Power Supply Unit (PSU)

Catalogue

MICROELECTRONICS

INTRODUCTION of PSU PRODUCT LINES

TE Microwave is a leading PSU provider operated by tens of experienced senior engineers and experts in PSUs. TE has a very wide range of product lines from modules, IMAs and integrated PSU chassis products, meanwhile specific turn-key systems are available to satisfy customers demanding the most reliable products. We have served for defense, commercial and government entities and their affiliates worldwide, and devote ourselves to high quality and reliability products and good after-sales service for professional customers and business partners based on long-term mutual benefits cooperation.

FEATURES

- High efficiency, high power density, multiple types, intelligent control
- Output Power Range from Watts to Kilowatts
- Ruggedized Modules/IMAs/Chassis Types (optional)
- Overload short circuit protection
- Self-recovery over temperature protection
- Input and output over-voltage and under-voltage protection
- PCB embedded plane transformer
- Excellent output current equalization control characteristic.
- Customer-designed products Available
- State-of-art DPD Technologies Available
- Well-done Heat Dissipation Employed
- 2+ years Warranty Guaranteed

APPLICATIONS

- Military, communications and other special applications ,
- Artificial intelligence.
- Industrial process control
- Transportation
- Land/Shipboard/Airborne
- Multi-module parallel machine
- Capacitive load conditions with rapid and large dynamic changes from 0 to 100%.

OUR CAPABILITIES

- Professional R&D team in PSU /microwave over 30 years
- Quick response from blueprints to ready-made products
- Powerful R&D tools and platform
- More than 20+ R&D professional hard-working engineers
- In-house engineering capabilities
- Fully equipped manufacturing facilities
- Full line of Testing and Verification Capabilities

Headquartered in Chengdu, China, TE utilizes its global network of Sales & Service partners to effectively support wide ranges of customer applications & requirements.

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Product catalog index

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General features of brick series power supply

- **Hiccup mode overload short circuit protection**
- **Self-recovery overtemperature protection**
- **Input and output over-voltage and under-voltage protection**
- **PCB embedded plane transformer**
- **ON/OFF Enable control(Except for PFC series)**

TECS(1/16 brick) Series

FEATURES

- **Power density: 30W**
- **Conversion efficiency: 86%, TYP.**
- **Source voltage effect: ±0.5%, TYP.**
- **Load effect: ±0.1%, TYP.**
- **Isolation voltage: 1500Vac**
- **ON/OFF Enable control**
- **Fixed switching frequency: 200KHz, TYP.**

(Unless otherwise specified, the test conditions of subsequent described electrical performance parameters are: Tb=25℃, Vin=rated input voltage, Iout= rated load.For changes in environmental conditions, see the following table.)

ELECTRICAL SPECIFICATIONS

Parameter		Min.	Typ.	Max.	Units	Notes & Conditions
Absolute Maximum Ratings						
Input Voltage	TECS270xxx	-0.5		500	Vdc	Continuous,not Running
				425	Vdc	Continuous, Running
				475	Vdc	Transient Square Wave Voltage
Enable to -Vin Voltage		-2.0		20	Vdc	Continuous Control Voltage
Input Specifications						
Operating Input Voltage Range	TECS270xxx	200	270	425	Vdc	Rated Input Voltage
Input Under-Voltage Lockout	TECS270xxx	170	175	180	Vdc	Undervoltage Shutdown
		180	185	190	Vdc	On-State Voltage Threshold
Input Up-Voltage Lockout	TECS270xxx	435	440	445	Vdc	Overvoltage Shutdown
		425	430	435	Vdc	Overvoltage Recovery
Disabled Power Dissipation			0.3		W	Enable OFF，Rated Input
Note: In order to improve system stability, the input parallel capacitor should have a certain series equivalent resistance (ESR).						
Output Specifications						
Line Regulation Rate			±0.5		% Vout	
Load Regulation Rate			±0.1		% Vout	
Voltage Temperature Coefficient				±0.02	% /℃	

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Output Voltage Set Point				±1	% Vout	
Output Voltage Accuracy				±1	% Vout	
Efficiency			86		%	
Output Voltage Ripple and Noise	PK-PK		1		% Vout	Full Load
	RMS		0.5		% Vout	Full Load
Output DC Current-Limit Inception			120		%	Maximum Rated Output
Output Voltage Dynamic Load Response	Overshoot		4		%	50%-75%-50% Rated Load, Percentage of Output Voltage
	Recovery Time		0.5		ms	
Output Voltage TRIM Range		-20		+10	% Vout	TRIM end adjustment, voltage adjustable range see specific model specification.
Output Over-Voltage Protection			150		%Vout	Overvoltage Lock Output 0V, Restart
Output Voltage Overshoot				5	%Vout	Output Maximum Load Capacitor
GENERAL FEATURES						
Dynamic Specifications						
Input Turn-On Time			500		ms	Keep The Power ON and Apply The Rated Input Voltagee.
Enable Turn-On Time			50		ms	Maintain The Rated Input Voltage and Enable The Switch From OFF to ON.
Isolation Specifications						
Isolation Voltage	Input-Output Input-Case	1500			Vac	1mA,60s
	Output-Case	750			Vac	1mA,60s
Isolation Resistance	Input-Output Input-Case Output-Case	100			MΩ	500Vdc
Other Specifications						
ON/OFF Control at Input	On-State Voltage	Positive Logic	2		15	Vdc	
		Negative Logic	-1		0.8	Vdc	
	Off-State Voltage	Positive Logic	-1		0.8	Vdc	
		Negative Logic	2		15	Vdc	
	Pull-Up Voltage			5		Vdc	
	Pull-Up Resistance			20		KΩ	
Weight				30		g	
MTBF(Calculated according to GJB/Z 299C-2006)				1.5		106Hrs	GB , +70℃

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Temperature Specifications

Quality Grade	Temperature	Operation	operating ambient temperature	Storage Temperature
F：Mil	H Class	-55～+105℃	-55～+85℃	-55～+125℃
	T Class	-40～+95℃	-40～+75℃	-55～+125℃
	P Class	-25～+85℃	-25～+60℃	-40～+105℃
G：Industrial	H Class	-40～+105℃	-40～+85℃	-55～+125℃
	T Class	-40～+95℃	-40～+75℃	-55～+125℃
	P Class	-25～+85℃	-25～+55℃	-40～+105℃
Over-Temperature Shutdown Restart Hysteresis		15±5℃		

PRODUCT MODELl (Example)

Input Specifications		Output Specifications				Efficiency	Product Model (Example)
Rated Input Voltage	Input Operating Voltage Range	Rated utput Voltage	Output Current	Output Power	Ripple and Noise (PK-PK)		
270Vdc	(200~425)Vdc	5V	0~6A	30W	50mV	86%	TECS270P5H6S
		12V	0~3A	30W	120mV	86%	TECS270P12H3S
		15V	0~2A	30W	150mV	86%	TECS270P15H2S
		24V	0~1.3A	30W	200mV	86%	TECS270P24H1A3S
		36V	0~1A	30W	250mV	86%	TECS270P24H1S

PRODUCT MODEL

F	C	S	270	N	5	H	6	S	-X
Quality Grade F: Military G: Industrial	Conversion type C:DC/DC	Package size S: 1/16 brick	Input voltage 270：270V	N: Negative Logic P: Positive Logical	Output voltage 5:5V	Temperature Class (shell) H: -55℃～+105℃(F) H: -40℃～+105℃(G) T: -40℃～+105℃ P: -25℃～+85℃	Output Current : 6:6A	" S: single way	Suffix A～Z

Model Description

1. The model list only provides the models with the maximum rated power. If you choose the products with low power, please change the Output Current in the models by yourself.

2. The shelf products can be specially customized according to user requirements. The models should be added with corresponding suffixes, and the company will provide separate corresponding specifications.

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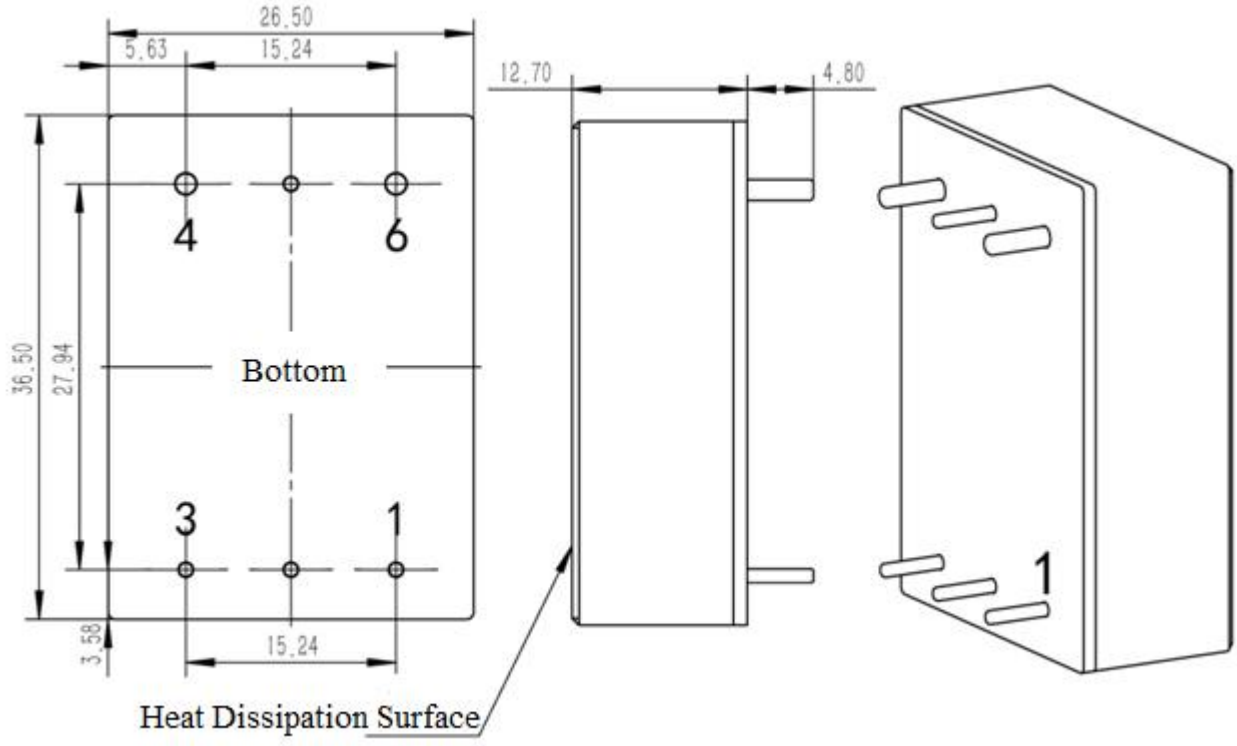
PACKAGE PIN



Outline drawing

Notes

- ✧ L×W×H：(36.5±0.5) mm × (26.5±0.5) mm × (12.7±0.2) mm.
- ✧ Pin1-Pin3、Pin5：Copper Needle Diameter is 1mm，The length of the pin 4.8(±0.5)mm.
- ✧ Pin4、Pin6：Copper Needle Diameter is1.5mm， The length of the pin 4.8(±0.5)mm.
- ✧ All the pins are made of copper alloy and chemically immersed gold.
- ✧ Module pin function description is shown in the following table.

Table 1 Pin definition

Pin	Name	Function
1	+Vin	Input voltage positive pole
2	CNT	Remote control (enable ON/OFF)
3	-Vin	Input voltage negative pole
4	-Vo	Output voltage negative pole
5	TRIM	Output voltage adjustment
6	+Vo	Output voltage positive pole

- ✧ Components without dimensions are for direct reference only.

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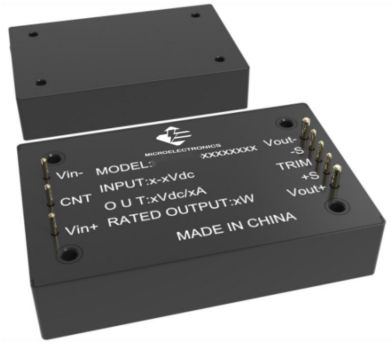
TECE(1/8 brick) Series

FEATURES

- **Power density: 240W**
- **Conversion efficiency: 92%, TYP.**
- **Source voltage effect: ±0.3%, TYP.**
- **Load effect: ±0.3%, TYP.**
- **Isolation voltage: 1500Vdc**
- **ON/OFF Enable control**
- **Easy to extend serial communication form BIT function**
- **Fixed switching frequency: 200KHz, TYP.**



ELECTRICAL SPECIFICATIONS

Parameter		Min.	Typ.	Max.	Units	Notes & Conditions
Absolute Maximum Ratings						
Input Voltage	TECE24xxx	-0.5		60	Vdc	Continuous, Not Running
				36	Vdc	Continuous,Running
				50	Vdc	Transient Square Wave Voltage
	TECE28xxx	-0.5		60	Vdc	Continuous, Not Running
				40	Vdc	Continuous,Running
				50	Vdc	Transient Square Wave voltage
	TECE48xxx	-0.5		100	Vdc	Continuous, Not Running
				80	Vdc	Continuous,Running
				90	Vdc	Transient Square Wave voltage
	TECE24Wxxx	-0.5		60	Vdc	Continuous, Not Running
				36	Vdc	Continuous,Running
Enable to -Vin Voltage		-2.0		20	Vdc	Continuous Control Voltage
Input Specifications						
Operating Input Voltage Range	TECE24xxx	18	24	36	Vdc	Rated Input VoltageRated Range
	TECE28xxx	16	28	40	Vdc	Rated Input Voltage Range
	TECE48 xxx	36	48	75	Vdc	Rated Input Voltage Range
	TECE24Wxxx	9	24	36	Vdc	Rated Input Voltage Range
Input Under-Voltage Lockout	TECE24xxx	15.5	16.0	16.5	Vdc	Undervoltage Shutdown Threshold
		16.5	17.0	17.5	Vdc	Startup voltage threshold
	TECE28xxx	13.5	14.7	15.5	Vdc	Undervoltage Shutdown
		14.5	15.7	16	Vdc	Startup voltage threshold
	TECE48xxx	30	32	34	Vdc	Undervoltage Shutdown Threshold
	TECE48xxx	32	34	36	Vdc	On-State Voltage Threshold

