

方案简介

本方案由 VPS8702 和隔离变压器 VPTSIBB-01C 组合，结合必要的阻容元件以及 VPS2703 实现 4.6V ± 10% 输入，5V/100mA 输出的隔离非稳压电源。原副边隔离耐压不小于 3000VAC，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。

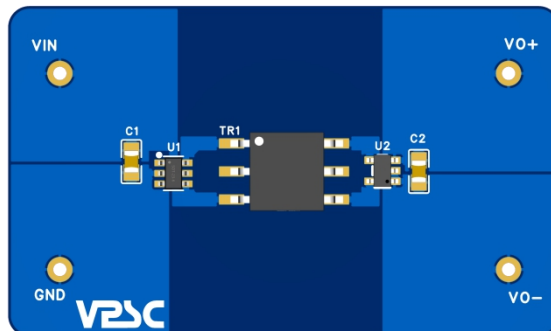
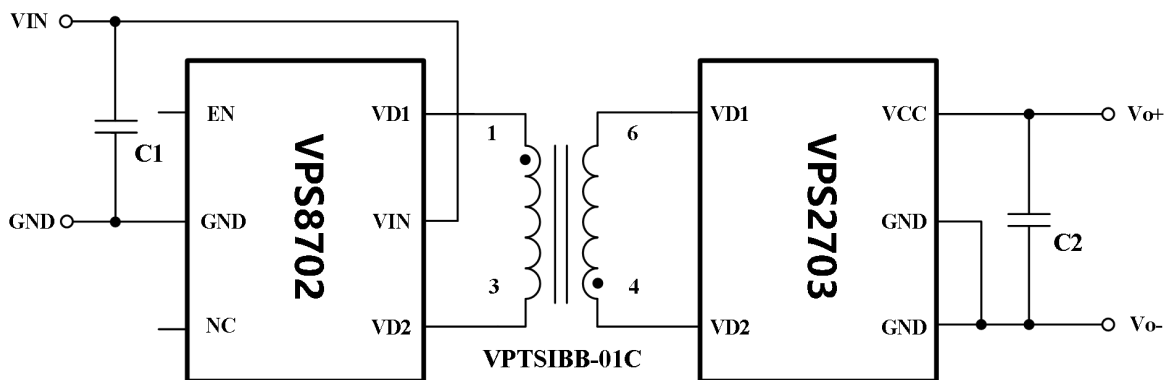


图 1: VPS8702 Demo 板(尺寸:50mm*30mm)

关键词：输入：4.14V-5.06V，输出 5V/0.5W，隔离电压：3000VAC，反馈方式：开环

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
IC2	VPS2703	SOT23-5	---
TR1	VPTSIBB-01C	SMD-6	---

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=4.6V; Io=100mA/0A	3	---	120	mA
转换效率	Typ: VIN=4.6V, Io=100mA	---	79	---	%
纹波&噪声	VIN=4.6V; Io=100mA	---	20	60	mV
线性调节率	VIN=4.14/5.06V; Io=100mA	---	1.18	---	%
负载调整率	VIN=4.6V; Io=100mA	---	18.18	---	%
工作温度	---	-40	---	85	°C
绝缘电压	原边短接 VS 副边短接	3000	---	---	VAC
开关频率	VIN=4.6V	---	340	---	KHz
短路保护	VIN=4.6V; Io=100mA	可长期保护，即时自恢复			

