

方案简介

本方案由 VPS8702 和桥式变压器 VPT82BB-01A 组合，结合必要的整流芯片 VPS2703 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。

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

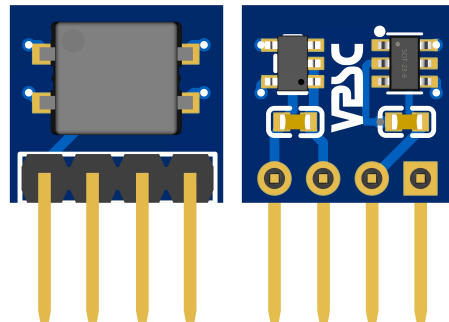
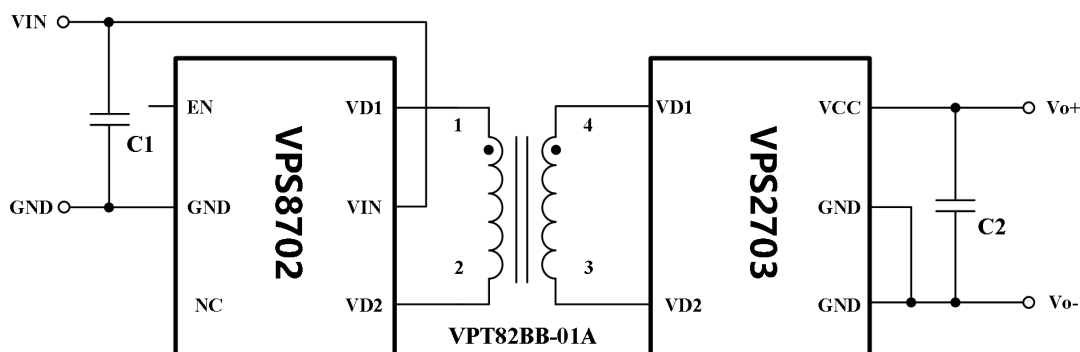


图1: VPS8702 Demo 板(尺寸:11.2mm*10.3mm)

编号	功能
1	GND
2	VIN
3	VO-
4	VO+

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	---
IC2	VPS2703	SOT23-5	---
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
TR1	VPT82BB-01A	SMD-4	---

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	---	81	---	%
纹波&噪声	VIN=5V; Io=200mA	---	30	70	mV
工作温度	---	-40	---	85	°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

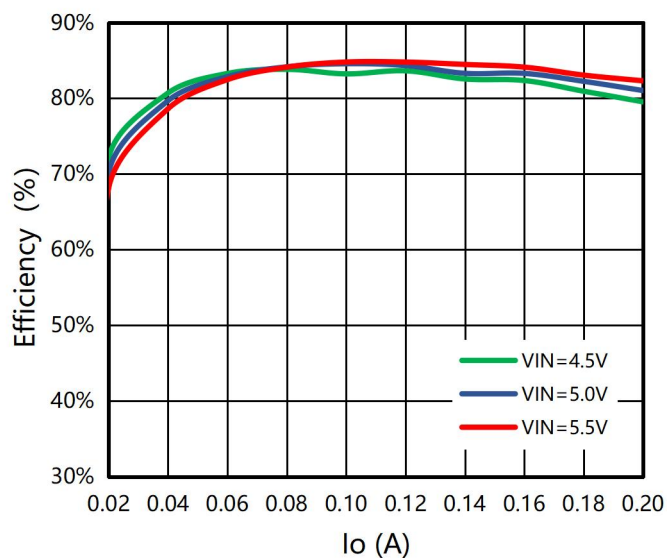


图 2: 效率 VS 输出电流(输出满载)

