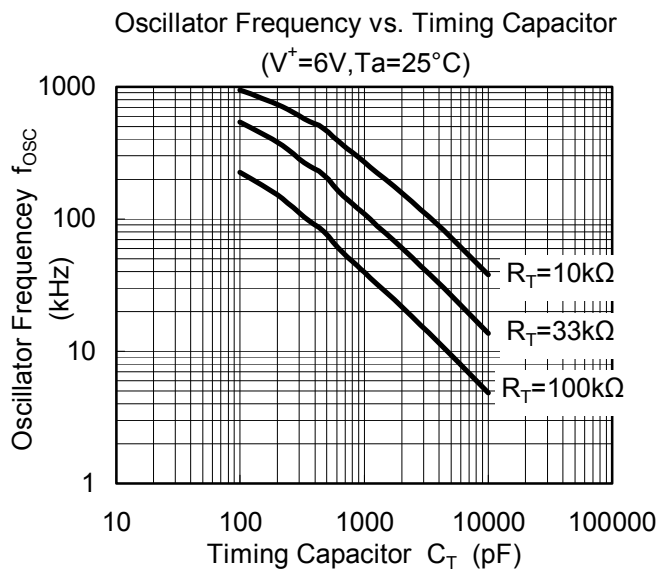
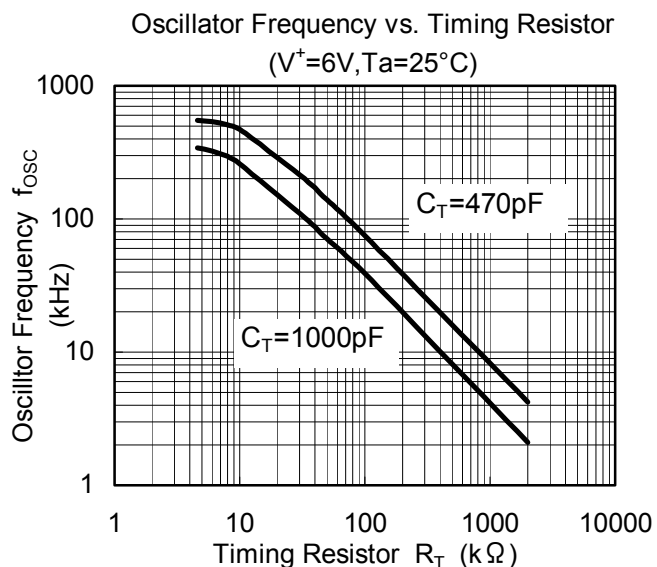
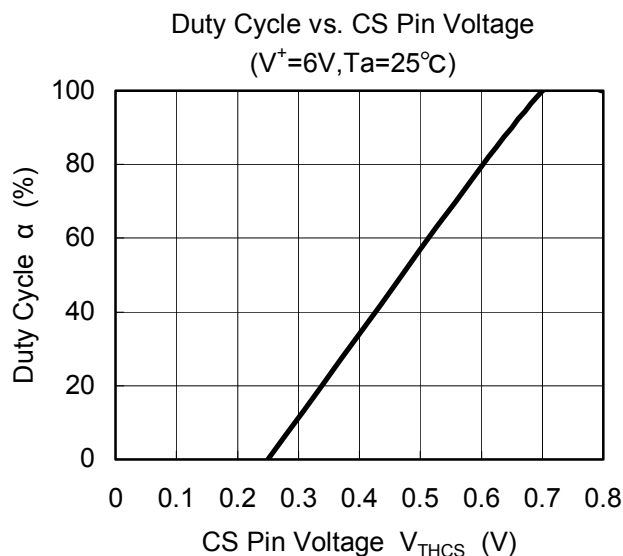
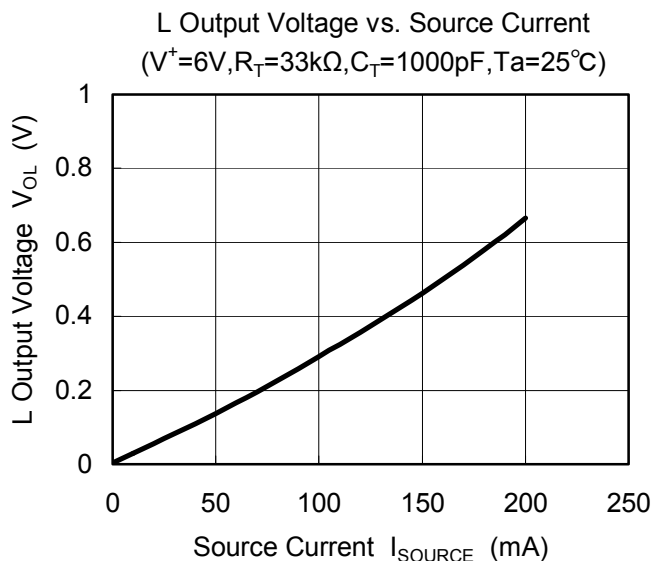
Duty-Cycle=100%: IC output transistor is ON.

