

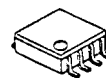
1.8V Operate PWM control Step-Up / Flyback switching regulator IC

■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

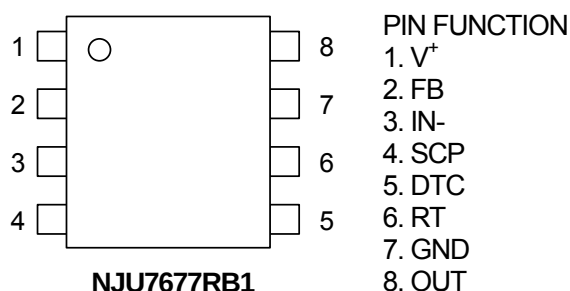


NJU7677RB1

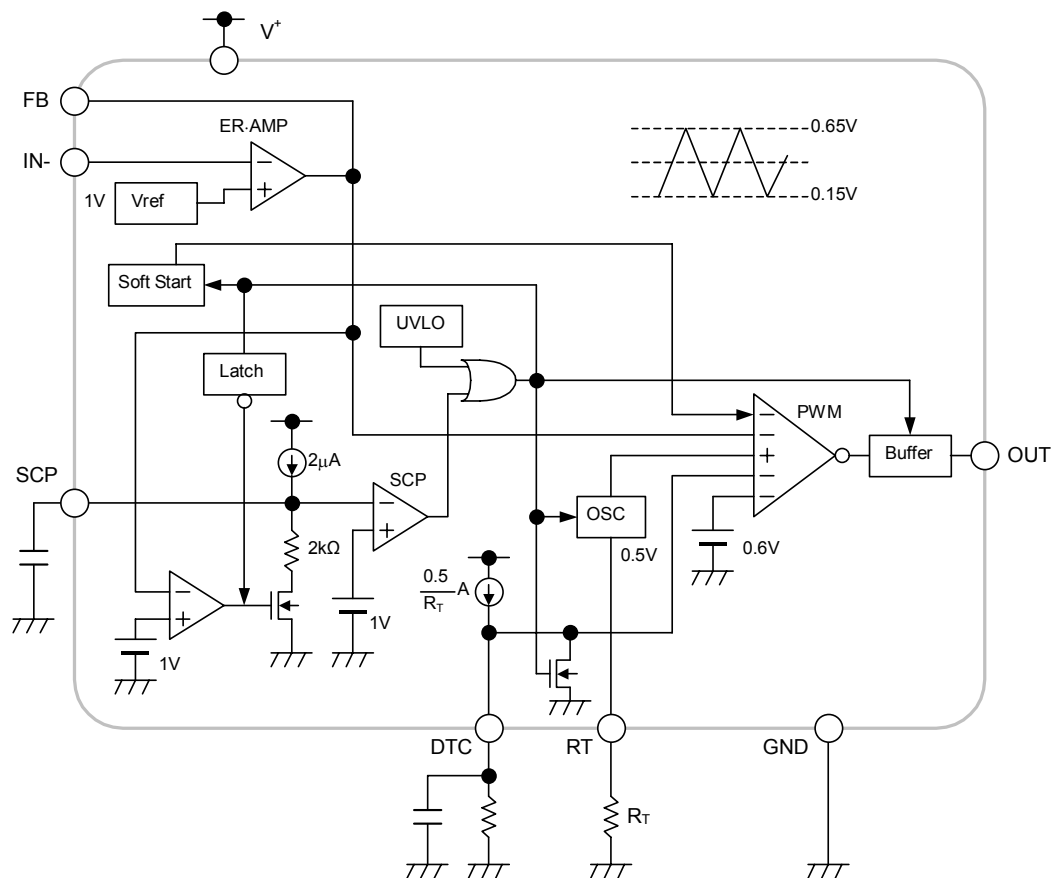
■FEATURES

- 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



■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=47kΩ, 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 → 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
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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 ~ 7V	—	1	—	%
Oscillate Temperature Fluctuations	f _{DT}	Ta=-40°C ~ +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	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

