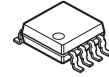


1.8V Operate PWM control Step-Up / Flyback switching regulator IC

■ GENERAL DESCRIPTION

The **NJU7677** is a high-speed switching regulator control IC for PWM control step-up and fly-back converter that operates from 1.8V. It incorporates a totem pole driver output, which can directly drive an external MOS-FET. The NJU7677 also has a soft-start function, dead time control and timer latch for short circuit protection and their times are all adjustable with external parts. It is available in a small and thin 8-lead MSOP (TVSP) package. It is suitable for battery powered applications.

■ PACKAGE OUTLINE



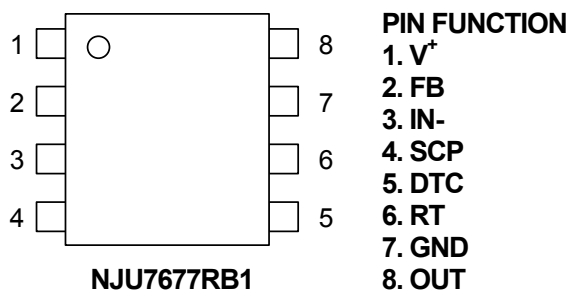
NJU7677RB1
(MSOP8 (TVSP8))

■ 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 : MSOP8 (TVSP8)*

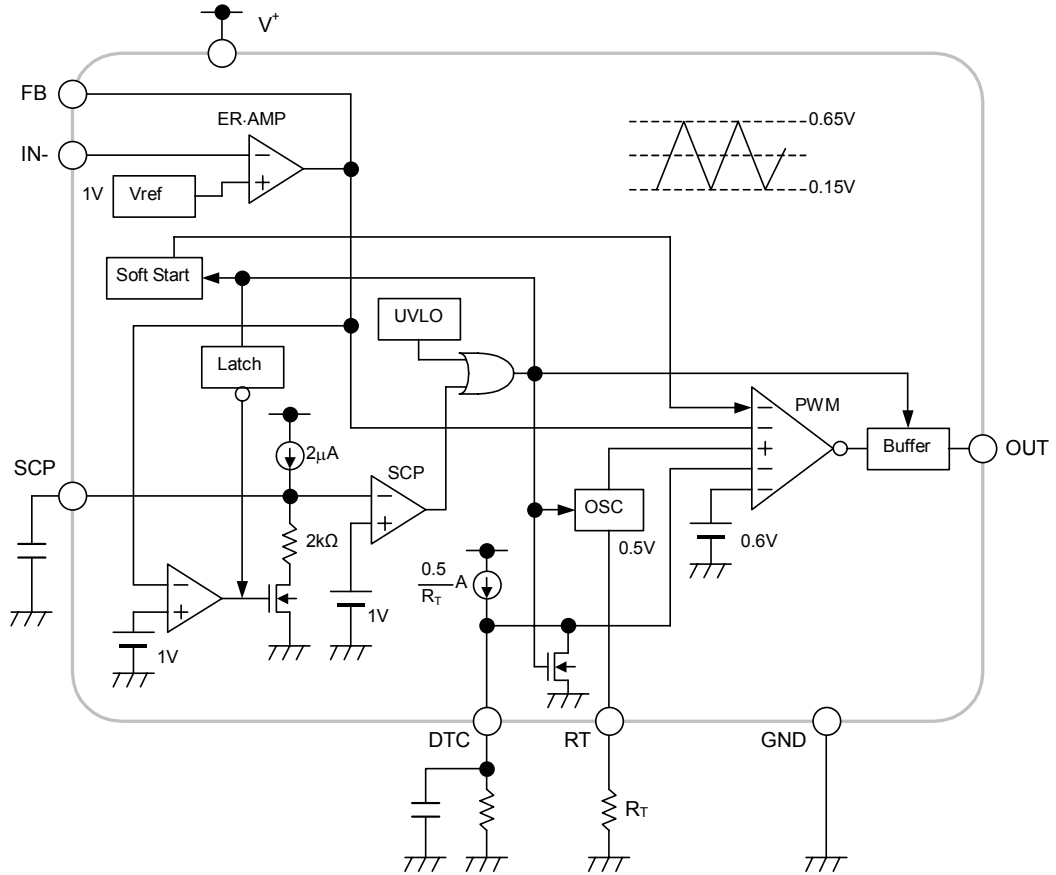
*MEET JEDEC MO-187-DA / THIN TYPE