■TYPICAL APPLICATIONS



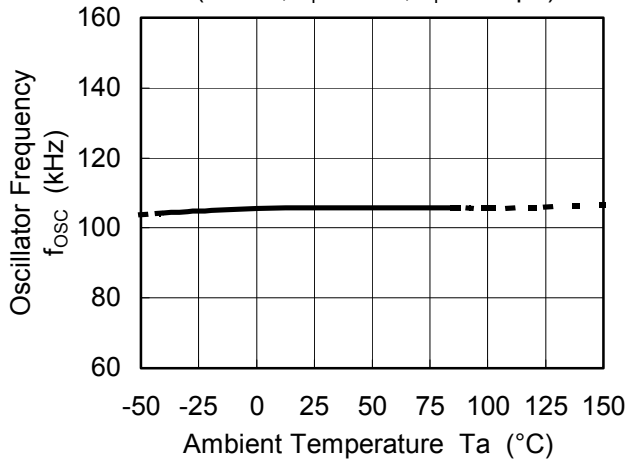
(Package:SSOP10)

■TYPICAL CHARACTERISTICS

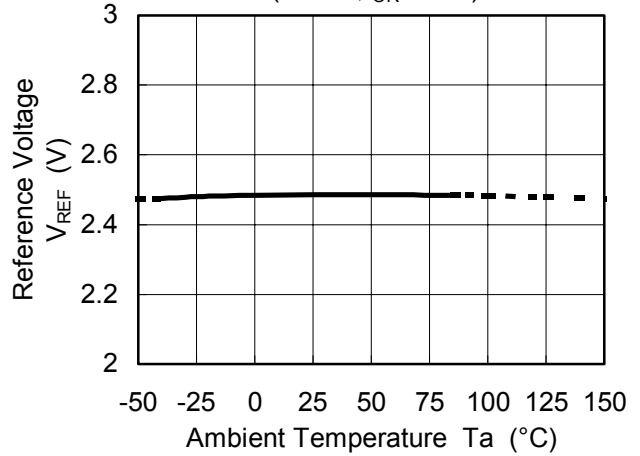


TYPICAL CHARACTERISTICS

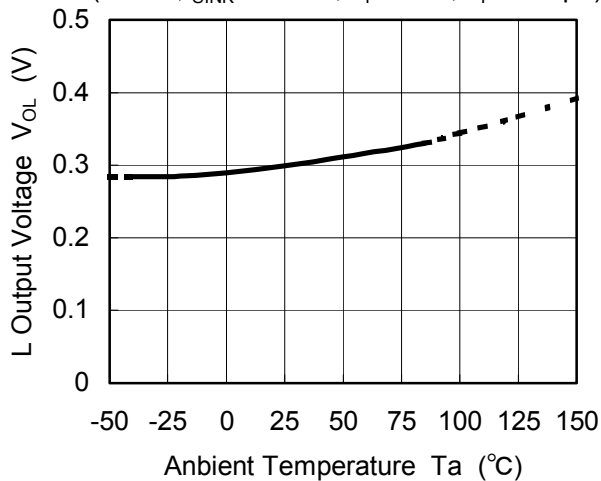
Oscillator Frequency vs. Temperature
($V^+=6V, R_T=33k\Omega, C_T=1000pF$)



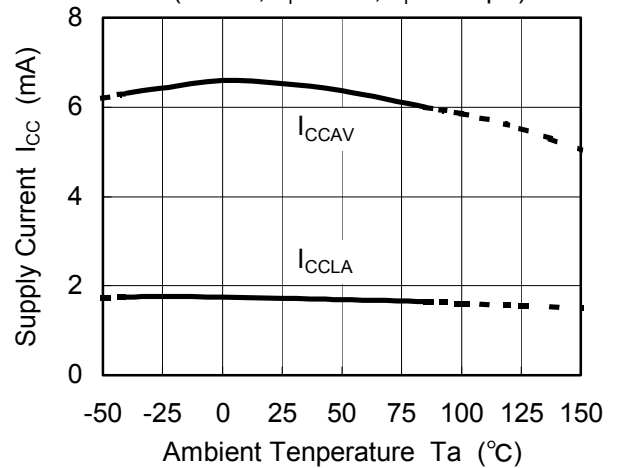
Reference Voltage vs. Temperature
($V^+=6V, I_{OR}=1mA$)



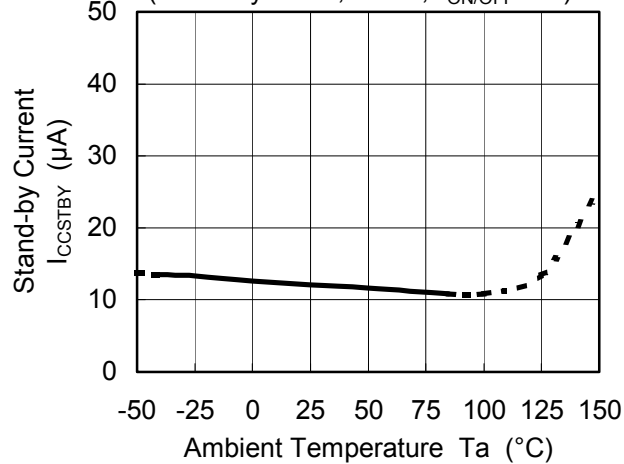
L Output Voltage vs. Temperature
($V^+=6V, I_{SINK}=100mA, R_T=33k\Omega, C_T=1000pF$)



Supply Current vs. Temperature
($V^+=6V, R_T=33k\Omega, C_T=1000pF$)



Stand-by Current vs. Temperature
(Stand-by Mode, $V^+=6V, V_{ON/OFF}=0V$)



[CAUTION]

The specifications on this databook are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.