

**Subject**  
**OB2633S+OB2608 QC/SCP**  
**Demo Board Manual**

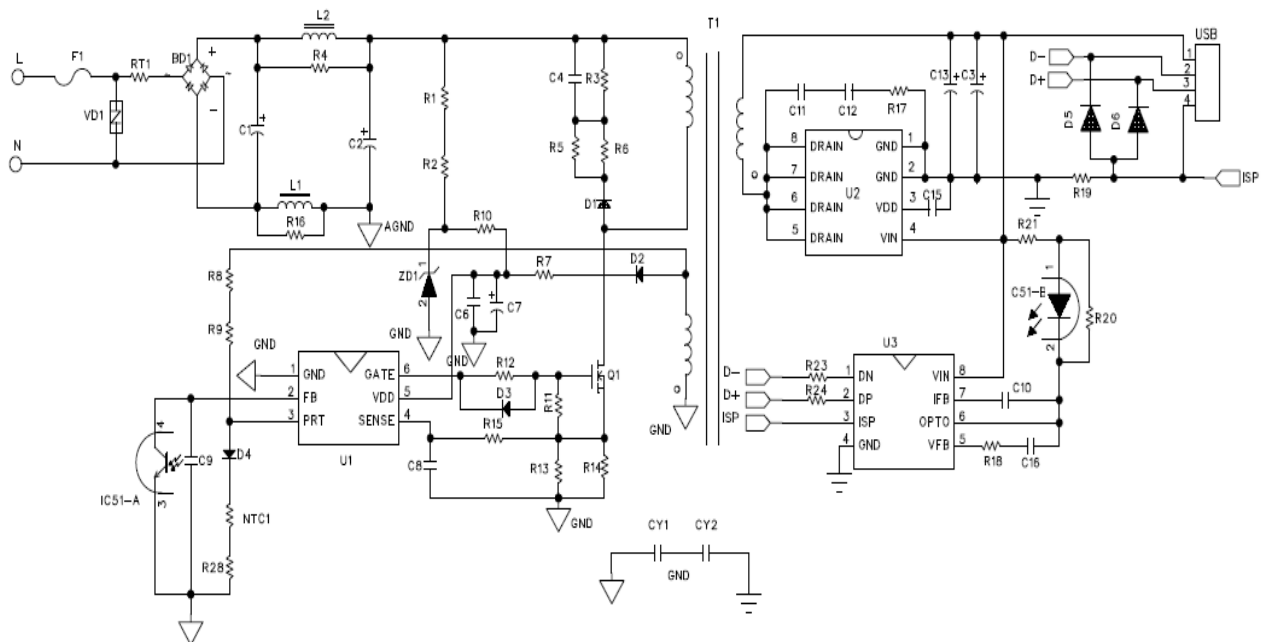
Board Model: CH10V2.25A 2633S+2608  
Doc. No.: OB\_DOC\_DBM\_2633S+2608



**Key features:**

- Support BC1.2 protocol
- Support QC/SCP protocol
- SSR+ Synchronous rectification for high efficiency
- DC output: 5.25V/2A , 5.5V/2.5A, 9V/2.5A , 10V/2.25A , 12V/1.6A
- Standby power less than 75mW @264Vac
- Average efficiency meet DOE & COC
- Comprehensive protection coverage with auto-recovery, such as SCP、OLP、OVP、UVP、OTP etc.
- Meet EN55022 EMI

## Schematic



## Performance Evaluation

This session presents the test results of OB2633S+OB2004A+OB2608 module up to date. Results on inrush current and safety test are not included and will be added when they become available.

Overall, the module meets design specifications. All data was measured at the end of 75mR line end.

