

iP7302B VS. iP7300/L656x



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大綱

- iP7302B 和 iP7300(L656x) 簡介
- 應用電路和特性比較
- iP7302B的優點
- 結論

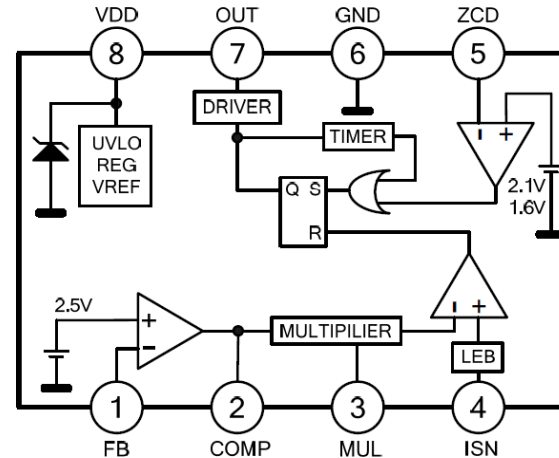
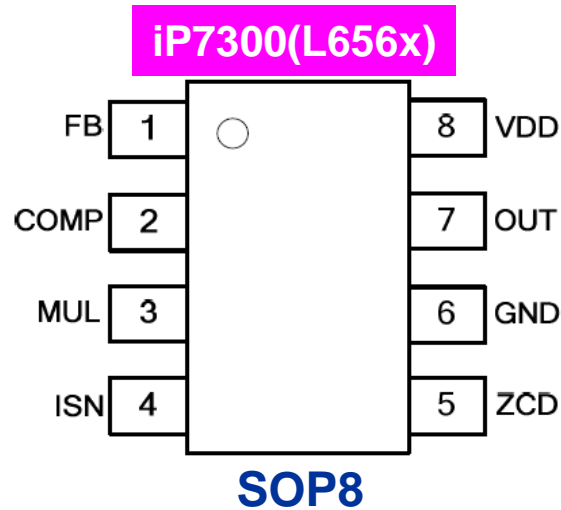


簡介

iP7302B與iP7300(L656x系列)皆為Single stage架構，內建PFC之IC。iP7302B由L656x架構演變而成，克服L656x在LED應用上會遇到的問題，並減化週邊線路，降低客戶校調時間。更甚者，加入多種保護功能，使客戶在使用或生產上減低不良的風險。

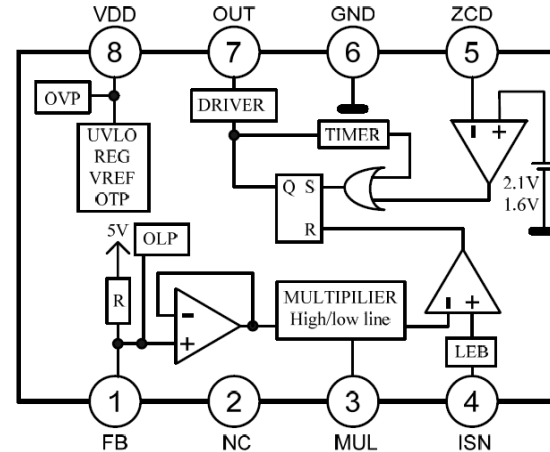
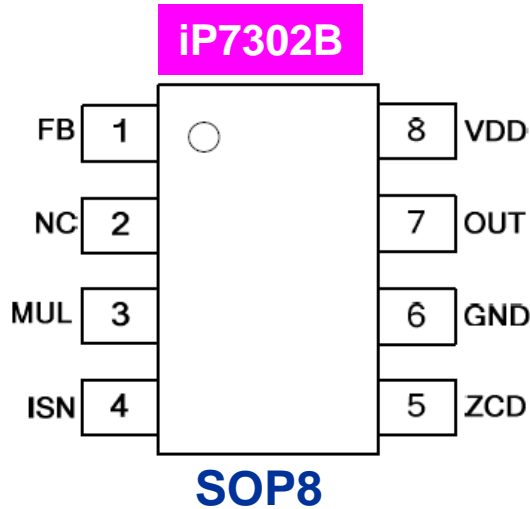


