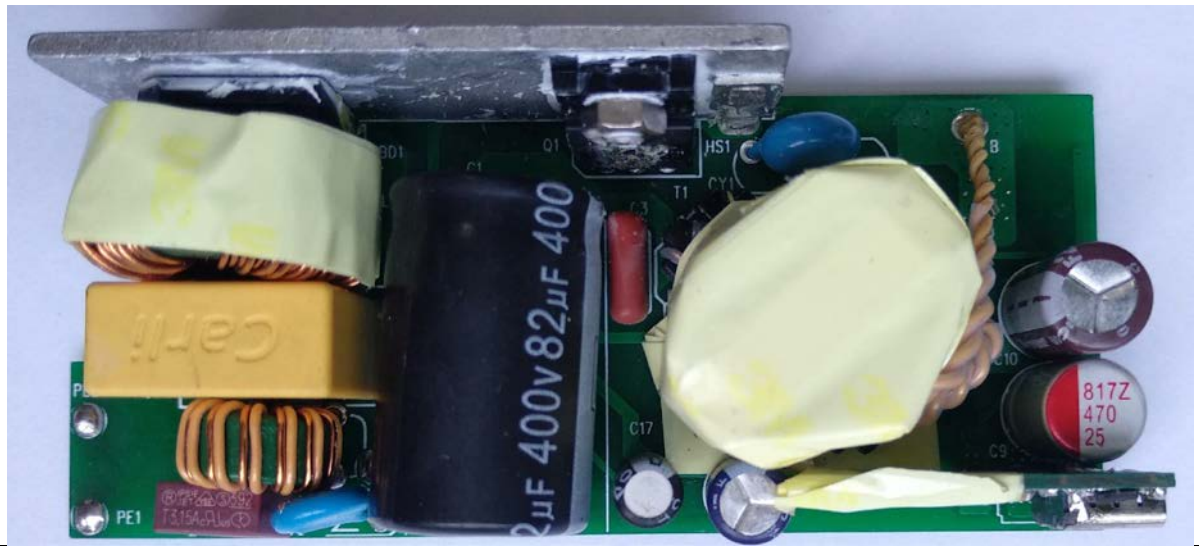
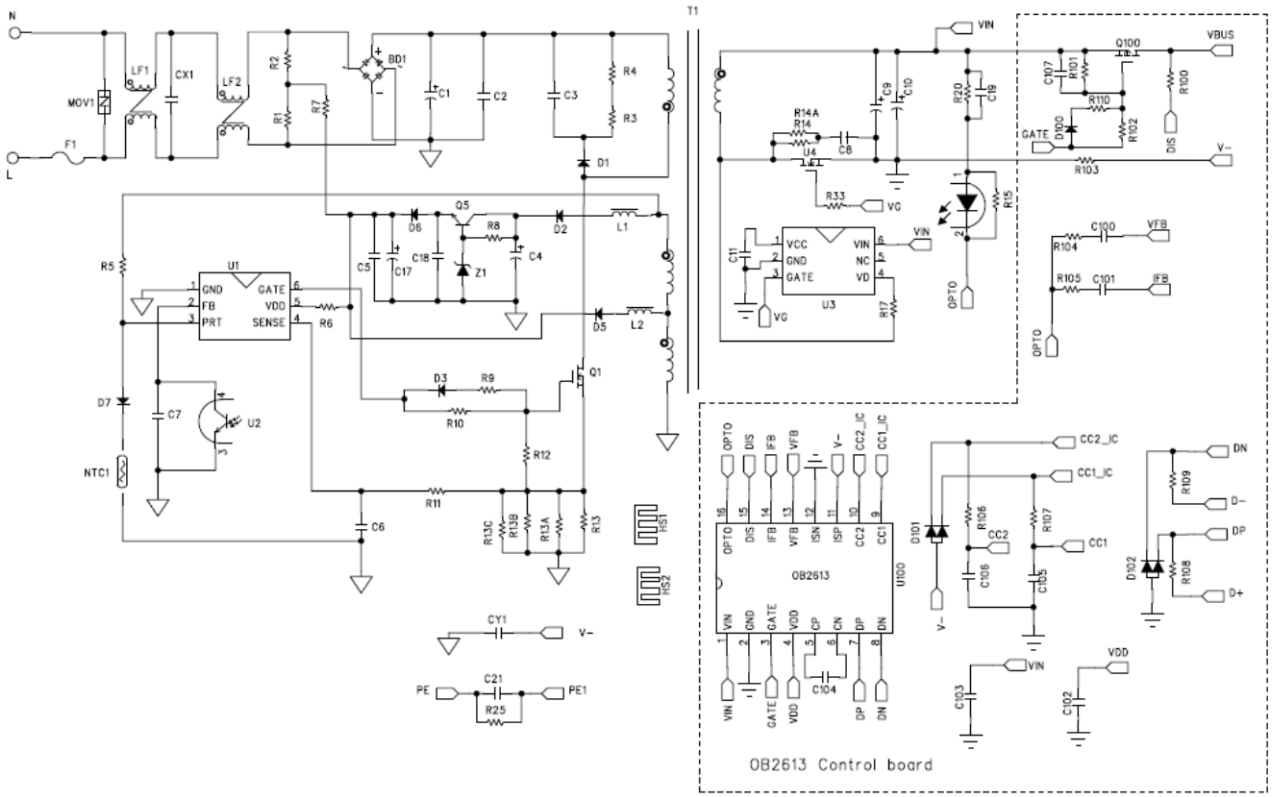
Subject	Board Model: PD20V2.25A OB2632QMP+2613
OB2632Q+OB2613+OB2007 Demo Board Manual	Doc. No.: OB_DOC_DBM_2632Q+261305