### Performance Highlights

- Standby power less than 75mW@264Vac(5V output)
- Precise CV/CC regulation
- The average efficiency meet COC
- EMI passed EN55022 and FCC Part15 Class B test with more than 6dB margin

### System Electrical Specification

Description	Symbol	Min	Typ.	Max	Units	Comment	
<b>Input Section</b>							
Input Voltage	$V_{IN}$	90		264	$V_{AC}$	2 Wire	
Line Frequency	$f_{LINE}$	47	50/60	63	Hz		
Standby Power				75	mW	$V_{IN}=230V_{AC}$ $V_{OUT}=5V$	
<b>Output characteristics</b>							
CV Section	Output Voltage	$V_{OUT\_CV}$	4.75	5.0	5.25	V	Vout=5.25V
	Output Current	$I_{OUT\_CV}$	0	2	2.4	A	
	Output Voltage	$V_{OUT\_CV}$	8.73V	9.0	9.27	V	Vout=9V
	Output Current	$I_{OUT\_CV}$		2.25A		A	
	Output Voltage	$V_{OUT\_CV}$	9.7	10	10.3	V	Vout=10V
	Output Current	$I_{OUT\_CV}$	0	2.25		A	
	Output Voltage	$V_{OUT\_CV}$	11.40	12.0	12.60	V	Vout=12V
	Output Current	$I_{OUT\_CV}$	0	1.6		A	
Ripple & Noise	$V_{RIPPLE}$			150	mV <sub>P-P</sub>		
Continuous Output Power	$P_{OUT}$		22.5W				
Active Mode Efficiency (5.25V output)	$\eta$	78.70			%	$V_{IN}=115V_{AC}/230V_{AC}$	
Active Mode Efficiency (9V output)	$\eta$	85.96			%	$V_{IN}=115V_{AC}/230V_{AC}$	
Active Mode Efficiency (10V output)	$\eta$	85.96			%	$V_{IN}=115V_{AC}/230V_{AC}$	
<b>Time sequence</b>							
Turn on delay time				2	S		
<b>Environmental</b>							
Conducted/Radiation EMI	Meets CISPR22B/EN55022B						
Safety	Meets IEC950,UL1950,Class II						
ESD	8/15	15		18	kV		



**22.5W CC/CV QC/SCP protocol Quick Charger  
Module Using OB2633S+OB2608  
CH10V2.25A 2633S+2608.00**

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***Test Equipments***

<b>Item</b>	<b>Vender</b>	<b>Module</b>
AC Source	WEST	WEW1010
Digital Power Meter	YOKOGAWA	WT210
Electrical Load	Chroma	63030
Oscilloscope	LeCroy	WS424
Multimeter	VICTORY	VC9807A

## 1. Input Characteristics

### 1.1 Standby power

Table. 1 Standby power(5V)

Input voltage	Pin(mW)	Vo(V)	Specification	Test result
90Vac/60HZ	28.2	5.25	<75mW	Pass
115Vac/60HZ	31.4	5.25		
230Vac/50HZ	63.0	5.25		
264Vac/50HZ	73.8	5.25		

### 1.2 Efficiency (Testing after working on 5 minutes)

#### 5.25V2A module

Table. 2 Efficiency with Cable End (5.25V)

Input voltage	10%	25%	50%	75%	100%	Aver. Eff.	Spec	Test result
115Vac/60HZ	79.06	82.98	83.85	84.47	84.10	83.85	78.70%	Pass
230Vac/50HZ	74.66	80.01	82.40	84.02	84.26	82.67		

#### 9V/2.5A module

Table. 3 Efficiency with Cable End (9V)

Input voltage	10%	25%	50%	75%	100%	Aver. Eff.	Spec	Test result
115Vac/60HZ	87.55	88.07	86.92	85.68	83.63	86.08	85.96%	Pass
230Vac/50HZ	85.70	86.65	86.48	85.96	84.91	86.00		

#### 10V/2.25A module

Table. 4 Efficiency with Cable End (10V)

Input voltage	10%	25%	50%	75%	100%	Aver. Eff.	Spec	Test result
115Vac/60HZ	87.46	87.88	87.32	85.79	83.95	86.24	85.96%	Pass
230Vac/50HZ	86.55	86.59	87.33	86.87	85.85	86.66		

