



ON Semiconductor®

QC3.0 Quick Charger Solution

(NCP1361,NCP4305,NCP4371)

QC3.0 Quick Charger Solution

Value Proposition

This design used 2 Q V H NCP1361 hybrid controller, NCP4305 synchronous rectified controller and NCP4371 QC3.0 protocol controller with CC/CV control, this design supports Qualcomm QC2.0 and QC3.0 quick charger.

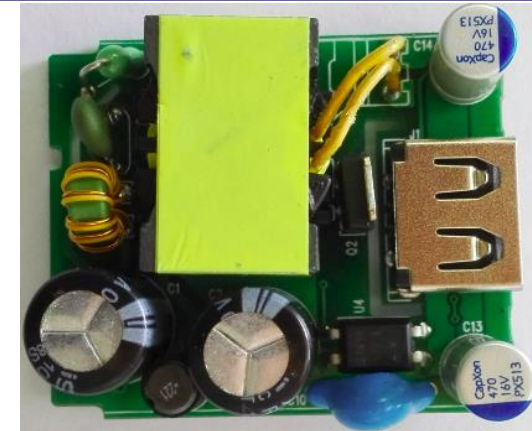
Features

- § Quasi-Resonant current mode control with Valley Switching
- § Valley lockout avoids audible noise at valley jumping operation
- § Secondary synchronous rectified control with high efficiency
- § Qualcomm protocol controller supports QC2.0 and QC3.0
- § Output 5V/2.5A, 9V/2A and 12V/1.5A
- § Standby power <75mW @5V output
- § Support external 2200uF capacitive load startup
- § Less than 1.5s startup time with 10M startup resistor at 90Vac
- § Support E-load startup at $V_{on}=0V$
- § Support output capacitor discharge function while USB is unplugged
- § Smooth output voltage transition
- § Board size: 41.5mmx34.5mmx15mm

