



PD产品推广与应用

TYPE-C/PD的由来

TYPE-C是一种电子设备接口标准，也叫USB-C，是USB-A/B的升级版本，由USB IF发布新一代USB接口标准规范，逐步统一电子设备接口；既可以传输音视频信号，也可以传输电力双向传输；TYPE-C的电力传输为固定5V，最大传输功率为15W，PD在TYPE-C的基础上增强的电力传输能力，将电流增大到5A，电压增加到20V，最大传输功率增强到100W；



TYPE-C 的优点



性能	内容
全功能	支持数据，音视频，及电力传输，一条线可以代替之前的多条线
支持正反插拔	与苹果的 Lighting 头类似，端口正面和反面相同，支持正反插拔
支持双向传输	数据，电力可以实现双向传输
向下兼容	能兼容之前的 USB-A/B 接口
小尺寸	接口尺寸为 8.3*2.5mm ，约为 USB-A 口的三分之一
高速率	数据传输支持 USB3.1 ,协议传输速率可达 10Gb/S

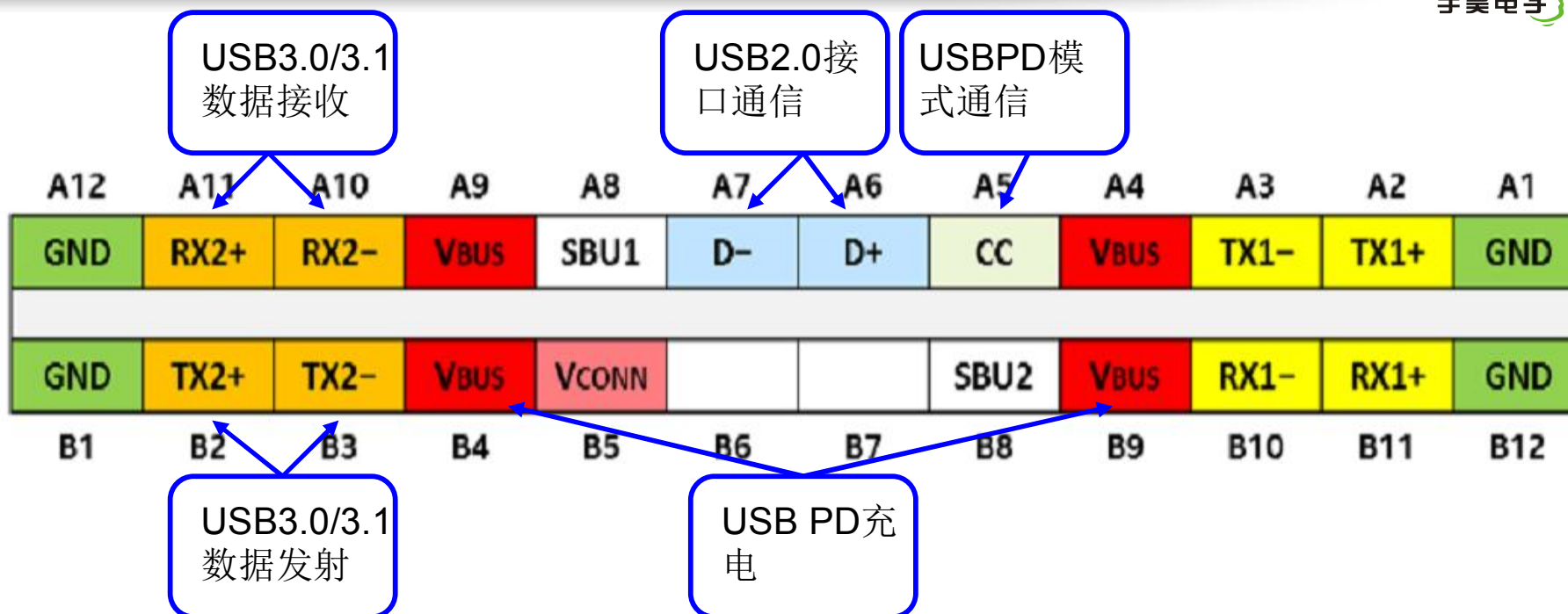
各种USB参数比较



	输出电压	输出电流	输出功率	理论传输带宽	传输信号协议
USB2.0	5V	500mA	2.5W	480Mbps	D+/D-
USB3.0	5V	900mA	5W	5Gbps	D+/D-
BC1.2	5V	1.5A	7.5W	480Mbps	D+/D-
QC2.0/3.0 ClassA	3.6-12V	3A	36W	480Mbps	D+/D-
PE+/PD2.0	3.6-12V	3A	36W	480Mbps	D+/D-
USB_TYPE-C 电流1.5A	5V	1.5A	7.5W	10Gbps	CC1/CC2
USB_TYPE-C 电流3A	5V	3A	15W	10Gbps	CC1/CC2
PD	3.3-20V	5A	100W	10Gbps	CC1/CC2

不要看着USB Type-C好像能支持最高20V/5A，实际上这需要USB PD，而支持USB PD需要额外的pd芯片，所以不要以为是USB Type-C接口就可以支持到20V/5A。

TYPE-C引脚定义



可以看到，一个完整的TYPE-C端口共计有24 Pin脚，数据传输主要有TX/RX两组差分信号，CC1和CC2是两个关键引脚，作用很多

- 探测连接，区分正反面，区分DFP和UFP，也就是主从
- 配置Vbus，有USB Type-C和USB Power Delivery两种模式
- 配置Vconn，当线缆里有芯片的时候，一个cc传输信号，一个cc变成供电Vconn

电源和地都有4个，这就是为什么可以支持到100W的原因。

TYPE-C引脚定义





二：只有在适配器检测到有UFP设备插入时才开启VBUS，当UFP设备拔出时，关闭VBUS;

