

1.8V Operate PWM control Step-Up / Flyback switching regulator IC

■GENERAL DESCRIPTION

NJU7677 is a high speed low voltage operation switching regulator control IC. It features a totem pole driver that can directly drive an external MOS-FET.

Internal soft-start function, dead time control and timer latch function are included, requiring no external components. All parameters can be optimized by additional external components for design flexibility.

■PACKAGE OUTLINE

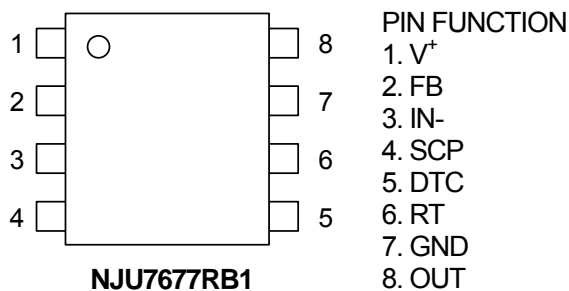


NJU7677RB1

■FEATURES

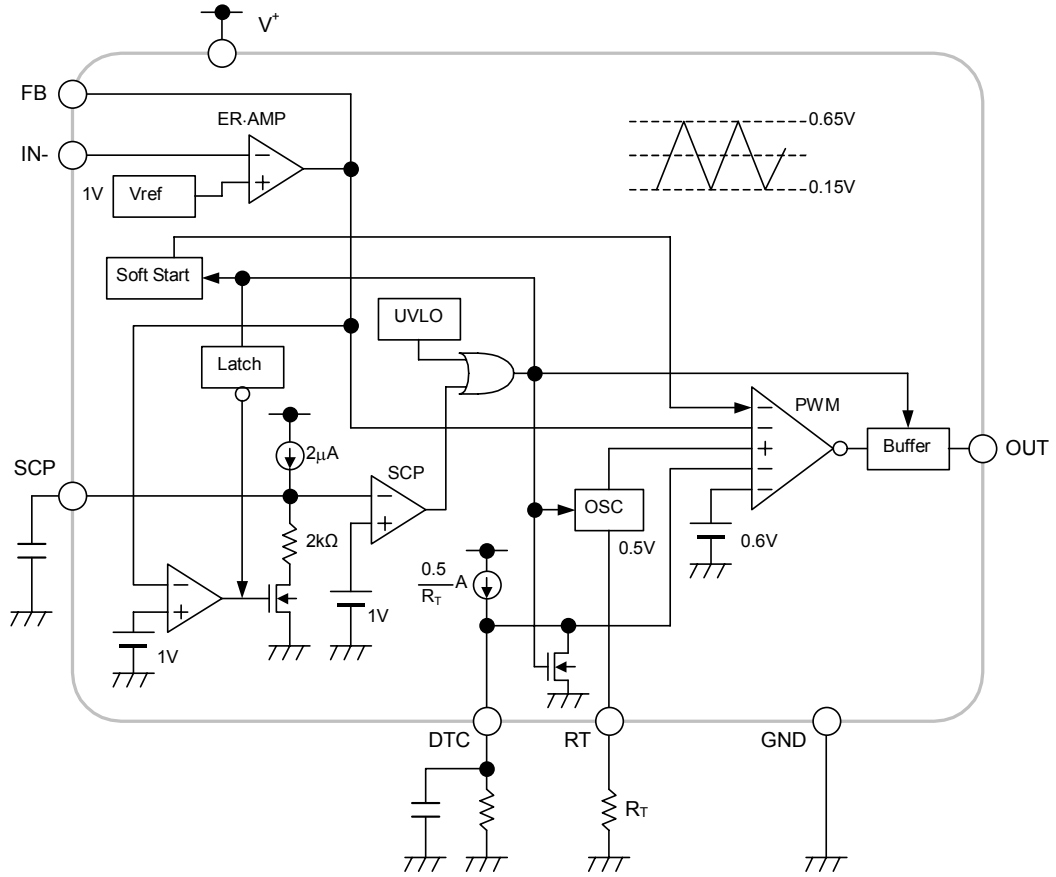
- PWM switching control
- Operating Voltage 1.8V to 7V
- Wide Oscillator Range 300kHz to 1MHz
- Maximum Duty Cycle 90% typ.
- Quiescent Current 600 μ A typ.
- Soft-Start Function Internal : 4ms typ. or adjustable
- Dead Time Control
- Timer Latch for Short Circuit Protection
- C-MOS Technology
- Package Outline NJU7677RB1 : TVSP8