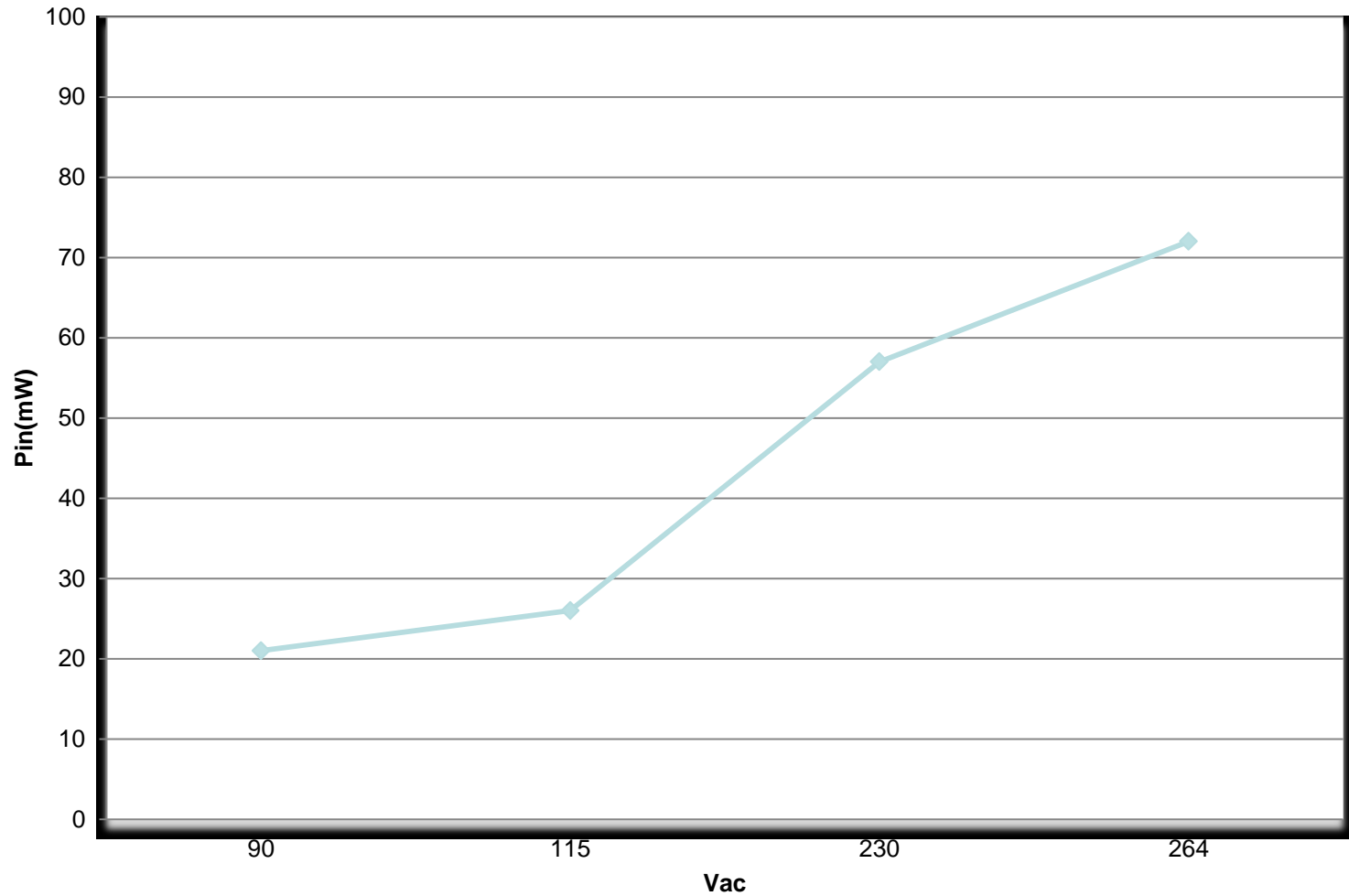
Market & Applications

- § QC2.0 and QC3.0 Quick Charger

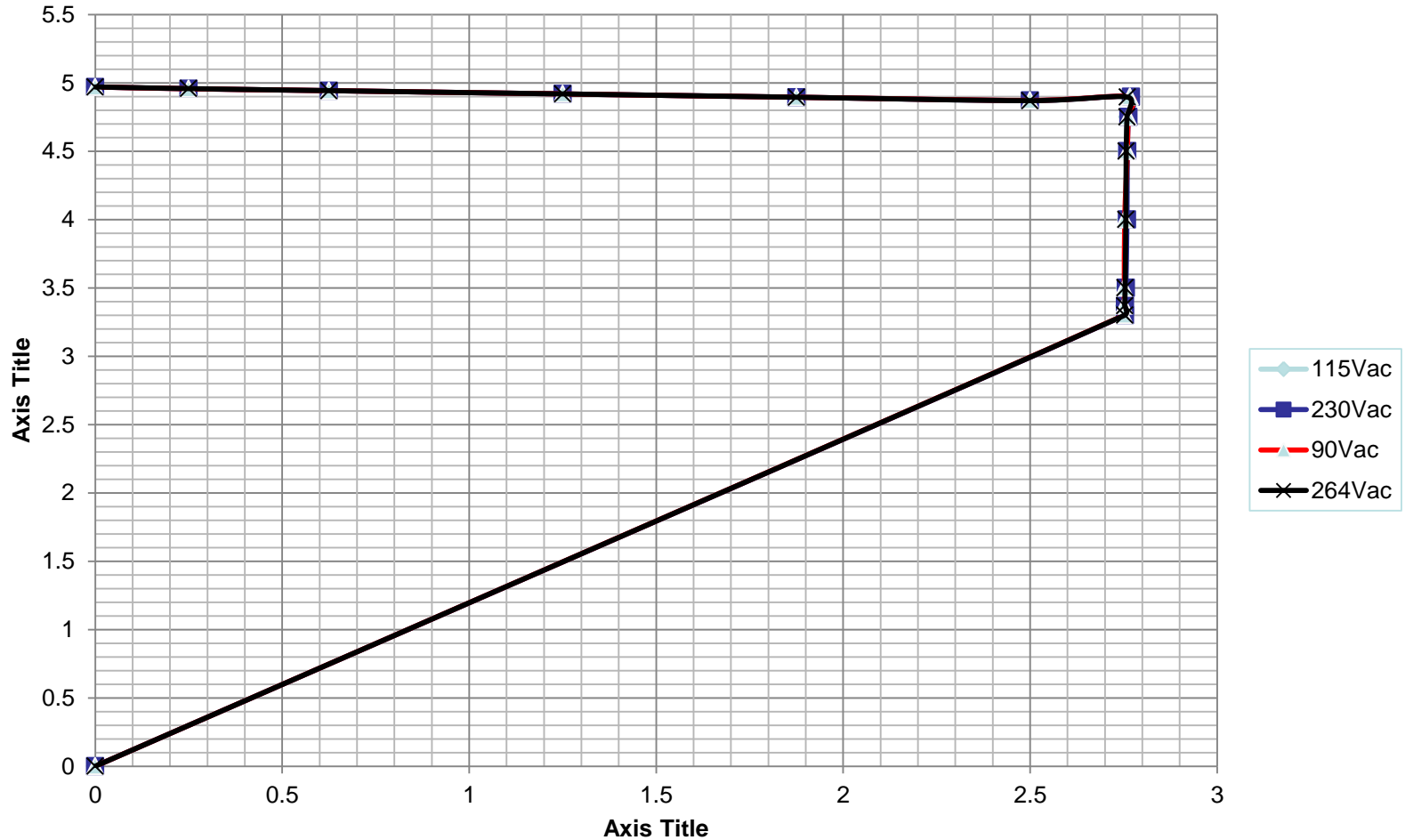
Demoboard Photo



Standby Power At 5V Output

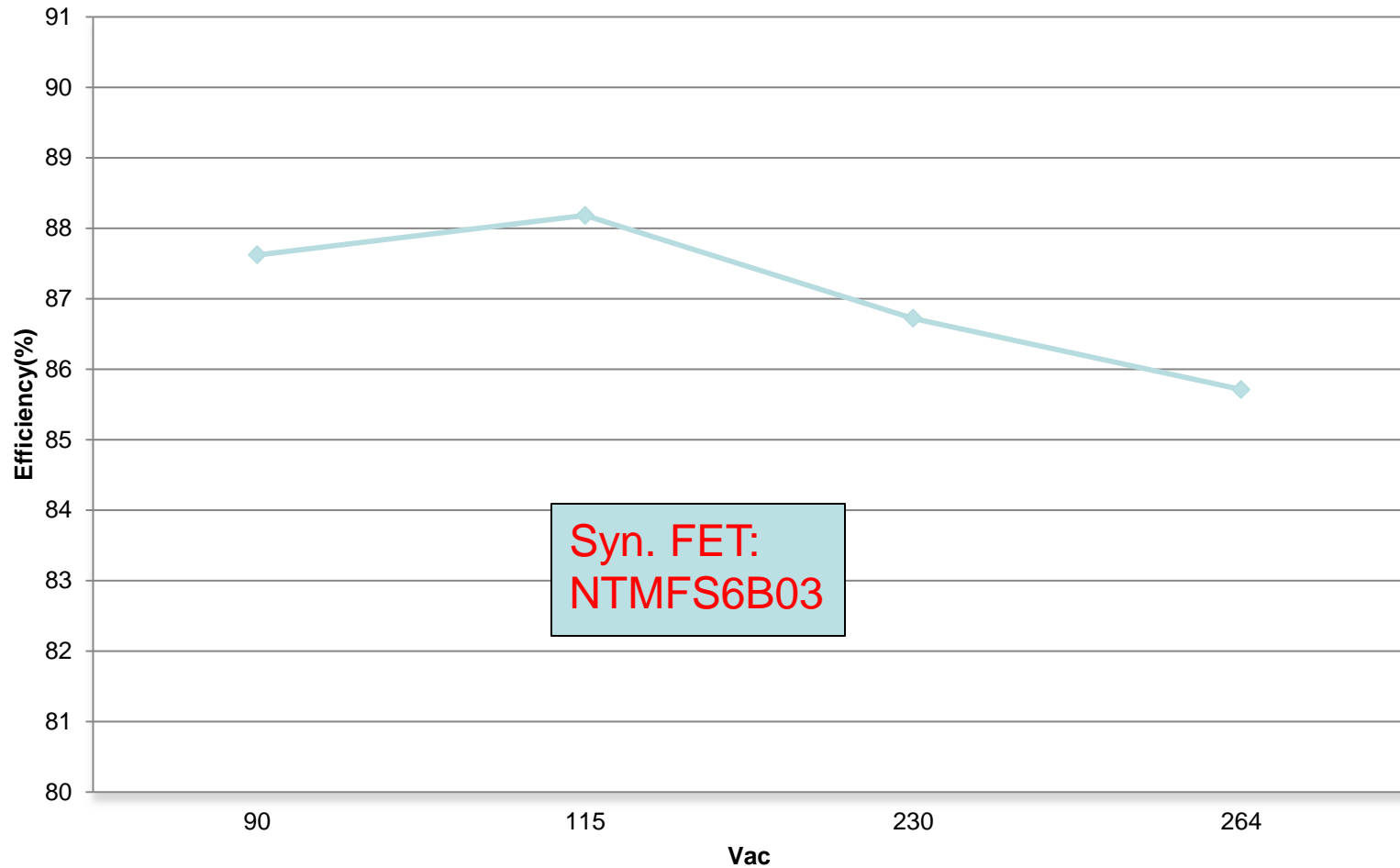


IV Curve At 5V Output



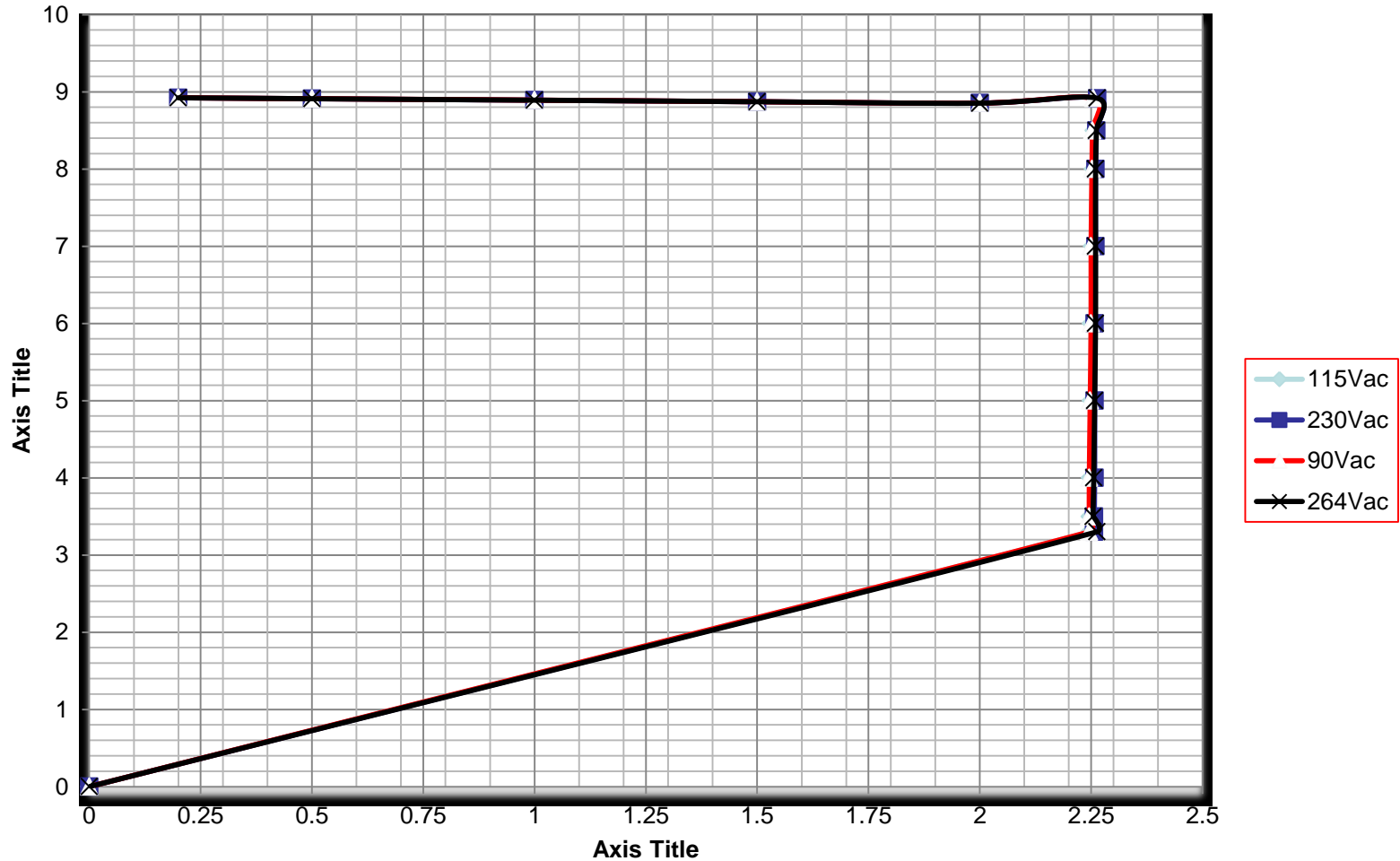
Test condition: all efficiency are tested at board end via USB connector

