特性

- 低功耗
- 低压降
- 较低的温度系数
- 高输入电压 (高达 40V)
- 输出电压精度：±1.5%
- 软启动功能
- 过流保护
- 过温保护
- 封装类型：3-pin SOT89，5-pin SOT23，8-pin SOP-EP

应用领域

- 工业 / 汽车应用
- 电表，水表，智能表
- 便携式 / 电池供电设备

概述

HT73Hxx 系列是一组以 BCD 制程实现的低功耗高电压稳压器。BCD 制程可确保其具有低压降和低静态电流的特性。输入电压可高达 40V，且具有几个固定的输出电压，范围为 2.1V~5.0V。

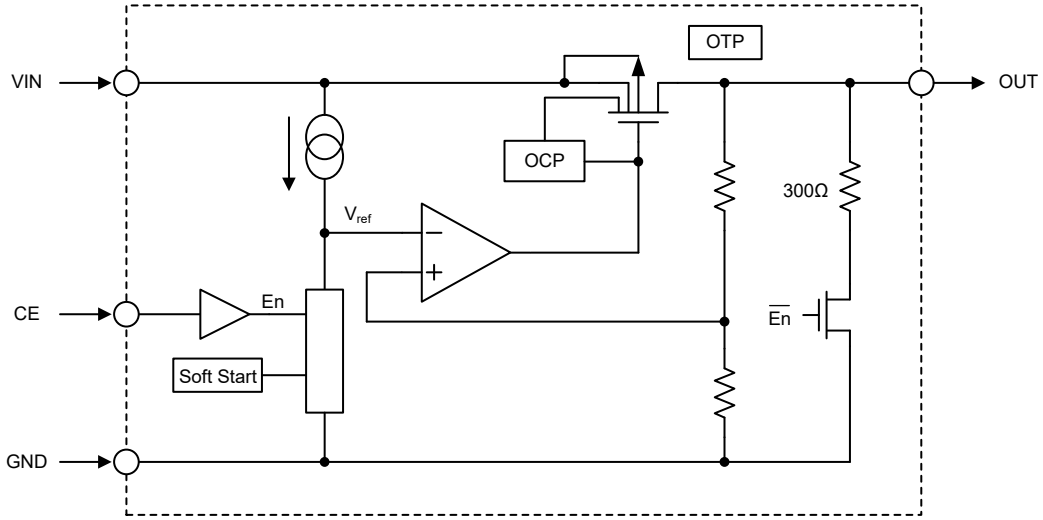
软启动功能控制输出转换速率，以防止上电时过调现象。使能 CE 引脚并以 CMOS 电平作为逻辑输入。当 CE 输入引脚拉低，快速放电通道可通过一个内置的 300Ω 下拉电阻将输出电压拉低。即使输出引脚短接到地，内建的过流保护电路也可以避免芯片受到损坏。过温保护电路确保芯片结温将不超过 150°C。

选型表

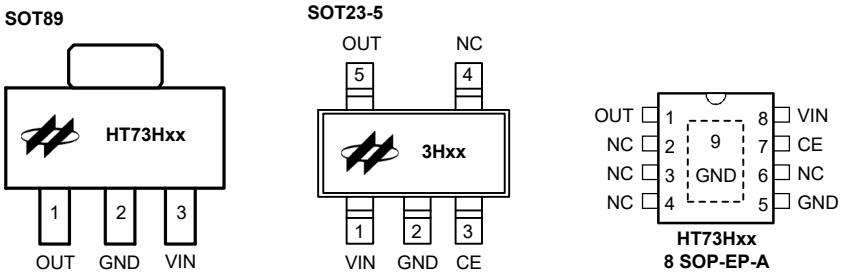
型号	输出电压	封装	正印
HT73H21	2.1V	SOT89 SOT23-5 8SOP-EP	HT73Hxx (封装为 SOT89，8SOP-EP) 3Hxx (封装为 SOT23-5)
HT73H23	2.3V		
HT73H25	2.5V		
HT73H27	2.7V		
HT73H30	3.0V		
HT73H33	3.3V		
HT73H36	3.6V		
HT73H40	4.0V		
HT73H44	4.4V		
HT73H50	5.0V		

注：“xx”代表输出电压。

方框图



引脚图



引脚说明

引脚序号			引脚名称	引脚说明
SOT89	SOT23-5	8SOP-EP		
3	1	8	VIN	输入引脚
2	2	5, 9	GND	地
1	5	1	OUT	输出引脚
—	3	7	CE	芯片使能引脚，高电平使能
—	4	2, 3, 4, 6	NC	未连接

极限参数

参数		值	单位
V_{IN}		-0.3~+48	V
V_{CE}		-0.3~(V_{IN}+0.3)	V
工作温度范围，Ta		-40~+85	°C
最大结温，$T_{J(MAX)}$		+150	°C
储存温度范围		-65~+165	°C
ESD 敏感性	人体模型	±5000	V
	机器模型	±400	V
结至环境的热阻，θ_{JA}	SOT89	200	°C/W
	SOT23-5	500	°C/W
	8SOP-EP	140	°C/W
功耗，P_D	SOT89	0.625	W
	SOT23-5	0.25	W
	8SOP-EP	0.89	W

注：P_D 值是在 Ta=25°C 时测得。

建议工作条件

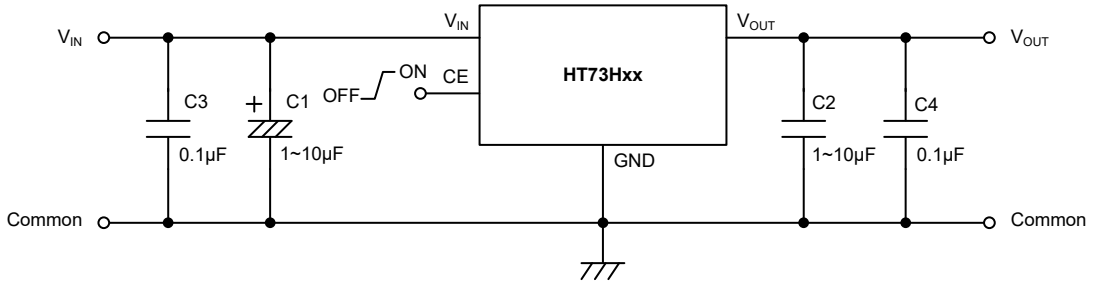
参数	值	单位
V_{IN}	(V_{OUT}+2)~40	V
V_{CE}	0~V_{IN}	V

电气特性

$V_{IN}=V_{OUT}+2V$，$V_{CE}=V_{IN}$，Ta=25°C 和 $C_{IN}=C_{OUT}=1\mu F$，除非另外说明

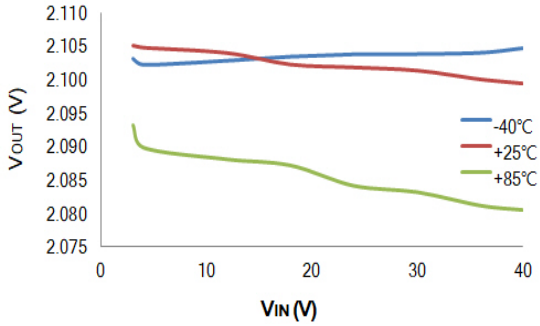
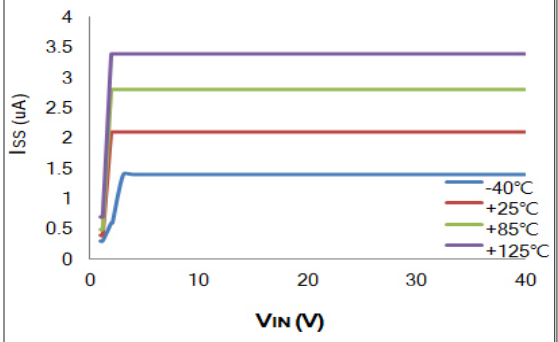
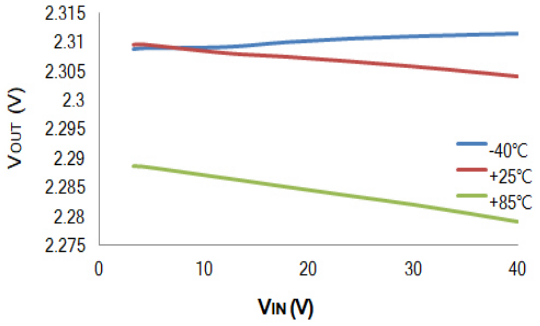
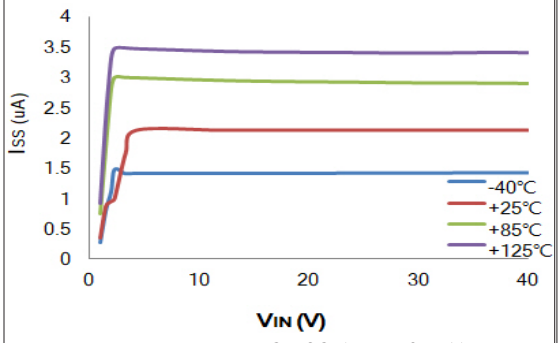
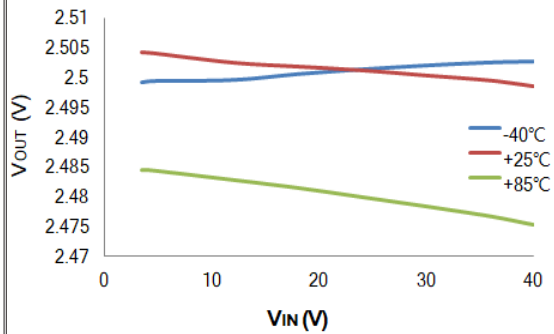
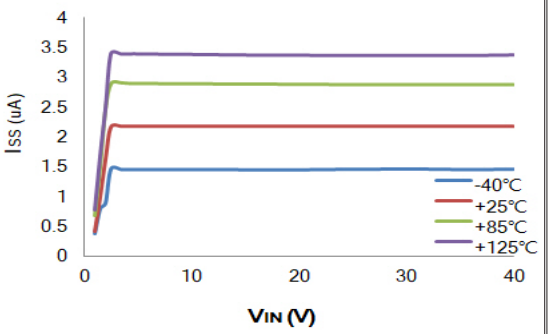
符号	参数	测试条件	最小	典型	最大	单位
V_{IN}	输入电压	—	—	—	40	V
V_{OUT}	输出电压范围	—	2.1	—	5.0	V
V_O	输出电压精准度	I_{OUT}=10mA	-1.5	—	1.5	%
I_{OUT}	输出电流	V_{OUT}=2.1V~3.0V	180	—	—	mA
		V_{OUT}=3.3V~5.0V	250	—	—	
ΔV_{OUT}	负载调节	1mA ≤ I_{OUT} ≤ 100mA	—	45	90	mV
V_{DIF}	压差	I_{OUT}=1mA，V_{OUT} 下降 = 2%（注）	—	5	15	mV
		I_{OUT}=30mA，V_{OUT} 下降 = 2%（注）	—	80	300	mV
I_{SS}	静态电流	I_{OUT}=0mA	—	2.5	4.0	μA
		V_{CE}=2.2V，V_{IN}=40V，I_{OUT}=0mA	—	3.0	5.0	μA
I_{SHD}	关机电流	V_{CE}=0V	—	0.1	1.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN}\times\Delta V_{OUT}}$	线性调整率	(V_{OUT}+1V)≤V_{IN}≤40V，I_{OUT}=1mA	—	0.1	0.2	%/V
$\frac{\Delta V_{OUT}}{\Delta Ta\times\Delta V_{OUT}}$	温度系数	I_{OUT}=10mA，-40°C<Ta<85°C	—	±100	—	ppm/°C
I_{OCP1}	OCP1 电流阈值	V_{IN}=24V	350	—	—	mA
I_{OCP2}	OCP2 电流阈值	V_{IN}=24V，强制 V_{OUT}=0V	—	300	—	mA
V_{OCP_TH}	OCP1/OCP2 电流阈值	在 V_{OUT} 端上观察	—	0.7	—	V
T_{SHD}	关机温度	—	—	150	—	°C
T_{REC}	恢复温度	—	—	120	—	°C
V_{IH}	使能高电平阈值	CE 引脚，(V_{OUT}+1V)≤V_{IN}≤40V	2	—	—	V
V_{IL}	使能高电平阈值	CE 引脚，(V_{OUT}+1V)≤V_{IN}≤40V	—	—	0.6	V
R_{DIS}	放电电阻	V_{IN}=24V，CE=0V，可通过 V_{OUT} 测量	—	300	—	Ω
PSRR	电源抑制比	V_{IN}=24V，V_{OUT}=5V，I_{OUT}=10mA，f=1kHz	—	60	—	dB
噪声	输出电压噪声	V_{OUT}=5V，I_{OUT}=10mA，BW=10Hz~100kHz	—	75	—	μV_{RMS}

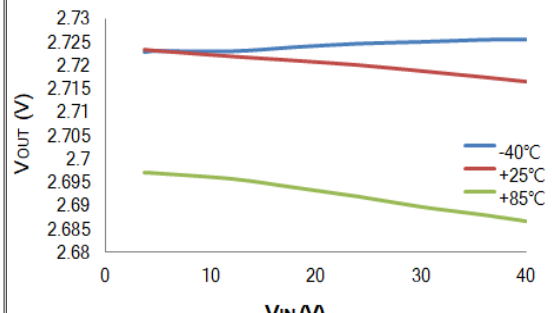
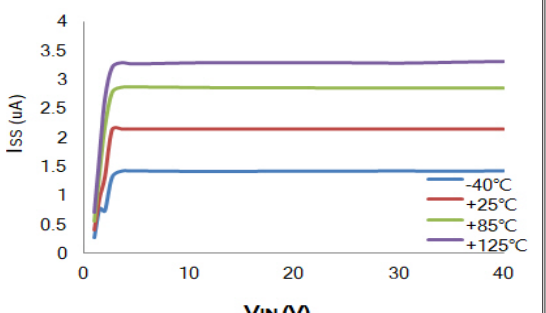
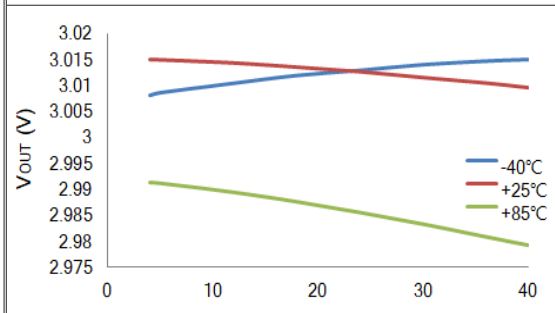
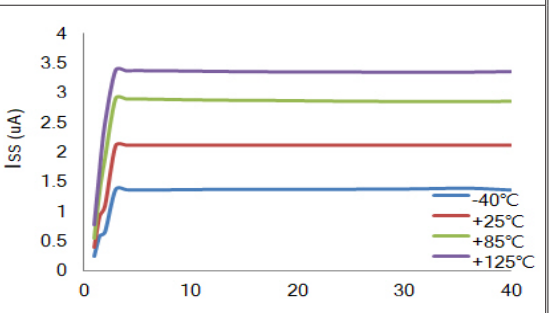
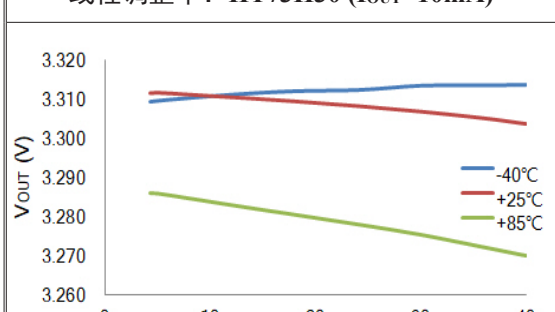
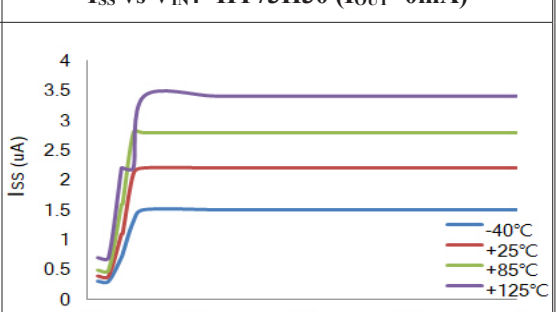
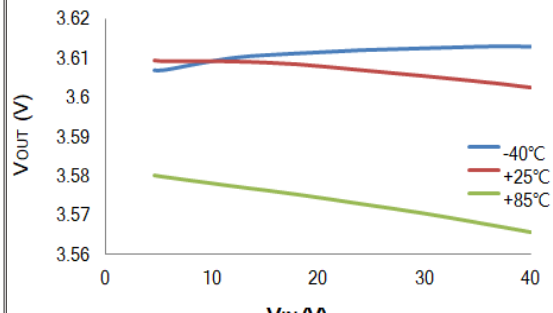
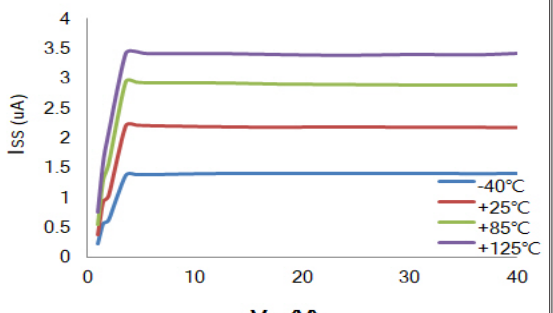
注：输入电压减去输出电压就是电压差，其在 $V_{IN}=V_{OUT}+2V$ 与一个固定负载条件下使输出电压下降 2%。

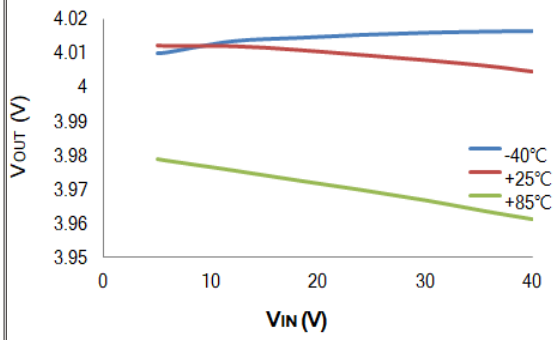
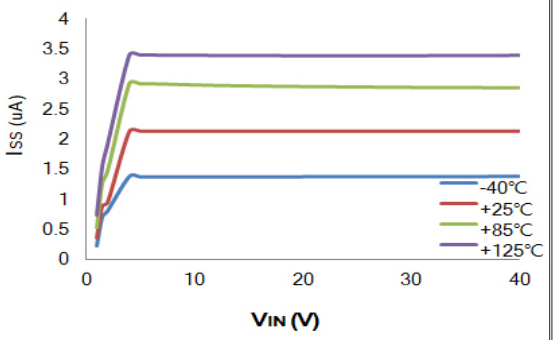
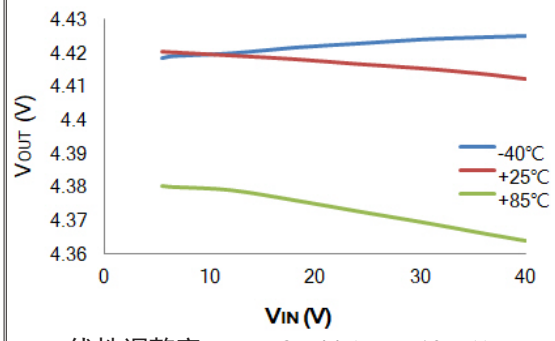
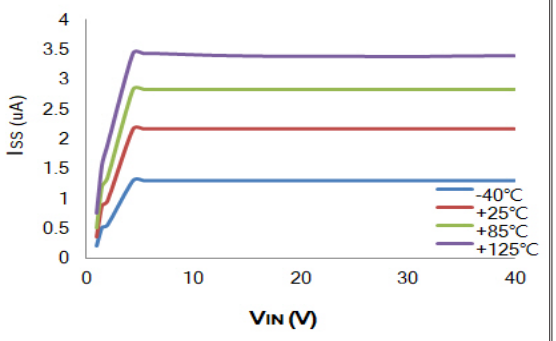
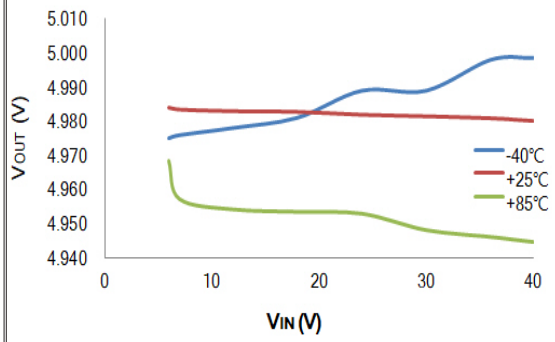
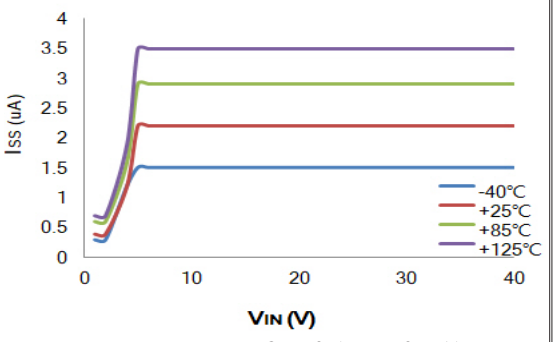