关键性能指标测试结果

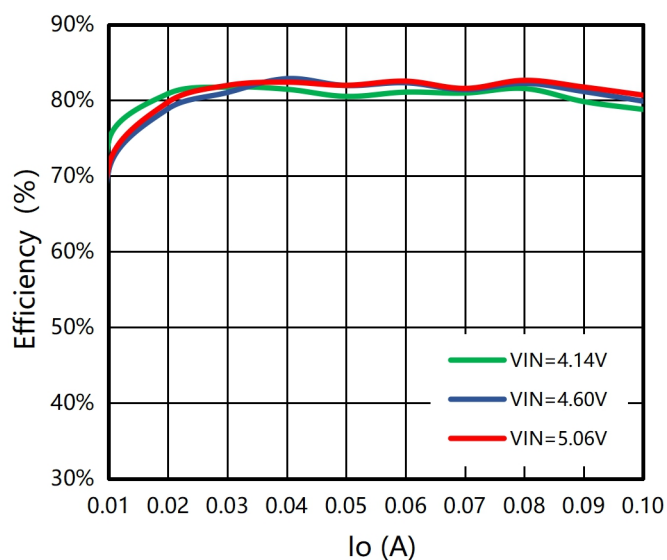


图 2: 效率 VS 输出电流

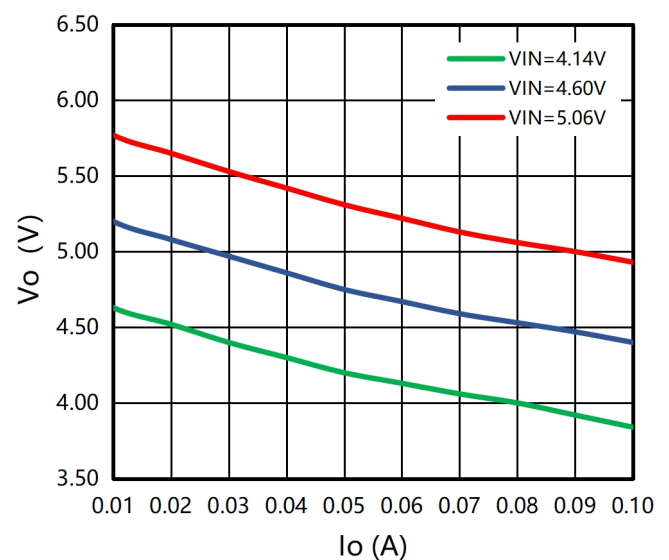


图 3: 输出电压 VS 输出电流

相关波形

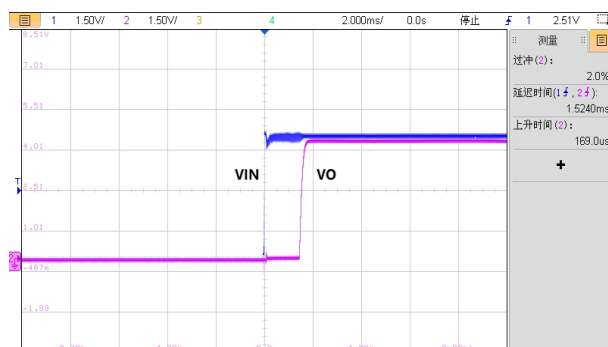


图 4: VIN=4.6V，满载启机波形

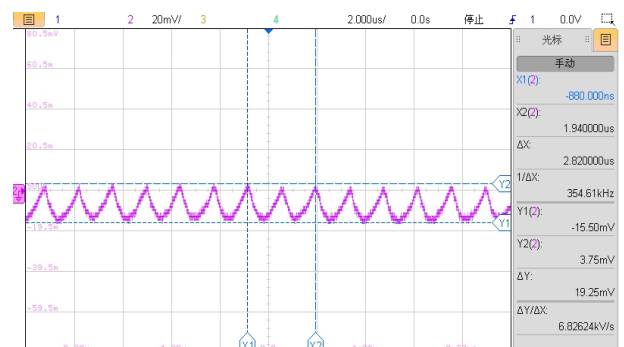
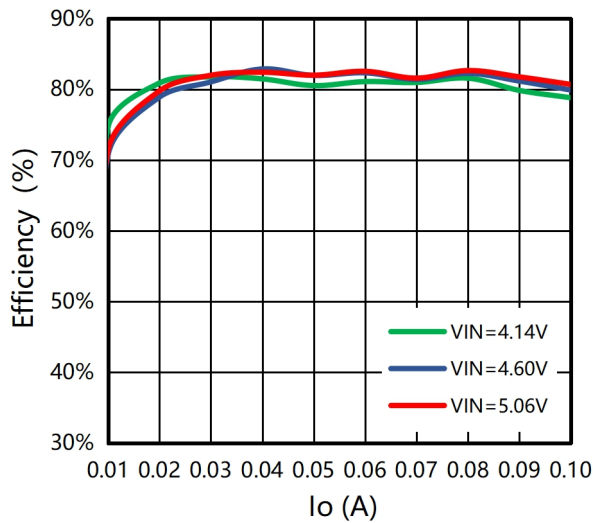


