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FAN6754WA

高度集成的绿色模式 PWM 控制器

通过 HV 引脚进行掉电和 V_{Limit} 调整

特性

- 高压启动
- 带滞回的 AC 输入掉电保护
- 监控 HV 以调整 V_{Limit}
- 低工作电流: 1.5 mA
- 以线性方式将 PWM 频率降至 22 kHz
- 抖频可降低 EMI 辐射
- 固定 PWM 频率: 65 kHz
- 峰值电流模式控制
- 逐周期限流
- 前沿消隐 (LEB)
- 内部开环保护
- 栅极输出最大电压箝位: 13 V
- V_{DD} 欠压锁定 (UVLO)
- V_{DD} 过压保护 (OVP)
- 可编程过温保护 (OTP)
- 内部锁存电路 (OVP, OTP)
- 开环保护 (OLP); FAN6754WAMRMY 重启, FAN6754WAMLMY 闩锁
- 内部感应短路保护 (SSCP)
- 内置 8 ms 软启动功能

应用

通用开关电源 (SMPS) 和反激式电源转换器, 包括:

- 电源适配器

说明

高度集成的 FAN6754WA PWM 控制器提供了一些可提高反激式转换器性能的特性。为了最大限度地降低待机功耗, 专有绿色模式功能提供了关断时间调制, 以在轻载条件下持续降低开关频率。

在空载和极轻载条件下, FAN6754WA 通过进入“深度”间歇模式来节省 PWM 脉冲。绿色模式功能可使电源达到国际节电要求。

FAN6754WA 还集成了抖频功能, 有助于使用最少的线路滤波器来降低电源的 EMI 辐射。内置的同步斜率补偿可实现稳定的峰值电流控制。要在通用 AC 输入范围内保持恒定的输出功率限制, 可以根据 HV 引脚上检测到的 AC 线路电压来调节限流。栅极输出被箝位在 13 V, 以保护外部 MOSFET 免受过压损坏。

其它保护功能包括带滞回的 AC 输入掉电保护、SENSE 引脚短路保护和 V_{DD} 过压保护。为了实现过温保护, 将使用外部 NTC 热敏电阻来感知外部开关温度。当 V_{DD} 过压保护 (OVP) 或过温保护 (OTP) 被激活时, 内部闩锁电路用于闭锁控制器。当 V_{DD} 电源拔除时, 闩锁模式复位。

FAN6754WA 采用 8-引脚 SOP 封装。

订购信息

器件编号	工作温度范围	封装	包装方法
FAN6754WAMRMY	-40 至 +105°C	8 引脚, 小外形封装 (SOP)	卷带和卷盘
FAN6754WAMLMY			