■PIN CONFIGURATION



NJU7677

■BLOCK DIAGRAM



■ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	MAXIMUM RATINGS	UNIT
Supply Voltage	V^+	+8	V
Output Pin Current	I_O	±50	mA
Power Dissipation	P_D	320	mW
Operating Temperature Range	T_{OPR}	-40 ~ +85	°C
Storage Temperature Range	T_{STG}	-40 ~ +125	°C

■RECOMMENDED OPERATING CONDITIONS (Ta=25°C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V^+	1.8	—	7	V
Oscillator Timing Resistor	R_T	30	47	120	kΩ
Oscillation Frequency	f_{OSC}	300	700	1,000	kHz

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

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Under Voltage Lockout Block						
ON Threshold Voltage	V_{T_ON}	$V^+ = L \rightarrow H$	1.6	1.7	1.8	V
OFF Threshold Voltage	V_{T_OFF}	$V^+ = H \rightarrow L$	1.5	1.6	1.7	V
Hysteresis Voltage	V_{HYS}		60	100	—	mV
Soft Start Block						
Soft Start Time	T_{SS}	$V_{T_ON} \rightarrow$ Duty=80%	2	4	8	ms
Short Circuit Protection Block						
Input Threshold Voltage	V_{T_PC}	FB Pin	0.95	1.00	1.05	V
Charge Current	I_{CHG}	$V_{SCP}=0V$	1.5	2	2.5	μA
Latch Mode ON Threshold Voltage	V_{T_LA}	SCP Pin	0.90	1.00	1.10	V
Latch Mode OFF Threshold Voltage	V_{T_LAOFF}	SCP Pin	0.35	0.6	0.85	V
Oscillator Block						
RT Pin Voltage	V_{RT}		-8%	0.5	+8%	V
Oscillation Frequency	f_{OSC}		630	700	770	kHz
Oscillate Supply Voltage Fluctuations	f_{DV}	$V^+=1.8V \sim 7V$	—	1	—	%
Oscillate Temperature Fluctuations	f_{DT}	$T_a=-40^\circ C \sim +85^\circ C$	—	3	—	%