■ 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 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 ⁺	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=47kΩ, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Under Voltage Lockout Block						
ON Threshold Voltage	V _{T_ON}	V ⁺ = L → H	1.6	1.7	1.8	V
OFF Threshold Voltage	V _{T_OFF}	V ⁺ = H → 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} → 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 to 7V	–	1	–	%
Oscillate Temperature Fluctuations	f _{DT}	Ta=-40°C to +85°C	–	3	–	%

NJU7677

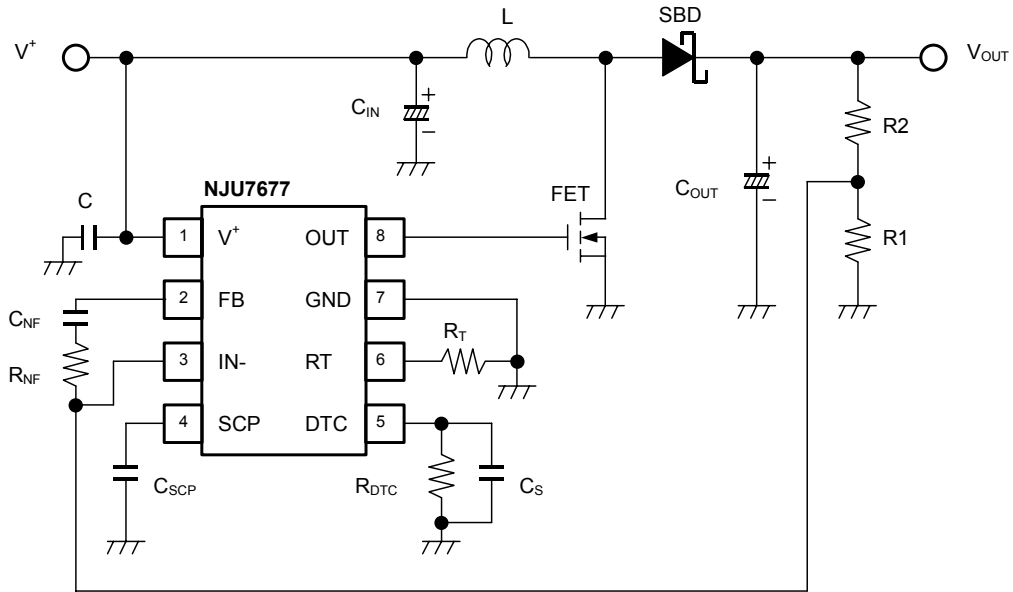
■ ELECTRICAL CHARACTERISTICS

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

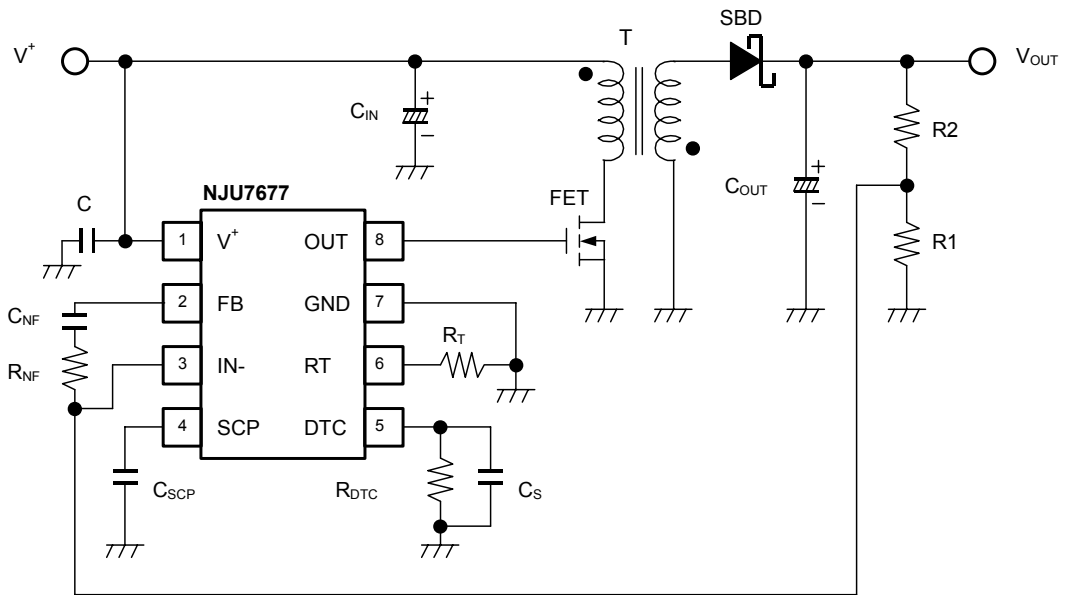
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Error Amplifier Block						
Reference Voltage	V_B		-1.0%	1.00	+1.0%	V
Input Bias Current	I_B		-0.1	–	0.1	μA
Open Loop Gain	A_V		–	80	–	dB
Gain Bandwidth Product	G_B		–	1	–	MHz
Output Source Current	I_{OM+}	$V_{FB}=1V$, $V_{IN-}=0.9V$	20	35	50	μA
Output 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