应用框图

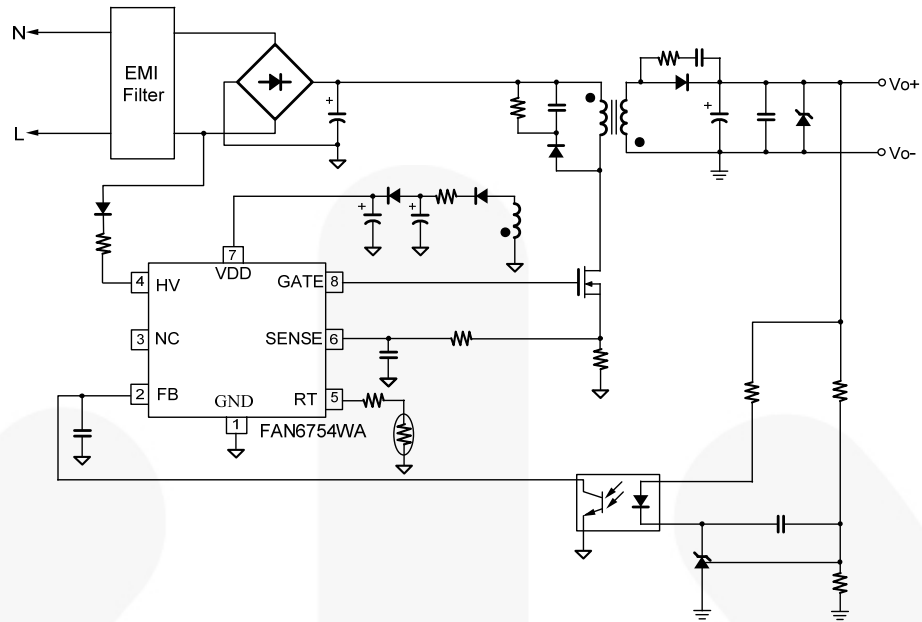


图 1. 典型应用

内部框图

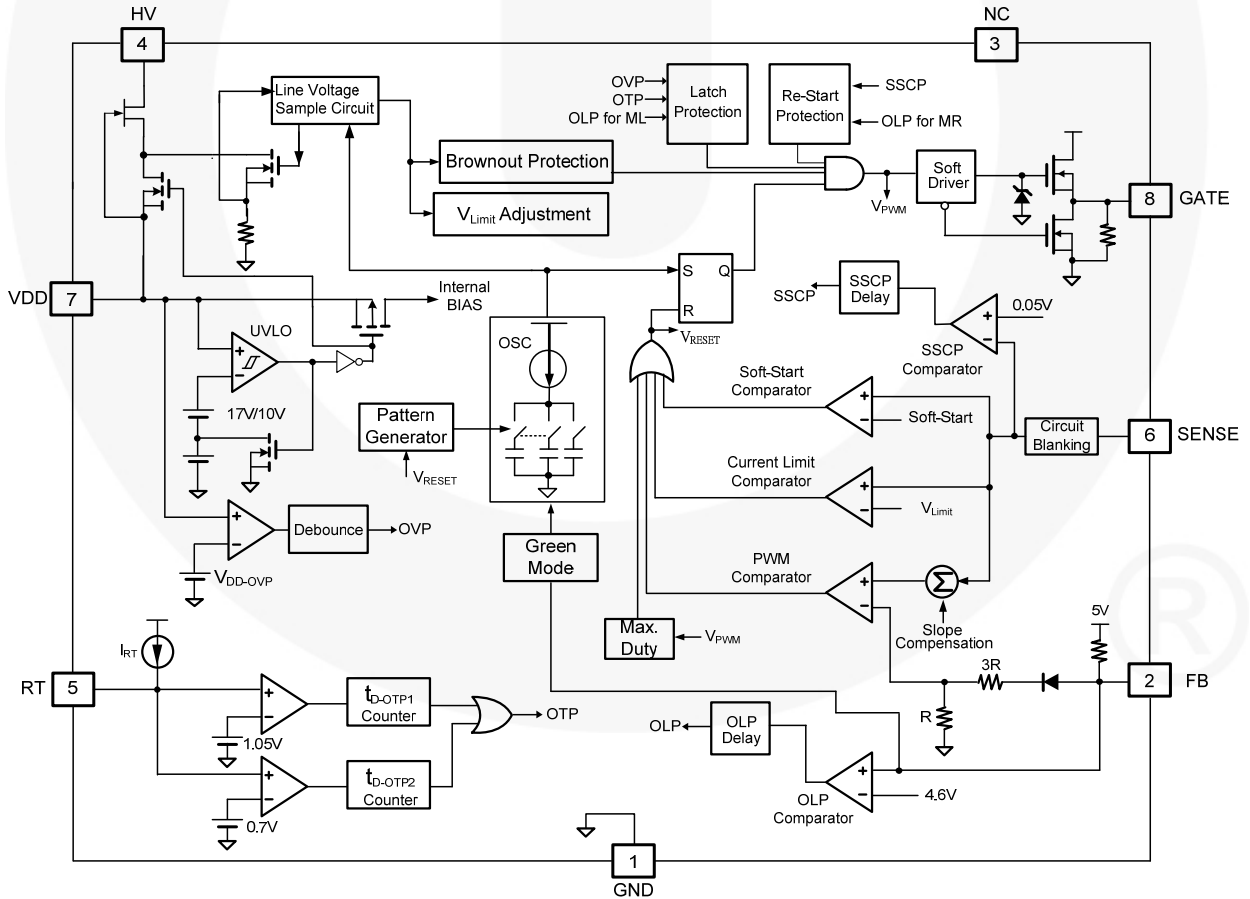
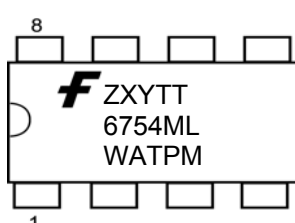
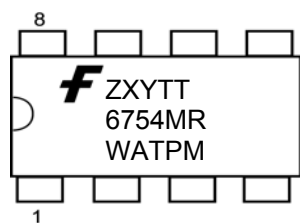


图 2. 功能框图

标识信息



F - 飞兆徽标
 Z - 工厂代码
 X - 一位数字年份代码
 Y - 一位数字周代码
 TT - 两位数字裸片运行代码
 T - 封装类型 (M=SOP)
 P - Y: 封装 (绿色)
 M - 制造流程编码

图 3. 顶标

引脚配置

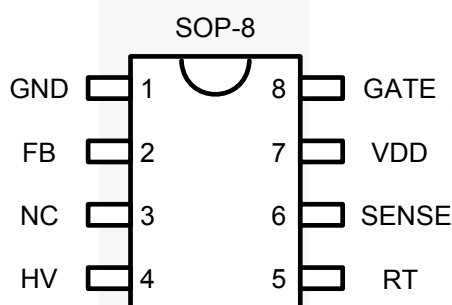


图 4. 引脚配置 (俯视图)

引脚定义

引脚号	名称	说明
1	GND	接地。 该引脚用于所有引脚的地电位。建议在 VDD 和 GND 之间连接 0.1 μF 去耦电容。
2	FB	反馈。 外部补偿电路的输出电压反馈信息被馈入该引脚。PWM 占空比由该引脚和引脚 6 的电流检测信号确定。FAN6754WA 实现开环保护 (OLP)；如果 FB 电压高于阈值电压 (大约 4.6 V) 的时间超过 56 ms，控制器闭锁 PWM。
3	NC	无连接
4	HV	高压启动。 该引脚通过 1N4007 和 200 k Ω 电阻连接至线路输入，实现掉电和高/低压线路补偿。一旦 HV 引脚电压低于掉电电压，PWM 输出就会关断。高/低压线路补偿控制逐周期限流，从而通过通用输入实现恒定输出功率限制。
5	RT	过温保护。 一个外部 NTC 热敏电阻从该引脚连接至 GND。NTC 的阻抗在高温时会降低。一旦 RT 引脚电压降至阈值电压以下，控制器闭锁 PWM。如果 RT 未连接一个 NTC 电阻实现过温保护，推荐在 RT 引脚和 GND 引脚之间连接一个 100 k Ω 的电阻。该引脚受限于内部箝位电路。
6	感测	电流检测。 该引脚用于检测电流模式 PWM 和电流限制的 MOSFET 电流。
7	VDD	电源电压端。 集成电路工作电流和 MOSFET 驱动电流通过此引脚提供。该引脚连接至外部大容量电容，典型值为 47 μF 。启动和关断的阈值电压分别为 17 V 和 10 V。工作电流低于 2 mA。
8	栅极	栅极驱动输出。 功率 MOSFET 的图腾柱输出驱动器。该引脚内部箝位到低于 13 V。

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 _{VDD}	直流电源电压 ^(1,2)		30	V
V _{FB}	FB 引脚输入电压	-0.3	7.0	V
V _{SENSE}	SENSE 引脚输入电压	-0.3	7.0	V
V _{RT}	RT 引脚输入电压	-0.3	7.0	V
V _{HV}	HV 引脚输入电压		500	V
P _D	功率耗散 (T _A < 50°C)		400	mW
Θ _{JA}	热阻 (结到空气)		150	°C/W
T _J	工作结温	-40	+125	°C
T _{STG}	存储温度范围	-55	+150	°C
T _L	引脚温度 (波动焊接或 IR, 10 秒)		+260	°C
ESD	静电放电性能, 除 HV 引脚外的全部引脚	人体模型; JESD22-A114	5000	V
		元件充电模型; JESD22-C101	2000	

注意:

