

Step-Up/Flyback Switching Regulator IC with Constant Current Control

■ GENERAL DESCRIPTION

The **NJU7620** is a low voltage operation high-speed switching regulator control IC for step-up and flyback converter, with a constant current control. It incorporates a totem pole output, which can drive an external MOS-FET easily. It also incorporates error amplifier and current sense amplifier, which can allow the constant voltage/current control for output voltage. Therefore the NJU7620 is suitable for a LED driving and other CCCV applications up to 10W.

The NJU7620 is available in a small and thin 8-lead MSOP (TVSP) package.

■ FEATURES

- PWM switching control
- Constant Current Control
- Operating Voltage 2.2V to 8V
- Wide Oscillator Range 300kHz to 1MHz
- Maximum Duty Cycle 90% typ.
- Quiescent Current 800 μ A typ.
- Soft-Start Function Internal : 16ms typ. or adjustable
- Dead Time Control
- C-MOS Technology
- Package Outline NJU7620RB1 : MSOP8 (TVSP8)*

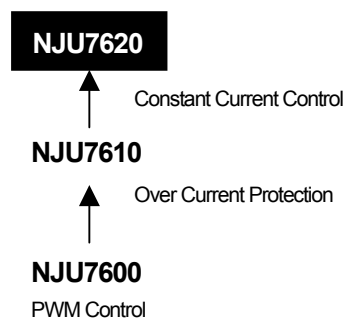
*MEET JEDEC MO-187-DA / THIN TYPE

■ PACKAGE OUTLINE

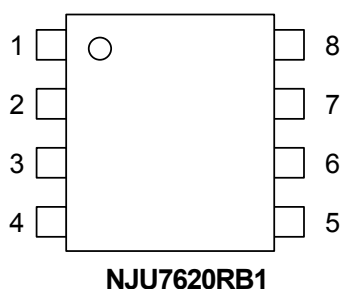


NJU7620RB1
(MSOP8 (TVSP8))