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	TECE24Wxxx	7	7.5	8	Vdc	Undervoltage Shutdown Threshold
		8	8.5	9	Vdc	Startup voltage threshold
Input Up-Voltage Lockout	TECE24 xxx	38	40	42	Vdc	Overvoltage Shutdown Threshold
		36	38	40	Vdc	Overvoltage Recovery Threshold
	TECE28 xxx	42	44	46	Vdc	Overvoltage Shutdown Threshold
		40	42	44	Vdc	Overvoltage Recovery Threshold
	TECE48xxx	79	82	85	Vdc	Overvoltage Shutdown Threshold
		75	78	81	Vdc	Overvoltage Recovery Threshold
	TECE24Wxxx	38	40	42	Vdc	Overvoltage Shutdown Threshold
		36	38	40	Vdc	Overvoltage Recovery Threshold
Disabled Power Dissipation			1.2		W	Enable OFF， Rated Input Voltage
Note: In order to improve system stability, the input parallel capacitor should have a certain series equivalent resistance (ESR).						
Output Specifications						
Line Regulation Rate			±0.3		% Vout	
Load Regulation Rate			±0.3		% Vout	
Voltage Temperature Coefficient				±0.02	% /℃	
Output Voltage Set Point				±1	% Vout	
Output Voltage Accuracy				±1	% Vout	
Efficiency			92		%	
Output Voltage Ripple and Noise	PK-PK		1		% Vout	Full load
	RMS		0.2		% Vout	Full load
Output DC Current-Limit Inception			120		%	Maximum Rated Output Curren
Output Voltage Dynamic Load Response	Overshoot Magnitude		4		%	50%-75%-50% Rated Load, Percentage of Output Voltage
	Recovery Time		0.5		ms	
Output Voltage TRIM Range		-20		+10	% Vout	TRIM end adjustment, voltage adjustable range see specific model specification.
Output Over-Voltage Protection			120		%Vout	Overvoltage Lock Output 0V, Restart Recovery
Output Voltage Overshoot				5	%Vout	Output Maximum Load Capacitor
GENERAL FEATURES						
Dynamic Specifications						
Input Turn-On Time			50		ms	Keep The Power ON and Apply The Rated Input Voltage.
Enable Turn-On Time			10		ms	Keep The Rated Input Voltage and Enable The Terminal Changes from OFF to ON.

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Isolation Specifications							
Isolation Voltage		Input-Output Input-Case	1500			Vdc	1mA,60s
		Output-Case	750			Vdc	1mA,60s
Isolation Resistance		Input-Output Input-Case Output-Case	100			MΩ	500Vdc
Other Specifications							
ON/OFF Control at Input	On-State Voltage	Positive Logic	2.4		18	Vdc	
		Negative Logic	-1		0.8	Vdc	
	Off-State Voltage	Positive Logic	-1		0.8	Vdc	
		Negative Logic	2.4		18	Vdc	
	Pull-Up Voltage			3.3		Vdc	
	Pull-Up Resistance			10		KΩ	
ON/OFF Control at Output	On-State Voltage		0.9		3	Vdc	
	Off-State Voltage-		0		0.7	Vdc	
Weight				58		g	
MTBF(Calculated according to GJB/Z 299C-2006)				1.2		10^6Hrs	G_B , +70℃

Temperature Specifications				
Quality Grade	Temperature Grade	Operation Temperature	operating ambient temperature	Storage Temperature
F：Mil	H Class	-55 ~ +105℃	-55 ~ +85℃	-55 ~ +125℃
	T Class	-40 ~ +95℃	-40 ~ +75℃	-55 ~ +125℃
	P Class	-25 ~ +85℃	-25 ~ +60℃	-40 ~ +105℃
G：Industrial	H Class	-40 ~ +105℃	-40 ~ +85℃	-55 ~ +125℃
	T Class	-40 ~ +95℃	-40 ~ +75℃	-55 ~ +125℃
	P Class	-25 ~ +85℃	-25 ~ +55℃	-40 ~ +105℃
Over-Temperature Shutdown Restart Hysteresis		15±5℃		

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Input Specifications		Output Specifications				Efficiency	Product Model (Example)
Rated Input Voltage	Input Operating Voltage Range	Rated Output Voltage	Output Current	Output Power	Ripple and Noise（PK-PK）		
24Vdc	(18~36)Vdc	3.3V	0~30A	100W	50mV	90%	TECE24P3V3H30S
		5V	0~30A	150W	50mV	93%	TECE24P5H30S
		12V	0~20A	240W	100mV	91%	TECE24P12H20S
		15V	0~16A	240W	100mV	91%	TECE24P15H27S
		24V	0~4A	100W	150mV	90%	TECE24P24H4S
		28V	0~4A	100W	150mV	90%	TECE24P28H4S
28Vdc	(16~40)Vdc	3.3V	0~30A	100W	50mV	90%	TECE28P3V3H30S
		5V	0~30A	150W	50mV	93%	TECE28P5H30S
		12V	0~20A	240W	100mV	91%	TECE28P12H20S
		15V	0~27A	240W	100mV	91%	TECE28P15H27S
		24V	0~6A	140W	150mV	92%	TECE28P24H8S
		28V	0~5A	140W	150mV	92%	TECE28P28H7S
48Vdc	(36~75)Vdc	3.3V	0~30A	150W	50mV	90%	TECE48P3V3H30S
		5V	0~30A	200W	50mV	92%	TECE48P5H30S
		12V	0~20A	240W	100mV	93%	TECE48P12H20S
		15V	0~16A	240W	100mV	93%	TECE48P15H16S
		24V	0~10A	240W	150mV	93%	TECE48P24H8S
		28V	0~9A	250W	150mV	93%	TECE48P28H7S
24W	(9~36)Vdc	3.3V	0~15A	50W	50mV	88%	TECE24W3V3H15S
		5V	0~15A	75W	50mV	89%	TECE24W P5H15S
		12V	0~4A	50W	100mV	88%	TECE24W P12H4S
		15V	0~4A	60W	100mV	88%	TECE24W P15H4S

F	C	E	24	N	5	H	30	S	-X
Quality Grade F:Mil G:Industrial	Conversion Type C:DC/DC	Package Size E:1/8brick	Input Voltage 24：24V	N: Negative Logic P: Positive Logic	Output Voltage 5:5V	Temperature Grade（Case） H: -55℃ ~ +105℃(F) H: -40℃ ~ +105℃(G) T: -40℃ ~ +105℃ P: -25℃ ~ +85℃	Output Current : 30:30A	' S:Single Way	Suffix A ~ Z

Model Description:：

1. Shelf products can be specially customized according to user requirements. The model should be added with corresponding suffixes, and the company will provide separate corresponding specifications;
2, At present, this series of products only provide low voltage input, single output products;
3. The model list shows the rated maximum Power models, which can reduce the Output Power according to user requirements and further optimize other indicators according to the actual application.

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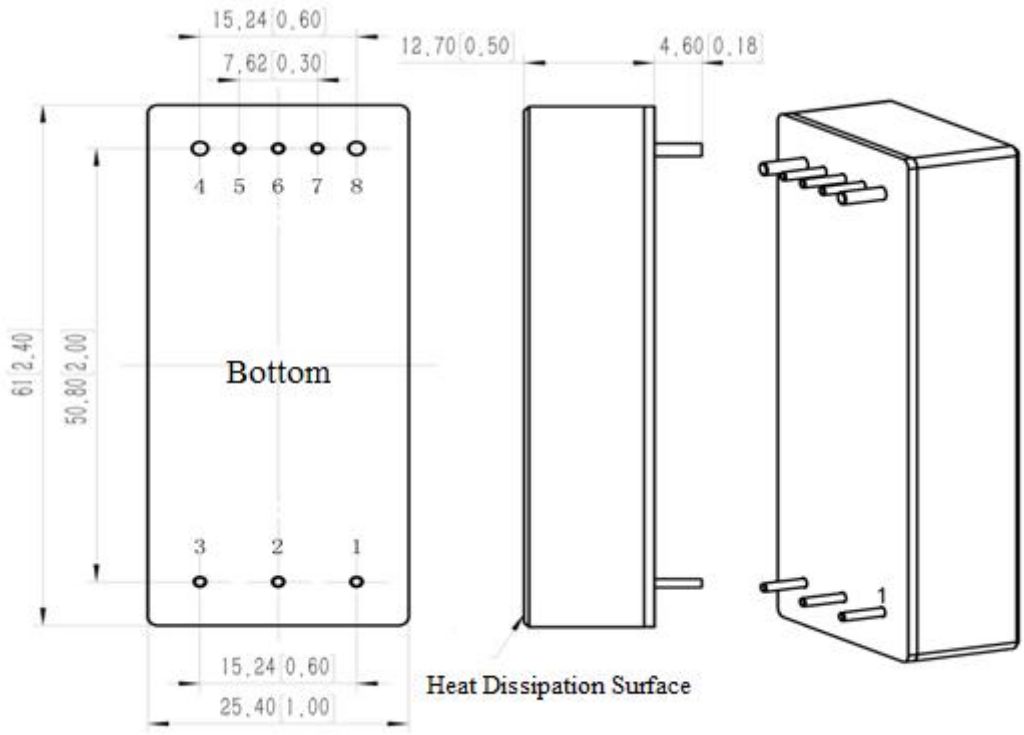

Outline drawing

Table 2 Pin Definition

Pin	Name	Function
1	+Vin	Input Voltage Positive
2	CNT	Remote Control (enable ON/OFF)
3	-Vin	Negative Input Voltage
4	-Vo	Negative Output Voltage
5	-S	Output Voltage Compensates The Negative
6	TRIM	Output Voltage Regulation/ON/OFF Control
7	+S	Output Voltage Compensation Anode
8	+Vo	Output Voltage Positive Terminal

Notes

- ✧ L×W×H：(61.0±0.5) mm × (25.4±0.5) mm × (12.7±0.2) mm.
- ✧ Pin1-Pin3、Pin5-Pin7，Output Voltage Compensation Anode1.02(±0.05)mm，The length of the pin4.6 (±0.5)mm.
- ✧ Pin4、Pin8，Copper Needle Diameter is1.5(±0.05)mm，The length of the pin4.6 (±0.5)mm.
- ✧ All pins are made of copper alloy and chemically immersed gold.
- ✧ Components without dimensions are for direct reference only.

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TEST REPORT (Sample model: TECE24N12H20S)

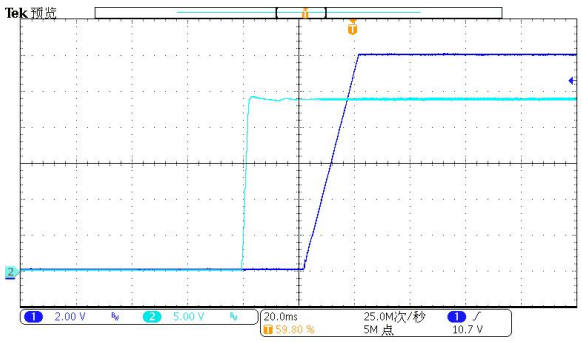

FIG.1 Enter the power-on time
(Vin=24V,Iout=20A,CH1Output Voltage,CH2Input Voltage)

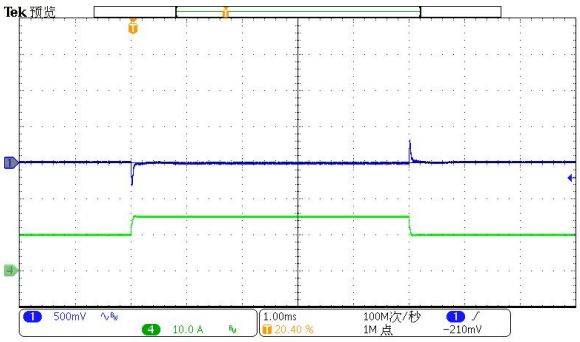

FIG.2 Output VoltageDynamic response waveform
(Vin=24V,50% ~ 75% ~ 50%Dynamic load,di/dt=1A/us)

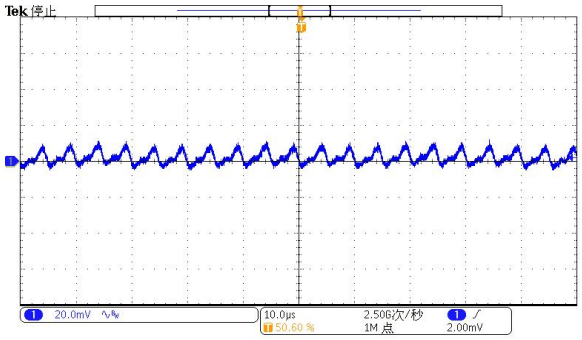

FIG.3 Output ripple voltage waveform
(Vin=24V,Iout=20A, Output ripple voltage waveform oscilloscope bandwidth 20M,10uF ceramic capacitor)

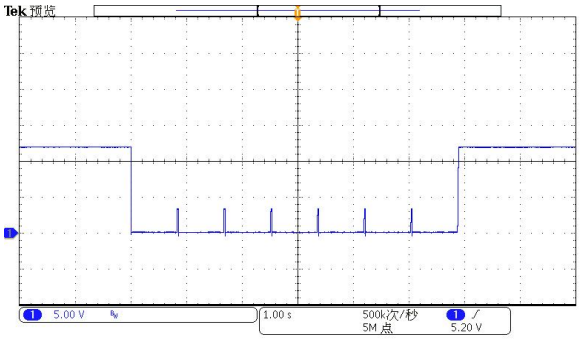

FIG.4 Output short circuit
(Vin=24V CH1Output Voltage CH4 Output current)