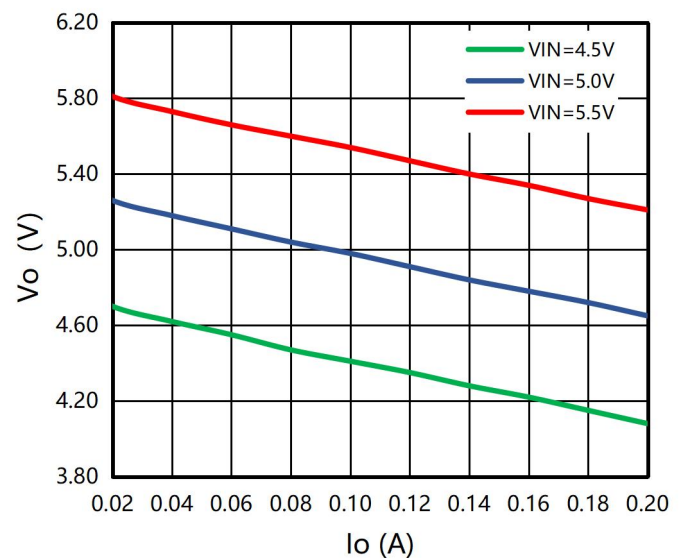


图 3: 输出电压 VS 输出电流

相关波形

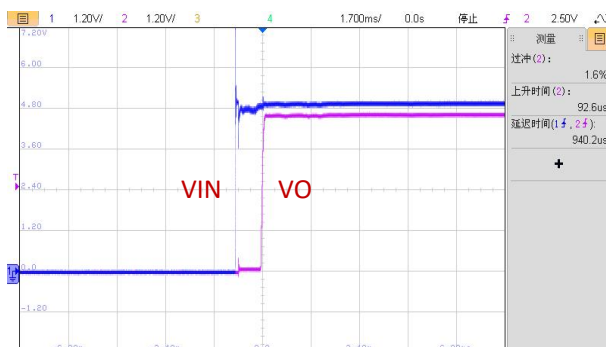


图 4: VIN=5V, 满载启机波形

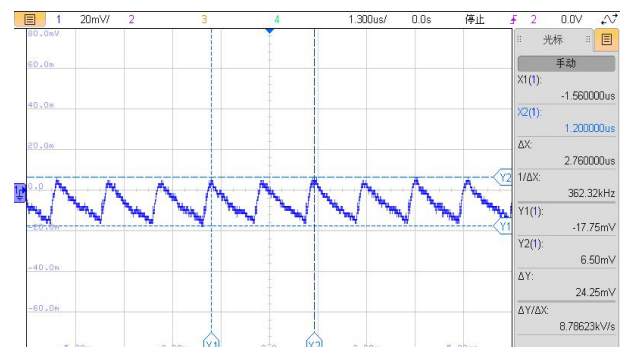
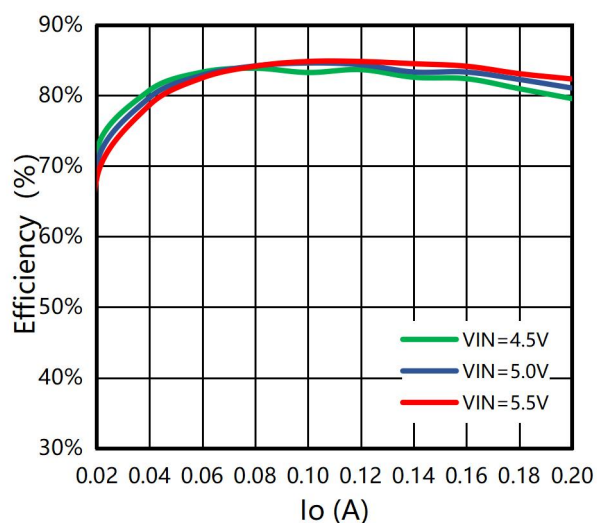