Pin Assignments of iP7300(L656x)



Pin	Name	Description
1	FB/INV	Inverting input of the error amplifier. A resistive divider is connected between the output regulated voltage and this pin, to provide voltage feedback.
2	COMP	Output of the error amplifier. A feedback compensation network is placed between this pin and the FB pin.
3	MUL	Input of the multiplier stage. A resistive divider is connected between the rectified mains and this pin, to provide the sinusoidal reference to the multiplier.
4	ISN/CS	Input of the PWM comparator. The current flowing in the MOSFET is sensed by a resistor and the resulting voltage is applied to this pin.
5	ZCD	Boost inductor's demagnetization sensing input for transition-mode operation. A negative-going edge triggers MOSFET's turn on.
6	GND	Ground.
7	OUT/GD	Gate driver output.
8	VDD/Vcc	Supply voltage of driver and control circuits.

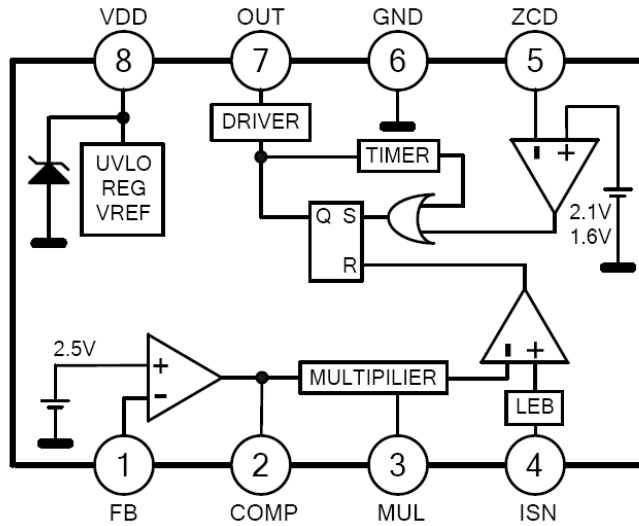
Pin Assignments of iP7302B



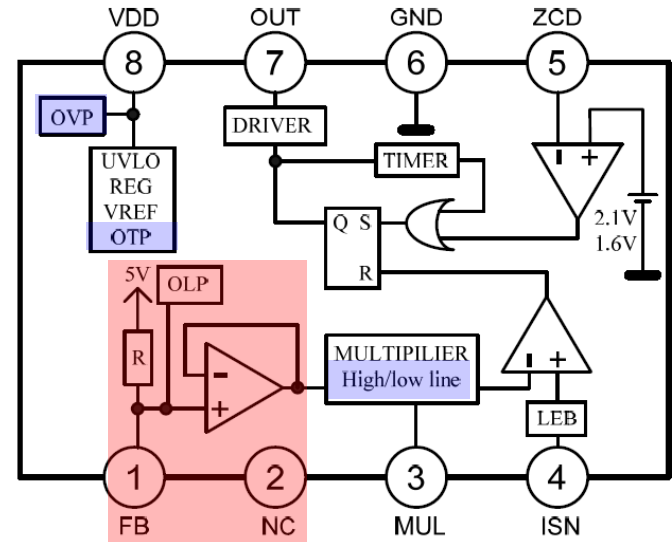
Pin	Name	Description
1	FB	Non inverting input of the buffer. A 50KΩ resistor is connected between this pin and internal 5V.
2	NC	No connected.
3	MUL	Input of the multiplier stage. A resistive divider is connected between the rectified mains and this pin, to provide the sinusoidal reference to the multiplier.
4	ISN	Input of the PWM comparator. The current flowing in the MOSFET is sensed by a resistor and the resulting voltage is applied to this pin.
5	ZCD	Flyback inductor's demagnetization sensing input for transition-mode operation. A negative-going edge triggers MOSFET's turn on.
6	GND	Ground.
7	OUT	Gate driver output.
8	VDD	Supply voltage of driver and control circuits.