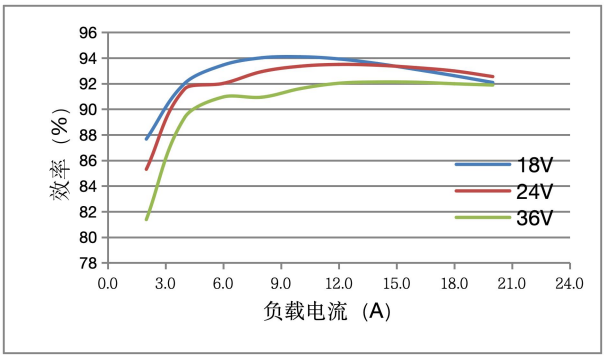

FIG.6 Environmental temperature25℃ efficiency Curve

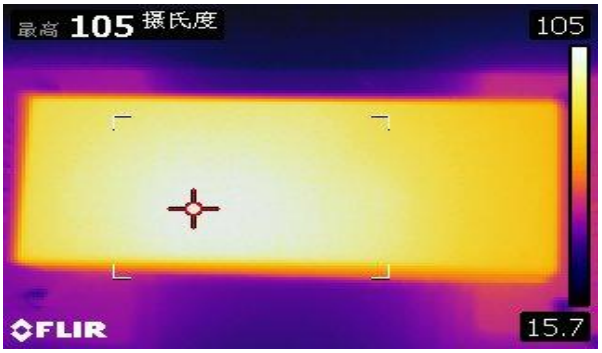

FIG. 6 Shell high temperature Heat distribution

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MICROELECTRONICS

TECQ(1/4 brick) Series

FEATURES

- **Power density: up to 420W**
- **Conversion efficiency: 94%, TYP.**
- **Source voltage effect: ±0.3%, TYP.**
- **Load effect: ±0.3%, TYP.**
- **Isolation voltage: 1500Vdc**
- **Easy to extend serial communication form BIT function**
- **ON/OFF Enable control**
- **Fixed switching frequency: 200KHz, TYP.**

ELECTRICAL SPECIFICATIONS

Parameter		Min.	Typ.	Max.	Units	Notes & Conditions
Absolute Maximum Ratings						
Input Voltage	TECQ24 xxx	-0.5		60	Vdc	Continuous, Not Running
				36	Vdc	Continuous,Running
				50	Vdc	Transient Square Wave Voltage
	TECQ28 xxx	-0.5		60	Vdc	Continuous, Not Running
				40	Vdc	Continuous,Running
				50	Vdc	Transient Square Wave Voltage
	TECQ48 xxx	-0.5		100	Vdc	Continuous, Not Running
				80	Vdc	Continuous,Running
				90	Vdc	Transient Square Wave Voltage
	TECQ24W xxx	-0.5		40	Vdc	Continuous, Not Running
				36	Vdc	Continuous,Running
Enable to -Vin Voltage		-2.0		20	Vdc	Continuous Control Voltage
Input Specifications						
Operating Input Voltage Range	TECQ 24xxx	18	24	36	Vdc	Rated Input Voltage Range
	TECQ 28 xxx	16	28	40	Vdc	Rated Input Voltage Range
	TECQ 48 xxx	36	48	75	Vdc	Rated Input Voltage Range
	TECQ 24Wxxx	9	24	36	Vdc	
Input Under-Voltage Lockout	TECQ 24 xxx	15.5	16.0	16.5	Vdc	Undervoltage Shutdown Threshold
		16.5	17.0	17.5	Vdc	On-State Voltage Threshold
	TECQ 28 xxx	13.5	14.7	15.5	Vdc	Undervoltage Shutdown Threshold
		14.5	15.7	16	Vdc	On-State Voltage Threshold
	TECQ 48P xxx	30	32	34	Vdc	Undervoltage Shutdown Threshold

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Input Under-Voltage Lockout		32	34	36	Vdc	On-State Voltage Threshold
	TECQ 24Wxxx	7	7.5	8	Vdc	Undervoltage Shutdown Threshold
		8	8.5	9	Vdc	On-State Voltage Threshold
Input Up-Voltage Lockout	TECQ 24P xxx	38	40	42	Vdc	Overvoltage Shutdown Threshold
		36	38	40	Vdc	Overvoltage Recovery Threshold
	TECQ 28P xxx	42	44	46	Vdc	Overvoltage Shutdown Threshold
		40	42	44	Vdc	Overvoltage Recovery Threshold
	TECQ 48P xxx	79	82	85	Vdc	Overvoltage Shutdown Threshold
		75	78	81	Vdc	Overvoltage Recovery Threshold
	TECQ 24Wxxx	38	40	42	Vdc	Overvoltage Shutdown Threshold
		36	38	40	Vdc	Overvoltage Recovery Threshold
Disabled Power Dissipation			0.7		W	Enable OFF，Rated Input Voltage
Note: In order to improve system stability, the input parallel capacitor should have a certain series equivalent resistance (ESR).						
Output Specifications						
Line Regulation Rate			±0.2		% Vout	
Load Regulation Rate			±0.2		% Vout	
Voltage Temperature Coefficient				±0.02	%/℃	
Output Voltage Set Point				±1	% Vout	
Regulated Voltage Accuracy				±1	% Vout	
Efficiency			93		%	
Output Voltage Ripple and Noise			1		% Vout	Full Load，Ripple Peak
			0.2		% Vout	Full Load，Ripple RMS
Output DC Current-Limit Inception			120		%	Maximum Rated Output Current
Output Voltage Dynamic Load Response			4		%	Overshoot Magnitude，50%-75%-50% Rated Load, Percentage of
			0.5		ms	Recovery Time
Output Voltage TRIM Range		-20		+10	% Vout	TRIM end adjustment, voltage adjustable range see specific model specification.
Output Over-Voltage Protection			120		%Vout	Overvoltage Lock Output 0V, Restart
Output Voltage Overshoot				5	%Vout	Output Maximum Load Capacitor
GENERAL FEATURES						
Dynamic Specifications						
Input Turn-On Time			50		ms	Keep The Power ON and Apply
Enable Turn-On Time			10		ms	Maintain The Rated Input

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Isolation Specifications							
Isolation Voltage		Input-Output Input-Case	1500			Vdc	5mA,60s
		Output-Case	750			Vdc	5mA,60s
Isolation Resistance Isolation Resistance		Input-Output Input-Case Output-Case	100			MΩ	500Vdc
Other Specifications							
ON/OFF Control at Input	On-State Voltage	Positive Logic	2.4		18	Vdc	
		Negative Logic	-1		0.8	Vdc	
	Off-State Voltage	Positive Logic	-1		0.8	Vdc	
		Negative Logic	2.4		18	Vdc	
	Pull-Up Voltage					Vdc	
	Pull-Up Resistance					KΩ	
ON/OFF Control at Output	On-State Voltage		0.9		3	Vdc	
	Off-State Voltage		0		0.7	Vdc	
Weight				87		g	
MTBF**(Calculated according to GJB/Z 299C-2006)**				1.2		10^6Hrs	G_B , +70℃

Temperature Specifications				
Quality Grade	Temperature	Operation Temperature	operating ambient temperature	Storage Temperature
F：Mil	H Class	-55 ~ +105℃	-55 ~ +85℃	-55 ~ +125℃
	T Class	-40 ~ +95℃	-40 ~ +75℃	-55 ~ +125℃
	P Class	-25 ~ +85℃	-25 ~ +60℃	-40 ~ +105℃
G：Industrial	H Class	-40 ~ +105℃	-40 ~ +85℃	-55 ~ +125℃
	T Class	-40 ~ +95℃	-40 ~ +75℃	-55 ~ +125℃
	P Class	-25 ~ +85℃	-25 ~ +55℃	-40 ~ +105℃
Over-Temperature Shutdown Restart Hysteresis		15±5℃		

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MICROELECTRONICS

PRODUCT MODEL (Example)									
F	C	Q	24	N	5	H	30	S	-X
Quality	Conversion Type	Package	Input	N: Negative	Output	Temperature Grade（Case）	Output	'	Suffix

Input Specifications		Output Specifications				Efficiency	Product Model (Example)
Rated Input Voltage	Input Operating Voltage Range	Rated Output Voltage	Output Current	Output Power	Ripple and Noise（PK-PK）		
24Vdc	(18~36)Vdc	3.3V	0~45A	150W	50mV	91%	TECQ24P3V3H45S
		5V	0~40A	200W	50mV	91%	TECQ24P5H40S
		12V	0~33A	400W	50mV	92%	TECQ24P12H33S
		15V	0~27A	400W	50mV	92%	TECQ24P12H27S
		24V	0~17A	410W	100mV	92%	TECQ24P24H17S
		28V	0~15A	420W	100mV	93%	TECQ24P28H15S
		48V	0~8A	380W	200mV	93%	TECQ24P48H8S
28Vdc	(16~40)Vdc	3.3V	0~45A	150W	50mV	91%	TECQ28P3V3H45S
		5V	0~40A	200W	50mV	91%	TECQ28P5H40S
		12V	0~33A	400W	50mV	92%	TECQ28P12H33S
		15V	0~27A	400W	50mV	92%	TECQ28P12H27S
		24V	0~17A	410W	100mV	92%	TECQ28P24H17S
		28V	0~15A	420W	100mV	93%	TECQ28P28H15S
48Vdc	(36~75)Vdc	3.3V	0~45A	150W	50mV	91%	TECQ48P3V3H45S
		5V	0~40A	200W	50mV	91%	TECQ48P5H40S
		12V	0~33A	400W	50mV	92%	TECQ48P12H33S
		15V	0~27A	400W	50mV	92%	TECQ48P12H27S
		24V	0~17A	410W	100mV	92%	TECQ48P24H17S
		28V	0~15A	420W	100mV	93%	TECQ48P28H15S
		48V	0~6A	430W	150mV	93%	TECQ48P48H6S
24W	(9~36)Vdc	3.3V	0~45A	150W	50mV	91%	TECQ24W P3V3H45S
		5V	0~40A	200W	50mV	91%	TECQ24W P5H40S
		12V	0~15A	180W	50mV	92%	TECQ24W P12H15S
		15V	0~14A	210W	50mV	92%	TECQ24W P15H14S
		24V	0~7A	170W	100mV	92%	TECQ24W P24H7S
		28V	0~6A	170W	100mV	93%	TECQ24W P28H6S

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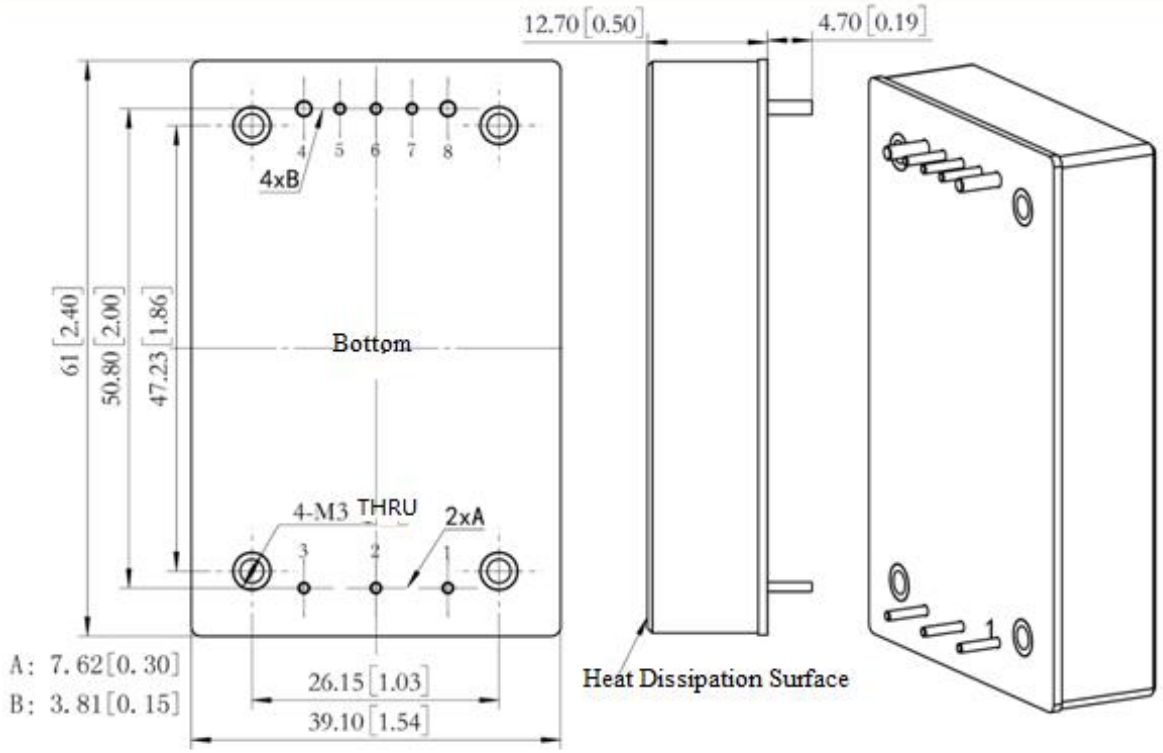
Grade F:Mil G:Industrial	C:DC/DC	Size Q:1/4Brick	Voltage 24: 24V	Logic P: Positive Logic	Voltage 5:5V	H: -55℃ ~ +105℃(F) H: -40℃ ~ +105℃(G) T: -40℃ ~ +105℃ P: -25℃ ~ +85℃	Current : 30:30A	S:Single Way	A ~ Z

Model Description:

1. Shelf products can be specially customized according to user requirements. The model should be added with corresponding suffixes, and the company will provide separate corresponding specifications;

2, at present, this series of products only provide low voltage input, single output products;

PACKAGE PIN



Outline drawing

Table 3 Pin Definition

Pin	Name	Function	Pin	Name	Function
1	+Vin	Input Voltage Positive	5	-S	Output Voltage Compensates The Negative Pole
2	CNT	Remote Control (enable	6	TRIM	Output Voltage Regulation/ON/OFF Control at Output
3	-Vin	Negative Input Voltage	7	+S	Output Voltage Compensation Anode
4	-o	Negative Output Voltage	8	+	Output Voltage Positive Terminal

