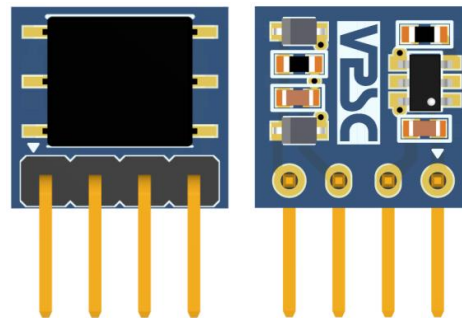


方案简介

本方案由 VPS8702 和桥式变压器 VPT87BB-01A 组合，结合必要的整流二极管以及阻容元件实现 5V ± 10% 输入，5V/200mA 输出的隔离非稳压电源。原副边隔离耐压不小于 1500VDC*，可长期短路保护并自恢复。主要应用于电路板上分布式电源系统中需要产生一组与输入隔离以达到安全和（或）抗干扰的场合。

*注：变压器能满足 1.5KV 隔离要求，DEMO 板仅供性能测试使用，因 PIN 脚焊盘间距不足，实际使用建议增加 PIN 脚焊盘的爬电距离，建议预留 2mm 以上。

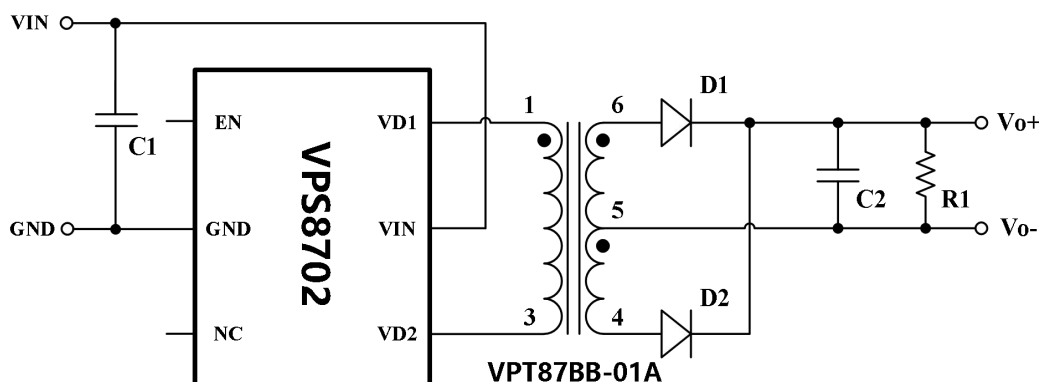
关键词：输入：4.5V-5.5V，输出 5V/1W，隔离电压：1500VDC，反馈方式：开环



编号	功能
1	GND
2	VIN
3	VO-
4	VO+

图 1: VPS8702 Demo 板(尺寸:11.16mm*10.32mm) 注: ▽ 为 1 脚

原理图



物料清单

位号	参数	封装	选型建议
IC1	VPS8702	SOT23-6	---
C1	1uF/10V	0603	电容量 1uF，耐压 10V 以上，X7R 材质
C2	4.7uF/10V	0603	电容量 4.7uF，耐压 10V 以上，X7R 材质
R1	4.7KΩ	0603	4.7KΩ，精度±1%
D1/D2	B0540WS	SOD-323	平均电流 0.5A，耐压 30V 以上 不重复浪涌峰值电流 3A 以上（短路保护）
TR1	VPT87BB-01A	T4-SMD	---

总体性能一览表

性能指标	测试条件	Min	Typ	Max	Unit
输入电流 (满载/空载)	VIN=5V; Io=200mA/0A	6	---	230	mA
转换效率	Typ: VIN=5V, Io=200mA	---	85	---	%
纹波&噪声	VIN=5V; Io=200mA	---	45	80	mV
工作温度	---	-40	---	105	°C
绝缘电压	原边短接 VS 副边短接	1500	---	---	VDC
开关频率	VIN=5V	---	340	---	KHz
短路保护	VIN=5V; Io=200mA	可长期保护, 即时自恢复			

关键性能指标测试结果

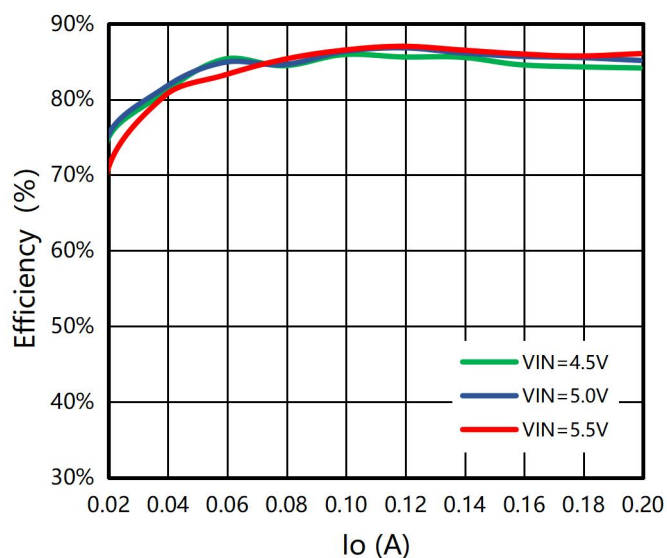


图 2: 效率 VS 输出电流(输出满载)

