

方案简介

本方案由 VPS8701B 和变压器 VPT72FB-01D 组合，结合必要的阻容元件以及 VPS2703 实现 24V±10%输入, 5V/200mA 输出的隔离非稳压电源。原副边爬电距离≥16mm，隔离耐压不小于 5000VAC，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。

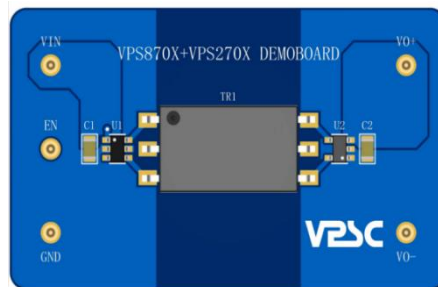
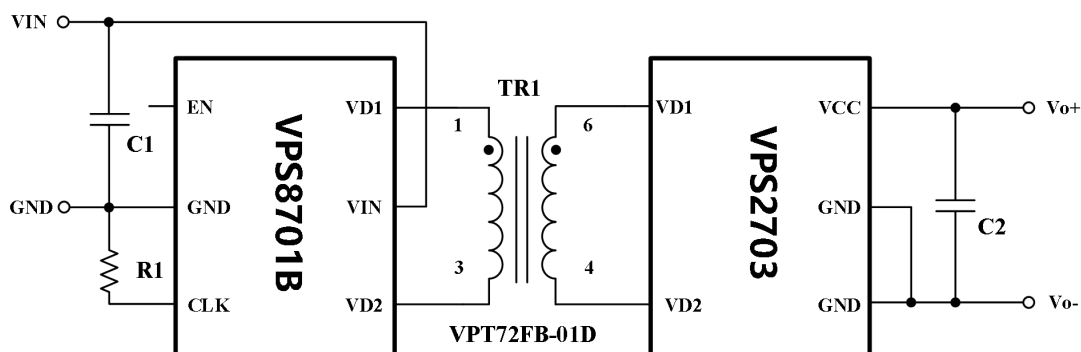


图 1: VPS8701B Demo 板(尺寸:50mm*30mm)

关键词：输入：21.6V-26.4V，输出 5V/1W，爬电距离：≥16mm，隔离电压：5000VAC，反馈方式：开环

原理图



物料清单

位号	参数	封装	选型建议
IC1	VPS8701B	SOT23-6	---
IC2	VPS2703	SOT23-5	---
R1	---	---	---
C1	1uF/50V	0805	电容量 1uF，耐压 50V 以上，X7R 材质
C2	4.7uF/10V	0603	电容量 4.7uF，耐压 10V 以上，X7R 材质
TR1	VPT72FB-01D	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=24V; Io=200mA/0A	1	---	47	mA
转换效率	Typ: VIN=24V, Io=200mA	---	85	---	%
纹波&噪声	VIN=24V; Io=200mA	---	43	70	mV
工作温度	---	-40	---	105	°C
绝缘电压	原边短接 VS 副边短接	5000	---	---	VAC
开关频率	VIN=5V	---	250	---	KHz
短路保护	VIN=24V; Io=200mA	可长期保护，即时自恢复			

关键性能指标测试结果

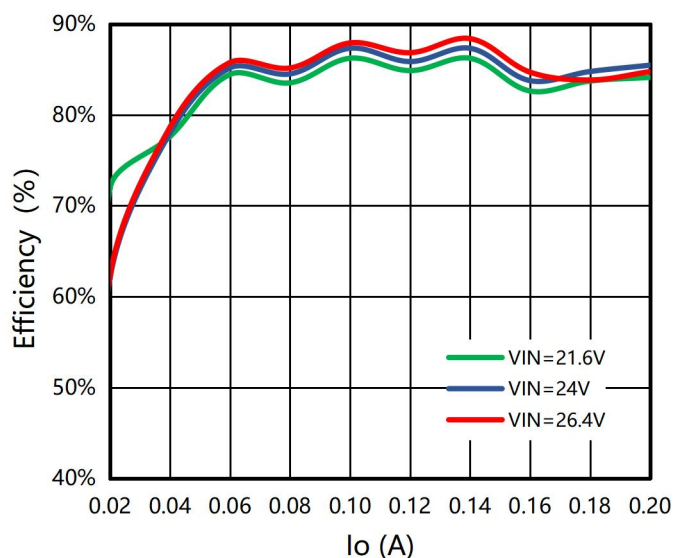


图 2: 效率 VS 输出电流(输出满载)