四： 8 Pin MSOP-8封装

PD的规格

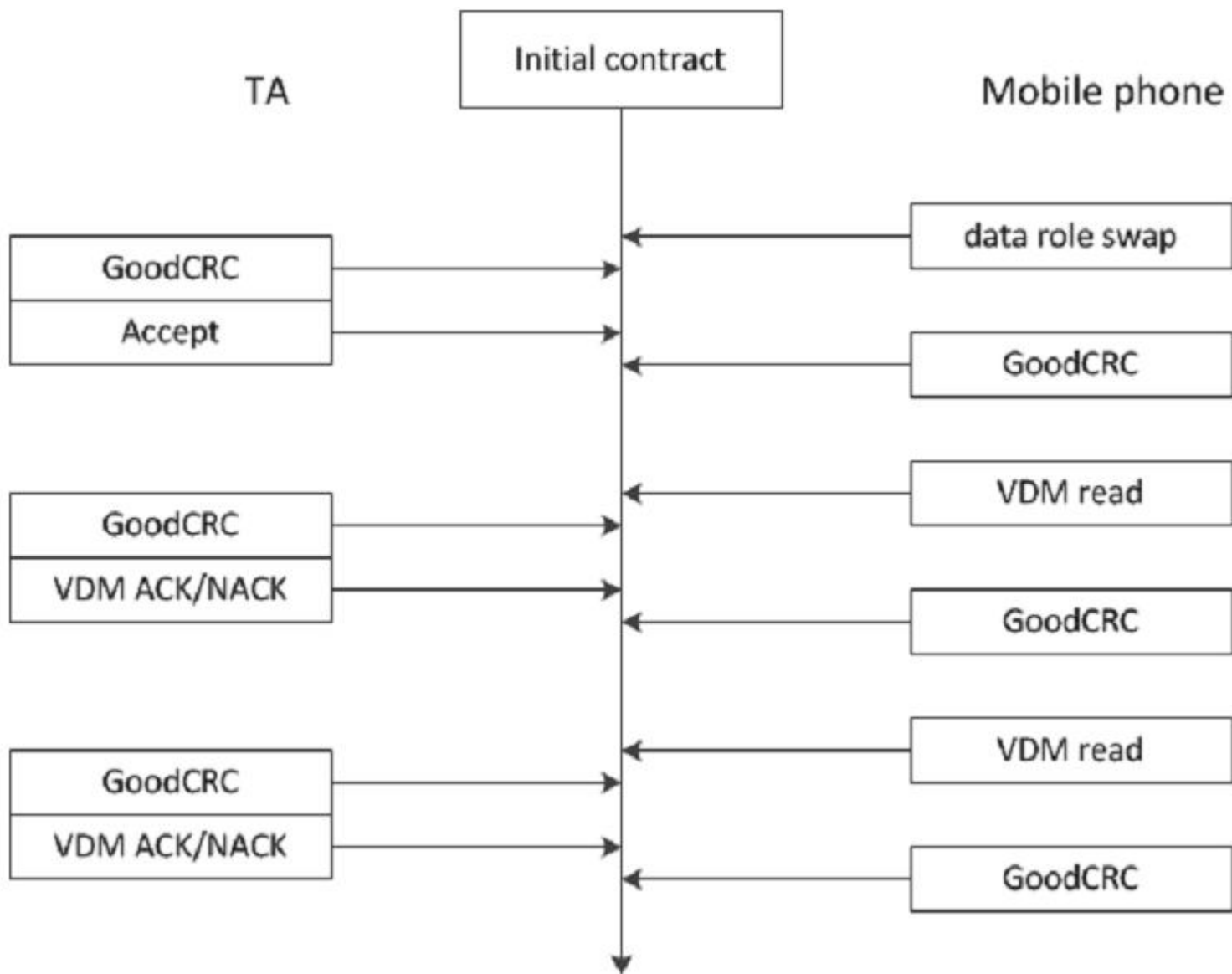


PDP (W)	5V fixed	9V fixed	15V fixed	20V fixed	5V Prog	9V Prog	15V Prog	20V Prog
$x \leq 15W$	PDP/5	-	-	-	PDP/5	-	-	-
$15 < x \leq 27W$	3A	PDP/9	-	-	3A or PDP/5 ²	PDP/9	-	-
$27 < x \leq 45W$	3A	3A	PDP/15	-	PDP/5 ¹	3A or PDP/9 ²	PDP/15	-
$45 < x \leq 100W$	3A	3A	3A	PDP/20	-	PDP/9 ¹	3A or PDP/15 ²	PDP/20 ²

表一：Pd在不同功率段输出电压电流规格

	PPS电压范围			
PDO	5V	9V	15V	20V
最大电压	5.9V	11V	16V	21V
最小电压	3.3V	3.3V	3.3V	3.3V

PD协议握手时序



IW657P



N0.	Protection Feature	PD Fault condition	Actions
1	OVP	$V_{out} > V_{set} * 1.23$ (23%) Typ	Vbus off;send DLNK OVP to primary to shutdown TA
2	Vcc UVLO	$V_{cc} < 2.6V$	Vbus switch off
3	Output-short-protection(OSP)	$V_{out} - V_{bus} (R_{ds}) > V_{osp}$ (300mV)	Vbus switch off, set Vcc to 5V
4	External over-temp.-protection (OTP)	NTC temperature>Totp(120C default, R25=100kohm, B=4250) or Vsd<1V(IC option)	Vbus off;send DLNK OVP to primary to shutdown TA
5	Internal Over-temp.-protection (OTP)	$T_j > 140C$	Vbus off;send DLNK OVP to primary to shutdown TA
6	D+,D- OVP	$> 4.5V$ Typ	Vbus off
7	Cable Fault Protection	$< \text{Equiv } 300 \text{ ohm}$	Vbus off
8	CC1, CC2 OVP	$> 6.8V$ Typ	Vbus off
9	AC unplug detection	iW656P V_DET(th) < 0.8V (Typ) & 40 mS	Vbus off;send DLNK OVP to primary to shutdown TA
10	Secondary OCP	$I_{bus} > I_{set}$ by 30%/25%/20%	Vbus off