4 Points Average Efficiency At 9V Output



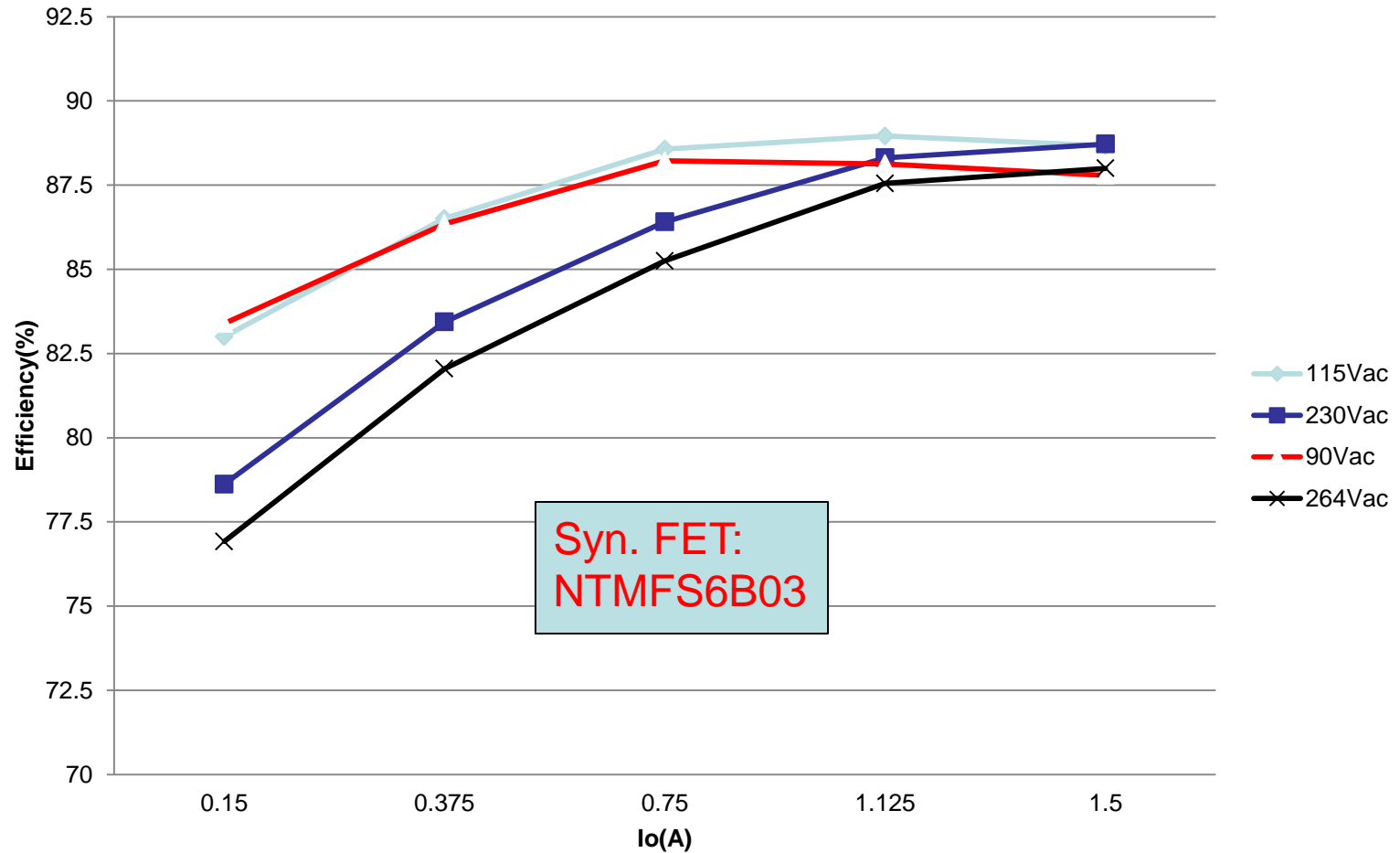
Test condition: all efficiency are tested at board end via USB connector

IV Curve At 9V Output



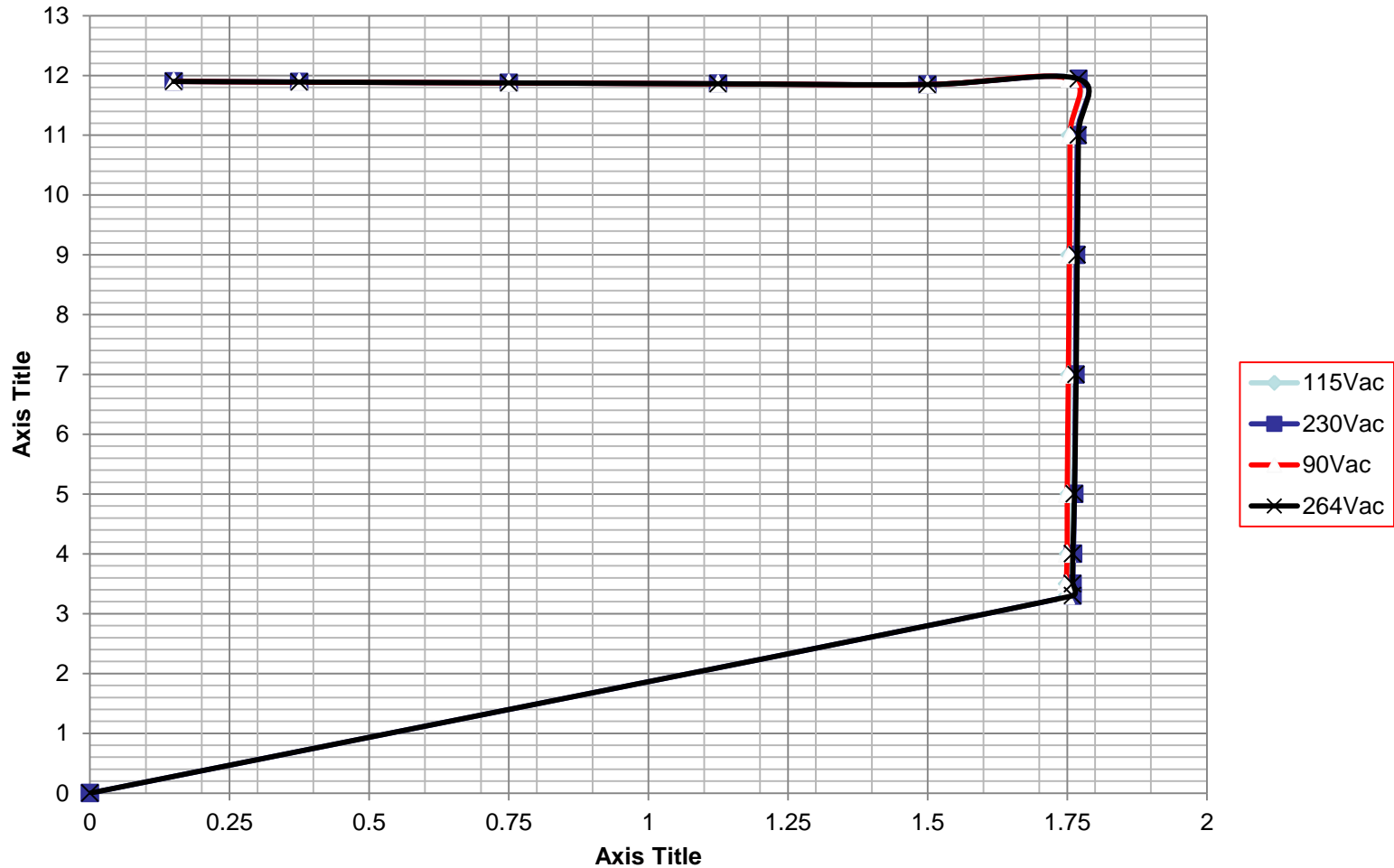
Test condition: all efficiency are tested at board end via USB connector