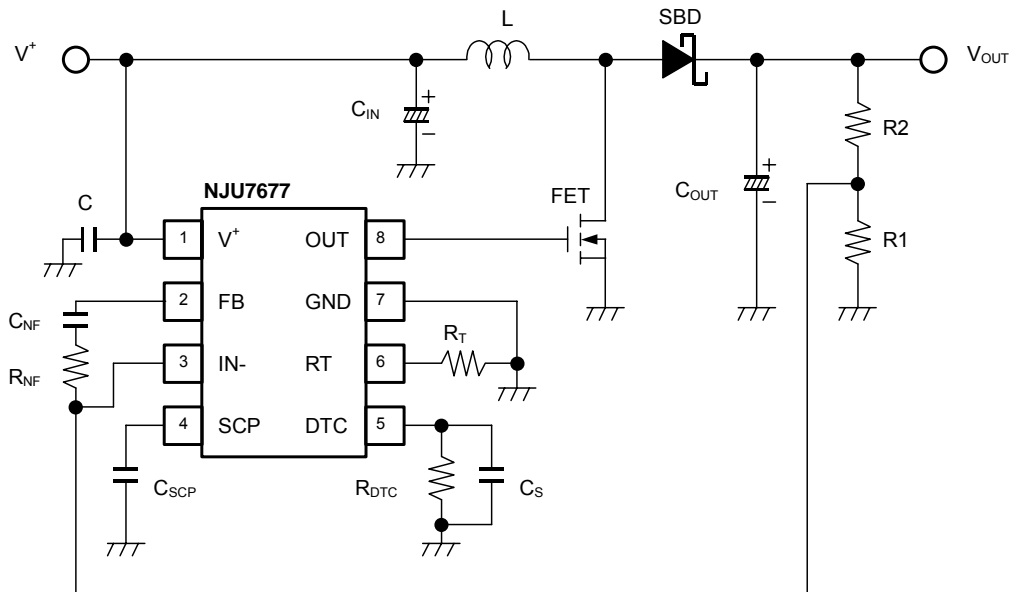
NJU7677

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

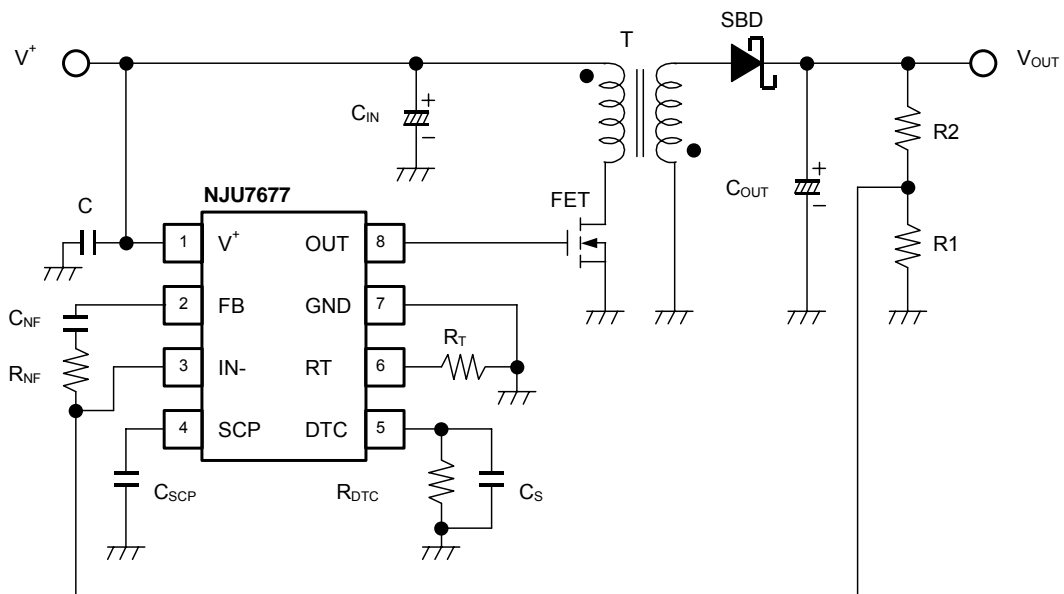
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Error Amplifier Block						
Reference Voltage	V_B		-1.0%	1.00	+1.0%	V
Input Bias Current	I_B		-0.1	–	0.1	μA
Open Loop Gain	A_V		–	80	–	dB
Gain Bandwidth Product	G_B		–	1	–	MHz
Output Source Current	I_{OM+}	$V_{FB}=1V$, $V_{IN-}=0.9V$	20	35	50	μA
Output Sink Current	I_{OM-}	$V_{FB}=1V$, $V_{IN-}=1.1V$	1.0	4.0	12	mA
PWM Compare Block						
Input Threshold Voltage	$V_{T,0}$	Duty=0%	0.10	0.16	0.22	V
	$V_{T,50}$	Duty=50%	0.36	0.42	0.48	V
Maximum Duty Cycle	$M_{AX}D_{UTY,1}$	$V_{FB}=0.9V$	85	90	95	%
	$M_{AX}D_{UTY,2}$	$V_{FB}=0.9V$, $R_{DTC}=43k\Omega$	45	55	65	%
Output Block						
Output High Level ON Resistance	R_{OH}	$I_O=-20mA$	–	6	12	Ω
	$R_{OH,1.8}$	$I_O=-20mA$, $V^+=1.8V$	–	10	20	Ω
Output Low Level ON Resistance	R_{OL}	$I_O=+20mA$	–	4.5	9	Ω
	$R_{OL,1.8}$	$I_O=+20mA$, $V^+=1.8V$	–	8	16	Ω
General Characteristics						
Quiescent Current	I_{DD}	$R_L=Non\ Load$	–	600	900	μA