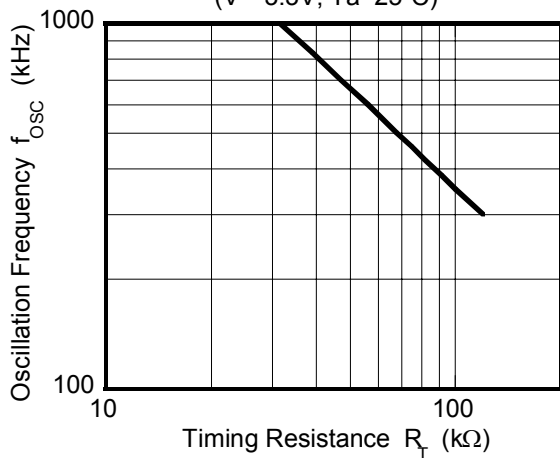


Flyback Converter

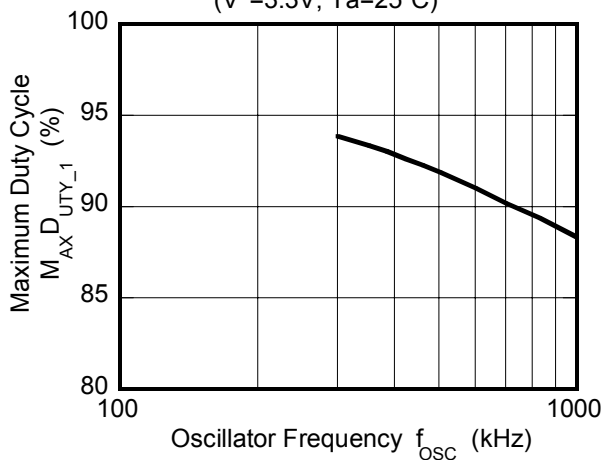


■ TYPICAL CHARACTERISTICS

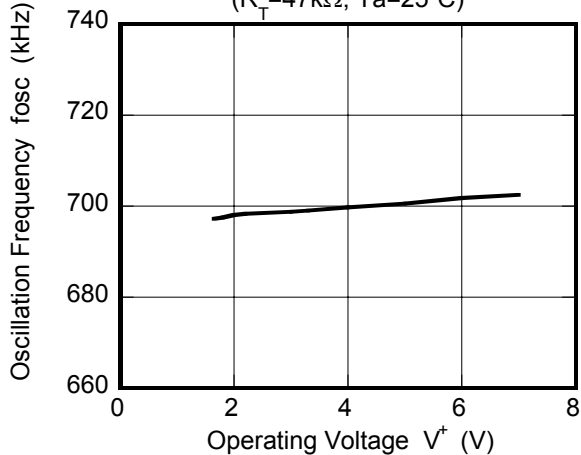
Oscillation Frequency vs. Timing Resistance
($V^+ = 3.3V, T_a = 25^\circ C$)



