

HUSB339 USB-A+USB-C 双口输出

智能功率分配方案更新

简介

随着 USB PD 快充的高速发展，USB-A+USB-C 双口输出 PD 快充无疑是当前实用性最高、最受欢迎的 PD 快充之一。其中 USB-C 口支持 PD 电压 5V, 9V, 12V, 15V 和 20V 不同的电压档输出；而 USB-A 口支持 5V/2.4A, 12W 输出。更为重要的是，USB-A+USB-C 双口支持智能功率分配功能，USB-C 输出功率会随着 USB-A 的插入状态动态变化，PD 快充的功能保持不变，实现了 AC-DC 功率级利用率最大化。相对于 USB-A 口支持 QC 功能，5V/2.4A 的输出更能满足苹果设备（特别是 iPad）的快速充电，而支持 QC 手机几乎都能支持 PD 快充，USB-A 支持 QC 反而显得作用没有那么大。

前段时间，慧能泰半导体推出了 USB-A+USB-C 双口输出智能功率分配方案参考设计，实现了任何功率值的降功率，深受广大客户欢迎。本次我们对原来方案作了更新。相对于原来的方案，电路更简洁，成本更低，性能更好。

规格指标

表 1, 表 2, 表 3 和表 4 分别给出了总功率 30W、45W、60W 和 65W 的 USB-A+USB-C 双口输出 PD 快充规格指标。

表 1. 30W 总功率规格指标 (以 12W 降功率为例)

类别	项目	规格指标
输入特性	输入电压范围	5V-25V
A 口输出特性	充电标准	Apple 5V/2.4A, BC 1.2 DCP
	输出电压电流	5.1V2.4A
	输出功率	12W
C 口输出特性	充电标准	PD2.0, PD3.0, PPS, QC2.0, QC3.0, Apple 5V/2.4A, BC 1.2 DCP
	输出电压电流 (A 口不插)	5.1V3A, 9V3A, 12V2.5A, 15V2A, 20V1.5A
	输出电压电流 (A 口插入)	5.1V3A, 9V2A, 12V1.5A, 15V1.2A
	输出功率 (A 口不插)	30W
	输出功率 (A 口插入)	18W

表 2. 45W 总功率规格指标 (以 15W 降功率为例)

类别	项目	规格指标
输入特性	输入电压范围	5V-25V
A 口输出特性	充电标准	Apple 5V/2.4A, BC 1.2 DCP
	输出电压电流	5.1V2.4A

	输出功率	12W
C 口输出特性	充电标准	PD2.0, PD3.0, PPS, QC2.0, QC3.0, Apple 5V/2.4A, BC 1.2 DCP
	输出电压电流 (A 口不插)	5.1V3A, 9V3A, 12V3A, 15V3A, 20V2.25A
	输出电压电流 (A 口插入)	5.1V3A, 9V3A, 12V2.5A, 15V2A, 20V1.5A
	输出功率 (A 口不插)	45W
	输出功率 (A 口插入)	30W

表 3. 60W 总功率规格指标 (以 12W 降功率为例)

类别	项目	规格指标
输入特性	输入电压范围	5V-25V
A 口输出特性	充电标准	Apple 5V/2.4A, BC 1.2 DCP
	输出电压电流	5.1V2.4A
	输出功率	12W
C 口输出特性	充电标准	PD2.0, PD3.0, PPS, QC2.0, QC3.0, Apple 5V/2.4A, BC 1.2 DCP
	输出电压电流 (A 口不插)	5.1V3A, 9V3A, 12V3A, 15V3A, 20V3 A
	输出电压电流 (A 口插入)	5.1V3A, 9V3A, 12V3A, 15V3A, 20V2.4A
	输出功率 (A 口不插)	60W
	输出功率 (A 口插入)	48W

表 4. 65W 总功率规格指标 (以 15W 降功率为例)

类别	项目	规格指标
输入特性	输入电压范围	5V-25V
A 口输出特性	充电标准	Apple 5V/2.4A, BC 1.2 DCP
	输出电压电流	5.1V2.4A
	输出功率	12W
C 口输出特性	充电标准	PD2.0, PD3.0, PPS, QC2.0, QC3.0, Apple 5V/2.4A, BC 1.2 DCP
	输出电压电流 (A 口不插)	5.1V3A, 9V3A, 12V3A, 15V3A, 20V3.25A
	输出电压电流 (A 口插入)	5.1V3A, 9V3A, 12V3A, 15V3A, 20V2.5A
	输出功率 (A 口不插)	65W
	输出功率 (A 口插入)	50W

