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FAN7601B

绿色电流模式 PWM 控制器

特性

- 绿色电流模式 PWM 控制
- 低工作电流：最大值 4 mA
- 间歇模式运行
- 内部高压启动开关
- 欠压锁定 (UVLO) 12 V / 8 V
- 闩锁保护和软启动功能
- 过压保护：19 V
- 工作频率高达 300 kHz
- 最大占空比：95%

应用

- 离线适配器应用
- 辅助电源

相关资源

- [AN4129—绿色电流模式 PWM 控制器 FAN7601](#)

说明

FAN7601B 是一款可编程频率绿色电流模式 PWM 控制器。它特别为需要在轻负载和空载条件下具有高效率的离线适配器应用和辅助电源而设计。内部高压启动开关和间歇模式减少了功率损耗。

FAN7601B 包含保护功能，例如闩锁保护和过压保护。闩锁保护可用于过压保护、热保护及其他功能。软启动防止启动时的输出电压过冲。

订购信息

器件编号	工作结温	顶标	封装	包装方法
FAN7601BMX	-40°C 至 +150°C	7601B	8-SOP	卷带和卷盘

框图

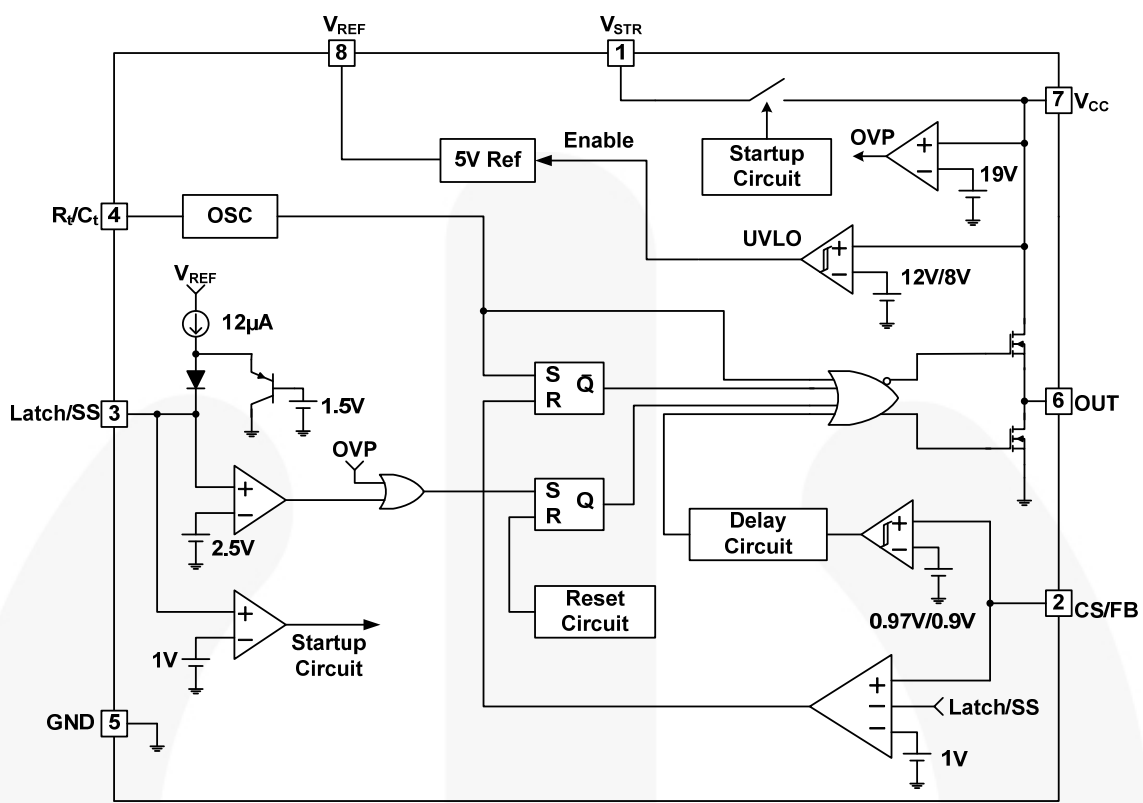


图 1. 内部框图

引脚配置

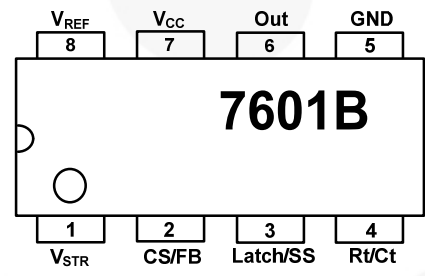


图 2. 引脚分配 (顶视图/俯视图)

引脚定义

引脚编号 (8 引脚)	名称	说明
1	V_{STR}	启动
2	CS/FB	电流检测与反馈
3	门锁/软启动	门锁保护和软启动功能
4	Rt/Ct	振荡器定时
5	GND	接地
6	输出	栅极驱动输出
7	V_{CC}	IC 电源
8	V_{REF}	参考电压

绝对最大额定值

应力超过绝对最大额定值，可能会损坏器件。在超出推荐的工作条件的情况下，该器件可能无法正常工作，所以不建议让器件在这些条件下长期工作。此外，长期在高于推荐的工作条件下工作，会影响器件的可靠性。绝对最大额定值仅是应力规格值。

符号	参数		最小值	最大值	单位
V_{CC}	电源电压			20	V
$V_{CS/FB}$	输入电压 CS/FB		-0.3	20.0	V
T_{STG}	存储温度		-55	+150	°C
T_J	建议工作结温		-40	+150	°C
I_O	输出电流			250	mA
V_{STR}	V_{STR} 输出电压			500	V
ESD	静电放电能力	人体放电模型, JESD22-A114		2000	V
		元件充电模型, JESD22-C101		1500	

热阻测试

符号	参数	数值	单位
θ_{JA}	结至环境热阻	180	°C/W

电气特性

除非另有说明, $T_A = -25^{\circ}\text{C} \sim 125^{\circ}\text{C}$, $V_{CC} = 14\text{ V}$, $R_T = 9.5\text{ k}\Omega$, $C_T = 2.2\text{ nF}$ 。