典型性能特性

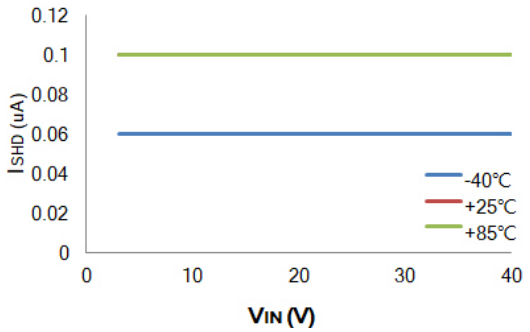
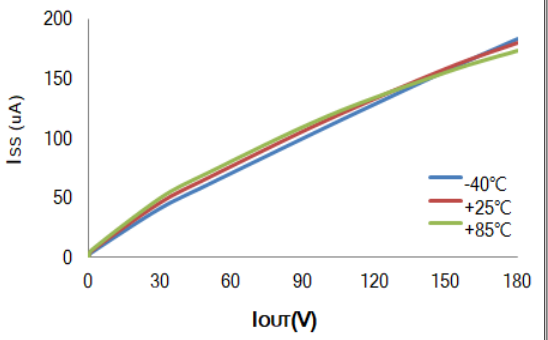
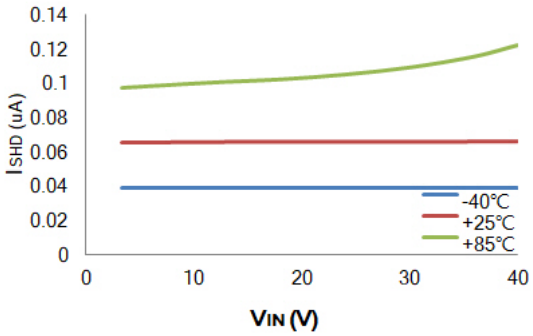
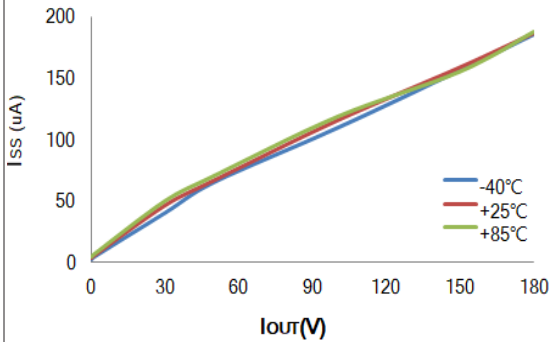
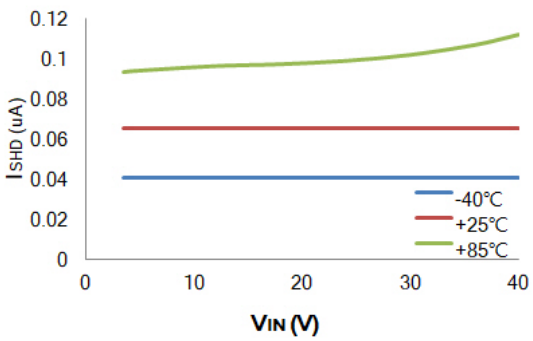
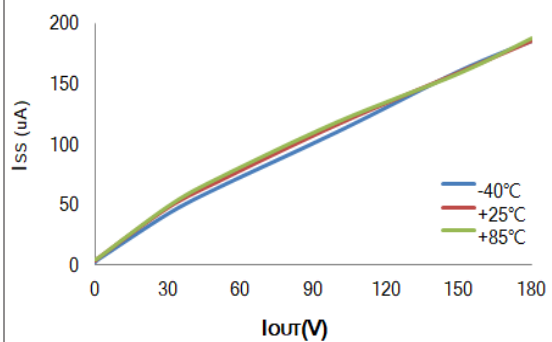
测试条件：V_{IN}=V_{OUT}+2V，V_{CE}=V_{IN}，I_{OUT}=10mA，C_{IN}=1μF，C_{OUT}=1μF，Ta=25°C，除非另有说明。

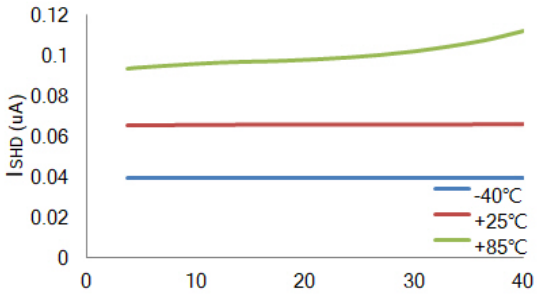
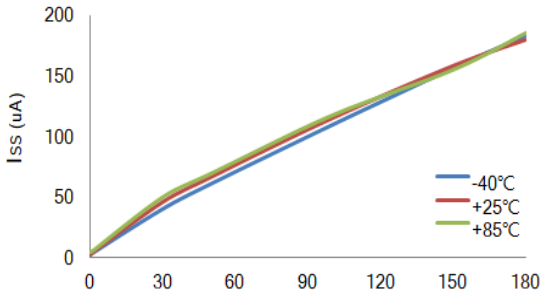
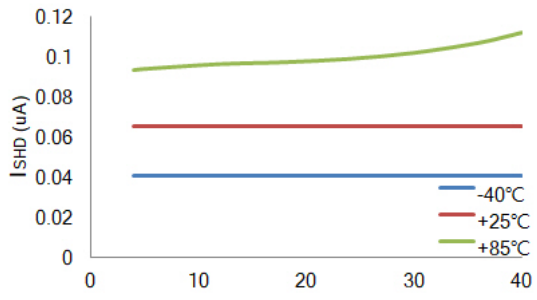
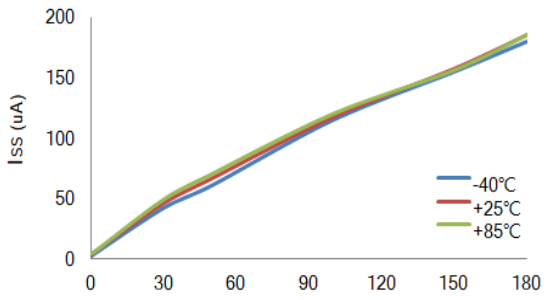
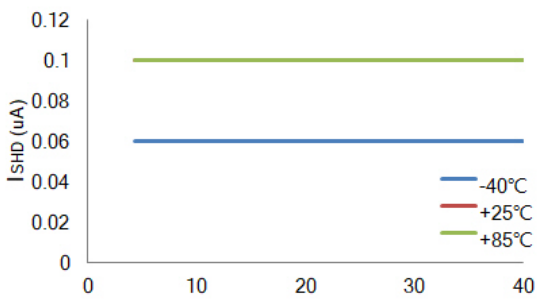
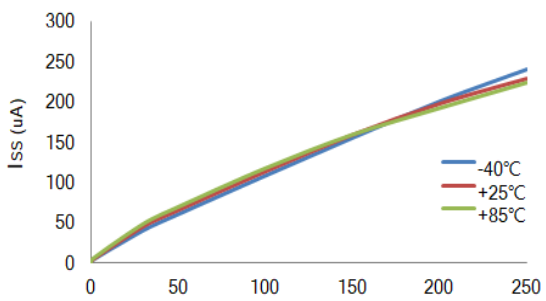
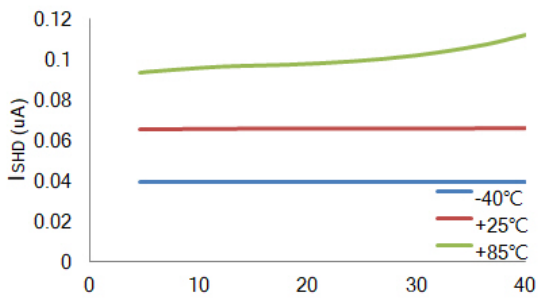
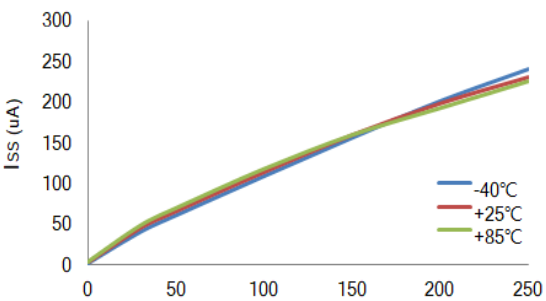
输出电压与输入电压	静态电流与输入电压
 线性调整率：**HT73H21 (I_{OUT}=10mA)**	 **I_{SS} vs V_{IN}：HT73H21 (I_{OUT}=0mA)**
 线性调整率：**HT73H23 (I_{OUT}=10mA)**	 **I_{SS} vs V_{IN}：HT73H23 (I_{OUT}=0mA)**
 线性调整率：**HT73H25 (I_{OUT}=10mA)**	 **I_{SS} vs V_{IN}：HT73H25 (I_{OUT}=0mA)**

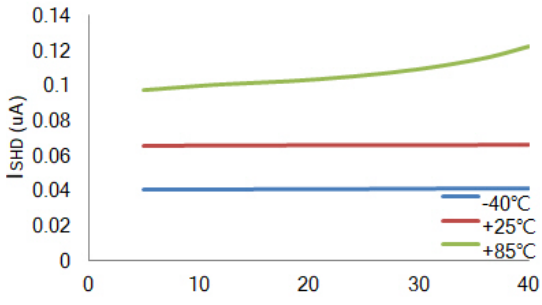
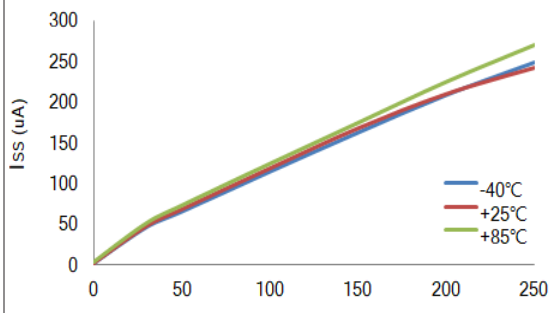
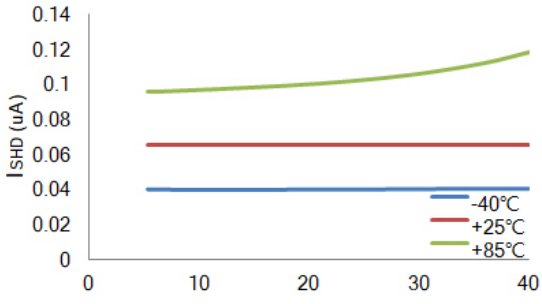
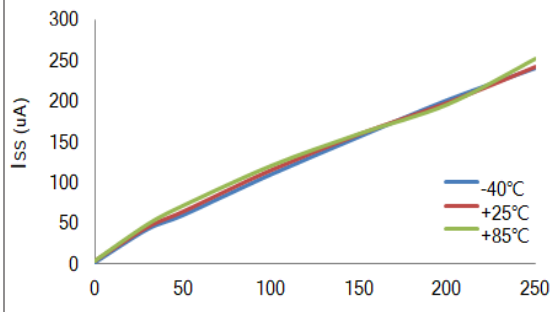
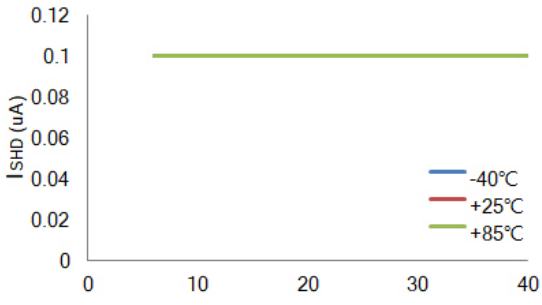
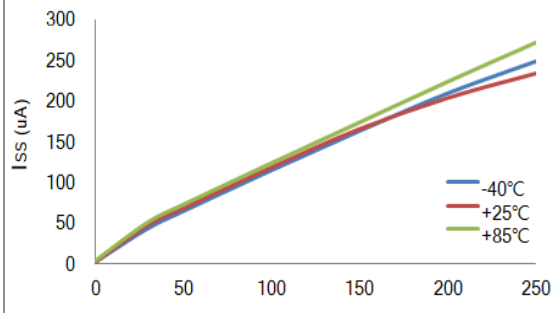
输出电压与输入电压	静态电流与输入电压
	
线性调整率：**HT73H27 (I_{OUT}=10mA)**	**I_{SS} vs V_{IN}：HT73H27 (I_{OUT}=0mA)**
	
线性调整率：**HT73H30 (I_{OUT}=10mA)**	**I_{SS} vs V_{IN}：HT73H30 (I_{OUT}=0mA)**
	
线性调整率：**HT73H33 (I_{OUT}=10mA)**	**I_{SS} vs V_{IN}：HT73H33 (I_{OUT}=0mA)**
	
线性调整率：**HT73H36 (I_{OUT}=10mA)**	**I_{SS} vs V_{IN}：HT73H36 (I_{OUT}=0mA)**

输出电压与输入电压	静态电流与输入电压
	
线性调整率：**HT73H40 (I_{OUT}=10mA)**	**I_{SS} vs V_{IN}：HT73H40 (I_{OUT}=0mA)**
	
线性调整率：**HT73H44 (I_{OUT}=10mA)**	**I_{SS} vs V_{IN}：HT73H44 (I_{OUT}=0mA)**
	
线性调整率：**HT73H50 (I_{OUT}=10mA)**	**I_{SS} vs V_{IN}：HT73H50 (I_{OUT}=0mA)**

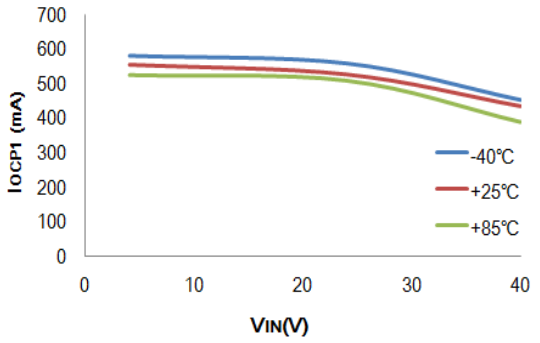
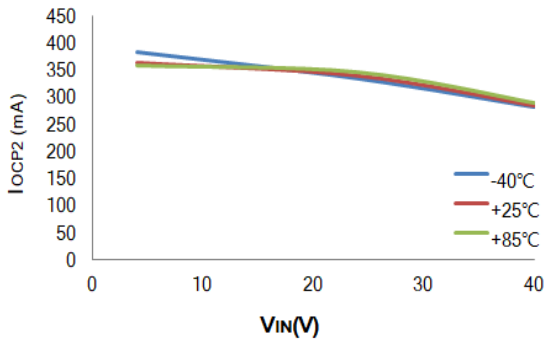
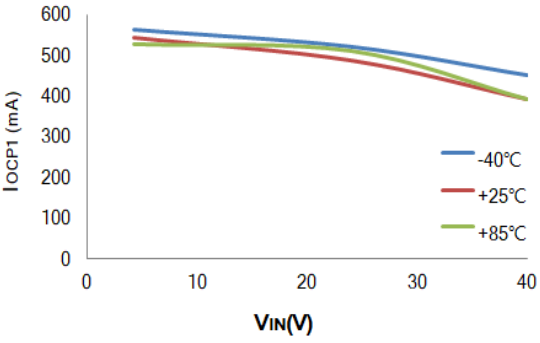
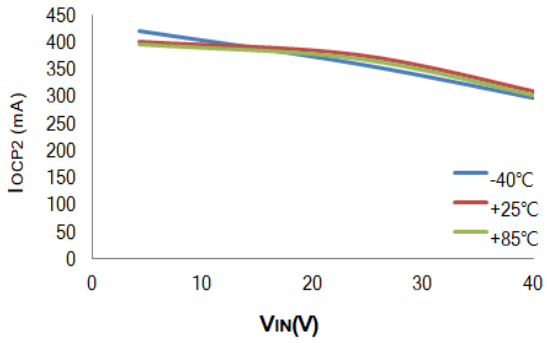
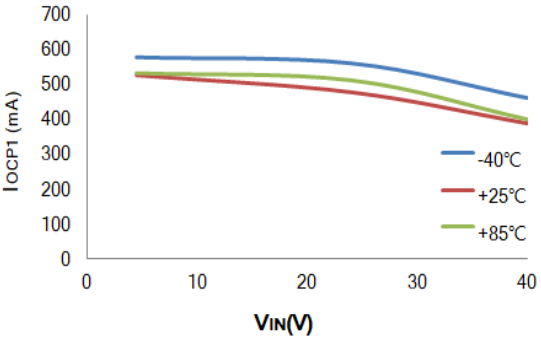
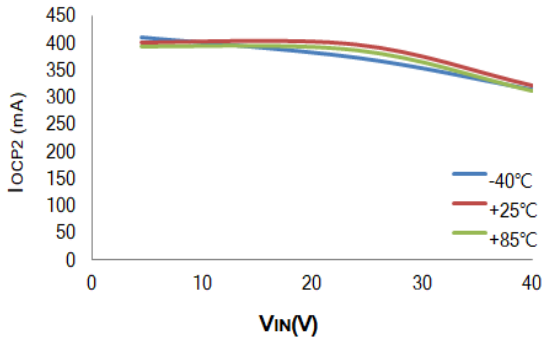
测试条件：V_{IN}=V_{OUT}+2V，V_{CE}=V_{IN}, I_{OUT}=10mA，C_{IN}=1μF，C_{OUT}=1μF，Ta=25°C，除非另有说明。

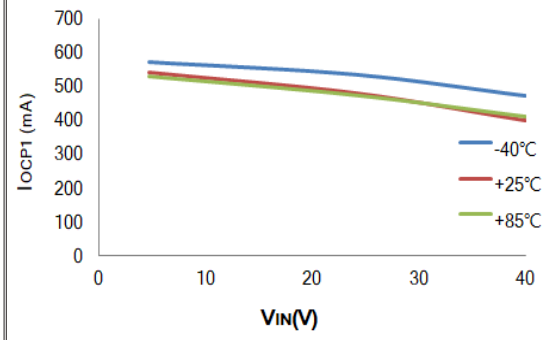
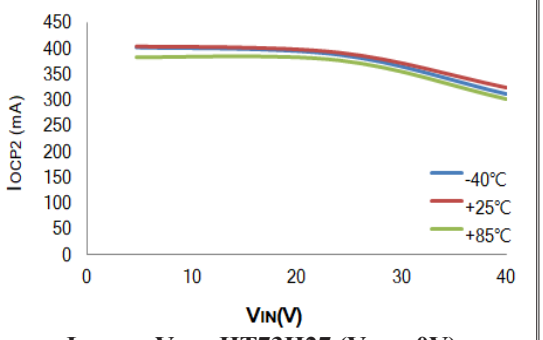
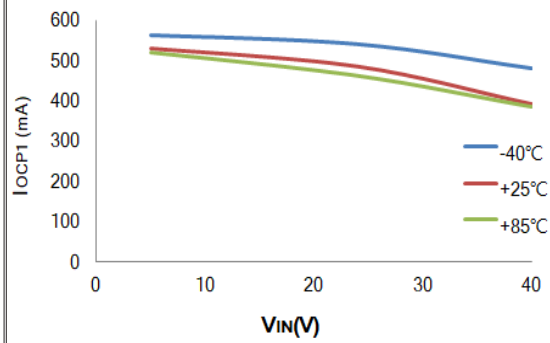
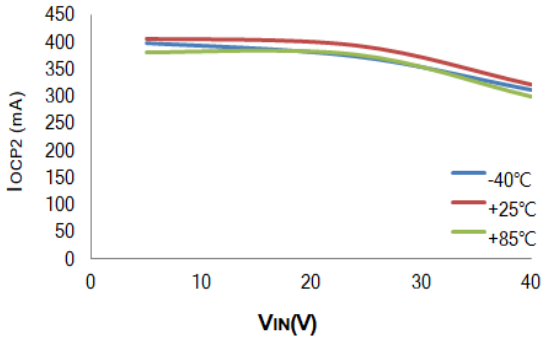
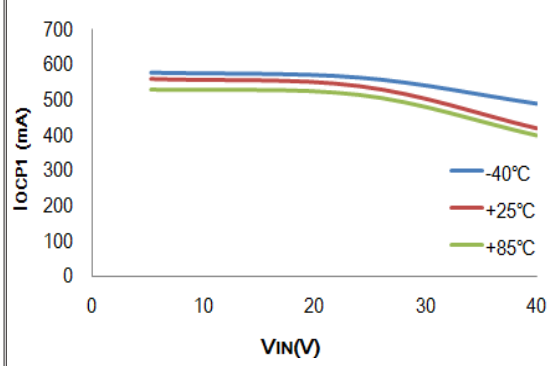
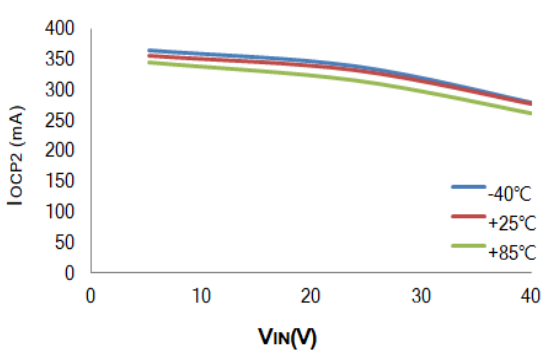
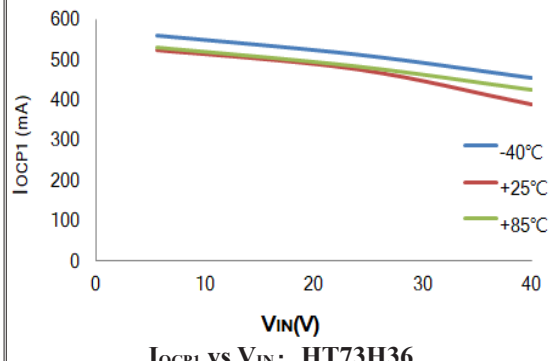
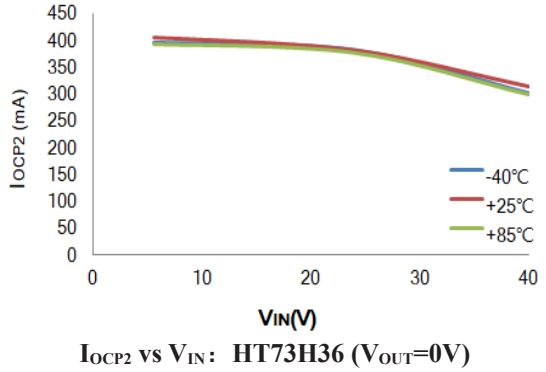
关机电流与输入电压	静态电流与输出电流
	
I_{SHD} vs V_{IN}：HT73H21 (I_{OUT}=0mA, V_{CE}=0V)	**I_{SS} vs I_{OUT}：HT73H21 (V_{IN}=4.1V)**
	
I_{SHD} vs V_{IN}：HT73H23 (I_{OUT}=0mA, V_{CE}=0V)	**I_{SS} vs I_{OUT}：HT73H23 (V_{IN}=4.3V)**
	
I_{SHD} vs V_{IN}：HT73H25 (I_{OUT}=0mA, V_{CE}=0V)	**I_{SS} vs I_{OUT}：HT73H25 (V_{IN}=4.5V)**

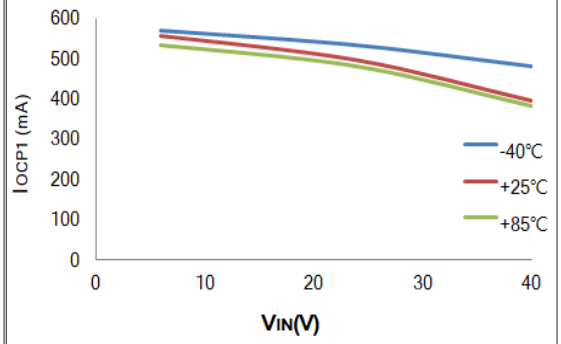
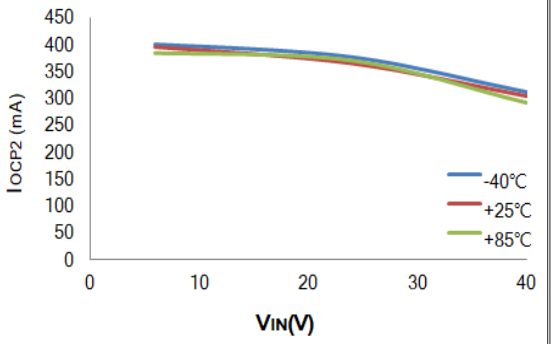
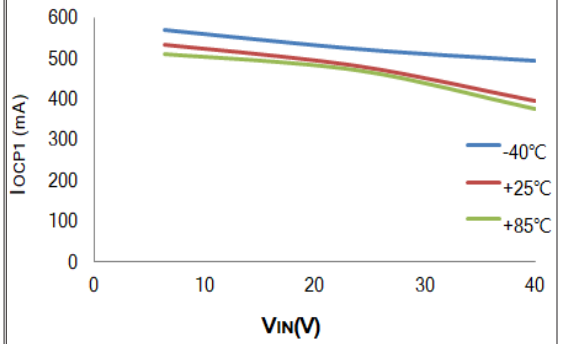
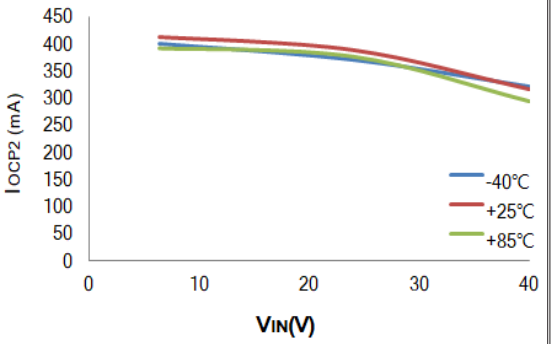
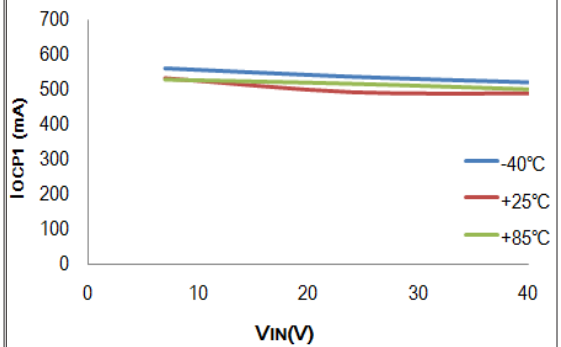
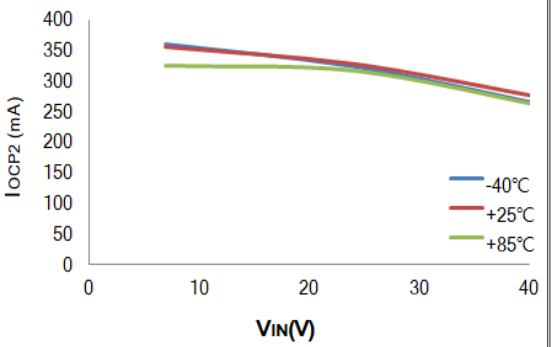
关机电流与输入电压	静态电流与输出电流
	