Key features:

- Support Power Delivery 3.0 Protocol@ Include PPS
- Output voltage: 5V/9V/12V/15V/20V
- Output current: 3A/3A/3A/3A/2.25A
- Standby power less than 75mW
- Average efficiency meet COC Ⅴ tier2
- Comprehensive protection coverage such as SCP、OCP、OLP、OVP、OTP
- High precision OCP performance
- Programmable cable drop compensation
- Peak power function
- Meet EN55022 Class B EMI

Schematic



Performance Evaluation

1. Input Characteristics

1.1 Input current and Standby power

The module was tested at different input voltages (from 90Vac to 264Vac)

Table 1 Input current at full load

Input Voltage	90V/60Hz	115V/60Hz	230V/50Hz	264V/50Hz
Input Current(A)	1.01	0.86	0.62	0.55

Table 2 Standby power at no load

Input voltage	Pin(mW)	Vo(V)	Specification	Test result
90Vac/60HZ	27	4.948	**<75mW**	**Pass**
115Vac/60HZ	32	4.947		
230Vac/50HZ	60	4.948		
264Vac/50HZ	73	4.946		

1.2 Efficiency

Table 3 Efficiency @PCB End

5V3A								
	100%	75%	50%	25%	AVE	CoC Req	10%	CoC Req
115Vac	88.7	89.21	88.91	87.94	88.69	81.84%	85.06%	72.48%
230Vac	87.95	87.66	86.78	83.25	86.41		80.4%	

9V3A								
	100%	75%	50%	25%	AVE	CoC Req	10%	CoC Req
115Vac	90.46	91.17	90.97	90.38	90.74	87.30%	88.81%	77.30%
230Vac	90.94	90.65	90.23	88.62	90.11		84.26%	

12V3A								
	100%	75%	50%	25%	AVE	CoC Req	10%	CoC Req
115Vac	90.66	91.46	91.31	89.77	90.98	88.30%	87.62%	78.30%
230Vac	91.63	91.22	90.62	89.32	90.85		86.49%	

15V3A								
	100%	75%	50%	25%	AVE	CoC Req	10%	CoC Req
115Vac	90.61	91.56	91.44	90.31	90.64	88.85%	86.7%	78.85%
230Vac	91.23	91.71	90.92	89.56	90.59		85.97%	