Efficiency Vs Load Curve At 12V Output



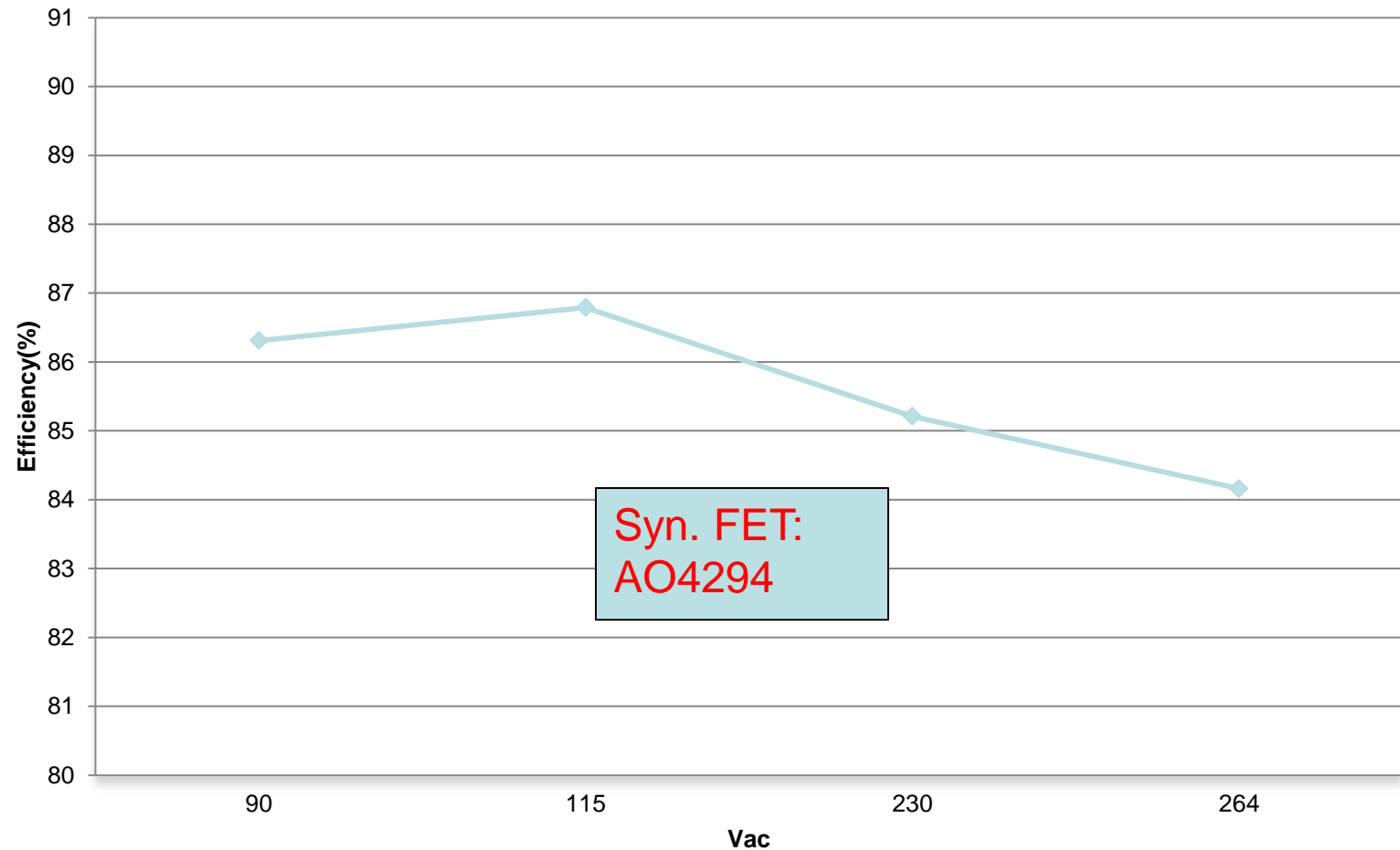
Test condition: all efficiency are tested at board end via USB connector

IV Curve At 12V Output



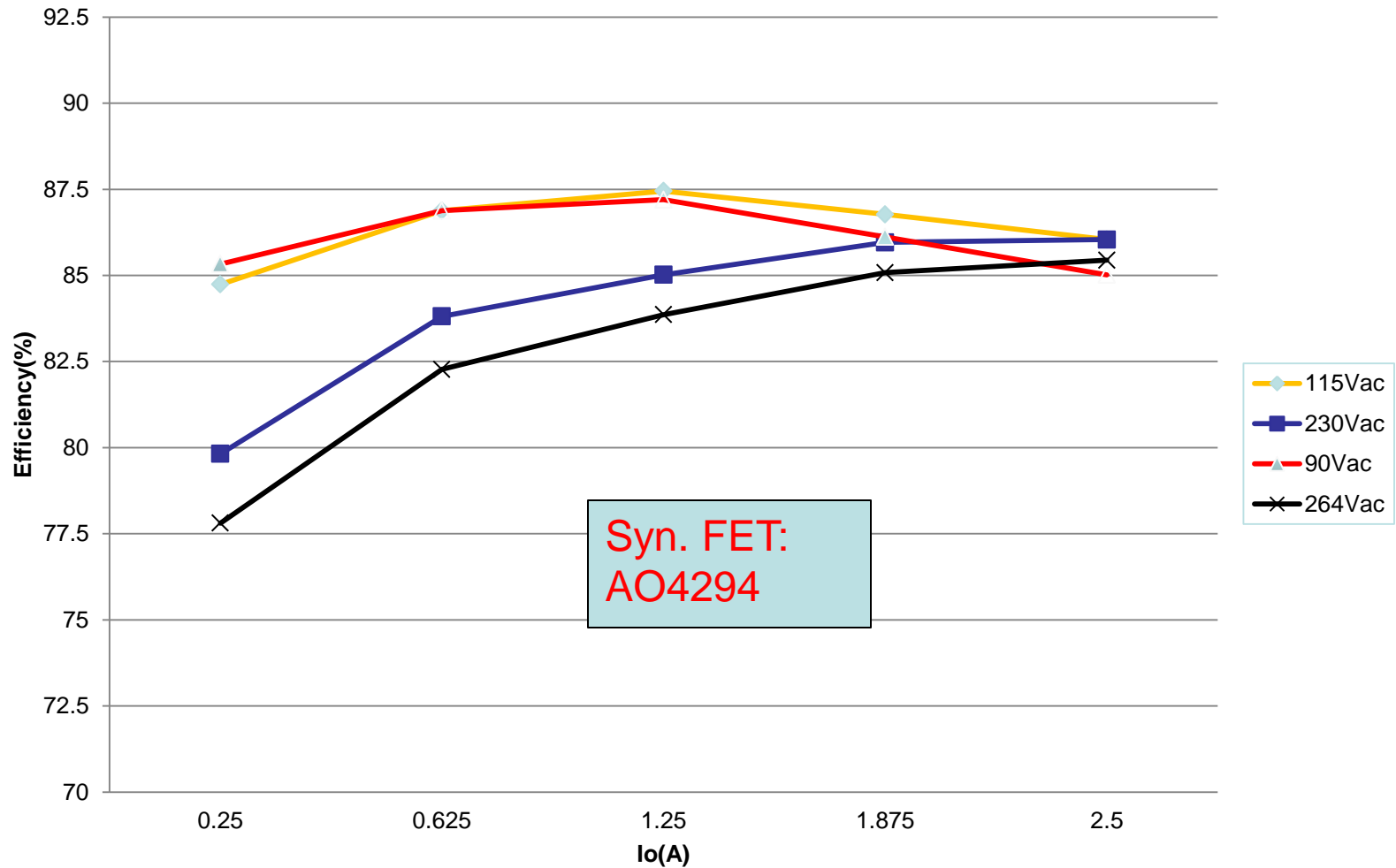
Test condition: all efficiency are tested at board end via USB connector