■ PRODUCT VARIATION



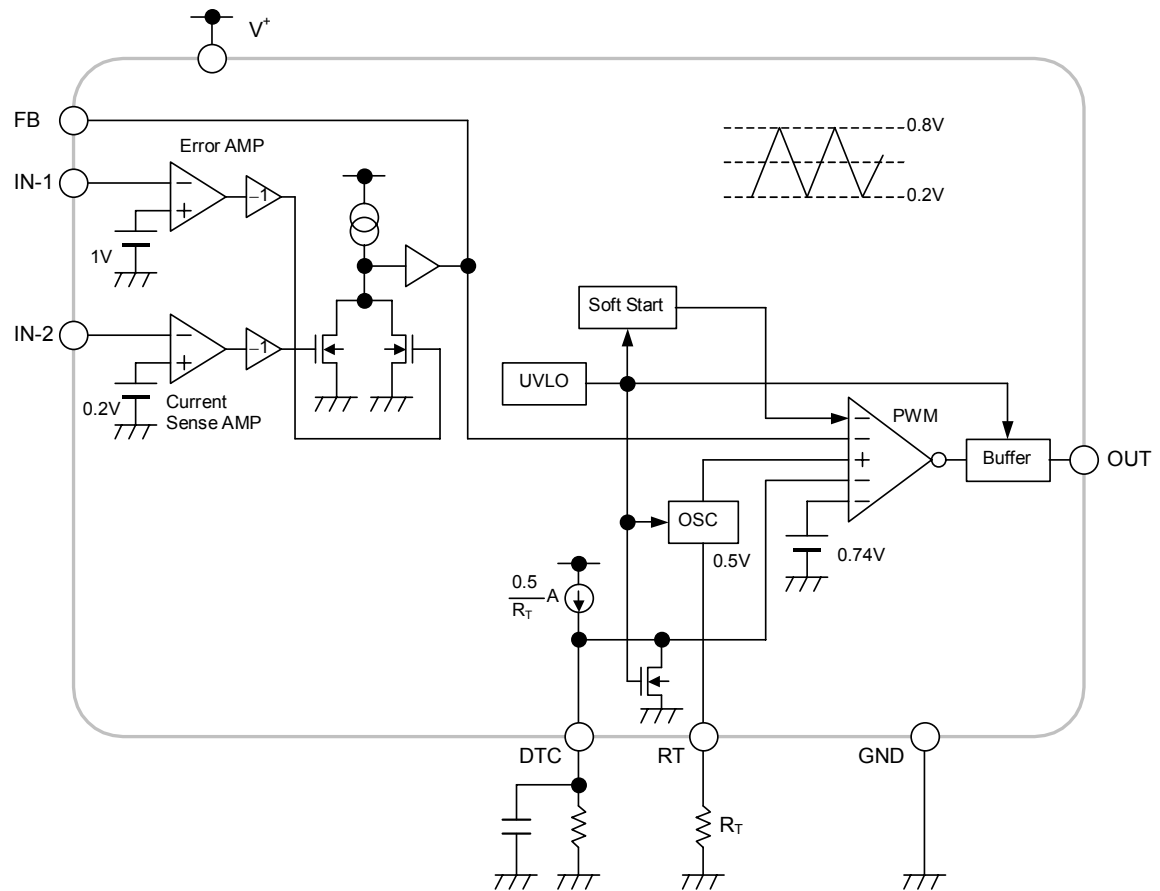
■ PIN CONFIGURATION



PIN FUNCTION

1. V⁺
2. FB
3. IN-1
4. IN-2
5. DTC
6. RT
7. GND
8. OUT

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	MAXIMUM RATINGS	UNIT
Supply Voltage	V^+	+9	V
Output Pin Current	I_O	±50	mA
Power Dissipation	P_D	MSOP8 (TVSP8) :320	mW
Operating Temperature Range	T_{OPR}	-40 to +85	°C
Storage Temperature Range	T_{STG}	-40 to +125	°C

■ RECOMMENDED OPERATING CONDITIONS

(Ta=25°C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V^+	2.2	—	8	V
Oscillator Timing Resistor	R_T	30	47	120	kΩ
Oscillation Frequency	f_{OSC}	300	700	1,000	kHz

■ ELECTRICAL CHARACTERISTICS

($V^+=3.3V$, $R_T=47k\Omega$, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
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Under Voltage Lockout Block

ON Threshold Voltage	V_{T_ON}	$V^+ = L \rightarrow H$	1.9	2.0	2.1	V
OFF Threshold Voltage	V_{T_OFF}	$V^+ = H \rightarrow L$	1.8	1.9	2.0	V
Hysteresis Voltage	V_{HYS}		60	100	—	mV

Soft Start Block

Soft Start Time	T_{SS}	$V_{T_ON} \rightarrow \text{Duty}=80\%$	8	16	24	ms
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Oscillator Block

RT Pin Voltage	V_{RT}		-5%	0.5	+5%	V
Oscillation Frequency	f_{OSC}		630	700	770	kHz
Oscillate Supply Voltage Fluctuations	f_{DV}	$V^+=2.2V$ to 8V	—	1	—	%
Oscillate Temperature Fluctuations	f_{DT}	Ta=-40°C to +85°C	—	3	—	%

■ELECTRICAL CHARACTERISTICS ($V^+=3.3V$, $R_T=47k\Omega$, $T_a=25^\circ C$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
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Error Amplifier Block

Reference Voltage 1	V_{B1}		-1.5%	1.00	+1.5%	V
Input Bias Current 1	I_{B1}		-0.1	—	0.1	μA
Open Loop Gain 1	A_{V1}		—	80	—	dB
Gain Bandwidth Product 1	G_{B1}		—	1	—	MHz
Output Source Current 1	I_{OM+_1}	$V_{FB}=1V$, $V_{IN-1}=0.9V$, $V_{IN-2}=0.1V$	25	55	95	mA
	I_{OM+_2}	$V_{FB}=1V$, $V_{IN-1}=0.9V$, $V_{IN-2}=0.1V$, $V^+=2.2V$	4	9	16	mA
Output Sink Current 1	I_{OM-}	$V_{FB}=1V$, $V_{IN-1}=1.1V$, $V_{IN-2}=0.1V$	0.10	0.16	0.22	mA

Current Sense Amplifier Block

Reference Voltage 2	V_{B2}		-10%	0.2	+10%	V
Input Bias Current 2	I_{B2}		-0.1	—	0.1	μA
Open Loop Gain 2	A_{V2}		—	70	—	dB
Gain Bandwidth Product 2	G_{B2}		—	1	—	MHz
Output Sink Current 2	I_{OM2-}	$V_{FB}=1V$, $V_{IN-1}=0.9V$, $V_{IN-2}=0.3V$	0.10	0.16	0.22	mA

