

Arrow-ST Joint-Lab Project : 5.5kW AI Server ORv3 Power Supply

Newly Released



Application: High density PSU (For AI Data Center)

ASSP for metering- STPM32

16 x GPCA P/Ns including TSC2022IST, TSV791ILT and L6981CDR/L7987L ...

QR Flyback converter with GaN VIPerGaN65D

Si MOS- STG06N030M9
Galvanically isolated gate driver- STGAP2SM

SiC MOS- SCT027TO65G3
Galvanically isolated gate driver- STGAP2SICSNTR

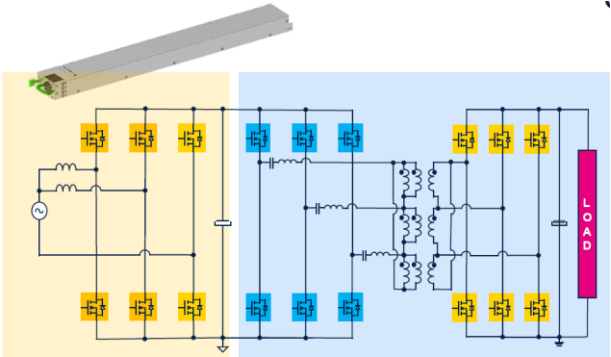
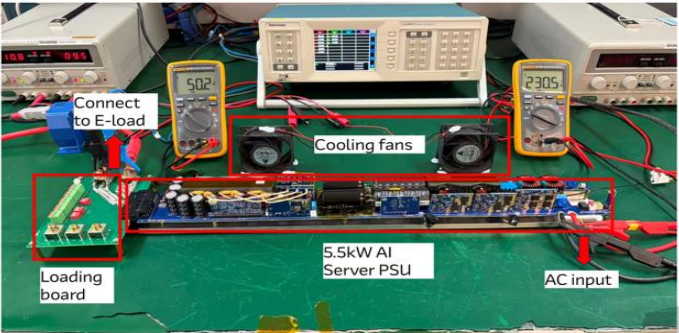
Arm Cortex M4 MCU- STM32G474RBT6

SiC MOS- SCT027TO65G3
Galvanically isolated gate driver- STGAP2SICSNTR

Arm Cortex M4 MCU- STM32G474QET6

Test setup

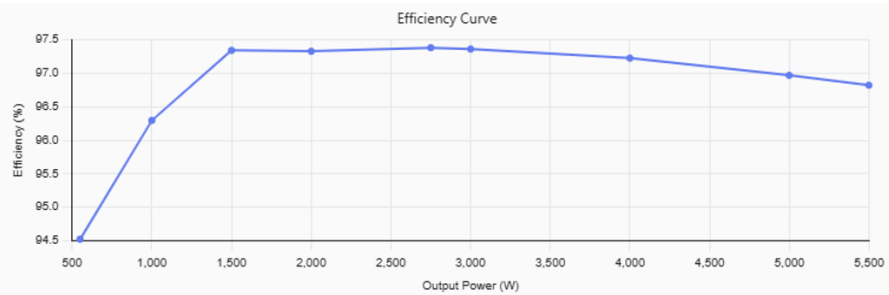
System overview



Key specifications:

- Fully digital AC-DC power supply
- Input AC voltage: 180-305 VAC
- Input AC frequency: 47-63 Hz
- DC output voltage: 48-50 Vdc
- Peak efficiency:
 - 97.5% @ 230, 240, 277 Vac with 30-100% load
 - 96.5% @ 208 Vac with 30-100% load
- Min efficiency:
 - 96.5% @ 230, 240, 277 Vac with 30-100% load
 - 95.5% @ 208 Vac with 30-100% load
- Power Factor >0.98 @ 100% load
- iTHD < 5% @ 100% load
- Outline dimension: 73.5 x 640 x 40 mm
- Power density up to 50 W/inch³
- Peak inrush current <30 A