#### 12V/1.6A module

Table. 5 Efficiency with Cable End (12V)

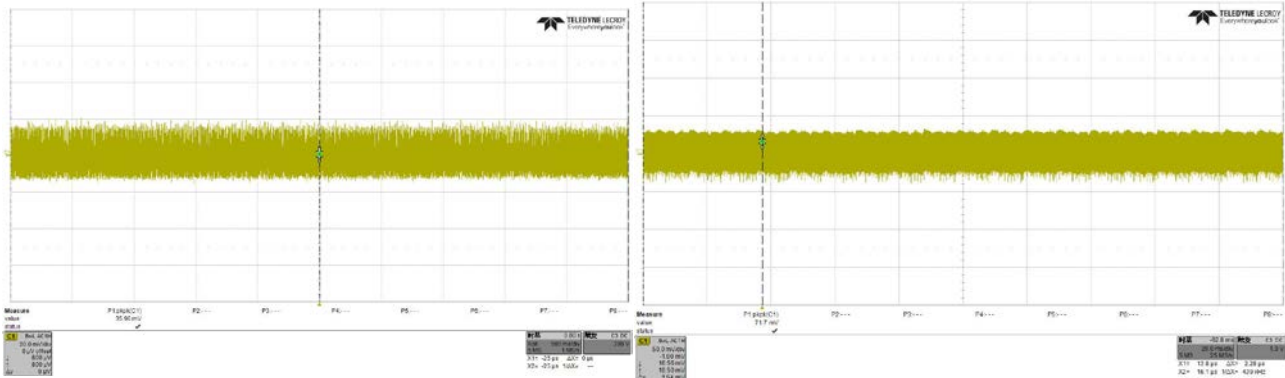
Input voltage	10%	25%	50%	75%	100%	Aver. Eff.	Spec	Test result
115Vac/60HZ	78.18	83.19	85.97	86.79	86.78	85.68	85.00%	Pass
230Vac/50HZ	77.18	82.43	85.80	87.45	87.89	85.92		

## 2. Output Characteristics

### 2.1 Ripple & Noise

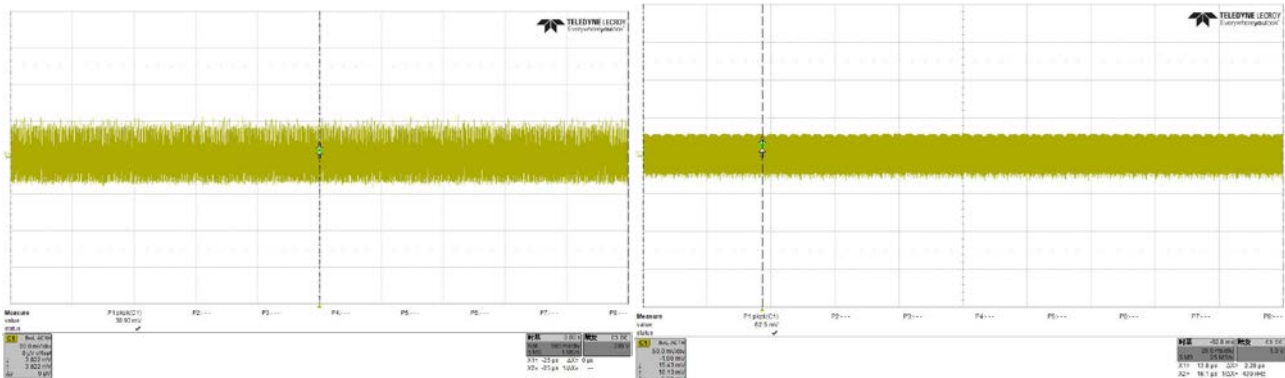
Input voltage	R&N (mV)								Specification
	5.25V		9V		10V		12V		
	No load	Full load	No load	Full load	No load	Full load	No load	Full load	
90Vac/60HZ	35.9	71.7	51.1	152.3	46.5	140.7	44.1	127.0	<150mV
264Vac/50HZ	38.9	62.5	57.2	95.5	54.5	87.6	53.02	81.8	

Note: Ripple& noise was measured at PCB end with probe cap and ground clip. Measurement bandwidth was limited to 20MHZ.