I_{SHD} vs V_{IN}： HT73H27 (I_{OUT}=0mA, V_{CE}=0V)	**I_{SS} vs I_{OUT}： HT73H27 (V_{IN}=4.7V)**
	
I_{SHD} vs V_{IN}： HT73H30 (I_{OUT}=0mA, V_{CE}=0V)	**I_{SS} vs I_{OUT}： HT73H30 (V_{IN}=5V)**
	
I_{SHD} vs V_{IN}： HT73H33 (I_{OUT}=0mA, V_{CE}=0V)	**I_{SS} vs I_{OUT}： HT73H33 (V_{IN}=5.3V)**
	
I_{SHD} vs V_{IN}： HT73H36 (I_{OUT}=0mA, V_{CE}=0V)	**I_{SS} vs I_{OUT}： HT73H36 (V_{IN}=5.6V)**

关机电流与输入电压	静态电流与输出电流
	
I_{SHD} vs V_{IN}： HT73H40 (I_{OUT}=0mA, V_{CE}=0V)	**I_{SS} vs I_{OUT}： HT73H40 (V_{IN}=6V)**
	
I_{SHD} vs V_{IN}： HT73H44 (I_{OUT}=0mA, V_{CE}=0V)	**I_{SS} vs I_{OUT}： HT73H44 (V_{IN}=6.4V)**
	
I_{SHD} vs V_{IN}： HT73H50 (I_{OUT}=0mA, V_{CE}=0V)	**I_{SS} vs I_{OUT}： HT73H50 (V_{IN}=7V)**

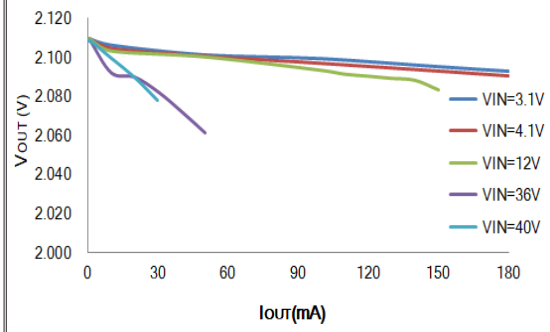
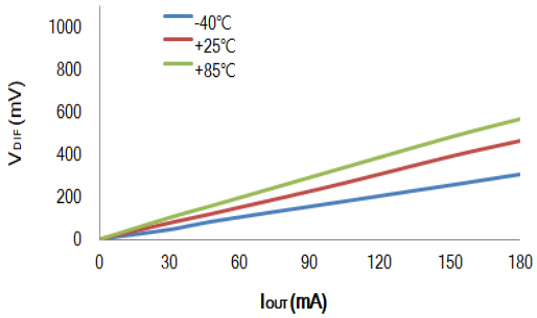
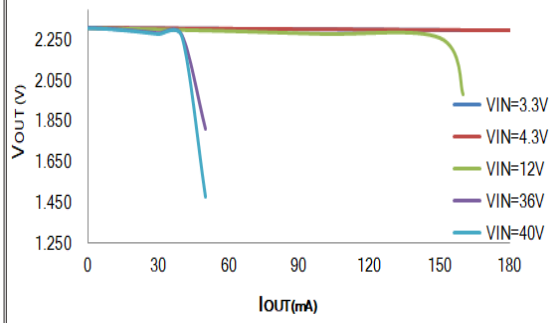
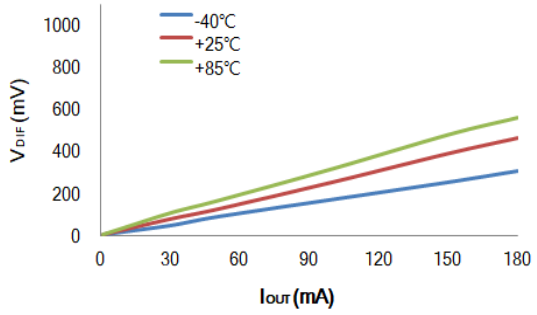
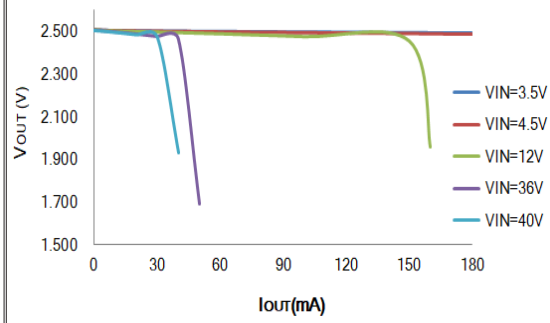
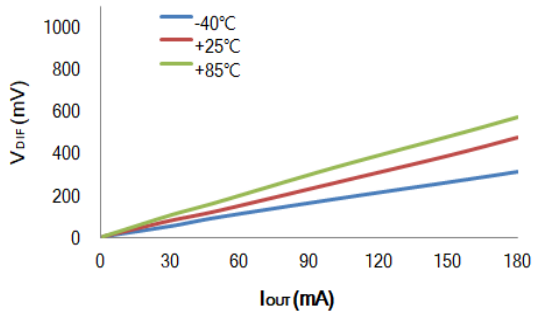
测试条件：V_{IN}=V_{OUT}+2V，V_{CE}=V_{IN}, I_{OUT}=10mA，C_{IN}=1μF，C_{OUT}=1μF，Ta=25°C，除非另有说明。

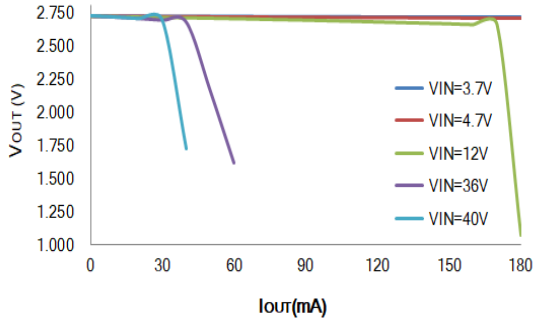
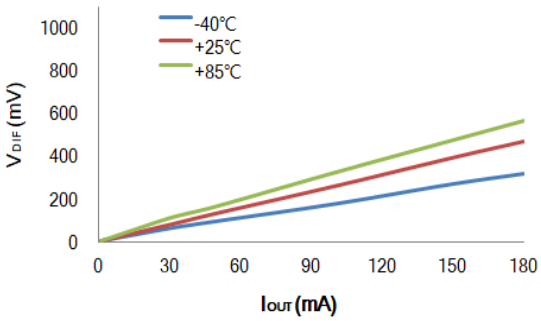
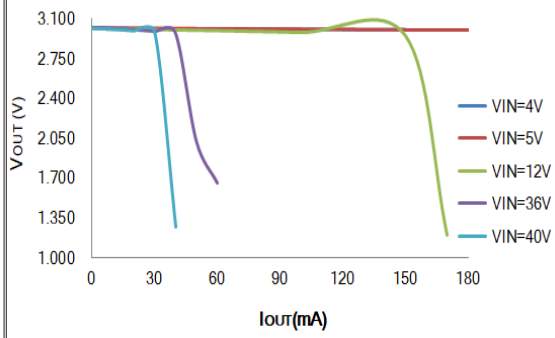
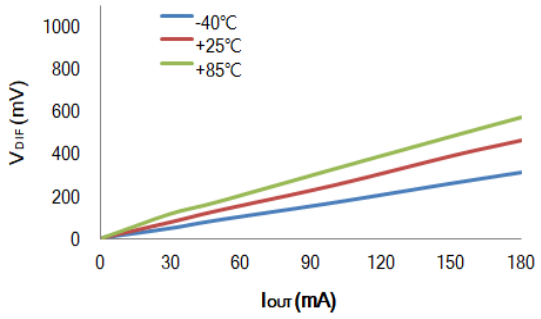
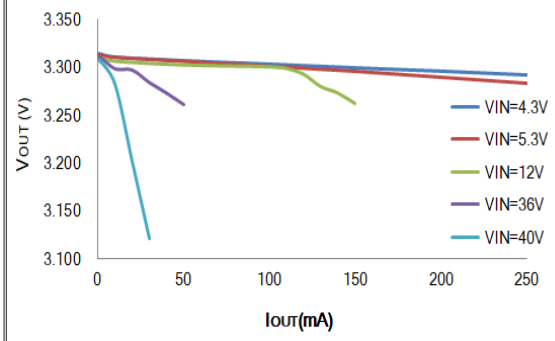
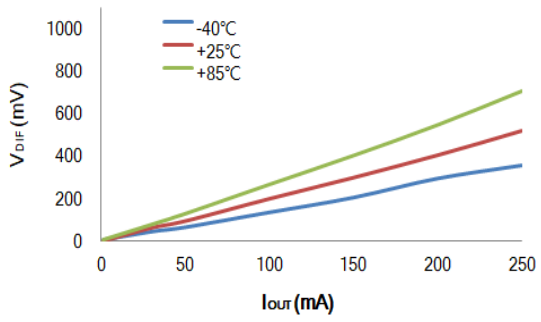
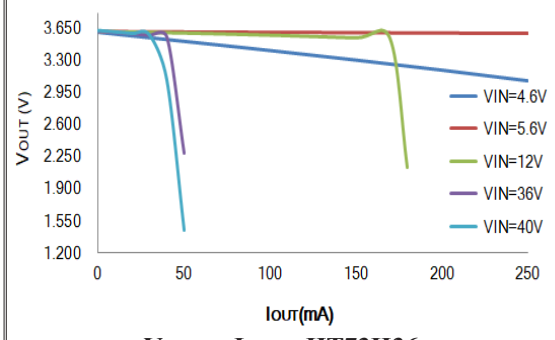
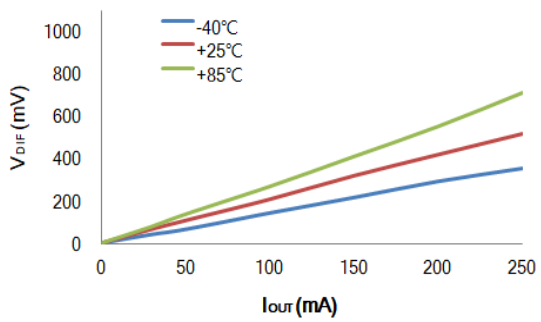
I_{OCP1} 与输入电压	I_{OCP2} 与输入电压
	
I_{OCP1} vs V_{IN}：HT73H21	**I_{OCP2} vs V_{IN}：HT73H21 (V_{OUT}=0V)**
	
I_{OCP1} vs V_{IN}：HT73H23	**I_{OCP2} vs V_{IN}：HT73H23 (V_{OUT}=0V)**
	
I_{OCP1} vs V_{IN}：HT73H25	**I_{OCP2} vs V_{IN}：HT73H25 (V_{OUT}=0V)**

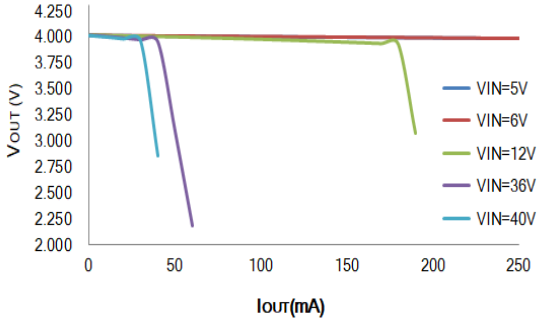
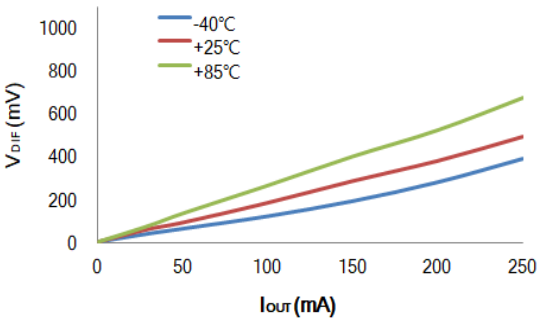
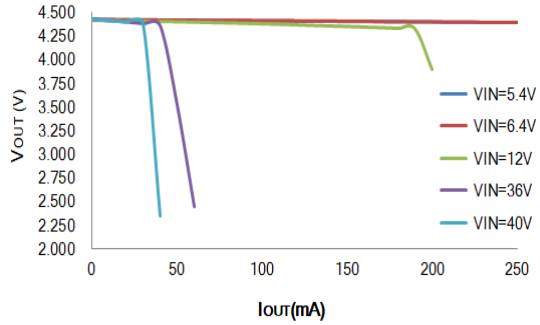
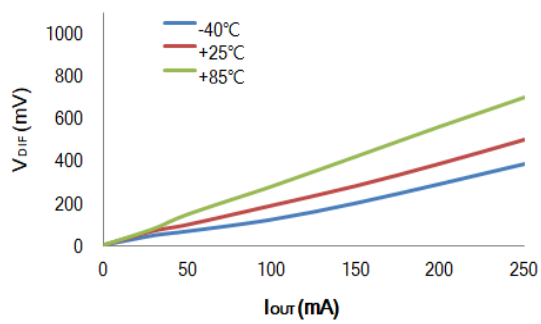
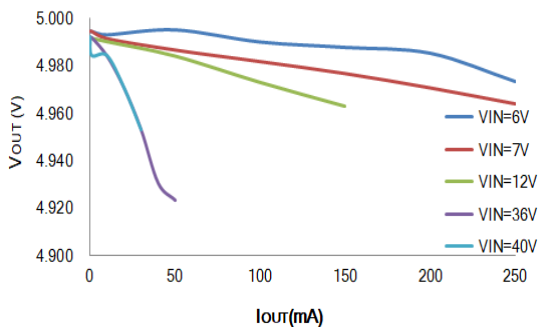
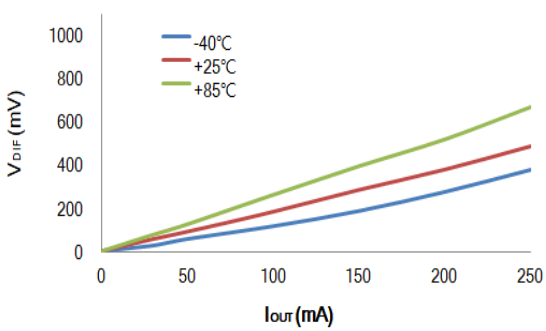
I_{OCP1} 与输入电压	I_{OCP2} 与输入电压
	
I_{OCP1} vs V_{IN}：HT73H27	I_{OCP2} vs V_{IN}：HT73H27 (V_{OUT}=0V)
	
I_{OCP1} vs V_{IN}：HT73H30	I_{OCP2} vs V_{IN}：HT73H30 (V_{OUT}=0V)
	
I_{OCP1} vs V_{IN}：HT73H33	I_{OCP2} vs V_{IN}：HT73H33 (V_{OUT}=0V)
	
I_{OCP1} vs V_{IN}：HT73H36	I_{OCP2} vs V_{IN}：HT73H36 (V_{OUT}=0V)

I_{OCP1} 与输入电压	I_{OCP2} 与输入电压
	
I_{OCP1} vs V_{IN}：HT73H40	I_{OCP2} vs V_{IN}：HT73H40 (V_{OUT}=0V)
	
I_{OCP1} vs V_{IN}：HT73H44	I_{OCP2} vs V_{IN}：HT73H44 (V_{OUT}=0V)
	
I_{OCP1} vs V_{IN}：HT73H50	I_{OCP2} vs V_{IN}：HT73H50 (V_{OUT}=0V)

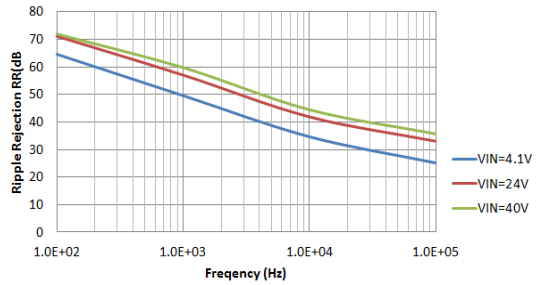
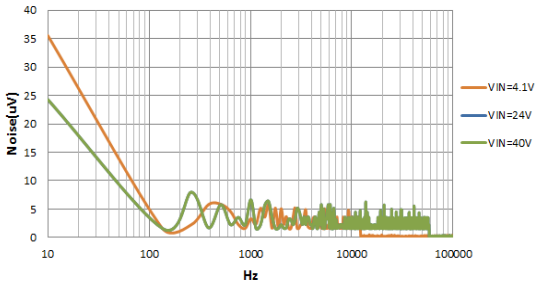
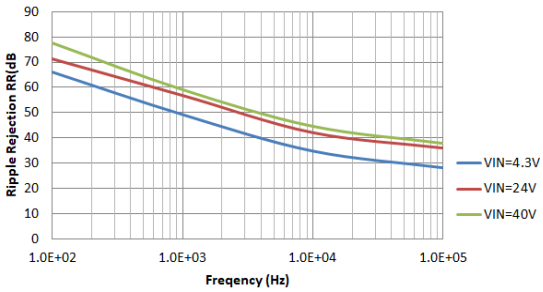
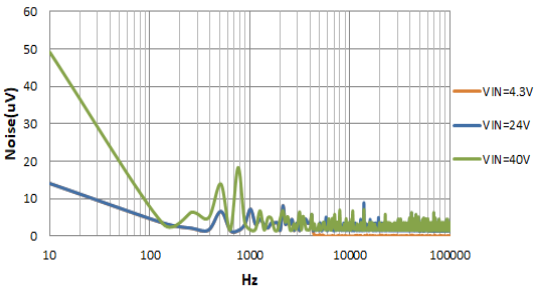
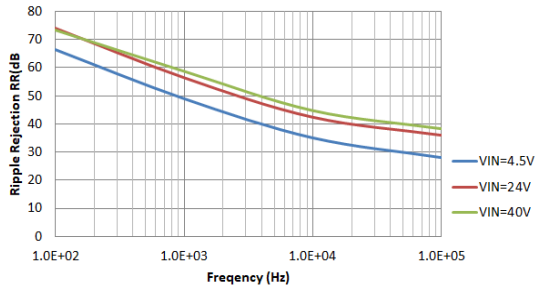
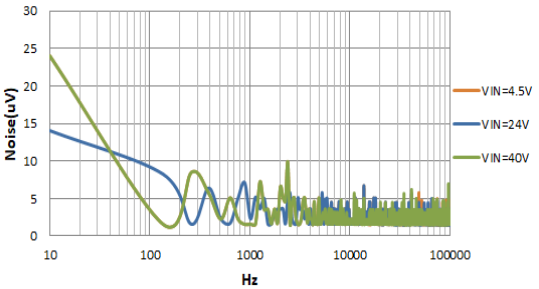
测试条件：V_{IN}=V_{OUT}+2V，V_{CE}=V_{IN}, I_{OUT}=10mA，C_{IN}=1μF，C_{OUT}=1μF，Ta=25°C，除非另有说明。