At 230Vac input, Efficiency

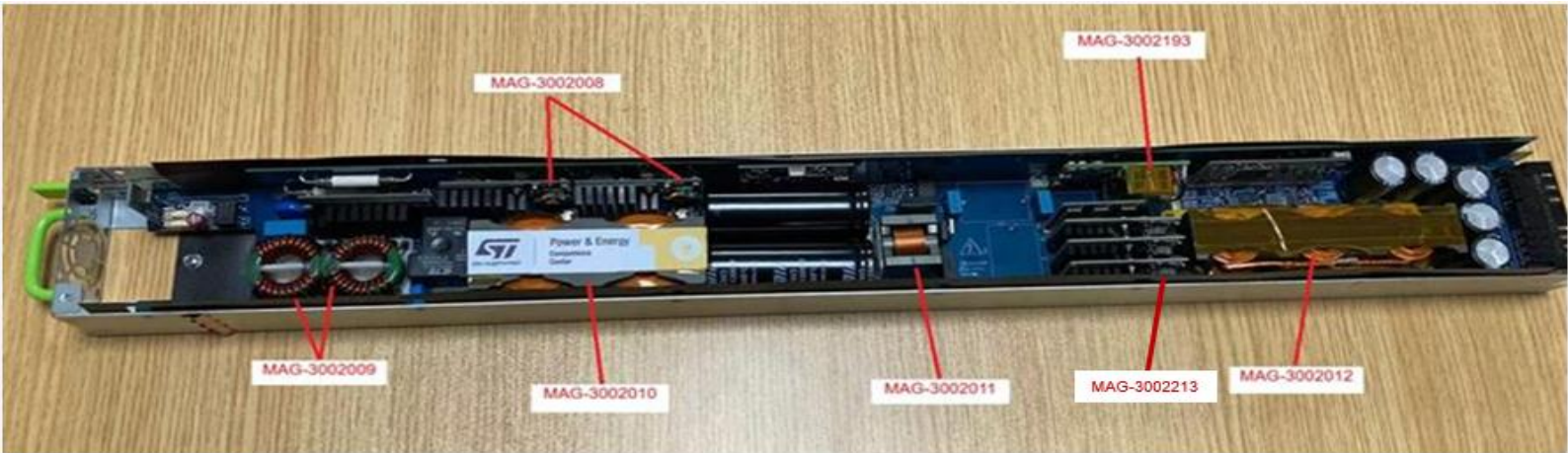


Input voltage (VAC)	Input current (A)	Input power (kW)	PF	iTHD (%)	Output voltage (VDC)	Output current (A)	Output power (W)	Efficiency (%)
229.61	2.602	0.5822	0.9745	7.688	50.0293	11	550.322	94.525
229.50	4.544	1.0390	0.9963	2.174	50.0252	20	1000.504	96.295
229.42	6.733	1.5416	0.9981	3.227	50.0193	30	1500.579	97.339
229.32	8.981	2.0557	0.9981	3.752	50.0183	40	2000.732	97.326
229.18	12.348	2.8246	0.9981	3.628	50.0103	55	2750.567	97.379
229.15	13.475	3.0818	0.9981	3.776	50.0070	60	3000.420	97.359
228.94	18.002	4.1140	0.9982	3.856	49.9973	80	3999.784	97.224
228.78	22.571	5.1550	0.9982	4.024	49.9863	100	4998.630	96.967
228.68	24.881	5.6790	0.9981	3.937	49.9855	110	5498.405	96.820

Key ST Parts	5.5kW AI PSU	Qty
SiC MOS	SCT027TO65G3	6
SiC MOS	SCT014O65G3	6
MOS	STY139N65M5	1
MOS	STW70N60DM6-4	1
MOS	ST8L65N050DM9	4
MOS	STL120N10F8	1
MOS	STL180N8F8	46
Gate-DRV	STGAP2SICS	6
Gate-DRV	STGAP2SM	1
Gate-DRV	PM8834	4
AUX CTRL	UC2843	1
AUX GaN	VIPerGaN65D	1
MCU	STM32G474RBT6	2
EEPROM	M95M01-DFCS6TP/K	1
Temp. Sensor	STLM20W87F	2
LDO	LD1117S33CTR	8
LDO	LDK320AM33	3
SYNC. CTRL	SRK1004F	1
Current Sensor	TSC2022IST	1
Buck CTRL	L6981	3
Buck CTRL	L7987L	1
OP-AMP	LMV358IDT	2
OP-AMP	TSV791ILT	2
Schottky Diode	STPSC20065	1
Schottky Diode	STPS160ZF	24
Schottky Rectifier	STPS6M100DEE	1
UF Rectifier	STTH1R02ZF	1
Schottky Rectifier	STPS2150A	4
ESD-HDMI	HDMIULC6-4SC6Y	3
ESD-CAN	ESDCAN03-2BWY	2

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BOURNS®

Bourns Project No	Bourns Part Number	Description
MAG-3002008	BS601273S	Gate Driver 14:24:24
MAG-3002009	BS800495T	CMC
MAG-3002010	BS501239T	PFC
MAG-3002011	BS501240T	Boost inductor
MAG-3002012	BS601275T	LLC Transformer
MAG-3002193	BS601276T	Aux power

Supplier	Function	Key Part Number	Qty
Amphenol	Film capacitor	R71PR468050H6K	2
Amphenol	Relay	AHUSH-112DM5	1
Amphenol	Rear Blind Mate Connector	10127396-01U1520LF	1
Bourns	Isolated driver transformer	BS601273S	5
Bourns	Flyback transformer	BS601276T	1
Bourns	Common mode choke	BS800495T	2
Bourns	PFC inductor	BS501239T	1
Lelon	DC link E-cap.	Custom made LSM series 1200uF 450V	2
Lelon	DC link E-cap.	Custom made LSG series 820uF 450V	2
EPCOS (TDK)	Varistor	B72214P2381K101	3
KEMET	Resonator Capacitor	CKC21C473JWGACTU	24