20V2.25A								
	100%	75%	50%	25%	AVE	CoC Req	10%	CoC Req
115Vac	91.36	91.4	90.82	88.98	90.64	88.85%	83.76%	79%
230Vac	91.96	91.51	90.48	88.42	90.59		83.38%	

2. Output Characteristics

2.1 Ripple & Noise

All data was measurement at @100mR CABLE end

Table 4 Ripple & Noise

Input voltage	5V R&N (mV)		
	No load	Full load	Remark
90Vac/60HZ	86mv	77mv	
264Vac/50HZ	77mv	83mv	

Input voltage	9V R&N (mV)		
	No load	Full load	Remark
90Vac/60HZ	72mv	91mv	
264Vac/50HZ	80mv	86mv	

Input voltage	12V R&N (mV)		
	No load	Full load	Remark
90Vac/60HZ	67mv	98mv	
264Vac/50HZ	86mv	91mv	

Input voltage	15V R&N (mV)		
	No load	Full load	Remark
90Vac/60HZ	61mv	115mv	
264Vac/50HZ	72mv	102mv	

Input voltage	20V R&N (mV)		
	No load	Full load	Remark
90Vac/60HZ	51mv	102mv	
264Vac/50HZ	66mv	96mv	

Note: Ripple& noise was measured at DC cord end without probe cap and ground clip. Measurement bandwidth was limited to 20MHZ.

2.2 Dynamic Test

A dynamic loading with low set at 10% full load lasting for 10mS and high set at 90% full load lasting for 10mS is added to output. The ramp is set at 0.25A/uS at transient.
All data was measurement at @100mR CABLE end.

Table 5 Output voltage under dynamic test

Input voltage	5V Output voltage (mV)	Waveform
90V/60HZ	±362	Fig.15-16
264V/50HZ	±349	

Input voltage	9V Output voltage (mV)	Waveform
90V/60HZ	±384	

264V/50HZ	±368	

Input voltage	12V Output voltage (mV)	Waveform
90V/60HZ	±432	
264V/50HZ	±432	

Input voltage	15V Output voltage (mV)	Waveform
90V/60HZ	±448	
264V/50HZ	±432	

Input voltage	20V Output voltage (mV)	Waveform
90V/60HZ	±384	Fig.17-18
264V/50HZ	±352	