■ TYPICAL APPLICATIONS

Step-Up Converter

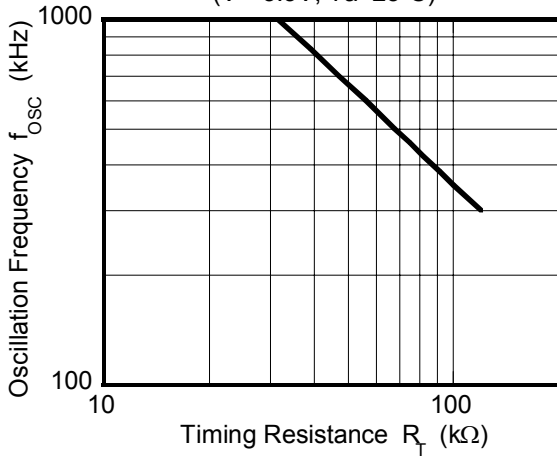


Flyback Converter

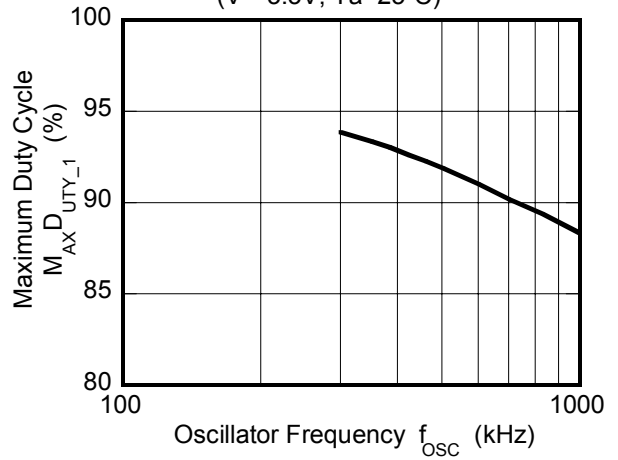


■ TYPICAL CHARACTERISTICS

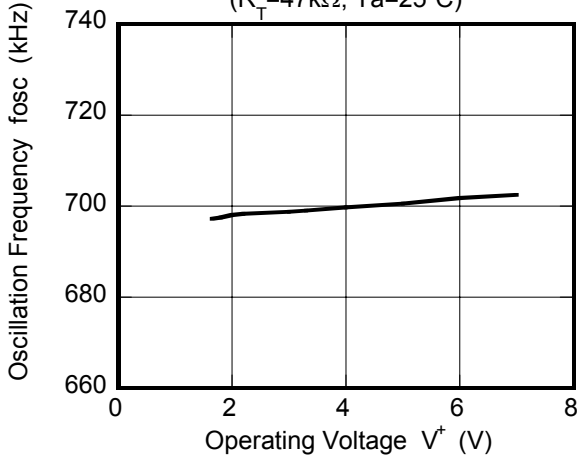
Oscillation Frequency vs. Timing Resistance
($V^+ = 3.3V$, $T_a = 25^\circ C$)



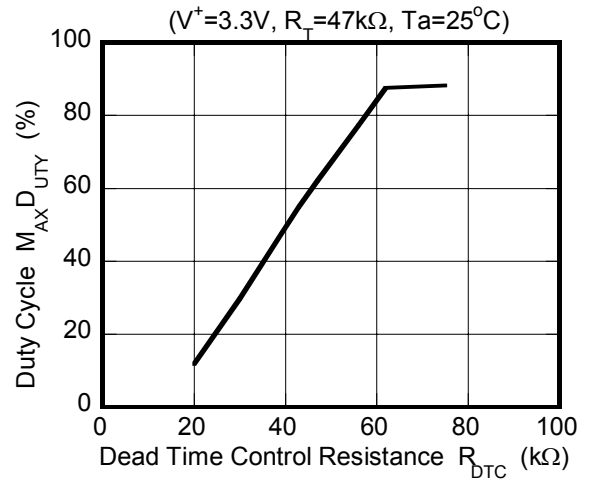
Maximum Duty Cycle vs. Oscillator Frequency
($V^+ = 3.3V$, $T_a = 25^\circ C$)