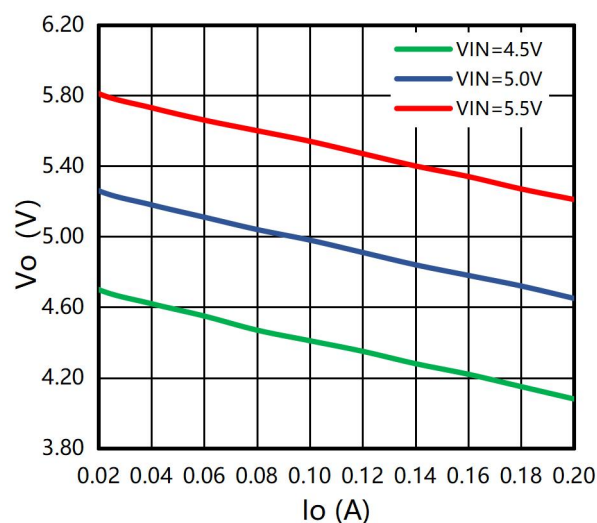
图 5: VIN=5V, 满载输出电压纹波波形

详细测试数据

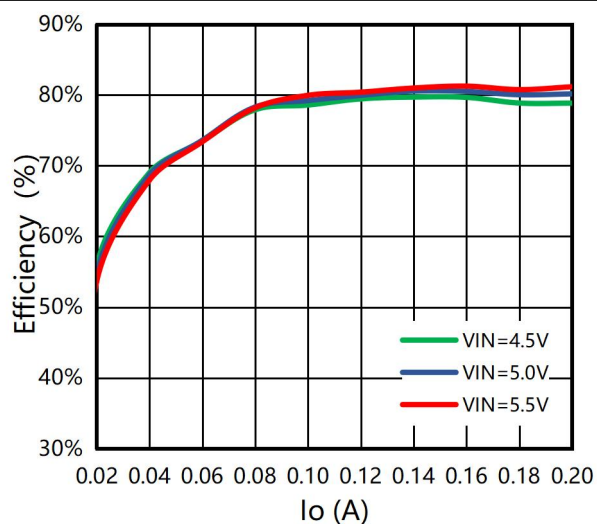
高低温测试曲线



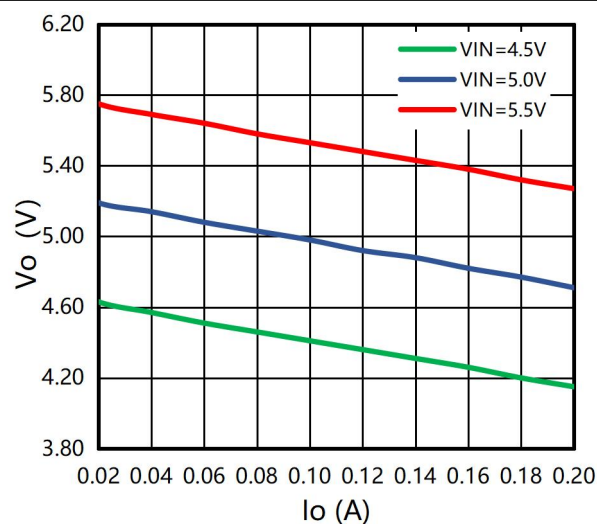
效率 VS 输出电流(25°C)



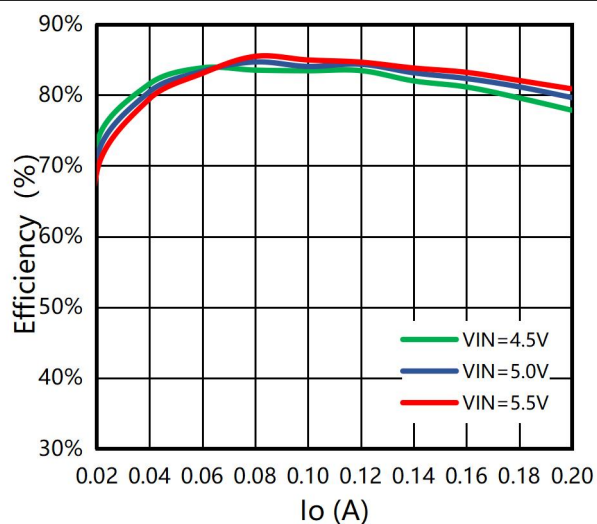
效率 VS 输入电压(输出满载@25°C)



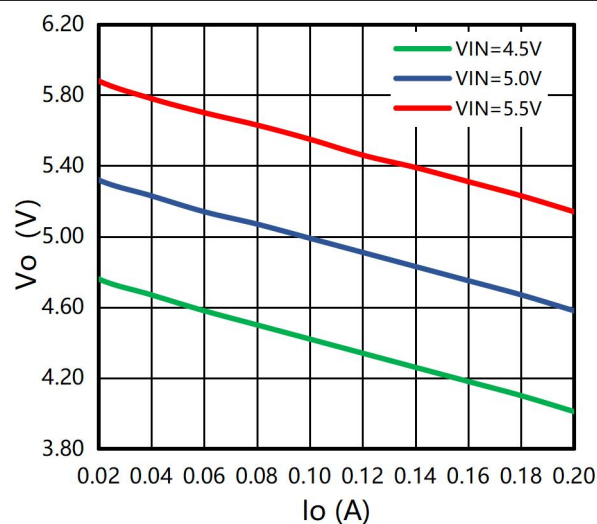
效率 VS 输出电流(-40°C)



效率 VS 输入电压(输出满载@-40°C)



效率 VS 输出电流(85°C)



效率 VS 输入电压(输出满载@85°C)

VIN=5V, Ta=25°C, 输入、输出及效率数据:

VIN(V)	IIN(A)	VO(V)	IO(A)	η(%)
5.00	0.006	5.42	0.000	00.00%
5.00	0.030	5.26	0.020	70.13%
5.00	0.052	5.18	0.040	79.69%
5.00	0.074	5.11	0.060	82.86%
4.99	0.096	5.04	0.080	84.17%
4.99	0.118	4.98	0.100	84.58%
4.99	0.140	4.91	0.120	84.34%
4.99	0.163	4.84	0.140	83.31%
4.99	0.184	4.78	0.160	83.30%
4.99	0.207	4.72	0.180	82.25%
4.99	0.230	4.65	0.200	81.03%