Dynamic waveform

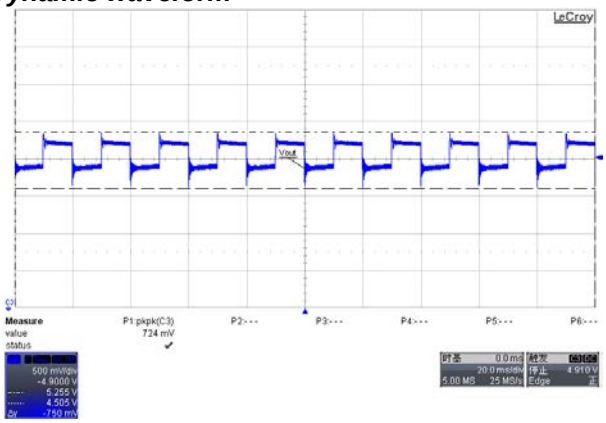


Fig. 1 Dynamic waveform@90Vac input

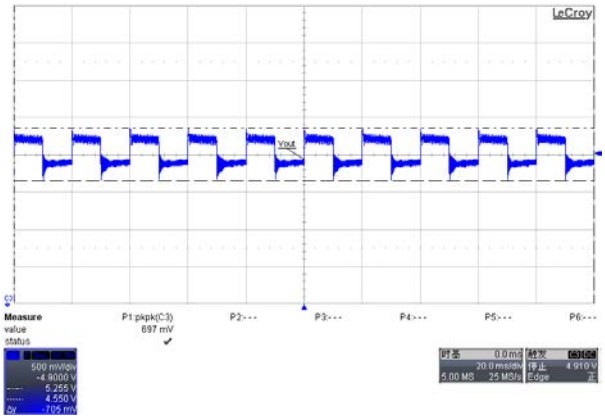


Fig. 2 Dynamic waveform@264Vac input

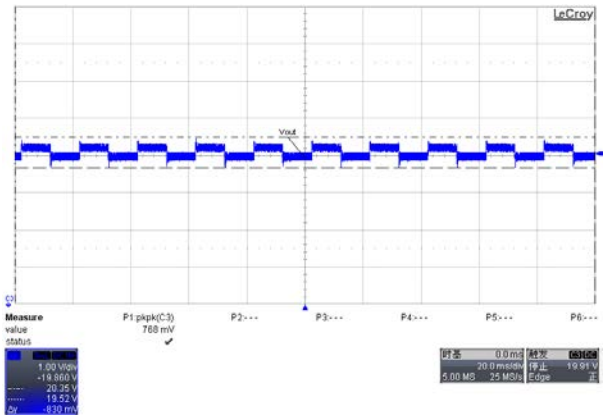


Fig. 3 Dynamic waveform@90Vac input

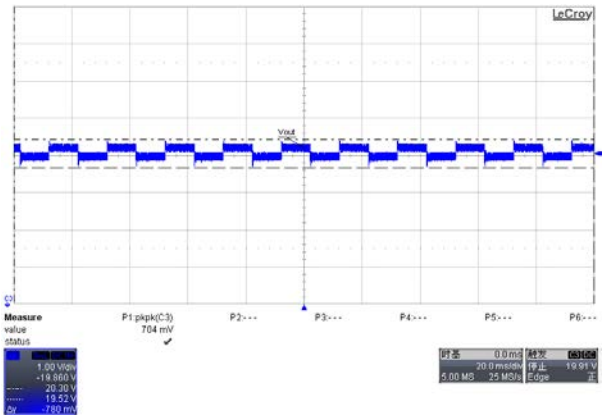


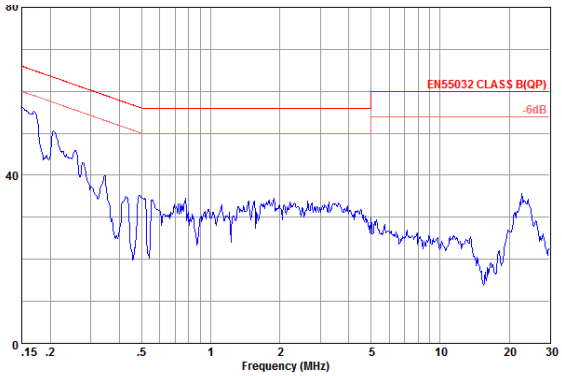
Fig. 4 Dynamic waveform@264Vac input

3. EMI test

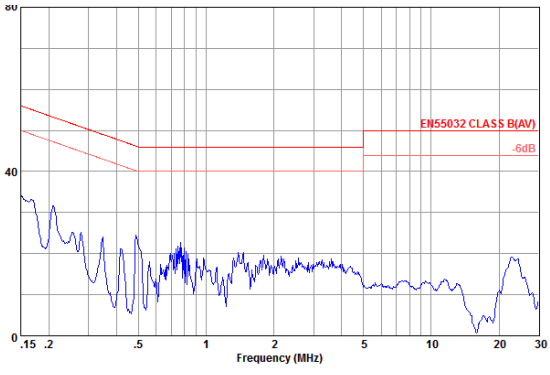
The Power supply passed EN55022 Class B & FCC class B EMI requirement with more than 6dB margin tested with shield

3.1 Conducted EMI Test

EN55022 CLASS B @ full load report




```
Site              : Audix(Shanghai) Shielded1
Condition         : EN55032 CLASS B(QP) ESH2-Z5-2019 LINE
Project No.       :
Applicant         :
EUT               : OB2632Q
M/N               : 45W
S/N               :
Power Supply      : 230V/50Hz
Ambient           : 22'C 48%RH
Test line         : L
Test Mode         :
Test Engineer     : Kevin
Memo              :
```