符号	参数	工作条件	最小值	典型值	最大值	单位
基准部分						
V_{REF}	参考输出电压	$I_O = 1\text{ mA}$	4.85	5.00	5.15	V
ΔV_{REF1}	线路调节	$V_{CC} = 10\text{ V} \sim 18\text{ V}$		10	20	mV
ΔV_{REF2}	负载调节	$I_O = 1\text{ mA} \sim 10\text{ mA}$		20	30	mV
振荡器部分						
f_{OSC}	初始精确度		90	100	110	kHz
ST_V	稳压	$V_{CC} = 10\text{ V} \sim 18\text{ V}$		1.0	1.5	%
V_{OSC}	振幅	V_{pin4} 峰-峰		1.25		V
PWM 部分						
$V_{CS/FB1}$	CS/FB 阈值电压 1		0.9	1.0	1.1	V
D_{MAX}	最大占空比	$T_A = 25^{\circ}\text{C}$	92	95	98	%
D_{MIN}	最小占空比				0	%
间歇模式部分						
$V_{CS/FB2}$	CS/FB 阈值电压 2 ⁽¹⁾		0.77	0.97	1.17	V
$V_{CS/FB3}$	CS/FB 阈值电压 3 ⁽¹⁾		0.7	0.9	1.1	V
软启动部分						
I_{SS}	软启动电流	$V_{pin3} = \text{GND}$	9	12	15	μA
V_{SL}	软启动限压 ⁽²⁾	$I_{SS} = 1\text{ }\mu\text{A}$	1.2	1.5	1.8	V
保护部分						
V_{LATCH}	门锁电压		2.25	2.50	2.75	V
V_{OVP}	过压保护		18	19	20	V
UVLO 部分						
V_{th}	启动阈值电压		11	12	13	V
V_{tl}	最大工作电压		7	8	9	V
总电流部分						
I_{OP}	工作电源电流			3	4	mA
输出部分						
V_{OL}	低输出电压	$T_A = 25^{\circ}\text{C}$, $I_O = 100\text{ mA}$		2.0	2.5	V
V_{OH}	高输出电压	$T_A = 25^{\circ}\text{C}$, $I_O = -100\text{ mA}$	11.5	12.0	14.0	V
t_r	上升时间 ⁽¹⁾	$T_A = 25^{\circ}\text{C}$, $C_L = 1\text{ nF}$		45	150	ns
t_f	下降时间 ⁽¹⁾	$T_A = 25^{\circ}\text{C}$, $C_L = 1\text{ nF}$		35	150	ns
启动部分						
I_{str}	V_{STR} 启动电流	$V_{STR} = 30\text{ V}$, $T_A = 25^{\circ}\text{C}$	0.5	1.0	1.5	mA