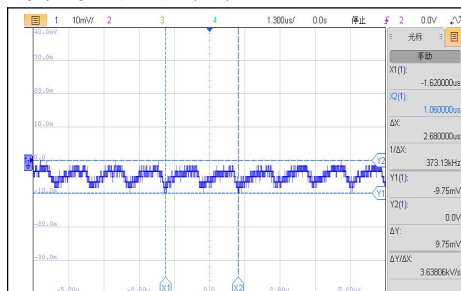
VIN=5V, Ta=-40°C, 输入、输出及效率数据:

VIN(V)	IIN(A)	VO(V)	IO(A)	η(%)
5.00	0.013	5.33	0.000	00.00%
5.00	0.038	5.19	0.020	54.63%
4.99	0.060	5.14	0.040	68.67%
4.99	0.083	5.08	0.060	73.59%
4.99	0.103	5.03	0.080	78.29%
4.99	0.126	4.98	0.100	79.21%
4.99	0.148	4.92	0.120	79.94%
4.99	0.170	4.88	0.140	80.54%
4.99	0.192	4.82	0.160	80.49%
4.99	0.215	4.77	0.180	80.03%
4.98	0.236	4.71	0.200	80.15%

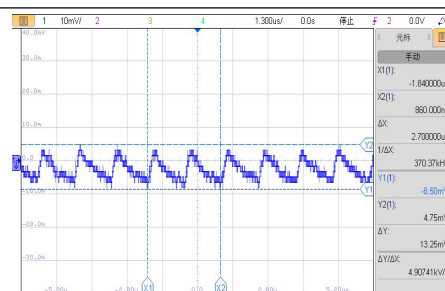
VIN=5V, Ta=85°C, 输入、输出及效率数据:

VIN(V)	IIN(A)	VO(V)	IO(A)	η(%)
5.00	0.007	5.49	0.000	00.00%
5.00	0.030	5.32	0.020	70.93%
5.00	0.052	5.23	0.040	80.46%
5.00	0.074	5.14	0.060	83.35%
4.99	0.096	5.07	0.080	84.67%
4.99	0.119	4.99	0.100	84.03%
4.99	0.140	4.91	0.120	84.34%
4.99	0.163	4.83	0.140	83.14%
4.99	0.185	4.75	0.160	82.33%
4.98	0.208	4.67	0.180	81.15%
4.98	0.231	4.58	0.200	79.63%