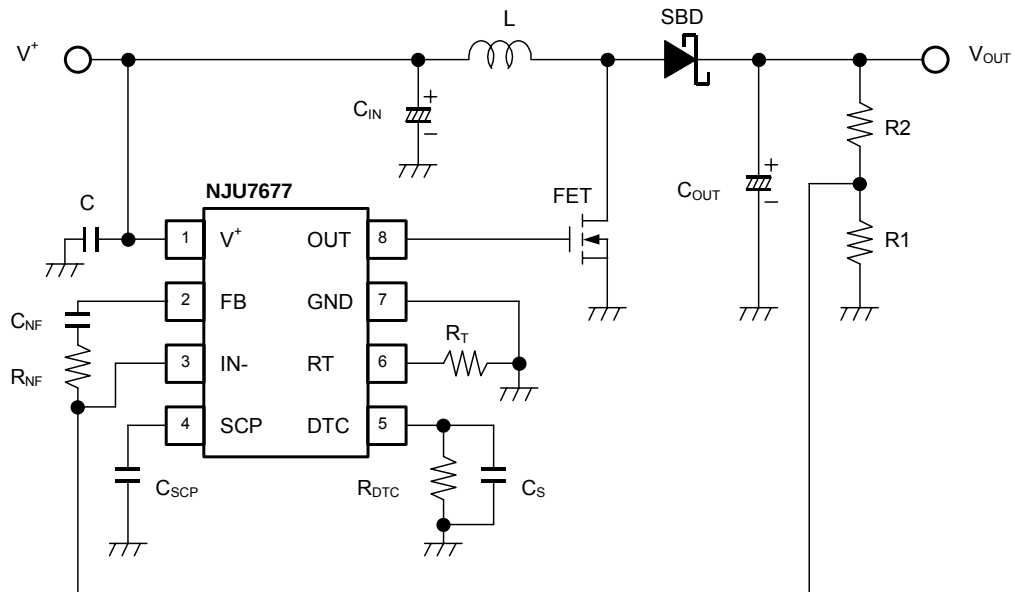
Output High Level ON Resistance	R_{OH}	$I_O=-20mA$	—	6	12	Ω
	$R_{OH_1.8}$	$I_O=-20mA$, $V^+=1.8V$	—	10	20	Ω
Output Low Level ON Resistance	R_{OL}	$I_O=+20mA$	—	4.5	9	Ω
	$R_{OL_1.8}$	$I_O=+20mA$, $V^+=1.8V$	—	8	16	Ω

General Characteristics

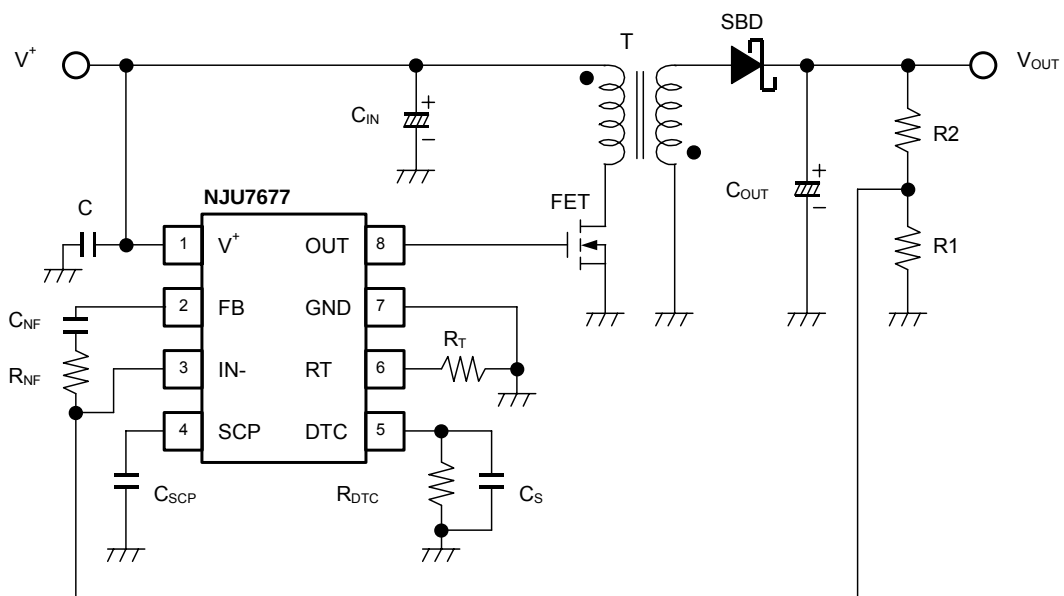
Quiescent Current	I_{DD}	$R_L=Non\ Load$	—	600	900	μA
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■ TYPICAL APPLICATIONS