电路连接

参考板与 AC-DC 功率级连接参见图 1 所示。

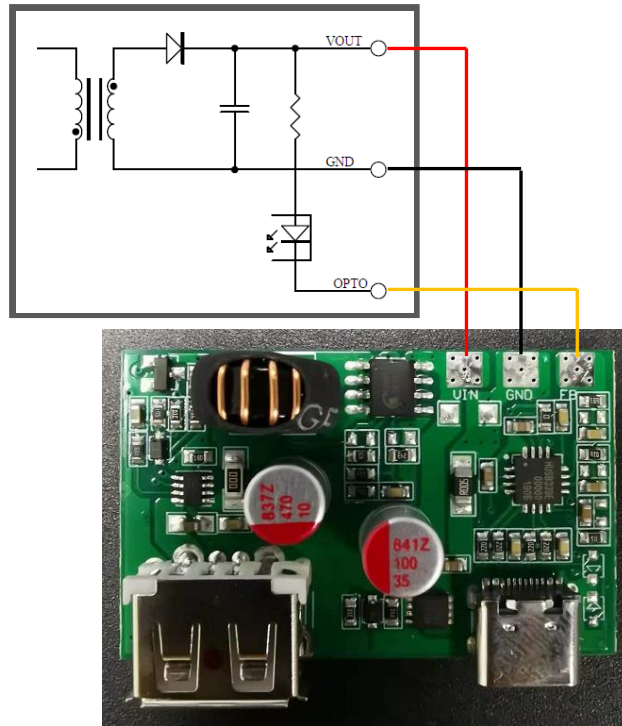


图 1. 参考设计的连接图

原理图

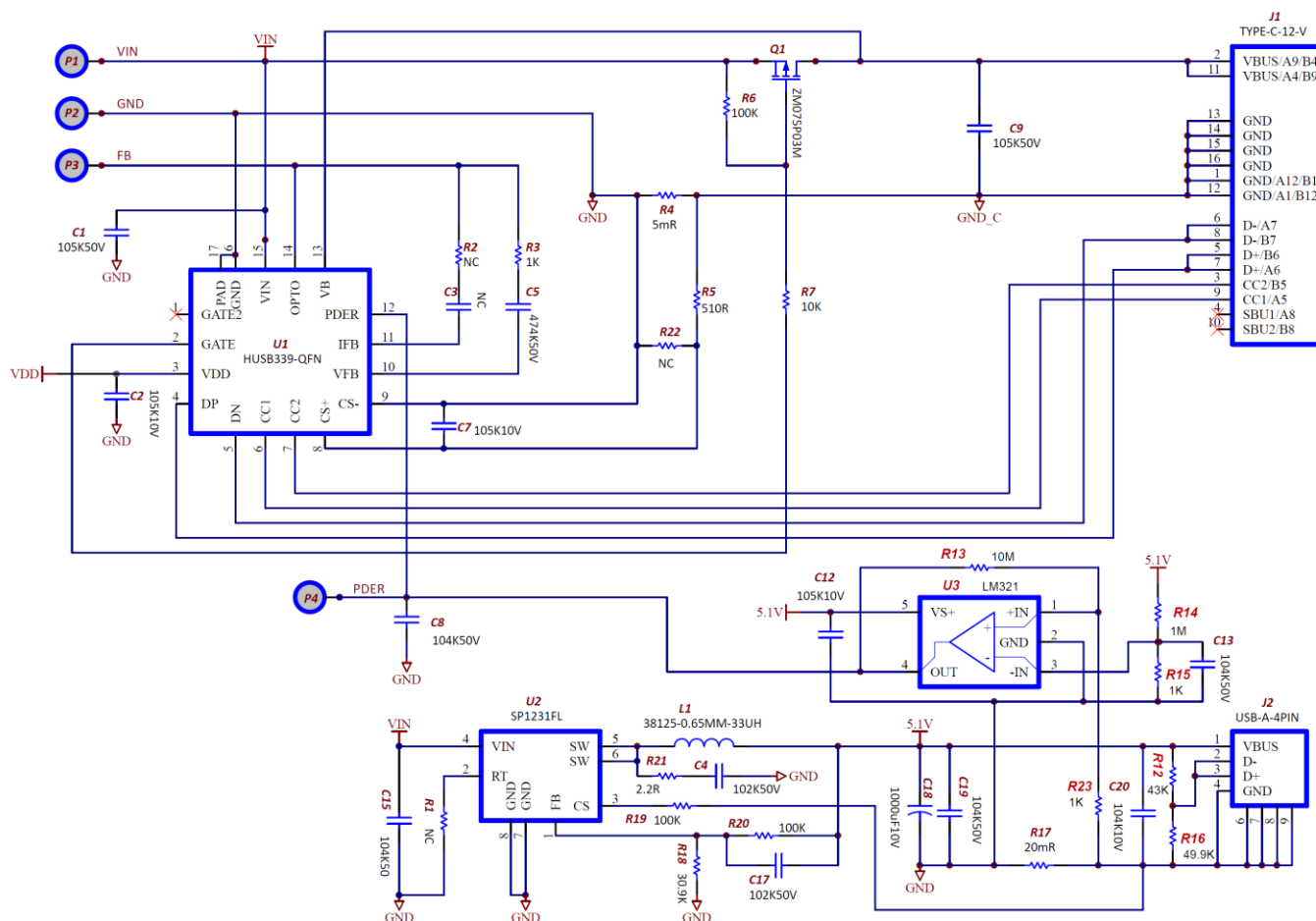


图 2. 参考设计的原理图

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