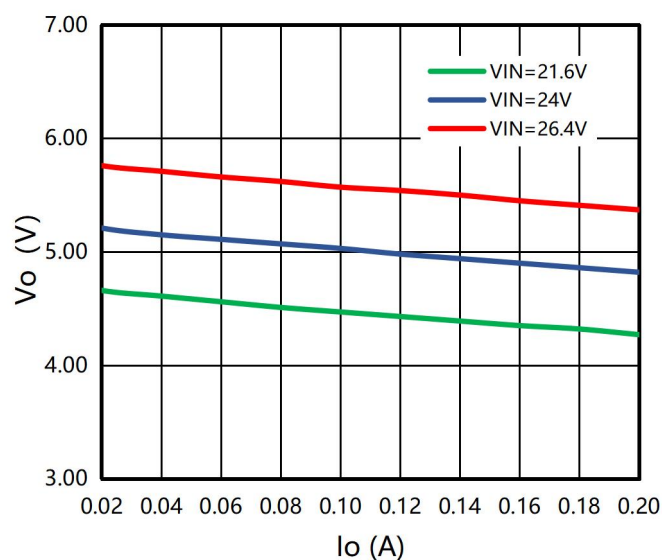


图 3: 输出电压 VS 输出电流

相关波形

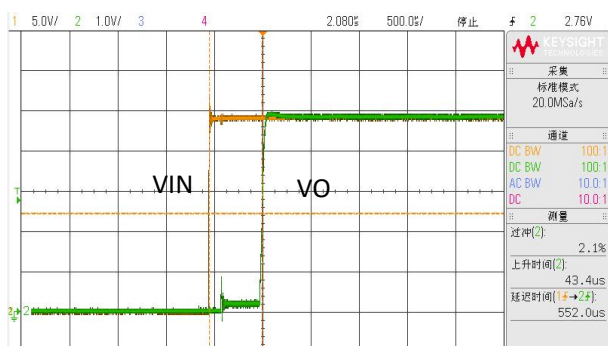


图 4: VIN=24V，满载启机波形

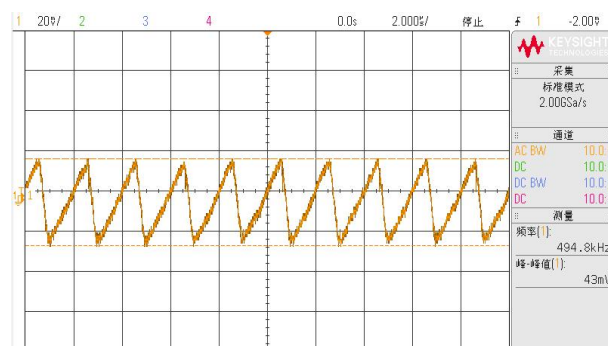
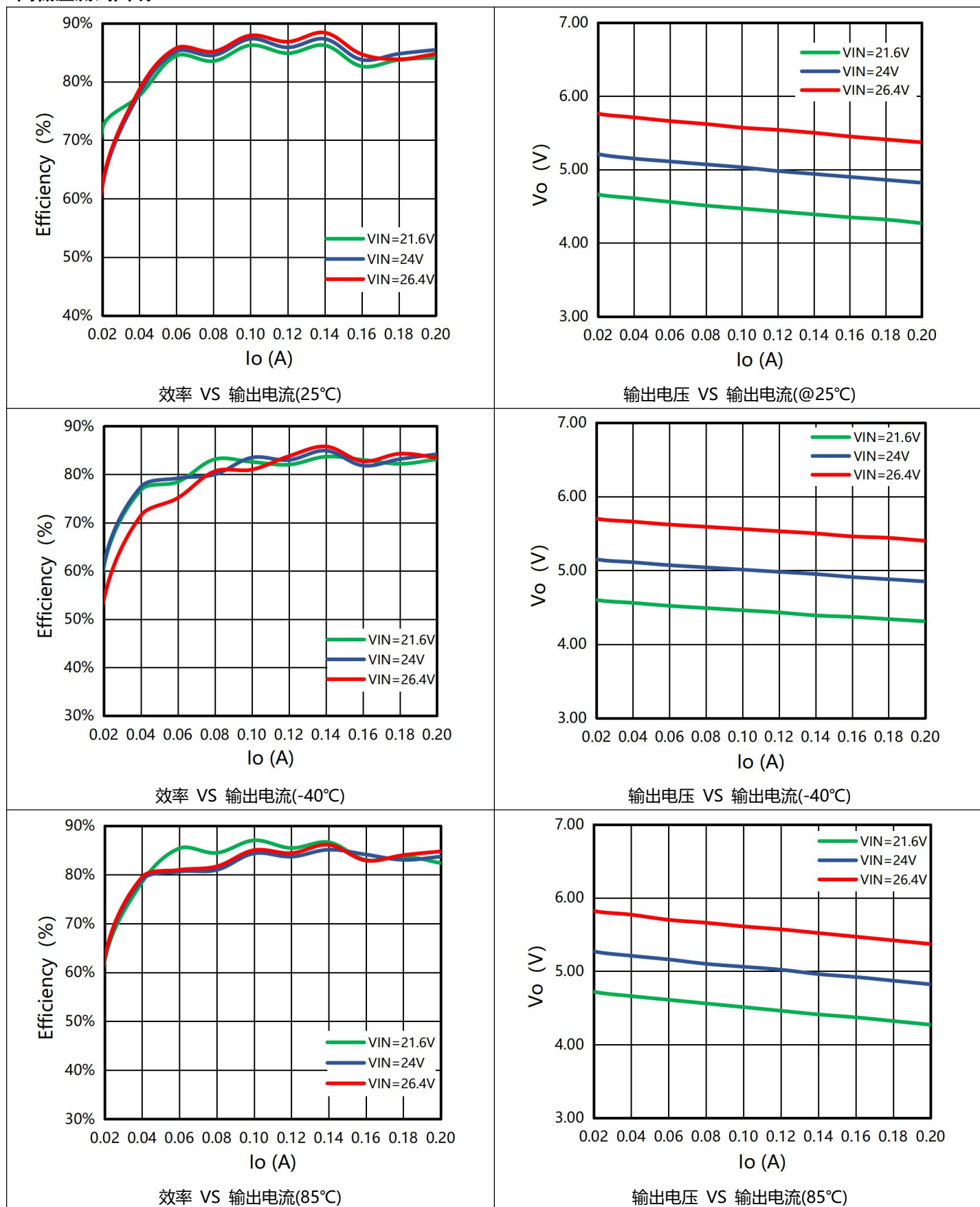


图 5: VIN=24V，满载输出电压纹波波形

详细测试数据

高低温测试曲线



VIN=24V, Ta=25°C, 输入、输出及效率数据:

VIN(V)	IIN(A)	VO(V)	IO(A)	η(%)
24.00	0.002	5.34	0.000	0.00%
24.00	0.007	5.21	0.020	62.02%
24.00	0.011	5.15	0.040	78.03%
24.00	0.015	5.11	0.060	85.17%
24.00	0.020	5.07	0.080	84.50%
24.00	0.024	5.03	0.100	87.33%
24.00	0.029	4.98	0.120	85.86%