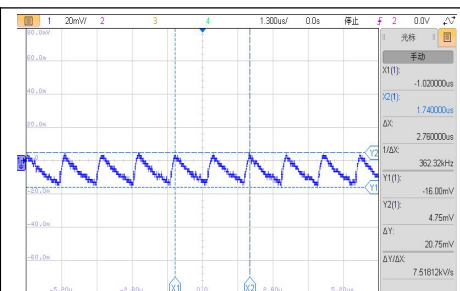
输出电压纹波波形



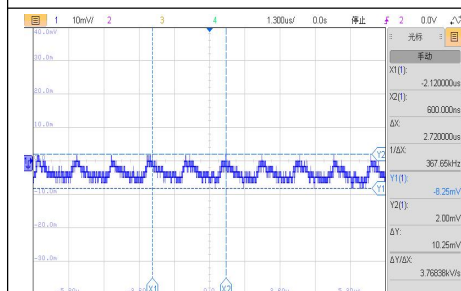
VIN=4.5V, 轻载输出电压纹波波形



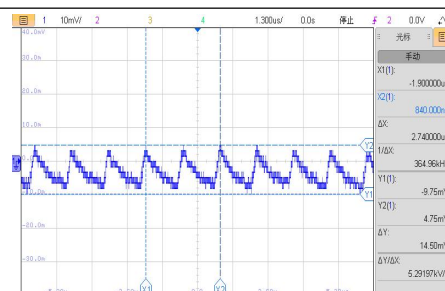
VIN=4.5V, 半载输出电压纹波波形



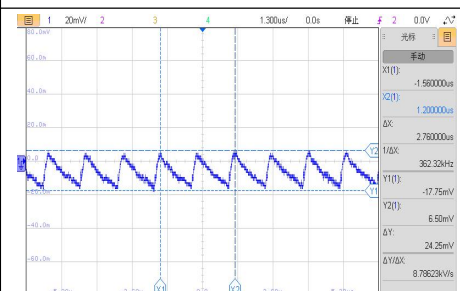
VIN=4.5V, 满载输出电压纹波波形



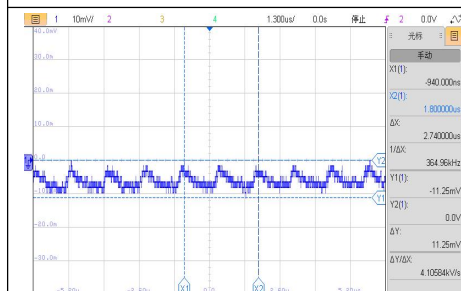
VIN=5.0V, 轻载输出电压纹波波形



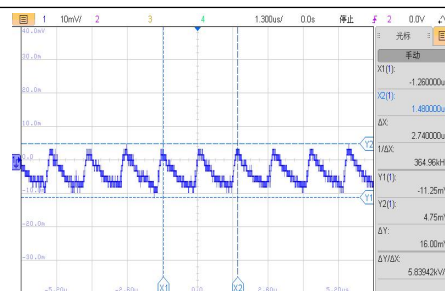
VIN=5.0V, 半载输出电压纹波波形



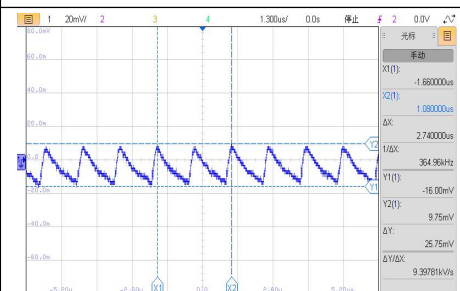
VIN=5.0V, 满载输出电压纹波波形



VIN=5.5V, 轻载输出电压纹波波形

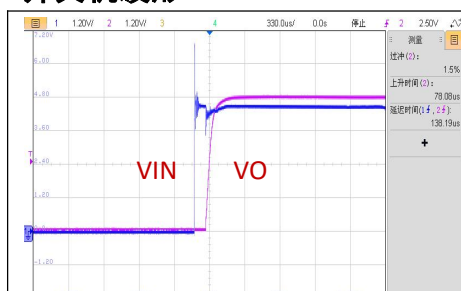