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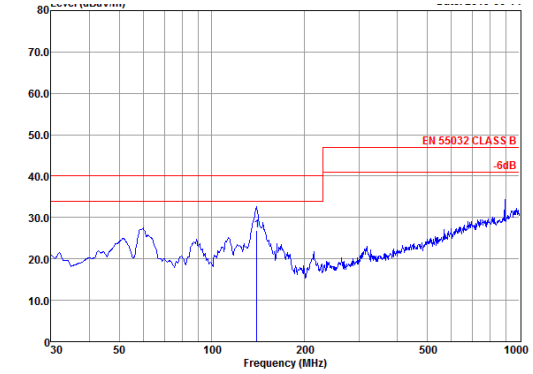
Site              : Audix(Shanghai) Shielded1
Condition         : EN55032 CLASS B(AV) ESH2-Z5-2019 LINE
Project No.       :
Applicant         :
EUT               : OB2632Q
M/N               : 45W
S/N               :
Power Supply      : 230V/50Hz
Ambient           : 22'C 48%RH
Test line         : L
Test Mode         :
Test Engineer     : Kevin
Memo              :
```

3.2 Radiation EMI Test

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Site          : Audix(Shanghai) Chamber3
Condition     : EN 55032 CLASS B VERTICAL
Project No.   :
Applicant     :
EUT           :
M/N           : OB2632Q 45W
S/N           :
Power Supply  : 230V/50Hz
Ambient       : 22'C  60%RH
Test Mode     :
Test Engineer: Kevin
Memo          :
```
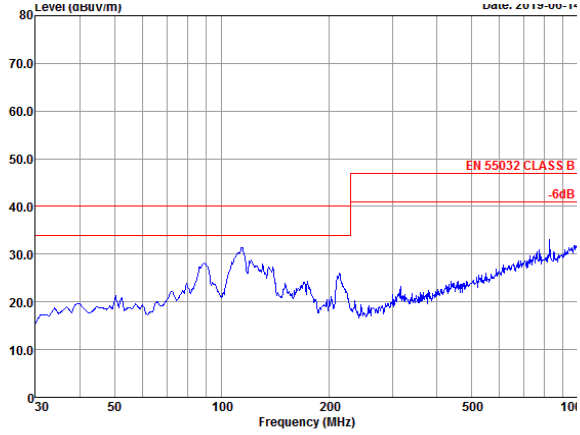

	Freq	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Limit Line	Level	Over Limit	Remark
	MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	139.89	33.80	1.31	19.40	27.66	40.00	26.85	-13.15	QP




```
Site          : Audix(Shanghai) Chamber3
Condition     : EN 55032 CLASS B HORIZONTAL
Project No.   :
Applicant     :
EUT           :
M/N           : OB2632Q 45W
S/N           :
Power Supply  : 230V/50Hz
Ambient       : 22'C  60%RH
Test Mode     :
Test Engineer: Kevin
Memo          :
```

4. PD Specification Test

4.1 Vbus Change Test

Vbus changing test between 5V/9V/12V/15V/20V under No load/Full load conditions

Fig. 5 Vbus Changing Test @no load

Fig. 6 Vbus Changing Test @full load

4.2 Negative Voltage Transitions

Vbus changing test from 20V to 5V @No load/Full load. The transition time is 167ms（spec: <275ms）