24.00	0.033	4.94	0.140	87.32%
24.00	0.039	4.90	0.160	83.76%
24.00	0.043	4.86	0.180	84.77%
24.00	0.047	4.82	0.200	85.46%

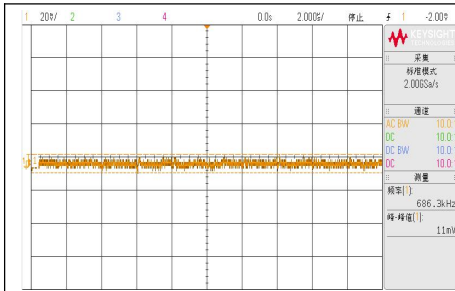
VIN=24V, Ta=-40°C, 输入、输出及效率数据:

VIN(V)	IIN(A)	VO(V)	IO(A)	η(%)
24.00	0.020	5.28	0.000	0.00%
24.00	0.007	5.15	0.020	61.31%
24.00	0.011	5.11	0.040	77.42%
24.00	0.016	5.07	0.060	79.22%
24.00	0.021	5.04	0.080	80.00%
24.00	0.025	5.01	0.100	83.50%
24.00	0.030	4.98	0.120	83.00%
24.00	0.034	4.95	0.140	84.93%
24.00	0.040	4.91	0.160	81.83%
24.00	0.044	4.88	0.180	83.18%
24.00	0.048	4.85	0.200	84.20%

