TECHNICAL
DATA SHEET

AA65M-59FKB-R

PHIHONG

DESCRIPTION

A 65W desktop adapter provides a reliable and efficient power supply for a wide range of devices, featuring a compact design perfect for home or office setups. Its advanced safety protections and universal compatibility ensure stable performance for laptops, monitors, and various peripherals.

Features

Class B EMI
DOE VI+1% / COC V5 Tier 2
Over-Voltage, Over-Current, Short Circuit, Over-Temperature, Output Pins Short Protection
5,000 Meters Operating Altitude

Applications

Networking Device | Monitor| Laptops

Certifications & compliance

UL/CB+EMC/FCC/NRCAN
Comply with DOE VI+Erp
IEC62368

Technical Summary

Parameters	Value
Input Voltage range	90 VAC to 264 VAC
Output voltage	5V/9V/15V/20V (PPS : 5V~21V)
Output power	65 Watt Max
Efficiency	CoC V5 Tier2: Avg Efficiency >89.0% at 20V/3.25A, > 88.852% at 15V/3A, >87.295% at 9V/3A, > 81.835% at 5V/3A DOE VI+1%: Avg Efficiency >89.0% at 20V/3.25A, > 88.727% at 15V/3A, > 87.62% at 9V/3A, > 82.385% at 5V/3A
Dimensions	66mm x 66mm x 28.5mm
Weight	215g±10g

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AC Input

AC input voltage rating	100VAC ~ 240VAC
AC input voltage range	90 VAC to 264 VAC
AC input frequency	47Hz - 63 Hz
AC input current	1.5A (RMS) Max. at 100Vac
In-rush current	The inrush current of the power supply should be less than the rating of its critical components (include bridge diode, surge limiting device) for all condition. At 264Vac/50Hz, 90 degrees, the condition inrush current must be less than 150A. The I2t shall less than 22% of the fuse, surge limiting device and bridge diode rating.
Leakage current	25uA Max. at 240Vac / 50Hz
Primary Aluminum Capacitor	450Vdc(min.) for both WM & DM Type. The voltage stress of anode foil must be larger than 620V for WM & DM Type.

DC Output

Output voltage	5V/ 9V / 15V / 20V (PPS : 5V~21V)
Output Voltage Regulation	Measured at cable end For 5Vdc output: 4.85V to 5.5 V at output current 0A to 3A. For 9Vdc output: 8.55V to 9.45 V at output current 0A to 3A. For 15Vdc output: 14.25V to 15.75 V at output current 0A to 3A. For 20Vdc output: 19V to 21 V at output current 0A to 3A
Maximum load current	0A to 3A continuous with 5Vdc 0A to 3A. continuous with 9Vdc 0A to 3A continuous with 15Vdc 0A to 3.25A continuous with 20Vdc
Programmable Power Supply Voltage Ranges (PPS Mode)	Operating max current: should be rated current * 110%. PPS mode follows USB PD Specification. It shell be support PD CC/CV setting on PPS mode. PPS mode Operating Current Limit accuracy should be +0 ~ +100mA. PPS mode Operating Current Limit setting minimum should be 50mA
Ripple and noise	For 5Vdc output :180mV For 9Vdc output :200mV For 15Vdc output :300mV For 20Vdc output :300mV

NOTE
1) Measures at the cable end.
2) Measurements shall be made with an oscilloscope with 20MHz Bandwidth.
3) Outputs should be bypassed at a connector with a 0.1uF ceramic capacitor and a 10uF electrolytic capacitor (Low ESR).

Overall Performance

Output Power	65 Watt Max
Efficiency for single output *NOTE :* *Measured at the cable end. Testing at 100%, 75%, 50%, 25%, 10% of rated current output and then computing the arithmetic average of these four values. Measure efficiency at 100%, 75%, 50%, 25%, 10% load after burn in 30min, at 115Vac/60Hz & 230Vac/50Hz.*	The power supply shall meet DOE VI+1% / COC V5 Tier 2 spec measuring the cable end. CoC V5 Tier2 5V / 3A Average Efficiency >81.835%; 10% Load Efficiency >72.48% 9V / 3A Average Efficiency >87.295%; 10% Load Efficiency >77.295% 15V / 3A Average Efficiency >88.852%; 10% Load Efficiency >78.852% 20V / 3.25A Average Efficiency > 89.0%; 10% Load Efficiency >78.852% DOE VI+1% 5V / 3A Average Efficiency >82.385% 9V / 3A Average Efficiency >87.620% 15V / 3A Average Efficiency >88.727% 20V / 3.25A Average Efficiency > 89.0%
Power Saving	< 0.075 W at 115Vac/60Hz & 230Vac/50Hz (5V Only) Min. Load Consumption: The power consumption of the device in off mode shall not exceed 0.30W at 20V (0.18W). Must comply with the requirements " ErP (EU) 2023/826" specification.