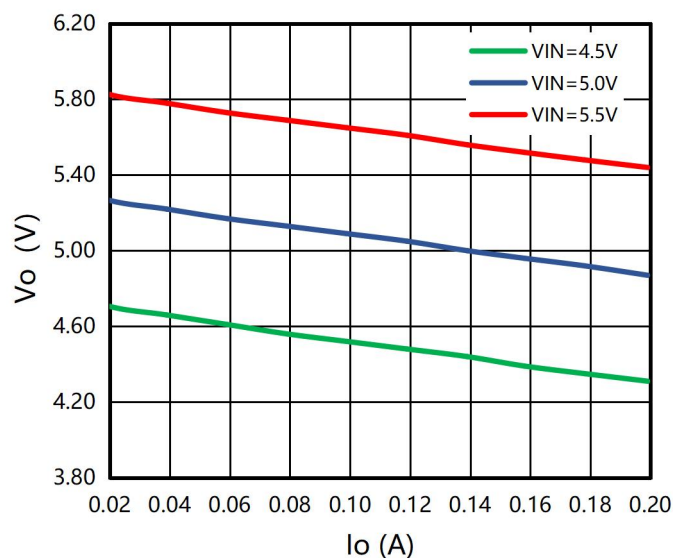


图 3: 输出电压 VS 输出电流

相关波形

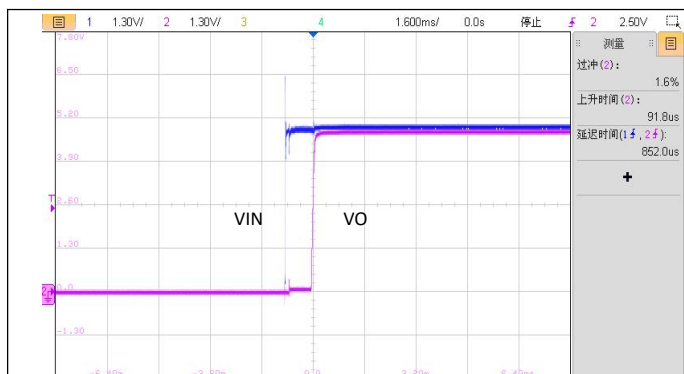


图 4: VIN=5V, 满载启机波形

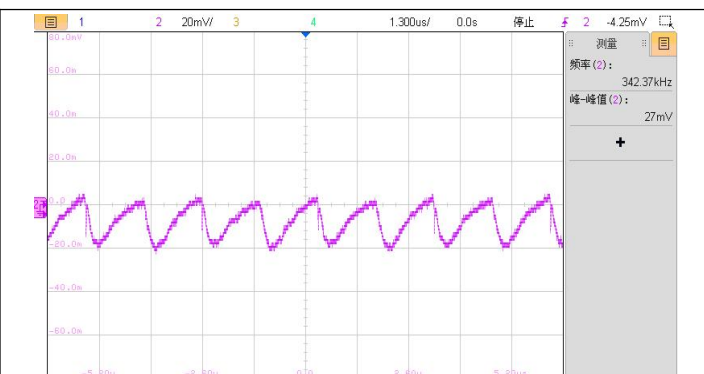
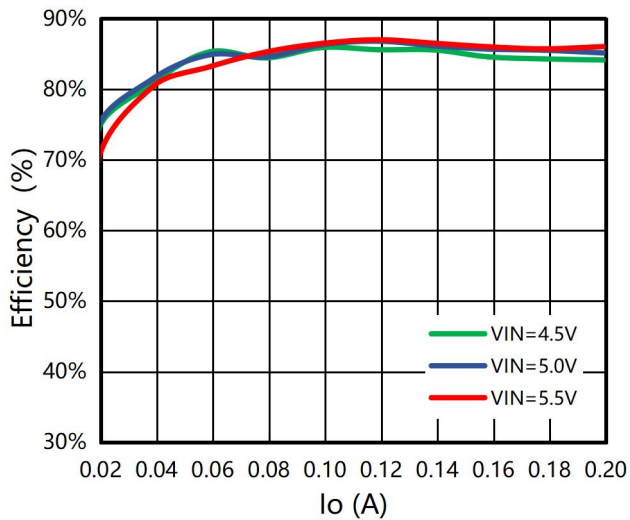


