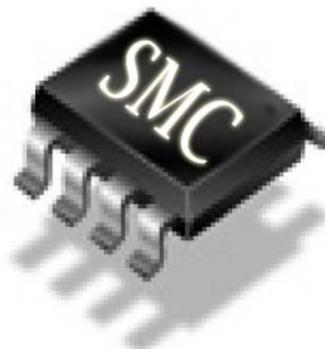


SMC Ballast Control IC

燈絲預熱及掃頻點燈



PDIP 8

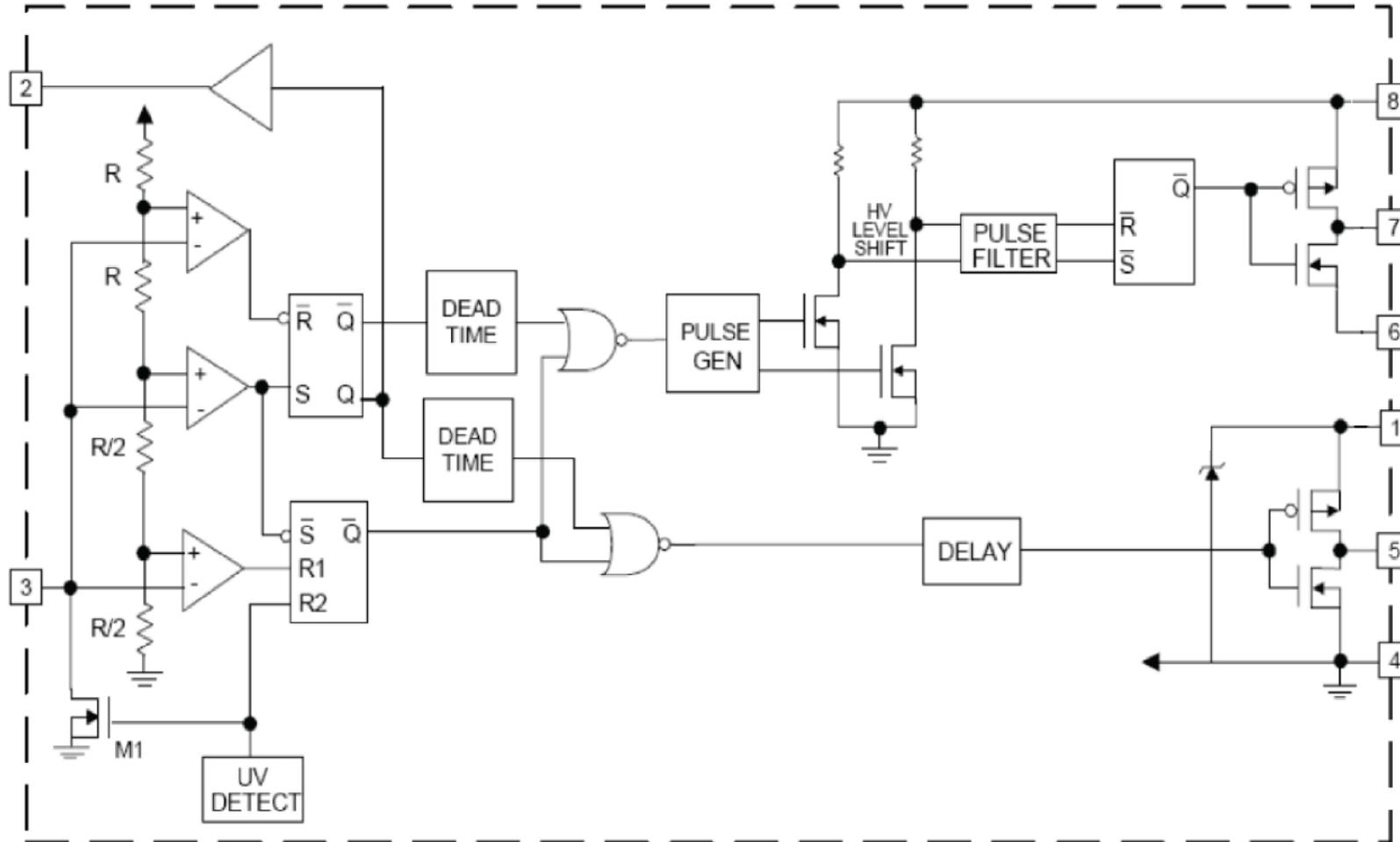


SOP 8

Features

- ◆帶自舉二級管的浮動設計，最大耐壓為 600V
- ◆不需額外零件的燈管預熱功能
- ◆欠壓保護滯環 ($UVLO^+ = 10V$, $UVLO^- = 8.5V$)
- ◆靜電貯存放電 (ESD) 保護 (可達 6KV)
- ◆單電源供電，內置 17 V 穩壓線路
- ◆關機功能 (當 C_T 電壓 $< 1/6 V_{CC}$)
- ◆高、低通道匹配的 Deadtime
- ◆低功耗啓動
- ◆高、低通道輸出頻率為 RT 端頻率的 1/2
- ◆內部震盪頻率可用 R_T 、 C_T 調整