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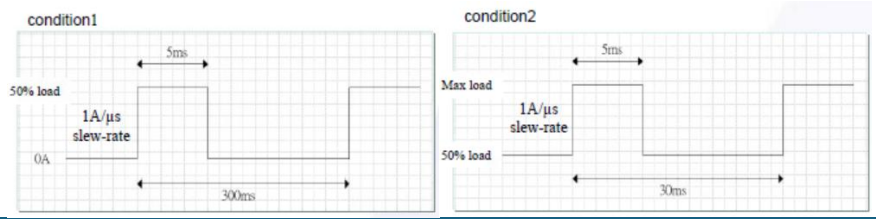
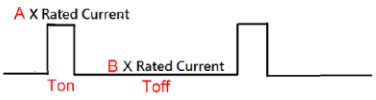
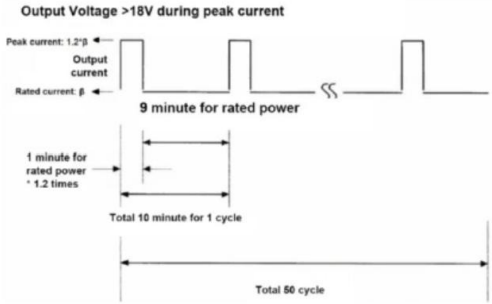
AC Turn on Delay Time	**< 3 sec Max.at 100Vac & 240Vac (5V Only)**
Hold Up Time	> 5 ms at 100Vac/60Hz & Max load.
Transient Response	**Transient condition** Transient for 15V/20V: Specification Transient Current Range: 0.05A ~ Full Load Transient Frequency: 100Hz ~ 100KHz Slew rate: 2.5A/us Criteria*: Output voltage regulation shall be less than 5% Transient condition: For 5V mode: Output voltage range: Max 5.8V Min 4.6V For 9V mode: Output voltage shall within +/- 5% Test condition as below: 
Overshoot	The output overshoot at turn on shall not exceed 10% of normal voltage value with or without the load connected.
Output Rise Time	At turn on the rise time of output voltage shall be less than 40ms (5V Only). **Measured from the 10% point to the 90% point of the normal*
Audible Noise	Input Condition: @ Vin: 90Vac~264Vac , Frequency : 47Hz to 63 Hz Load Condition: Static Load: From 0A to Full Load , 0.1A per step Static Load: -for 5V:0.02A/step (No load to 2W), and 0.1A/step (2W to Full load) -for 9V/15V:0.01A/step (No load to 2W), and 0.1A/step (2W to Full load) -for 20V:0.005A/step (No load to 2W), and 0.1A/step (2W to Full load) Static Load Microphone at a distance of 5cm from the surface and noise level is less than 20dB Dynamic Load Microphone at a distance of 5cm from the surface and noise level is less than 25dB
Peak load (For 20V /15V)	The adapter shall support below loading condition without any damage, safety issues and protection happened. The output voltage shall be more than 18.1V (20V Mode)/13.5V  Spec / Ton / Toff / A / B 1 / 2ms / 18ms / 200% / 90% 2 / 250us / 2.25ms / 225% / 87.5%
Surge load (For 20V/15V)	The adapter should support a surge load with 120% of maximum load for1min, maximum load for 9min and output voltage should be more than 18.5V/13.7V at 100-240Vac/50Hz-60Hz. 
Hot Plugging	Plugging a live AC adapter into the system with 100uF(for 5V Mode) and1000uF(for 15V/20V Mode) capacitance shall not trigger any protections or cause the adapter to shut down.

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Protection

Over Current Protection (OCP)	The maximum constant current shall be 3.1~ 3.6A for Vo < 15V with 60ms deglitch time. -The maximum constant current shall be 3.8A ~ 4.3A for Vo = 15V with 60ms deglitch time. -The maximum constant current shall be 3.9A ~ 5.0A for Vo = 20V with 60ms deglitch time. -The adapter shall be DC latch off and no component damaged When fault condition is removed and re-plug in DC plug, the output voltage must return to the normal condition. -The adapter cannot have any safety issue or be damaged when the load condition is before over current protection point (OTP is allowed) -Meet LPS
Over Voltage Protection (OVP)	- Maximum output voltage can't be over 35% for Vo ≥ 15V and 50% for other Vo rating. -The adapter should be AC latch off and no component damage. -When fault condition is removed and re plug in AC plug, the output voltage must return to the normal condition
Short Circuit Protection (SCP)	-The adapter should be DC latch off and no component damage. -When fault condition is removed and re plug in DC plug, the output voltage must return to the normal condition
Over Temperature Protection (OTP)	-The adapter shall be AC (primary protection) or DC (secondary protection) latch off and no component damaged. -Must put a thermal sensor at the secondary side for PD IC to read/report temperature. -If PD IC lack OTP pin, it must have internal OTP and be able to report temperature. -No fire and no melted of the enclosure. -When fault condition is removed and re-plug in AC or DC plug, the output voltage must return to the normal condition.
Output Pins Short Protection	When any two pins (including signal pins) of the output plug short, there should be no damage to any components. (Protection is allowed)