- 所有电压值，除差模电压之外，都参照电路接地端子。
- 若应力超过绝对最大额定值中所列的数值，可能会给器件造成不可修复的损坏。
- 通过 HV 引脚进行静电放电：CDM=1250 V 且 HBM=500 V。

推荐的工作条件

推荐的操作条件表明了器件的真实工作条件。指定推荐的工作条件，以确保器件的最佳性能达到数据表中的规格。飞兆半导体建议不要超过推荐工作条件，也不能按照绝对最大额定值进行设计。

符号	参数	最小值	典型值	最大值	单位
R _{HV}	HV 启动电阻	150	200	250	kΩ

电气特性

除非另外说明, $V_{DD}=15\text{ V}$ 且 $T_A=25^\circ\text{C}$ 。

符号	参数	工作条件	最小值	典型值	最大值	单位
V_{DD} 部分						
V_{OP}	连续工作电压				24	V
V_{DD-ON}	启动阈值电压		16	17	18	V
V_{DD-OFF}	最小工作电压		9	10	11	V
V_{DD-OLP}	I_{DD-OLP} 关断电压		5.5	6.5	7.5	V
V_{DD-LH}	VDD 引脚阈值电压, 用作门锁关闭释放电压		3.5	4.0	4.5	V
V_{DD-AC}	VDD 引脚阈值电压, 用于禁用 AC 恢复, 以避免启动失败		$V_{DD-OFF}+2.8$	$V_{DD-OFF}+3.3$	$V_{DD-OFF}+3.8$	V
I_{DD-ST}	启动电流	$V_{DD-ON}-0.16\text{ V}$			30	μA
I_{DD-OP1}	工作电源电流, PWM 运行	$V_{DD}=20\text{ V}$, $FB=3\text{ V}$ 栅极开路		1.5	2.0	mA
I_{DD-OP2}	工作电源电流, 栅极终止	$V_{DD}=20\text{ V}$, $FB=3\text{ V}$		1.0	1.5	mA
I_{LH}	门锁关闭传导条件下 PWM 关断时的工作电流	$V_{DD}=5\text{ V}$	30	60	90	μA
I_{DD-OLP}	门锁关闭传导条件下内部灌电流	$V_{DD-OLP}+0.1\text{ V}$	170	200	230	μA
V_{DD-OVP}	V_{DD} 过电压保护		24	25	26	V
$t_{D-VDDOVP}$	V_{DD} 过电压保护去抖时间		75	165	255	μs
HV 部分						
I_{HV}	来自 HV 引脚的电源电流	$V_{AC}=90\text{ V}(V_{DC}=120\text{ V})$, $V_{DD}=0\text{ V}$	2.0	3.5	5.0	mA
I_{HV-LC}	启动后的漏电流	$HV=700\text{ V}$, $V_{DD}=V_{DD-OFF}+1\text{ V}$		1	20	μA
V_{AC-OFF}	掉电阈值	直流电源串联 $R=200\text{ k}\Omega$ 至 HV 引脚参见方程式 1	92	102	112	V
V_{AC-ON}	通电阈值	直流电源串联 $R=200\text{ k}\Omega$ 至 HV 引脚参见方程式 2	104	114	124	V
ΔV_{AC}	$V_{AC-ON}-V_{AC-OFF}$	直流电源串联 $R=200\text{ k}\Omega$ 至 HV 引脚	6	12	18	V
$t_{S-CYCLE}$	线路电压采样周期	$FB > V_{FB-N}$		220		μs
		$FB < V_{FB-G}$		650		
t_{H-TIME}	线路电压保持时间			20		μs
$t_{D-AC-OFF}$	PWM 关断去抖时间	$FB > V_{FB-N}$	65	75	85	ms
		$FB < V_{FB-G}$	180	235	290	ms

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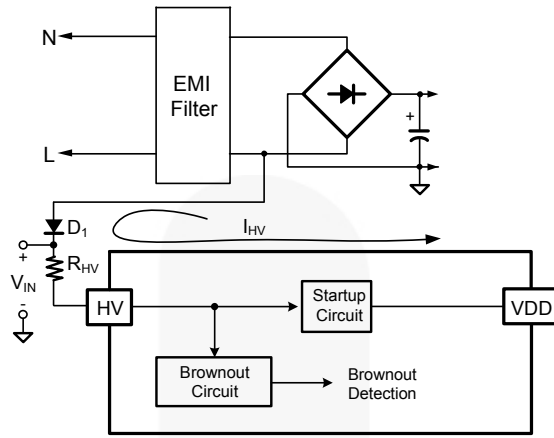