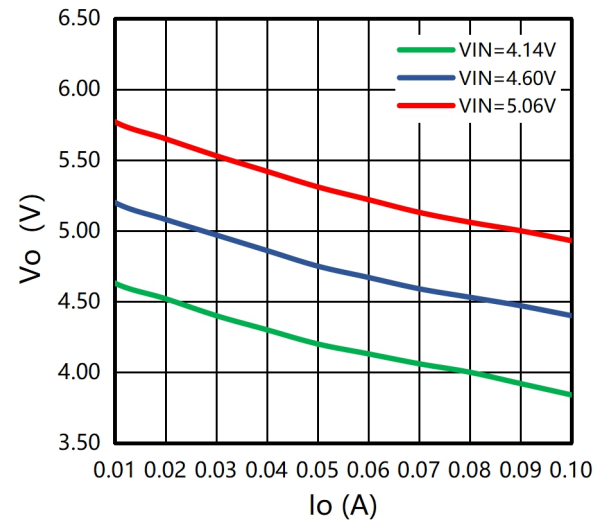
图 5: VIN=4.6V，满载输出电压纹波波形

详细测试数据

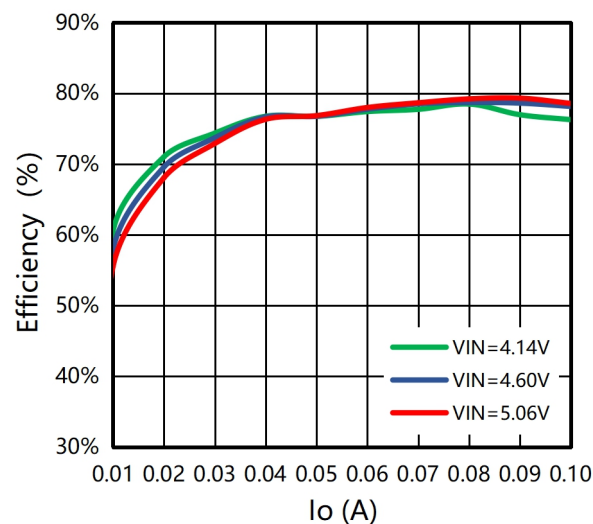
高低温测试曲线



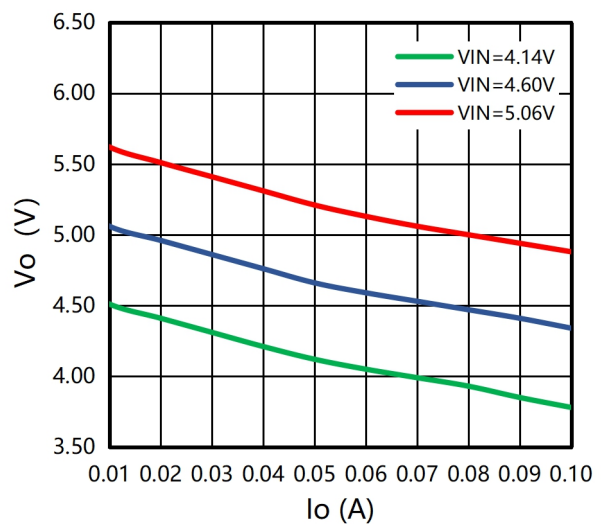
效率 VS 输出电流(25°C)



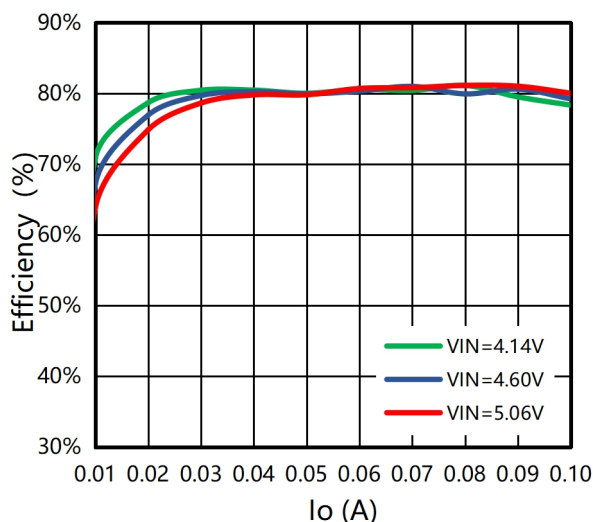
输出电流 VS 输出电压 (25°C)



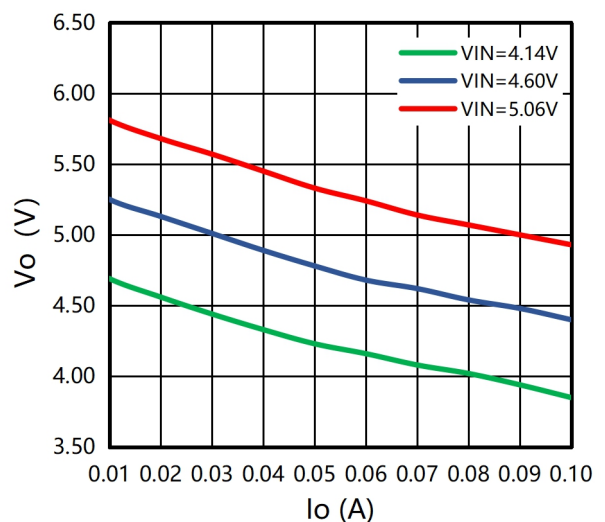
效率 VS 输出电流(-40°C)



输出电流 VS 输出电压(-40°C)



效率 VS 输出电流(85°C)



输出电流 VS 输出电压(85°C)

VIN=4.6V, Ta=25°C, 输入、输出及效率数据:

VIN(V)	IIN(A)	VO(V)	IO(A)	η(%)
4.60	0.003	5.45	0.000	0.00%
4.60	0.016	5.20	0.010	70.65%
4.60	0.028	5.08	0.020	78.88%
4.60	0.040	4.97	0.030	81.03%
4.60	0.051	4.86	0.040	82.86%
4.60	0.063	4.75	0.050	81.95%
4.60	0.074	4.67	0.060	82.31%
4.59	0.086	4.59	0.070	81.40%
4.59	0.096	4.53	0.080	82.24%
4.59	0.108	4.47	0.090	81.15%
4.59	0.120	4.40	0.100	79.88%