Function Block



IC Pin Functional Description

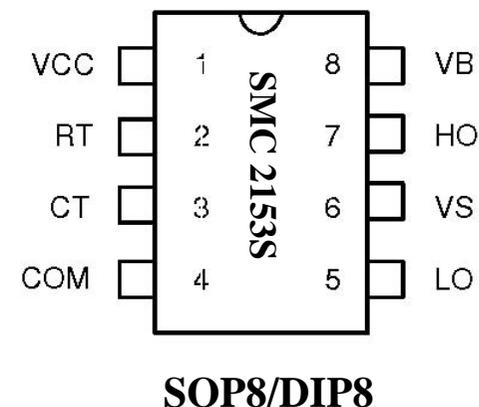
■ VDD , COM

- Low Start up current < 100 μ A
- UVLO On 10V
- UVLO Off 8.5V
- 17 V zener clamp

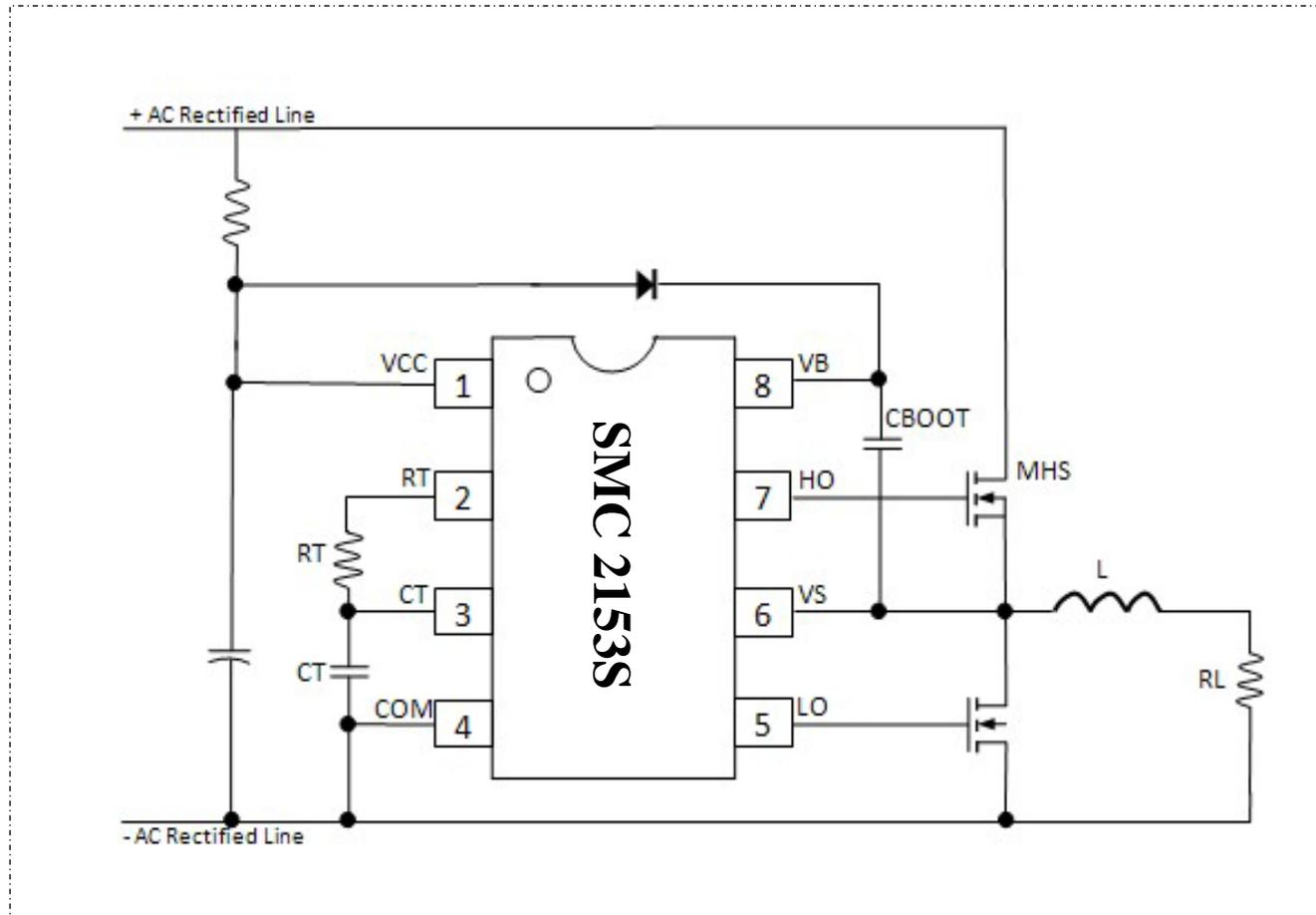
■ RT , CT

- 60 K Ω + 60 pF , $f_s = 50$ KHz
- Pre _heat time 1.5s : 1.6 $f_s \rightarrow f_s$