PWM Compare Block

Input Threshold Voltage	V_{T_0}	Duty=0%	0.16	0.22	0.28	V
	V_{T_50}	Duty=50%	0.44	0.5	0.56	V
Maximum Duty Cycle	$M_{AX}D_{UTY_1}$	$V_{FB}=0.9V$	85	90	95	%
	$M_{AX}D_{UTY_2}$	$V_{FB}=0.9V$, $R_{DTC}=47k\Omega$	40	50	60	%

Output Block

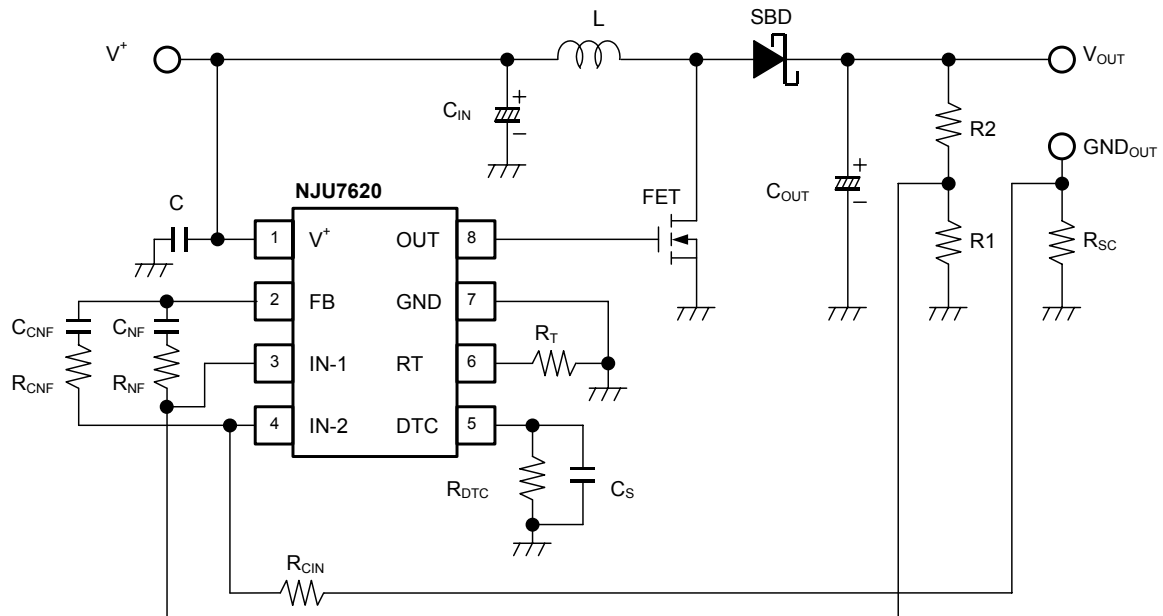
Output High Level ON Resistance	R_{OH}	$I_O=-20mA$	—	10	20	Ω
Output Low Level ON Resistance	R_{OL}	$I_O=+20mA$	—	5	10	Ω

General Characteristics

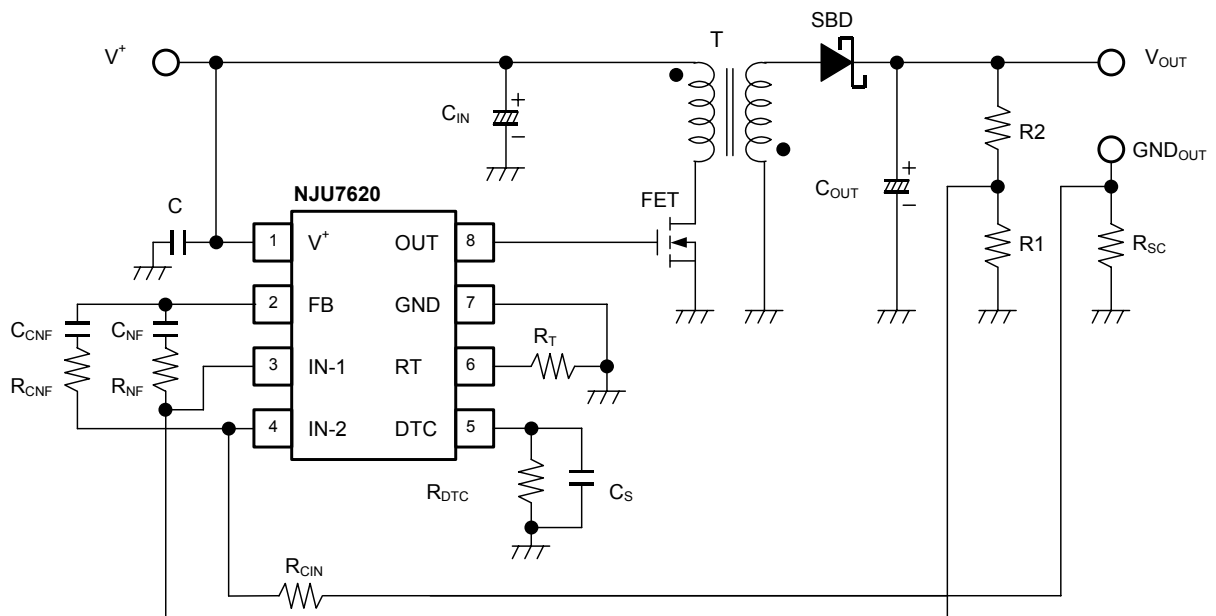
Quiescent Current	I_{DD}	$R_L=Non\ Load$	—	800	1200	μA
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■ TYPICAL APPLICATIONS