Step-Up Converter

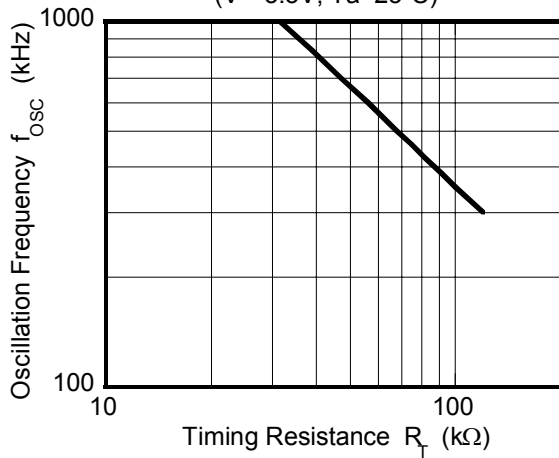


Flyback Converter

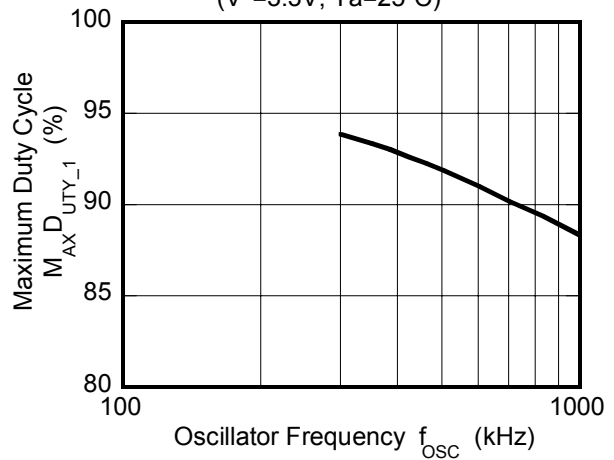


■ TYPICAL CHARACTERISTICS

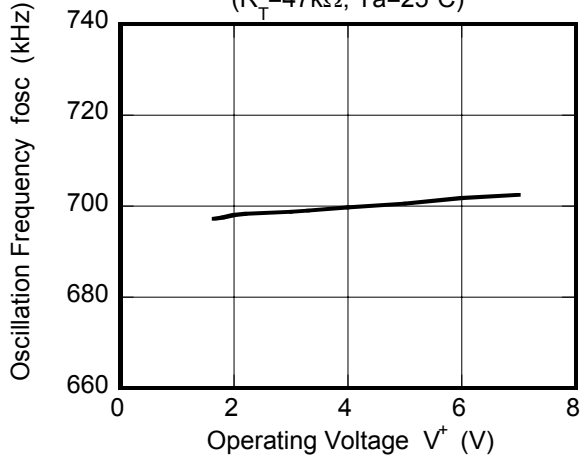
Oscillation Frequency vs. Timing Resistance
($V^+ = 3.3\text{V}$, $T_a = 25^\circ\text{C}$)



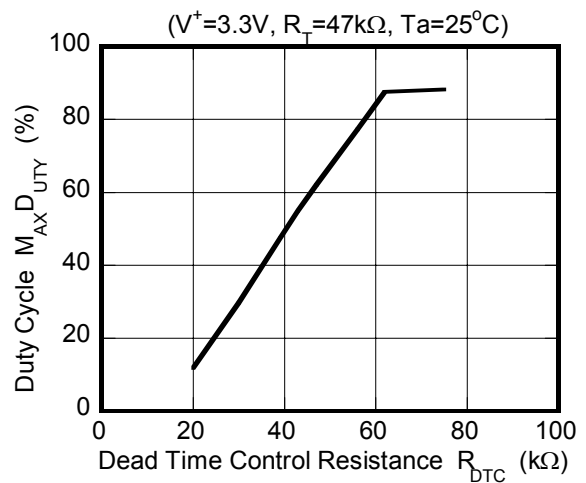
Maximum Duty Cycle vs. Oscillator Frequency
($V^+ = 3.3\text{V}$, $T_a = 25^\circ\text{C}$)