图 5. 欠压电路

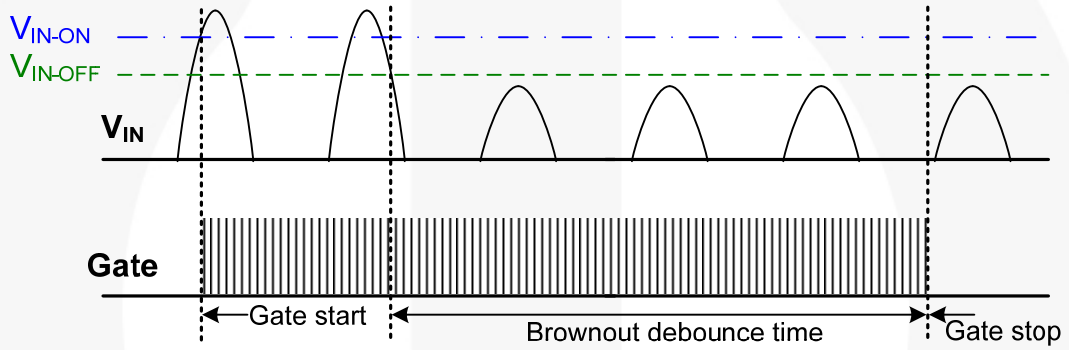


图 6. 掉电行为

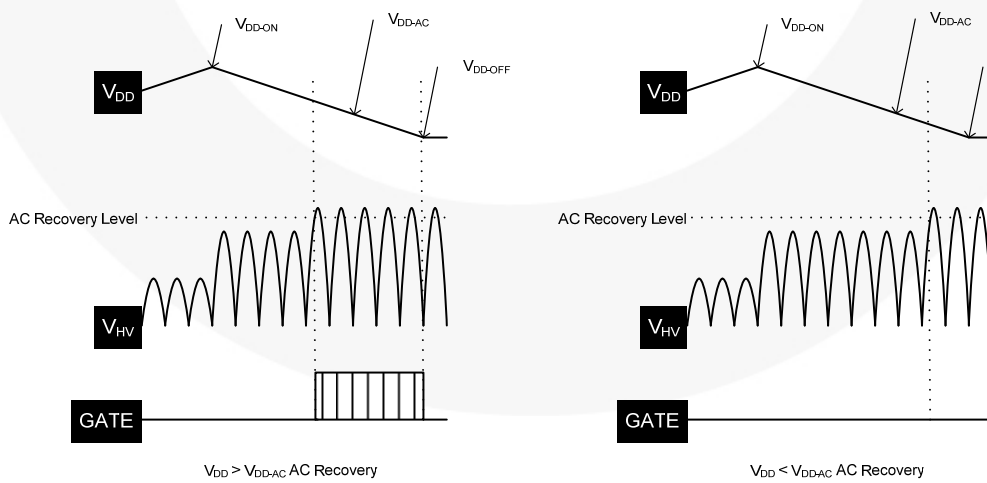


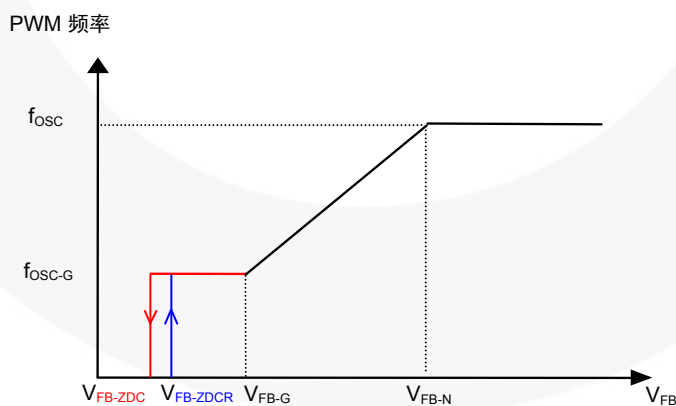
图 7. V_{DD-AC} 和 AC 恢复

电气特性 (接上页)

除非另外说明, $V_{DD}=15\text{ V}$ 且 $T_A=25^\circ\text{C}$ 。

符号	参数	工作条件	最小值	典型值	最大值	单位
振荡器部分						
f_{OSC}	标准模式下的频率	中央频率	61	65	69	kHz
		抖频范围	± 3.7	± 4.2	± 4.7	
t_{HOP}	抖频周期		12.0	13.5	15.0	ms
$f_{\text{OSC-G}}$	绿色模式频率		19	22	25	kHz
f_{DV}	频率变化与 V_{DD} 偏差的关系	$V_{\text{DD}}=11\text{ V}$ 至 22 V			5	%
f_{DT}	频率变化与温度偏差的关系	$T_A=-40$ 至 $+105^\circ\text{C}$			5	%
反馈输入部分						
A_V	输入电压至电流检测衰减		1/4.5	1/4.0	1/3.5	V/V
Z_{FB}	输入阻抗		14	16	18	k Ω
$V_{\text{FB-OPEN}}$	输出高电平	FB 引脚开路	4.8	5.0	5.2	V
$V_{\text{FB-OLP}}$	FB 开环触发电平		4.3	4.6	4.9	V
$t_{\text{D-OLP}}$	FB 引脚开环保护延迟时间		50	56	62	ms
$V_{\text{FB-N}}$	绿色模式开始 FB 电压	引脚, FB 电压 ($\text{FB}=V_{\text{FB-N}}$)	2.6	2.8	3.0	V
		抖频范围	± 3.7	± 4.2	± 4.7	kHz
$V_{\text{FB-G}}$	绿色模式结束 FB 电压	引脚, FB 电压 ($\text{FB}=V_{\text{FB-G}}$)	2.1	2.3	2.5	V
		抖频范围	± 1.27	± 1.45	± 1.62	kHz
$V_{\text{FB-ZDCR}}$	用于零占空比恢复的 FB 阈值电压		1.9	2.1	2.3	V
$V_{\text{FB-ZDC}}$	用于零占空比的 FB 阈值电压		1.8	2.0	2.2	V

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图 8. V_{FB} 与 PWM 频率的关系

电气特性 (接上页)

除非另外说明, $V_{DD}=15\text{ V}$ 且 $T_A=25^\circ\text{C}$ 。

符号	参数	工作条件	最小值	典型值	最大值	单位
电流检测部分						
t_{PD}	输出延迟			100	250	ns
t_{LEB}	前沿消隐时间		230	280	330	ns
$V_{Limit-L}$	低线电压下 ($V_{AC}=86\text{ V}$) 的电流限制	$V_{DC}=122\text{ V}$, 串联 $R=200\text{ k}\Omega$ 至 HV	0.43	0.46	0.49	V
$V_{Limit-H}$	高线电压下 ($V_{AC}=259\text{ V}$) 的电流限制	$V_{DC}=366\text{ V}$, 串联 $R=200\text{ k}\Omega$ 至 HV	0.36	0.39	0.42	V
V_{SSCP}	用于感应短路保护的阈值电压		0.03	0.05	0.07	V
$t_{ON-SSCP}$	V_{SSCP} 检查		4.0	4.4	4.8	μs
t_{D-SSCP}	感应短路保护延迟	$V_{SENSE}<0.05\text{ V}$	60	120	180	μs
t_{SS}	软启动时间	启动时间	7	8	9	ms
GATE 部分						
DCY_{MAX}	最大占空比		86	89	92	%
V_{GATE-L}	栅极低电压	$V_{DD}=15\text{ V}$, $I_O=50\text{ mA}$			1.5	V
V_{GATE-H}	栅极高电压	$V_{DD}=12\text{ V}$, $I_O=50\text{ mA}$	8			V
$I_{GATE-SINK}$	栅极灌电流 ⁽⁴⁾	$V_{DD}=15\text{ V}$	300			mA
$I_{GATE-SOURCE}$	栅极-源极电流 ⁽⁴⁾	$V_{DD}=15\text{ V}$, GATE=6 V	250			mA
t_r	栅极上升时间	$V_{DD}=15\text{ V}$, $C_L=1\text{ nF}$		100		ns
t_f	栅极下降时间	$V_{DD}=15\text{ V}$, $C_L=1\text{ nF}$		50		ns
$V_{GATE-CLAMP}$	栅极输出箝位电压	$V_{DD}=22\text{ V}$	9	13	17	V
RT 部分						
I_{RT}	来自 RT 引脚的输出电流		92	100	108	μA
V_{RTTH1}	过温保护阈值电压	$0.7\text{ V}<V_{RT}<1.05\text{ V}$, 12 ms 后门锁关闭	1.000	1.035	1.070	V
V_{RTTH2}		$V_{RT}<0.7\text{ V}$, 100 μs 后 门锁关闭	0.65	0.70	0.75	
t_{D-OTP1}	过温门锁关闭保护去抖	$V_{RTTH2}<V_{RT}<V_{RTTH1}$ $FB>V_{FB-N}$	14	16	18	ms
		$V_{RTTH2}<V_{RT}<V_{RTTH1}$ $FB<V_{FB-G}$	40	51	62	
t_{D-OTP2}		$V_{RT}<V_{RTTH2}$, $FB>V_{FB-N}$	110	185	260	μs
		$V_{RT}<V_{RTTH2}$, $FB<V_{FB-G}$	320	605	890	