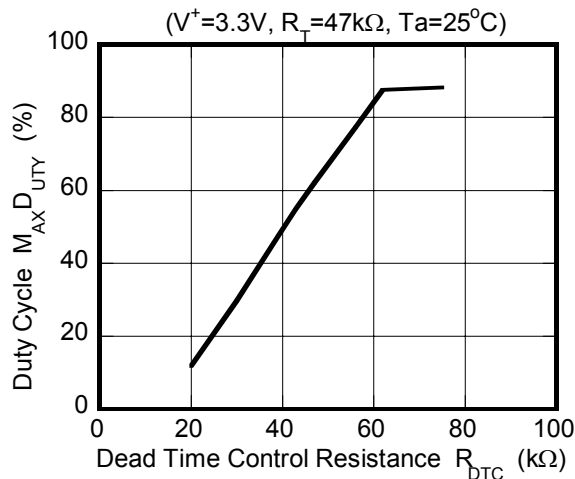
Maximum Duty Cycle vs. Oscillator Frequency
($V^+ = 3.3V, T_a = 25^\circ C$)



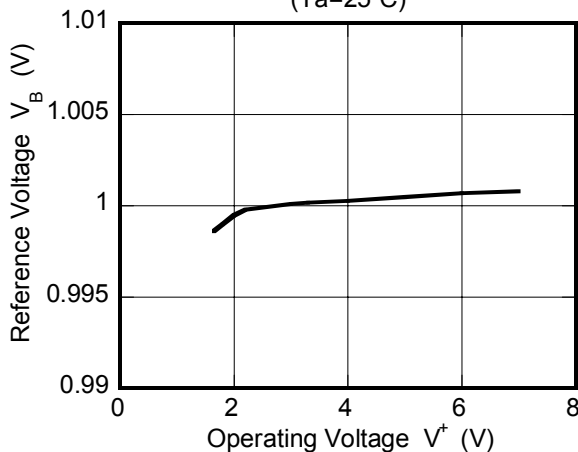
Oscillation Frequency vs. Operating Voltage
($R_T = 47k\Omega, T_a = 25^\circ C$)