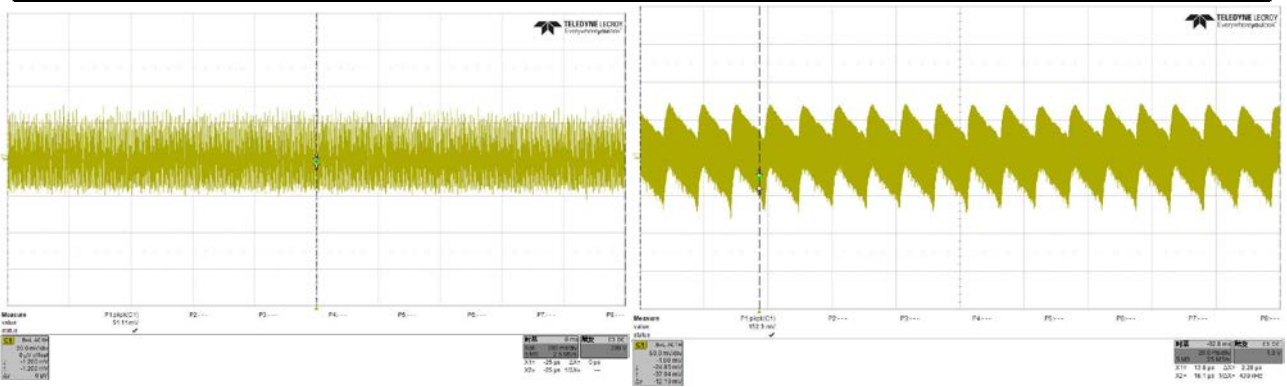
90V 5.25V/0A

90V 5.25V/2A



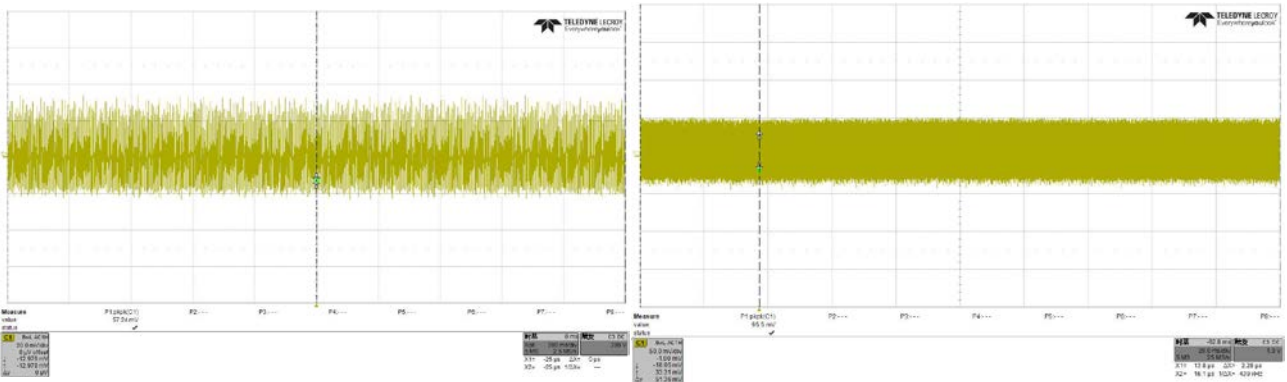
264V 5.25V/0A

264V 5.25V/2A



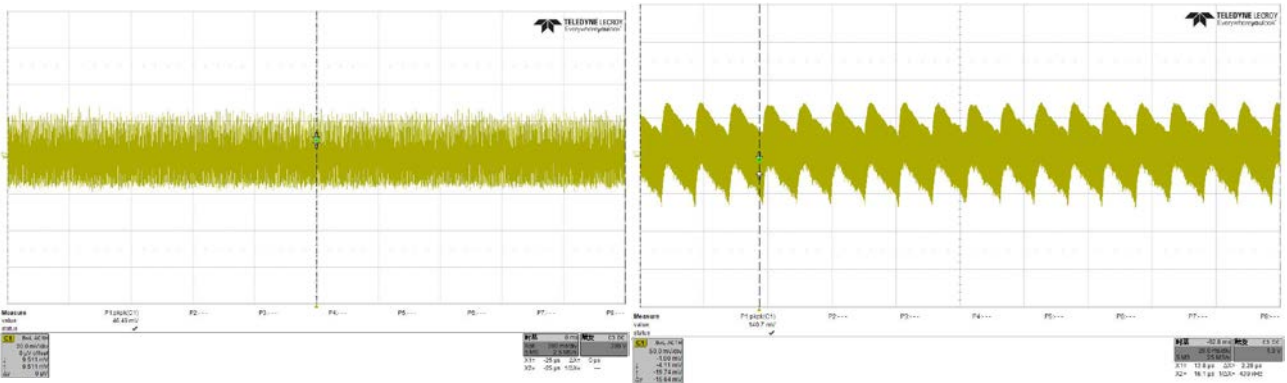
90V 9V/0A

90V 9V/2.5A



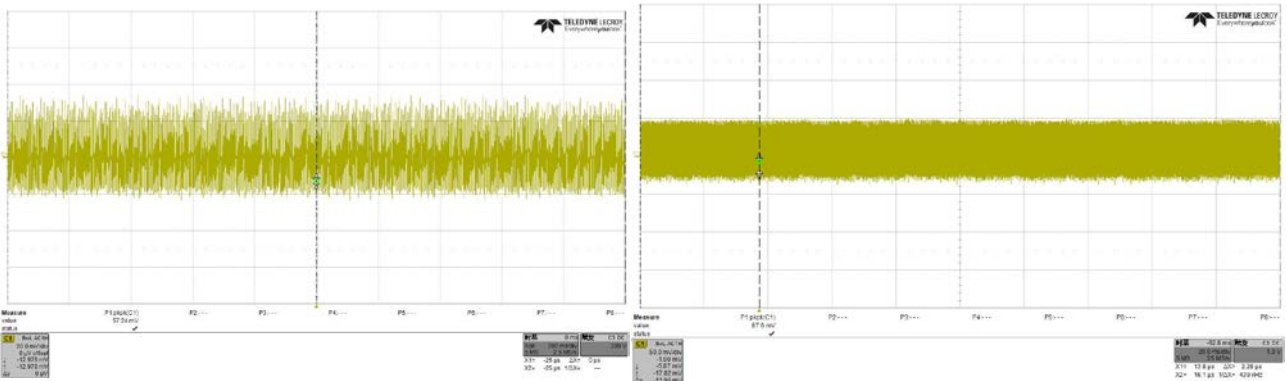
264V 9V/0A

264V 9V/2.5A

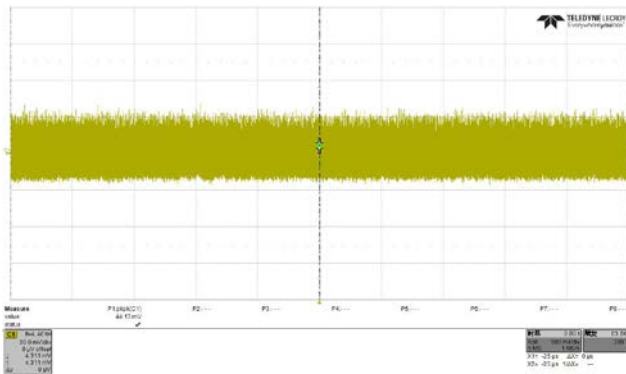


90V 10V/0A

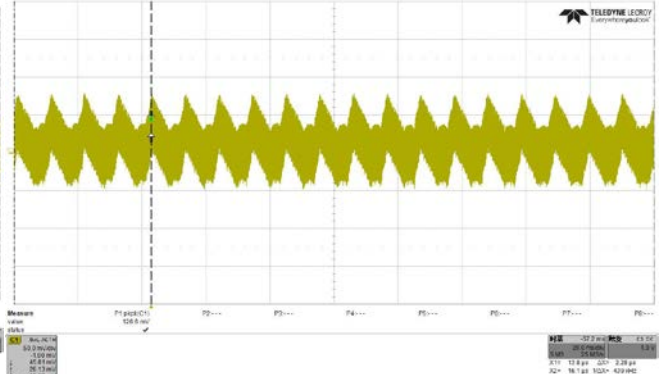
90V 10V/2.25A



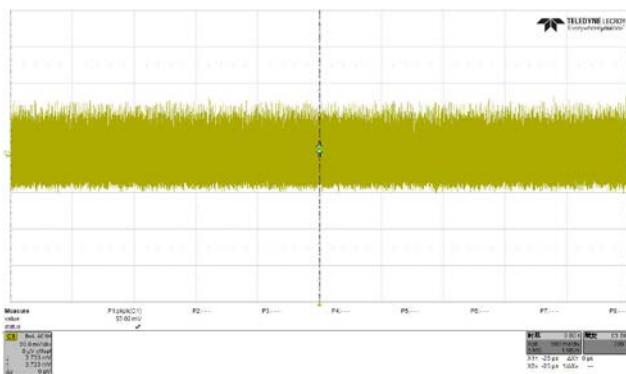
264V 10V/0A



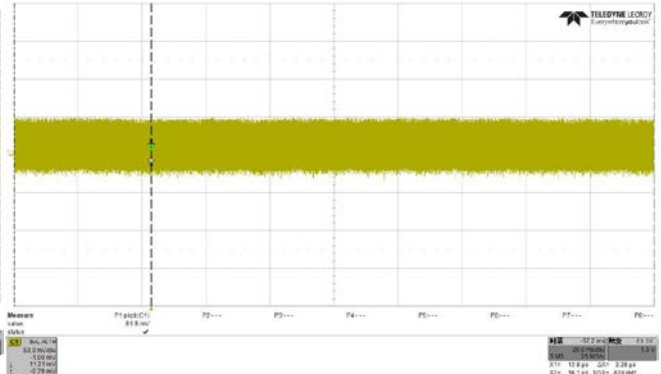
264V 10V/2.25A



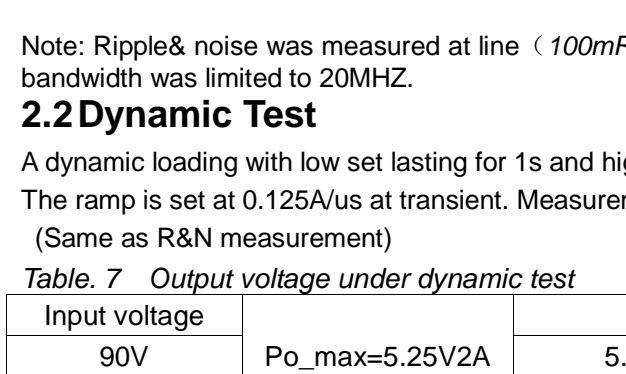
90V 12V/0A



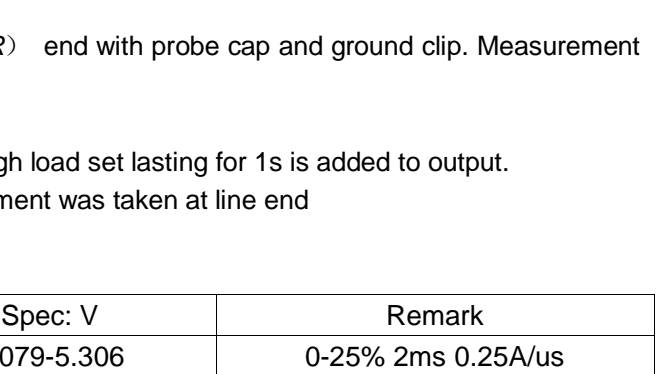
90V 12V/1.6A



264V 12V/0A



264V 12V/1.6A