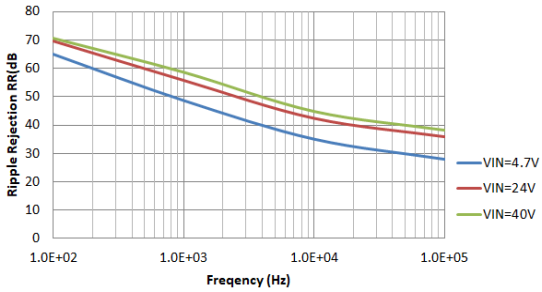
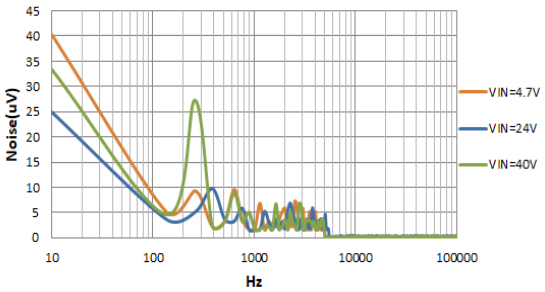
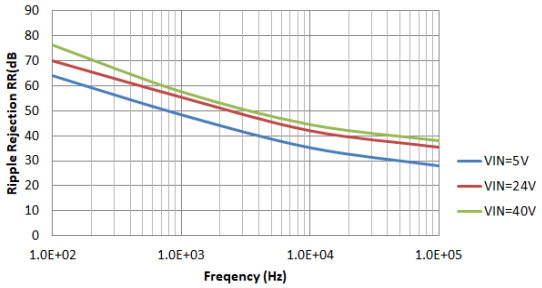
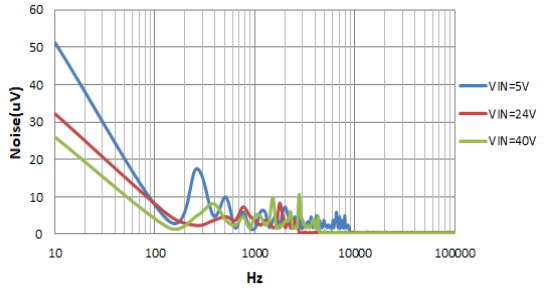
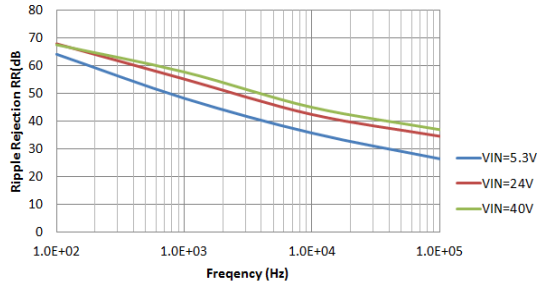
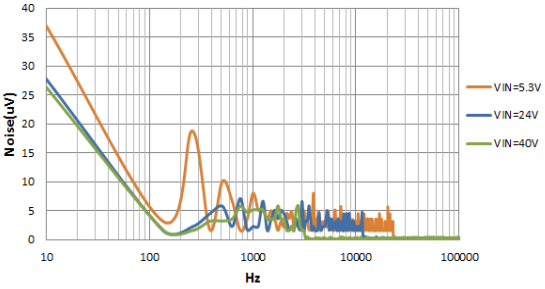
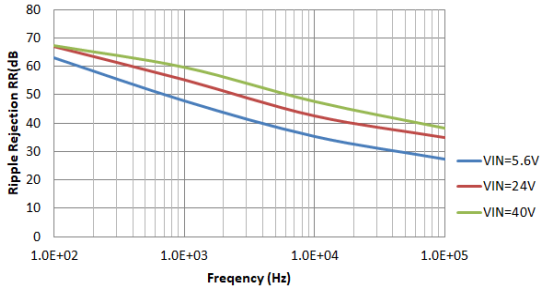
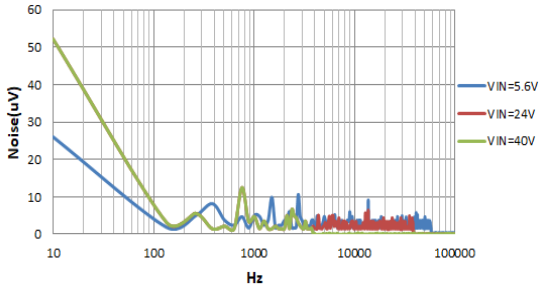
输出电压与输出电流 (RMS)	压差与输出电流
	
V_{OUT} vs I_{OUT}：HT73H21	**压差：HT73H21**
	
V_{OUT} vs I_{OUT}：HT73H23	**压差：HT73H23**
	
V_{OUT} vs I_{OUT}：HT73H25	**压差：HT73H25**

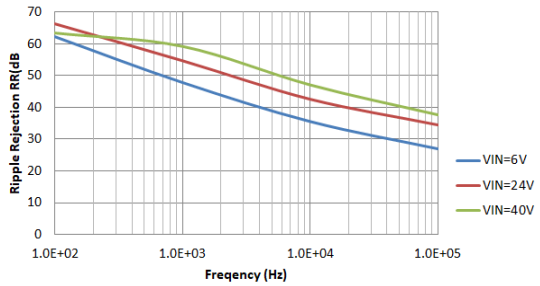
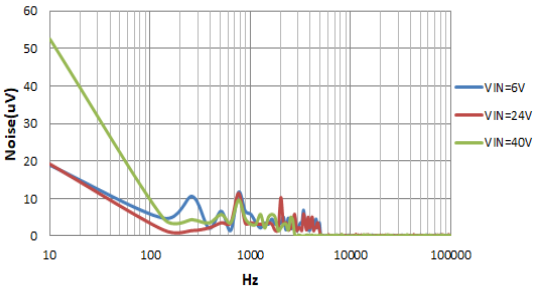
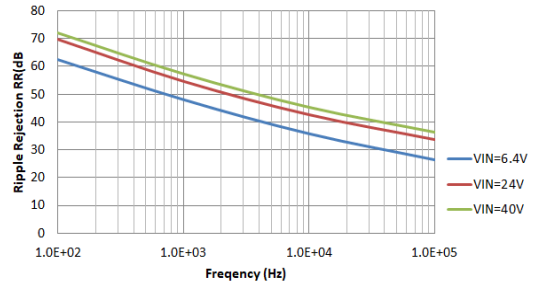
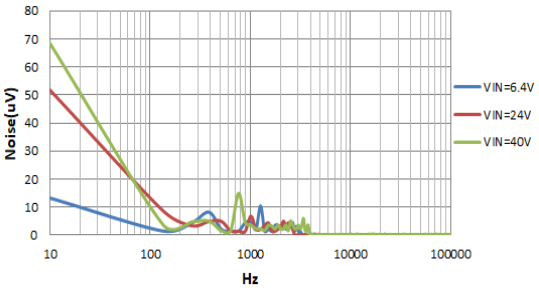
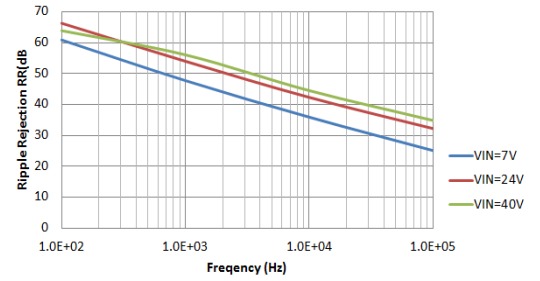
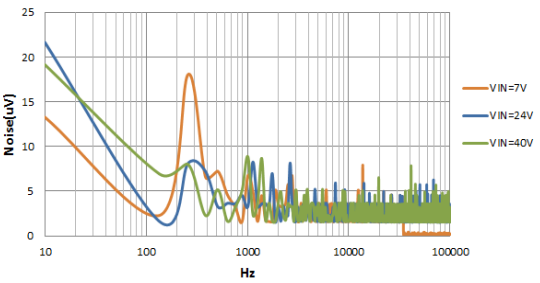
输出电压与输出电流 (RMS)	压差与输出电流
	
VOUT vs IOUT：HT73H27	**压差：HT73H27**
	
VOUT vs IOUT：HT73H30	**压差：HT73H30**
	
VOUT vs IOUT：HT73H33	**压差：HT73H33**
	
VOUT vs IOUT：HT73H36	**压差：HT73H36**

输出电压与输出电流 (RMS)	压差与输出电流
 **VOUT vs IOUT：HT73H40**	 **压差：HT73H40**
 **VOUT vs IOUT：HT73H44**	 **压差：HT73H44**
 **VOUT vs IOUT：HT73H50**	 **压差：HT73H50**

测试条件：V_{IN}=V_{OUT}+2V，V_{CE}=V_{IN}, I_{OUT}=10mA，C_{IN}=1μF，C_{OUT}=1μF，Ta=25°C，除非另有说明。

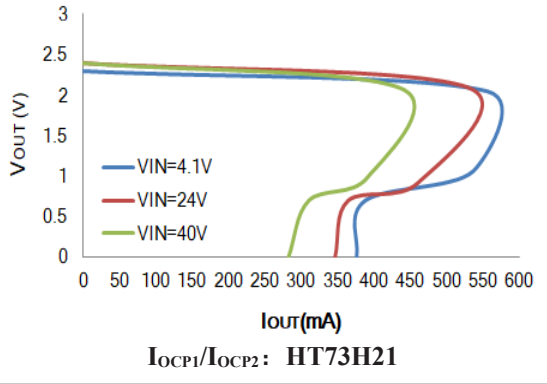
PSRR	输出噪声与频率
	
PSRR：HT73H21 (I_{OUT}=10mA，f=100Hz~100kHz)	**输出噪声：HT73H21 (I_{OUT}=10mA，f=10Hz~100kHz)**
	
PSRR：HT73H23 (I_{OUT}=10mA，f=100Hz~100kHz)	**输出噪声：HT73H23 (I_{OUT}=10mA，f=10Hz~100kHz)**
	
PSRR：HT73H25 (I_{OUT}=10mA，f=100Hz~100kHz)	**输出噪声：HT73H25 (I_{OUT}=10mA，f=10Hz~100kHz)**

PSRR	输出噪声与频率
 **PSRR：HT73H27** **(I_{OUT}=10mA，f=100Hz~100kHz)**	 **输出噪声：HT73H27** **(I_{OUT}=10mA，f=10Hz~100kHz)**
 **PSRR：HT73H30** **(I_{OUT}=10mA，f=100Hz~100kHz)**	 **输出噪声：HT73H30** **(I_{OUT}=10mA，f=10Hz~100kHz)**
 **PSRR：HT73H33** **(I_{OUT}=10mA，f=100Hz~100kHz)**	 **输出噪声：HT73H33** **(I_{OUT}=10mA，f=10Hz~100kHz)**
 **PSRR：HT73H36** **(I_{OUT}=10mA，f=100Hz~100kHz)**	 **输出噪声：HT73H36** **(I_{OUT}=10mA，f=10Hz~100kHz)**

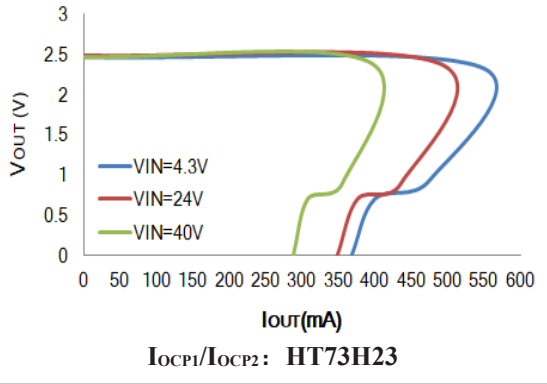
PSRR	输出噪声与频率
	
PSRR：HT73H40 **(I_{OUT}=10mA，f=100Hz~100kHz)**	**输出噪声：HT73H40** **(I_{OUT}=10mA，f=10Hz~100kHz)**
	
PSRR：HT73H44 **(I_{OUT}=10mA，f=100Hz~100kHz)**	**输出噪声：HT73H44** **(I_{OUT}=10mA，f=10Hz~100kHz)**
	
PSRR：HT73H50 **(I_{OUT}=10mA，f=100Hz~100kHz)**	**输出噪声：HT73H50** **(I_{OUT}=10mA，f=10Hz~100kHz)**

测试条件：V_{IN}=V_{OUT}+2V，V_{CE}=V_{IN}, I_{OUT}=10mA，C_{IN}=1μF，C_{OUT}=1μF，Ta=25°C，除非另有说明。

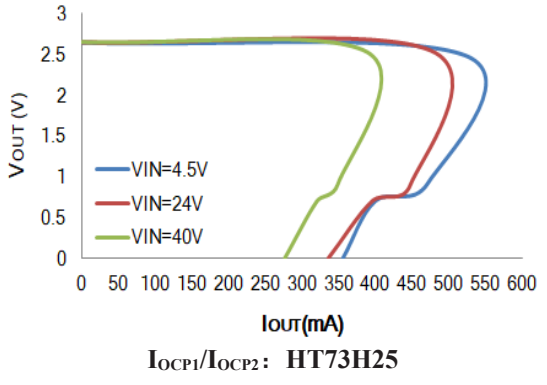
输出电压与输出电流 (脉冲)



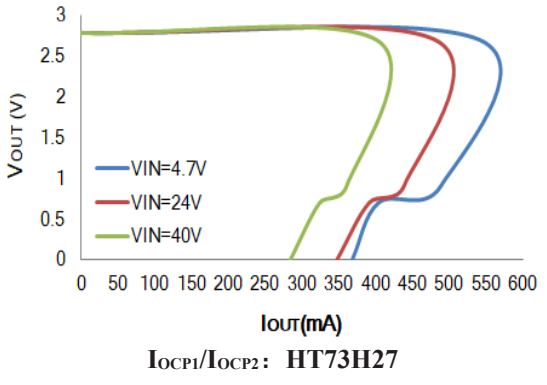
I_{OCP1}/I_{OCP2}：HT73H21



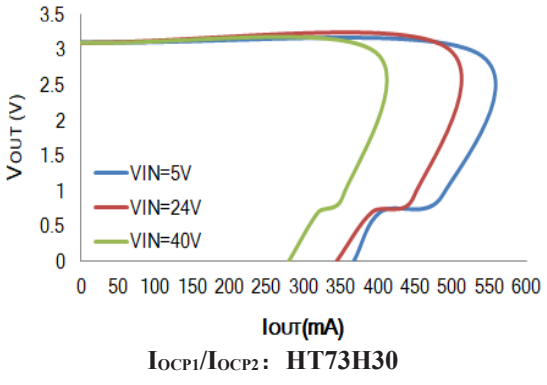
I_{OCP1}/I_{OCP2}：HT73H23



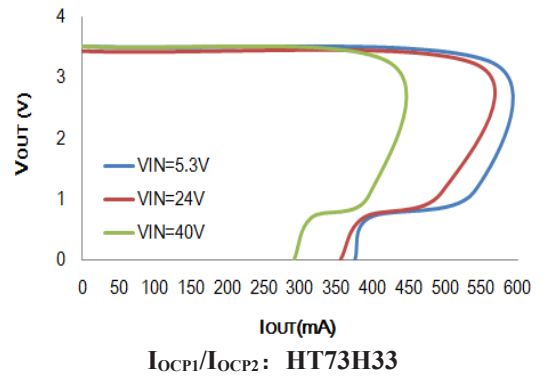
I_{OCP1}/I_{OCP2}：HT73H25



I_{OCP1}/I_{OCP2}：HT73H27

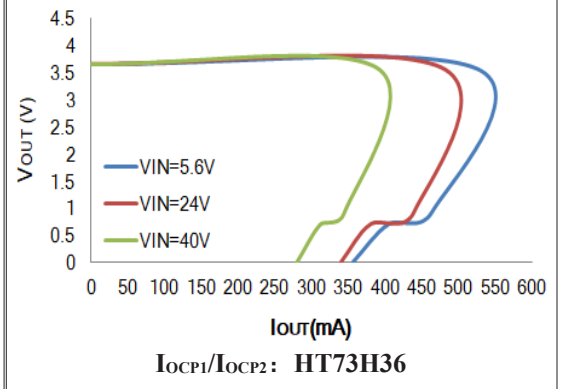


I_{OCP1}/I_{OCP2}：HT73H30

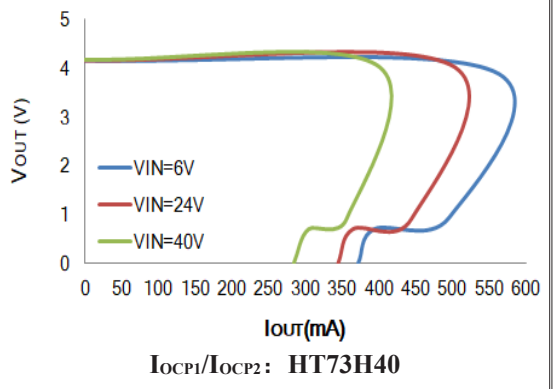


I_{OCP1}/I_{OCP2}：HT73H33

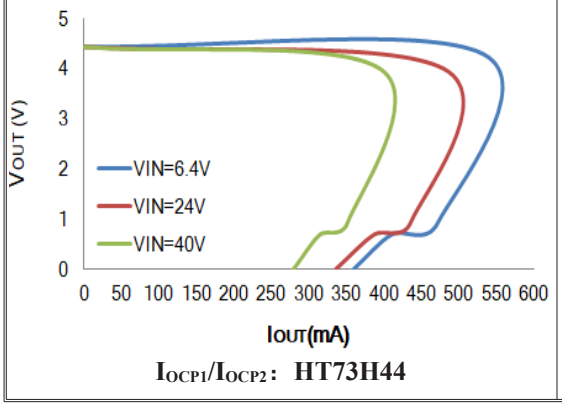
输出电压与输出电流 (脉冲)



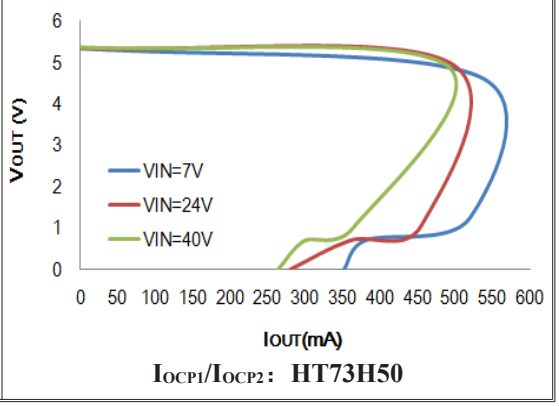
I_{OCP1}/I_{OCP2}：HT73H36



I_{OCP1}/I_{OCP2}：HT73H40

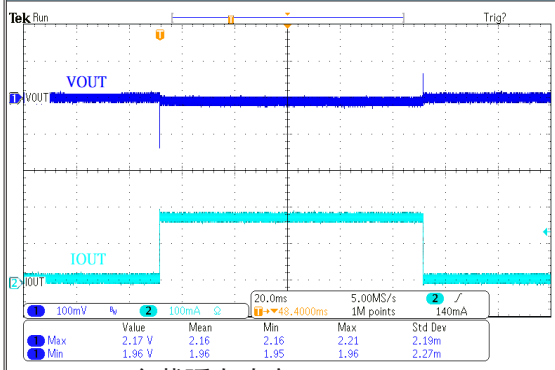
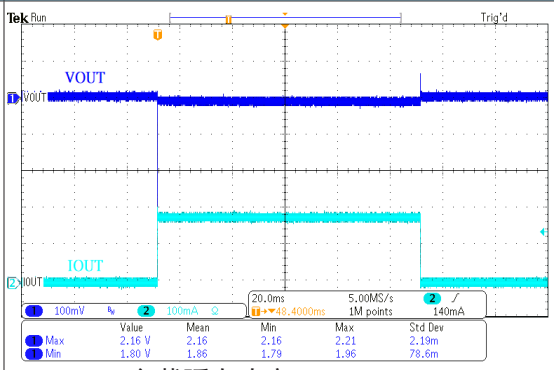
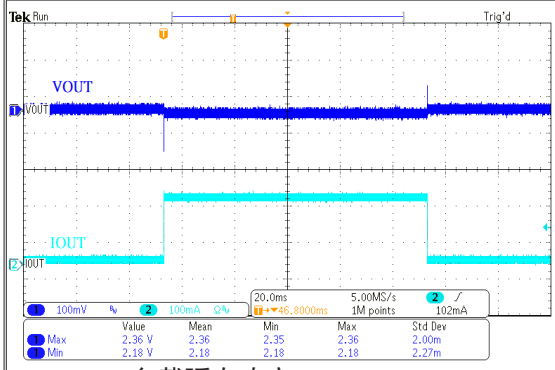
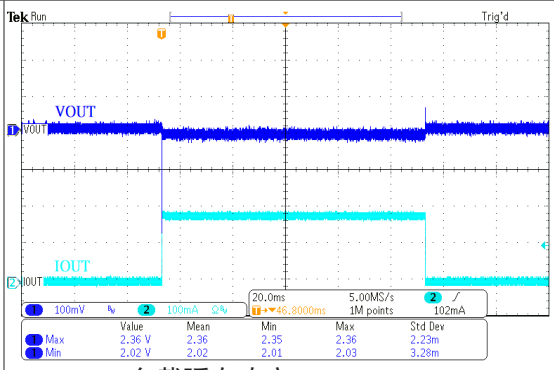
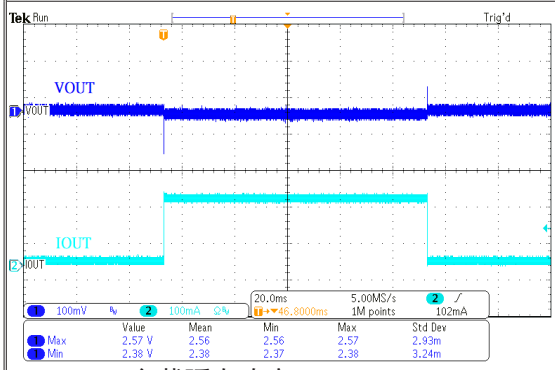
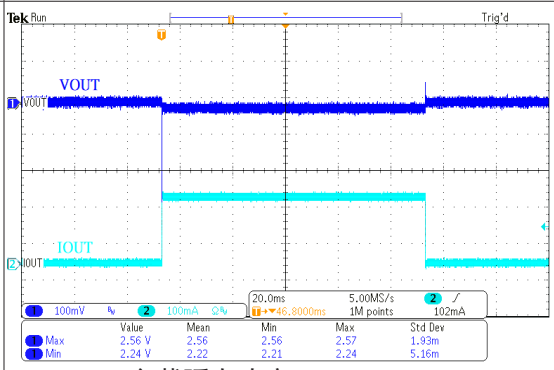


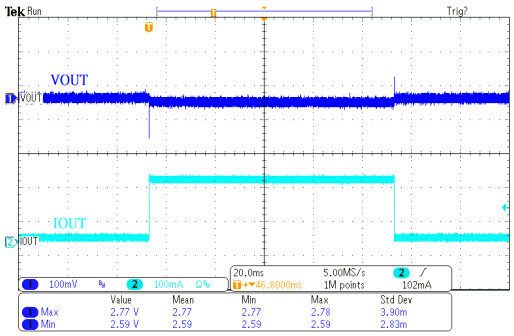
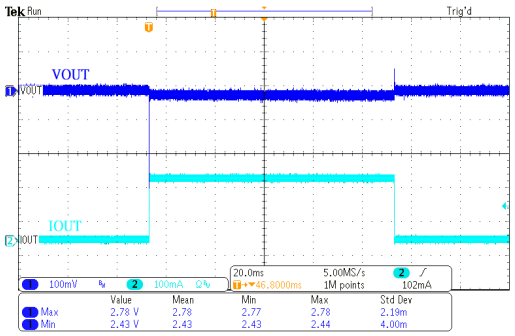
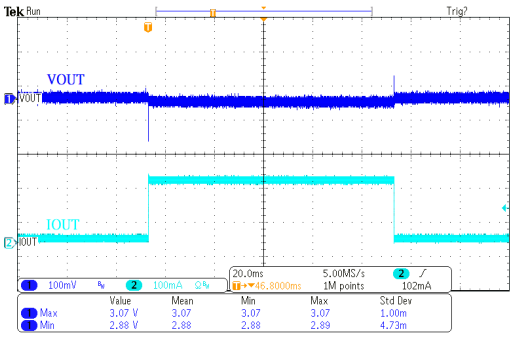
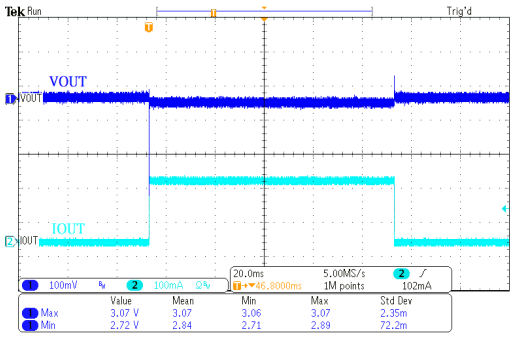
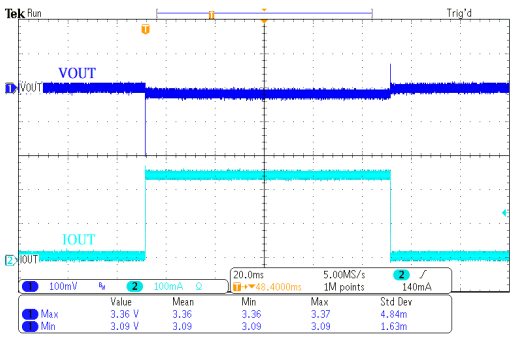
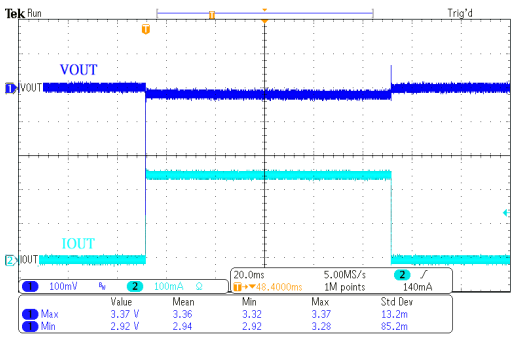
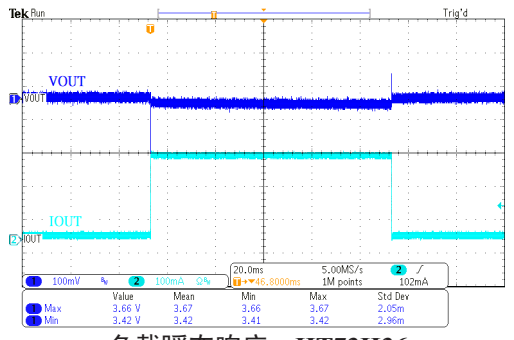
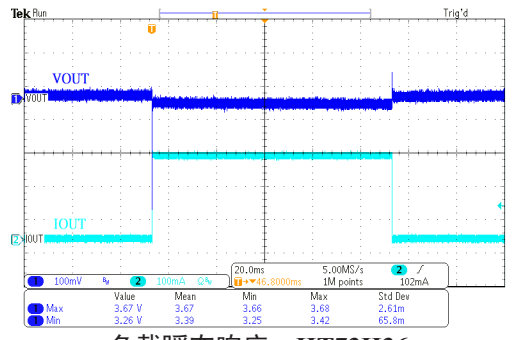
I_{OCP1}/I_{OCP2}：HT73H44