- VS: High side gate driver floating supply offset
- VB: High side gate driver floating supply
- HO: High side gate driver output
- LO: LOW side gate driver output

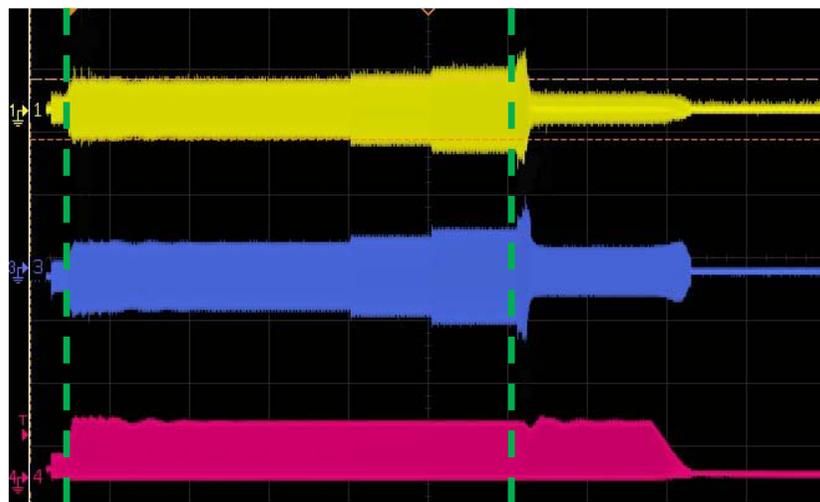


Application Circuit



SMC2153S Sweeping Frequency of Filament Preheat

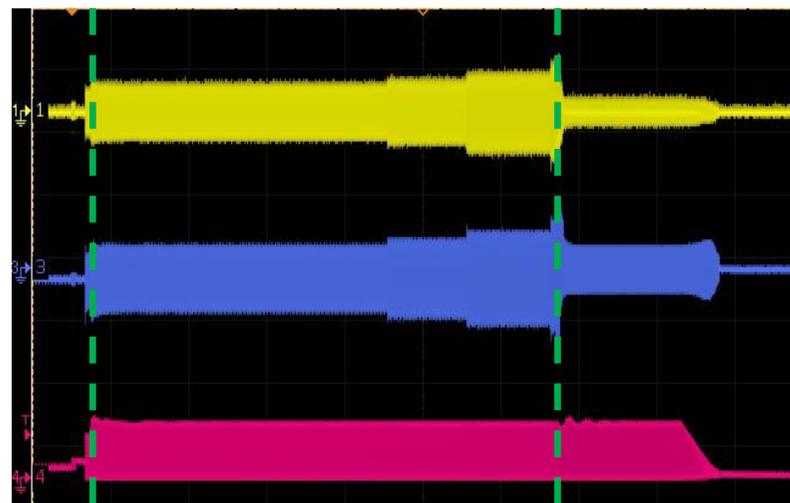
110V



Preheat

Ignition

220V



Preheat

Ignition

I Lamp (燈管電流)

V Lamp (燈管電壓)

VS

Preheat + Ignition = 1.6fs ~ fs = 80KHz ~ 50KHz

RT = 60KΩ , CT = 60pF

不需額外零件的燈管預熱功能-實景圖



圖一 未通電



圖二. 通電，預熱中



圖三 完成點燈

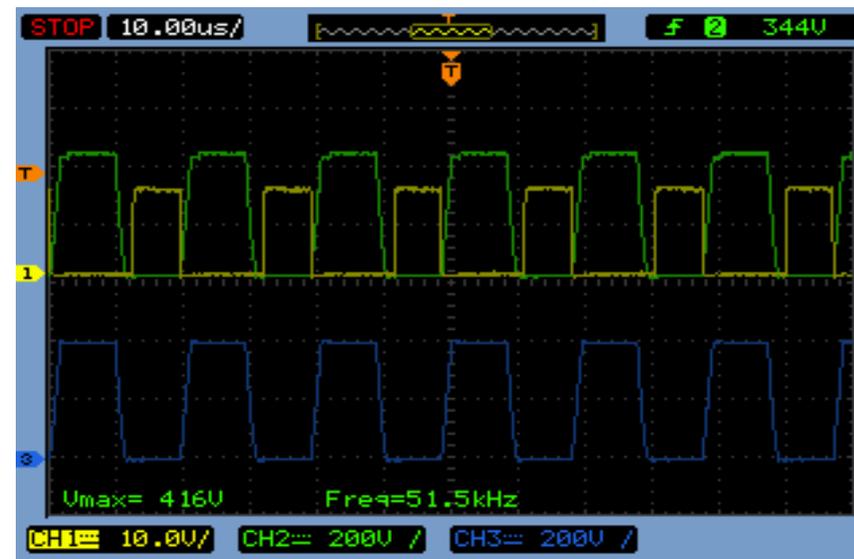
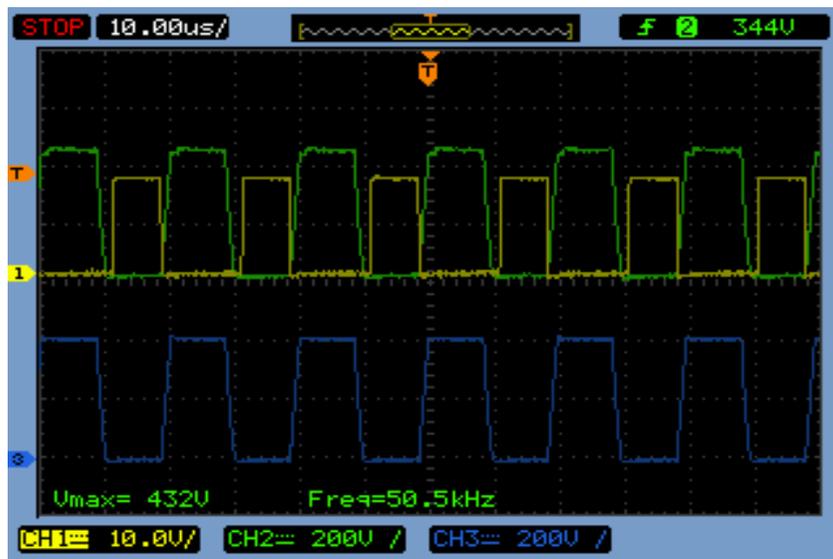
經實驗，點燈次數可
達 15000 次以上