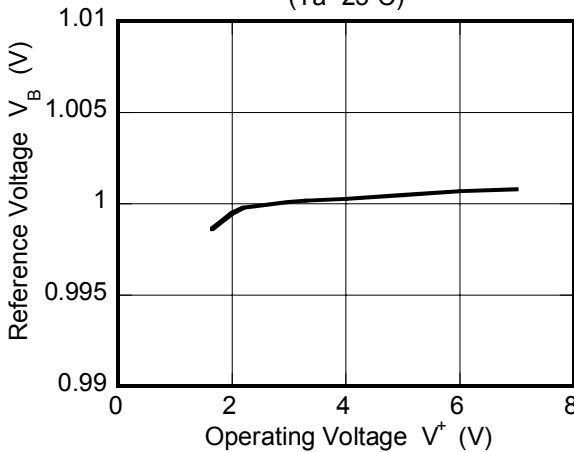
Oscillation Frequency vs. Operating Voltage
($R_T = 47k\Omega$, $T_a = 25^\circ C$)



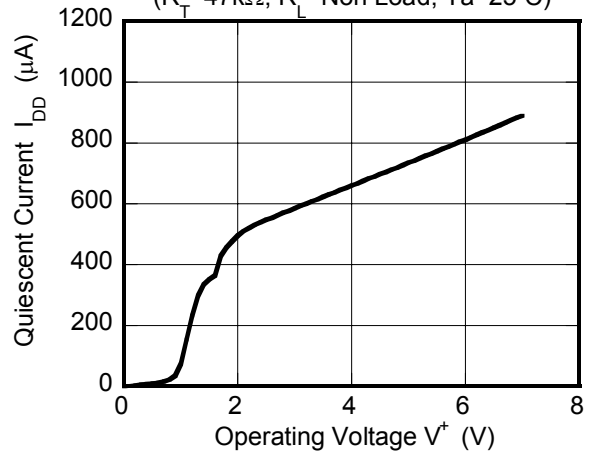
Duty Cycle vs. R_{DTC}



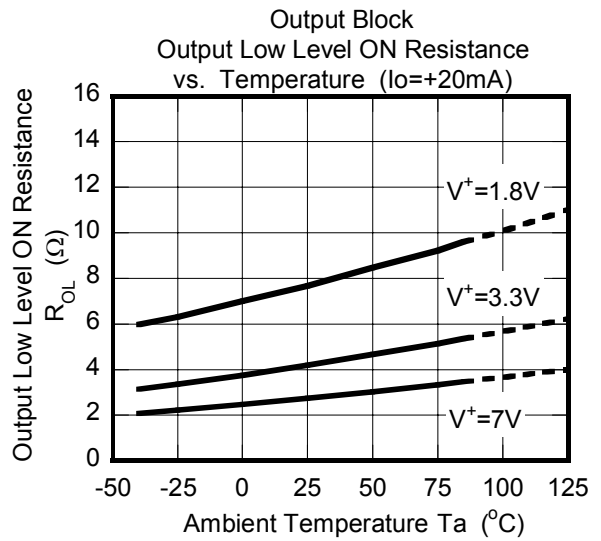
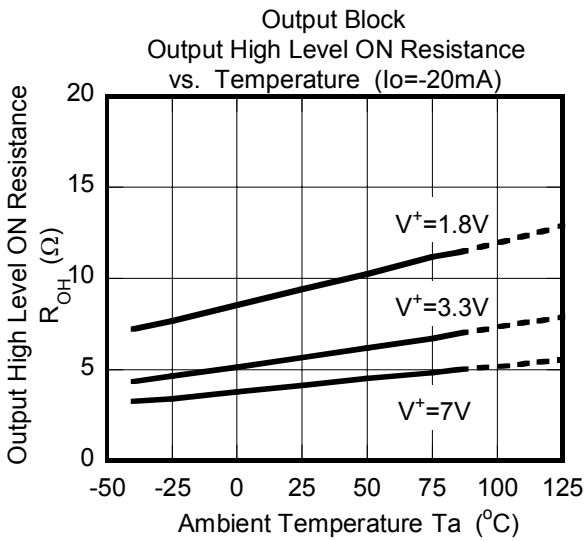
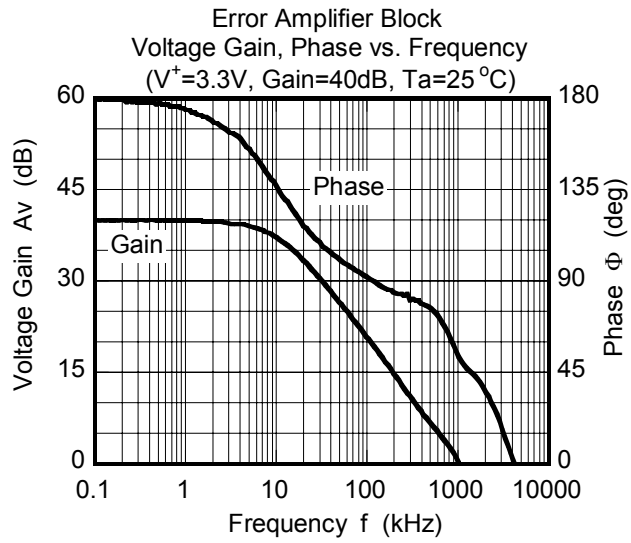
Reference Voltage vs. Operating Voltage
($T_a = 25^\circ C$)