VIN=5.5V, 半载输出电压纹波波形

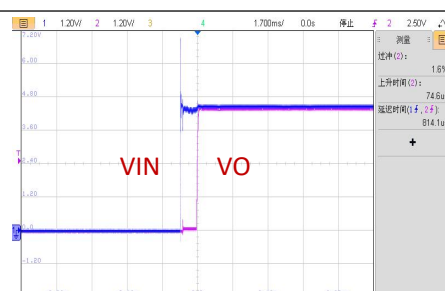


VIN=5.5V, 满载输出电压纹波波形

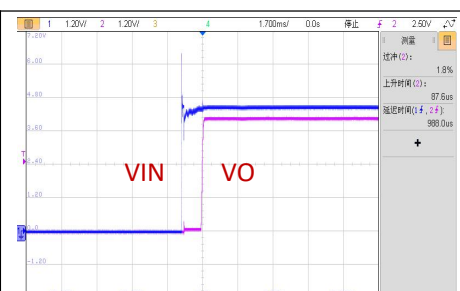
开关机波形



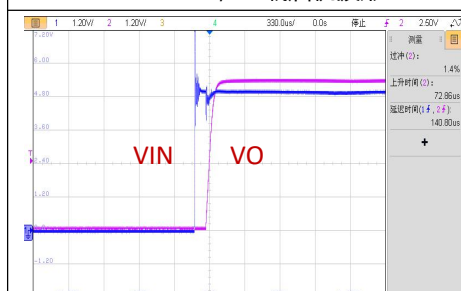
VIN=4.5V, 空载启机波形



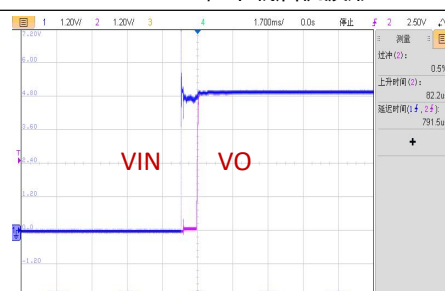
VIN=4.5V, 半载启机波形



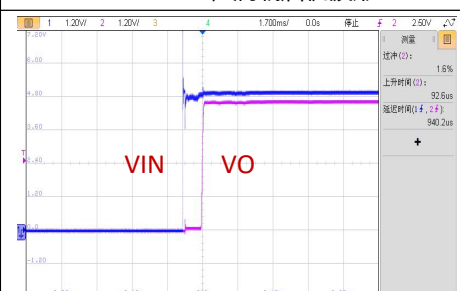
VIN=4.5V, 满载启机波形



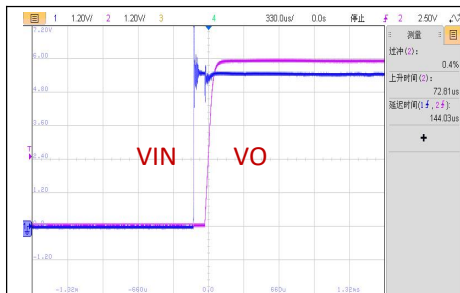
VIN=5.0V, 空载启机波形



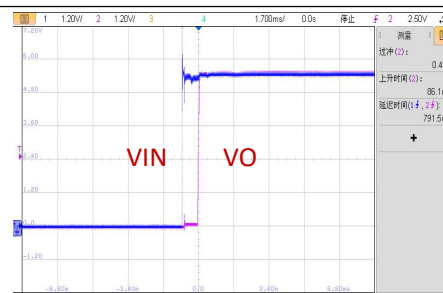
VIN=5.0V, 半载启机波形



VIN=5.0V, 满载启机波形