SMC2153S Output Waveform

110V

220V



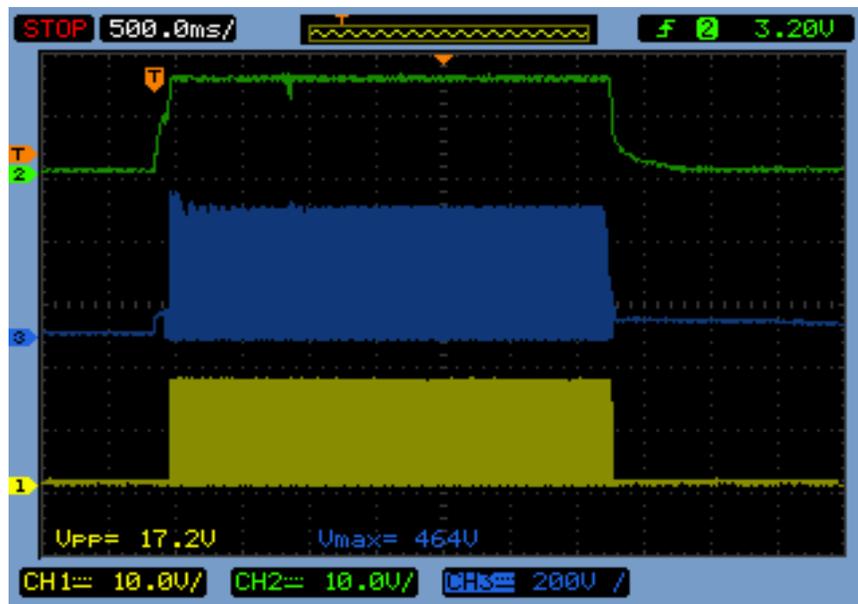
LO side driver wave form

HO side drive wave form

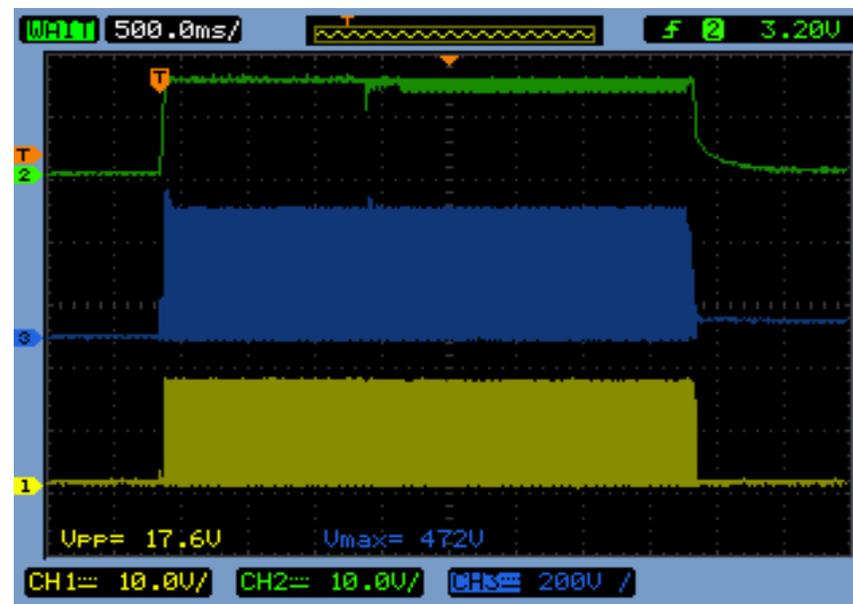
VS end output wave form

SMC2153S Turn ON / OFF Waveform

110V



220V

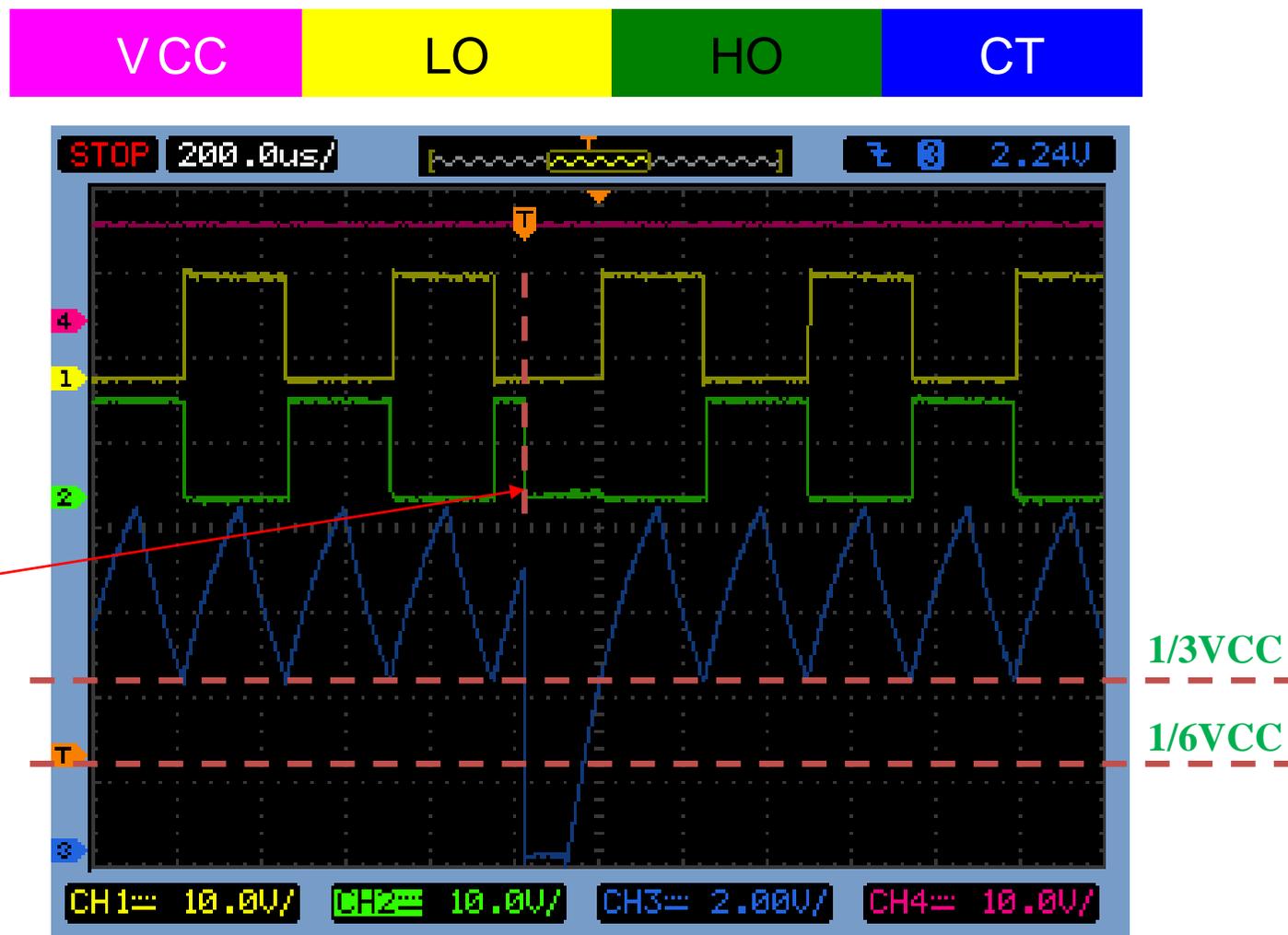


VCC side driver wave form

VS end output wave form

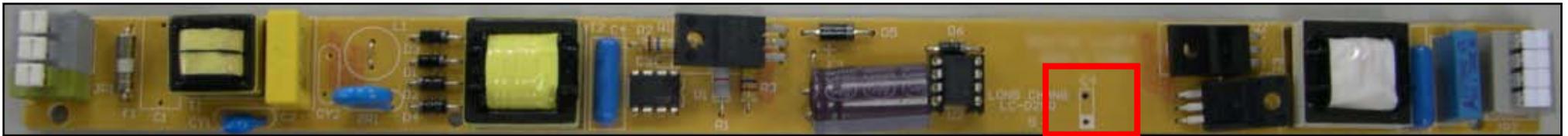
LO side driver wave form

關機功能 (當 C_T 電壓 $< 1/6 V_{CC}$)