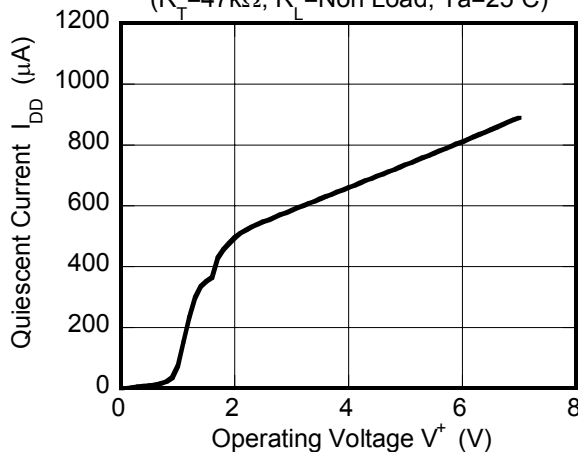
Duty Cycle vs. R_{DTC}



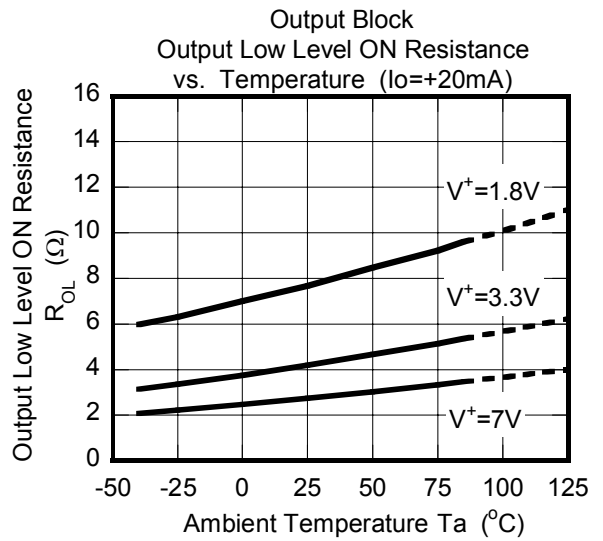
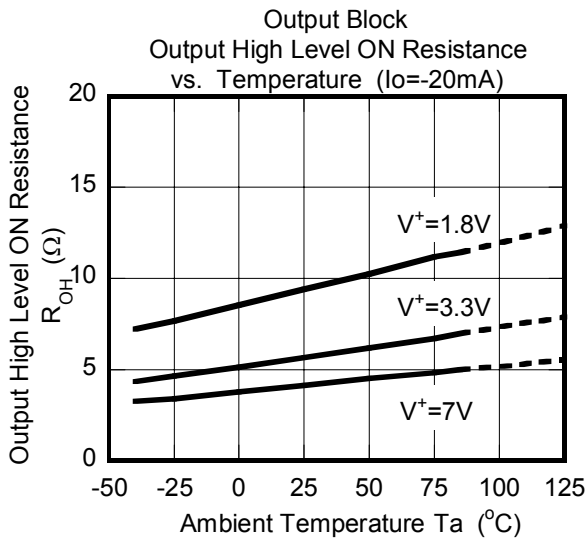
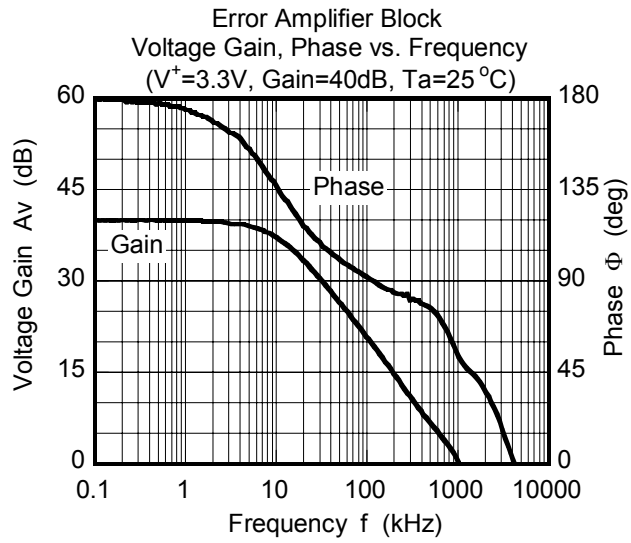
Reference Voltage vs. Operating Voltage
($T_a = 25^\circ C$)