Notes

- ✧ L×W×H：(61.0±0.5) mm × (39.1±0.5) mm × (12.7±0.2) mm.
- ✧ Pin1-Pin3、Pin5-Pin7，Copper Needle Diameter is1.02(±0.05)mm，The length of the pin4.6 (±0.5)mm.
- ✧ Pin4、Pin8，Copper Needle Diameter is1.5(±0.05)mm，The length of the pin4.6 (±0.5)mm.
- ✧ Components without dimensions are for direct reference only.
- ✧ All pins are made of copper alloy and chemically immersed gold。

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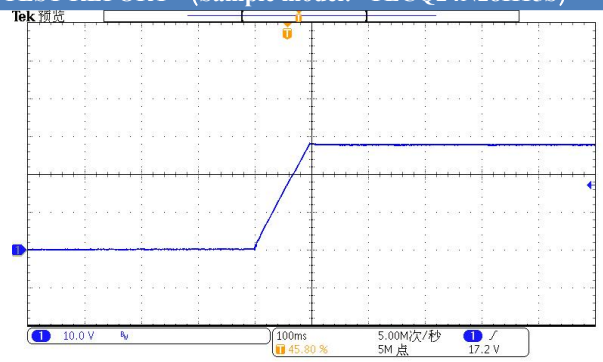


FIG.7 Output VoltageStart the waveform
（Vin=24V，Iout=15A）

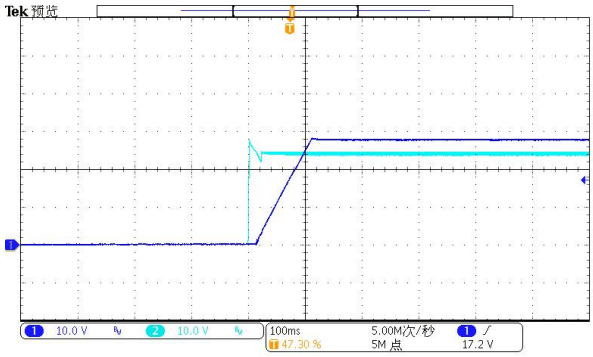


FIG.8 Enter the power-on time

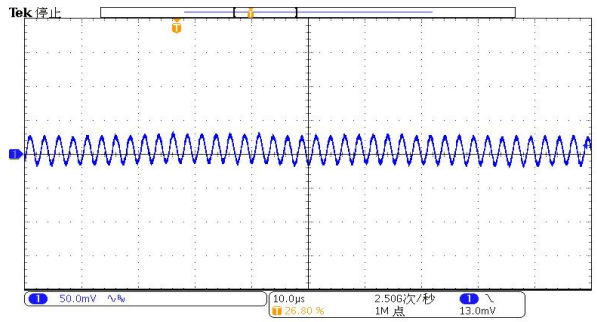


FIG.9 Output ripple voltage waveform
（Vin=24V,Iout=15A，Output ripple voltage waveform oscilloscope bandwidth 20M,10uF ceramic capacitor)

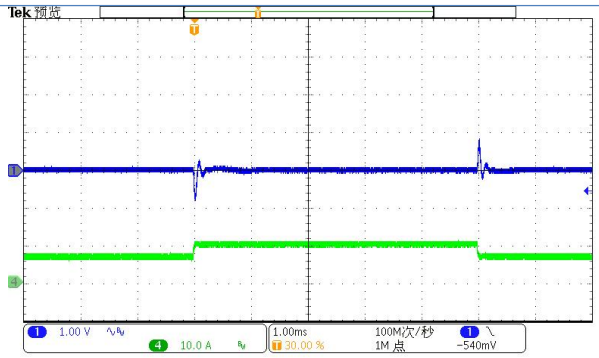


FIG.10 Output VoltageDynamic response waveform
（Vin=24V,50% ~ 75% ~ 50%Dynamic load,di/dt=1A/us）

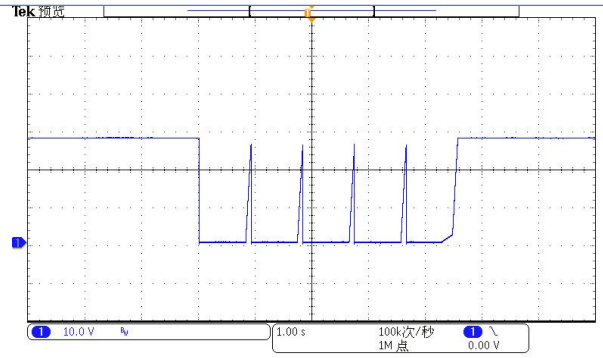


FIG.11 Output overcurrent hiccup
（Vin=24V CH1Output Voltage,RL0.5Ω）

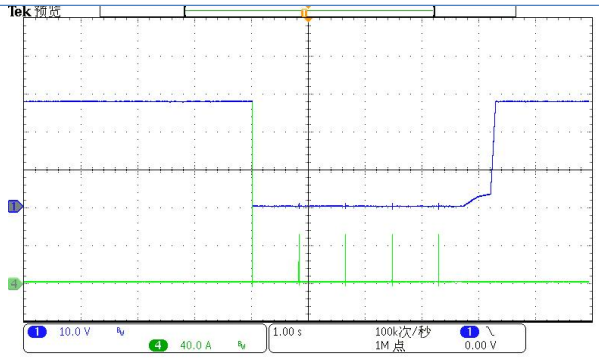
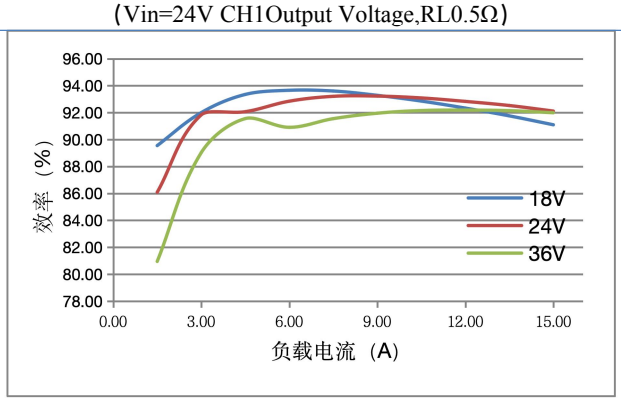


FIG.12 Output short circuit
（Vin=24V CH1Output VoltageCH4 Output Current ）



Environmental temp.25℃的 Efficiency Curve

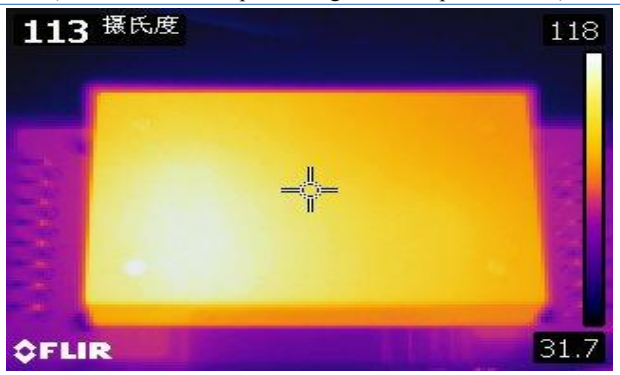


FIG.13 Heat distributionFIG
（Vin=24V,Iout=15A）

TECH(1/2 brick) Series

FEATURES

- **Power density: up to 800W**
- **Conversion efficiency: 94%, TYP.**
- **Source voltage effect: ±0.5%, TYP.**
- **Isolation voltage: 1500Vdc**
- **Easy to extend serial communication form BIT function**
- **ON/OFF Enable control**
- **Fixed switching frequency: 200KHz, TYP.**

ELECTRICAL SPECIFICATIONS

Parameter		Min.	Typ.	Max.	Units	Notes & Conditions
Absolute Maximum Ratings						
Input Voltage	TECH24xxx	-0.5		60	Vdc	Continuous, Not Running
				36	Vdc	Continuous,Running
				50	Vdc	Transient Square Wave Voltage
	TECH28Pxxx	-0.5		60	Vdc	Continuous, Not Running
				40	Vdc	Continuous,Running
				50	Vdc	Transient Square Wave Voltage
	TECH 48xxx	-0.5		100	Vdc	Continuous, Not Running
				80	Vdc	Continuous,Running
				90	Vdc	Transient Square Wave Voltage
	TECH 24Wxxx	-0.5		60	Vdc	Continuous, Not Running
				36	Vdc	Continuous,Running
				50	Vdc	Transient Square Wave Voltage
	TECH 160xxx	-0.5		230	Vdc	Continuous, Not Running
				200	Vdc	Continuous,Running
				220	Vdc	Transient Square Wave Voltage
	TECH 270xxx	-0.5		500	Vdc	Continuous, Not Running
				425	Vdc	Continuous,Running
				475	Vdc	Transient Square Wave Voltage
	TECH500xxx	-0.5		700	Vdc	Continuous, Not Running
				650	Vdc	Continuous,Running
				680	Vdc	Transient Square Wave Voltage
Enable to -Vin Voltage		-2.0		20	Vdc	Continuous Control Voltage

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Input Specifications						
Operating Input Voltage Range	TECH 24 xxx	18	24	36	Vdc	Rated Input Voltage Range
	TECH 28xxx	16	28	40	Vdc	Rated Input Voltage Range
	TECH 48 xxx	36	48	75	Vdc	Rated Input Voltage Range
	TECH 24Wxxx	9	24	36	Vdc	Rated Input Voltage Range
	TECH160xxx	100	160	200	Vdc	Rated Input Voltage Range
	TECH270xxx	200	270	425	Vdc	Rated Input Voltage Range
	TECH500xxx	400	500	650	Vdc	Rated Input Voltage Range
Input Under-Voltage Lockout	TECH 24xxx	15.5	16.0	16.5	Vdc	Undervoltage Shutdown Threshold
		16.5	17.0	17.5	Vdc	On-State VoltageThreshold
	TECH 28xxx	13.5	14.7	15.5	Vdc	Undervoltage Shutdown Threshold
		14.5	15.7	16	Vdc	On-State VoltageThreshold
	TECH 48xxx	30	32	34	Vdc	Undervoltage Shutdown Threshold
		32	34	36	Vdc	On-State VoltageThreshold
	TECH 24Wxxx	7	7.5	8	Vdc	Undervoltage Shutdown Threshold
		8	8.5	9	Vdc	On-State VoltageThreshold
	TECH160xxx	75	80	85	Vdc	Undervoltage Shutdown Threshold
		85	90	95	Vdc	On-State VoltageThreshold
	TECH270xxx	170	175	180	Vdc	Undervoltage Shutdown Threshold
		180	185	190	Vdc	On-State VoltageThreshold
	TECH500xxx	375	380	385	Vdc	Undervoltage Shutdown Threshold
		385	390	395	Vdc	On-State VoltageThreshold
Input Up-Voltage Lockout	TECH 24xxx	38	40	42	Vdc	Overvoltage Shutdown Threshold
		36	38	40	Vdc	Overvoltage Recovery Threshold
	TECH 28xxx	42	44	46	Vdc	Overvoltage Shutdown Threshold
		40	42	44	Vdc	Overvoltage Recovery Threshold
	TECH 48xxx	79	82	85	Vdc	Overvoltage Shutdown Threshold
		75	78	81	Vdc	Overvoltage Recovery Threshold
	TECH 24Wxxx	38	40	42	Vdc	Overvoltage Shutdown Threshold
		36	38	40	Vdc	Overvoltage Recovery Threshold
	TECH160xxx	210	215	220	Vdc	Overvoltage Shutdown Threshold
		200	205	210	Vdc	Overvoltage Recovery Threshold
	TECH270xxx	435	440	445	Vdc	Overvoltage Shutdown Threshold
		425	430	435	Vdc	Overvoltage Recovery Threshold
	TECH500xxx	660	670	680	Vdc	Overvoltage Shutdown Threshold

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Parameter			Min.	Typ.	Max.	Units	Notes & Conditions
			650	660	670	Vdc	Overvoltage Recovery Threshold
Disabled Power Dissipation				2		W	Enable OFF，Rated Input Voltage
Note: In order to improve system stability, the input parallel capacitor should have a certain series equivalent resistance (ESR).							
Output Specifications							
Line Regulation Rate				±0.5		% Vout	
Load Regulation Rate				±0.5		% Vout	
Voltage Temperature Coefficient					±0.02	% /℃	
Output Voltage Set Point					±1	% Vout	
Output Voltage Accuracy					±1	% Vout	
Efficiency				94		%	
Output Voltage Ripple and Noise		PK-PK		1		% Vout	Full Load
		RMS		0.3		% Vout	Full Load
Output DC Current-Limit Inception				120		%	Maximum Rated Output Current
Output Voltage Dynamic Load Response		Overshoot Magnitude		4		%	50%-75%-50% Rated Load, Percentage of Output Voltage
		Recovery Time		0.5		ms	
Output Voltage TRIM Range			-20		+10	% Vout	TRIM end adjustment, voltage adjustable range see specific
Output Over-Voltage Protection				120		%Vout	Overvoltage Lock Output 0V, Restart
Output Voltage Overshoot					5	%Vout	Output Maximum Load Capacitor
GENERAL FEATURES							
Dynamic Specifications							
Input Turn-On Time				550		ms	Keep The Power ON and Apply
Enable Turn-On Time				70		ms	Maintain The Rated Input
Isolation Specifications							
Isolation Voltage	24V、28V、48V、24WV	Input-Output Input-Case	1500			Vdc	DC,5mA,60s
		Output-Case	750			Vdc	DC,5mA,60s
	160V、270V、500V	Input-Output Input-Case	1500			Vac	AC5mA,60s
		Output-Case	750			Vac	AC,5mA,60s
Isolation Resistance		Input-Output Input-Case	100			MΩ	500Vdc,60s
Other Specifications							
ON/OFF Control at Input	On-State Voltage	Positive Logic	2		15	Vdc	
		Negative Logic	-10		1	Vdc	