Demo Board – SMC2153S

◆ SMC2153S-零件面

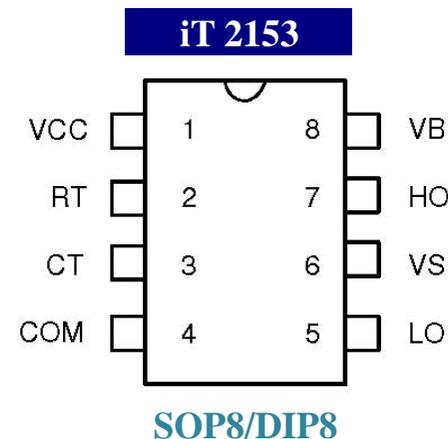
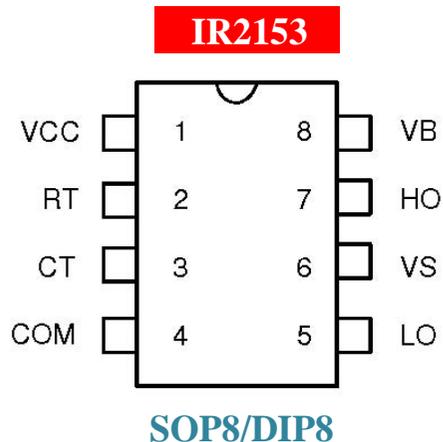
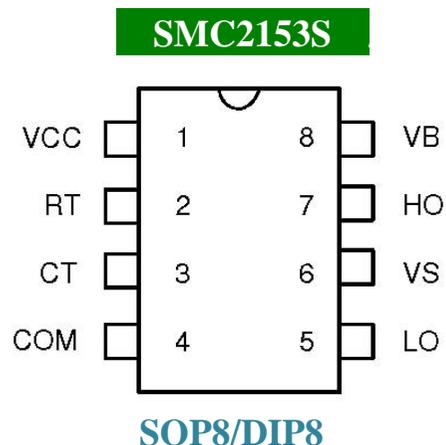