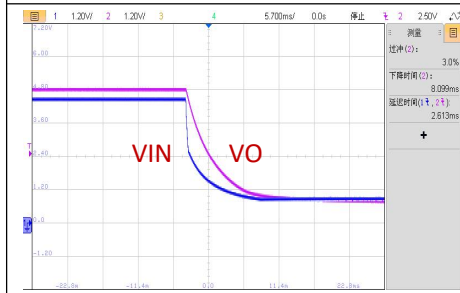
VIN=5.5V, 空载启机波形



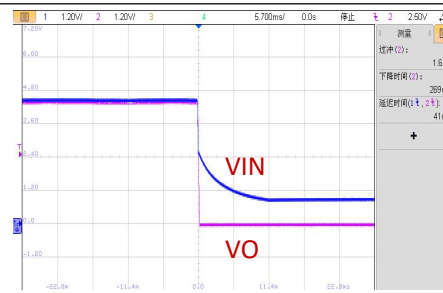
VIN=5.5V, 半载启机波形



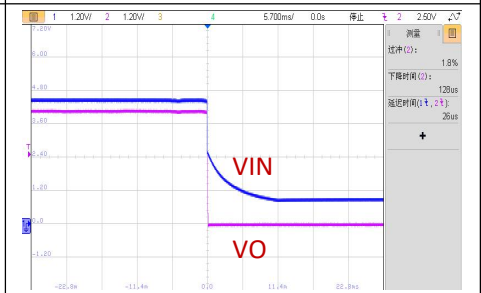
VIN=5.5V, 满载启机波形



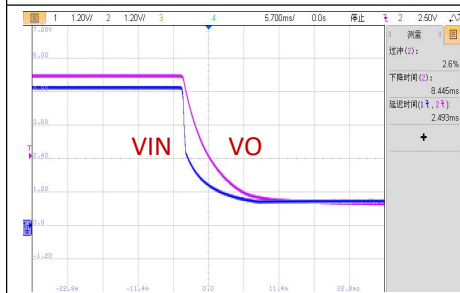
VIN=4.5V, 空载关机波形



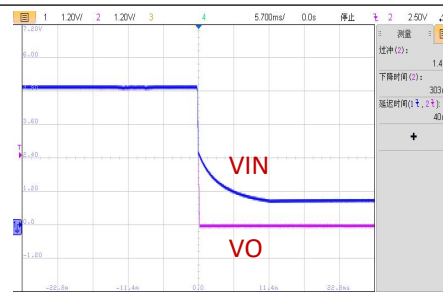
VIN=4.5V, 半载关机波形



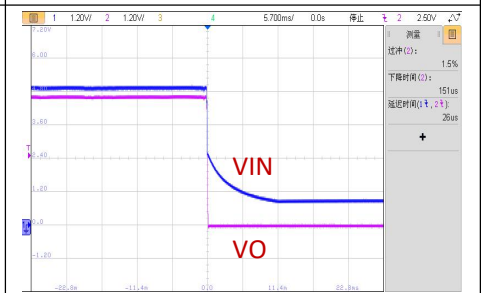
VIN=4.5V, 满载关机波形



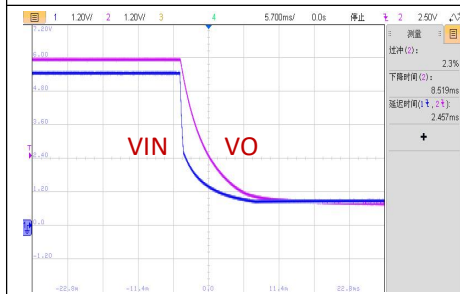
VIN=5.0V, 空载关机波形



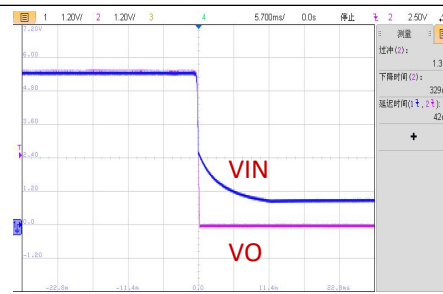
VIN=5.0V, 半载关机波形



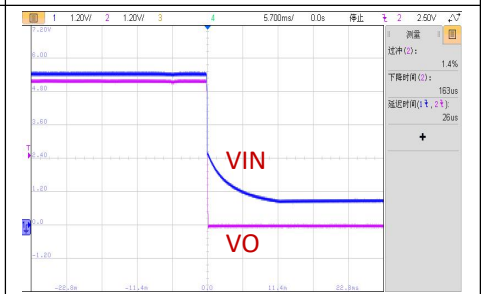