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Parameter			Min.	Typ.	Max.	Units	Notes & Conditions
	Off-State Voltage	Positive Logic	-10		1	Vdc	
		Negative Logic	2		15	Vdc	
	Pull-Up Voltage			5		Vdc	
	Pull-Up Resistance			10		KΩ	
ON/OFF Control at Output	On-State Voltage		3		15	Vdc	
	Off-State Voltage		-10		0.7	Vdc	
Weight				155		g	
MTBF(Calculated according to GJB/Z 299C-2006)				1.1		10^6Hrs	G_B , +70℃

Temperature Specifications

Quality Grade	Temperature Grade	Operation Temperature	operating ambient temperature	Storage Temperature
F：Mil	H Class	-55 ~ +105℃	-55 ~ +85℃	-55 ~ +125℃
	T Class	-40 ~ +95℃	-40 ~ +75℃	-55 ~ +125℃
	P Class	-25 ~ +85℃	-25 ~ +60℃	-40 ~ +105℃
G：Industrial	H Class	-40 ~ +105℃	-40 ~ +85℃	-55 ~ +125℃
	T Class	-40 ~ +95℃	-40 ~ +75℃	-55 ~ +125℃
	P Class	-25 ~ +85℃	-25 ~ +55℃	-40 ~ +105℃
Over-Temperature Shutdown Restart Hysteresis		15±5℃		

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PRODUCT MODEL(Example)							
Input Specifications		Output Specifications				Efficiency (typ.)	Product Model (Example)
Rated Input Voltage	Input Operating Voltage Range	Rated Output Voltage	Output Current	Output Power	Ripple and Noise (PK-PK)		
24	(18~36)Vdc	5V	0~80A	400W	50mV	93%	TECH24P5H80S
		12V	0~40A	480W	50mV	93%	TECH 24P12H40S
		15V	0~35A	525W	50mV	93%	TECH 24P15H35S
		24V	0~33A	800W	100mV	93%	TECH 24P24H33S
		28V	0~28A	800W	100mV	93%	TECH 24P28H28S
		32V	0~25A	800W	100mV	93%	TECH 24P28H25S
		48V	0~17A	800W	100mV	93%	TECH 24P28H17S
28	(16~40)Vdc	5V	0~80A	400W	50mV	93%	TECH28P5H80S
		12V	0~40A	480W	50mV	93%	TECH 28P12H40S
		15V	0~35A	525W	50mV	93%	TECH 28P15H35S
		24V	0~33A	800W	100mV	93%	TECH 28P24H33S
		28V	0~28A	800W	100mV	93%	TECH 28P28H28S
		32V	0~25A	800W	100mV	93%	TECH 28P28H25S
		48V	0~17A	800W	100mV	93%	TECH 28P28H17S
48	(36~75)Vdc	5V	0~80A	400W	50mV	93%	TECH48P5H80S
		12V	0~40A	480W	50mV	93%	TECH 48P12H40S
		15V	0~35A	525W	50mV	93%	TECH 48P15H35S
		24V	0~33A	800W	100mV	93%	TECH 48P24H33S
		28V	0~28A	800W	100mV	93%	TECH 48P28H28S
		32V	0~25A	800W	100mV	93%	TECH 48P28H25S
		48V	0~17A	800W	100mV	93%	TECH 48P28H17S
160	(100 ~ 200) Vdc	5V	0~80A	400W	100mV	91%	TECH160P5H80S
		12V	0~50A	600W	200mV	91%	TECH160P12H50S
		15V	0~40A	600W	200mV	91%	TECH160P15H40S
		24V	0~25A	600W	240mV	91%	TECH160P24H25S
		28V	0~21A	600W	250mV	91%	TECH160P28H21S
		32V	0~19A	600W	300mV	91%	TECH160P32H19S
		48V	0~13A	620W	350mV	91%	TECH160P48H13S

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270	(200～425) Vdc	5V	0~80A	400W	100mV	91%	TECH270P5H80S
		12V	0~60A	720W	200mV	94%	TECH270P12H60S
		15V	0~50A	750W	200mV	94%	TECH270P15H50S
		24V	0~32A	750W	250mV	95%	TECH270P24H32S
		28V	0~27A	750W	250mV	95%	TECH270P28H27S
		32V	0~24A	750W	300mV	95%	TECH270P32H24S
		48V	0~16A	750W	350mV	95%	TECH270P48H16S
500	(400～650) Vdc	5V	0~80A	400W	100mV	90%	TECH500P5H80S
		12V	0~60A	720W	200mV	93%	TECH500P12H60S
		15V	0~50A	750W	200mV	93%	TECH500P15H50S
		24V	0~32A	750W	250mV	94%	TECH500P24H32S
		28V	0~27A	750W	250mV	94%	TECH500P28H27S
		32V	0~24A	750W	300mV	94%	TECH500P32H24S
		48V	0~16A	750W	350mV	94%	TECH500P48H16S

F	C	H	28	N	28	H	22	S	-X
Quality Grade F:Mil G:Industrial	Conversion Type C:DC/DC	Package Size H:1/2brick	Input Voltage 28:28V	N: Negative Logic P: Positive Logic	Output Voltage 28:28V	Temperature Grade (Case) H: -55℃～+105℃(F) H: -40℃～+105℃(G) T: -40℃～+105℃ P: -25℃～+85℃	Output Current 22:22A	' S:Single Way	Suffix A～Z

Model Description:：

1、 The model list only gives the models with the maximum rated power. If you choose the products with low power, please change the Output Current value of the models by yourself.
2、 2. The shelf products can be specially customized according to user requirements. The models should be added with corresponding suffixes, and the company will provide separate corresponding specifications.

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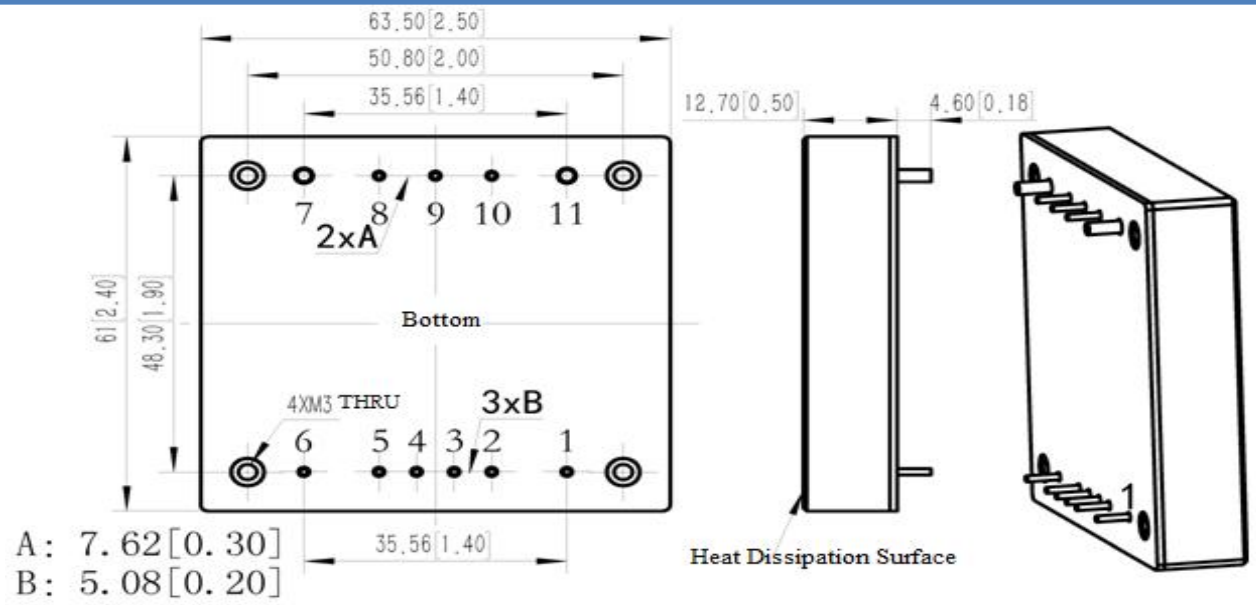
PACKAGE PIN



Outline drawing

Notes

- ✧ L×W×H：(63.5±0.5) mm × (61±0.5) mm × (12.7±0.2) mm.
- ✧ Pin1-Pin6、Pin8-Pin10：Copper Needle Diameter is1.02(±0.05)mm，The length of the pin4.6(±0.5)mm.
  Pin7、Pin11：Copper Needle Diameter is2.03(±0.05)mm，The length of the pin4.6(±0.5)mm.
- ✧ All pins are made of copper alloy and chemically immersed gold.
- ✧ Pin function is described in Table below.

Table 4 Pin Definition

Pin	Name	Function
1	+Vin	Input Voltage Positive
2	CNT	Remote Control (enable ON/OFF)
3	NC	--
4	NC	--
5	NC	--
6	-Vin	Negative Input Voltage
7	-Vo	Negative Output Voltage
8	-S	Output Voltage Compensates The Negative Pole
9	TRIM	Output Voltage Regulation/ON/OFF Control at Output
10	+S	Output Voltage Compensation Anode
11	+Vo	Output Voltage Positive Terminal

- ✧ Installation method: M3 bolt is used to fix substrate and other devices.
- ✧ Components without dimensions are for direct reference only.

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TEST REPORT（Sample model：TECH270N28H22S)

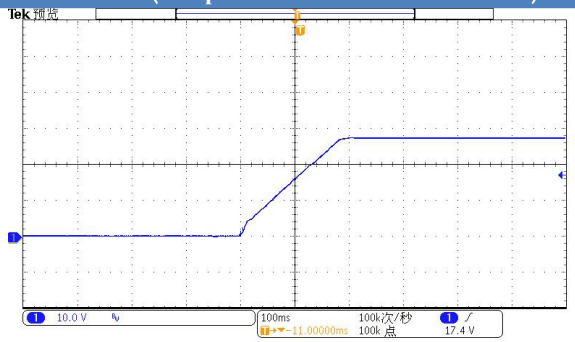

FIG. 14 Output VoltageStart the waveform
（Vin=270V，Iout=22A）

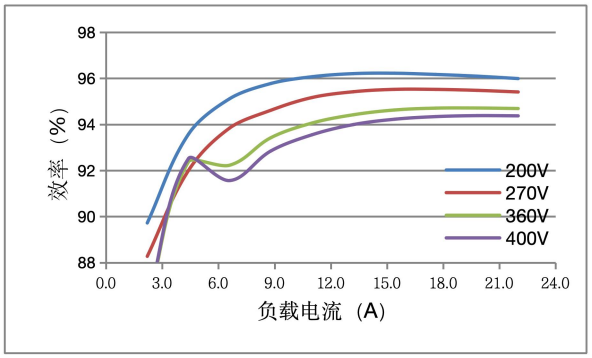

FIG. 15 Environmental temp.25℃ Efficiency Curve

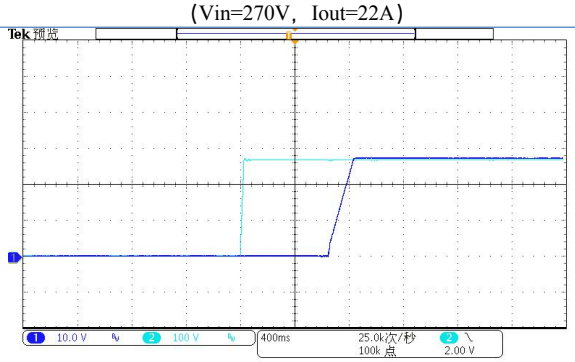

FIG. 16 Enter the power-on time
（Vin=270V,Iout=22A,CH1Output Voltage,CH2Input Voltage）

FIG. 17 SST SYNCHRONIZATION STARTUP
（Vin=270V,Iout=22A,CH1Output Voltage,CH2 SST Voltage）

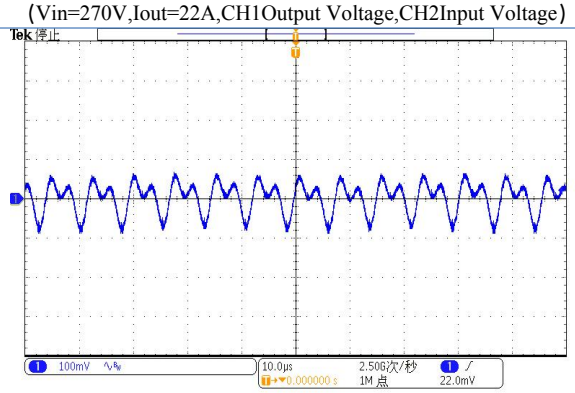

FIG. 18 Output ripple voltage waveform
（Vin=270V,Iout=22A，Output ripple voltage waveform
oscilloscope bandwidth 20M,10uF ceramic capacitor)

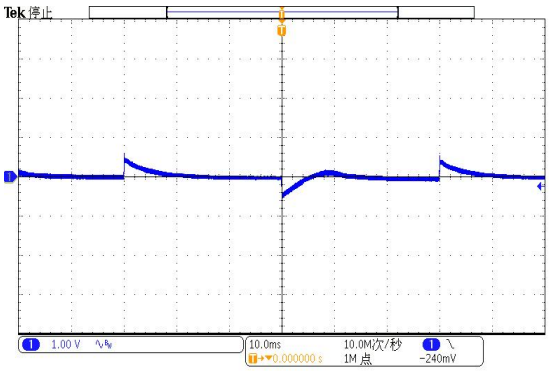

FIG. 19 Output VoltageDynamic response waveform
（Vin=270V,50%～75%～50%Dynamic load,di/dt=1A/us）