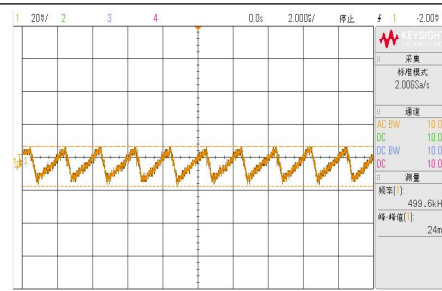
VIN=24V, Ta=85°C, 输入、输出及效率数据:

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24.00	0.007	5.27	0.020	62.74%
24.00	0.011	5.21	0.040	78.94%
24.00	0.016	5.16	0.060	80.63%
24.00	0.021	5.10	0.080	80.95%
24.00	0.025	5.06	0.100	84.33%
24.00	0.030	5.02	0.120	83.67%
24.00	0.034	4.96	0.140	85.10%
24.00	0.04	4.92	0.160	84.10%
24.00	0.044	4.87	0.180	83.01%
24.00	0.048	4.82	0.200	83.68%

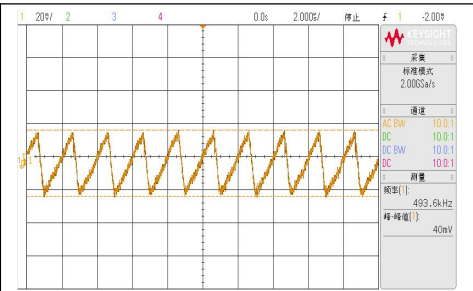
输出电压纹波波形



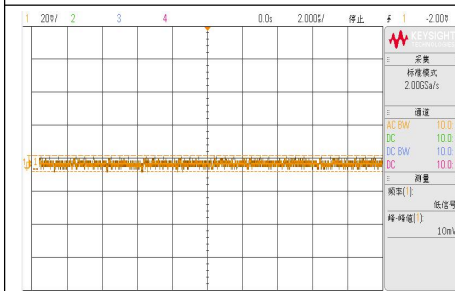
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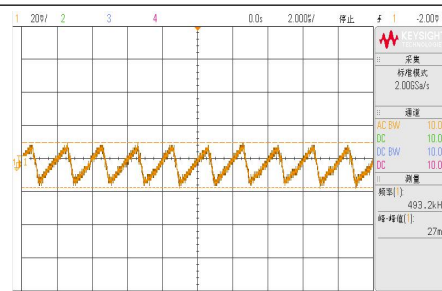
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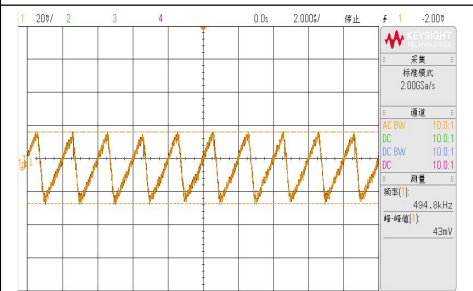
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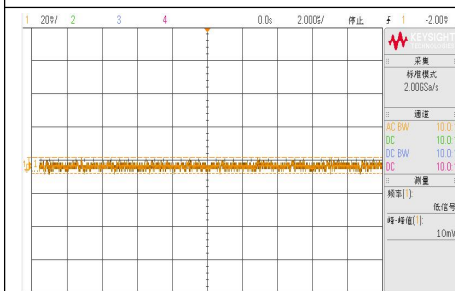
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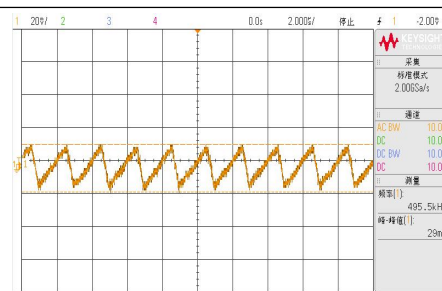
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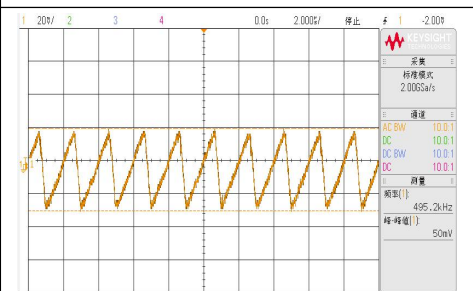
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VIN=26.4V，轻载输出电压纹波波形