注意:

- 该参数由设计保证; 未经 100% 产品测试。
- 建议在 Ω 门锁/软启动引脚和地之间连接一个 1 M 电阻器, 用于防止门锁保护功能因噪声耦合而异常运行。

典型性能特征

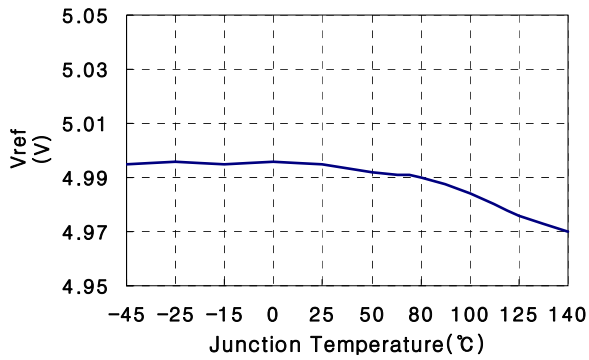


图 3. 削波参考电压

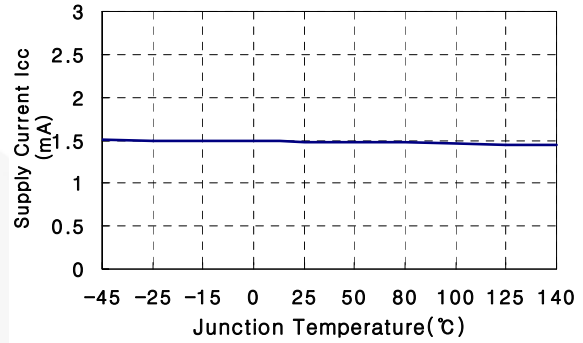


图 4. 电源电流

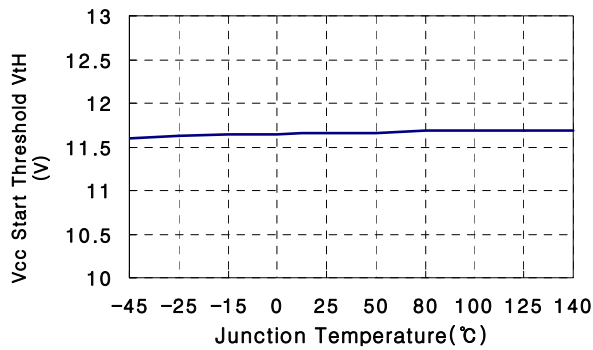
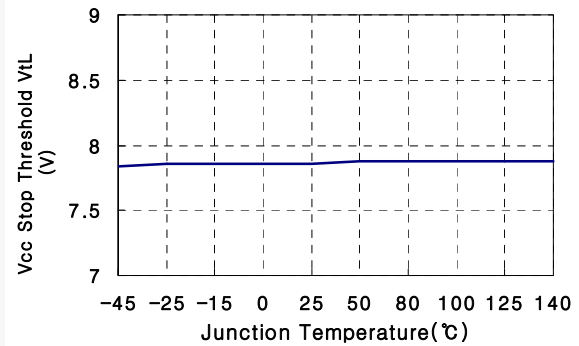
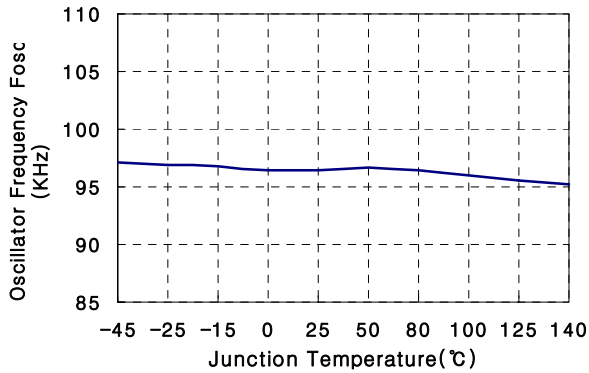
图 5. V_{CC} 启动阈值电压图 6. V_{CC} 停止阈值电压