注:

4. 设计保证。

典型性能特征

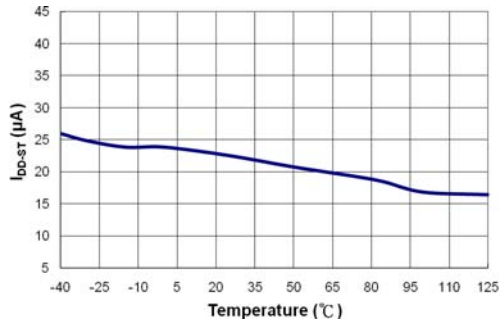


图 9. 启动电流 (I_{DD-ST}) 与温度的关系

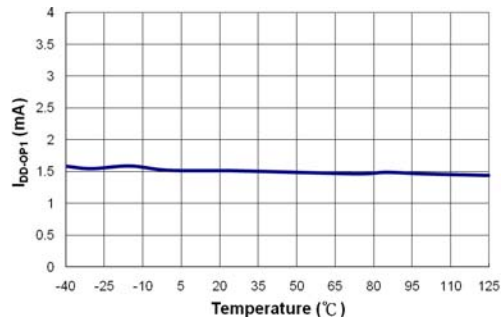


图 10. 工作电源电流 (I_{DD-OP1}) 与温度的关系

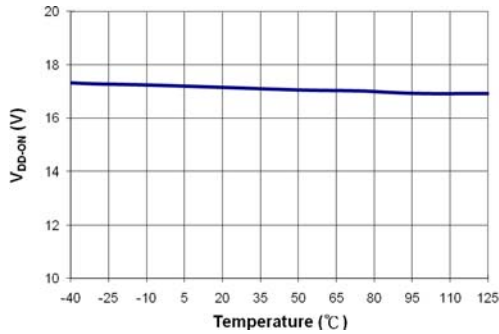


图 11. 启动阈值电压 (V_{DD-ON}) 与温度的关系

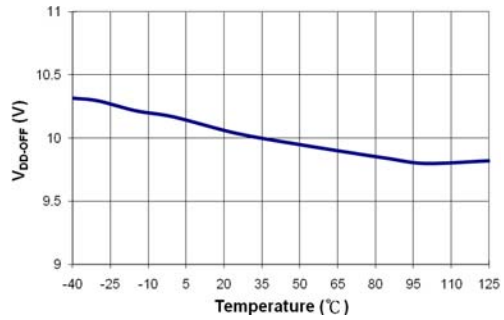


图 12. 最小工作电压 (V_{DD-OFF}) 与温度的关系

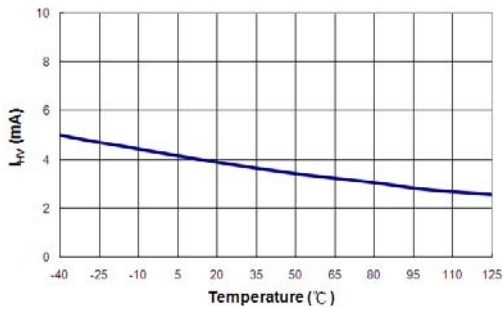


图 13. 来自 HV 引脚的电源电流 (I_{HV}) 与温度的关系

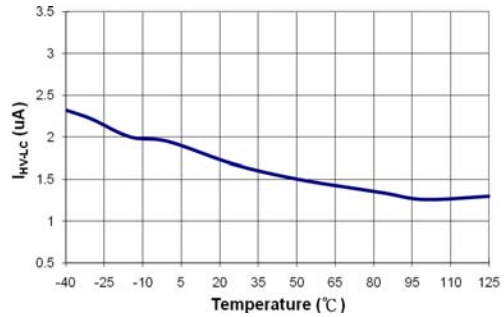


图 14. 启动后的 HV 引脚漏电流 (I_{HV-LC}) 与温度的关系

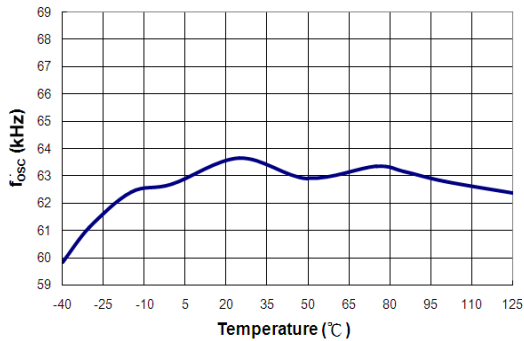


图 15. 标准模式下的频率 (f_{osc}) 与温度的关系

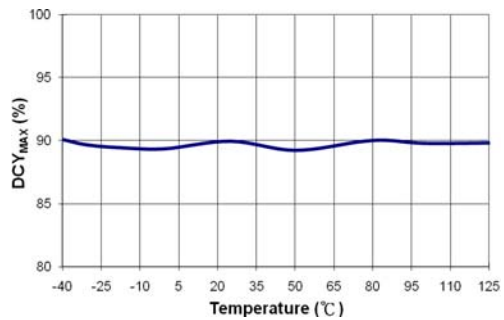


图 16. 最大占空比 (DCY_{MAX}) 与温度的关系

典型性能特征 (接上页)