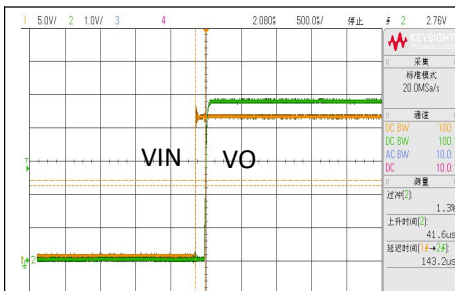


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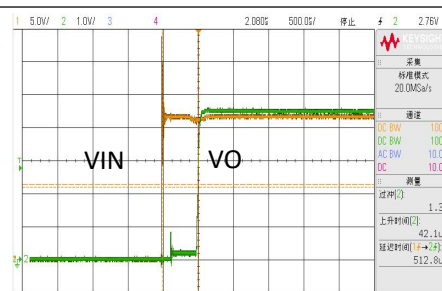


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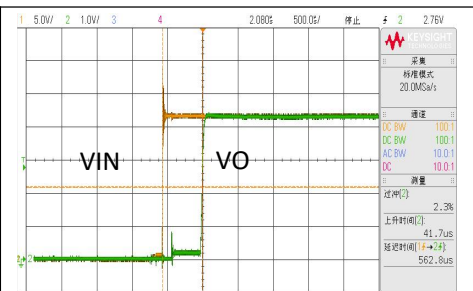
开关机波形