4 Points Average Efficiency At 5V Output



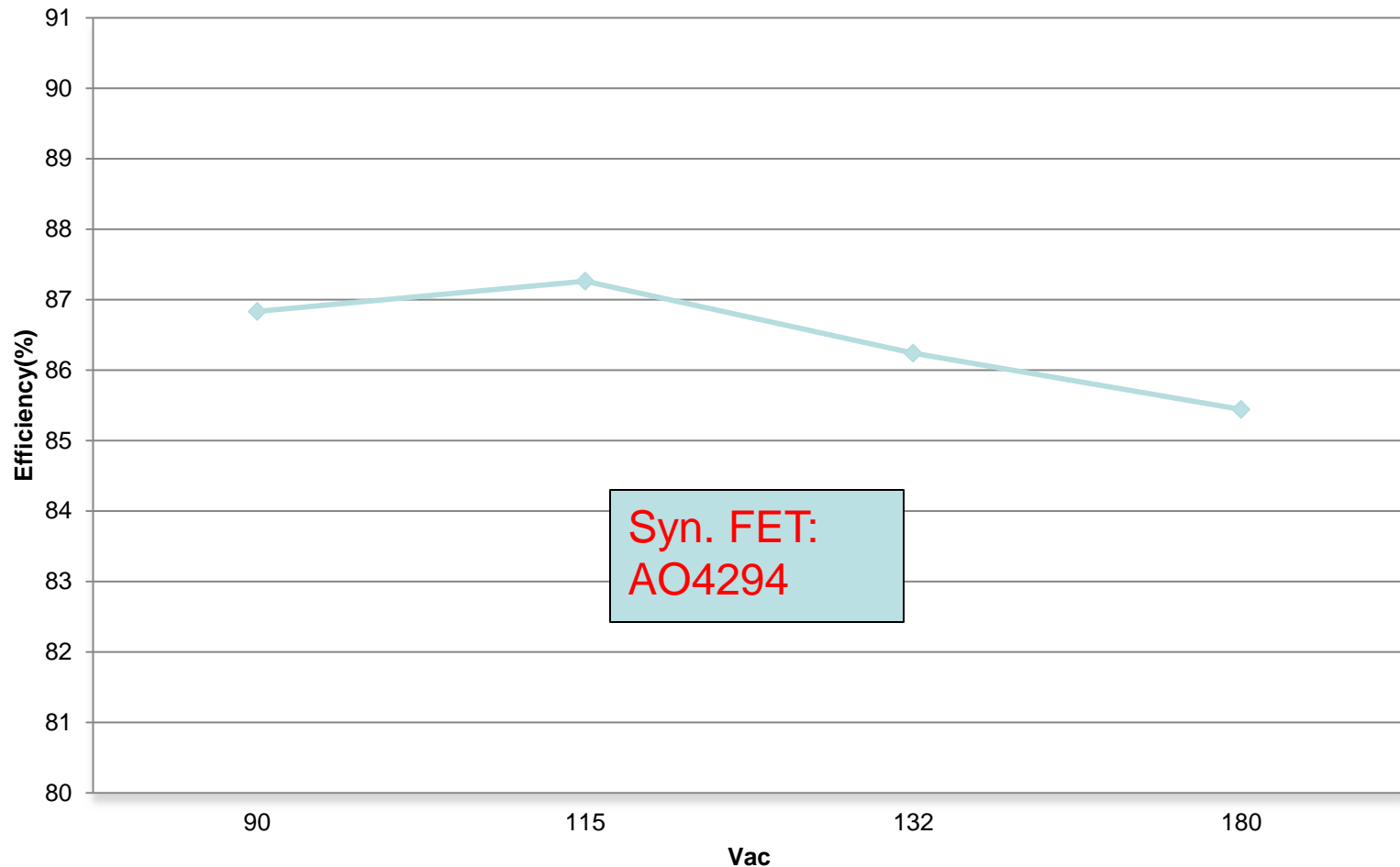
Test condition: all efficiency are tested at board end via USB connector

Efficiency Vs Load Curve At 5V Output



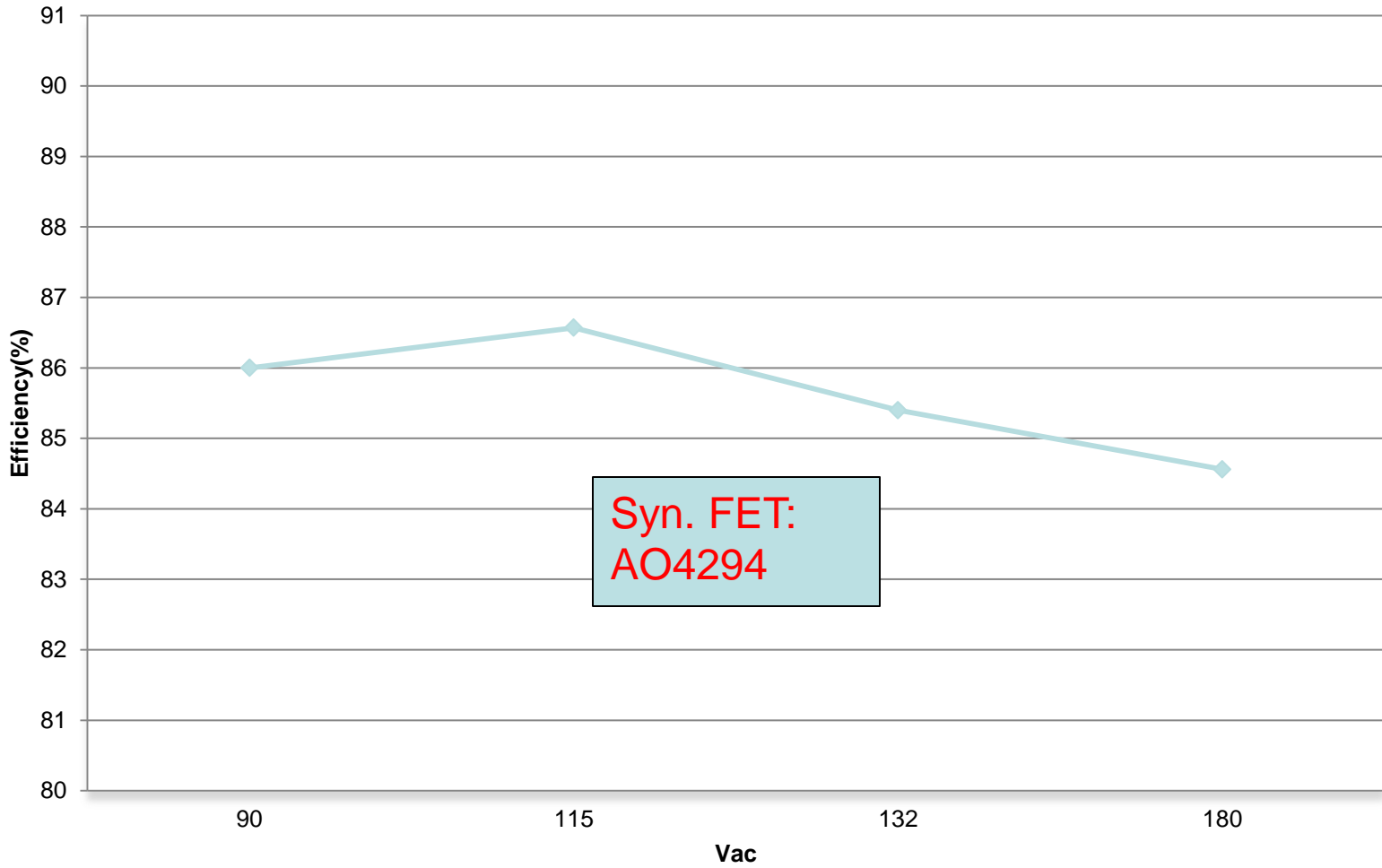
Test condition: all efficiency are tested at board end via USB connector