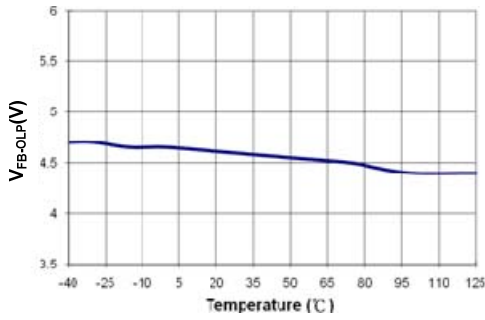


图 17. FB 开环触发电平 (V_{FB-OLP}) 与温度的关系

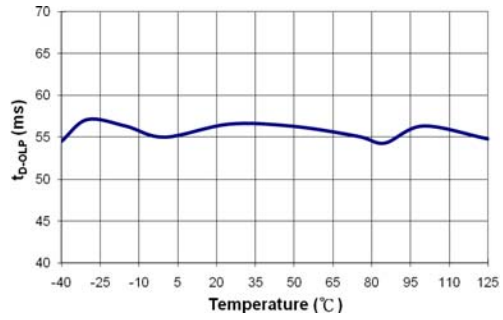


图 18. FB 引脚开环保护延迟时间 (t_{D-OLP}) 与温度的关系

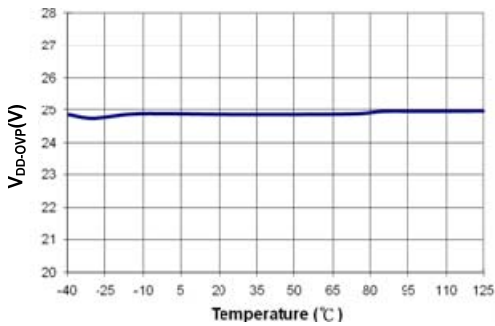


图 19. V_{DD} 过压保护 (V_{DD-OVP}) 与温度的关系

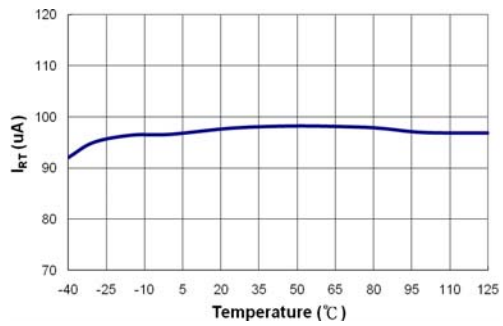


图 20. RT 引脚输出电流 (I_{RT}) 与温度的关系

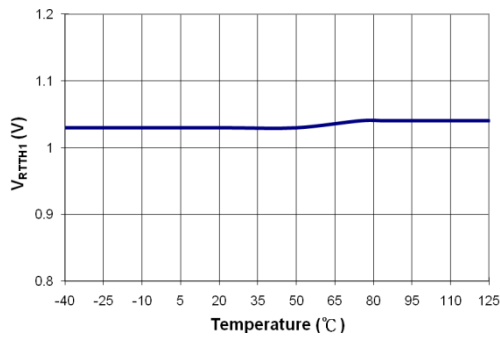


图 21. 过温保护阈值电压 (V_{RTTH1}) 与温度的关系

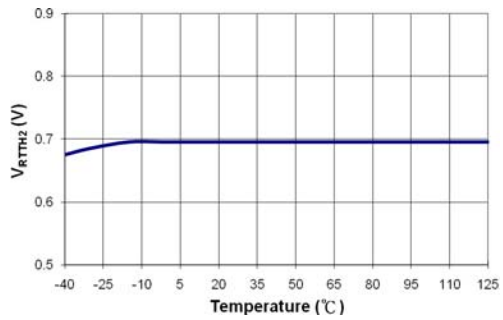


图 22. 过温保护阈值电压 (V_{RTTH2}) 与温度的关系

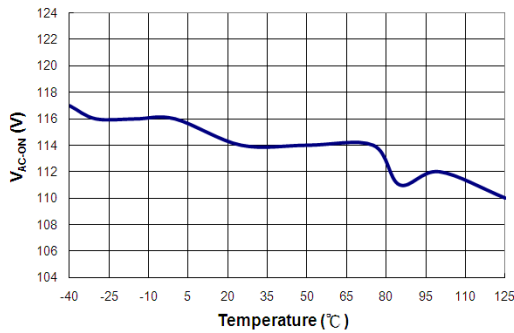


图 23. 通电 (V_{AC-ON}) 与温度的关系

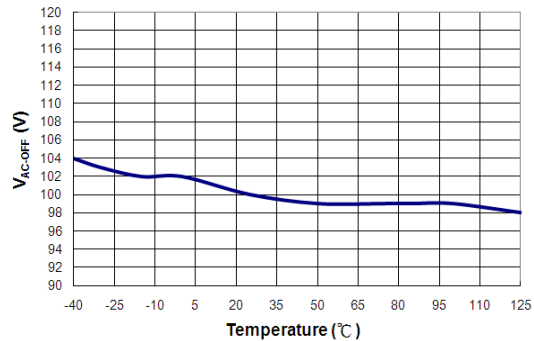


图 24. 掉电 (V_{AC-OFF}) 与温度的关系

功能说明

启动电流

启动时，HV 引脚通过外部二极管和电阻 R_{HV} （建议值 1N4007/200 k Ω ）连接至线路输入。来自 HV 引脚的峰值启动电流为 $(V_{AC} \times \sqrt{2})/R_{HV}$ 并通过二极管和电阻向保持电容充电。当 V_{DD} 电压电平达到 V_{DD-ON} 时，启动电流关断。此时， V_{DD} 电容仅向 FAN6754WA 供电，以维持 V_{DD} 恒定，直到主变压器的辅助绕组能够提供工作电流时为止。