IW657P For 18W/27W应用



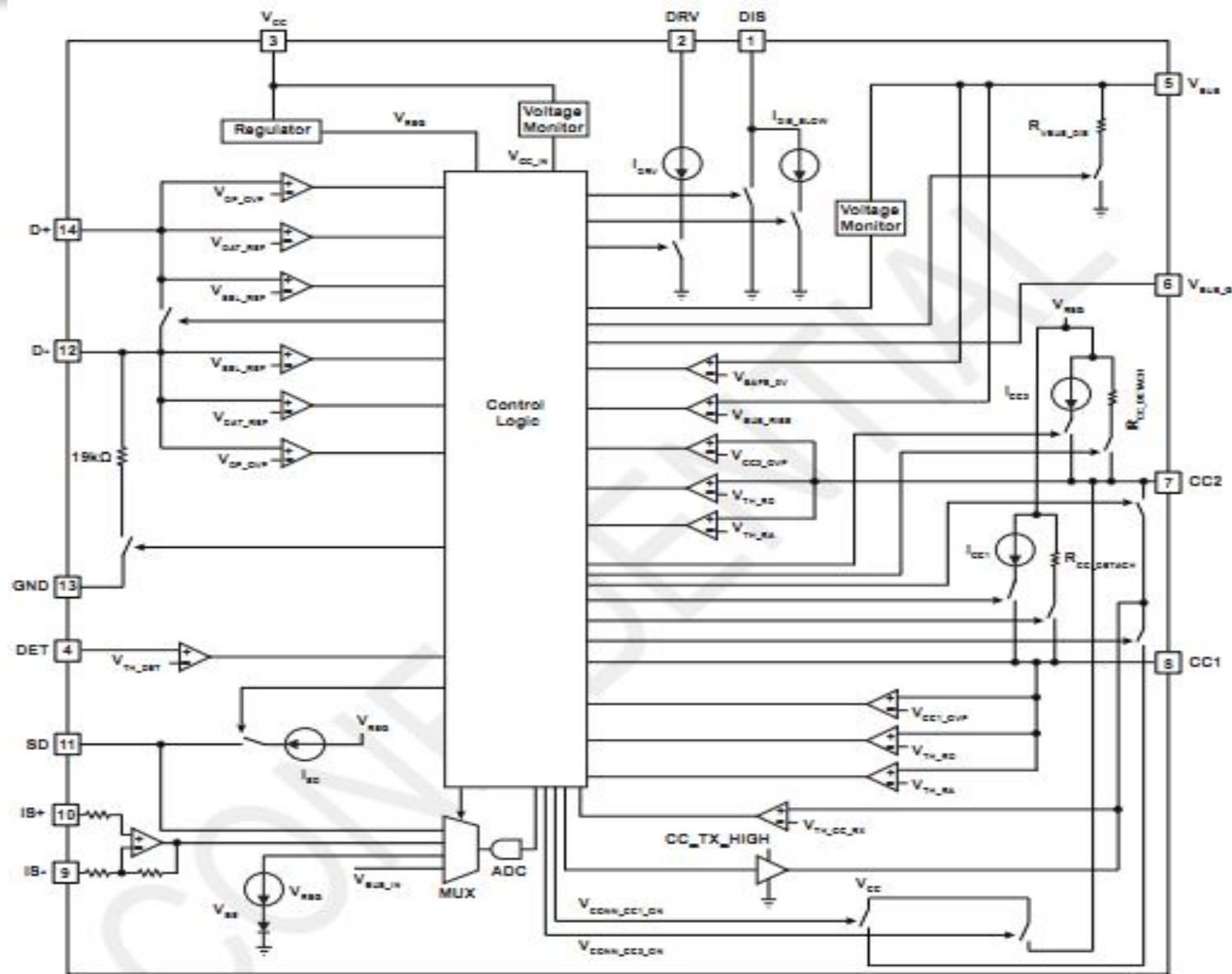
P/N	iW657P-18-90B	iW657P-18-91B	iW657P-18-70B	iW657P-27-92B	iW657P-27-93B	iW657P-27-74B
Power	18W			27W		
Pair with Primary-side Controller	iW1791 or iW1799	iW1791 or iW1799	iW1791 or iW1799	iW1791 or iW1799	iW1791 or iW1799	iW1791 or iW1799
PDO	5V 3A	5V 3A	5V 3A	5V 3A	5V 3A	5V 3A
	9V 2A	9V 2A	9V 2A	9V 3A	9V 3A	9V 3A
			12V 1.5A	12V 2.25A	12V 2.25A	
APDO1	3.3-5.9V 0.4-3A	3.3-5.9V 0.4-3A	3.3-5.9V 0.4-3A	3.3-5.9V 0.4-3A	3.3-5.9V 0.4-3A	3.3-5.9V 0.4-3A
APDO2	3.3-11V 0.4-2A	3.3-11V 0.4-2A	3.3-11V 0.4-2A	3.3-11V 0.4-3A	3.3-11V 0.4-3A	3.3-11V 0.4-3A
PPS Power Limit	Disable	Enable	Enable	Disable	Enable	Enable
Kcc@3A	0.495	0.495	0.495	0.417	0.417	0.417