Block Diagram

iP7300(L656x)

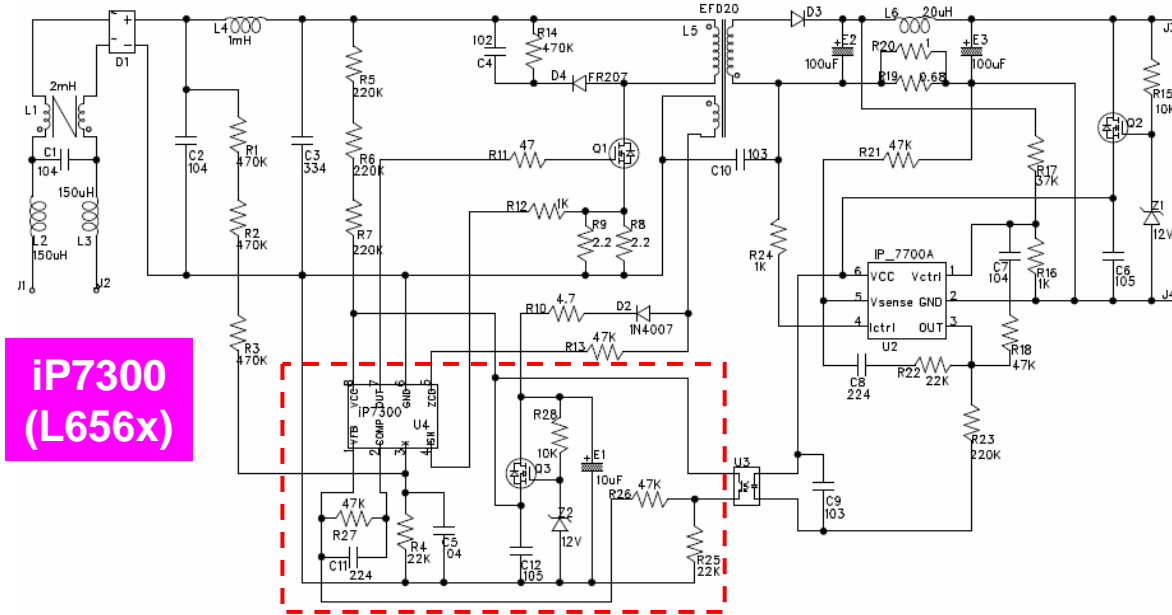


iP7302B



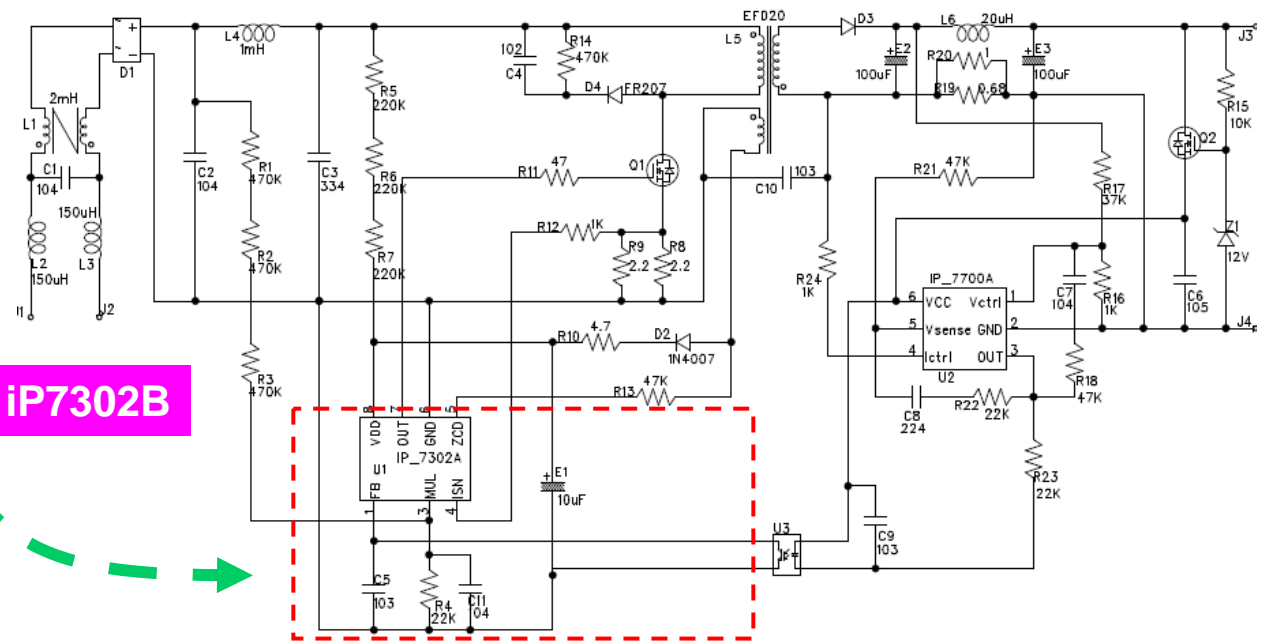
- ◆ iP7302B取消內部Vcc箝制二極體改為過電壓保護(OVP)偵測電路，避免系統過電壓時輸出仍持續動作。
- ◆ iP7302B將iP7300之誤差放大器(error amplifier)改良為單增益放大器(unity gain buffer)，使客戶節省調整回朔補償時間。
- ◆ iP7302B加入過載保護(OLP)功能，改善回遯開路或光耦短路造成炸機問題。
- ◆ iP7302B在乘法器上增加High/Low line補償，可改善iP7300啟動電流過大易讓變壓器飽和問題。