4 Points Average Efficiency At 9V Output



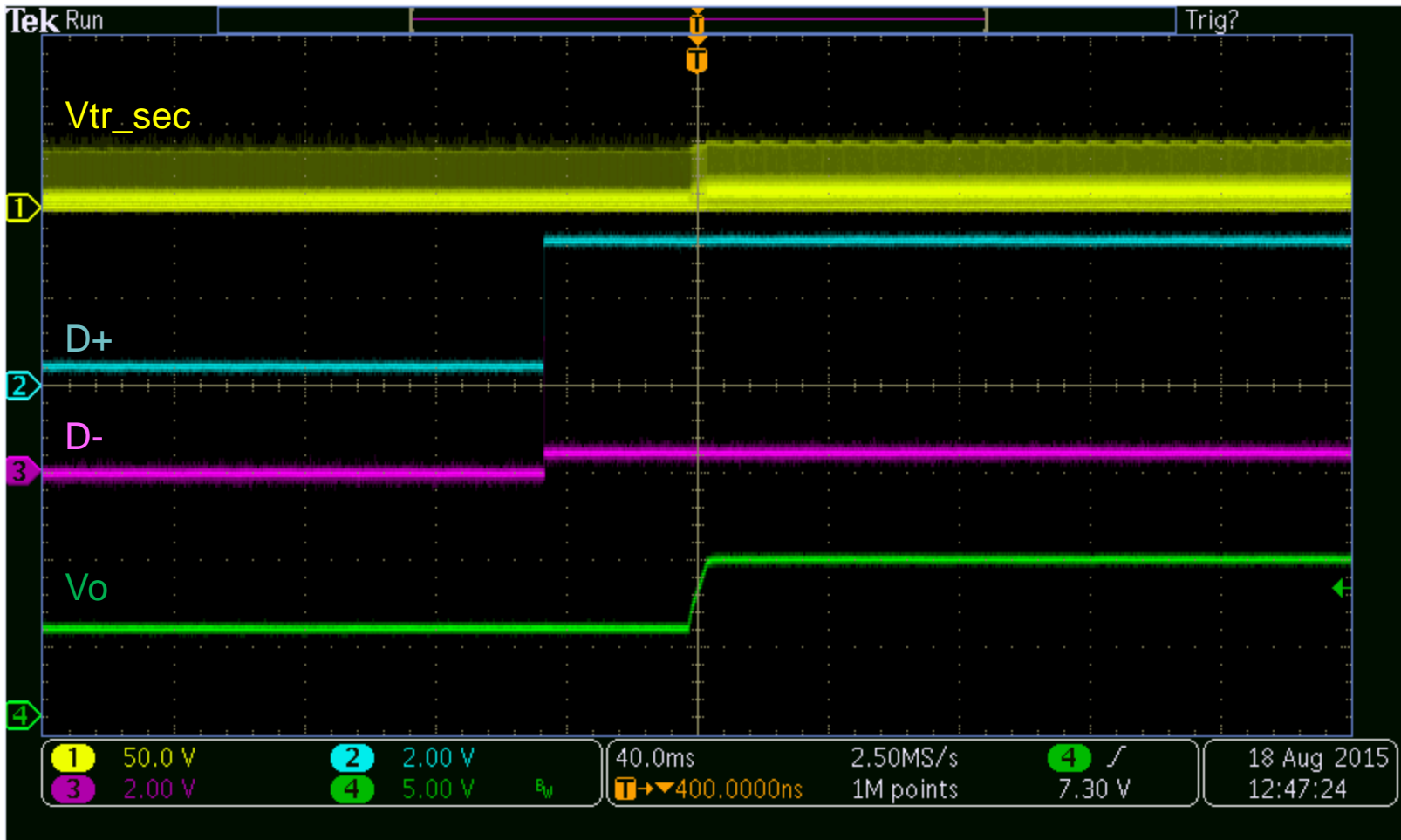
Test condition: all efficiency are tested at board end via USB connector