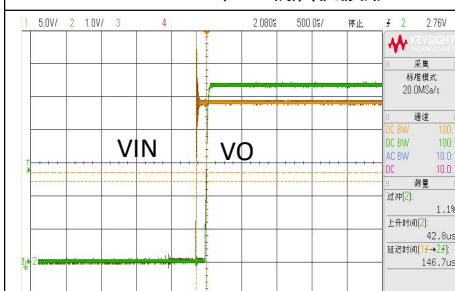
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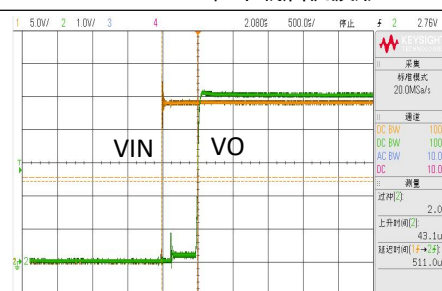
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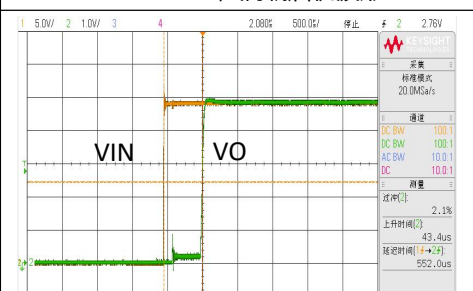
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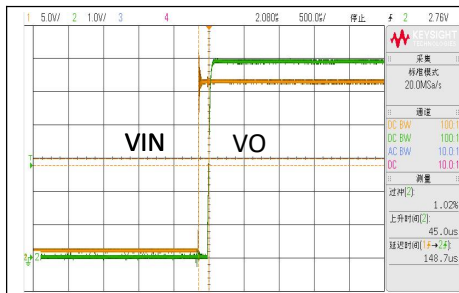
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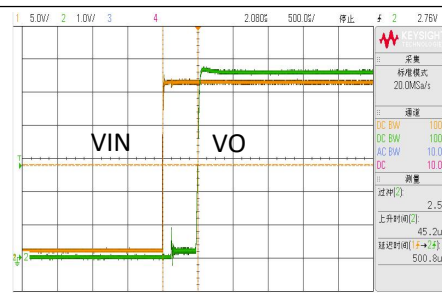
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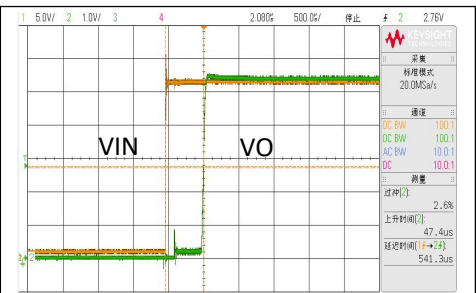
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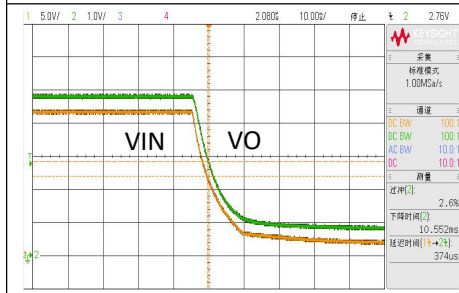
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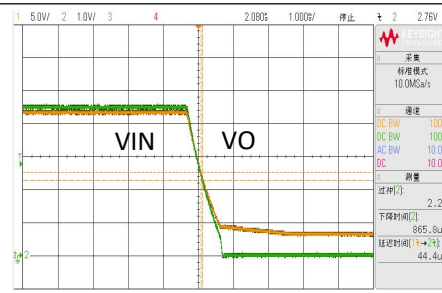
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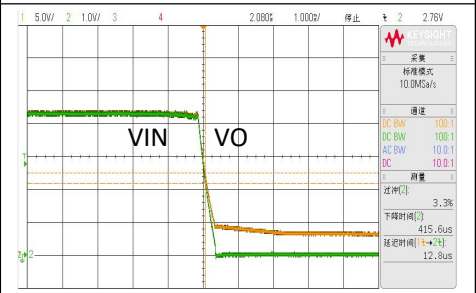
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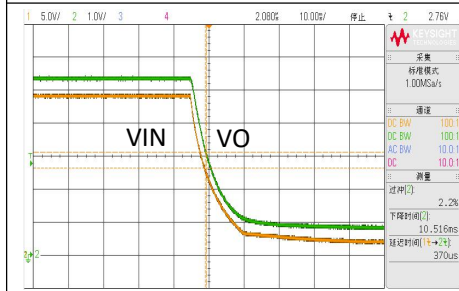
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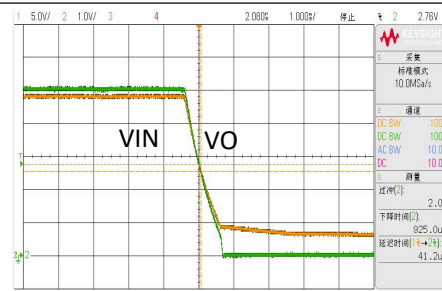
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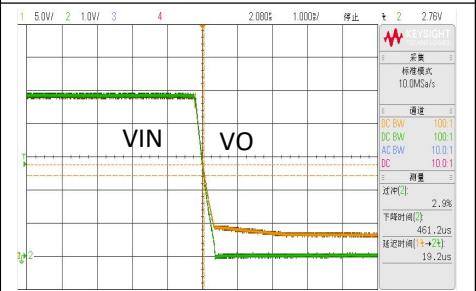
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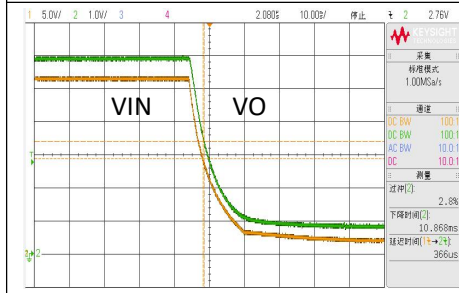
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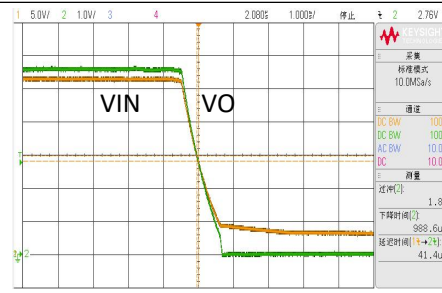
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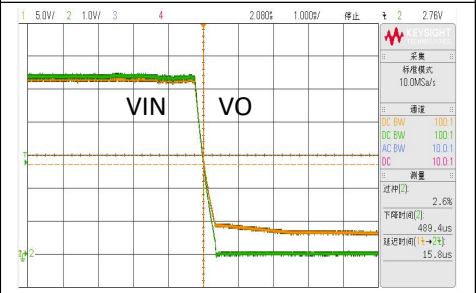
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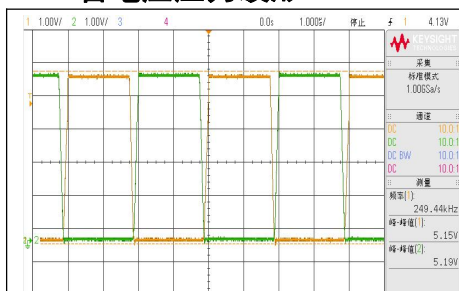