Application Circuits



**iP7300
(L656x)**

iP7302B減化
外部線路，
節省外部使
用元件和PCB
空間



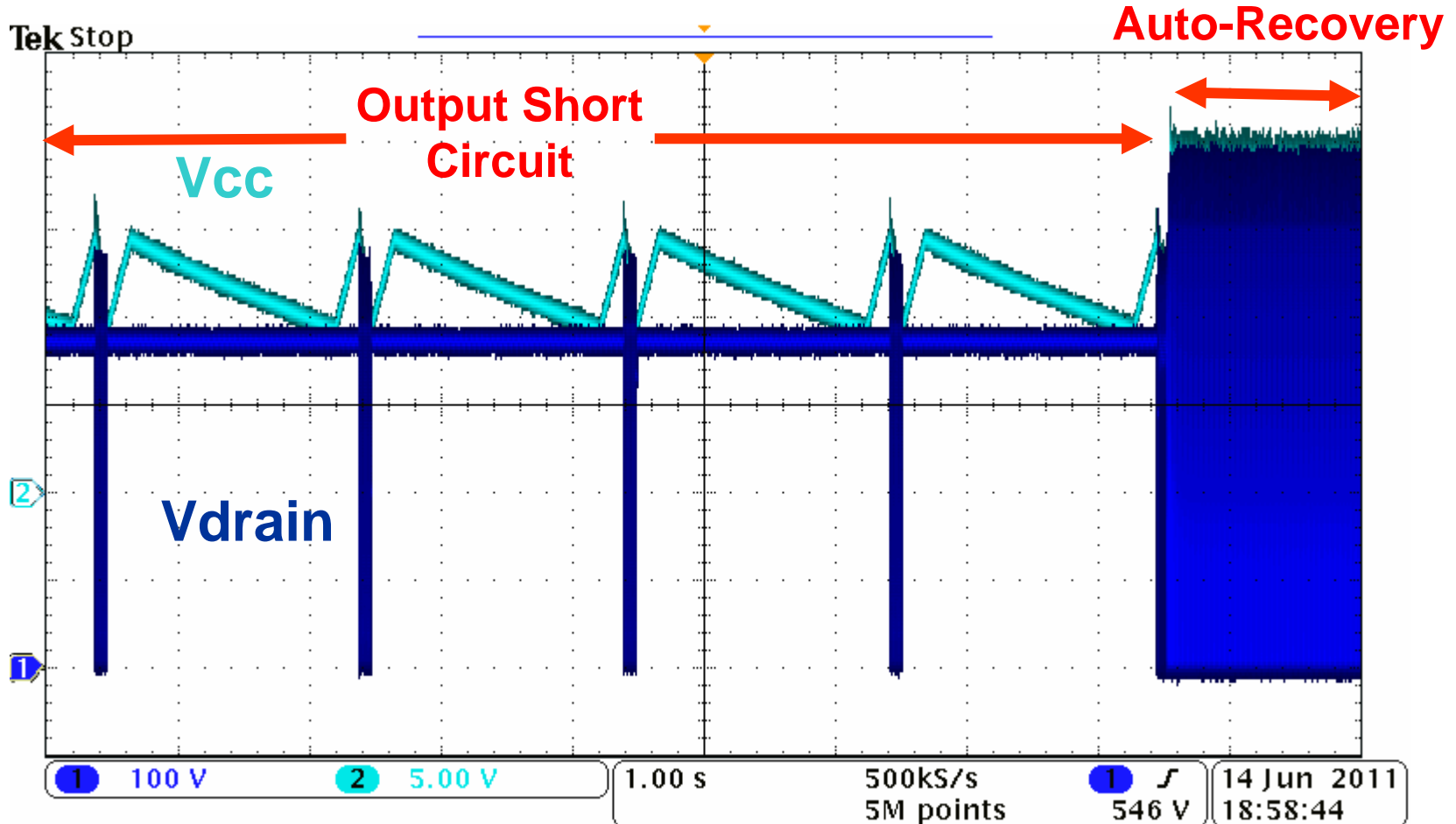
iP7302B

Performance Comparison

	iP7302B	iP7300	L6561	L6562D	L6562A
Vcc range	11~20V	10.5~17.5V	11~18V	10.5~22.5V	10.5~22.5V
UVLO ON	14V	11.5V	12V	12.5V	12.5V
UVLO OFF	9V	9.5V	9.5V	10V	10V
Startup current	70uA	16uA	50uA	30uA	30uA
Quiescent current	1mA	0.8mA	2.6mA	1.7mA	2.5mA
Operating current	1.3mA	3.6mA	4.0mA	3.5mA	3.5mA
VCC zener clamp voltage	X	22V	20V	25V	25V
Isn/Cs clamp voltage	1.7V	1.7V	1.7V	1.08V	1.08V
ZCD detect voltage	1.6V/2.1V	1.6V/2.1V	1.6V/2.1V	0.7V/1.4V	0.7V/1.4V
ZCD range	0.2~4.8V	0.2~4.8V	0.65~5.1V	0~5.7V	0~5.7V
Output clamp	18V	18V	X	12V	12V
OVP	by pin8 (VCC)	by pin2 (COMP)	by pin2 (COMP)	by pin2 (COMP)	by pin2 (COMP)
Short circuit protection	○	X	X	X	X
Over load protection	○	X	X	X	X
High/Low line compensation	○	X	X	X	X
Disable	by pin1 (FB)	by pin1 (FB)	by pin5 (ZCD)	by pin5 (ZCD)	by pin1 (INV)