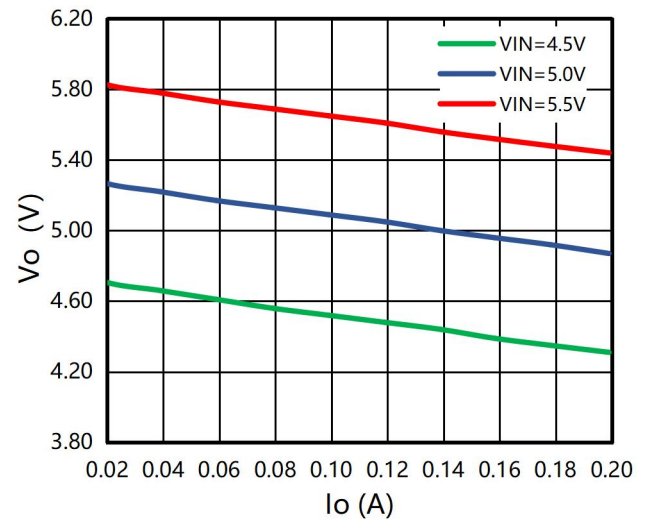
图 5: VIN=5V, 满载输出电压纹波波形

详细测试数据

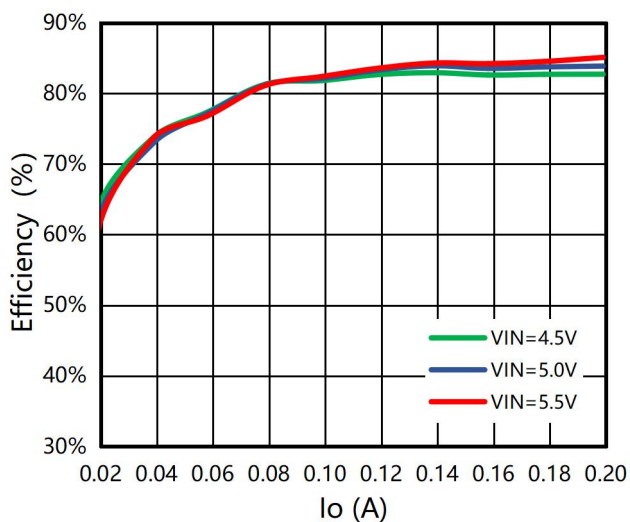
高低温测试曲线



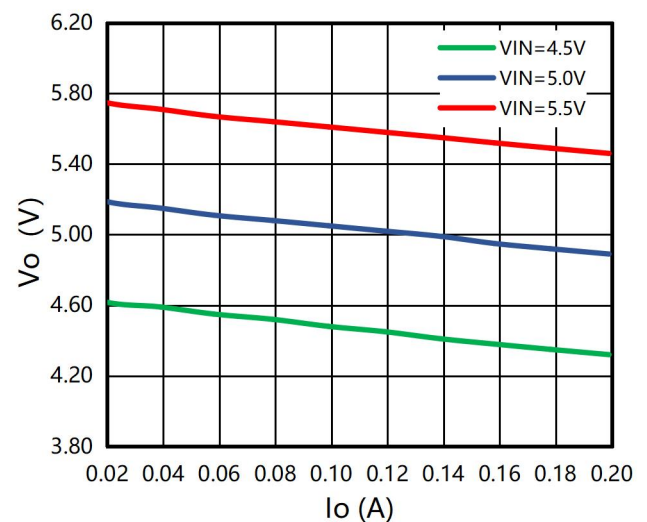
效率 VS 输出电流(输出满载@25°C)



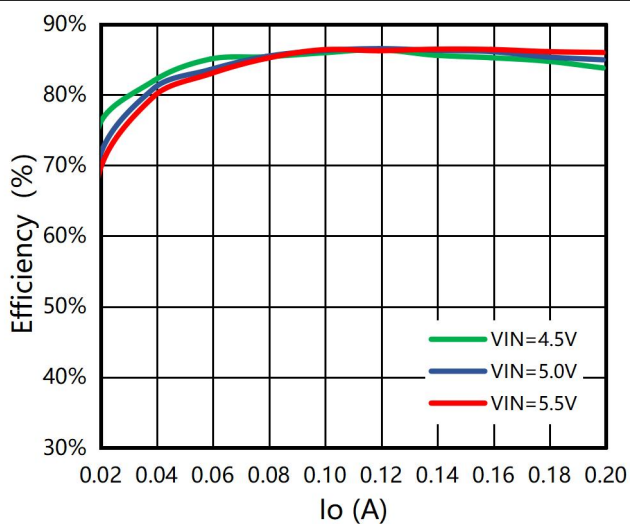
输出电压 VS 输出电流 (25°C)



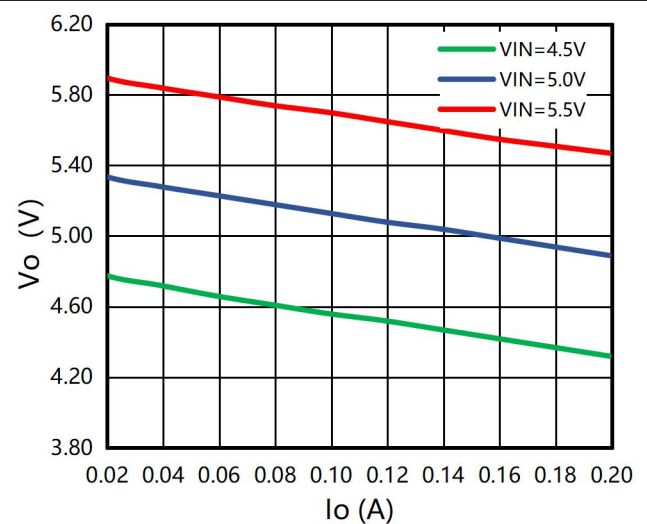
效率 VS 输出电流(输出满载@-40°C)