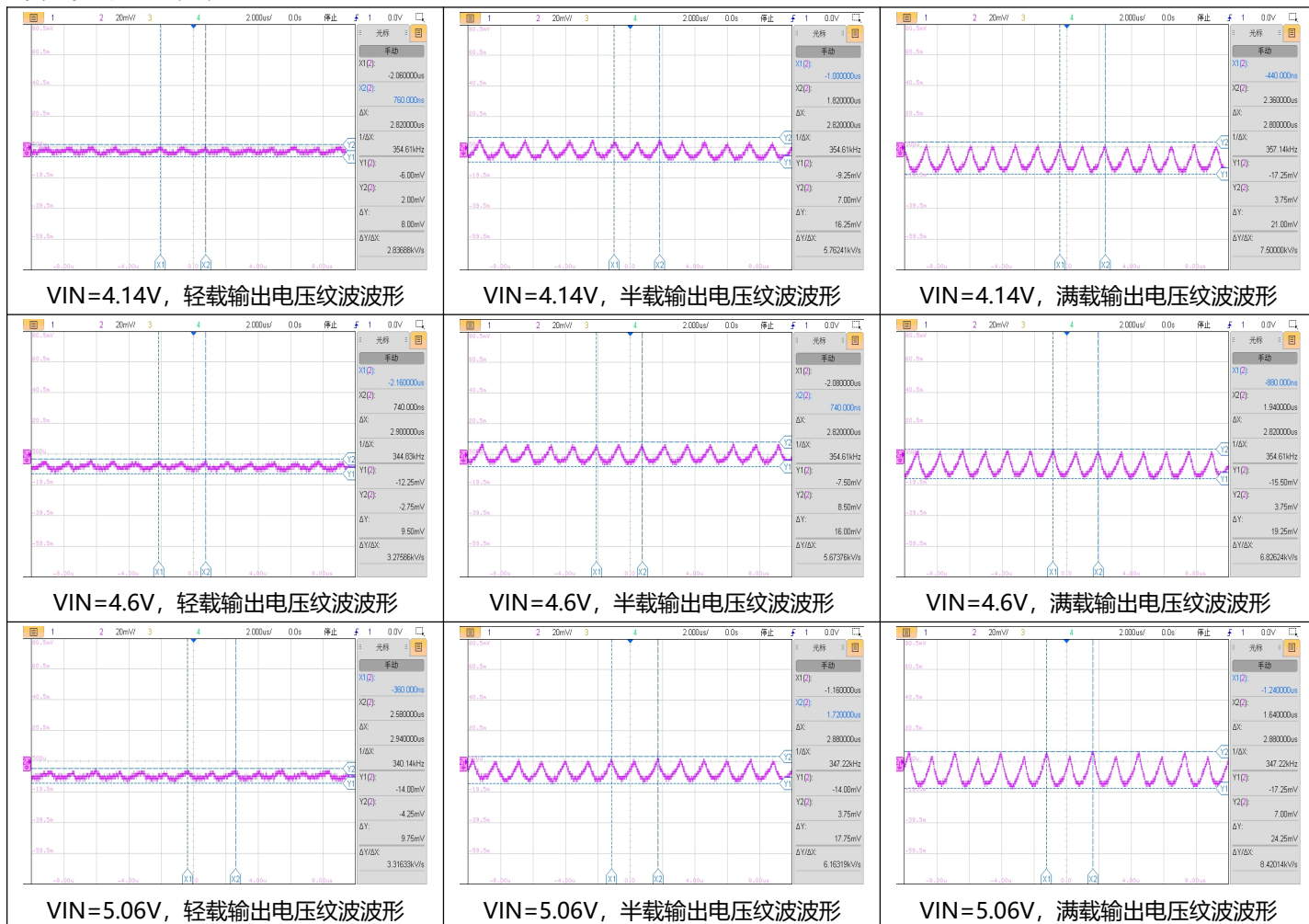
VIN=4.6V, Ta=-40°C, 输入、输出及效率数据:

VIN(V)	IIN(A)	VO(V)	IO(A)	η(%)
4.60	0.007	5.28	0.000	0.00%
4.60	0.019	5.06	0.010	57.89%
4.60	0.031	4.96	0.020	69.57%
4.60	0.043	4.86	0.030	73.71%
4.60	0.054	4.76	0.040	76.65%
4.60	0.066	4.66	0.050	76.75%
4.60	0.077	4.59	0.060	77.75%
4.59	0.088	4.53	0.070	78.51%
4.59	0.099	4.47	0.080	78.70%
4.59	0.110	4.41	0.090	78.61%
4.59	0.121	4.34	0.100	78.14%