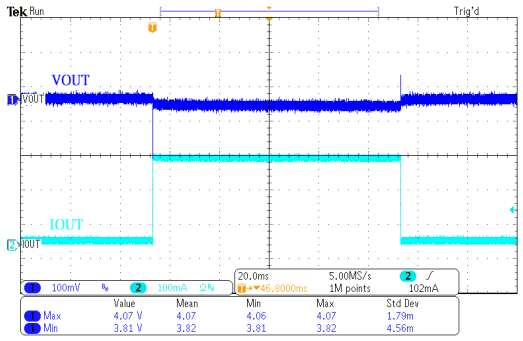
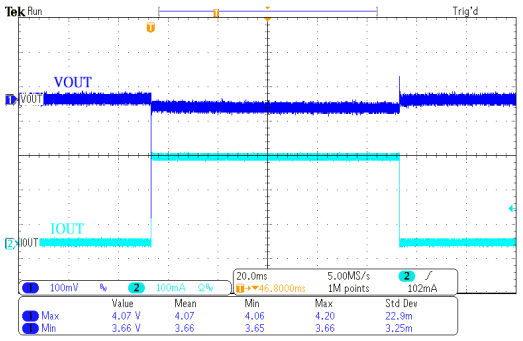
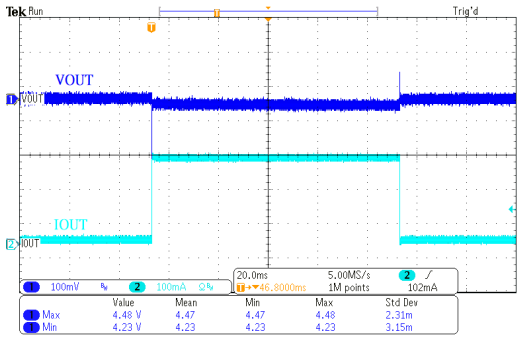
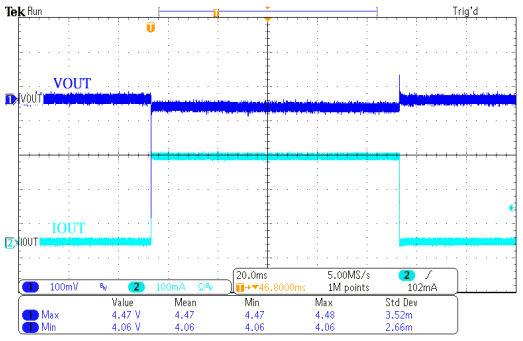
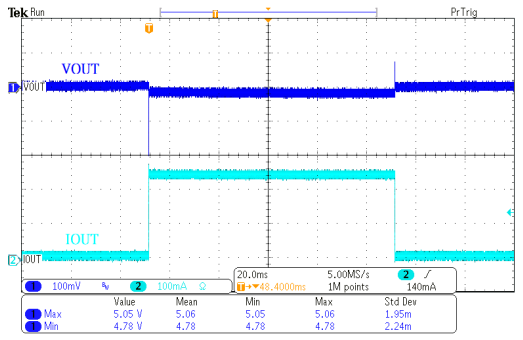
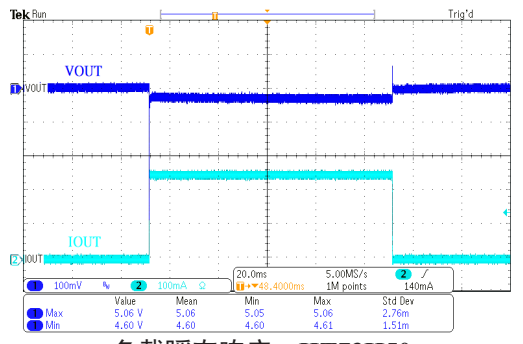


I_{OCP1}/I_{OCP2}：HT73H50

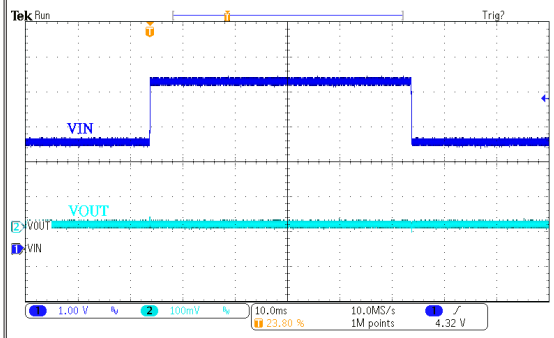
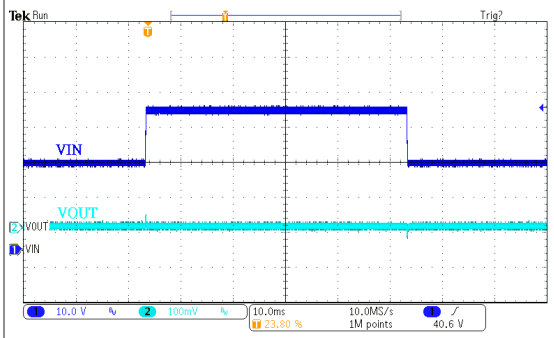
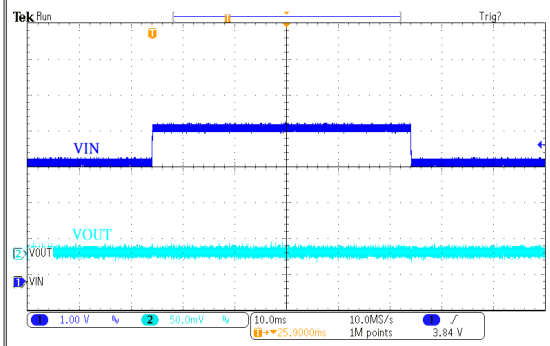
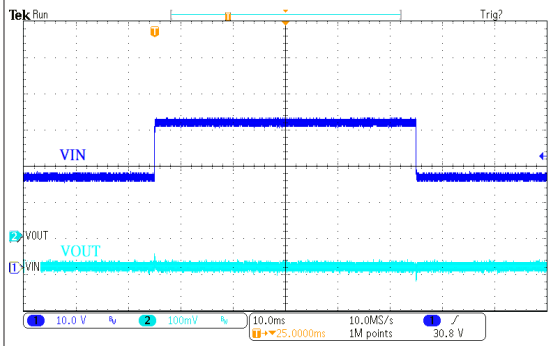
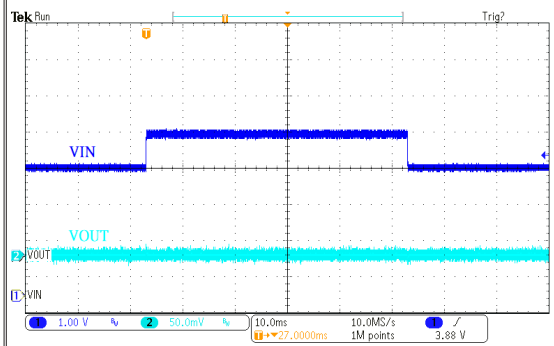
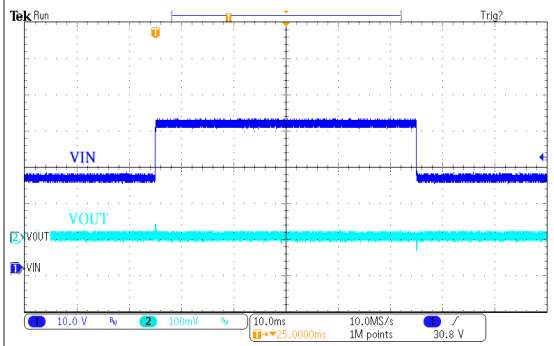
测试条件：V_{IN}=V_{OUT}+2V，V_{CE}=V_{IN}, I_{OUT}=10mA，C_{IN}=1μF，C_{OUT}=1μF，Ta=25°C，除非另有说明。

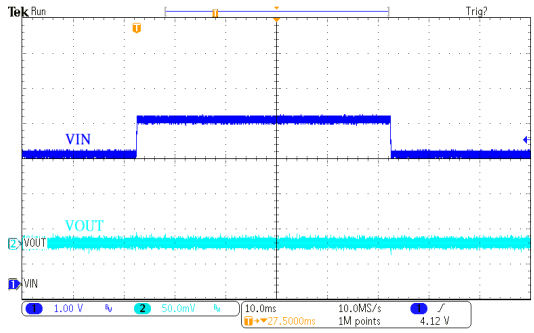
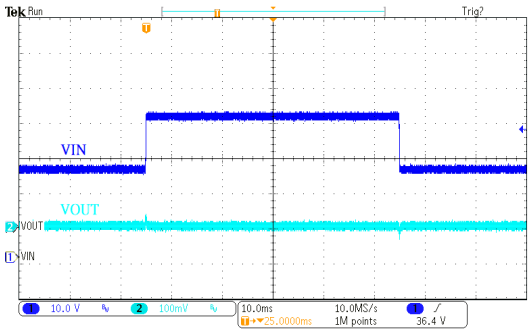
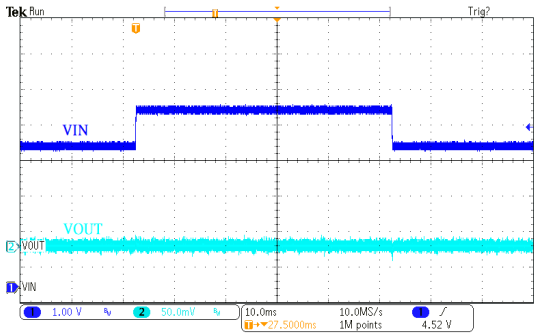
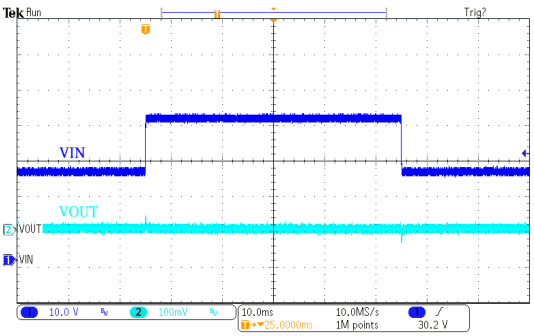
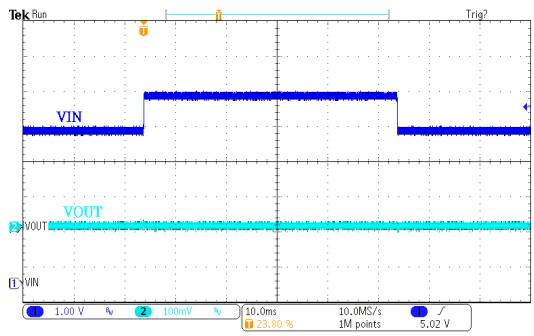
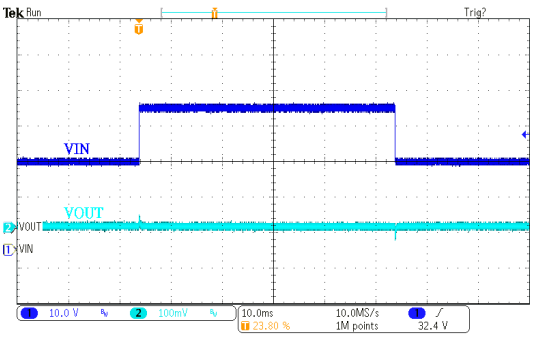
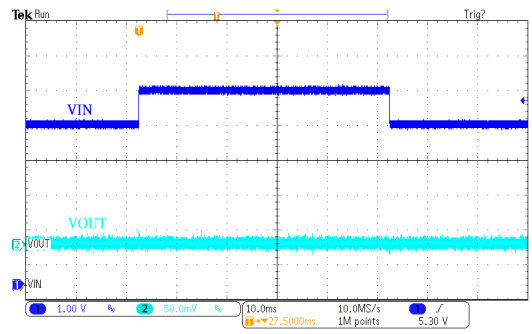
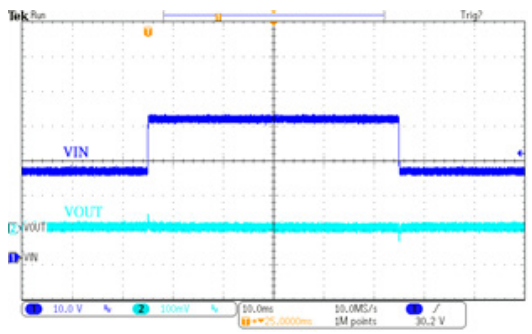
负载瞬态响应 1	负载瞬态响应 2
	
负载瞬态响应：**HT73H21** **(V_{IN}=4.1V，I_{OUT}=10mA~180mA)**	负载瞬态响应：**HT73H21** **(V_{IN}=4.1V，I_{OUT}=0mA~180mA)**
	
负载瞬态响应：**HT73H23** **(V_{IN}=4.3V，I_{OUT}=10mA~180mA)**	负载瞬态响应：**HT73H23** **(V_{IN}=4.3V，I_{OUT}=0mA~180mA)**
	
负载瞬态响应：**HT73H25** **(V_{IN}=4.5V，I_{OUT}=10mA~180mA)**	负载瞬态响应：**HT73H25** **(V_{IN}=4.5V，I_{OUT}=0mA~180mA)**

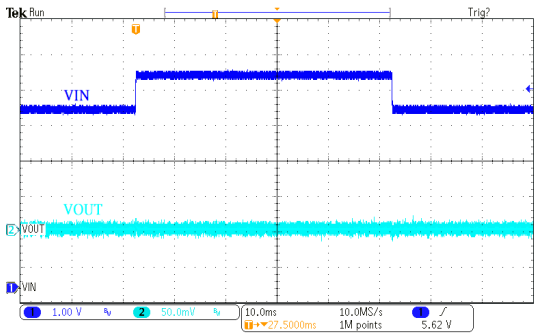
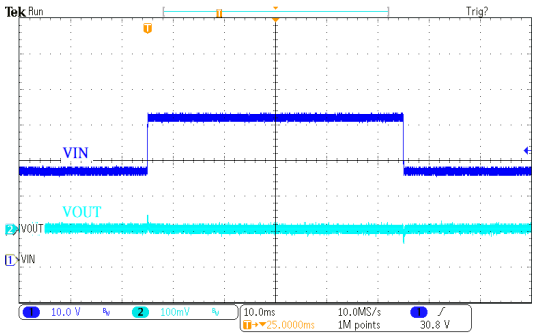
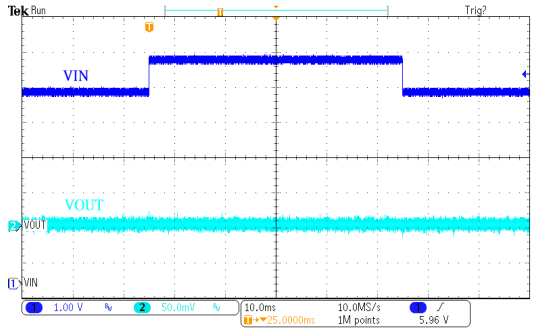
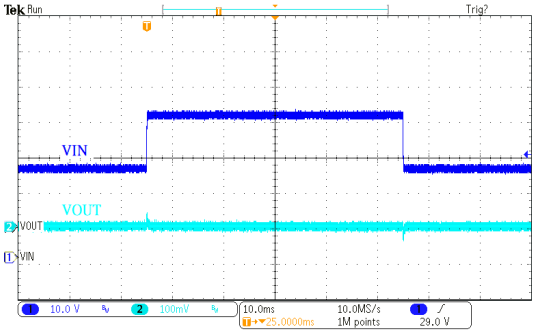
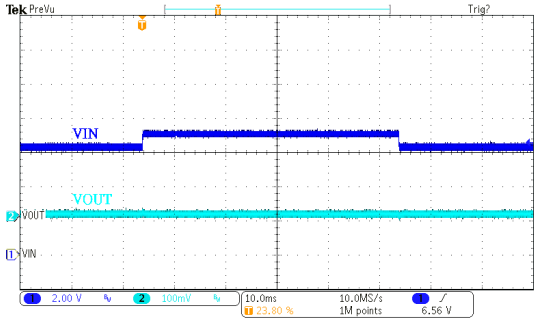
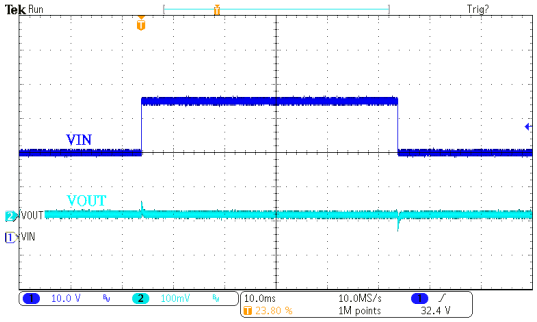
负载瞬态响应 1	负载瞬态响应 2
	
负载瞬态响应：**HT73H27** **(V_{IN}=4.7V，I_{OUT}=10mA~180mA)**	负载瞬态响应：**HT73H27** **(V_{IN}=4.7V，I_{OUT}=0mA~180mA)**
	
负载瞬态响应：**HT73H30** **(V_{IN}=5V，I_{OUT}=10mA~180mA)**	负载瞬态响应：**HT73H30** **(V_{IN}=5V，I_{OUT}=0mA~180mA)**
	
负载瞬态响应：**HT73H33** **(V_{IN}=5.3V，I_{OUT}=10mA~250mA)**	负载瞬态响应：**HT73H33** **(V_{IN}=5.3V，I_{OUT}=0mA~250mA)**
	
负载瞬态响应：**HT73H36** **(V_{IN}=5.6V，I_{OUT}=10mA~250mA)**	负载瞬态响应：**HT73H36** **(V_{IN}=5.6V，I_{OUT}=0mA~250mA)**

负载瞬态响应 1	负载瞬态响应 2
	
负载瞬态响应：**HT73H40** **(V_{IN}=6V，I_{OUT}=10mA~250mA)**	负载瞬态响应：**HT73H40** **(V_{IN}=6V，I_{OUT}=0mA~250mA)**
	
负载瞬态响应：**HT73H44** **(V_{IN}=6.4V，I_{OUT}=10mA~250mA)**	负载瞬态响应：**HT73H44** **(V_{IN}=6.4V，I_{OUT}=0mA~250mA)**
	
负载瞬态响应：**HT73H50** **(V_{IN}=7V，I_{OUT}=10mA~250mA)**	负载瞬态响应：**HT73H50** **(V_{IN}=7V，I_{OUT}=0mA~250mA)**

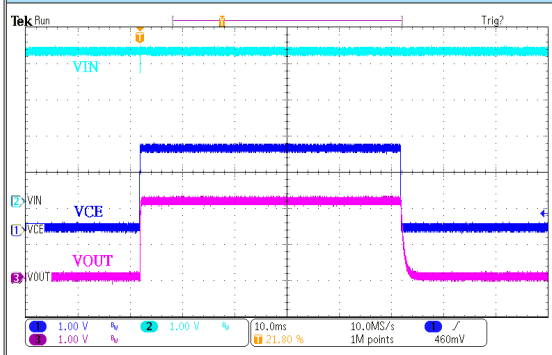
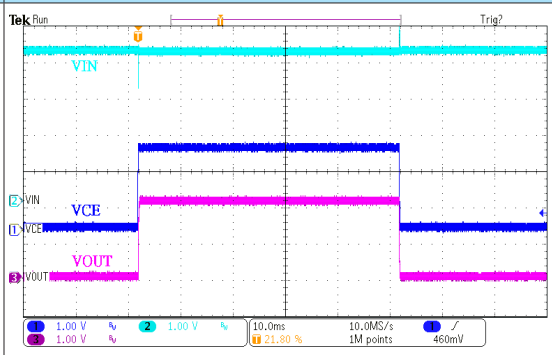
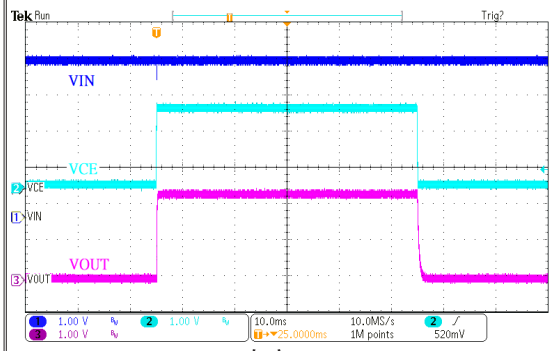
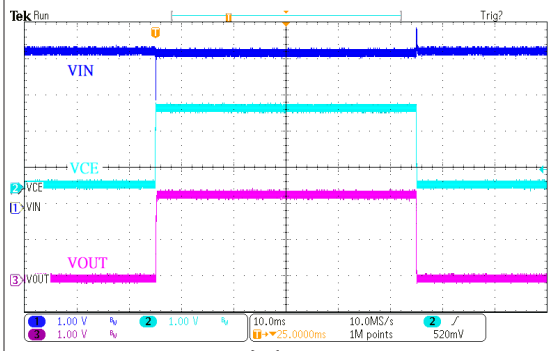
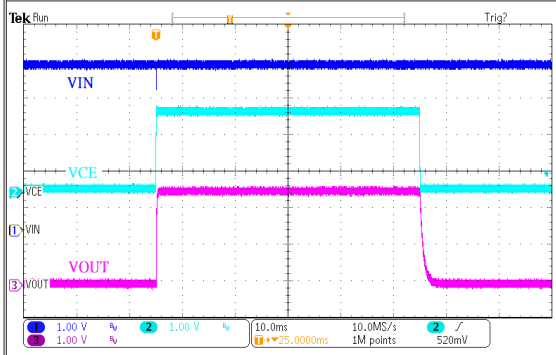
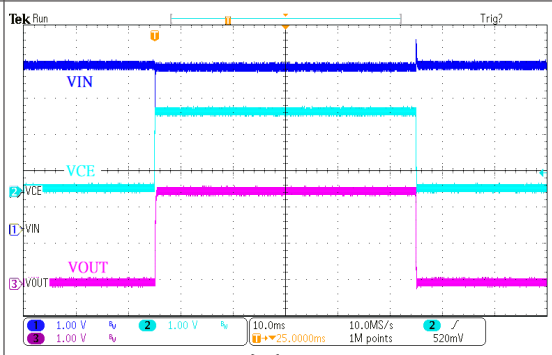
测试条件：V_{IN}=V_{OUT}+2V，V_{CE}=V_{IN}, I_{OUT}=10mA，C_{IN}=1μF，C_{OUT}=1μF，Ta=25°C，除非另有说明。