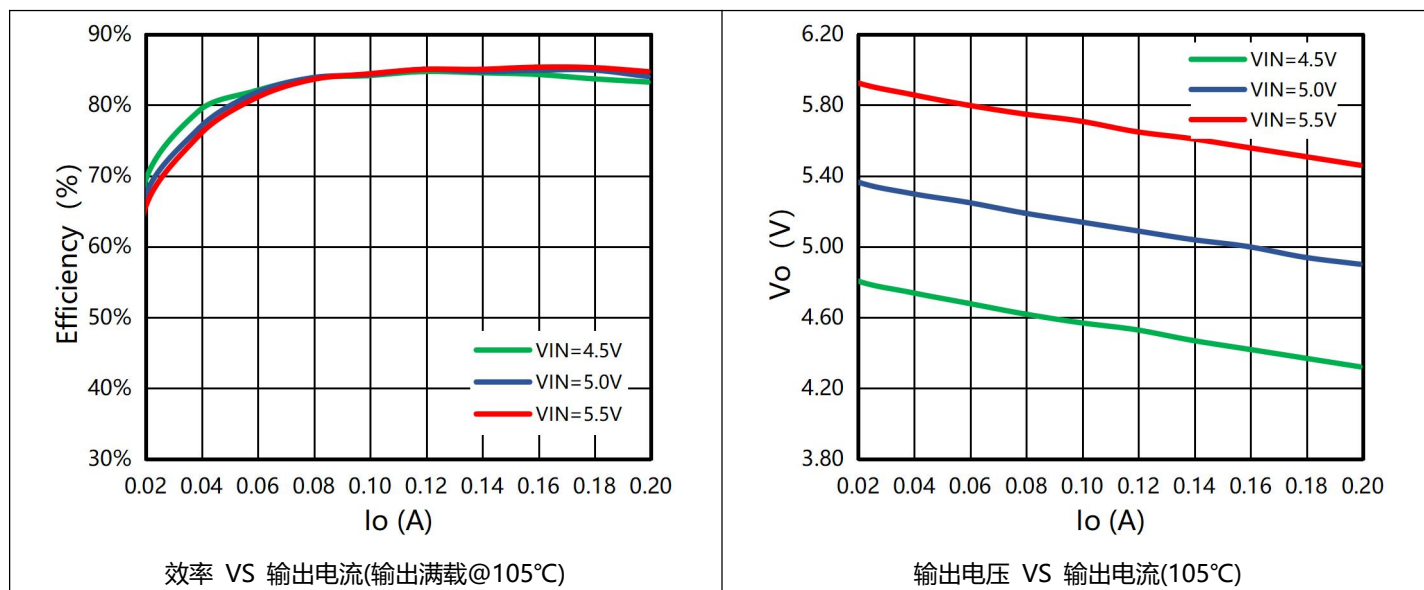
输出电压 VS 输出电流(-40°C)



效率 VS 输出电流(输出满载@85°C)



输出电压 VS 输出电流(85°C)



VIN=5V, Ta=25°C, 输入、输出及效率数据:

VIN(V)	IIN(A)	VO(V)	IO(A)	IO-max%	η(%)
5	0.005	5.39	0	0%	0.00%
5	0.027	5.27	0.019	10%	74.17%
4.99	0.050	5.22	0.039	20%	81.60%
4.99	0.072	5.17	0.059	30%	84.90%
4.99	0.096	5.13	0.079	40%	84.60%
4.99	0.117	5.09	0.099	50%	86.31%
4.98	0.139	5.05	0.119	60%	86.81%
4.98	0.162	5.00	0.139	70%	86.15%
4.97	0.184	4.96	0.158	80%	85.70%
4.97	0.206	4.92	0.178	90%	85.54%
4.97	0.229	4.87	0.199	100%	85.15%

VIN=5V, Ta=-40°C, 输入、输出及效率数据:

VIN(V)	IIN(A)	VO(V)	IO(A)	IO-max%	η(%)
5	0.009	5.3	0	0%	0.00%
5	0.032	5.19	0.019	10%	61.63%
5	0.055	5.15	0.039	20%	73.04%
4.99	0.077	5.11	0.058	30%	77.14%
4.99	0.099	5.08	0.079	40%	81.24%
4.99	0.122	5.05	0.099	50%	82.12%
4.98	0.144	5.02	0.119	60%	83.30%
4.98	0.166	4.99	0.139	70%	83.90%
4.98	0.188	4.95	0.158	80%	83.54%
4.98	0.210	4.92	0.178	90%	83.74%
4.98	0.233	4.89	0.199	100%	83.86%

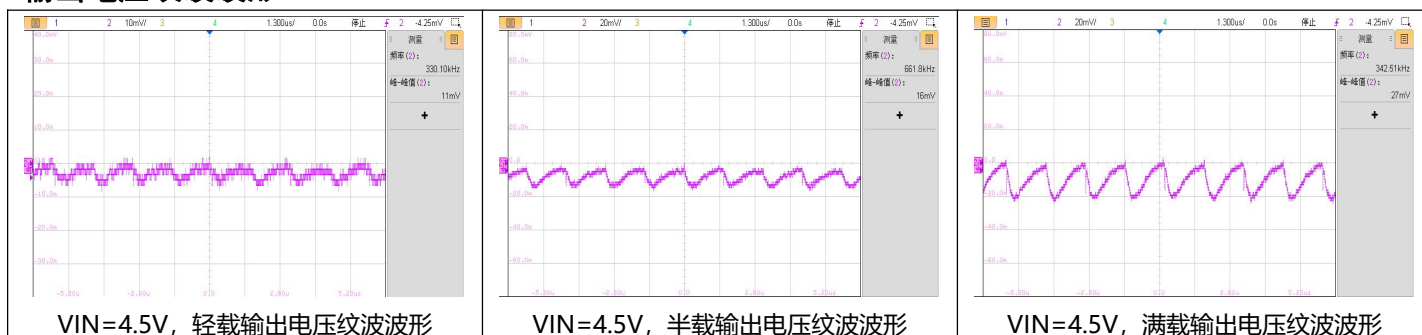
VIN=5V, Ta=85°C, 输入、输出及效率数据:

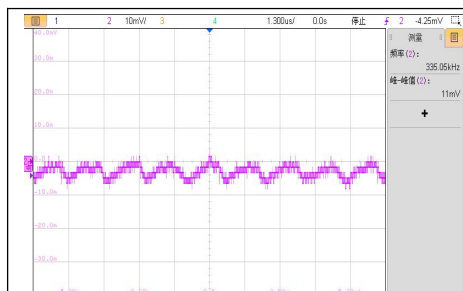
VIN(V)	IIN(A)	VO(V)	IO(A)	IO-max%	η(%)
5	0.006	5.48	0	0%	0.00%
4.99	0.029	5.34	0.019	10%	70.11%
4.99	0.051	5.28	0.039	20%	80.91%
4.99	0.074	5.23	0.059	30%	83.56%
4.99	0.096	5.18	0.079	40%	85.43%
4.99	0.118	5.13	0.099	50%	86.25%
4.99	0.140	5.08	0.119	60%	86.53%
4.98	0.163	5.04	0.139	70%	86.30%
4.98	0.185	4.99	0.159	80%	86.12%
4.98	0.208	4.94	0.179	90%	85.37%
4.98	0.230	4.89	0.199	100%	84.96%

VIN=5V, Ta=105°C, 输入、输出及效率数据:

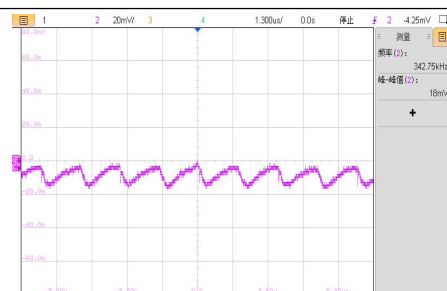
VIN(V)	IIN(A)	VO(V)	IO(A)	IO-max%	η(%)
5	0.008	5.52	0	0%	0.00%
5.00	0.031	5.37	0.019	10%	65.83%
4.99	0.054	5.30	0.039	20%	76.71%
4.99	0.076	5.25	0.059	30%	81.68%
4.99	0.098	5.19	0.079	40%	83.84%
4.99	0.121	5.14	0.099	50%	84.28%
4.98	0.143	5.09	0.119	60%	85.05%
4.98	0.166	5.04	0.139	70%	84.74%
4.98	0.188	5.00	0.159	80%	84.91%
4.98	0.209	4.94	0.179	90%	84.96%
4.98	0.233	4.90	0.199	100%	84.04%