图 7. 振荡器频率

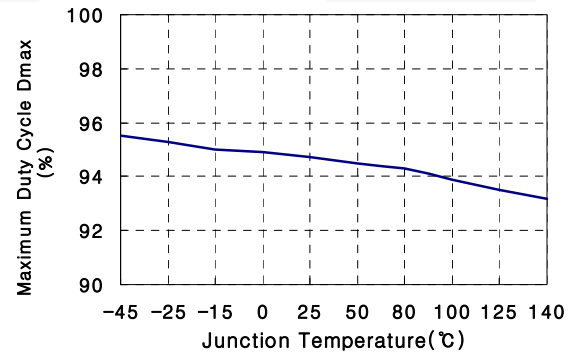


图 8. 最大占空比

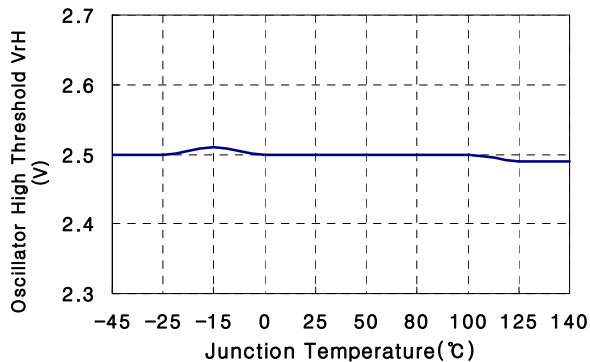


图 9. 振荡器高阈值电压

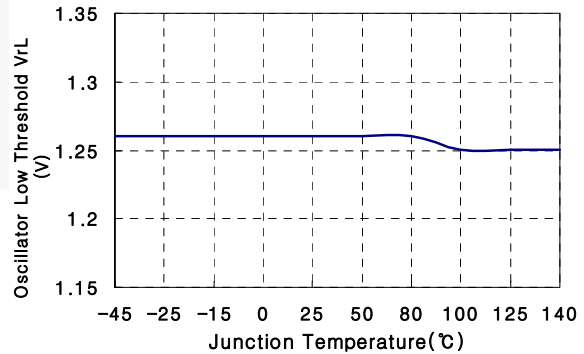


图 10. 振荡器低阈值电压

典型性能特征 (接上页)