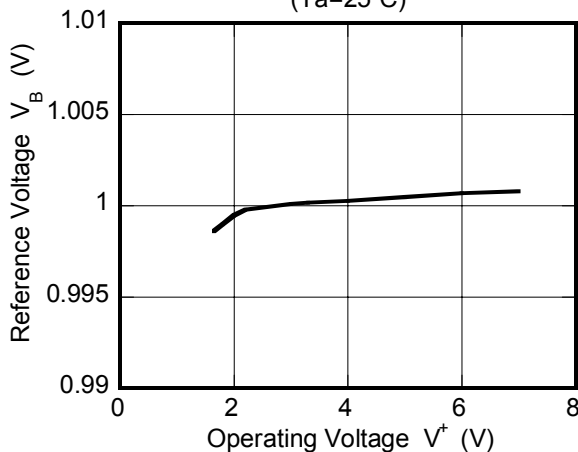
Oscillation Frequency vs. Operating Voltage
($R_T = 47\text{k}\Omega$, $T_a = 25^\circ\text{C}$)



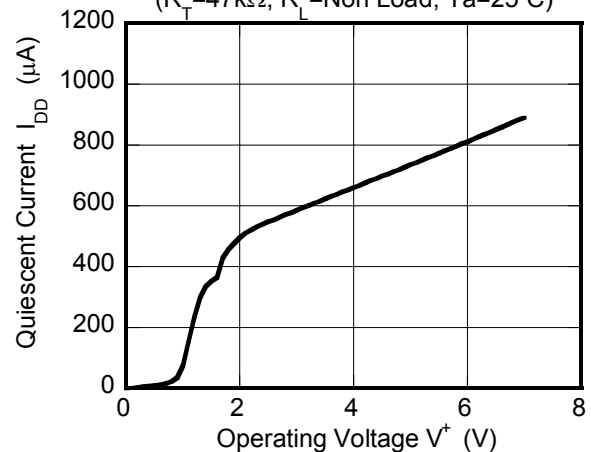
Duty Cycle vs. R_{DTC}



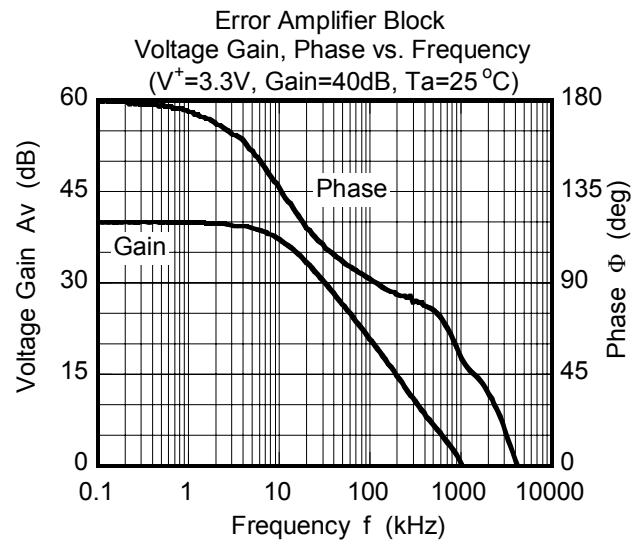
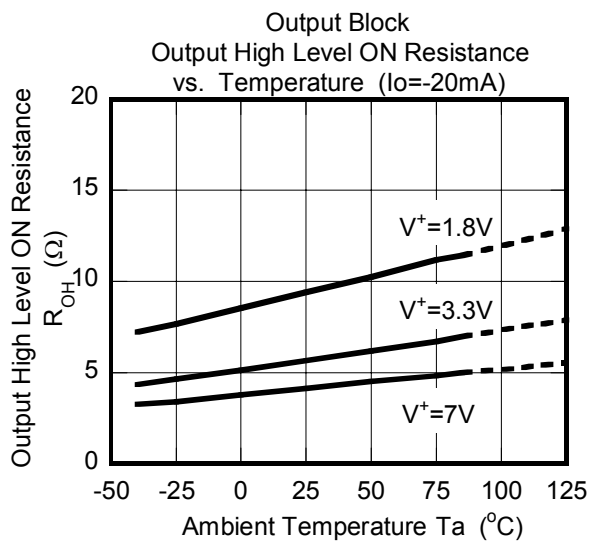
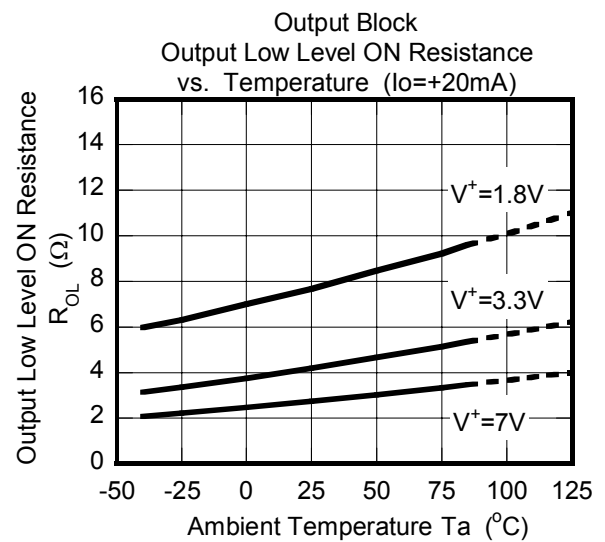
Reference Voltage vs. Operating Voltage
($T_a = 25^\circ\text{C}$)