输出电压纹波波形

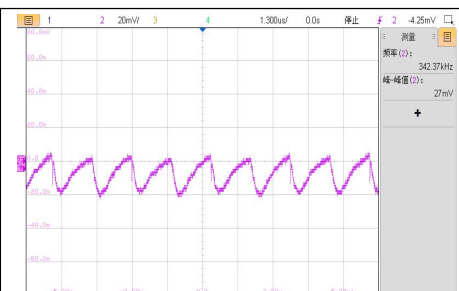




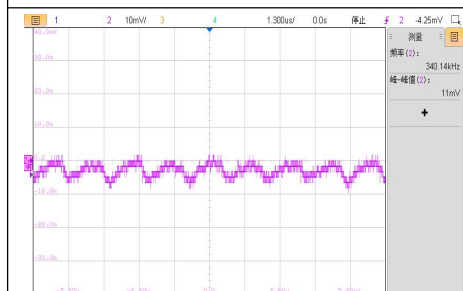
VIN=5.0V, 轻载输出电压纹波波形



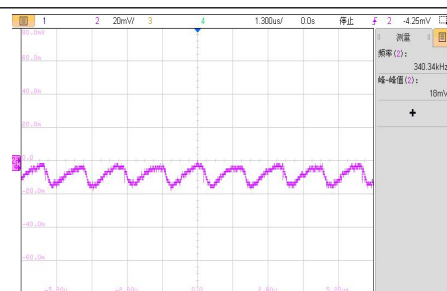
VIN=5.0V, 半载输出电压纹波波形



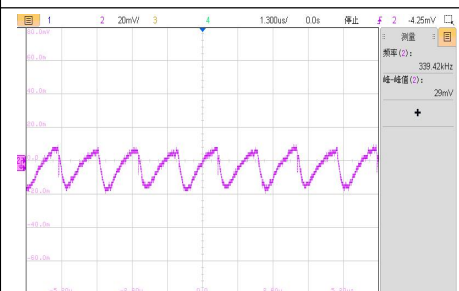
VIN=5.0V, 满载输出电压纹波波形



VIN=5.5V, 轻载输出电压纹波波形



VIN=5.5V, 半载输出电压纹波波形

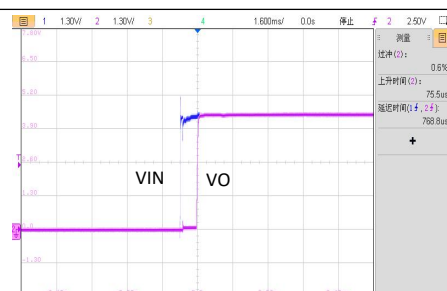


VIN=5.5V, 满载输出电压纹波波形

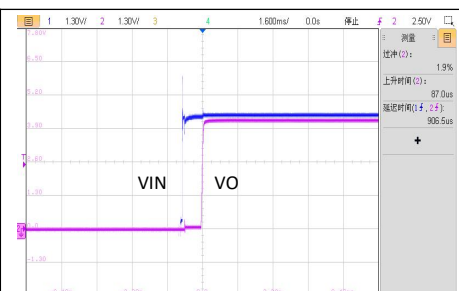
开关机波形



VIN=4.5V, 空载启机波形



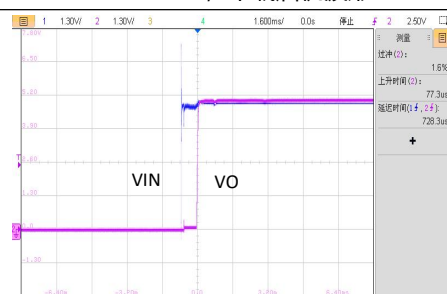
VIN=4.5V, 半载启机波形



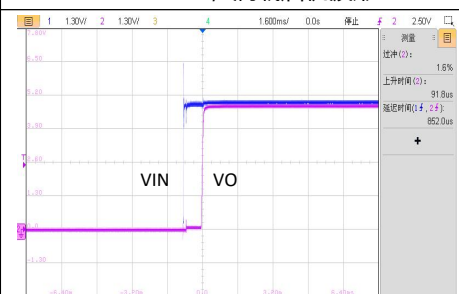
VIN=4.5V, 满载启机波形



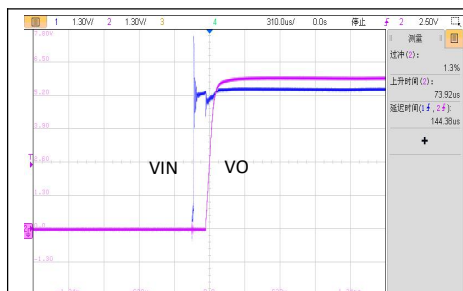
VIN=5.0V, 空载启机波形



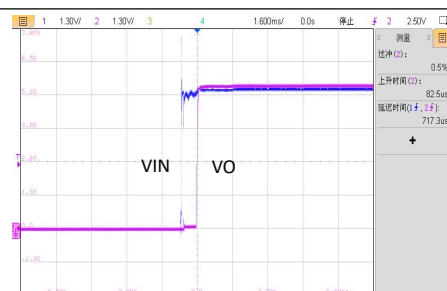
VIN=5.0V, 半载启机波形



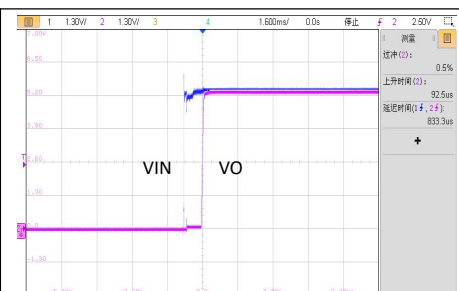
VIN=5.0V, 满载启机波形



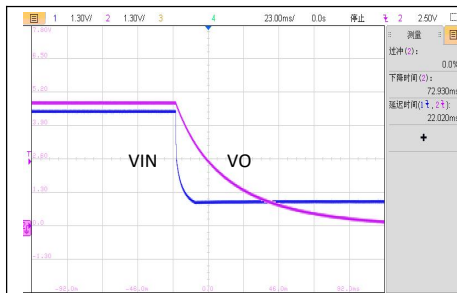
VIN=5.5V, 空载启机波形



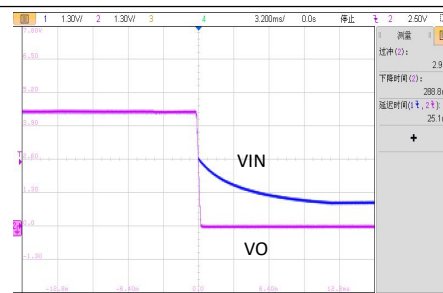
VIN=5.5V, 半载启机波形



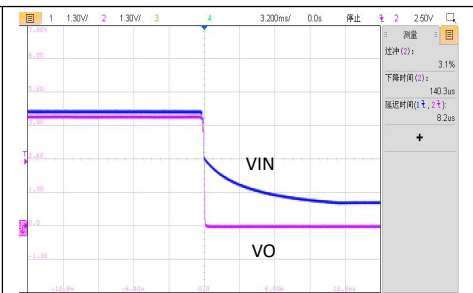