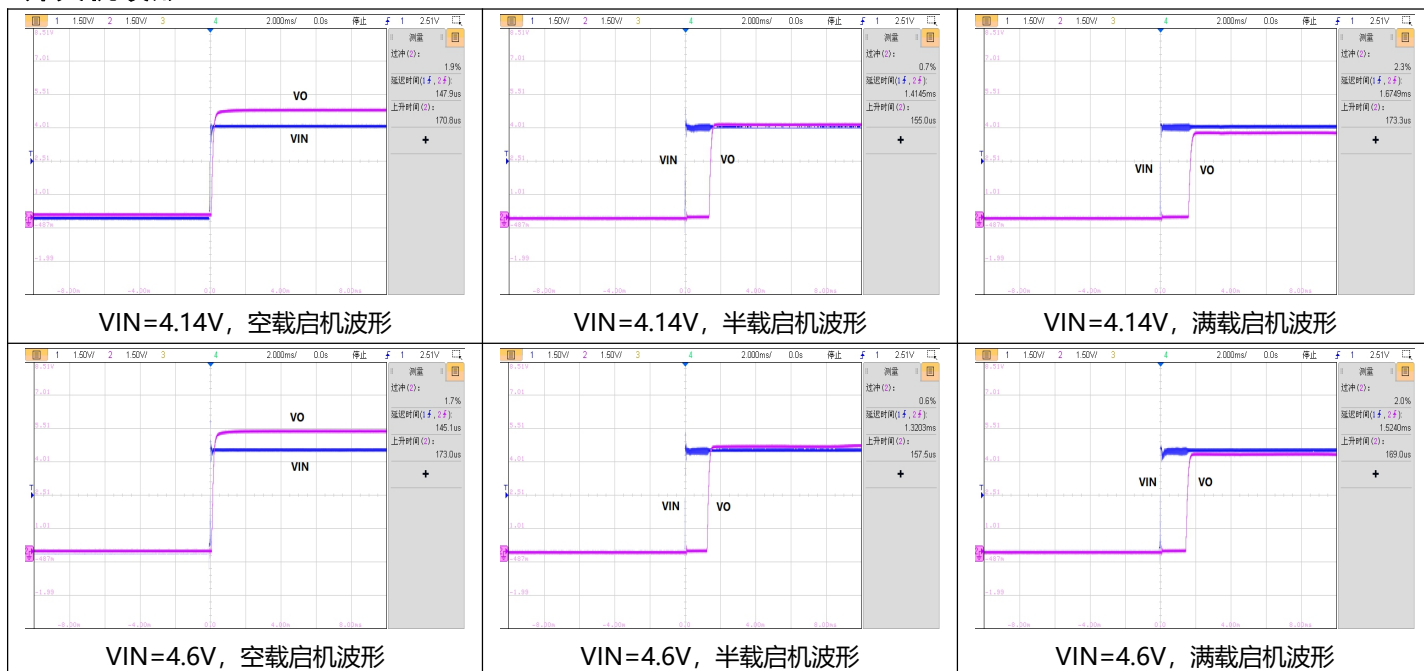
VIN=4.6V, Ta=85°C, 输入、输出及效率数据:

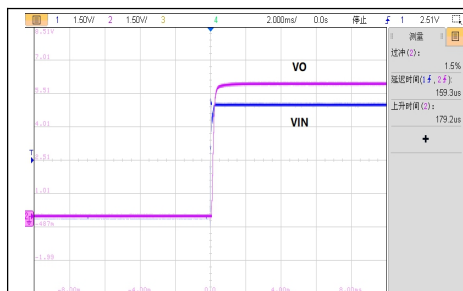
VIN(V)	IIN(A)	VO(V)	IO(A)	η(%)
4.60	0.005	5.46	0.000	0.00%
4.60	0.017	5.25	0.010	67.14%
4.60	0.029	5.13	0.020	76.91%
4.60	0.041	5.01	0.030	79.69%
4.60	0.053	4.89	0.040	80.23%
4.60	0.065	4.78	0.050	79.93%
4.60	0.076	4.68	0.060	80.32%
4.59	0.087	4.62	0.070	80.99%
4.59	0.099	4.54	0.080	79.93%
4.59	0.109	4.48	0.090	80.59%
4.59	0.121	4.40	0.100	79.22%

输出电压纹波波形

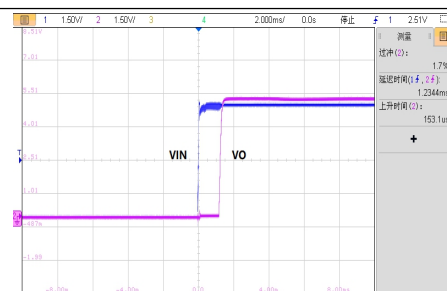


开关机波形

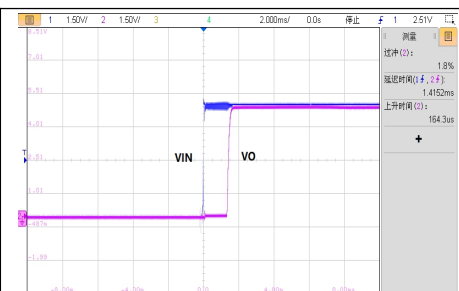




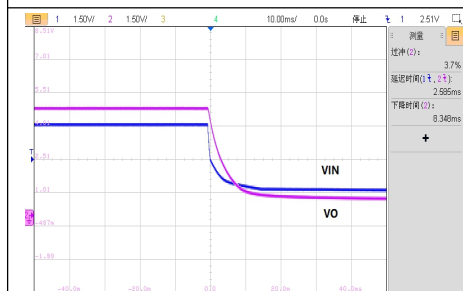
VIN=5.06V, 空载启机波形



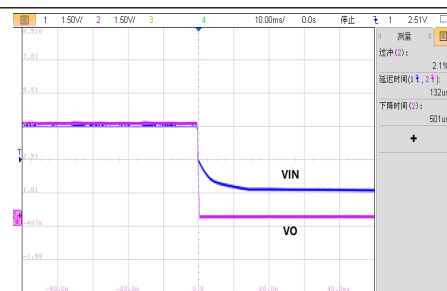
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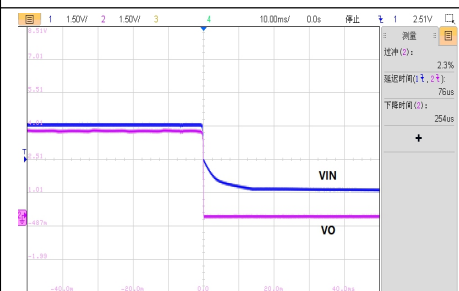
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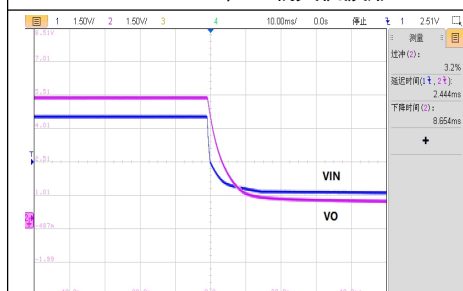
VIN=4.14V, 空载关机波形