工作电流

工作电流大约为 1.5 mA。较低的工作电流有助于提高效率、减小所需 V_{DD} 电容容量。

绿色模式工作

专有绿色模式功能提供了关断时间调制，以在轻载和空载条件下降低开关频率。选用电压反馈环路的 V_{FB} 信号作为参考电压。一旦 V_{FB} 低于阈值电压 (V_{FB-N})，开关频率就会持续降低至大约 22 kHz 的绿色模式最大频率。

电流感测与 PWM 限流

峰值电流模式可用来调整输出电压，并提供逐脉冲电流限制。开关电流通过一个感应电阻检测，并输入到 SENSE 引脚。PWM 占空比取决于电流检测信号以及反馈电压 V_{FB} 。当 SENSE 引脚电压达到大约 $V_{COMP} = (V_{FB} - 0.6)/4$ ，开关周期立即终止。 V_{COMP} 被内部箝位在一个大约 0.46 V 的可变电压，用于限制低线压输出功率。

前沿消隐 (LEB)

功率 MOSFET 每次导通时，在感测电阻处会发生导通尖峰。为了避免开关脉冲提前结束，其内置了前沿消隐时间。在消隐期间，限流比较器被禁用，不会关断栅极驱动器。

欠压锁定 (UVLO)

导通和关断阈值分别内固定为 17 V 和 10 V。在启动期间，为了使能 IC，保持电容必须通过启动电阻充电到 17 V。保持电容持续提供 V_{DD} ，直到能量可从主变压器的辅助绕组提供为止。在启动阶段， V_{DD} 不可低于 10 V。UVLO 滞回窗口确保启动期间保持电容可提供 V_{DD} 。

栅极输出/软驱动

BiCMOS 输出级为快速推挽栅极驱动电路。为了最大程度降低热损、增加效率并提高可靠性，避免出现交叉导通。输出驱动器被一个内部 13 V 的齐纳二极管箝位，防止功率 MOSFET 晶体管遭受不理想的栅极过压信号。实现一个软驱动波形，用于最小化 EMI。

软启动

对于很多应用，必须最大限度地减小启动期间的浪涌电流。内置 8 ms 软启动电路可大幅减少启动电流尖峰和输出电压过冲。

斜率补偿

电流检测电阻两端的检测电压用于峰值电流模式控制和逐周期限流。内置斜率补偿能够提高稳定性并阻止次谐波振荡。FAN6754WA 在每个开关周期中插入一个同步、正向斜坡。

恒定输出功率限制

当在低线压条件下，检测电阻 R_{SENSE} 两端的检测电压达到大约 0.46 V 的阈值电压，输出栅极驱动在一个较小的延迟 t_{PD} 后被关断。该延迟引入一个额外的电流，与 $t_{PD} \cdot V_{IN}/L_P$ 成正比。由于延迟几乎恒定，不管输入电压 V_{IN} 如何，较高的输入电压会导致较高的额外功率。因此，高线压下最大输出功率高于低线压。为了补偿较宽 AC 输入范围内的变化，通过 HV 引脚控制一个功率限制器，用于解决不均衡的功率限制问题。功率限制器馈入限流比较器的反相输入。这使得高压线路输入下的电流限值要比低压线路输入下的低。

受 HV 引脚限制的掉电和恒定功率

与以前的 PWM 控制器不同，FAN6754WA HV 引脚可以检测 AC 线路电压，针对功率限制实现掉电保护和线路补偿。通过采用一个快速二极管和启动电阻对 AC 线路电压进行采样，峰值刷新并存储与每个采样周期的寄存器中。当到达内部更新时间时，该峰值用于掉电和限流值判断。方程式 (1) 和 (2) 计算转换为 RMS 值后的通电或掉电值。为了节省电力，FAN6754WA 延长采样周期，以降低轻载条件下 HV 采样中的功耗。

$$V_{AC-ON}(RMS) = (0.9V \times \frac{(R_{HV} + 1.6)}{1.6}) / \sqrt{2} \quad (1)$$

$$V_{AC-OFF}(RMS) = (0.81V \times \frac{(R_{HV} + 1.6)}{1.6}) / \sqrt{2} \quad (2)$$

其中， R_{HV} 单位是 k Ω 。

HV 引脚可以实现限流，从而在整个 AC 电压范围内将过流保护 (OCP) 的容差缩减为线性限流曲线，如图 25 所示。FAN6754WA 还将 V_{limit} 值减半，从而降低 I^2R_{SENSE} 损耗，提高重载效率。

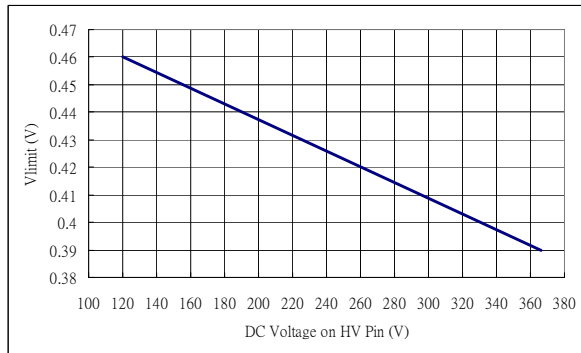


图 25. 线性限流曲线

V_{DD} 过压保护 (OVP)

V_{DD} 过电压保护能够防止异常状况引起的损坏。如果 V_{DD} 电压超过过压保护电平 (V_{DD-OVP}) 并且持续时间为 t_{D-VDDOVP}，PWM 脉冲被禁用并且 V_{DD} 开始降低。当 V_{DD} 降至 V_{DD-OLP} 时，内部 HV 启动电路被激活并且 V_{DD} 被充电至 V_{DD-ON}，以便重启 IC。过压情况通常由开路反馈环路导致。

感测引脚短路保护

FAN6754WA 提供针对限制电源 (LPS) 测试的安全保护功能。当在量产中进行焊接从而使感测电阻短路时，逐脉冲限流无法对器件提供有效的过功率保护。负载大于最大负载时，器件可能会损坏。为了保护电流感测电阻免受短路影响，如果检测到 SENSE 引脚上的连续低电压（约 0.05 V/120 μs），便立即关断控制器。