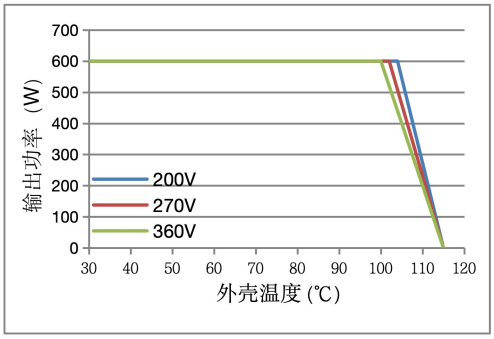

FIG. 20 Derating Curve
（Iout=22A）

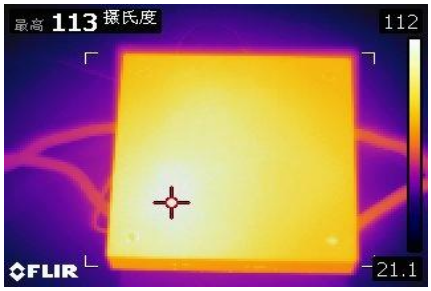

FIG. 21 Heat distribution
（Vin=270V,Iout=22A）

TECF(All brick) Series

FEATURES

- **Power density: up to 2000W**
- **Conversion efficiency: 95.5%, TYP.**
- **Source voltage effect: ±0.3%, TYP.**
- **Load effect: ±0.5%, TYP.**
- **Isolation voltage: 1500Vac**
- **N+1 redundant parallel connection**
- **With external communication function**
- **Fixed switching frequency: 200KHz, TYP.**

ELECTRICAL SPECIFICATIONS

Parameter		Min.	Typ.	Max.	Units	Notes & Conditions
Absolute Maximum Ratings						
Input Voltage	TECF110xxx	-0.5		230	Vdc	Continuous, Not Running
				160	Vdc	Continuous,Running
				200	Vdc	Transient Square Wave Voltage
	TECF160xxx	-0.5		250	Vdc	Continuous, Not Running
				200	Vdc	Continuous,Running
				220	Vdc	Transient Square Wave Voltage
	TECF270xxx	-0.5		500	Vdc	Continuous, Not Running
				425	Vdc	Continuous,Running
				475	Vdc	Transient Square Wave Voltage
	TECF500xxx	-0.5		700	Vdc	Continuous, Not Running
				650	Vdc	Continuous,Running
				680	Vdc	Transient Square Wave Voltage
Enable to -Vin Voltage		-2.0		20	Vdc	Continuous Control Voltage
Input Specifications						
Operating Input Voltage Range	TECF110xxx	66	110	160	Vdc	Rated Input Voltage Range
	TECF160xxx	100	160	200	Vdc	Rated Input Voltage Range
	TECF270xxx	200	270	425	Vdc	Rated Input Voltage Range
	TECF500xxx	400	500	650	Vdc	Rated Input Voltage Range
Input Under-Voltage Lockout	TECF110xxx	57	60	63	Vdc	Undervoltage Shutdown Threshold
		62	65	68	Vdc	On-State Voltage Threshold
	TECF160xxx	75	80	85	Vdc	Undervoltage Shutdown Threshold
		85	90	95	Vdc	On-State Voltage Threshold

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	TECF270xxx	170	175	180	Vdc	Undervoltage Shutdown Threshold
		180	185	190	Vdc	On-State Voltage Threshold
	TECF500xxx	375	380	385	Vdc	Undervoltage Shutdown Threshold
		385	390	395	Vdc	On-State Voltage Threshold
Input Up-Voltage Lockout	TECF110 xxx	175	180	185	Vdc	Overvoltage Shutdown Threshold
		165	170	175	Vdc	Overvoltage Recovery Threshold
	TECF160xxx	210	215	220	Vdc	Overvoltage Shutdown Threshold
		200	205	210	Vdc	Overvoltage Recovery Threshold
	TECF270xxx	435	440	445	Vdc	Overvoltage Shutdown Threshold
		425	430	435	Vdc	Overvoltage Recovery Threshold
	TECF500xxx	660	670	680	Vdc	Overvoltage Shutdown Threshold
		650	660	670	Vdc	Overvoltage Recovery Threshold
			1.5	4	W	Enable OFF，Rated Input Voltage
Note: In order to improve system stability, the input parallel capacitor should have a certain series equivalent resistance (ESR).						
Output Specifications						
Line Regulation Rate			±0.3		% Vout	
Load Regulation Rate			±0.5		% Vout	
Voltage Temperature Coefficient				±0.02	% /℃	
Output Voltage Set Point				±1	% Vout	
Regulated Voltage Accuracy				±1	% Vout	
Efficiency			95.9		%	
Output Voltage Ripple and Noise	PK-PK		1		% Vout	Full Load
	RMS		0.3		% Vout	Full Load
Output DC Current-Limit Inception			120		%	Maximum Rated Output Current
Output Voltage Dynamic Load Response	Overshoot Magnitude		4		%	50%-75%-50% Rated Load, Percentage of Output Voltage
	Recovery Time		0.5		ms	
Output Voltage TRIM Range		-20		+10	% Vout	TRIM end adjustment, voltage adjustable range see specific model specification.
Output Over-Voltage Protection			120		%Vout	Overvoltage Lock Output 0V, Restart
Output Voltage Overshoot				5	%Vout	Output Maximum Load

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GENERAL FEATURES

Dynamic Specifications

Input Turn-On Time				50		ms	Keep The Power ON and Apply
Enable Turn-On Time				10		ms	Maintain The Rated Input

Isolation Specifications

Isolation Voltage	Input-Output		1500			Vac	AC,5mA,60s
	Output-Case		750			Vac	AC,5mA,60s
Isolation Resistance	Input-Output		100			MΩ	500Vdc,60s

Other Specifications

ON/OFF Control at Input	On-State Voltage	Positive Logic	3		10	Vdc	ON/OFF Enable control for optical coupling isolation control
		Negative Logic	-2		1	Vdc	
	Off-State Voltage	Positive Logic	-2		1	Vdc	
		Negative Logic	3		10	Vdc	
ON/OFF Control at Output	On-State Voltage		0.9		3	Vdc	
	Off-State Voltage		0		0.7	Vdc	
Weight				315		g	
MTBF**(Calculated according to GJB/Z 299C-2006)**				0.65		10^6Hrs	G_B , +70℃

Temperature Specifications

Quality Grade	Temperature Grade	Operation Temperature	operating ambient temperature	Storage Temperature
F：Mil	H Class	-55 ~ +105℃	-55 ~ +85℃	-55 ~ +125℃
	T Class	-40 ~ +95℃	-40 ~ +75℃	-55 ~ +125℃
	P Class	-25 ~ +85℃	-25 ~ +60℃	-40 ~ +105℃
G：Industrial	H Class	-40 ~ +105℃	-40 ~ +85℃	-55 ~ +125℃
	T Class	-40 ~ +95℃	-40 ~ +75℃	-55 ~ +125℃
	P Class	-25 ~ +85℃	-25 ~ +55℃	-40 ~ +105℃
Over-Temperature Shutdown Restart Hysteresis		15±5℃		

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PRODUCT MODEL (Example)

Input Specifications		Output Specifications				Efficiency (typ.)	Product Model (Example)
Rated Input Voltage	Input Operating Voltage Range	Rated Output Voltage	Output Current	Output Power	Ripple and Noise (PK-PK)		
110	(66~160)Vdc	5V	0~120A	600W	100mV	92%	TECF110P5H120S
		12V	0~100A	1200W	200mV	94%	TECF110P12H100S
		15V	0~80A	1200W	200mV	94%	TECF110P15H80S
		24V	0~50A	1200W	240mV	94%	TECF110P24H50S
		28V	0~43A	1200W	280mV	94%	TECF110P28H43S
		32V	0~38A	1200W	300mV	94%	TECF110P32H38S
		48V	0~25A	1200W	350mV	94%	TECF110P48H25S
160	(100~200) Vdc	5V	0~120A	600W	100mV	94%	TECF160P5H120S
		12V	0~100A	1200W	200mV	94%	TECF160P12H100S
		15V	0~80A	1200W	200mV	94%	TECF160P15H80S
		24V	0~50A	1200W	240mV	94%	TECF160P24H50S
		28V	0~43A	1200W	280mV	94%	TECF160P28H43S
		32V	0~38A	1200W	300mV	94%	TECF160P32H38S
		48V	0~25A	1200W	350mV	94%	TECF160P48H25S
270	(200~400) Vdc	5V	0~130A	650W	100mV	93%	TECF270P5H130S
		12V	0~125A	1500W	200mV	94%	TECF270P12H125S
		15V	0~100A	1500W	200mV	95%	TECF270P15H100S
		24V	0~83A	2000W	240mV	95%	TECF270P24H83S
		28V	0~72A	2000W	280mV	96%	TECF270P28H72S
		32V	0~63A	2000W	300mV	96%	TECF270P32H63S
		48V	0~42A	2000W	350mV	96%	TECF270P48H42S
500	(400~650) Vdc	5V	0~130A	650W	100mV	93%	TECF500P5H130S
		12V	0~125A	1500W	200mV	94%	TECF500P12H125S
		15V	0~100A	1500W	200mV	95%	TECF500P15H100S
		24V	0~83A	2000W	250mV	95%	TECF500P24H83S
		28V	0~72A	2000W	250mV	96%	TECF500P28H72S
		32V	0~63A	2000W	300mV	96%	TECF500P32H63S

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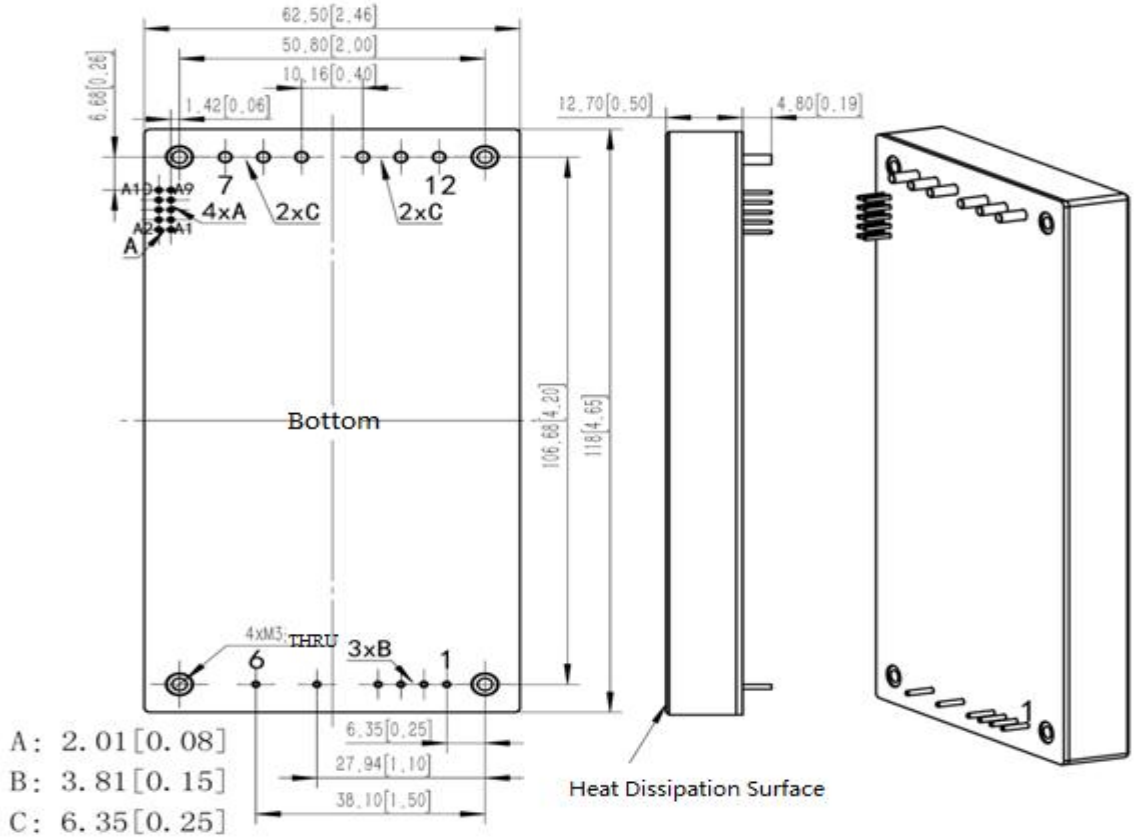
F	C	F	270	N	28	H	72	S	-X
Quality Grade F:Mil G:Industrial	Conversion Type C:DC/DC	Package Size: All brick	Input Voltage 270：270V	N: Negative Logic P: Positive Logic	Output Voltage 28:28V	Temperature Grade（Case）H: -55℃ ~ +105℃(F) H: -40℃ ~ +105℃(G) T: -40℃ ~ +105℃ P: -25℃ ~ +85℃	Output Current 72:72A	' S:Single Way	Suffix A ~ Z

Model Description:：

1、 The model list only gives the models with the maximum rated power. If you choose the products with low power, please change the Output Current value of the models by yourself.

2、 The shelf products can be specially customized according to user requirements. The models should be added with corresponding suffixes, and the company will provide separate corresponding specifications.

PACKAGE PIN



Outline drawing

Notes

- ✧ L×W×H：(118±0.5) mm ×(62.5±0.5) mm × (12.7±0.2) mm，The height of some models is13.5mm.
- ✧ Pin1-Pin6：Copper Needle Diameter is1.02(±0.05)mm，The length of the pin4.8(±0.5)mm.
- ✧ Pin7-Pin12：Copper Needle Diameter is2.03(±0.05)mm，The length of the pin4.8(±0.5)mm.
- ✧ PinA1-A10：The spacing is 2.01mm, and the square needle is 0.5mm x 0.5mm，The length of the pin4.8(±0.5)mm.
- ✧ All pins are made of copper alloy and chemically immersed gold.

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Table 5 Pin Definition

Pin	Name	Function
1	NC	--
2	NC	--
3	+CNT	Remote Control The Positive
4	-CNT	Remote Control Cathode
5	+Vin	Input Voltage Positive
6	-Vin	Negative Input Voltage
7	-Vo	Negative Output Voltage
8	-Vo	Negative Output Voltage
9	-Vo	Negative Output Voltage
10	+Vo	Output Voltage Positive Terminal
11	+Vo	Output Voltage Positive Terminal
12	+Vo	Output Voltage Positive Terminal
A1	TRIM	Output Voltage Regulation/ON/OFF Control at Output
A2	PC	Parallel Cable
A3	ADR	Address
A4	RTS	Request To Send
A5	AUX	Auxiliary Source
A6	TX	A Serial Port to Send
A7	+S	Output Voltage Compensation Anode
A8	RX	A Serial Port to Receive
A9	-S	Output Voltage Compensates The Negative Pole
A10	SST	Sync Start

- ✧ Installation method: M3 bolt is used to fix substrate and other devices.
- ✧ Components without dimensions are for direct reference only.