VIN=5.5V, 满载启机波形



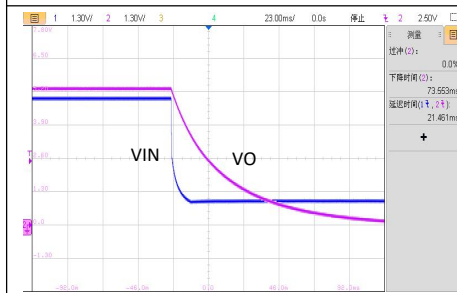
VIN=4.5V, 空载关机波形



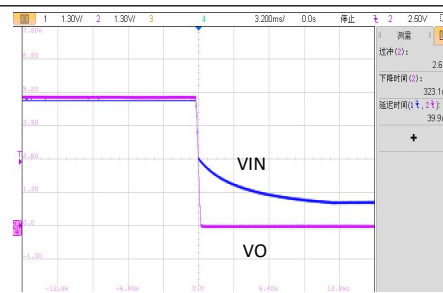
VIN=4.5V, 半载关机波形



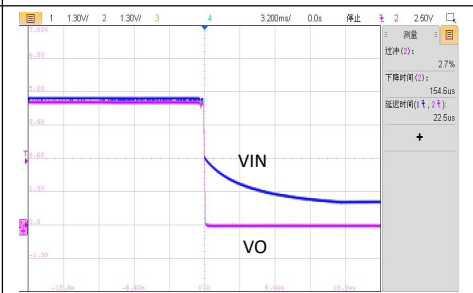
VIN=4.5V, 满载关机波形



VIN=5.0V, 空载关机波形



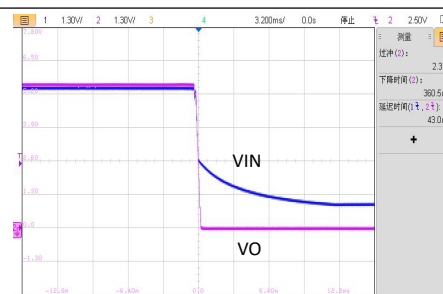
VIN=5.0V, 半载关机波形



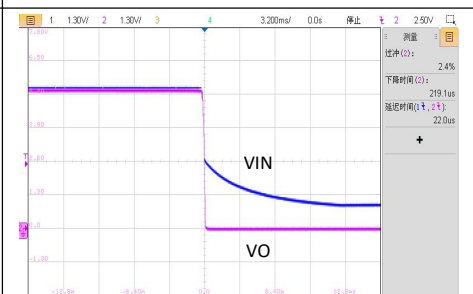
VIN=5.0V, 满载关机波形



VIN=5.5V, 空载关机波形

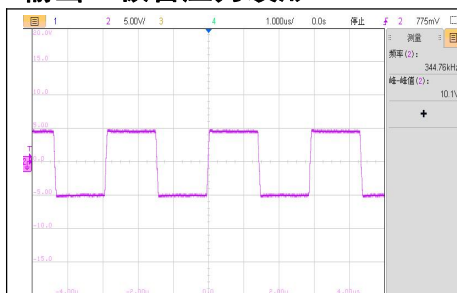


VIN=5.5V, 半载关机波形

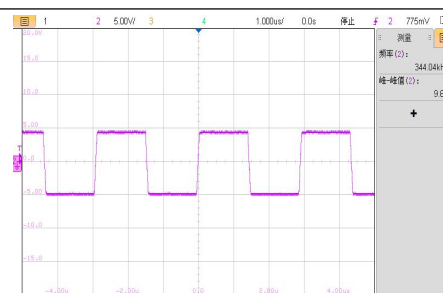


VIN=5.5V, 满载关机波形

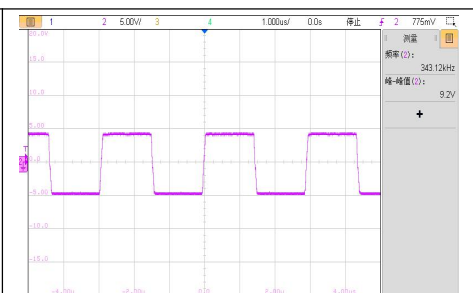
输出二极管应力波形



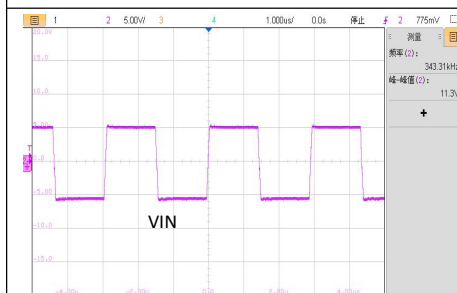
VIN=4.5V, 空载工作电压波形



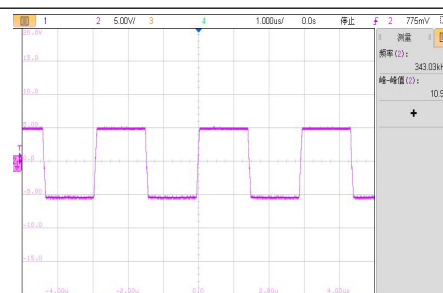
VIN=4.5V, 半载工作电压波形



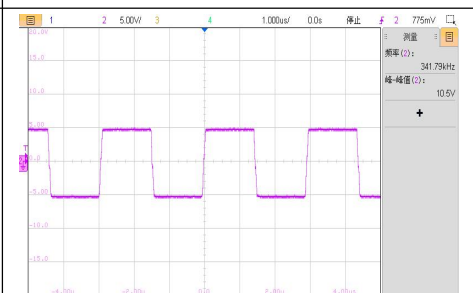
VIN=4.5V, 满载工作电压波形



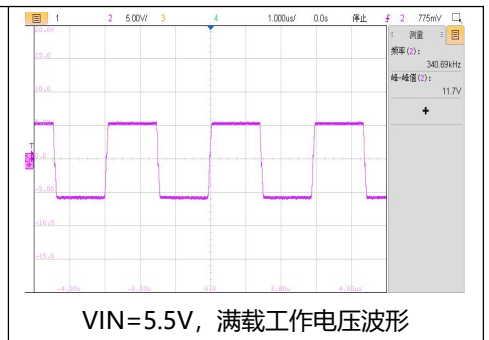
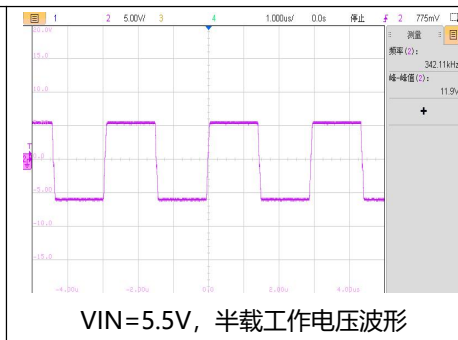
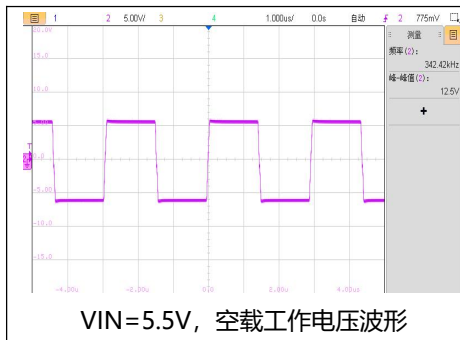
VIN=5.0V, 空载工作电压波形