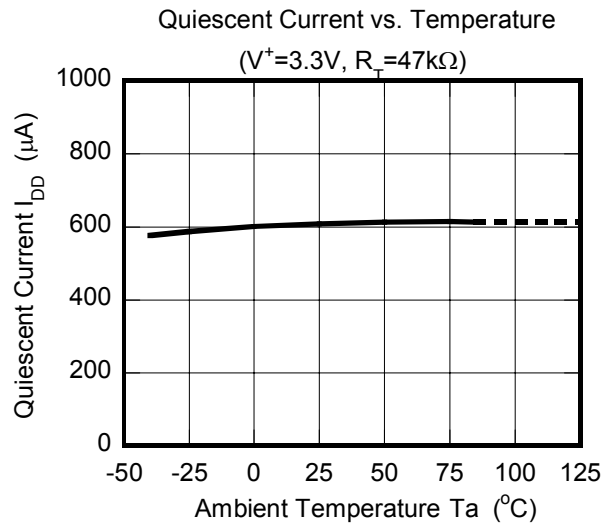
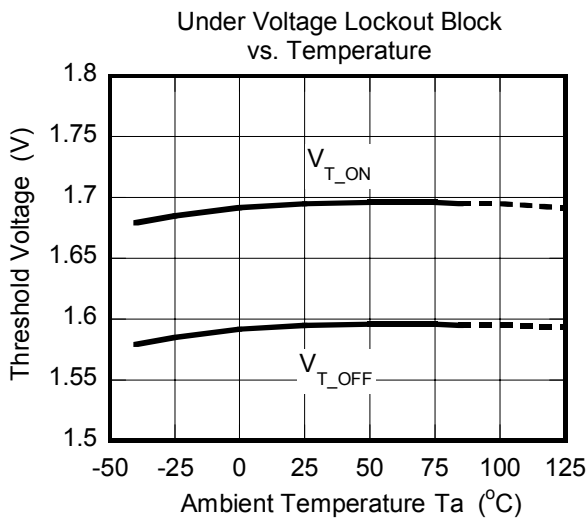
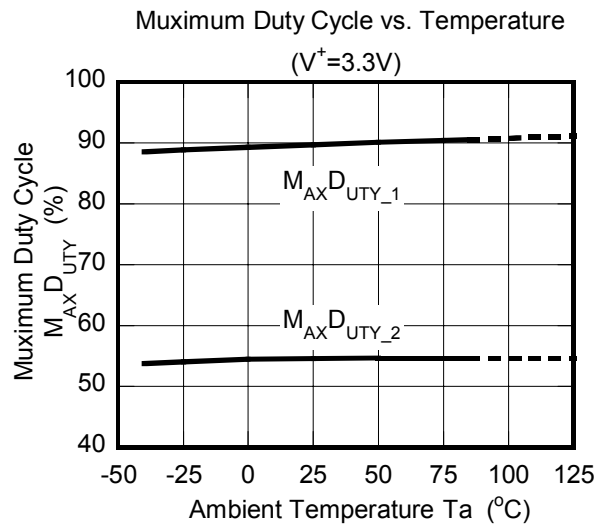
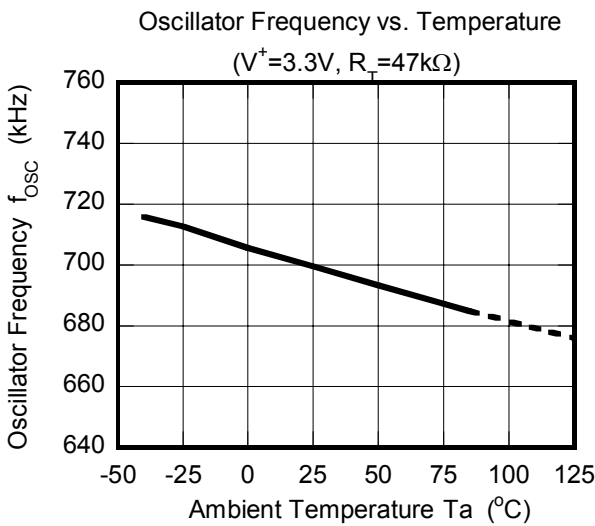
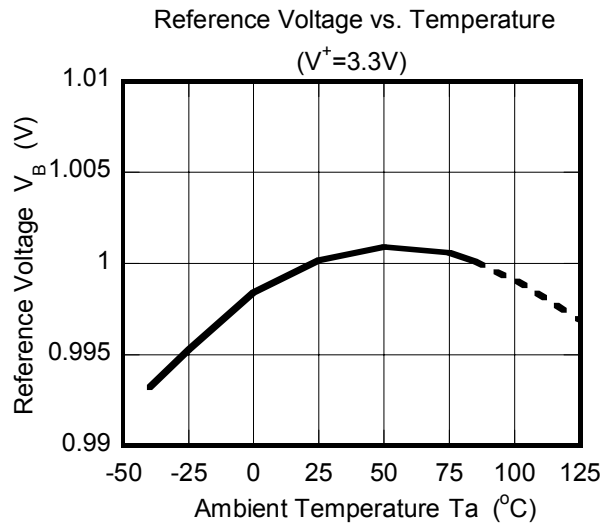
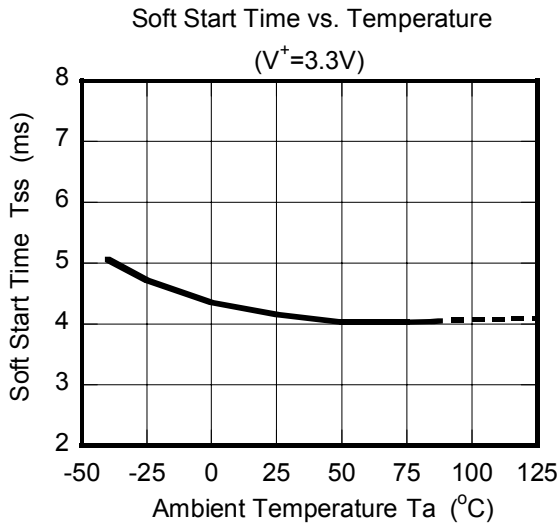
Quiescent Current vs. Operating Voltage
($R_T = 47k\Omega$, $R_L = \text{Non Load}$, $T_a = 25^\circ C$)



■ TYPICAL CHARACTERISTICS



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[CAUTION]

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