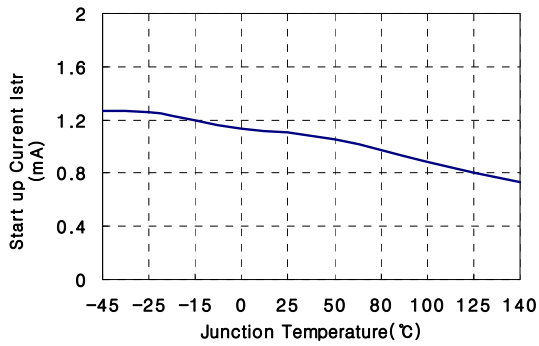


图 11. 启动电流

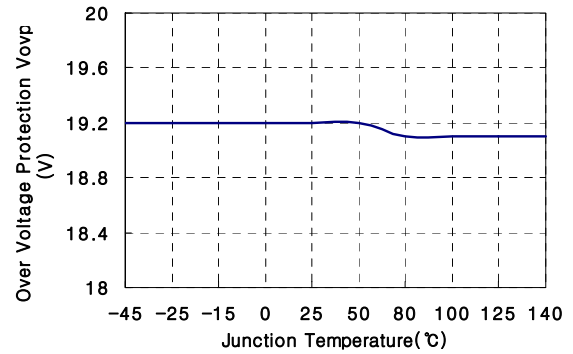


图 12. 过压保护电平

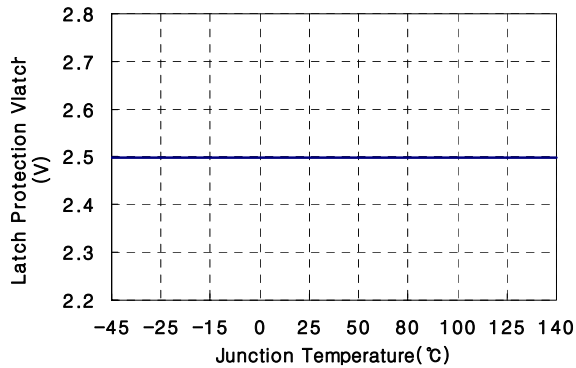


图 13. 门锁保护电压

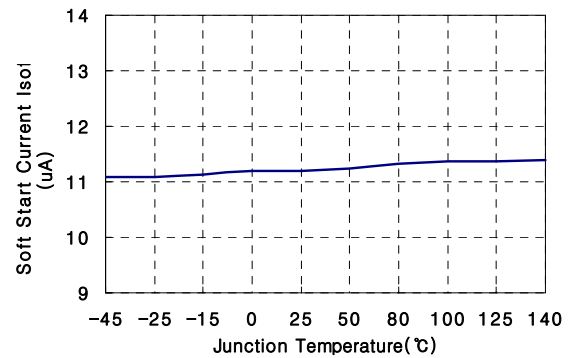


图 14. 软启动电流

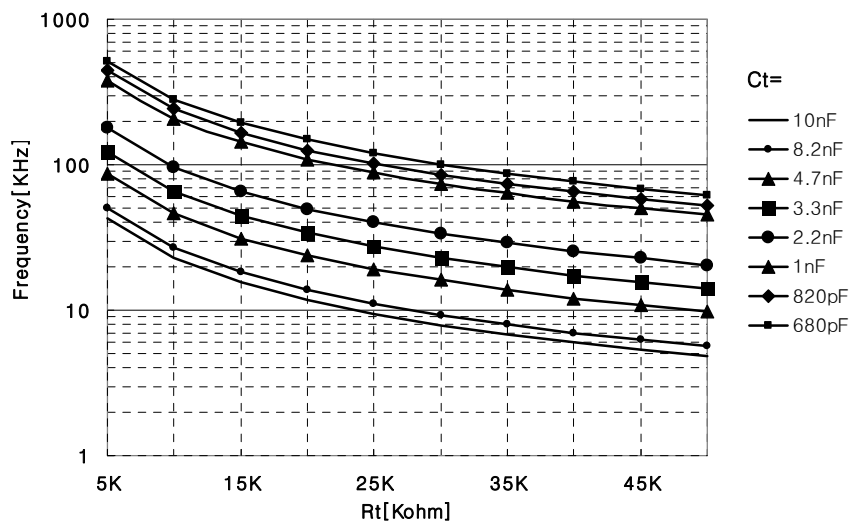


图 15. 振荡器频率特性

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