Other Specifications

Environmental Requirements	Operating Temperature: 0℃ to 40℃ Storage Temperature: -30℃ to 80℃ Operating Relative Humidity: 5% - 90% RH Storage Relative Humidity: 5% - 95% RH Operation Altitude: 5000 M Surface Temperature rise: < 45 ℃@Ambient 25℃ (Input Voltage 100Vac/240Vac Output 95% Load)
Reliability	Life/Power On Hours: -The power supply must be designed to operate for 26,280 power on hours. -AC input voltage: 100 and 240Vrms / DC output load :95% -Ambient Temp. :25°C MTBF: The power supply shall be designed to operate for 150,000 operation hours at 90% confidence–level while operating under the following condition. -AC input voltage: 100 and 240Vrms/DC output load: 95%(TBD) -Ambient Temp. :25°C Burn-in Test Condition: -More than 2 hours at 40°C, normal input voltage with 20V/3.25A output. -AC on/off must be tested. -No any component damage or fault condition during the test. AC On/Off Test -Input: 264Vac/63Hz -Load Condition : Full Load -Ambient :25℃ -AC ON 4sec and OFF 1sec for 10000 cycles

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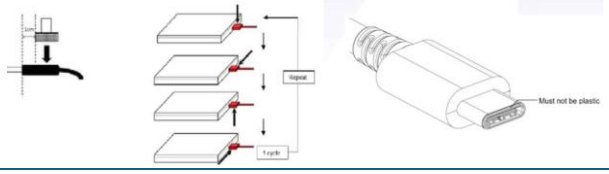
Safety and EMC

Safety	The power supply unit shall follow the safety standard (IEC62368)
EMC	EMI: The power supply shall comply with a following RFI/EMI standard when tested in a system configuration in F.C.C part 15 and PASS both CISPR22 / CISPR32(different setup for DC cable). The limits shall be meet with a margin more than 4dB with all system applicable EMS: EN55024 ESD — EN 61000-4-2 (ESD) Contact discharges: +-8KV — Criterion A Air discharge: +- 12KV — Criterion A Air discharge: +- 15KV — Criterion B Radiated Immunity: EN 61000-4-3 (RS) 80-1000MHz, 3V/m, 80% AM(1KHz), Criterion A Electrical Fast Transients: EN 61000-4-4 (EFT), 1kV, Criterion B Surge: Lighting Surge: ±1V (L-N); ± 2KV (L-FG; N-FG), Criteria A Common Mode Noise (CMN): EN 61000-4-6 (CS) Test voltage Condition: 3V Test Frequency: 150KHz ~ 600KHz Specification: CMN Max.: 2V @150K~600K
Voltage Fluctuations and Flicker	EN61000-3-3
HI-POT test	Primary to Secondary: 3.0KVac or 4242Vdc for 1minute Primary to F.G:1.5KVac for 1minut
Insulation Resistance	> 30M ohm at 500Vdc between primary and secondary

Mechanical Requirements

Drop Test	Drop 8 times (6 faces and 2 AC plug corners) on each cycle from a height of 1.0M onto a concrete surface. Increase the height in steps of 0.2M until the case is broken. - Must has 10cm margin during design stages Electrical - The unit should meet all specification and no function error after test.1.1M testing Mechanical - There shall be no visual damage and safety concern after 1.5M testing
Bending test	- 200g weight,90° angle to each side(Total angle 180°), 3000 cycles of arbitrary direction, 40 cycles/min. Disconnection rate <= 10% between case to S/R for 3000 cycles Disconnection rate <= 30% between plug to coil for 3000 cycles - Without damage to the insulations
Winding test	-200g weight,1080° angle on X-axis and Y-axis , 500 cycles of each direction 4 cycles/min. Disconnection rate of the wire shall be less than 30%
Tensile Test	Load: 10Kgf at Plug end and Bushing each for 1 minute Angle: 90◦/180◦ Criteria: The withdrawal of cord should be less than 2mm or without disconnection of cord
DC Power Cord Wire Push Test	Test condition: a) Fixture: 6mm, 10.5mm & 20mm aluminum block and ψ12mm aluminum bar b) Increase pressure by speeding up 2 mm per minute on the tested item until maximum force reached to 130 kg Criteria: After testing the V+ wire and Ground wire can't short
Type C Plug Requirements	Type-C plugs for use with devices must comply with the standard, with the following exceptions: Must demonstrate a minimum strength of 1.75 Nm in all 4 orientations, rather than 0.75 Nm as defined in section 3.8.1.7 (USB Type C Spec) @Can exceed the maximum plug strength of 2.0 and 3.5 Nm as defined in section 3.8.1.7 @Transverse overload force in all 4 orientations should meet 9Kg/1cm/50 cycles (as below) 