◆ SMC2153S-焊接面



SMC2153S / IR 2153 / iT 2153 之比較

Pin Assignments

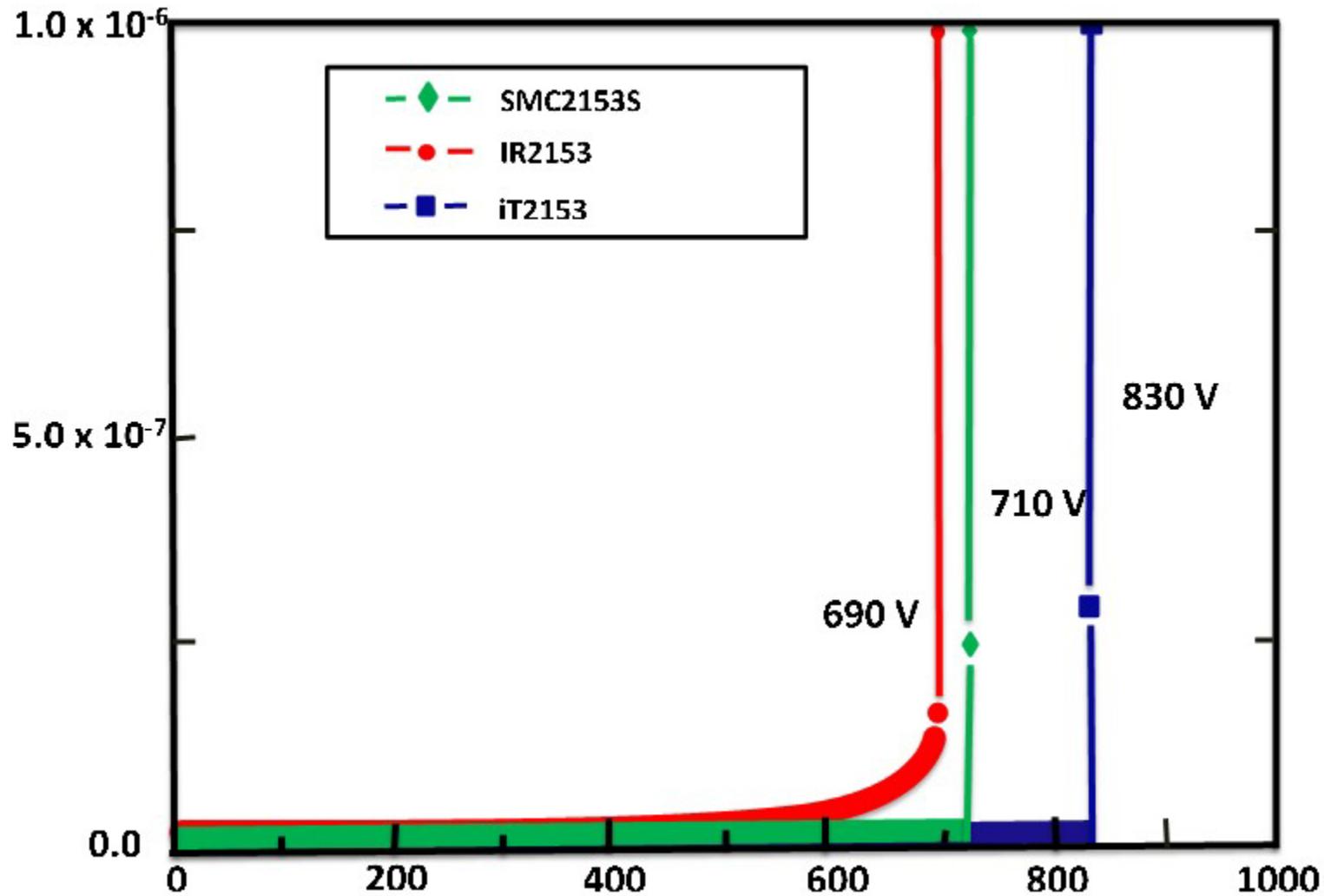


Pin No	Symbol	Description
1	V_{CC}	Logic and internal gate drive supply voltage
2	R_T	Oscillator timing resistor input
3	C_T	Oscillator timing capacitor input
4	COM	IC power and signal ground
5	LO	Low side gate driver output
6	V_S	Power supply
7	HO	Input pin of the current control loop
8	V_B	Power supply