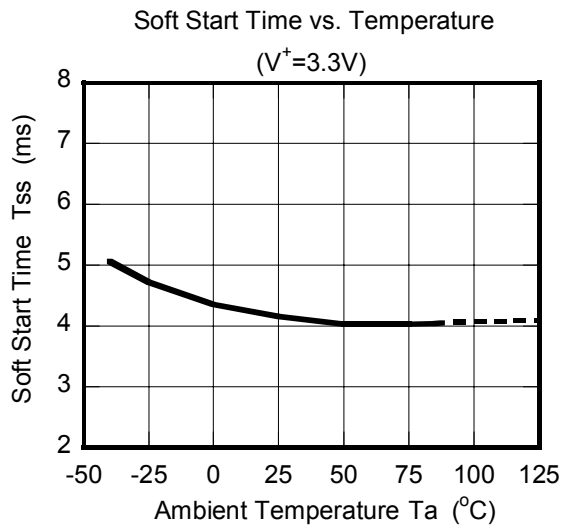
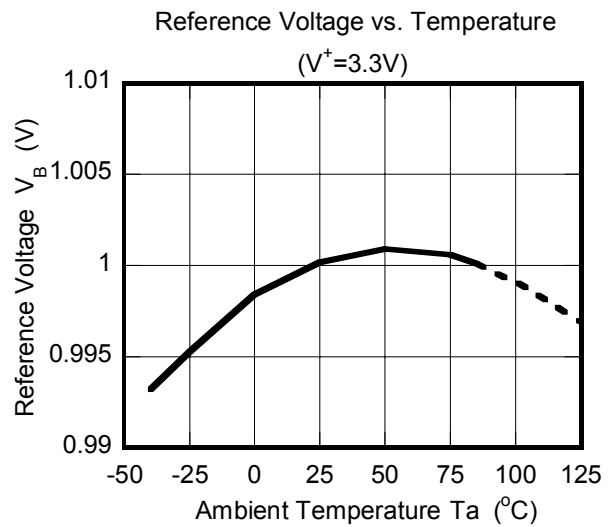
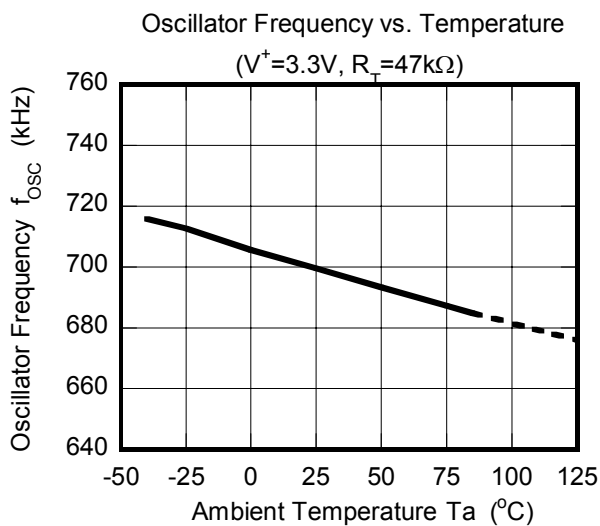
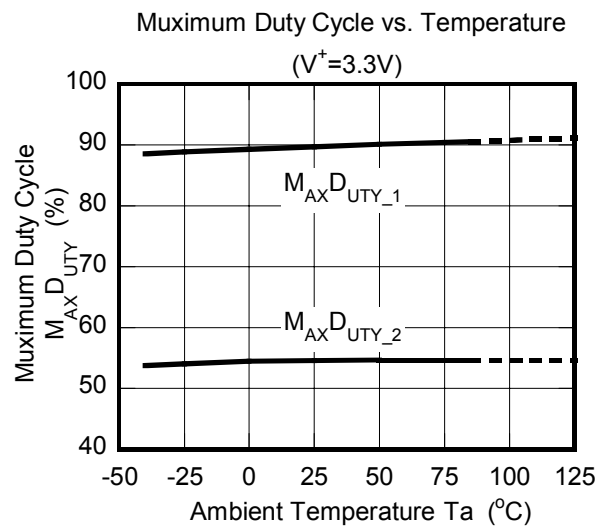
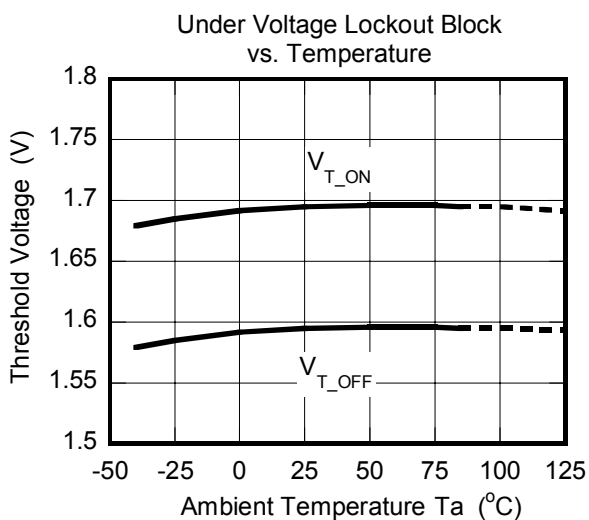
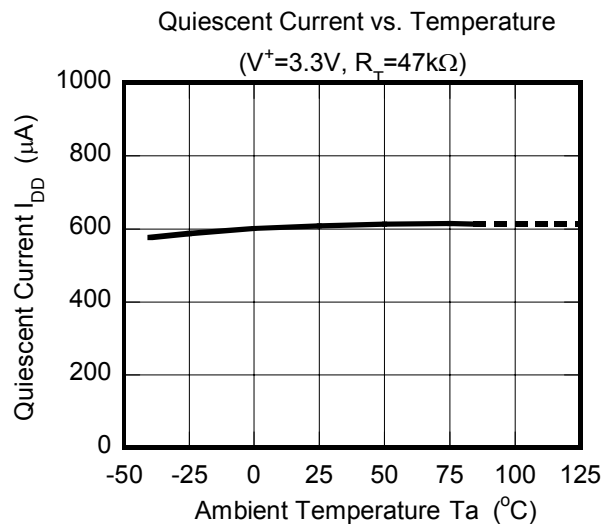
Quiescent Current vs. Operating Voltage
($R_T = 47\text{k}\Omega$, $R_L = \text{Non Load}$, $T_a = 25^\circ\text{C}$)



■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS



MEMO

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