Step-Up Converter

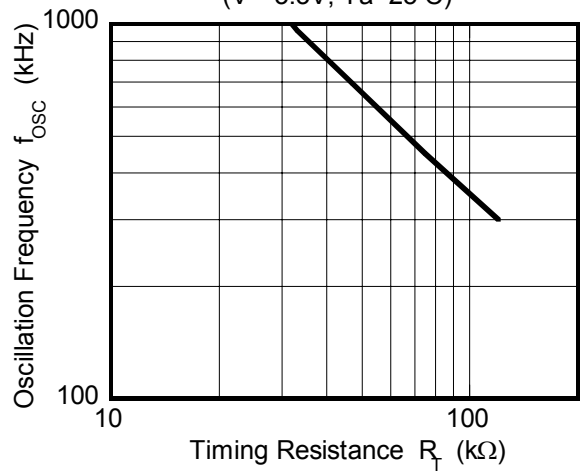


Flyback Converter

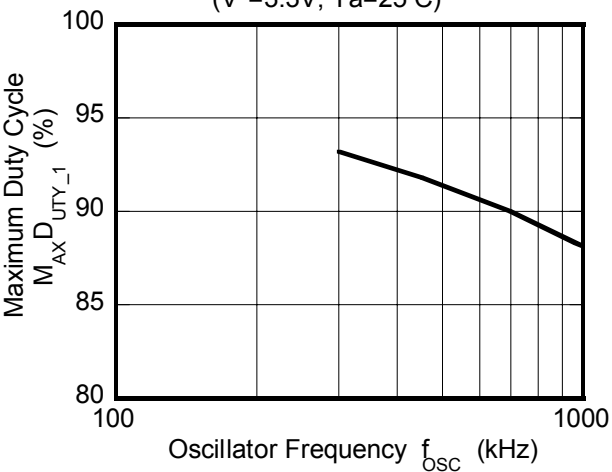


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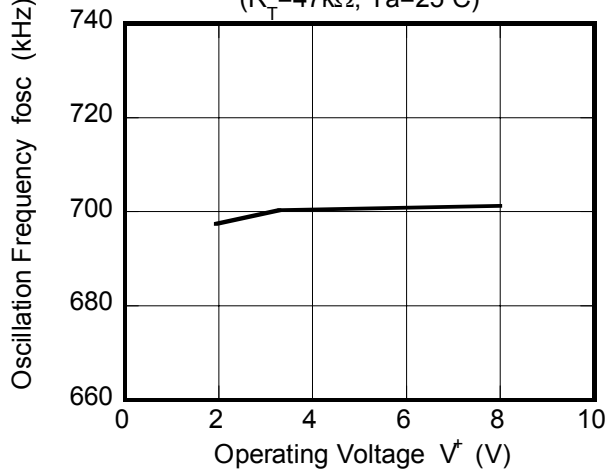
Oscillation Frequency vs. Timing Resistance
($V^+=3.3V$, $T_a=25^{\circ}C$)