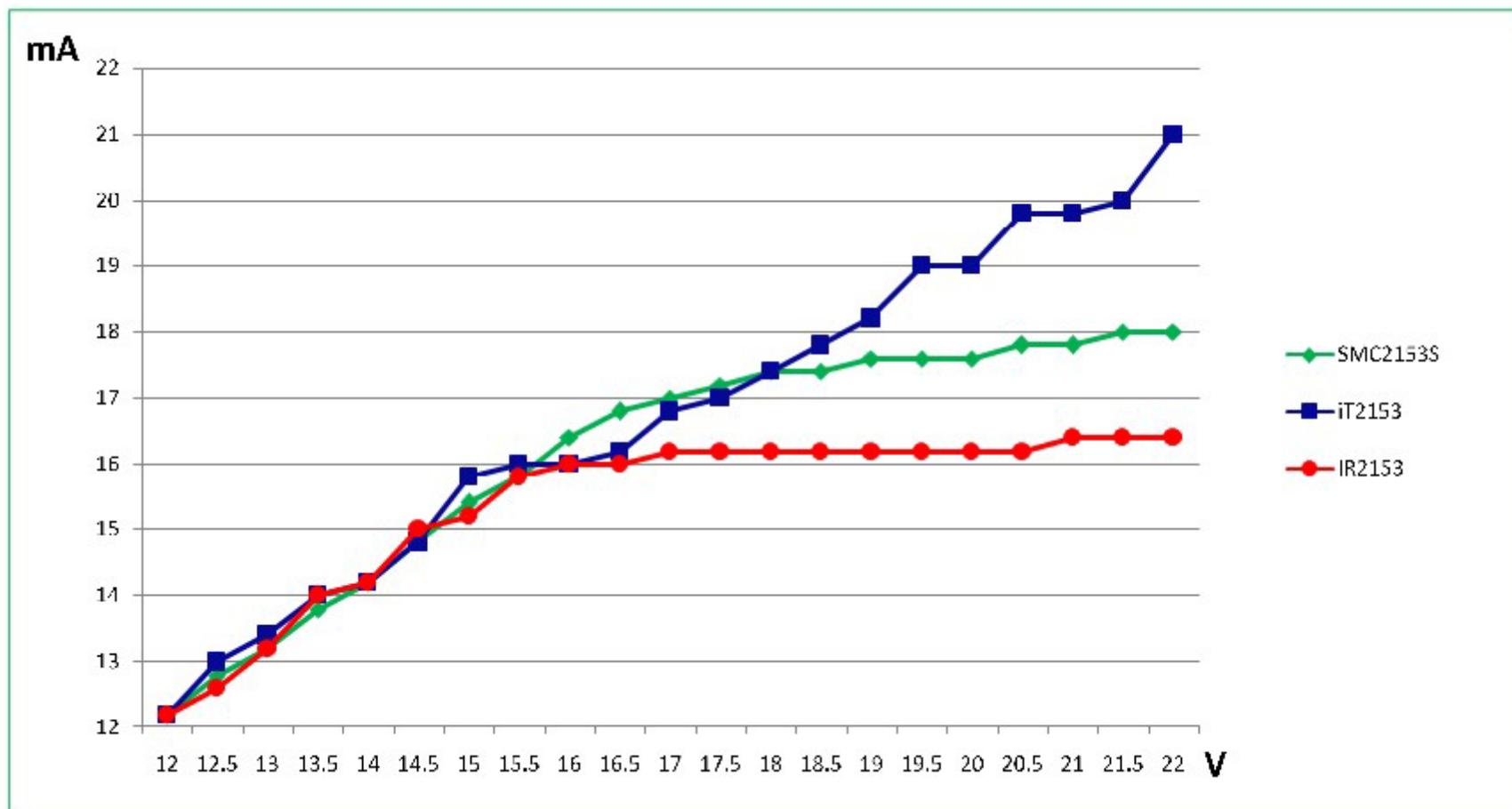
Performance Comparison

	SMC2153S	IR2153	iT2153
High side floating supply voltage	710V	690V	830V
UVLO ON	10V	9V	9V
UVLO OFF	8.5V	8V	8V
Startup current	100 μ A	75 μ A	103 μ A
Quiescent current	350 μ A	500 μ A	400 μ A
VCC zenert clamp voltage	17V	15.6v	15.6v
Output rise time	80ns	80ns	80ns
Output fall time	30ns	45ns	56ns