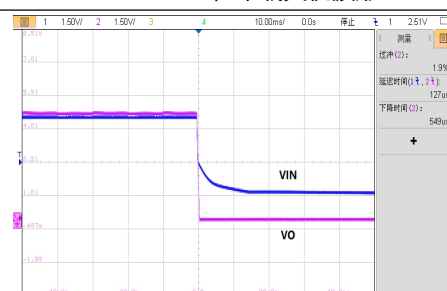
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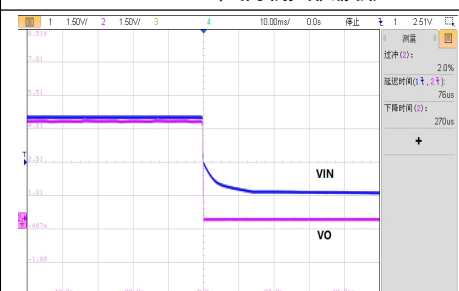
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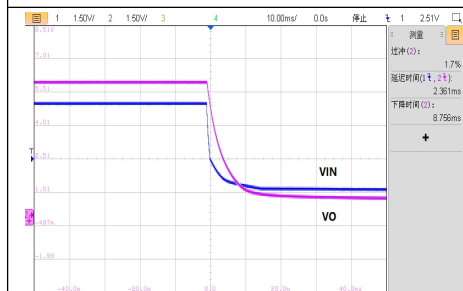
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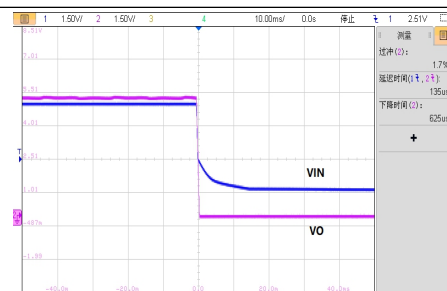
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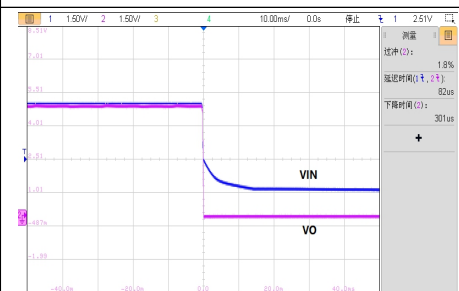
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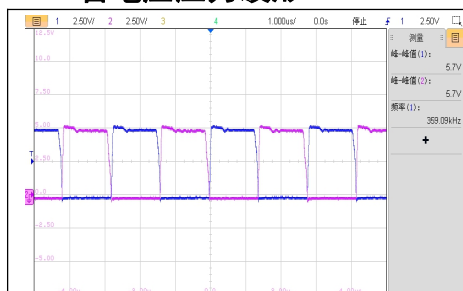


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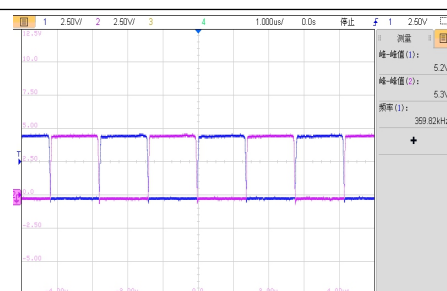


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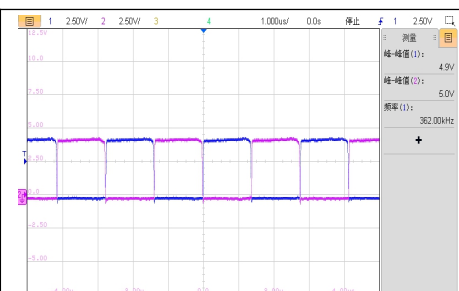
MOS 管电压应力波形-VPS2703