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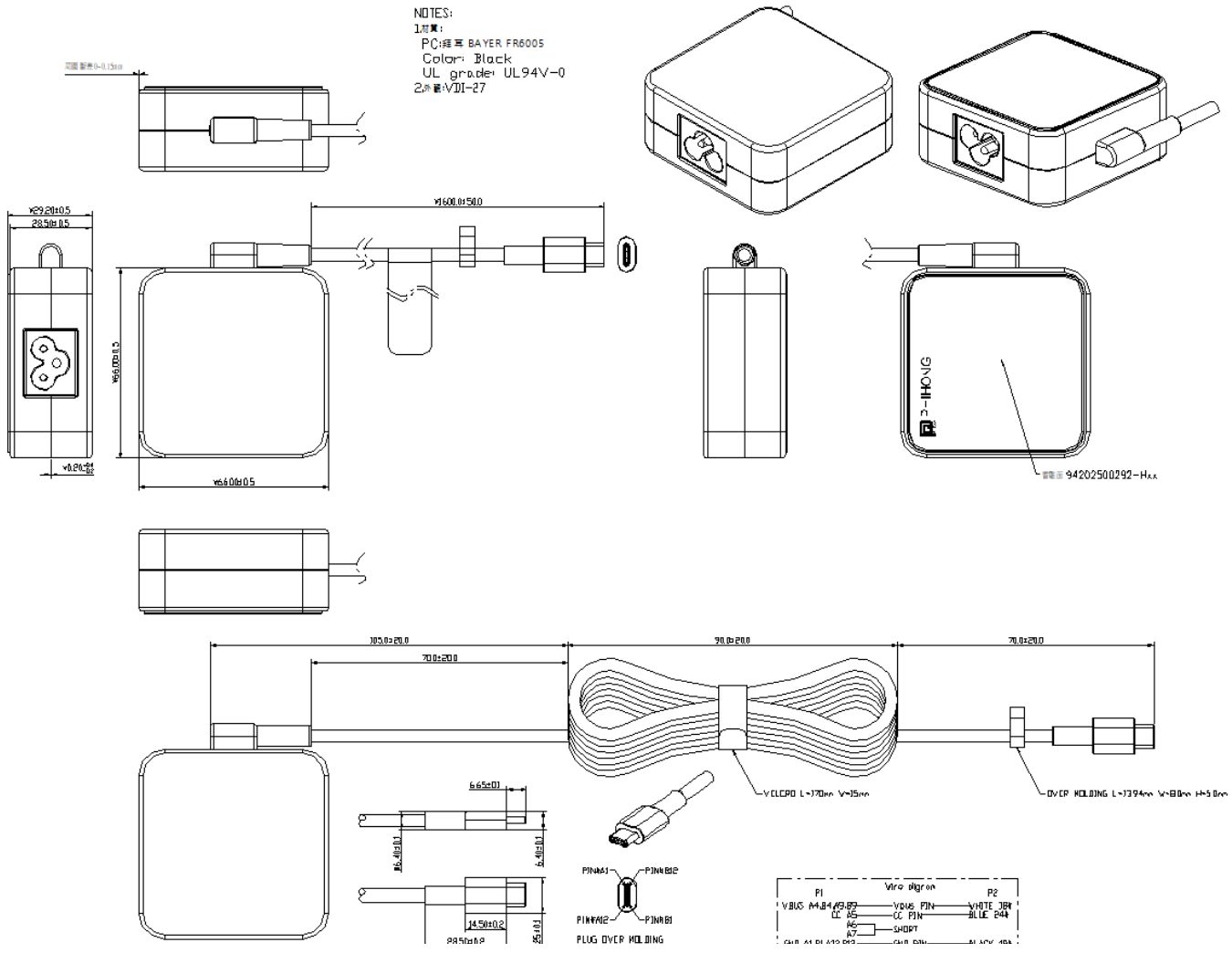
Input AC Inlet	For Desktop Type: Socket C6 Type
Output Cable	For Desktop Type: (1600mm)
Output Plug	TYPE C Should support BC1.2 DCP to allow charging older devices through legacy cable (D+/D should be short at connect side)
Power unit Dimension (DT Type)	As below



PHIHONG 50 YEARS OF HISTORY IN THE POWER SUPPLIES INDUSTRY

Since its founding in 1972, Phihong has emerged as a prominent power supply company, serving as a key supplier of solutions for consumer, mobile/portable, enterprise, telecom, datacom, and industrial applications.