Shutdown propagation delay	660ns	660ns	650ns
Output deadtime (HO or LO)	2.2 μ	1.2 μ s	1.26 μ s
ESD Level (HBM)	6KV	1.5KV	2KV
Package type	SOP8/DIP8	SOP8/DIP8	SOP8/DIP8
Soft-start	有，內建	無	無

High Side Breakdown Voltage

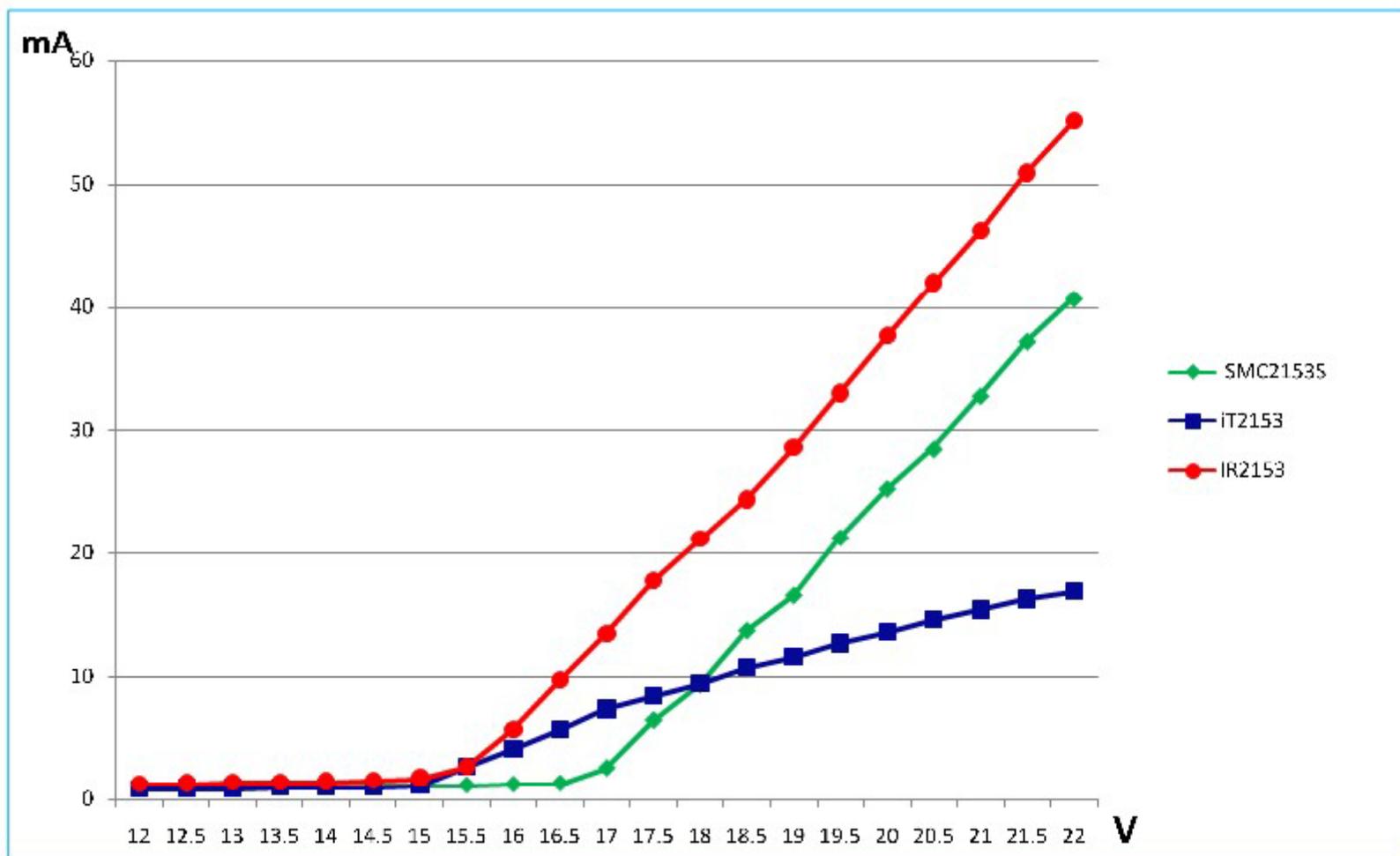


Vcc Zener Break-down Curve



由上圖所示，SMC2153S 工作電壓可高於 IR2153。

Vcc Zener Break-down Current



由上圖所示，SMC2153S 穩壓電流優於 iT2153。