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TEST REPORT（Sample model：TECF270P28H72S-P)

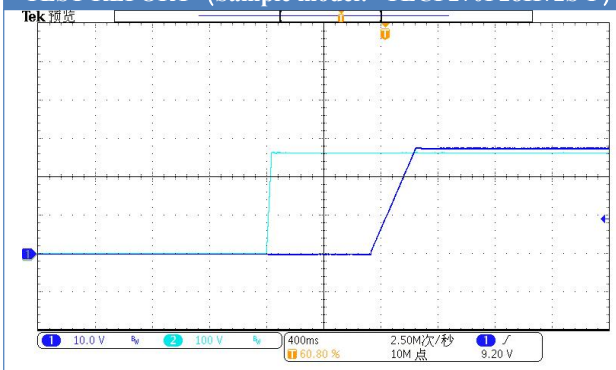


FIG.22 Enter the power-on time
（Vin=270V,Iout=72A,CH1Output Voltage,CH2Input Voltage）

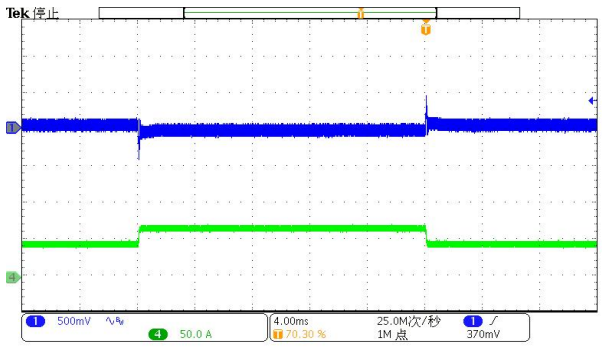


FIG.23 Output VoltageDynamic response waveform
（Vin=270V,50%～75%～50%Dynamic load,di/dt=3A/us）

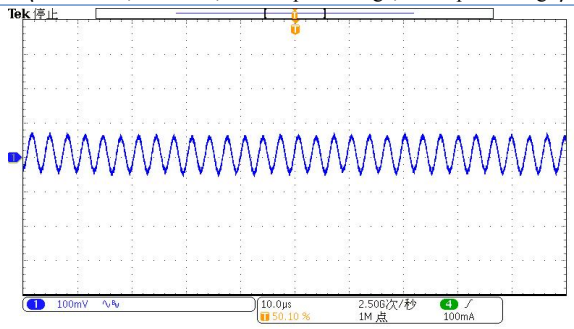


FIG.24 Output ripple voltage waveform
Vin=200V, Iout=72A， Output ripple voltage waveform oscilloscope bandwidth 20M,10uF ceramic capacitor)

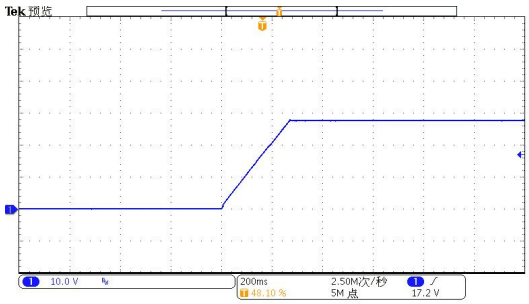


FIG 25Capacitive load startup

（Vin=270V,Iout=0A,Capacitance load 20000uF）

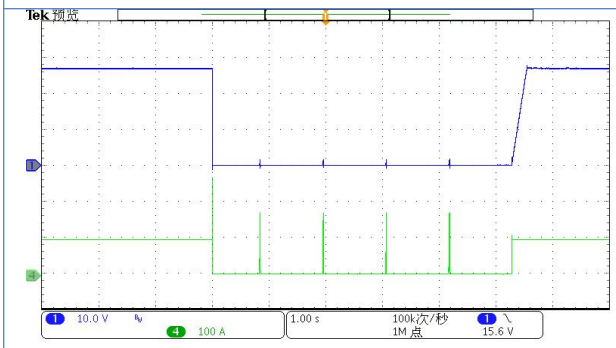


FIG.26 Output short circuit
（Vin=270V, CH1Output VoltageCH4Output Current）

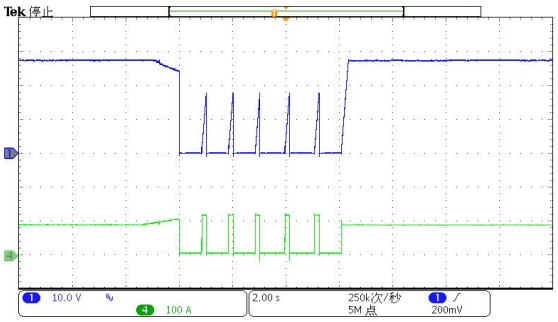


FIG.27 Output overcurrent hiccup
（Vin=270V, CH1Output VoltageCH4Output Current）

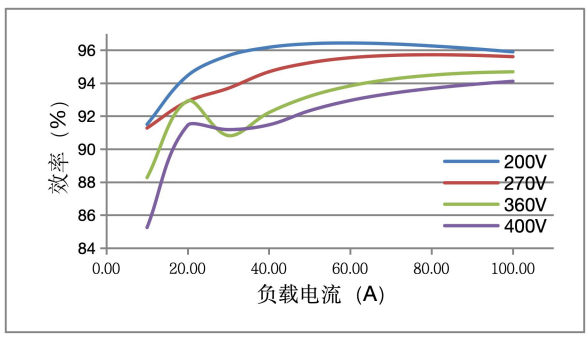


FIG.28 Environmental temp.25℃EfficiencyCurve

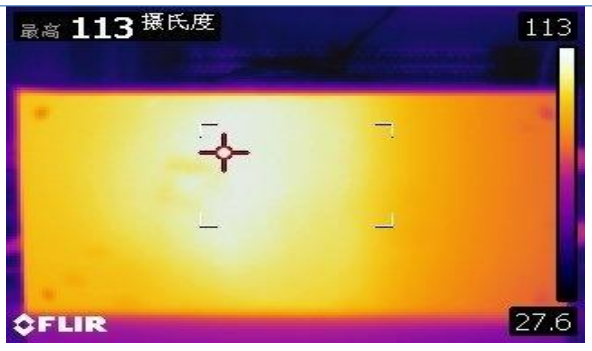
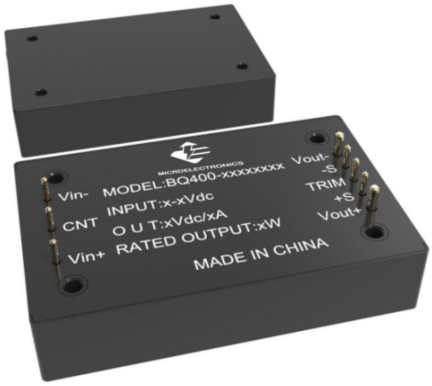


FIG.29 Heat distribution
（Vin=270V,Iout=72A）

TEPQ（PFC）Series



FEATURES

- **Power density: up to 500W**
- **Conversion efficiency: 95 %, TYP.**
- **Source voltage effect: ±1%, TYP.**
- **Load effect: ±1%, TYP.**
- **Isolation voltage: 1500Vac**
- **Load enable control**
- **FPC enable control**
- **Fault alarm**
- **Fixed switching frequency: 250KHz, TYP.**

ELECTRICAL SPECIFICATIONS

Parameter		Min.	Typ.	Max.	Units	Notes & Conditions
Absolute Maximum Ratings						
Input Voltage (L1 to L2/N)	TEPQ220xxx			300	Vac	
PFC_EN to -VOUT Voltage		-15		600	Vdc	Continuous Control Voltage
AC GOOD , LOAD EN to -VOUT Voltage		-0.3		50	Vdc	Continuous Control Voltage
AUX to -VOUT Voltage		-15		600	Vdc	Continuous Control Voltage
Input Specifications						
Operating Input Voltage Range	TEPQ220xxx	175	220	265	Vac	Rated Input Voltage Range
Input Under-Voltage Lockout	TEPQ220xxx	160	163	170	Vac	Undervoltage Shutdown Threshold
		170	173	180	Vac	On-State VoltageThreshold
Input Up-Voltage Lockout	TEPQ220xxx	275	280	285	Vac	Overvoltage Shutdown Threshold
		265	270	275	Vac	Overvoltage Recovery Threshold
Input Frequency		47		63	Hz	
Power Factor			0.98			
Total Harmonic Distortion of Input Current			5		%	
			1		W	Enable OFF， Rated Input Voltage

Note

1 Input terminal is recommended to be used with input EMI filter.

2.After input overvoltage or undervoltage protection, the PFC Function of the module stops working and the output voltage follows the input voltage

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Output Specifications						
Output Voltage Set Point				±1	% Vout	
Line Regulation Rate			±1		% Vout	
Load Regulation Rate			±1		% Vout	
Voltage Temperature Coefficient				±0.02	% /℃	
Output Voltage Accuracy				±1	% Vout	
Efficiency			95		%	Vin=220Vac
Output Voltage Ripple and Noise	Pk-pk		3		% Vout	Full Load
	RMS		0.7		% Vout	Full Load
Output DC Current-Limit Inception			120		%	Maximum Rated Output Current
Output Voltage Dynamic Load Response	Overshoot		5		%	50%-75%-50% Rated Load, Percentage of Output Voltage
	Recovery Time		0.5		s	
Output Voltage TRIM Range		-20		+10	% Vout	TRIM end adjustment, voltage adjustable range see specific model specification.
Output Over-Voltage Protection			150		%Vout	Overvoltage Lock Output 0V, Restart
Output Voltage Overshoot				10	%Vout	Output Maximum Load

GENERAL FEATURES

Dynamic Specifications						
Input Turn-On Time			2		s	Keep The Power ON and Apply
Enable Turn-On Time			2		s	Maintain The Rated Input
Isolation Specifications						
Isolation Voltage	Output-Case	1500			Vac	5mA,60s
Isolation Resistance	Output-Case	100			MΩ	500Vdc,60s
Other Specifications						
ON/OFF Control at PFC EN	On-State Voltage	Positive Logic	3		500	Vdc	Internal 5V Pull-up
		Negative Logic	-15		1	Vdc	
	Off-State Voltage	Positive Logic	-15		1	Vdc	
		Negative Logic	3		500	Vdc	
ON/OFF Control at LOAD EN	On-State Voltage			>365		Vdc	Internal MOS Tube Open Leakage Output
	Off-State Voltage			<350		Vdc	
ON/OFF Control at AC GOOD	AC Input Voltage Normal		>175		<265	Vac	Internal MOS Tube Open Leakage Output
	AC Input Voltage Abnormal		<165		>275	Vac	
Weight				92		g	
MTBF(Calculated according to GJB/Z 299C-2006)				1.4		10^6Hrs	G_B , +70℃

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Temperature Specifications

Quality Grade	Temperature	Operation Temperature	operating ambient temperature	Storage Temperature
F：Mil	H Class	-55～+105℃	-55～+85℃	-55～+125℃
	T Class	-40～+95℃	-40～+75℃	-55～+125℃
	P Class	-25～+85℃	-25～+60℃	-40～+105℃
G：Industrial	H Class	-40～+105℃	-40～+85℃	-55～+125℃
	T Class	-40～+95℃	-40～+75℃	-55～+125℃
	P Class	-25～+85℃	-25～+55℃	-40～+105℃
		15±5℃		

Input Specifications		Output Specifications				Efficiency	Product Model (Example)
Rated Input Voltage	Input Operating Voltage Range	Rated Output Voltage	Output Current	Output Power	Ripple and Noise（PK-）		
220Vac	(175~265)Vdc	380V	0~1.3A	500W	10V	95%	TEPQ220NN380H13S

F	P	Q	220	N	380	H	13	S	-X
Quality Grade F:Mil G:Industrial	Conversion Type P:AC/DC	Package Size Q:1/4brick	Input Voltage 220：270V	N: Negative Logic P: Positive Logic	Output Voltage 380:380 V	Temperature Grade（Case） H: -55℃～+105℃(F) H: -40℃～+105℃(G) T: -40℃～+105℃ P: -25℃～+85℃	Output Current : 13:1.3A	' S:Single Way	Suffix A～Z

Model Description:：

1、 The Table of models only shows the models with the maximum rated power. If you choose products with low power, please change the Output Current in the models by yourself;

2、 When the Output voltage is greater than or equal to 250V, the Output Current shall be multiplied by 10 (rounded).;

3、 The shelf products can be specially customized according to user requirements. The models should be added with corresponding suffixes, and the company will provide separate corresponding specifications.