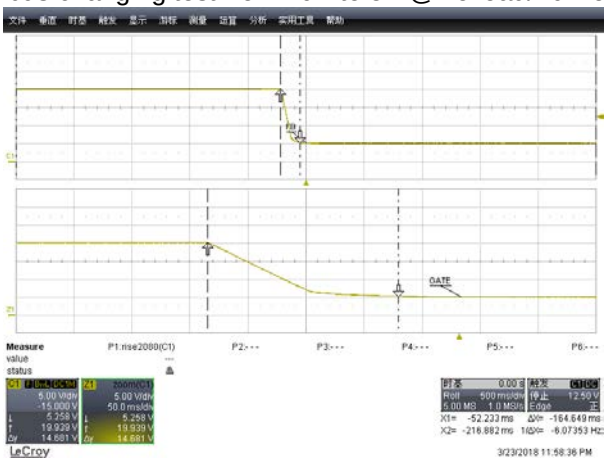


Fig. 7 Vbus Change From 20V to 5V @no load

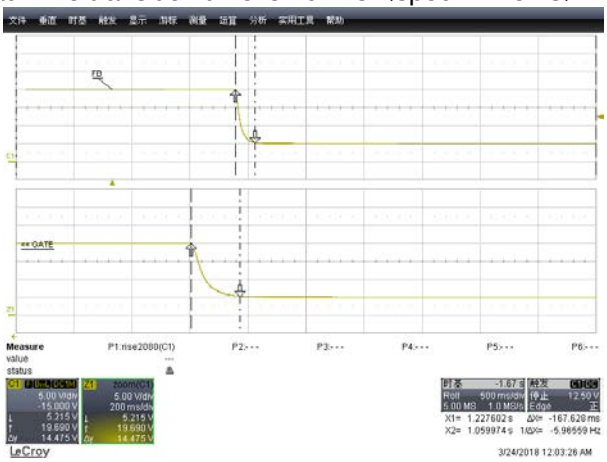


Fig. 8 Vbus Change From 20V to 5V @full load

4.3 Positive Voltage Transitions

Vbus changing test from 5V to 20V @No load/Full load. The transition time is 140ms（spec: <275ms）

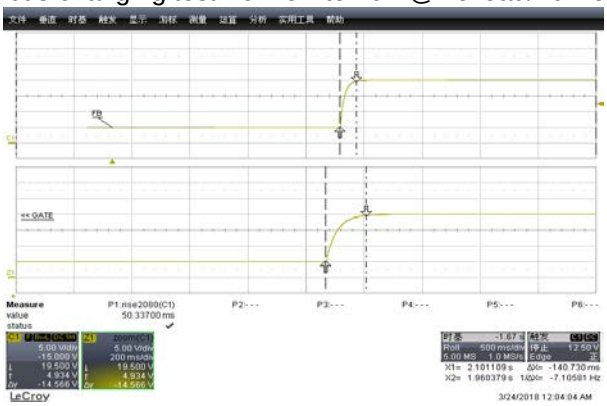


Fig. 9 Vbus Change From 5V to 20V @no load

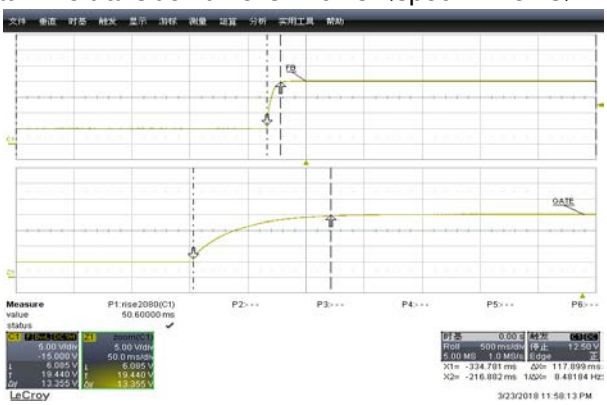


Fig. 10 Vbus Change From 5V to 20V @full load

4.4 Response to Hard Resets

When responding to hard reset, the time of tSafe5V/tSafe0V/tSrcRecover/tSrcTurnon are strict following PD spec.