iP7302B's Feature → Short Circuit Protection

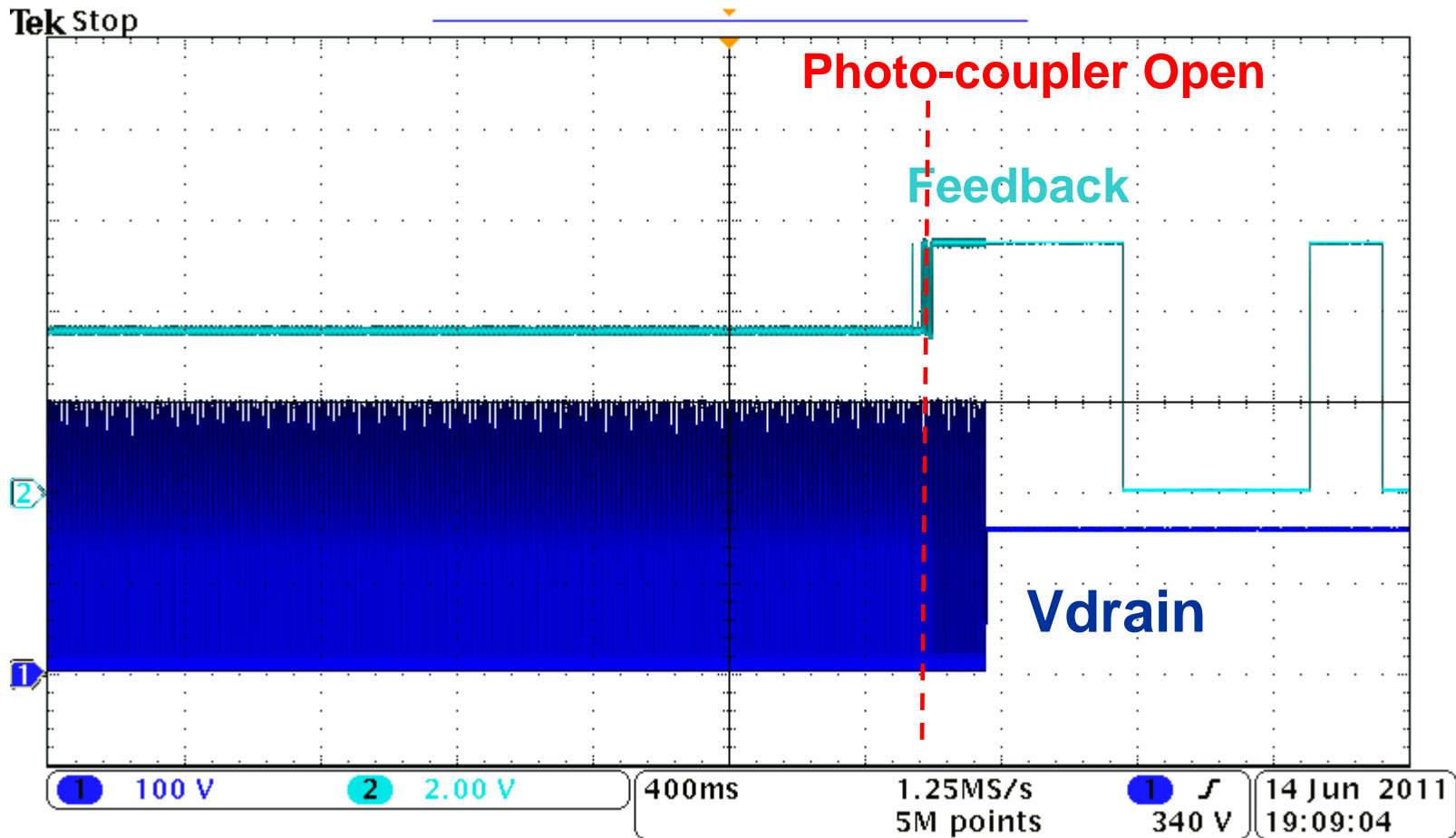
輸出短路時，iP7302B的VCC將會如下波形運作，間隔非常長的時間才輸出能量到二次側，降低了輸入功率，可保護板上各元件不會因為過熱燒毀，短路狀況解除後輸出自然回到正常狀況。