Note: Ripple& noise was measured at line ( 100mR) end with probe cap and ground clip. Measurement bandwidth was limited to 20MHZ.

## 2.2 Dynamic Test

A dynamic loading with low set lasting for 1s and high load set lasting for 1s is added to output.

The ramp is set at 0.125A/us at transient. Measurement was taken at line end

(Same as R&N measurement)

*Table. 7 Output voltage under dynamic test*

Input voltage	Po_max=5.25V2A	Spec: V	Remark
90V		5.079-5.306	0-25% 2ms 0.25A/us
264V		5.075-5.312	
Input voltage	Po_max=5.25V2A	Spec: V	Remark
90V		4.957-5.340	0-50% 2ms 0.25A/us
264V		4.950-5.349	
Input voltage	Po_max=5.25V2A	Spec: V	Remark
90V		4.875-5.387	10%-90% 2ms 0.25A/us
264V		4.871-5.390	
Input voltage	Po_max=5.5V2.5A	Spec: V	Remark
90V		5.287-5.529	0-50% 2ms 0.25A/us

264V		5.283-5.533	
Input voltage	Po_max=5.5V2.5A	Spec: V	Remark
90V		5.129-5.541	10%-90% 2ms 0.25A/us
264V		5.132-5.549	
Input voltage	Po_max=5.5V2.5A	Spec: V	Remark
90V		4.987-5.532	0-50% 2ms 0.25A/us
264V		4.963-5.529	
Input voltage	Po_max=9V2.5A	Spec: V	Remark
90V		8.841-9.062	10%-90% 2ms 0.25A/us
264V		8.839-9.065	
Input voltage	Po_max=9V2.5A	Spec: V	Remark
90V		8.714-9.082	0-50% 2ms 0.25A/us
264V		8.712-9.089	
Input voltage	Po_max=9V2.5A	Spec: V	Remark
90V		8.599-9.091	10%-90% 2ms 0.25A/us
264V		8.587-9.093	
Input voltage	Po_max=10V2.25A	Spec: V	Remark
90V		9.825-10.67	0-50% 2ms 0.25A/us
264V		9.824-10.67	
Input voltage	Po_max=10V2.25A	Spec: V	Remark
90V		9.681-10.089	10%-90% 2ms 0.25A/us
264V		9.682-10.086	
Input voltage	Po_max=10V2.25A	Spec: V	Remark
90V		9.541-10.099	0-50% 2ms 0.25A/us
264V		9.552-10.95	
Input voltage	Po_max=12V1.6A	Spec: V	Remark
90V		11.882-12.059	10%-90% 2ms 0.25A/us
264V		11.869-12.063	
Input voltage	Po_max=12V1.6A	Spec: V	Remark
90V		11.772-12.077	0-25% 2ms 0.25A/us
264V		11.768-12.075	
Input voltage	Po_max=12V1.6A	Spec: V	Remark
90V		11.671-12.083	0-50% 2ms 0.25A/us
264V		11.669-12.081	



### 3 EMI Test

The Power supply passed EN55022 Class B EMI requirement with more than 6dB margin





## 22.5W CC/CV QC/SCP protocol Quick Charger Module Using OB2633S+OB2608

CH10V2.25A 2633S+2608.00

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