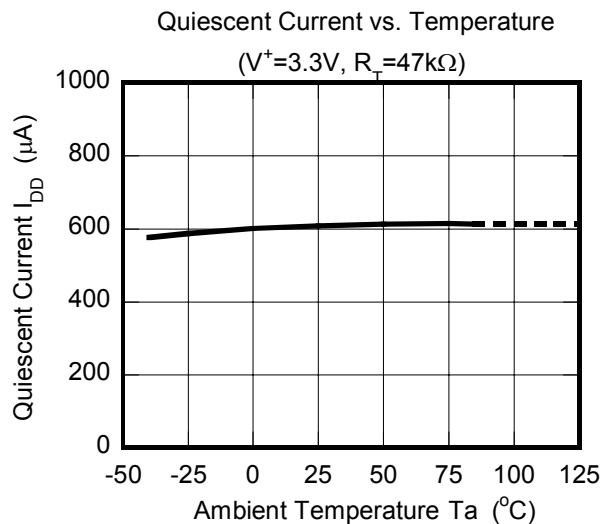
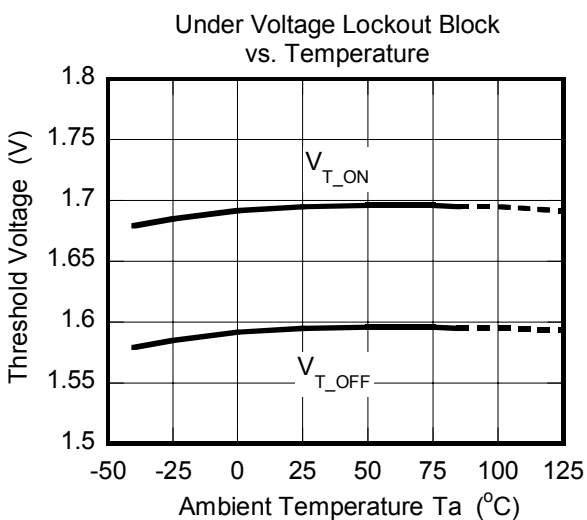
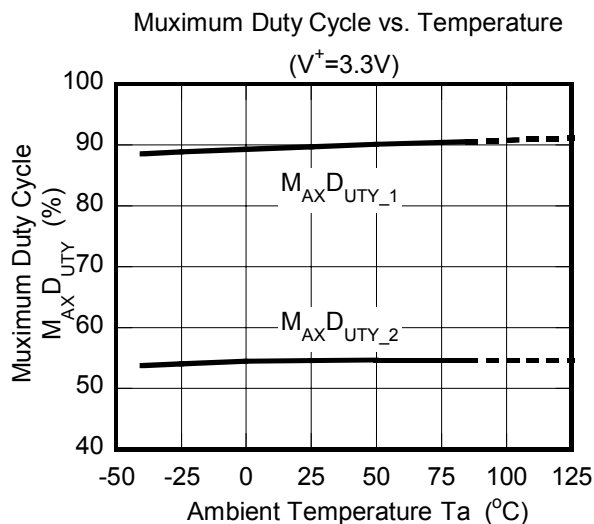
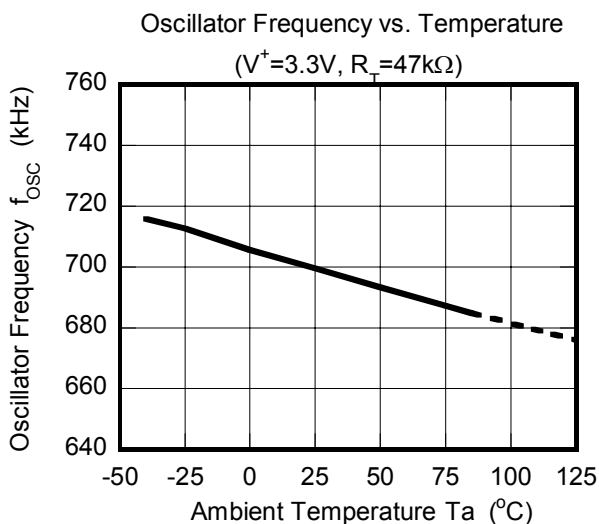
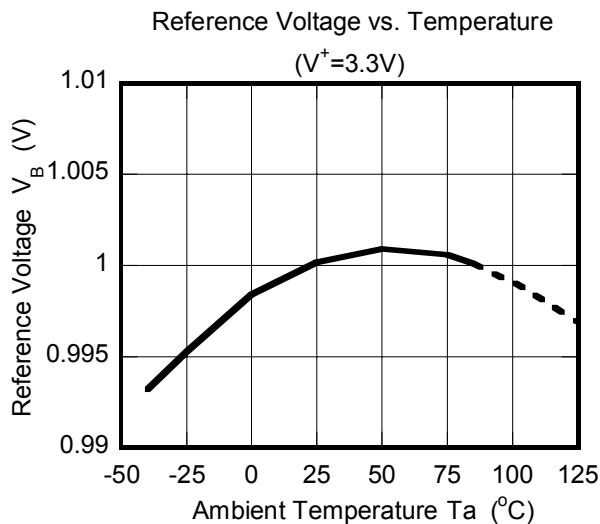
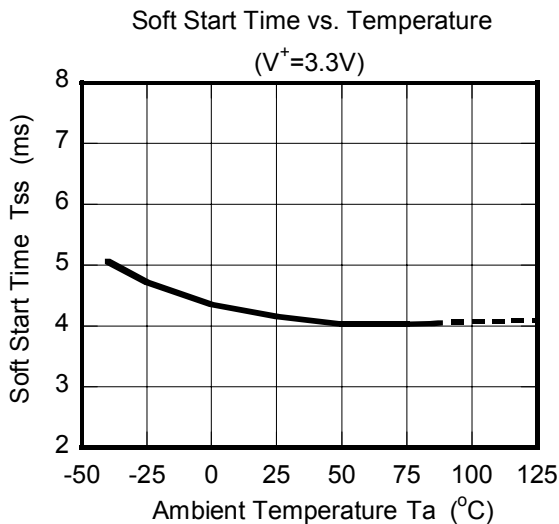
Quiescent Current vs. Operating Voltage
($R_T = 47k\Omega, R_L = \text{Non Load}, T_a = 25^\circ C$)



■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS



MEMO

[CAUTION]

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