VIN=5.0V, 满载关机波形



VIN=5.5V, 空载关机波形

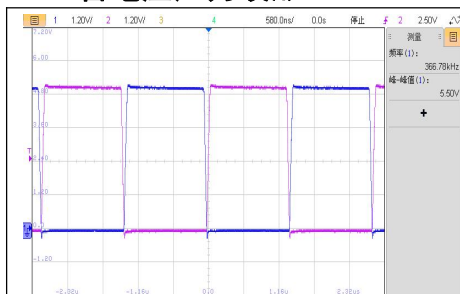


VIN=5.5V, 半载关机波形

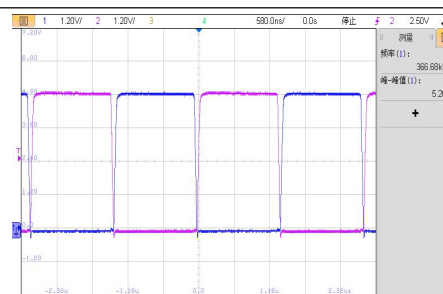


VIN=5.5V, 满载关机波形

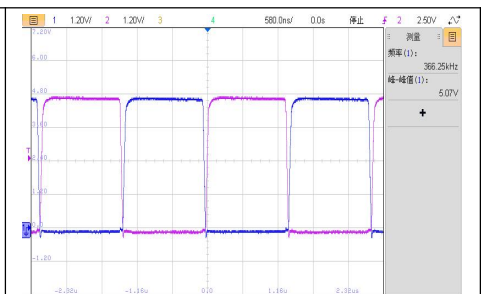
MOS 管电压应力波形-VPS2703



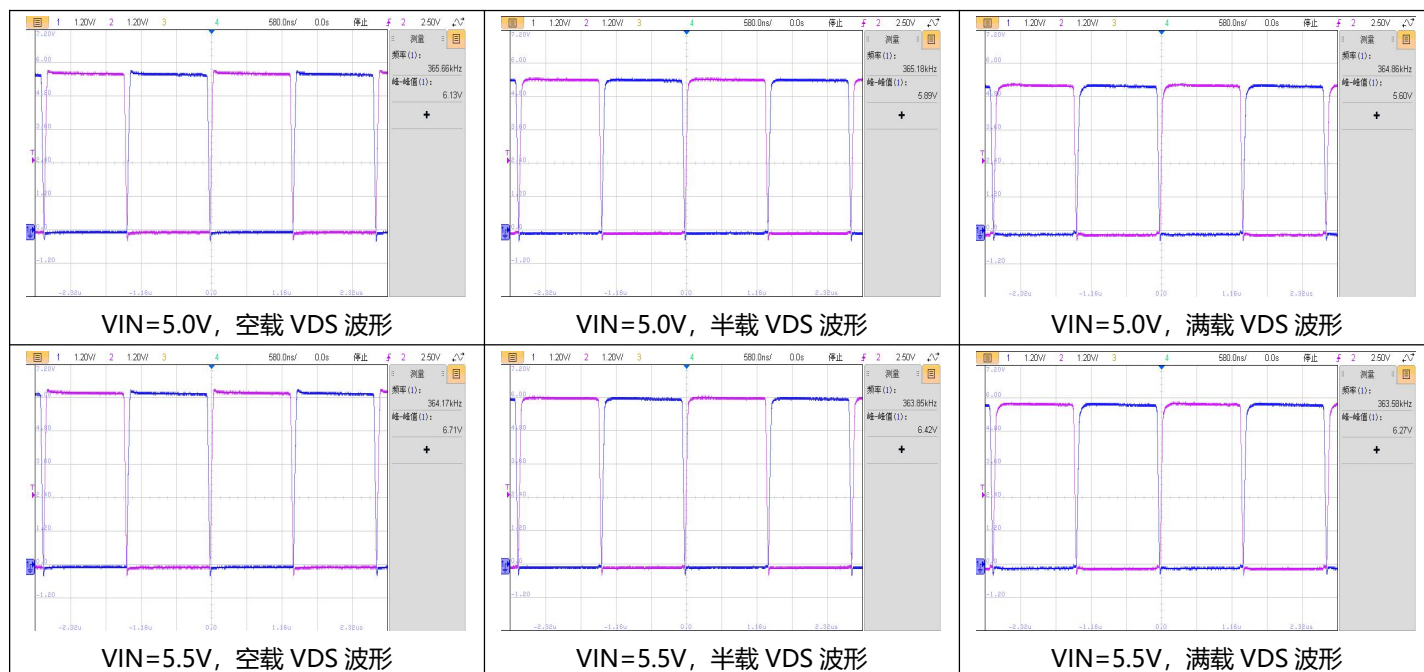
VIN=4.5V, 空载 VDS 波形



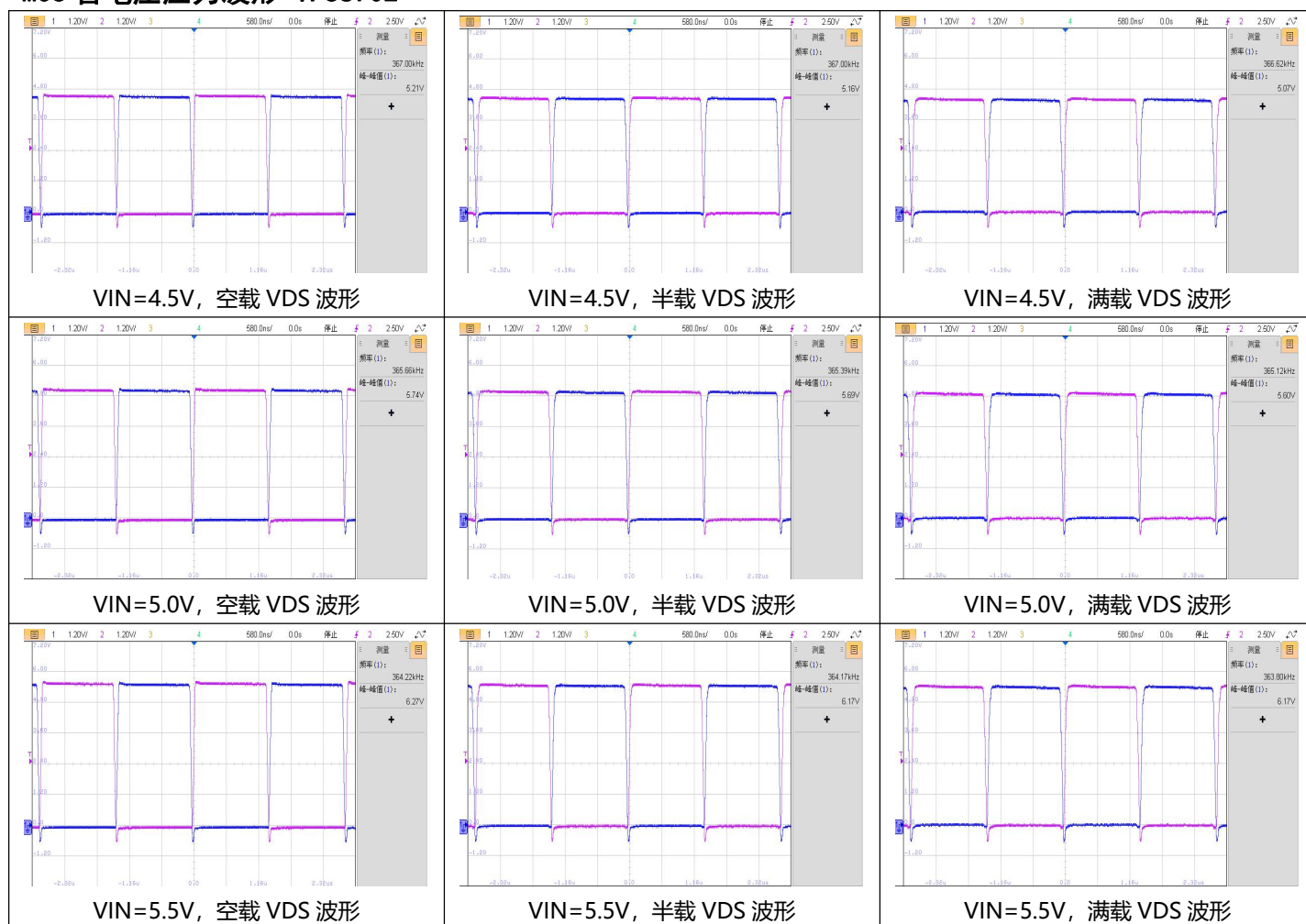
VIN=4.5V, 半载 VDS 波形



VIN=4.5V, 满载 VDS 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让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。