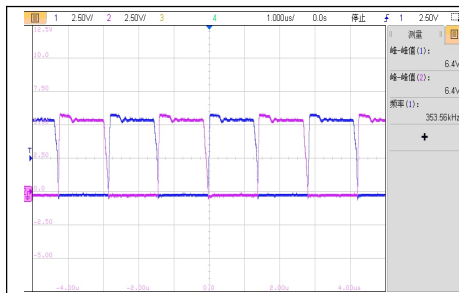
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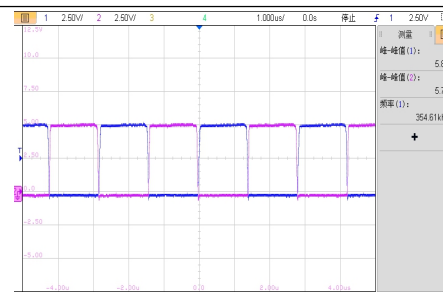
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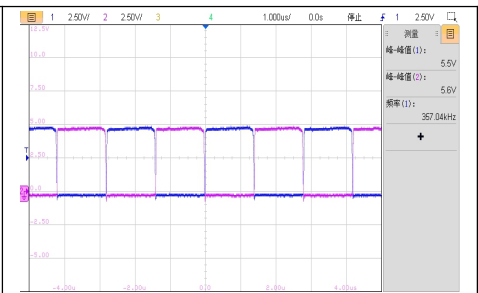
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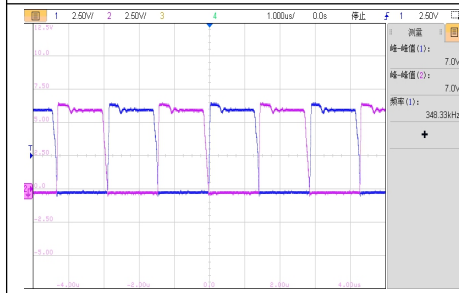
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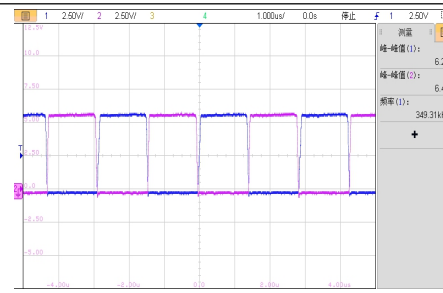
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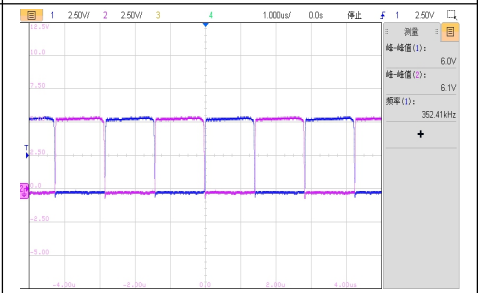
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VIN=5.06V, 空载工作电压波形

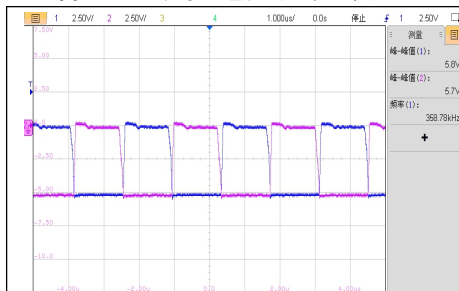


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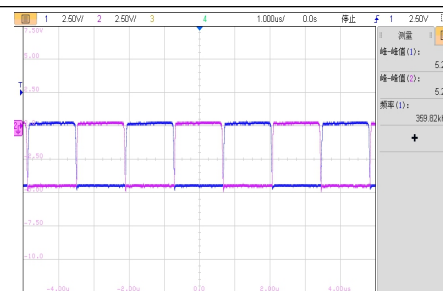


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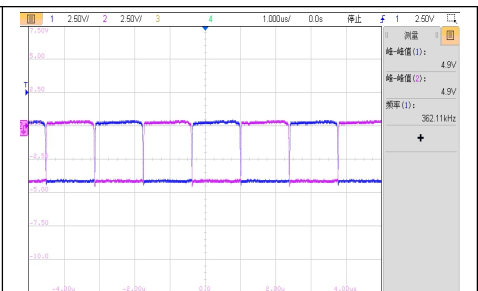
肖特基二极管电压应力波形-VPS2703



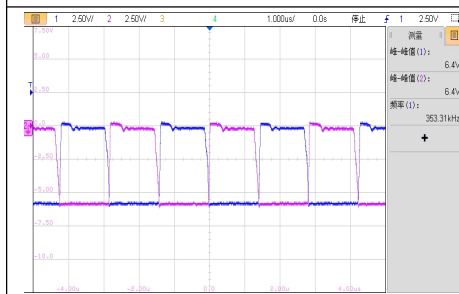
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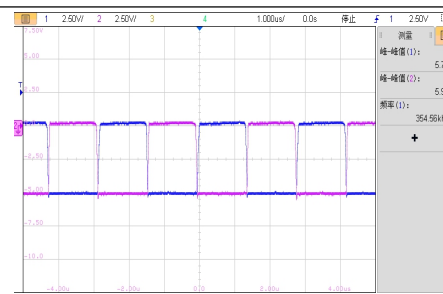
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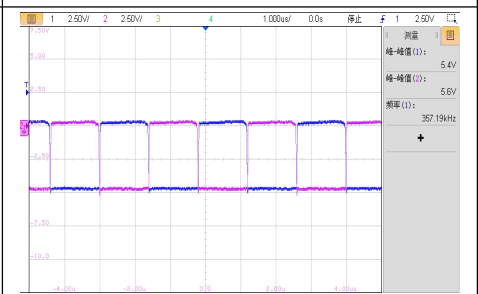
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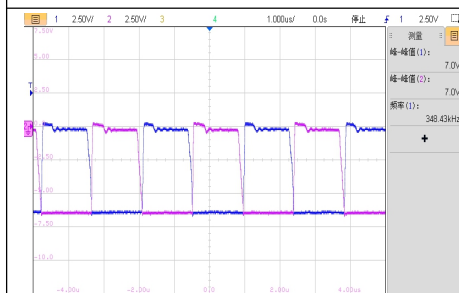
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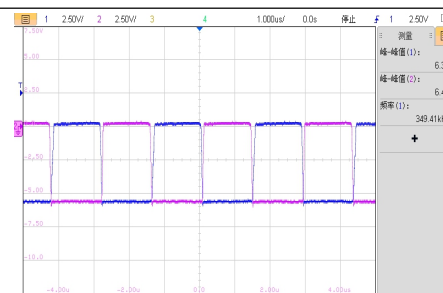
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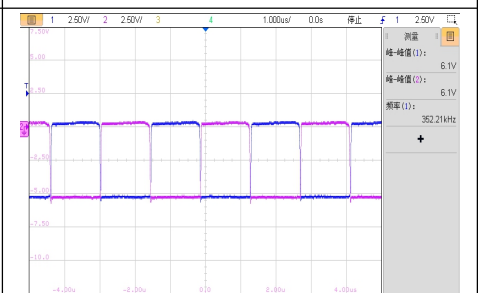
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VIN=5.06V, 空载工作电压波形