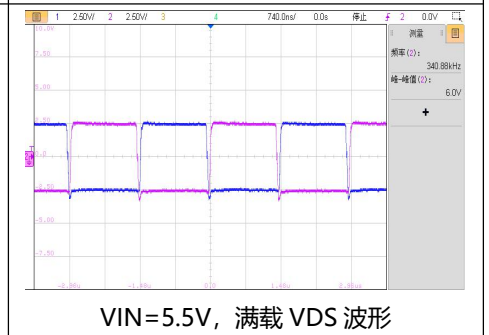
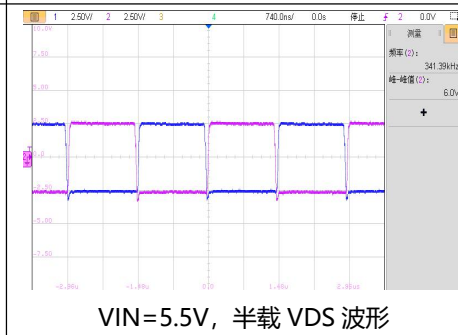
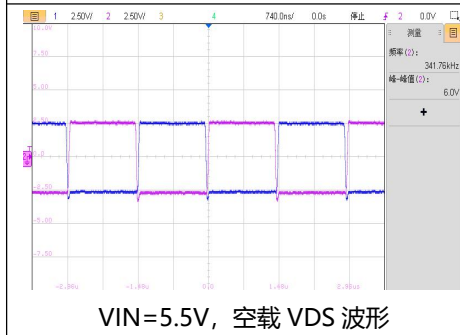
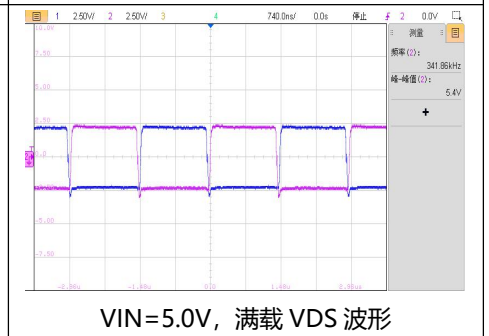
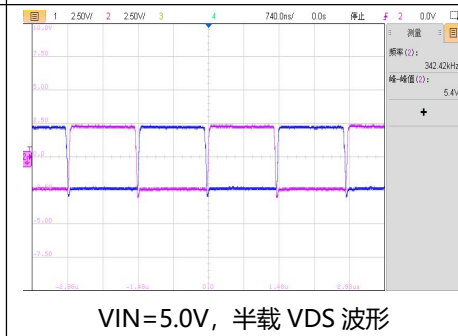
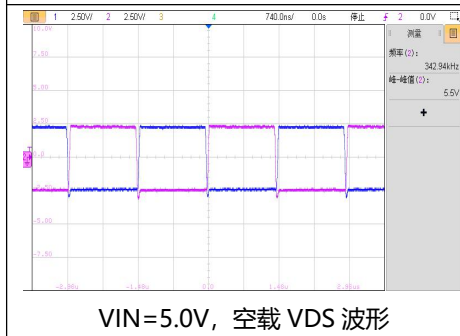
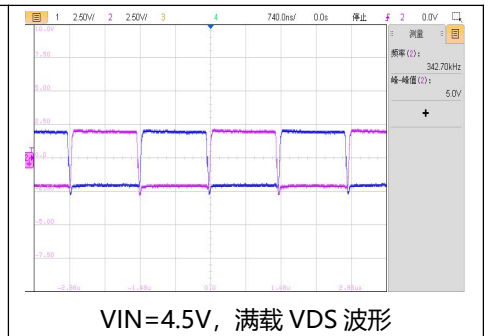
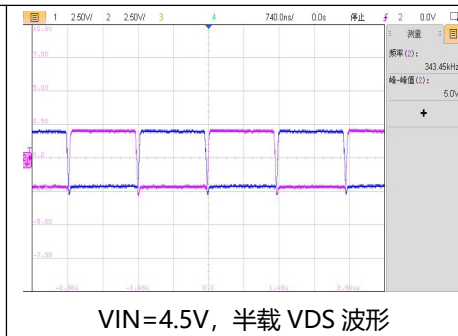
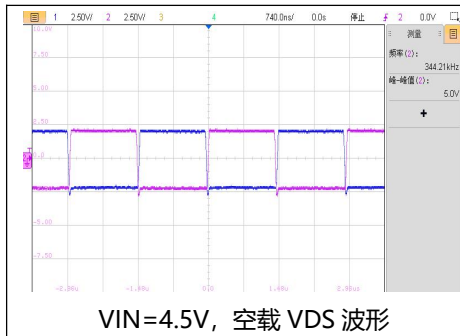
VIN=5.0V, 半载工作电压波形



VIN=5.0V, 满载工作电压波形



MOS 管电压应力波形-VPS8702



免责声明

本文的主要目的是为了客户更好地理解与应用源特相关产品。所涉及技术信息提供的所有参数、数值、数据都是基于源特对于部分标准的理解得到的，所提供的信息并不能保证所有假设情况和工作条件。客户在使用源特产品设计开发时，需进行充分的设计验证以确保设计方案能满足特定的应用场合。本文所提供的测试数据是基于有限数量样品测试的典型值，源特不能保证所有数据的准确性和完整性，也不对本文所提供的任何参数、数值、数据、建议、观点的准确性和充分性承担任何责任，不对由本文所造成的直接、间接损失承担任何责任。