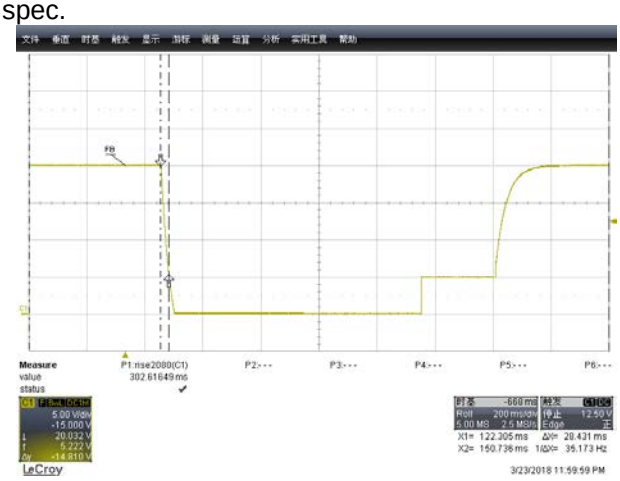


Fig. 11 Hard Reset t0-tSafe5V（spec: <275ms）

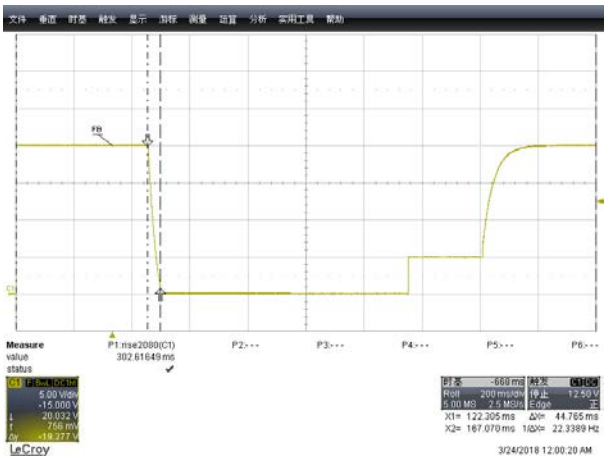


Fig. 12 Hard Reset t0-tSafe0V（spec: <650ms）

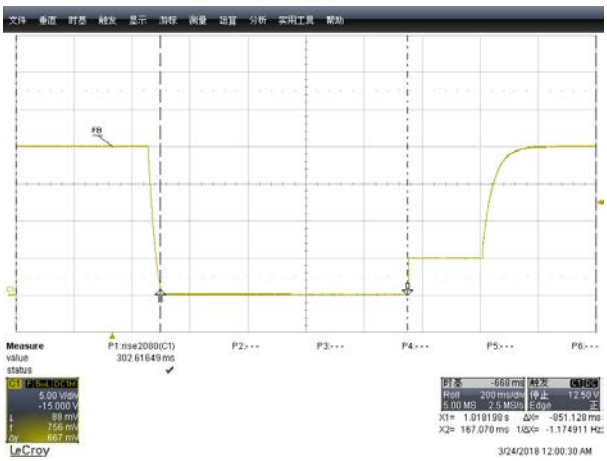


Fig. 13 Hard Reset tSrcRecover（660ms<spec<1s）

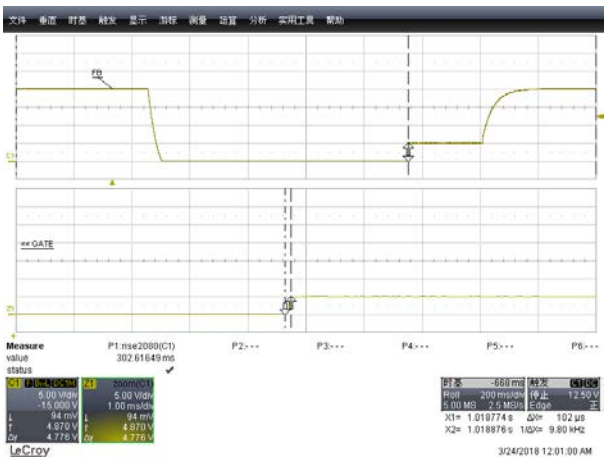


Fig. 14 Hard Reset tSrcTurnon（spec: <275ms）

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