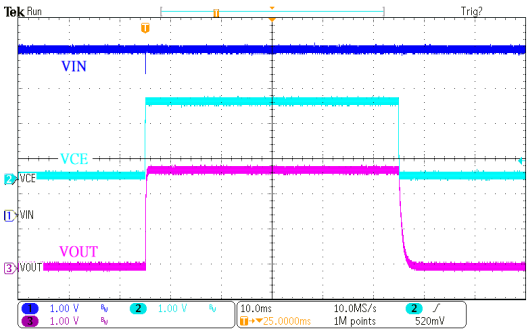
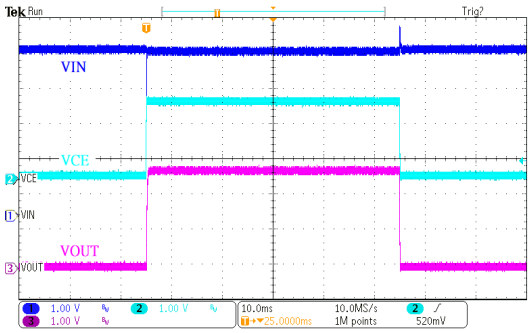
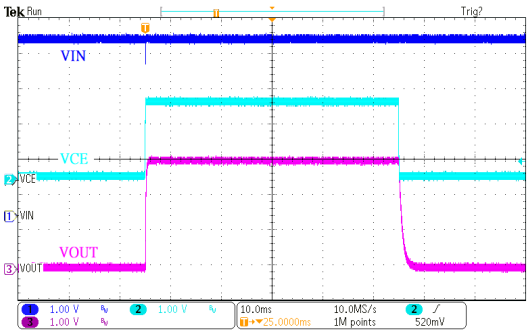
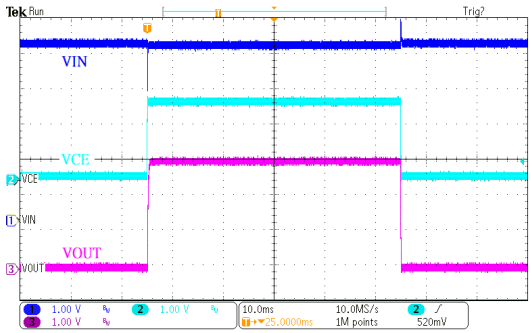
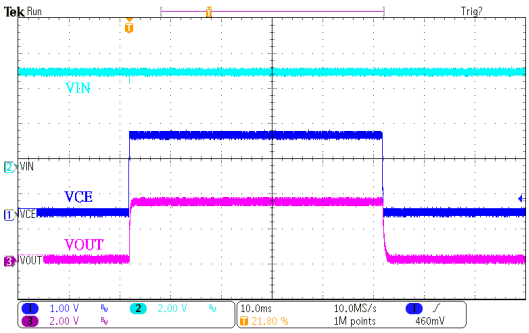
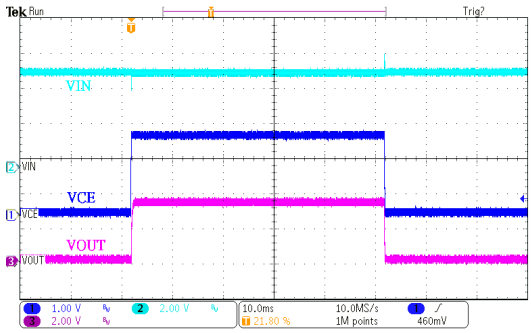
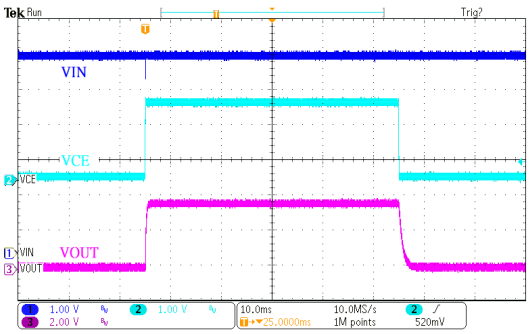
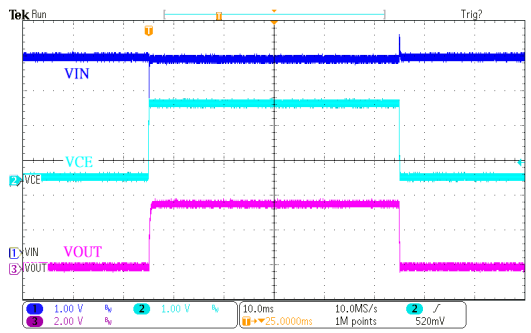
线性瞬态响应 1	线性瞬态响应 2
 线性瞬态响应：HT73H21 (V_{IN}=3.1V~4.1V，I_{OUT}=10mA)	 线性瞬态响应：HT73H21 (V_{IN}=24V~40V，I_{OUT}=10mA)
 线性瞬态响应：HT73H23 (V_{IN}=3.3V~4.3V，I_{OUT}=10mA)	 线性瞬态响应：HT73H23 (V_{IN}=24V~40V，I_{OUT}=10mA)
 线性瞬态响应：HT73H25 (V_{IN}=3.5V~4.5V，I_{OUT}=10mA)	 线性瞬态响应：HT73H25 (V_{IN}=24V~40V，I_{OUT}=10mA)

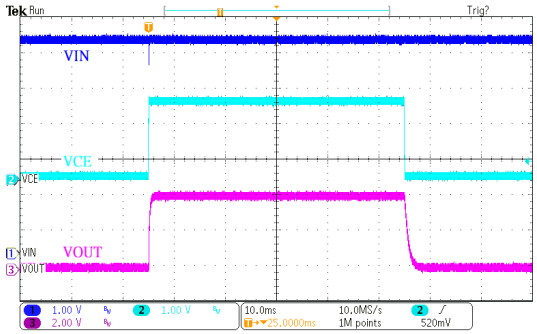
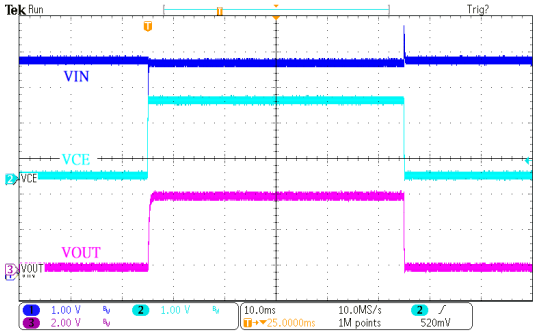
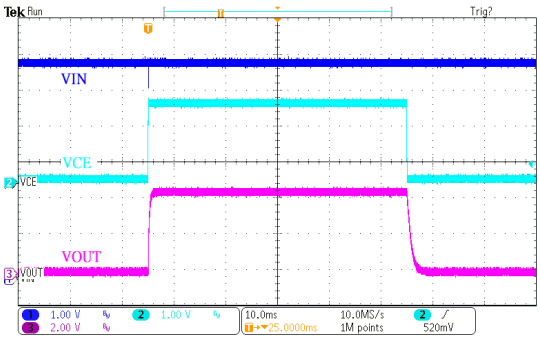
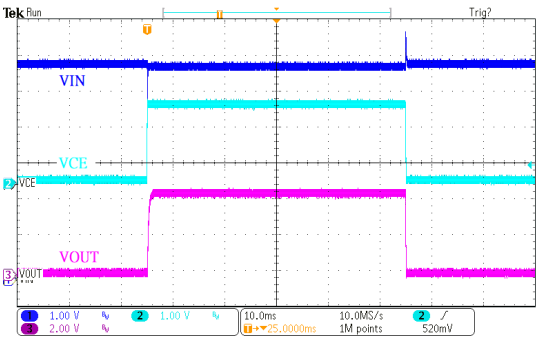
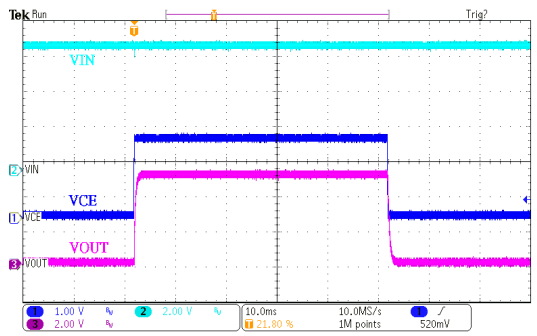
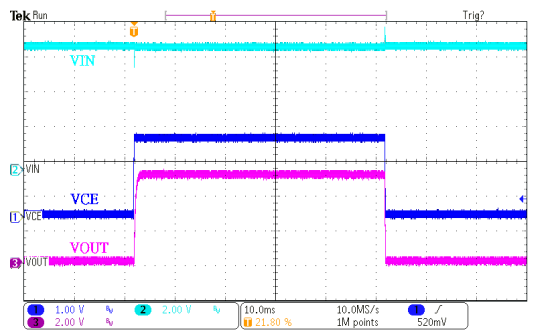
线性瞬态响应 1	线性瞬态响应 2
	
线性瞬态响应：HT73H27 (V_{IN}=3.7V~4.7V，I_{OUT}=10mA)	线性瞬态响应：HT73H27 (V_{IN}=24V~40V，I_{OUT}=10mA)
	
线性瞬态响应：HT73H30 (V_{IN}=4V~5V，I_{OUT}=10mA)	线性瞬态响应：HT73H30 (V_{IN}=24V~40V，I_{OUT}=10mA)
	
线性瞬态响应：HT73H33 (V_{IN}=4.3V~5.3V，I_{OUT}=10mA)	线性瞬态响应：HT73H33 (V_{IN}=24V~40V，I_{OUT}=10mA)
	
线性瞬态响应：HT73H36 (V_{IN}=5.6V~6.6V，I_{OUT}=10mA)	线性瞬态响应：HT73H36 (V_{IN}=24V~40V，I_{OUT}=10mA)

线性瞬态响应 1	线性瞬态响应 2
	
线性瞬态响应：HT73H40 (V_{IN}=5V~6V，I_{OUT}=10mA)	线性瞬态响应：HT73H40 (V_{IN}=24V~40V，I_{OUT}=10mA)
	
线性瞬态响应：HT73H44 (V_{IN}=5.4V~6.4V，I_{OUT}=10mA)	线性瞬态响应：HT73H44 (V_{IN}=24V~40V，I_{OUT}=10mA)
	
线性瞬态响应：HT73H50 (V_{IN}=6V~7V，I_{OUT}=10mA)	线性瞬态响应：HT73H50 (V_{IN}=24V~40V，I_{OUT}=10mA)

测试条件：V_{IN}=V_{OUT}+2V，V_{CE}=V_{IN}, I_{OUT}=10mA，C_{IN}=1μF，C_{OUT}=1μF，Ta=25°C，除非另有说明。

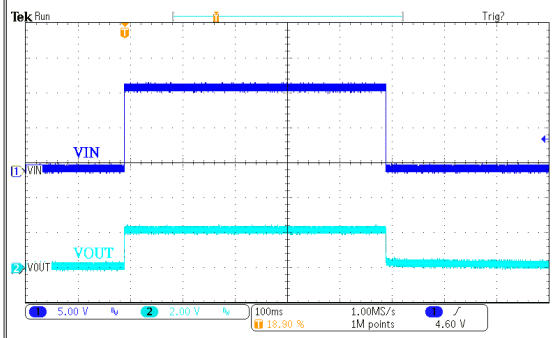
芯片使能时电源 ON/OFF (I_{OUT}=0mA)	芯片使能时电源 ON/OFF (I_{OUT}=150mA)
	
ON/OFF 响应：HT73H21 **(V_{IN}=4.1V，I_{OUT}=0mA，V_{CE}=0V~2.2V)**	**ON/OFF 响应：HT73H21** **(V_{IN}=4.1V，I_{OUT}=180mA，V_{CE}=0V~2.2V)**
	
ON/OFF 响应：HT73H23 **(V_{IN}=4.3V，I_{OUT}=0mA，V_{CE}=0V~2.2V)**	**ON/OFF 响应：HT73H23** **(V_{IN}=4.3V，I_{OUT}=180mA，V_{CE}=0V~2.2V)**
	
ON/OFF 响应：HT73H25 **(V_{IN}=4.5V，I_{OUT}=0mA，V_{CE}=0V~2.2V)**	**ON/OFF 响应：HT73H25** **(V_{IN}=4.5V，I_{OUT}=180mA，V_{CE}=0V~2.2V)**

芯片使能时电源 ON/OFF (I_{OUT}=0mA)	芯片使能时电源 ON/OFF (I_{OUT}=150mA)
	
ON/OFF 响应：HT73H27 **(V_{IN}=4.7V，I_{OUT}=0mA，V_{CE}=0V~2.2V)**	**ON/OFF 响应：HT73H27** **(V_{IN}=4.7V，I_{OUT}=180mA，V_{CE}=0V~2.2V)**
	
ON/OFF 响应：HT73H30 **(V_{IN}=5V，I_{OUT}=0mA，V_{CE}=0V~2.2V)**	**ON/OFF 响应：HT73H30** **(V_{IN}=5V，I_{OUT}=180mA，V_{CE}=0V~2.2V)**
	
ON/OFF 响应：HT73H33 **(V_{IN}=5.3V，I_{OUT}=0mA，V_{CE}=0V~2.2V)**	**ON/OFF 响应：HT73H33** **(V_{IN}=5.3V，I_{OUT}=250mA，V_{CE}=0V~2.2V)**
	
ON/OFF 响应：HT73H36 **(V_{IN}=5.6V，I_{OUT}=0mA，V_{CE}=0V~2.2V)**	**ON/OFF 响应：HT73H36** **(V_{IN}=5.6V，I_{OUT}=250mA，V_{CE}=0V~2.2V)**

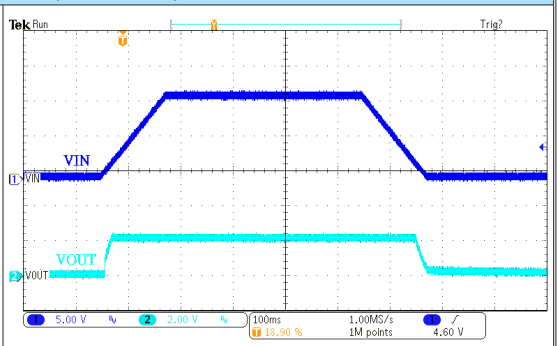
芯片使能时电源 ON/OFF (I_{OUT}=0mA)	芯片使能时电源 ON/OFF (I_{OUT}=150mA)
	
ON/OFF 响应：HT73H40 **(V_{IN}=6V，I_{OUT}=0mA，V_{CE}=0V~2.2V)**	**ON/OFF 响应：HT73H40** **(V_{IN}=6V，I_{OUT}=250mA，V_{CE}=0V~2.2V)**
	
ON/OFF 响应：HT73H44 **(V_{IN}=6.4V，I_{OUT}=0mA，V_{CE}=0V~2.2V)**	**ON/OFF 响应：HT73H44** **(V_{IN}=6.4V，I_{OUT}=250mA，V_{CE}=0V~2.2V)**
	
ON/OFF 响应：HT73H50 **(V_{IN}=7V，I_{OUT}=0mA，V_{CE}=0V~2.2V)**	**ON/OFF 响应：HT73H50** **(V_{IN}=7V，I_{OUT}=250mA，V_{CE}=0V~2.2V)**

测试条件：V_{IN}=V_{OUT}+2V，V_{CE}=V_{IN}, I_{OUT}=10mA，C_{IN}=1μF，C_{OUT}=1μF，Ta=25°C，除非另有说明。

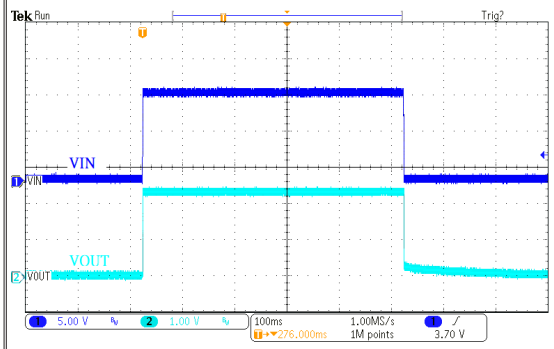
电源 ON/OFF 响应 (I_{OUT}=0mA)



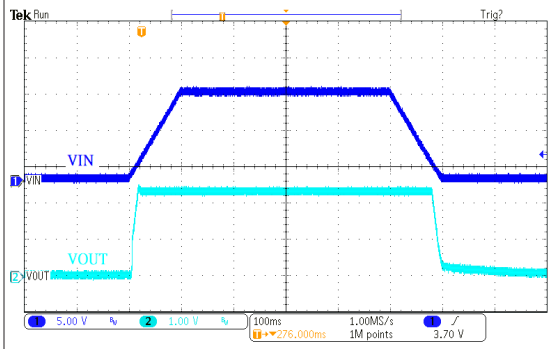
电源 ON/OFF 响应：HT73H21
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=0.1ms)



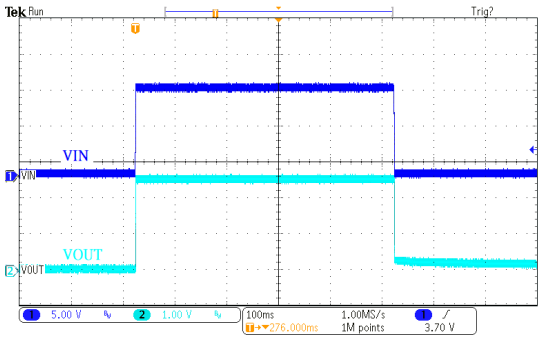
电源 ON/OFF 响应：HT73H21
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=100ms)



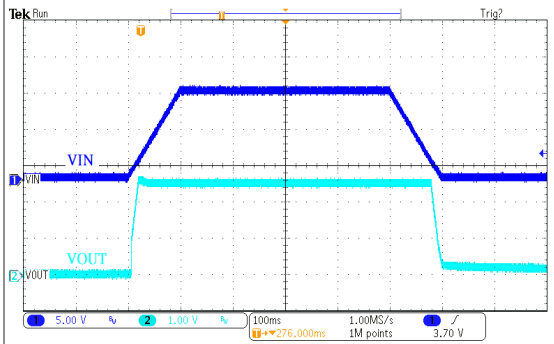
电源 ON/OFF 响应：HT73H23
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=0.1ms)



电源 ON/OFF 响应：HT73H23
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=100ms)

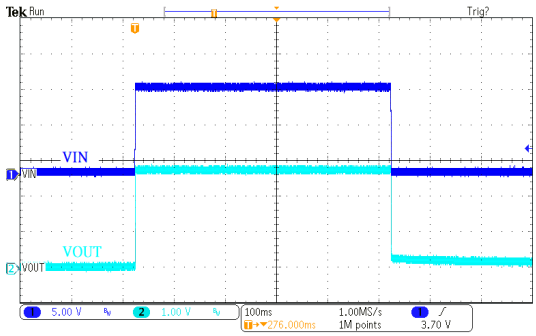


电源 ON/OFF 响应：HT73H25
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=0.1ms)

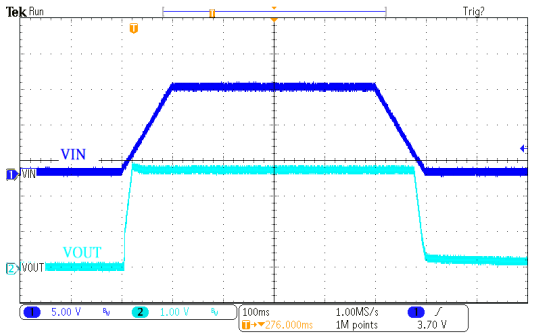


电源 ON/OFF 响应：HT73H25
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=100ms)

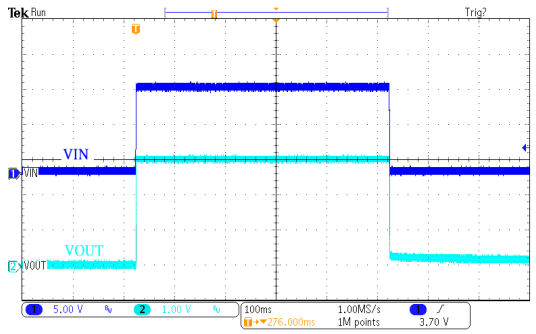
电源 ON/OFF 响应 (I_{OUT}=0mA)



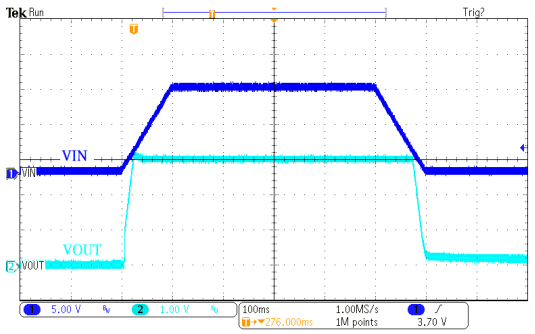
电源 ON/OFF 响应：HT73H27
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=0.1ms)



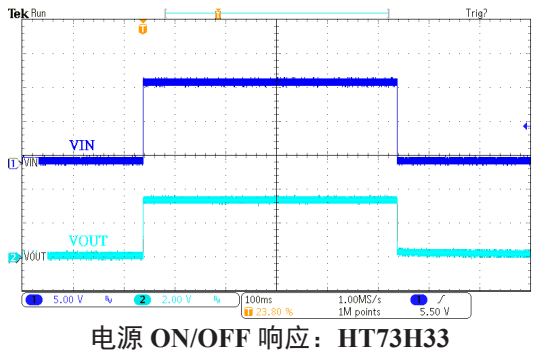
电源 ON/OFF 响应：HT73H27
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=100ms)