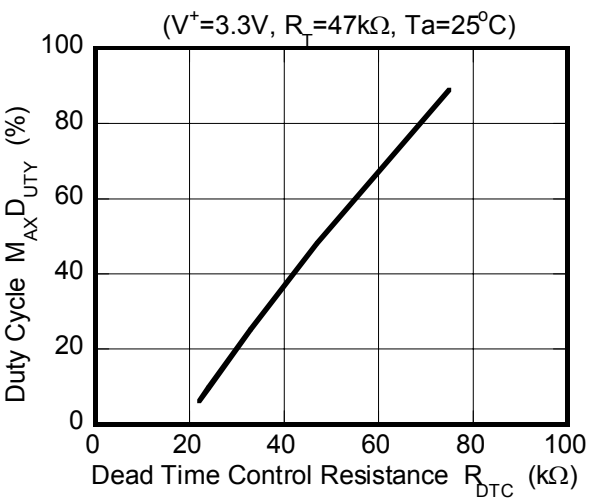
Maximum Duty Cycle vs. Oscillator Frequency
($V^+=3.3V$, $T_a=25^{\circ}C$)



Oscillation Frequency vs. Operating Voltage
($R_T=47k\Omega$, $T_a=25^{\circ}C$)

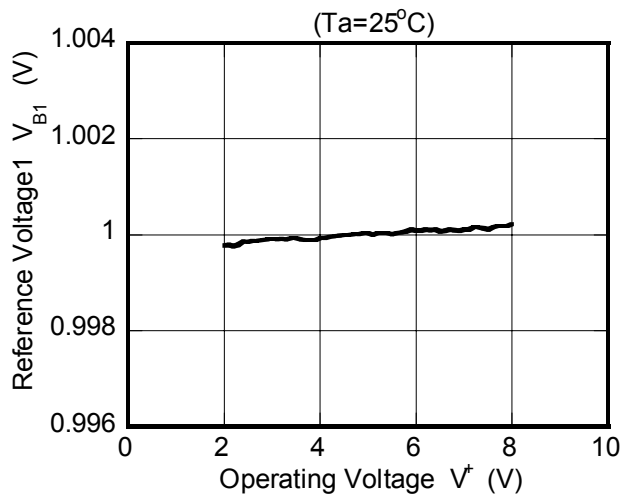


Duty Cycle vs. R_{DTC}

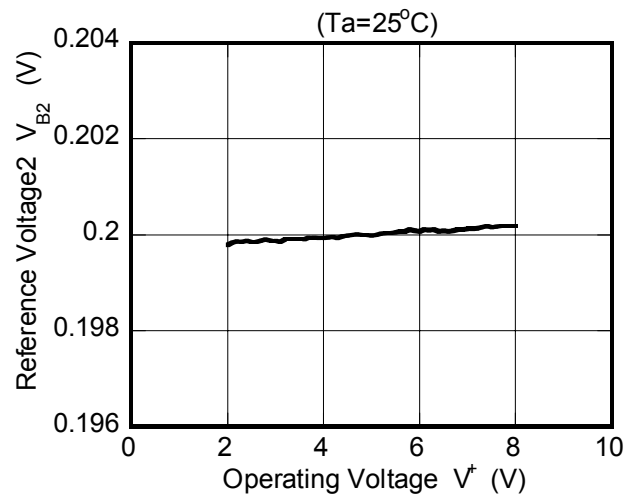


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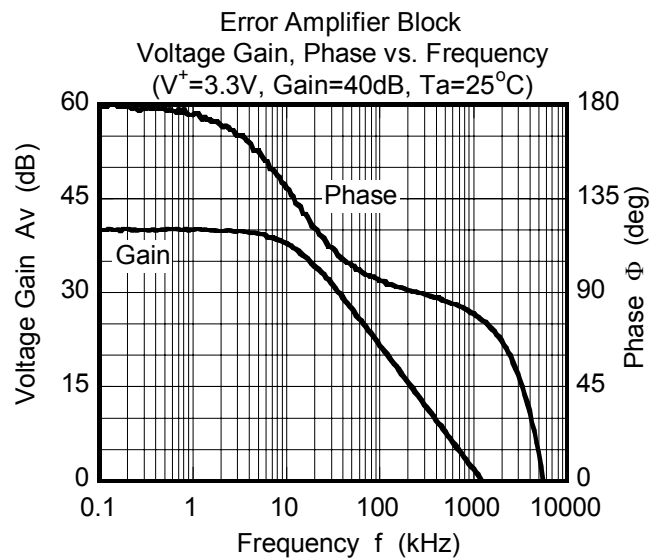
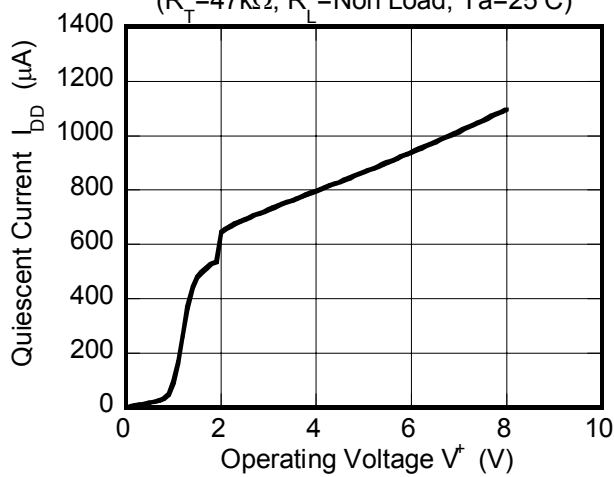
Error Amplifier Block
Reference Voltage1 vs. Operating Voltage