4 Points Average Efficiency At 12V Output

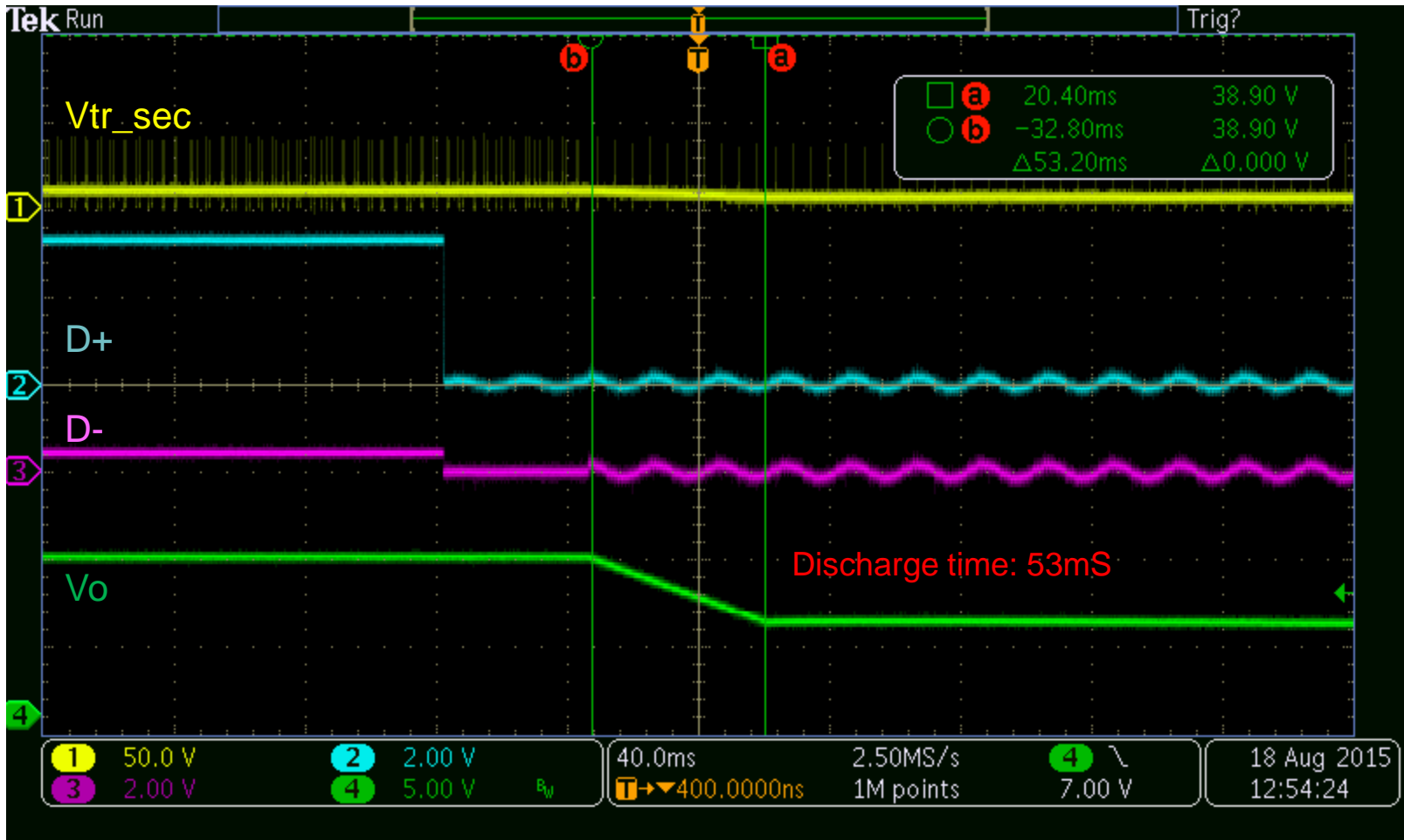


Test condition: all efficiency are tested at board end via USB connector

QC2.0 5V To 9V Transition At 230V2A



QC2.0 9V To 5V Transition At 230V0A



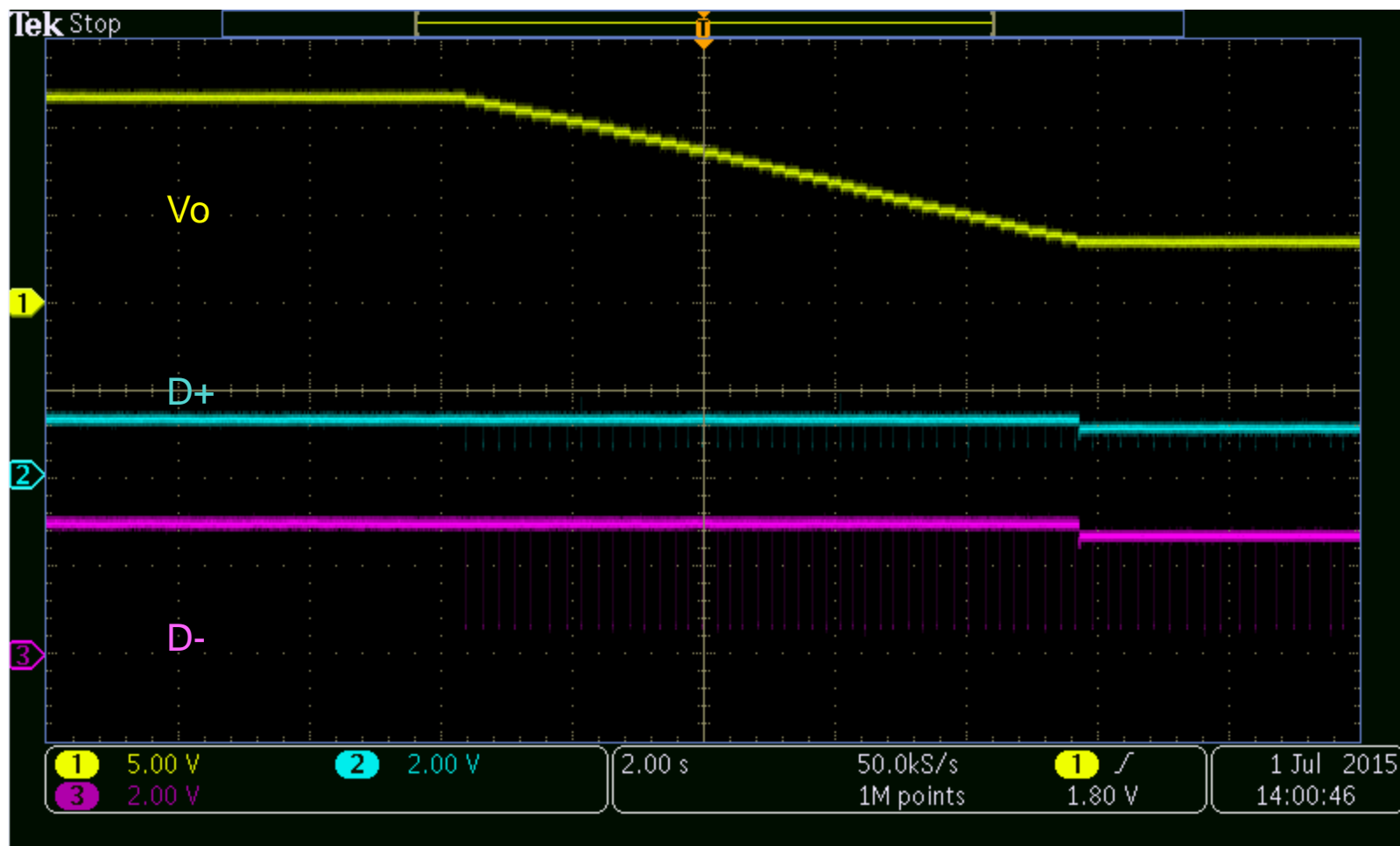
QC3.0 0.2V Step Increase At 115V1.5A

Vo

D+

D-

QC3.0 0.2V Step Decrease At 115V1.5A



Ripple At 90Vac and 5V2.5A

Ripple At 115Vac and 9V2A

Dynamic Test At 230Vac&5V

Vtr_sec

Io

Vo

Test condition: 0-2.5A, 10mS cycle, 250mA/Us
1m cable, tested at E-load

Dynamic Test At 230Vac&5V

Vtr_sec

Io

Vo

Test condition: 0-1A, 10mS cycle, 250mA/Us
1m cable, tested at E-load

OCP at 115Vac and 5V

I_o

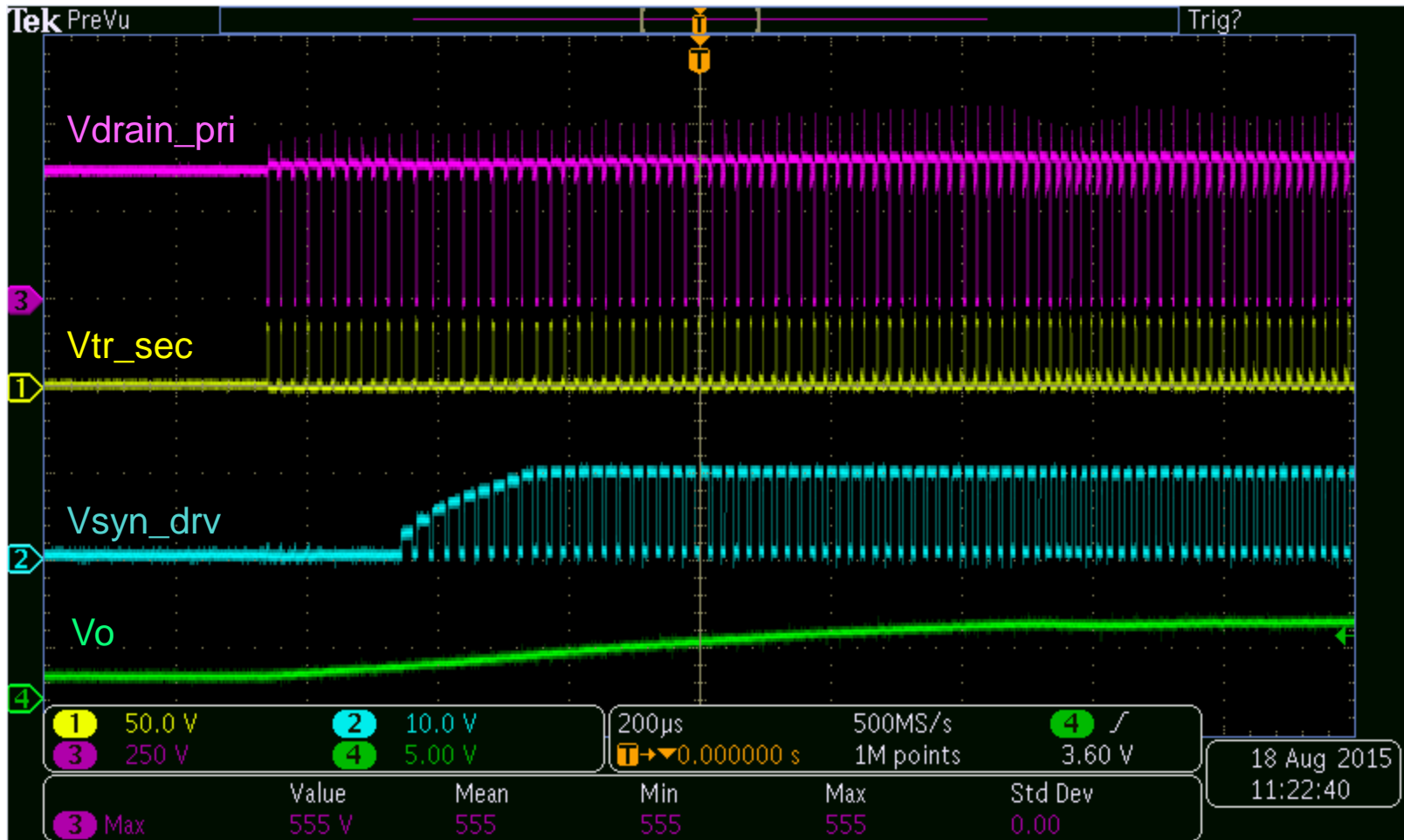
V_{tr-sec}

V_o

$P_i=1.3W$ at SCP

Rise Time At 115Vac&5V3A

Vds Voltage At 264Vac&5V2.5A At Startup



SEC. FET Reverse Voltage & Syn. Drive During Startup

45V Syn. FET
reverse voltage

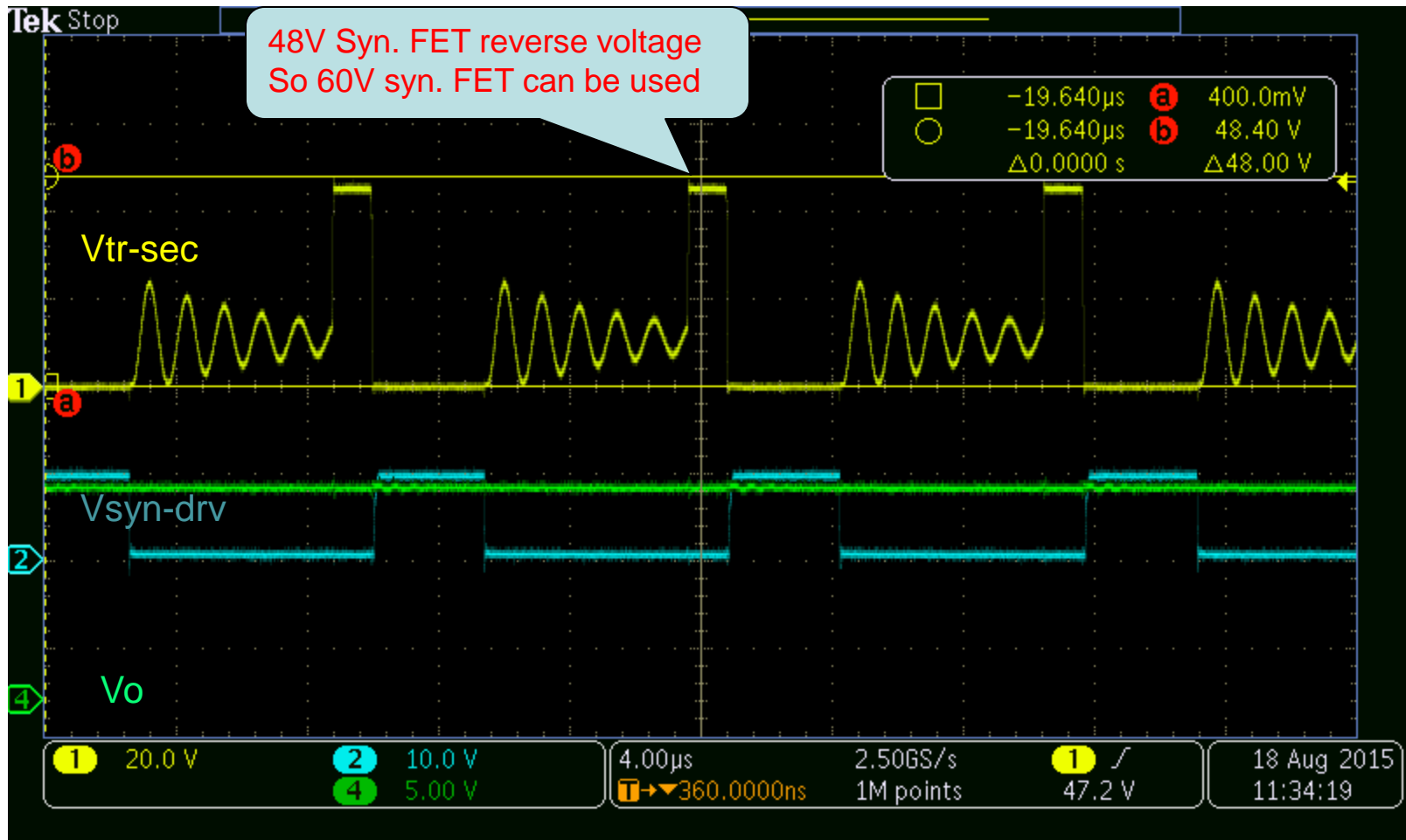
V_{tr-sec}

$V_{syn-drv}$

V_o

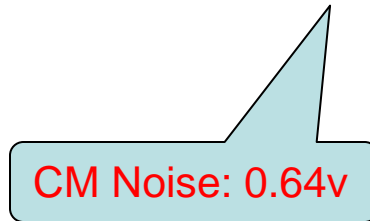
Test condition: 264Vac and 5V2.5A

SEC. FET Reverse Voltage & Syn. Drive During Working



Test condition: 264Vac and 12V1.5A

CM Noise Measurement



CM Noise: 0.64v

Test condition: 230Vac and 5V with 1m cable and 10ohm resistor

EMI-Conduction Emission

Line