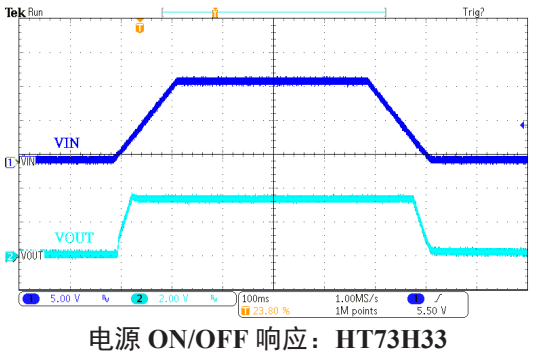
电源 ON/OFF 响应：HT73H30
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=0.1ms)



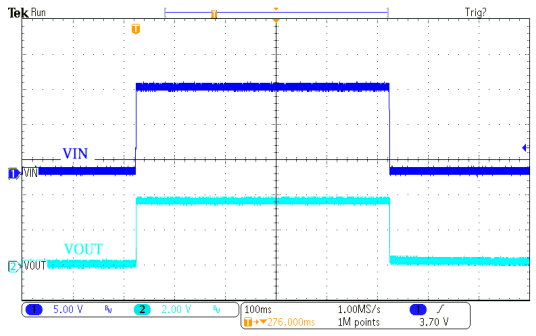
电源 ON/OFF 响应：HT73H30
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=100ms)



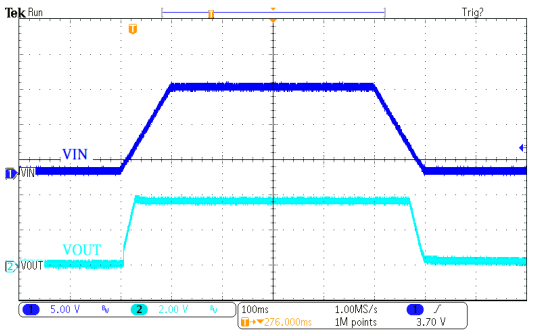
电源 ON/OFF 响应：HT73H33
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=0.1ms)



电源 ON/OFF 响应：HT73H33
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=100ms)

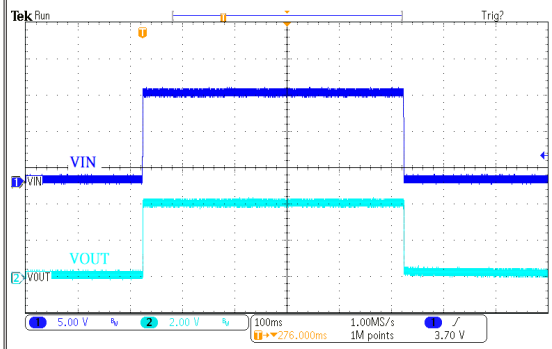


电源 ON/OFF 响应：HT73H36
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=0.1ms)

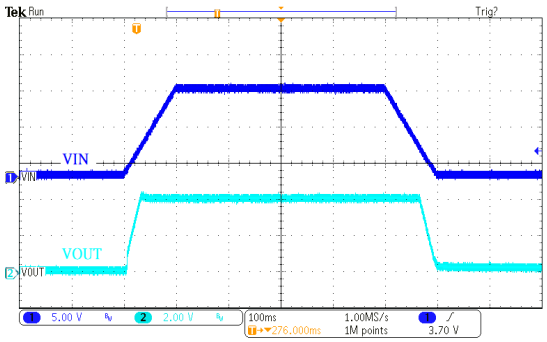


电源 ON/OFF 响应：HT73H36
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=100ms)

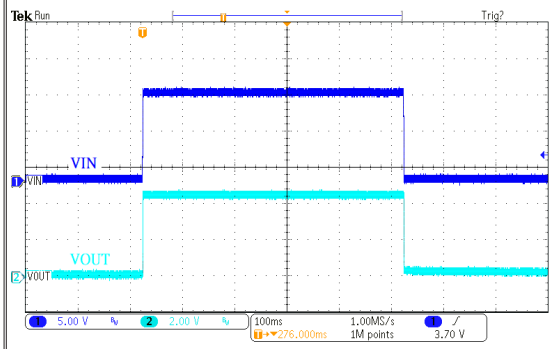
电源 ON/OFF 响应 (I_{OUT}=0mA)



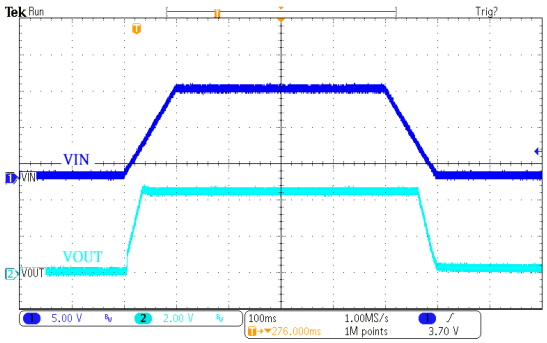
电源 ON/OFF 响应：HT73H40
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=0.1ms)



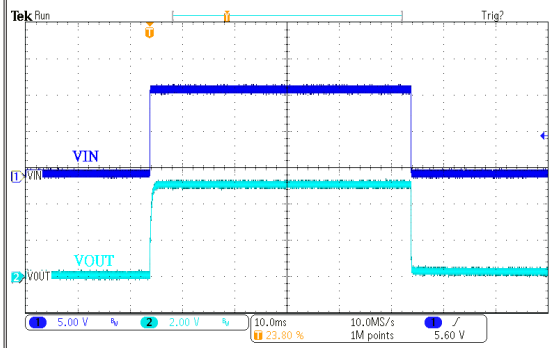
电源 ON/OFF 响应：HT73H40
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=100ms)



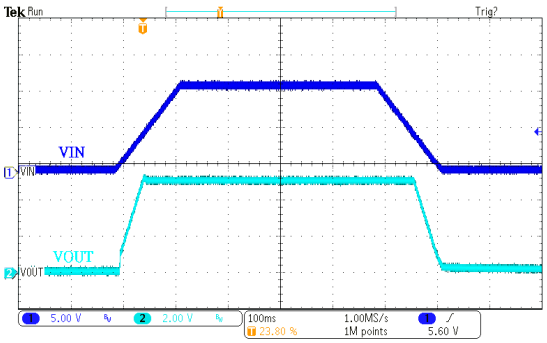
电源 ON/OFF 响应：HT73H44
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=0.1ms)



电源 ON/OFF 响应：HT73H44
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=100ms)



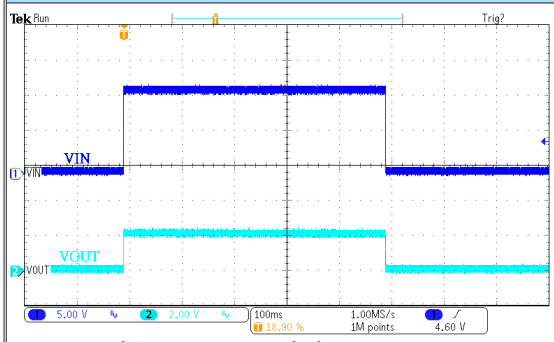
电源 ON/OFF 响应：HT73H50
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=0.1ms)



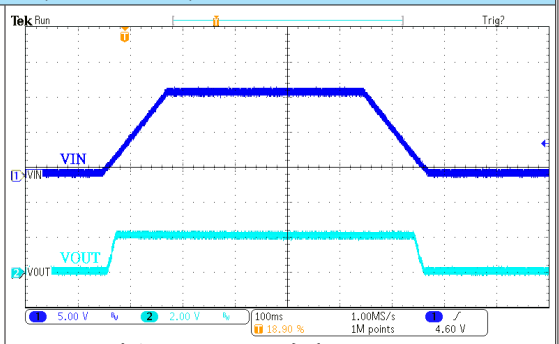
电源 ON/OFF 响应：HT73H50
(V_{IN}=12V，I_{OUT}=0mA，T_{RISE}=T_{FALL}=100ms)

测试条件：V_{IN}=V_{OUT}+2V，V_{CE}=V_{IN}, I_{OUT}=10mA，C_{IN}=1μF，C_{OUT}=1μF，Ta=25°C，除非另有说明。

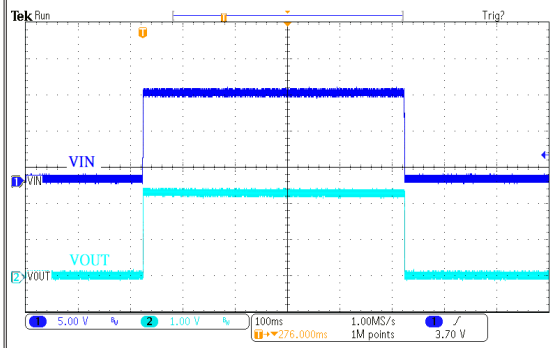
电源 ON/OFF 响应 (I_{OUT}=250mA)



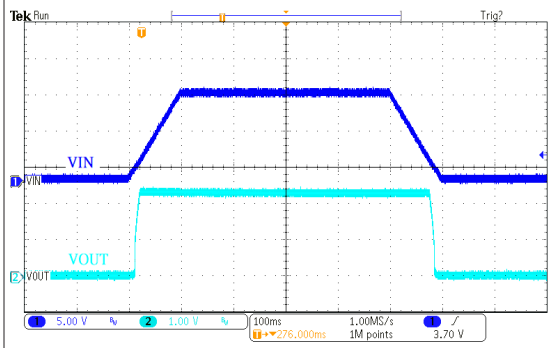
电源 ON/OFF 响应 HT73H21
(V_{IN}=12V，I_{OUT}=180mA，T_{RISE}=T_{FALL}=0.1ms)



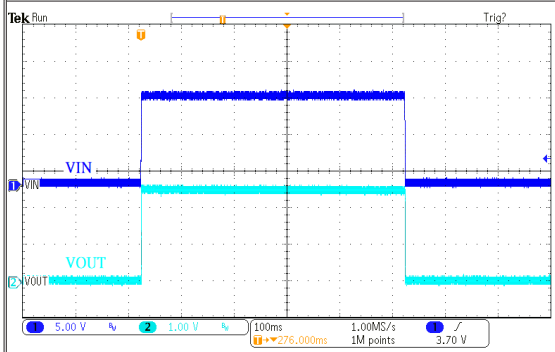
电源 ON/OFF 响应 HT73H21
(V_{IN}=12V，I_{OUT}=180mA，T_{RISE}=T_{FALL}=100ms)



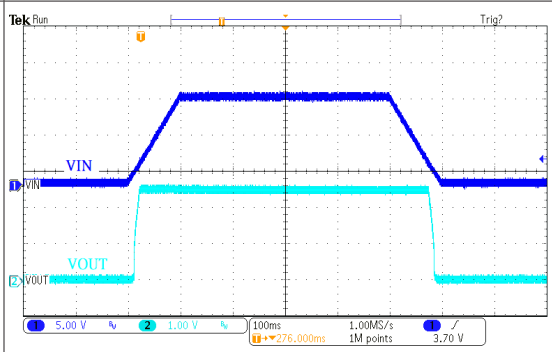
电源 ON/OFF 响应 HT73H23
(V_{IN}=12V，I_{OUT}=180mA，T_{RISE}=T_{FALL}=0.1ms)



电源 ON/OFF 响应 HT73H23
(V_{IN}=12V，I_{OUT}=180mA，T_{RISE}=T_{FALL}=100ms)

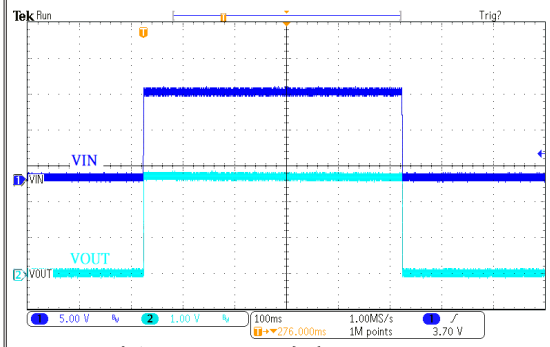


电源 ON/OFF 响应 HT73H25
(V_{IN}=12V，I_{OUT}=180mA，T_{RISE}=T_{FALL}=0.1ms)

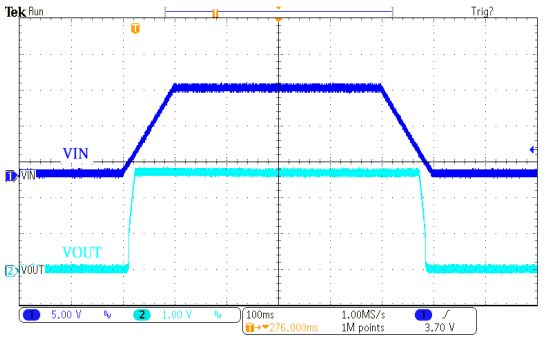


电源 ON/OFF 响应 HT73H25
(V_{IN}=12V，I_{OUT}=180mA，T_{RISE}=T_{FALL}=100ms)

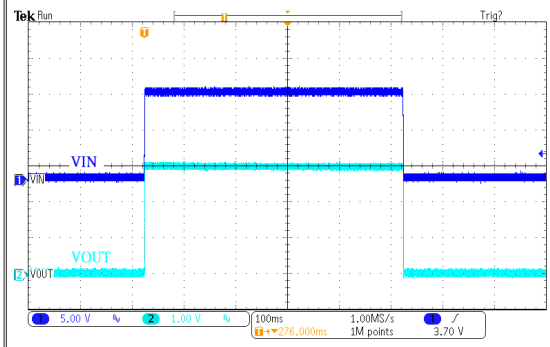
电源 ON/OFF 响应 (I_{OUT}=250mA)



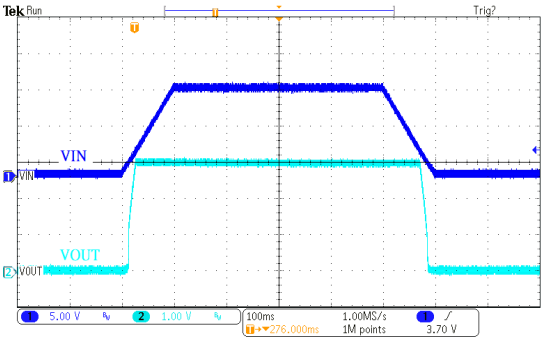
电源 ON/OFF 响应 HT73H27
(V_{IN}=12V，I_{OUT}=180mA，T_{RISE}=T_{FALL}=0.1ms)



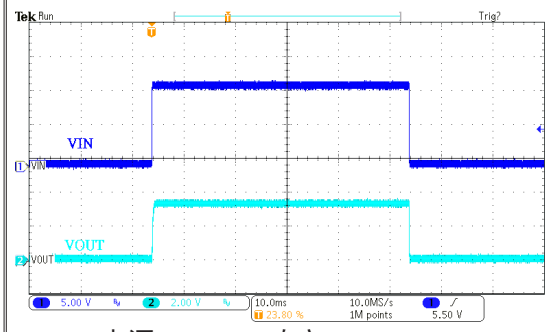
电源 ON/OFF 响应 HT73H27
(V_{IN}=12V，I_{OUT}=180mA，T_{RISE}=T_{FALL}=100ms)



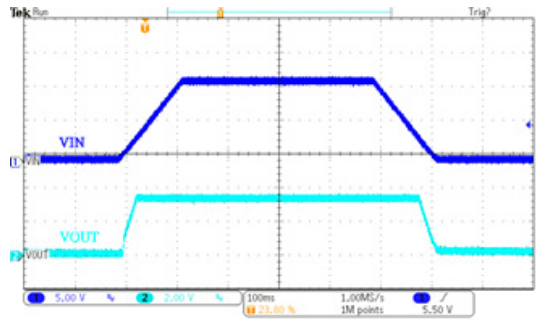
电源 ON/OFF 响应 HT73H30
(V_{IN}=12V，I_{OUT}=180mA，T_{RISE}=T_{FALL}=0.1ms)



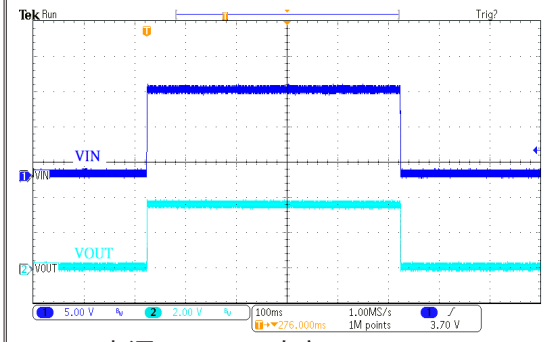
电源 ON/OFF 响应 HT73H30
(V_{IN}=12V，I_{OUT}=180mA，T_{RISE}=T_{FALL}=100ms)



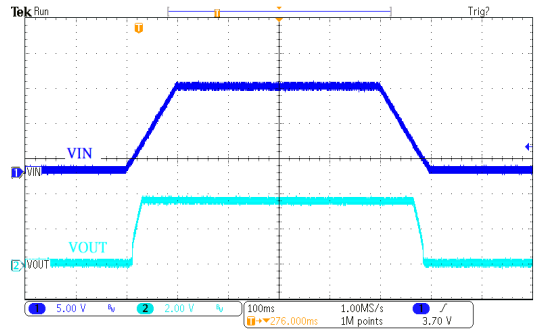
电源 ON/OFF 响应：HT73H33
(V_{IN}=12V，I_{OUT}=250mA，T_{RISE}=T_{FALL}=0.1ms)



电源 ON/OFF 响应 HT73H33
(V_{IN}=12V，I_{OUT}=250mA，T_{RISE}=T_{FALL}=100ms)

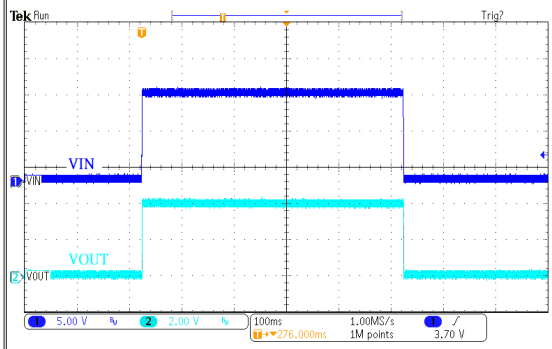


电源 ON/OFF 响应：HT73H36
(V_{IN}=12V，I_{OUT}=250mA，T_{RISE}=T_{FALL}=0.1ms)

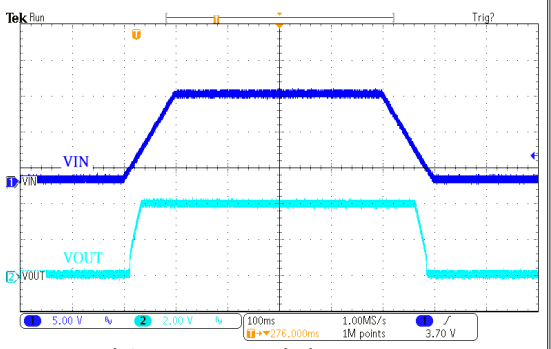


电源 ON/OFF 响应 HT73H36
(V_{IN}=12V，I_{OUT}=250mA，T_{RISE}=T_{FALL}=100ms)

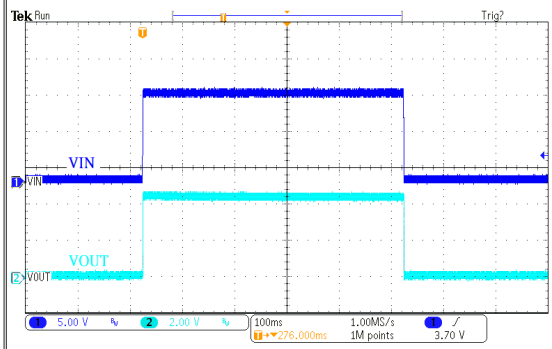
电源 ON/OFF 响应 (I_{OUT}=250mA)



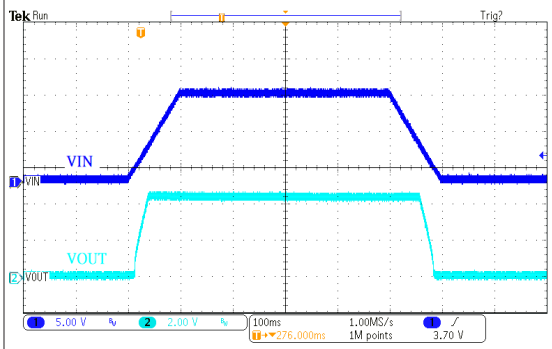
电源 ON/OFF 响应：HT73H40
(V_{IN}=12V，I_{OUT}=250mA，T_{RISE}=T_{FALL}=0.1ms)



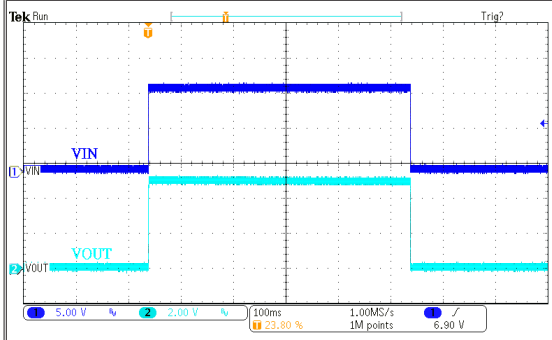
电源 ON/OFF 响应 HT73H40
(V_{IN}=12V，I_{OUT}=250mA，T_{RISE}=T_{FALL}=100ms)



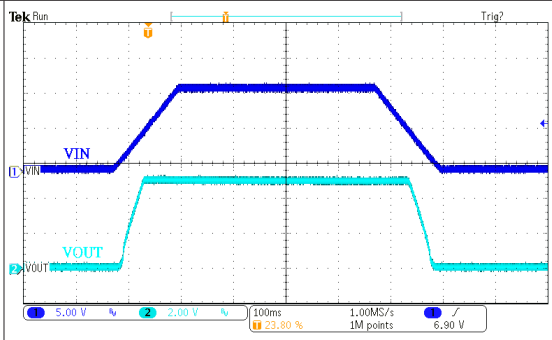
电源 ON/OFF 响应：HT73H44
(V_{IN}=12V，I_{OUT}=250mA，T_{RISE}=T_{FALL}=0.1ms)



电源 ON/OFF 响应 HT73H44
(V_{IN}=12V，I_{OUT}=250mA，T_{RISE}=T_{FALL}=100ms)



电源 ON/OFF 响应：HT73H50
(V_{IN}=12V，I_{OUT}=250mA，T_{RISE}=T_{FALL}=0.1ms)



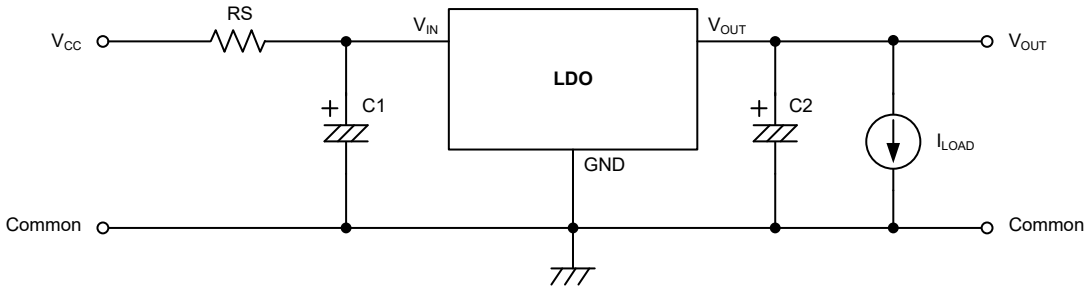
电源 ON/OFF 响应：HT73H50
(V_{IN}=12V，I_{OUT}=250mA，T_{RISE}=T_{FALL}=100ms)