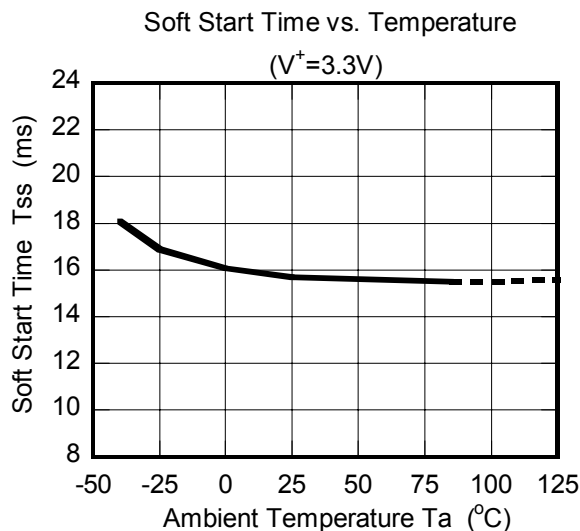
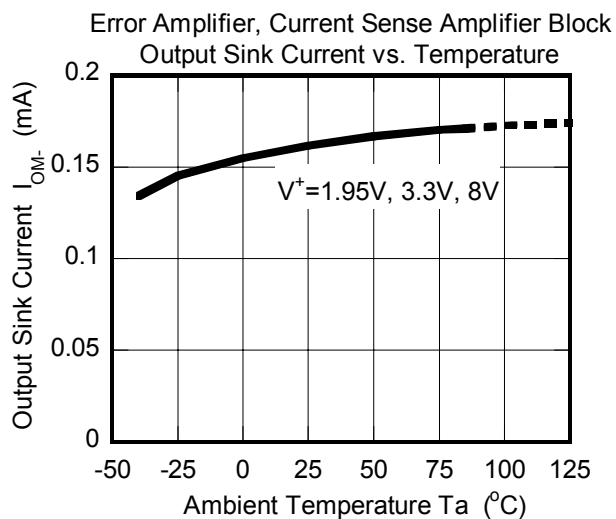
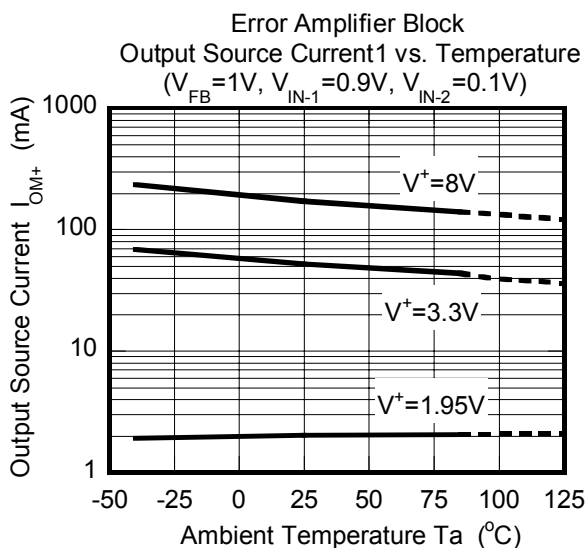
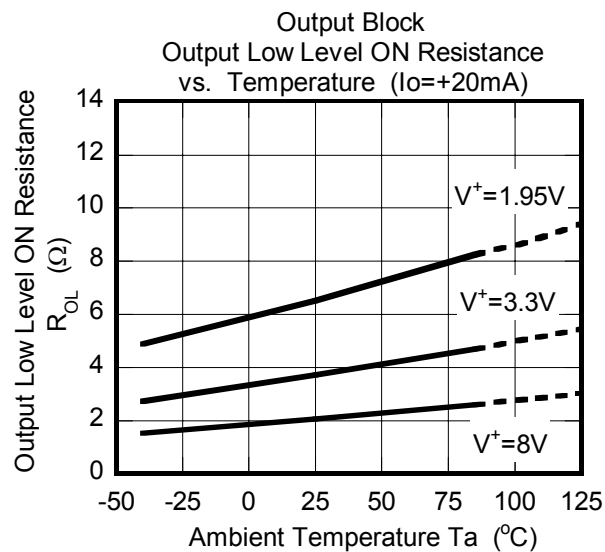
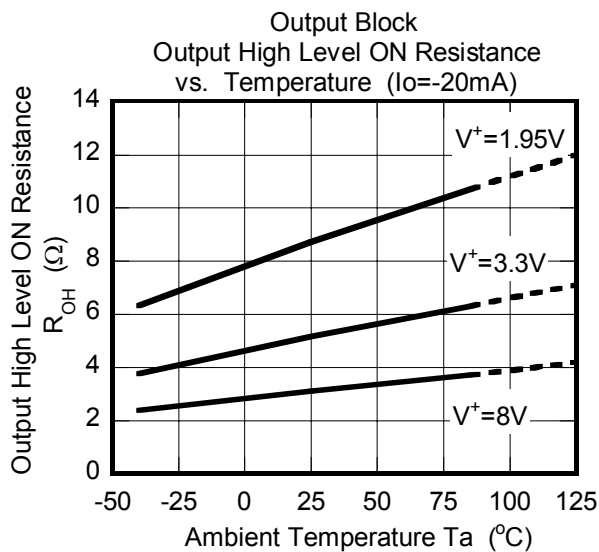
Current Sense Amplifier Block
Reference Voltage2 vs. Operating Voltage