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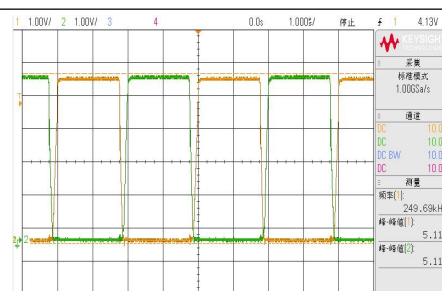


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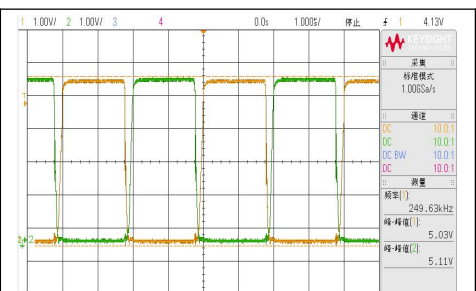
MOS 管电压应力波形-VPS2703



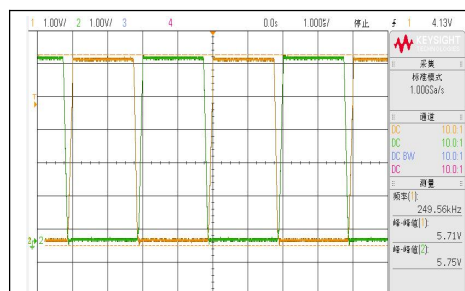
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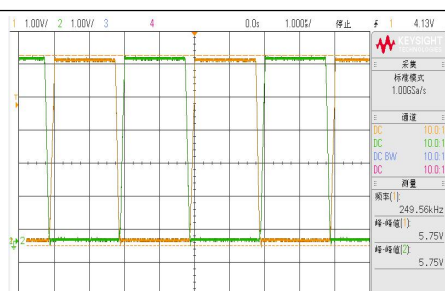
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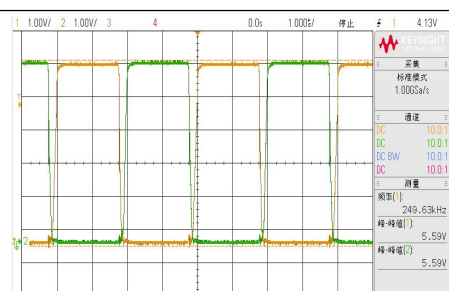
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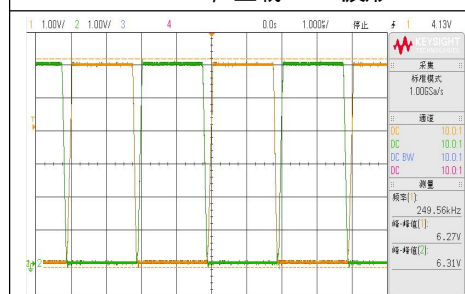
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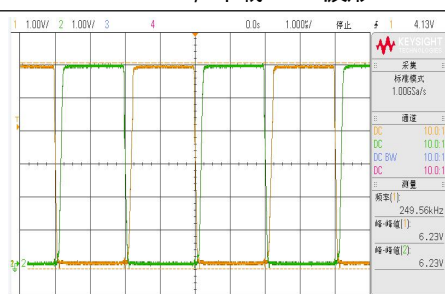
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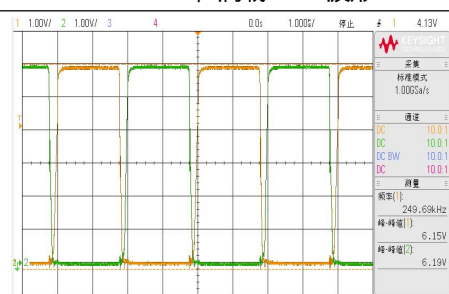
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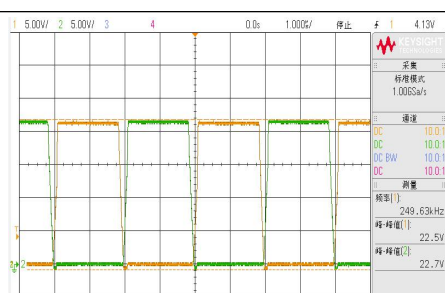