应用信息

要使 HT73Hxx 稳压器实现正确的操作，以下应用要点很重要，须特别注意。

上电注意事项

为了抑制输出过调现象，建议输入电源的上升时间要大于 1ms。添加一个输入电阻器 RS，其等效于一个低通滤波器，可以减慢 V_{IN} 端输入电源的上升时间，如下所示。



RS 最大值受 $I_{LOAD(MAX)}$ 和 $V_{DROPOUT}$ 值的限制。通过以下公式计算。

$$RS \leq \frac{V_{CC}-V_{DROPOUT}}{I_{LOAD(MAX)}}$$

一旦选择了 RS 值，就可以通过以下公式计算 C1 的最小值：

$$C1 \geq \frac{1ms}{2.2RS}$$

OCP 和 OTP 保护

HT73Hxx 实现了过电流保护和过结温保护，即使输出短路接地也可以防止 IC 损坏。当输出短路至地时，输出电流将钳位到 I_{OCP2}，结温将上升。一旦结温超过 150°C，HT73Hxx 将关闭电源元件以防止热损坏。当结温降至 120°C 时，保护将解除。

HT73Hxx 具有 2 级过电流保护阈值。一旦输出电压大于 0.7V，则 OCP 限制电流将设置为 I_{OCP1}。则输出电压将低于 0.7V，OCP 电流会折回 I_{OCP2}，以减慢结温上升的速度，即使输出端接地也是如此。

快速输出放电功能

当 CE 为低电平时，输出电压将通过内部 300Ω 电阻快速放电至 0V。该放电路径未使用 OCP/OTP 保护措施。

输入电容 C_{IN} 注意事项

建议输入电容值至少为 1μF，并且为陶瓷电容，以实现更好的温度系数和更低的 ESR (等效串联电阻)。

输出电容 C_{OUT} 注意事项

输出电容在保持输出电压稳定方面起着重要作用。对于陶瓷型电容器，电容值至少为 1μF。对于 E 型电容，电容值至少为 2.2μF。

热敏考虑

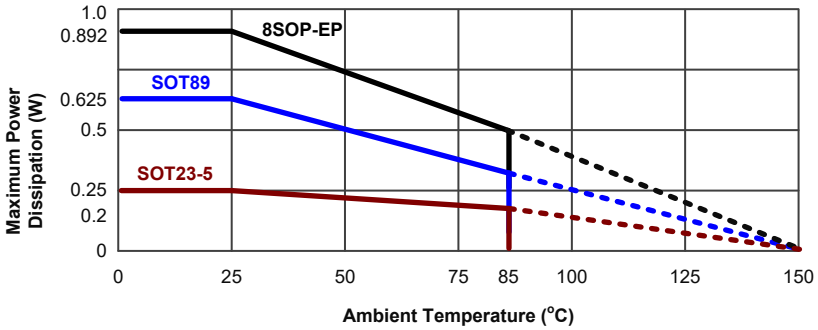
芯片最大功耗取决于芯片封装的热阻、PCB 布局、周围气流速度以及结点与环境温度的温差。最大功耗计算公式：

$$P_{D(MAX)} = (T_{J(MAX)} - Ta) / \theta_{JA}$$

其中，$T_{J(MAX)}$ 为最大结温，Ta 为环境温度，θ_{JA} 为芯片封装中结至环境的热阻，单位为 °C/W。下列表格将描述不同封装类型的 θ_{JA} 值。

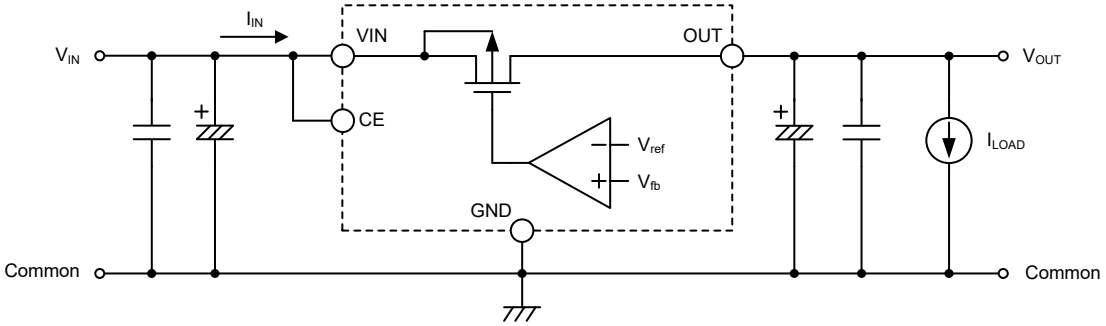
封装类型	θ_{JA} (°C/W)
SOT89	200 °C/W
SOT23-5	500 °C/W
8SOP-EP	140 °C/W

工作极限参数中，最大结温是 150°C。尽管如此，建议正常工作时最大结温不超过 125°C 以确保其可靠性。不同封装的最大功耗降额曲线图如下

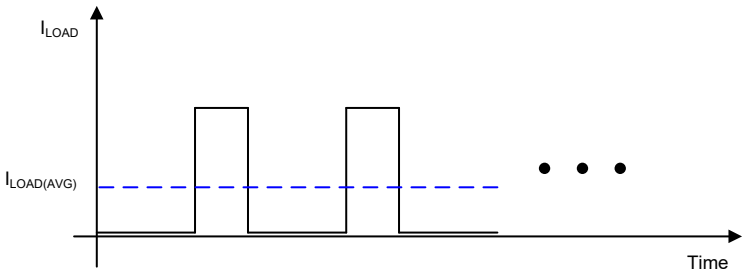


功耗计算

为了确保芯片工作在极限参数范围内且能够维持一个稳定的输出电压，芯片的功耗 P_D 必须不能超过最大功耗 $P_{D(MAX)}$。即 $P_D \le P_{D(MAX)}$。在下图中可以明显看见，功耗几乎产生于传输晶体管，此晶体管等效于一个可变电阻与负载串联，用于确保输出电压恒定。它将以热能的形式产生功耗，必须确保芯片不能超过它的最大结温。



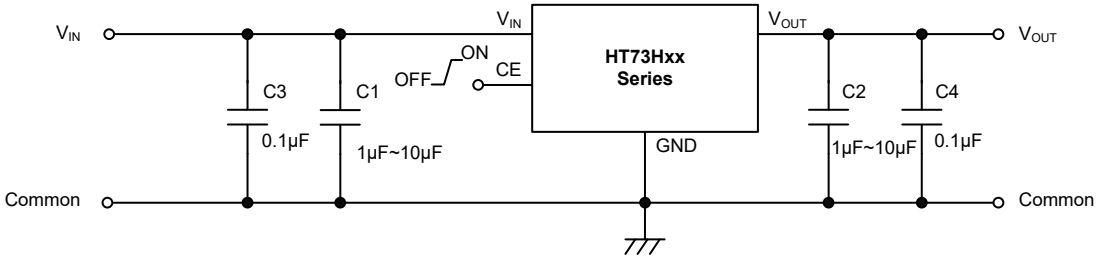
实际应用中，由于负载的瞬态特性，稳压器可能被要求用来提供稳态电流和瞬态电流。即使芯片在极限参数下可以以稳态电流的形式正常运行，仍须注意的是，瞬态负载可能导致电流增加到逼近最大电流值。同样须注意的是，瞬态负载和电流将导致芯片结温上升，但是不允许超过最大结温芯片发热时，其稳态电流值和瞬态电流值应采用平均值或更准确的均方根值。下图将描述平均电流和瞬态电流的关系。



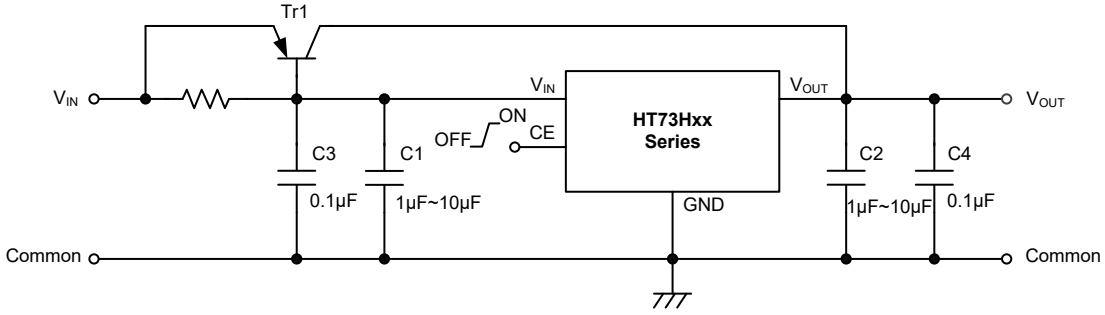
由于芯片的静态电流非常小，通常可以忽略，因此可以假设输入电流等于输出电流。芯片的功耗 P_D 可通过等式：$P_D = (V_{IN} – V_{OUT}) \times I_{IN}$ 计算得出，即输入和输出的压降与电流相乘。输入电流也等于负载电流，所以功耗 $P_D = (V_{IN} – V_{OUT}) \times I_{LOAD}$。由于瞬态负载电流的存在，$P_D = (V_{IN} – V_{OUT}) \times I_{LOAD(AVG)}$，如图中所示。

应用电路

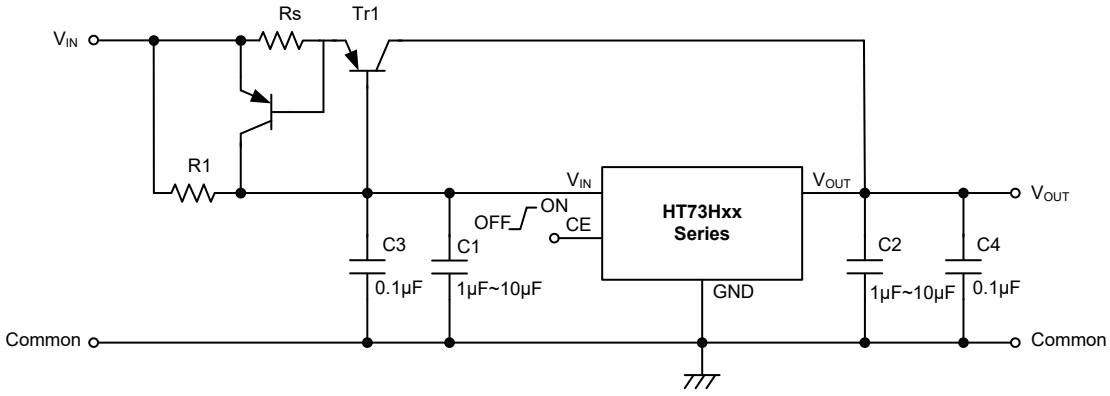
基本电路



大电流输出正电压稳压器

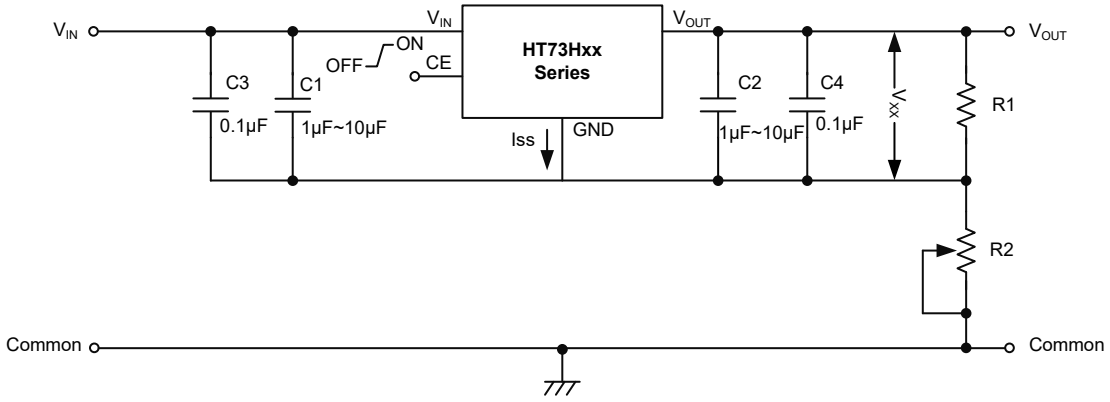


Tr1 短路保护

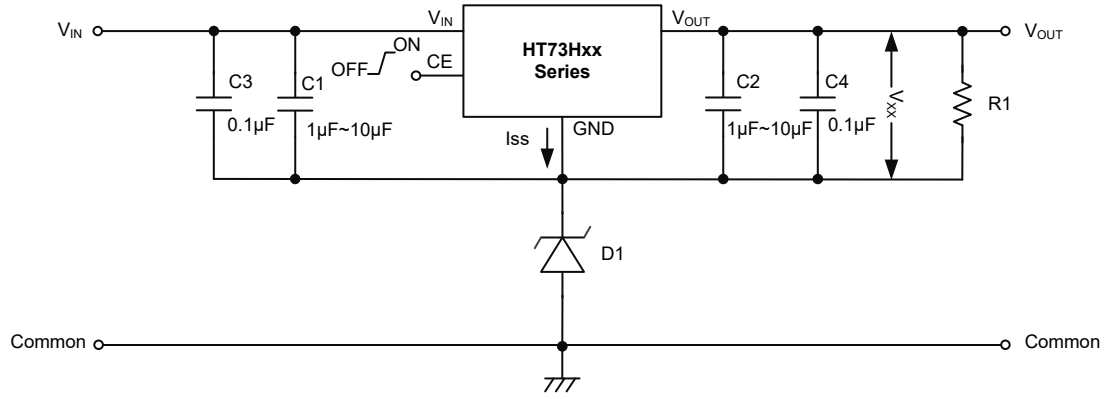


增加输出电压的电路

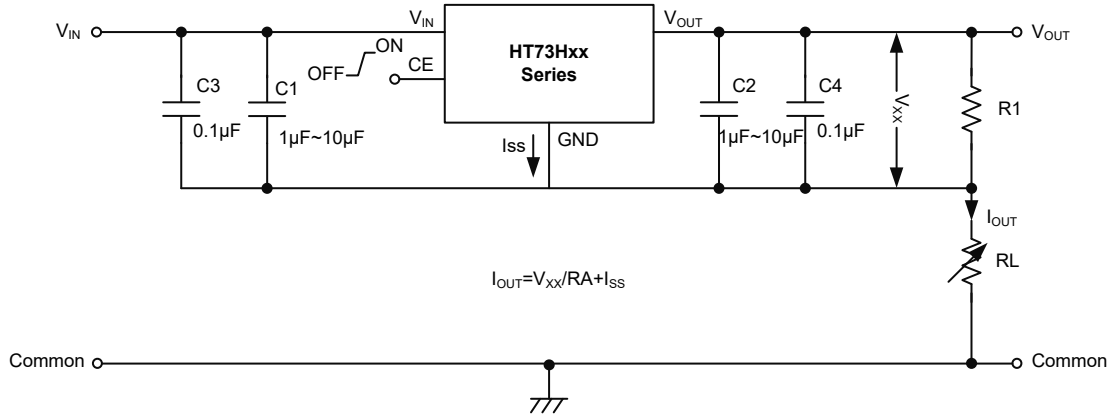
$V_{OUT} = V_{XX} \times (1 + R2/R1) + I_{SS} \times R2$



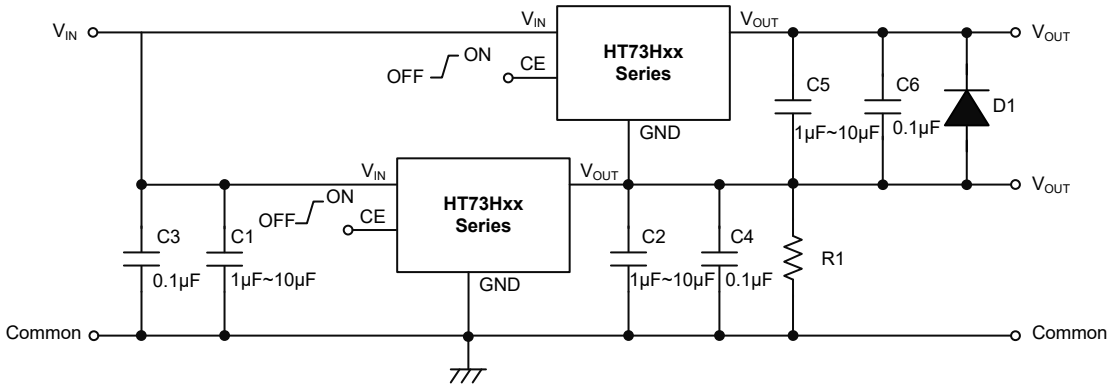
$V_{OUT} = V_{XX} + V_{D1}$



恒流稳压器


VIN
VIN
VOUT
VOUT
ON
OFF
CE
HT73Hxx
Series
C3
0.1μF
C1
1μF~10μF
Iss
GND
C2
1μF~10μF
C4
0.1μF
VXX
R1
IOUT
RL
IOUT=VXX/RA+ISS
Common
Common

双电源电路


VIN
VIN
VOUT
VOUT
ON
OFF
CE
HT73Hxx
Series
GND
C5
1μF~10μF
C6
0.1μF
D1
VIN
VOUT
VOUT
ON
OFF
CE
HT73Hxx
Series
C3
0.1μF
C1
1μF~10μF
GND
C2
1μF~10μF
C4
0.1μF
R1
Common
Common

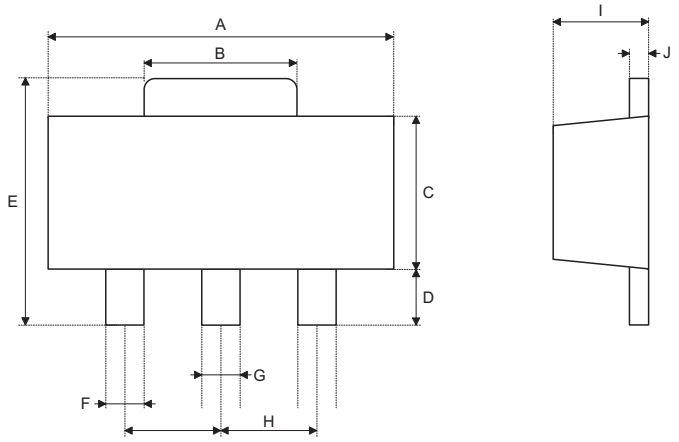
封装信息

请注意，这里提供的封装信息仅作为参考。由于这个信息经常更新，提醒用户咨询 Holtek 网站以获取最新版本的封装信息。

封装信息的相关内容如下所示，点击可链接至 Holtek 网站相关信息页面。

- 封装信息 (包括外形尺寸、包装带和卷轴规格)
- 封装材料信息
- 纸箱信息

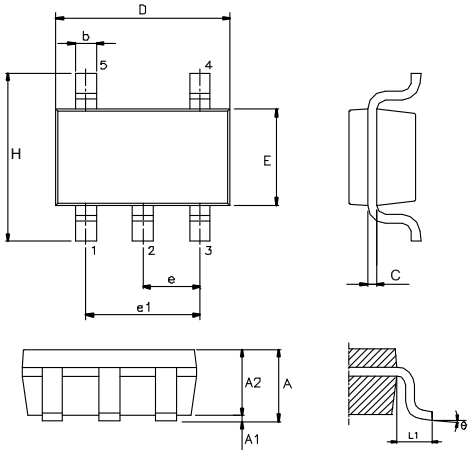
3-pin SOT89-3 外形尺寸



符号	尺寸 (单位：inch)		
	最小值	典型值	最大值
A	0.173	—	0.185
B	0.053	—	0.072
C	0.090	—	0.106
D	0.031	—	0.047
E	0.155	—	0.173
F	0.014	—	0.019
G	0.017	—	0.022
H	—	0.059 BSC	—
I	0.055	—	0.063
J	0.014	—	0.017

符号	尺寸 (单位：mm)		
	最小值	典型值	最大值
A	4.40	—	4.70
B	1.35	—	1.83
C	2.29	—	2.70
D	0.80	—	1.20
E	3.94	—	4.40
F	0.36	—	0.48
G	0.44	—	0.56
H	—	1.50 BSC	—
I	1.40	—	1.60
J	0.35	—	0.44

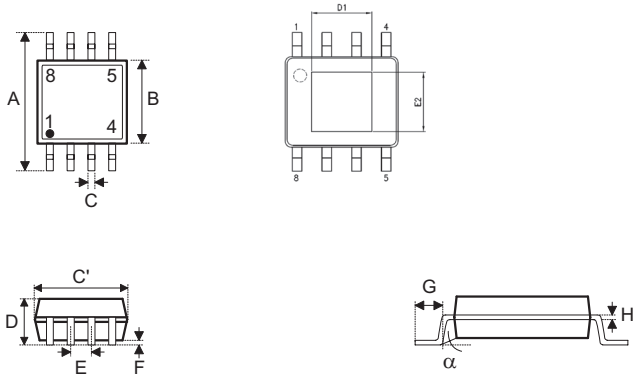
5-pin SOT23-5 外形尺寸



符号	尺寸 (单位：inch)		
	最小值	典型值	最大值
A	—	—	0.057
A1	—	—	0.006
A2	0.035	0.045	0.051
b	0.012	—	0.020
C	0.003	—	0.009
D	—	0.114 BSC	—
E	—	0.063 BSC	—
e	—	0.037 BSC	—
e1	—	0.075 BSC	—
H	—	0.110 BSC	—
L1	—	0.024 BSC	—
θ	0°	—	8°

符号	尺寸 (单位：mm)		
	最小值	典型值	最大值
A	—	—	1.45
A1	—	—	0.15
A2	0.90	1.15	1.30
b	0.30	—	0.50
C	0.08	—	0.22
D	—	2.90 BSC	—
E	—	1.60 BSC	—
e	—	0.95 BSC	—
e1	—	1.90 BSC	—
H	—	2.80 BSC	—
L1	—	0.60 BSC	—
θ	0°	—	8°

8-pin SOP-EP (150mil) 外形尺寸



符号	尺寸 (单位：inch)		
	最小值	典型值	最大值
A	—	0.236 BSC	—
B	—	0.154 BSC	—
C	0.012	—	0.020
C′	—	0.193 BSC	—
D	—	—	0.069
D1	0.059	—	—
E	—	0.050 BSC	—
E2	0.039	—	—
F	0.000	—	0.006
G	0.016	—	0.050
H	0.004	—	0.010
α	0°	—	8°

符号	尺寸 (单位：mm)		
	最小值	典型值	最大值
A	—	6.00 BSC	—
B	—	3.90 BSC	—
C	0.31	—	0.51
C′	—	4.90 BSC	—
D	—	—	1.75
D1	1.50	—	—
E	—	1.27 BSC	—
E2	1.00	—	—
F	0.00	—	0.15
G	0.40	—	1.27
H	0.10	—	0.25
α	0°	—	8°

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