IW657P For 30W/45W应用



P/N	iW657P-30-72B	iW657P-30-73B	iW657P-45-94B	iW657P-45-52B
Power	30W		45W	
Pair with Primary-side Controller	iW1799	iW1799	iW1799	iW1799
PDO	5V 3A	5V 3A	5V 3A	5V 3A
	9V 3A	9V 3A	9V 3A	9V 3A
	12V 2.5A	12V 2.5A	15V 3A	12V 3A
	15V 2A	15V 2A	20V 2.25A	15V 3A
	20V 1.5A			20V 2.25A
APDO1	3.3-11V 0.4-3A	3.3-11V 0.4-3A	3.3-11V 1-3A	Disable
APDO2	3.3-16V 0.4-2A	3.3-16V 0.4-2A	3.3-16V 1-3A	Disable
PPS Power Limit	Enable	Enable	Enable	NA
Kcc@3A	0.525	0.525	0.417	0.417

IW657系统框图



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Qualcomm® Quick Charge™ 4 Compliance Test Report

Qualcomm® Quick Charge™ 4 Compliance Test Report

Ref CTS: 0.9.9

Report Version: GRL-QC4-004

11th June 2018



Customer Name	Dialog Semiconductors Inc
GRL Report Number	DK-SC-051518
Product Name	iW657P
Product Description	Quick Charge 4 Reference Design
Product Test ID (VID)	0x2DCF
Product Test ID (PID)	0x657B
PD Firmware Version	N/A (ASIC)
Product Type	Provider Only
Customer Contact	657 Campbell Technology Pkwy, Suite 150, Campbell, CA 95008, USA.

Scope of Testing Quick Charge 4 Certification Testing

Test Result **PASS**
GRL Test Engineer Naresh B
naresh@graniteriverlabs.com

LEGAL DISCLAIMER:

1. This test report is subject to Granite River Labs Inc. Standard Terms & Conditions, and does not guarantee the quality or functionality of the device tested, compliance with any specifications, or interoperability with other products. Customer is solely responsible for the quality, functionality, interoperability, and specification conformance of Customer's products.
2. This report is based on the information Customer has supplied to GRL and Customer's representation of the device tested. Test result is valid only to the original tested device model.

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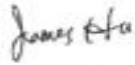
QUALCOMM® QUICK CHARGE™ 4+ TECHNOLOGY
HIGH VOLTAGE, HIGH CURRENT DEDICATED CHARGING PORT
VERIFICATION

ISSUED BY
UL TAIWAN CO., LTD.

CERTIFICATE NO	▶ 4788356267-2
SPECIFICATION	▶ Qualcomm HV-HC DCP Interface Specification Revision E
APPROVAL DATE	▶ July 25, 2018
APPROVAL TYPE	▶ ORIGINAL ASSESSMENT
CERTIFICATE HOLDER	▶ Dialog Semiconductor ▶ 675 Campbell Technology Pkwy ▶ Campbell, CA 95008
TYPE OF EQUIPMENT	▶ Chipset Reference Design
CLASS OF EQUIPMENT	▶ Class A
TRADE NAME AND MODEL	▶ Dialog Semiconductor ▶ iW657P
LABORATORY NAME AND ADDRESS	MEASUREMENT FACILITIES ▶ UL Verification Services Inc. ▶ 47266 Benicia Street ▶ Fremont, CA 94538 USA