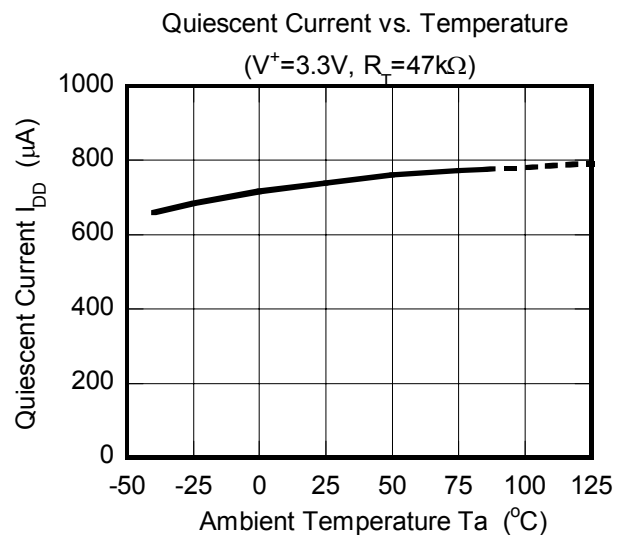
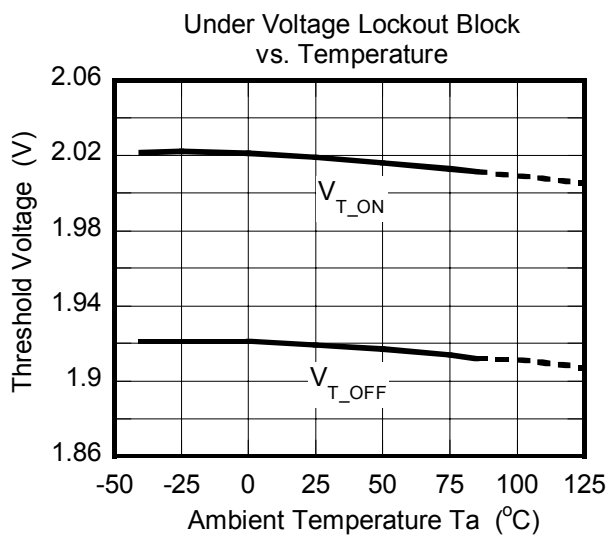
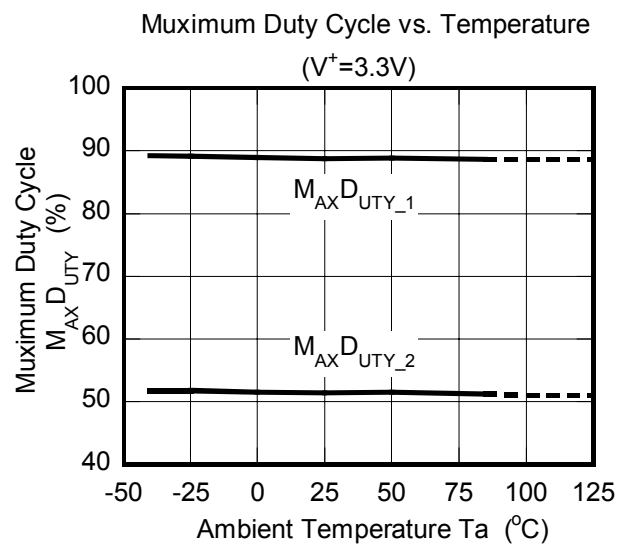
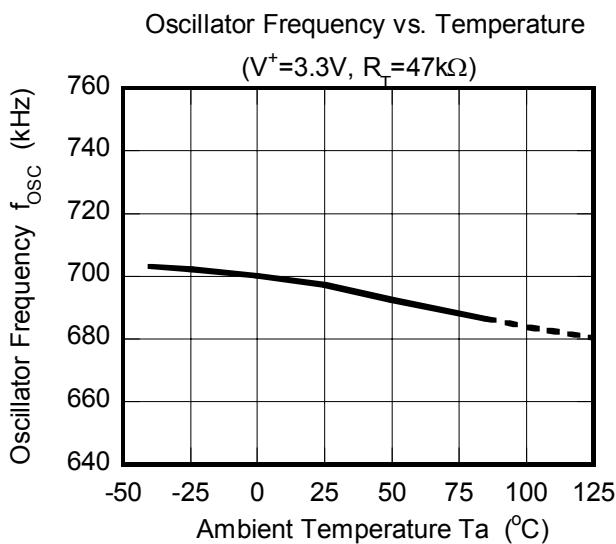
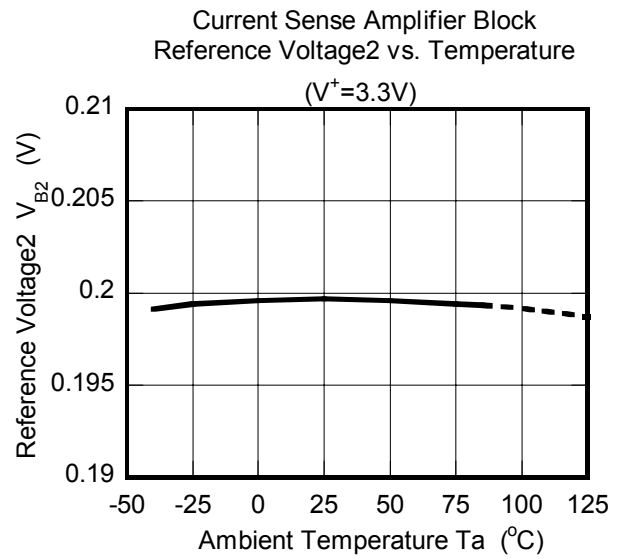
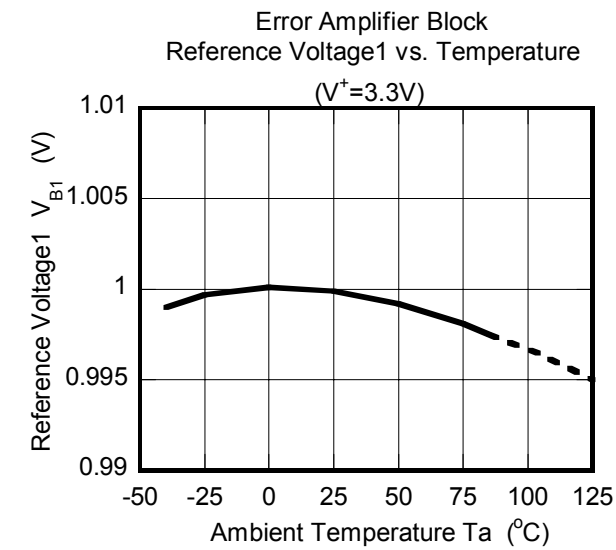
Quiescent Current vs. Operating Voltage
($R_T=47k\Omega$, R_L =Non Load, Ta=25°C)



■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS



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[CAUTION]

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