Natural

Test condition: 230Vac and 12V1.5A

EMI-Radiation Emission

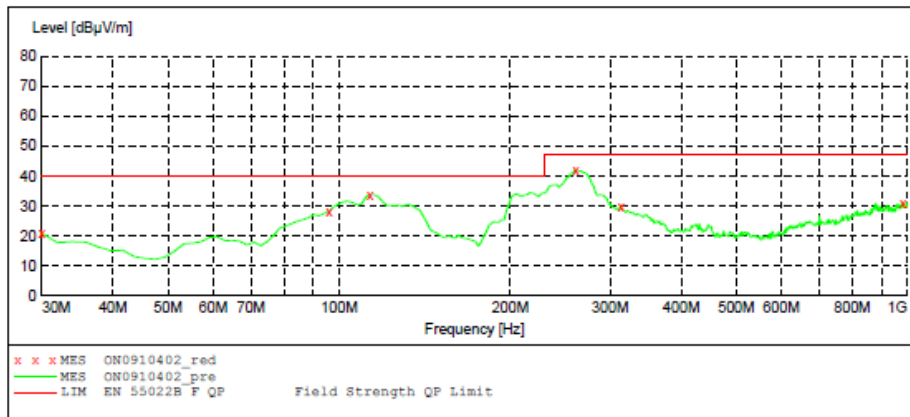
SHENZHEN HUATONGWEI INTERNATIONAL INSPECTION CO.,LTD

RADIATED EMISSION TEST EN 55022 CLASS B

EUT: B1-12V
 Manufacturer: ONSEMI
 Operating Condition: ON
 Test Site: 3M CHAMBER
 Operator: MAN.HU
 Test Specification: AC 230V/50Hz
 Comment:
 Start of Test: 9/10/2015 / 9:35:37AM

SWEEP TABLE: "test (30M-1G)"

Short Description: Field Strength
 Unit: dBuV/m
 Detector: Mode:



HORIZONTAL

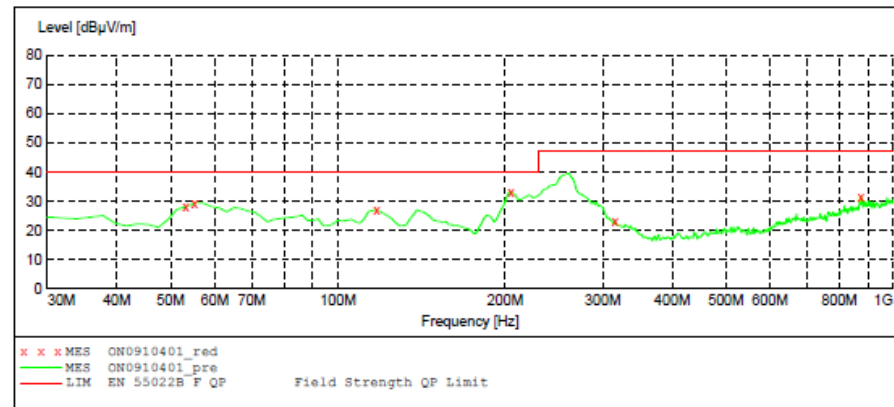
SHENZHEN HUATONGWEI INTERNATIONAL INSPECTION CO.,LTD

RADIATED EMISSION TEST EN 55022 CLASS B

EUT: B1-12V
 Manufacturer: ONSEMI
 Operating Condition: ON
 Test Site: 3M CHAMBER
 Operator: MAN.HU
 Test Specification: AC 230V/50Hz
 Comment:
 Start of Test: 9/10/2015 / 9:33:25AM

SWEEP TABLE: "test (30M-1G)"

Short Description: Field Strength
 Unit: dBuV/m
 Detector: Mode:



VERTICAL

Test condition: 230Vac and 12V1.5A

BOM(Continued)

安森美半导体
ON Semiconductor[®]



深圳市飞捷士科技有限公司

- 深圳总部：中国.深圳市民治梅龙大道皇嘉梅陇公馆广场 A 座 1310-1314
- 服务热线：400 608 2829
- 深圳总机：+086 755 8825 7825
- 销售一部：+086 755 6196 3122
- 企业传真：+086 755 8825 7896
- 公司邮箱：simon@flypowers.com 手机：13902969450 杨先生
- 官方网址：<http://www.flypowers.com> Q Q：2355410666
- 深圳地址：中国.深圳市民治梅龙大道皇嘉梅陇公馆广场 A 座 1310-1314