Verification of equipment means only that the equipment has met the requirements of the above-noted specification. Trademark applications and agreements regarding the use of Quick Charge 4+ Logo, are acted on accordingly by Qualcomm Technologies, Inc. This certificate is issued on condition that the holder complies and will continue to comply with the Quick Charge 4+ program requirements established by Qualcomm Technologies, Inc. The equipment for which this certificate is issued shall not bear the Qualcomm Quick Charge 4+ Logo unless the equipment complies with the applicable technical specifications and agreements issued by Qualcomm Technologies, Inc. as applicable to the Type Of Equipment and Class Of Equipment designated above.

I hereby attest that the subject equipment was tested and found in compliance with the above-noted specification.

ISSUED BY: 
James Hu
Senior Project Engineer, UL Taiwan Co., Ltd.

ISSUED ON: ▶ July 25, 2018



Qualcomm
quick charge 4+

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PPS证书号



Date Certified	Company	Product Type	Product Marketing Name	Product Model/Part Number	Product Rev	TID
7/12/2018	Analogix Semiconductor, Inc.	Development> IP Building Blocks> PD Silicon Only > PD 3.0>no PPS	Joseph Juan	ANX7447	AC	11090032
7/12/2018	Canyon Semiconductor	Development> IP Building Blocks> PD Silicon Only > PD 3.0>no PPS	CY2568	CY2568	A	11090012
12/8/2017	Canyon Semiconductor	Development> IP Building Blocks> PD Silicon Only > PD 3.0 > no PPS	CY2311 USB-PD3.0 Source Controller	CY2311	B	1061013
12/8/2017	CE LINK LIMITED	Development> IP Building Blocks> PD Silicon Only > PD 3.0 > no PPS	PD3.0 controller	UM1137	01	1061029
4/27/2018	Chrontel, Inc.	Development> IP Building Blocks> PD Silicon Only > PD 3.0>no PPS	CH7251	CH7251	AC	1080007
7/12/2018	Cypress Semiconductor	Development> IP Building Blocks> PD Silicon Only > PD 3.0>no PPS	CCG4 PD3.0 Silicon	CYPD4126	Rev 1	11090040
7/12/2018	Cypress Semiconductor	Development> IP Building Blocks> PD Silicon Only > PD 3.0>no PPS	CCG4	CYPD4136	Rev1	11090044
1/10/2018	Cypress Semiconductor	Development> IP Building Blocks> PD Silicon Only > PD 3.0 > with PPS	CCG3PA Opto Feedback Power Adapter Controller	CYPD3174	1	1060036
1/10/2018	Cypress Semiconductor	Development> IP Building Blocks> PD Silicon Only > PD 3.0 > with PPS	CCG3PA Direct Feedback Power Adapter Controller	CYPD3175	1	1060037
2/16/2018	Cypress Semiconductor	Development> IP Building Blocks> PD Silicon Only > PD 3.0>no PPS	CCG5	CYPD5225-96BZXI	Rev2	1070049
3/21/2018	Cypress Semiconductor	Development> IP Building Blocks> PD Silicon Only > PD 3.0>no PPS	EZ-PD CCG5	CYPD5125	Rev2	1071049
4/19/2018	Cypress Semiconductor	Development> IP Building Blocks> PD Silicon Only > PD 3.0>no PPS	EZ-PD CCG5	CYPD5235-96BZXI	Rev2	1072049
4/19/2018	Cypress Semiconductor	Development> IP Building Blocks> PD Silicon Only > PD 3.0>no PPS	EZ-PD CCG5	CYPD5236-96BZXI	Rev2	1073049
4/27/2018	Cypress Semiconductor	Development> IP Building Blocks> PD Silicon Only > PD 3.0>no PPS	CCG5	CYPD5225-96BZXI	Rev3	1080040
7/12/2018	Dialog Semiconductor (UK) Ltd	Development> IP Building Blocks> PD Silicon Only > PD 3.0> with PPS	iW657P	iW657P	B	11090046