热保护

可将一个 NTC 热敏电阻 R_{NTC}（与电阻 R_A 串联）从 RT 引脚连接至地。从 RT 引脚输出恒定电流 I_{RT}。RT 引脚电压可以表示为 $V_{RT} = I_{RT} \cdot (R_{NTC} + R_{PTC})$ ，其中，I_{RT} 为 100 μA。在较高的环境温度下，R_{NTC} 较小，因此 V_{RT} 降低。当 V_{RT} 低于 1.035 V (V_{RTTH1}) 时，PWM 在 16 ms (t_{D-OTP1}) 后关断。如果 V_{RT} 低于 0.7 V (V_{RTTH2})，PWM 在 185 μs (t_{D-OTP2}) 后关断。若 RT 引脚未连接 NTC 电阻以实现过温保护，则建议使用 100 kΩ 电阻接地，以防噪声干扰。该引脚受限于内部箝位电路。

受限功率控制

一旦电源无法在输出短路、过载等条件下维持输出负载，FB 电压就会被上拉至高电平。如果 FB 电压比内置阈值高的时间超过了 t_{D-OLP}，PWM 输出被关断。当 PWM 输出关断时，V_{DD} 开始降低。当 V_{DD} 降至关断阈值电压 (10 V) 以下，控制器完全关断并且 V_{DD} 通过 I_{DD-OLP} 持续放电至 V_{DD-OLP}(6.5 V)，从而降低平均输入功率。这称为二级 UVLO。V_{DD} 再次循环。只要过载条件仍然存在，这种保护特性就会继续。这样，可以防止电源由于过载而引起过热。

抗噪能力

电流检测或控制信号产生的噪声可能导致明显的脉宽抖动，尤其是在连续导通模式下。斜率补偿有助于缓解这个问题。应遵循良好的放置和布局方法。提高性能的方法有：避免较长的 PCB 走线和元件引线、将补偿和滤波元件靠近 FAN6754WA 放置，以及增大功率 MOS 栅极电阻。

物理尺寸

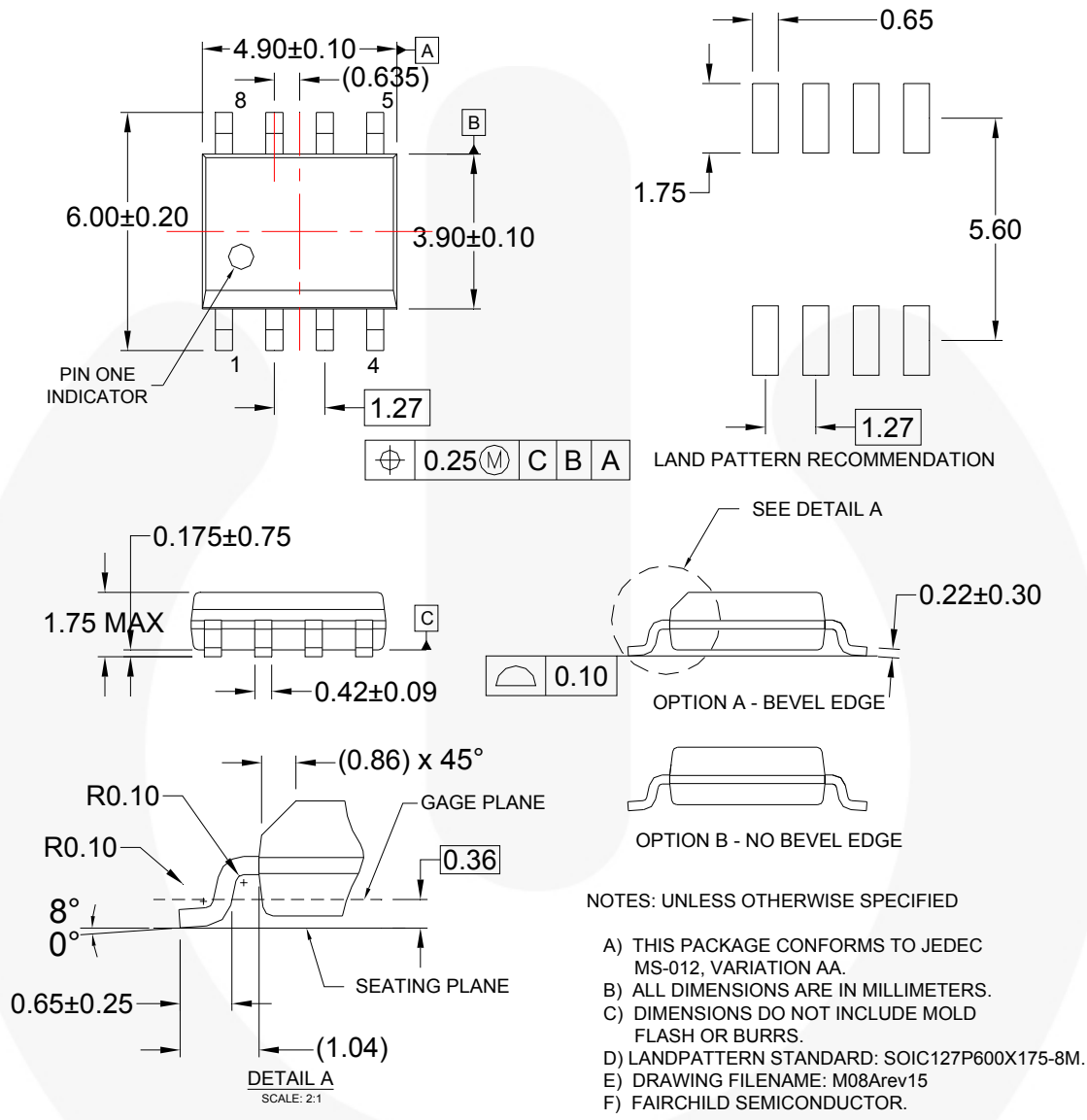


图 26. 8 引脚小尺寸封装 (SOP)

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