Vac=264V

iP7302B's Feature → Over Load Protection ienergy ◻

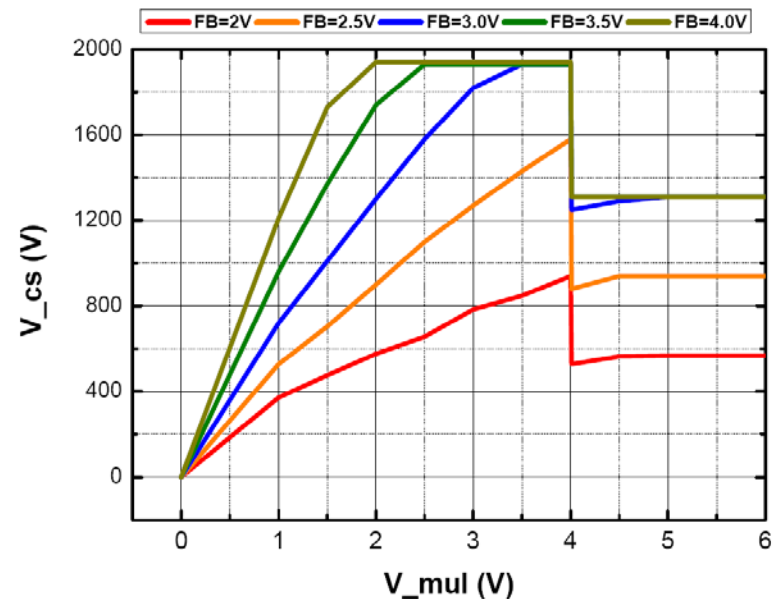
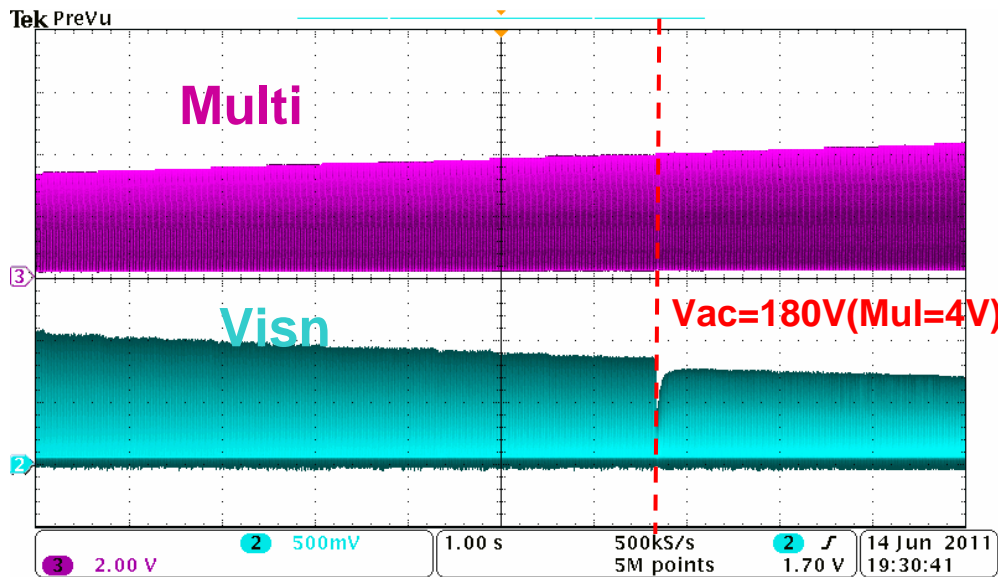
輸出過載或光耦開路時，iP7302B的VCC將會進入OLP模式，此可避免裝機不良造成的嚴重炸機問題；狀況解除後輸出自然回到正常狀況。



iP7302B's Feature → High/Low Line Detection ienergy □

客戶需要全電壓輸入時在設計Sense電阻時要考慮264VAC的變壓器飽和及輸出突波過大而會把阻值設計較高，但如此就會造成90VAC時的啟動較弱。iP7302B將高低壓輸入偵測內建其中，如此Sense電阻的設計彈性較大，好處有：

1. 避免變壓器飽和
2. 啟動電流突波較低
3. 輸入電壓較低時系統可運作正常



iP7302B優點：

- ◻ 自動回覆 (Auto-Recovery):
 - 過載保護 OLP (防止光耦開路或回遡斷路)。
 - 長時間輸出短路保護，消耗功率降低。

- ◻ 鎖住 (Latch):
 - 過電壓保護 (OVP)
 - 過溫保護 (OTP)

- ◻ 其它項目：
 - 高低電壓線補償 (High/Low Line Detection)
 - 避免啟動電流過大造成變壓器飽和
 - Min-off time
 - 節省 PCB 空間和週邊使用元件

i nergy □

WE THINK OUTSIDE THE BOX