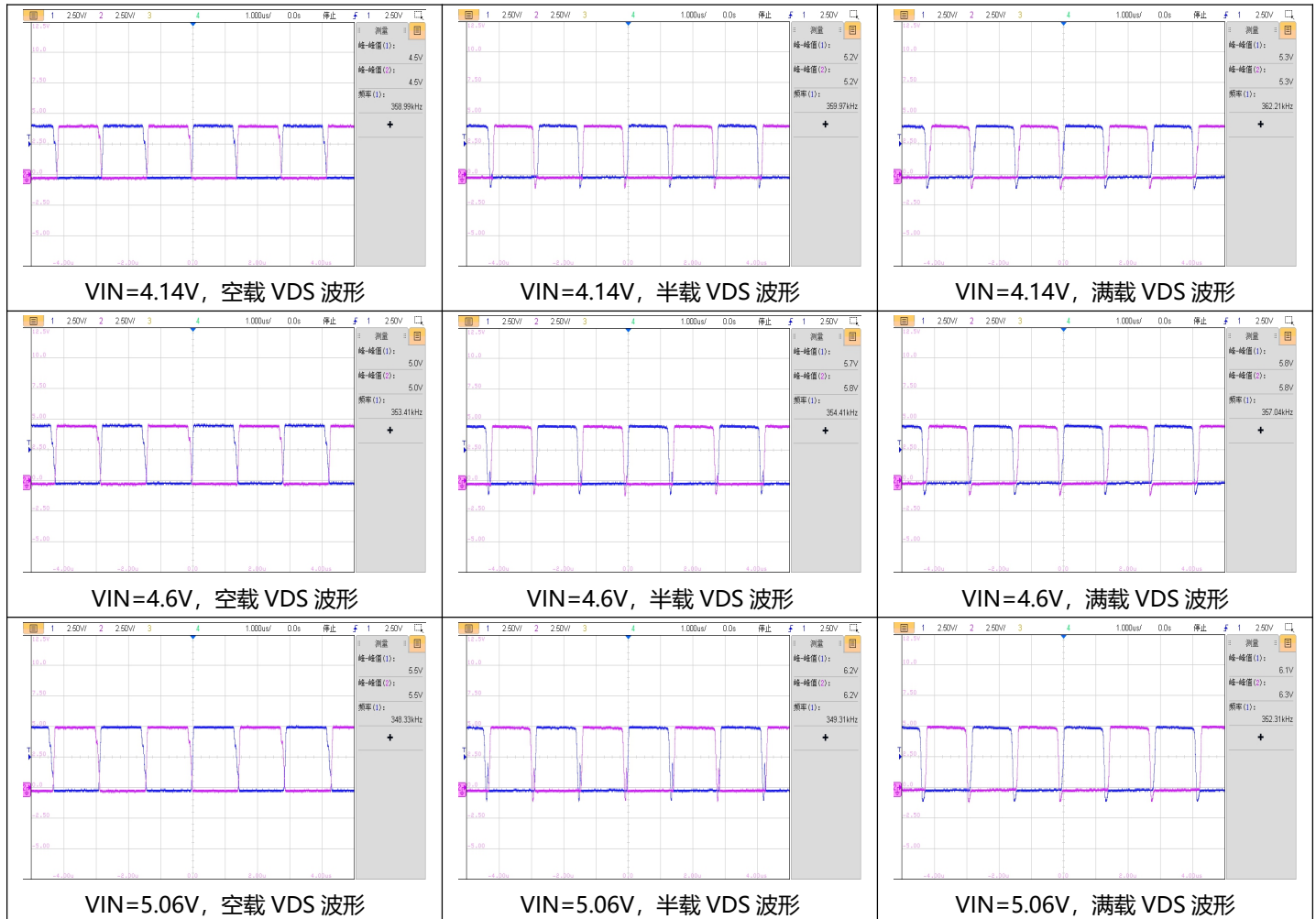


VIN=5.06V, 半载工作电压波形



VIN=5.06V, 满载工作电压波形

MOS 管电压应力波形-VPS8702



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