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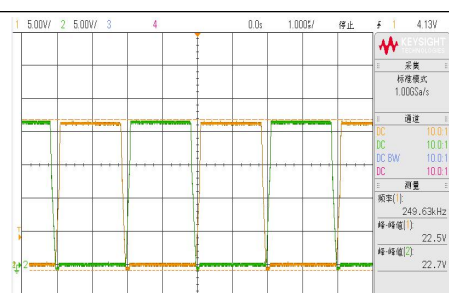
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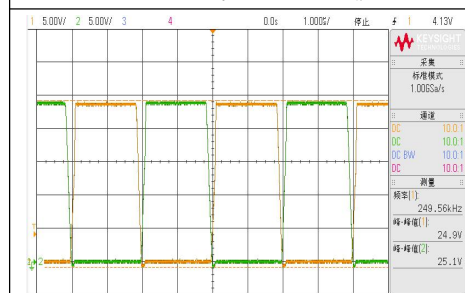
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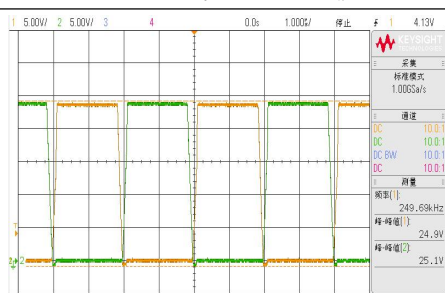
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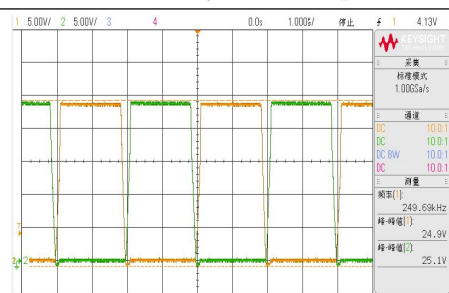
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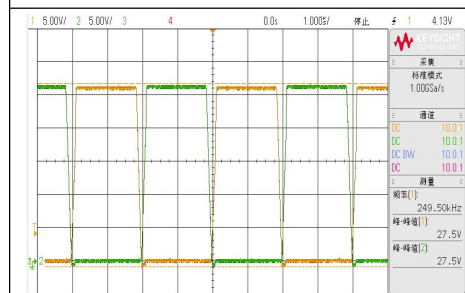
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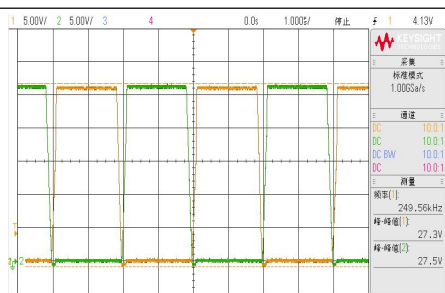
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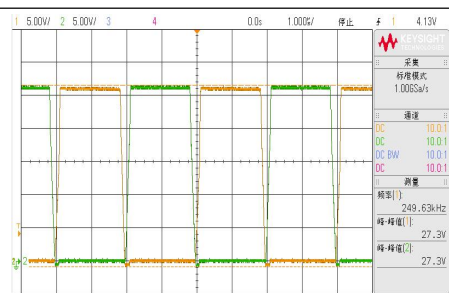
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VIN=26.4V, 空载 VDS 波形



VIN=26.4V, 半载 VDS 波形



VIN=26.4V, 满载 VDS 波形

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