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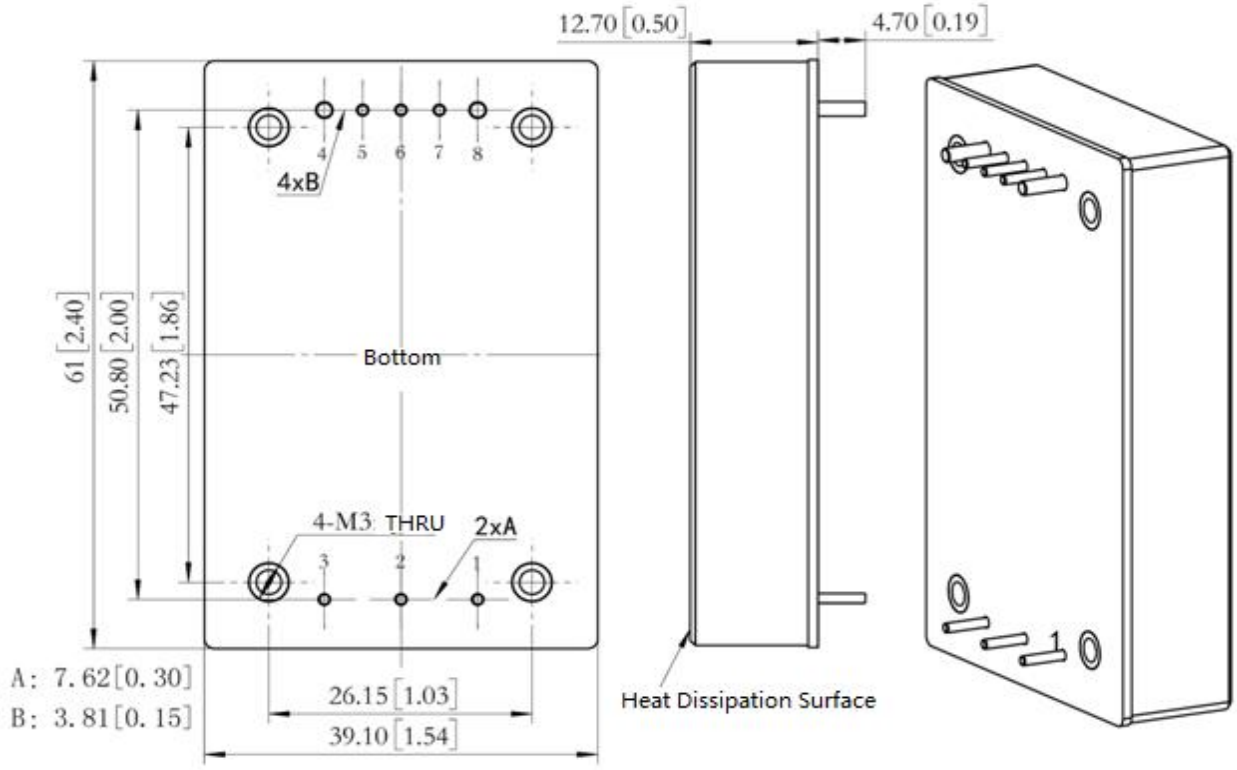
PACKAGE PIN



Outline drawing

Table 6 Pin Definition

Pin	Name	Function
1	L1/L	AC Input L
2	PFC_EN	Remote Enabling End
3	L2/N	AC Input N
4	-VOUT	Output The Cathode
5	AUX	Accessory Power Supply Output
6	LOAD_EN	Load Enabling End
7	AC_GOOD	Input Status Display
8	+VOUT	Output The Anode

NOTE:

- ✧ L×W×H：61mm × 39.1mm × 12.7mm.
- ✧ Pin1-Pin3、Pin5-Pin7：Copper Needle Diameter is1mm， The length of the pin4.7(±0.5)mm.
- ✧ Pin4、Pin8：Copper Needle Diameter is1.5mm， The length of the pin4.7(±0.5)mm.
- ✧ Tolerance：x.x±0.5mm，x.xx±0.25mm.
- ✧ All pins are made of copper alloy and chemically immersed gold.
- ✧ Installation method: M3 bolt is used to fix substrate and other devices.
- ✧ Components without dimensions are for direct reference only.

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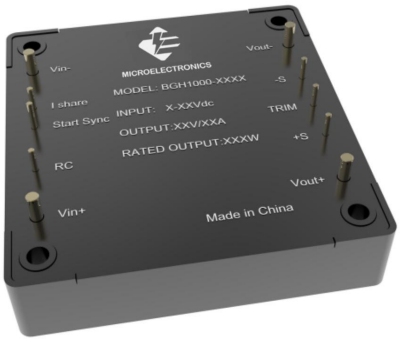
TEPH（PFC）**Series**

FEATURES

- **Power density: up to 1000W**
- **Conversion efficiency: 97 %, TYP.**
- **Source voltage effect: ±1%, TYP.**
- **Load effect: ±1%, TYP.**
- **Isolation voltage: 2000Vac**
- **Load enable control**
- **FPC enable control**
- **Fault alarm**
- **Fixed switching frequency: 250KHz, TYP.**



Parameter		Min.	Typ.	Max.	Units	Notes & Conditions
Absolute Maximum Ratings						
Input Voltage (L1 to L2/N)	TEPH220xxx			300	Vac	
	TEPH220Wxxx			300	Vac	
	TEPH115xxx			200	Vac	
PFC_ENA to -VOUT Voltage		-2		575	Vdc	Continuous Control Voltage
LOAD ENA,AC GOOD to -VOUT Voltage		-0.3		60	Vdc	
Input Specifications						
Operating Input Voltage Range	TEPH220xxx	165	220	265	Vac	Rated Input Voltage Range
	TEPH220Wxxx	85	220	265	Vac	Rated Input Voltage Range
	TEPH115xxx	100	115	140	Vac	Rated Input Voltage Range
Input Under-Voltage Lockout	TEPH220xxx	145	155	165	Vac	Undervoltage Shutdown Threshold
		155	165	175	Vac	On-State VoltageThreshold
	TEPH220Wxxx	65	75	85	Vac	Undervoltage Shutdown Threshold
		75	85	95	Vac	On-State VoltageThreshold
	TEPH115xxx	78	83	88	Vac	Undervoltage Shutdown Threshold
		85	90	95	Vac	On-State VoltageThreshold
Input Up-Voltage Lockout	TEPH220xxx	270	280	290	Vac	Overvoltage Shutdown Threshold
		260	270	280	Vac	Overvoltage Recovery Threshold
	TEPH220Wxxx	270	280	290	Vac	Overvoltage Shutdown Threshold
		260	270	280	Vac	Overvoltage Recovery Threshold
	TEPH115xxx	155	160	165	Vac	Overvoltage Shutdown Threshold
		145	150	155	Vac	Overvoltage Recovery Threshold
Input Frequency		47		63	Hz	
Power Factor			0.99			
Total Harmonic Distortion of Input Current			4		%	Full Load
Disabled Power Dissipation			1		W	Enable OFF，Rated Input

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Parameter		Min.	Typ.	Max.	Units	Notes & Conditions
Note 1 Input terminal is recommended to be used with input EMI filter. 2.After input overvoltage or undervoltage protection, the PFC Function of the module stops working and the output voltage follows the input voltage						
Output Specifications						
Output Voltage Set Point				±2	% Vout	
Line Regulation Rate			±1		% Vout	
Load Regulation Rate			±1		% Vout	
Voltage Temperature Coefficient				±0.02	% /℃	
Regulated Voltage Accuracy				±1	% Vout	
EfficiencyEfficiency			97		%	
Output Voltage Ripple and Noise	PK-PK		3		% Vout	Full Load
	RMS		0.7		% Vout	Full Load
Output DC Current-Limit Inception			120		%	Maximum Rated Output Current
Output Voltage Dynamic Load Response	Overshoot Magnitude		5		%	50%-75%-50% Rated Load, Percentage of Output Voltage
	Recovery Time		0.5		s	
Output Voltage TRIM Range		-20		+10	% Vout	TRIM end adjustment, voltage adjustable range see specific
Output Over-Voltage Protection			150		%Vout	Overvoltage Lock Output 0V, Restart
Output Voltage Overshoot				10	%Vout	Output Maximum Load apacitor
GENERAL FEATURES						
Dynamic Specifications						
Input Turn-On Time			2		s	Keep The Power ON and Apply
Enable Turn-On Time			2		s	Maintain The Rated Input
Isolation Specifications						
Isolation Voltage	Output-Case	1500			Vac	5mA，60s
Isolation Resistance	Output-Case	100			MΩ	500Vdc，60s

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Parameter			Min.	Typ.	Max.	Units	Notes & Conditions
Other Specifications							
ON/OFF Control at PFC EN	On-State Voltage	Positive Logic	4		500	Vdc	
		Negative Logic	-2		3	Vdc	
	Off-State Voltage	Positive Logic	-2		3	Vdc	
		Negative Logic	4		500	Vdc	
ON/OFF Control at LOAD EN	On-State Voltage			360		Vdc	OutputOD
	Off-State Voltage			330		Vdc	
	Maximum Open Circuit Voltage			60		Vdc	
	Pull-down resistance			2		Ω	
AC_GOOD	AC Input Voltage for		176		265	Vac	OutputOD
	Maximum Open Circuit			60		Vdc	
	Pull-down resistance			2		Ω	
IMON	Output voltage			0.7		Vdc	
	Full Load Output voltage			2.3		Vdc	
Weight				155		g	
MTBF(Calculated according to GJB/Z 299C-2006)				1		10^6Hrs	G_B , +70℃

Temperature Specifications

Quality Grade	Temperature	Operation Temperature	operating ambient temperature	Storage Temperature
F：Mil	H Class	-55 ~ +105℃	-55 ~ +85℃	-55 ~ +125℃
	T Class	-40 ~ +95℃	-40 ~ +75℃	-55 ~ +125℃
	P Class	-25 ~ +85℃	-25 ~ +60℃	-40 ~ +105℃
G：Industrial	H Class	-40 ~ +105℃	-40 ~ +85℃	-55 ~ +125℃
	T Class	-40 ~ +95℃	-40 ~ +75℃	-55 ~ +125℃
	P Class	-25 ~ +85℃	-25 ~ +55℃	-40 ~ +105℃
Over-Temperature Shutdown Restart Hysteresis		15±5℃		

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PRODUCT MODEL (Example)							
Input Specifications		Output Specifications				Efficiency	Product Model (Example
Rated Input Voltage	Input Operating Voltage Range	Rated Output Voltage	Output Current	Output Power	Ripple and Noise（PK-		
220Vac	(165~265)Vdc	360V	0~2.08A	750W	10V	97%	TEPH220NN360H21S
		380V	0~2.6A	1000W	10V	97%	TEPH220NN380H26S
220Vac	(85~265)Vdc	380V	0~1.3A	500W	10V	95%	TEPH220WNN380H13S
115Vac	(90~150)Vdc	300V	0~1.7A	500W	10V	95%	TEPH115NN300H17S

F	P	H	220	N	380	H	13	S	-X
Quality Grade F:Mil G:Industrial	Conversion Type P:AC/DC	Package Size H:1/2brick	Input Voltage 220：220V	N: Negative Logic P: Positive Logic	Output Voltage 380:380V	Temperature Grade（Case） H: -55℃ ~ +105℃ (F) H: -40℃ ~ +105℃ (G) T: -40℃ ~ +105℃ P: -25℃ ~ +85℃	Output Current : 13:1.3A	' S:Single Way	Suffix A ~ Z

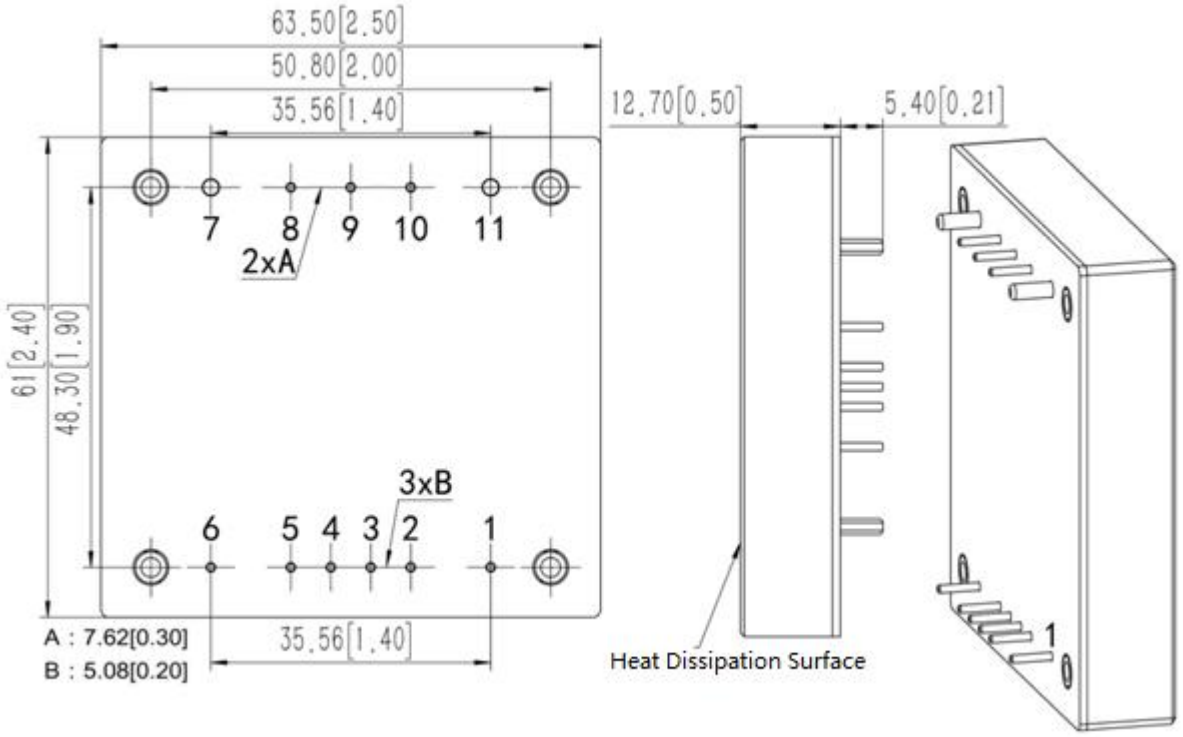
Model Description:：

1、The Table of models only shows the models with the maximum rated power. If you choose products with low power, please change the Output Current in the models by yourself；

2、When the Output voltage is greater than or equal to 250V, the Output Current shall be multiplied by 10 (rounded).；

3、The shelf products can be specially customized according to user requirements. The models should be added with corresponding suffixes, and the company will provide separate corresponding specifications.

PACKAGE PIN



Outline drawing

Table 7 Pin Definition

Pin	Name	Function
1	L1/L	Ac Input L
2	NC	--
3	NC	--
4	IMON	Output Current Detection
5	PFC_ENA	REM
6	L2/N	Ac Input N
7	-VOUT	Output
8	AUX	Accessory Power Supply Output
9	LOAD_ENA	Load Enabling End
10	AC_GOOD	Indicates The Status of Input Voltage
11	+VOUT	Output Voltage Positive Terminal

Notes：

- ✧ L×W×H：(63.5±0.5) mm × (61±0.5) mm × (12.7±0.2) mm.
- ✧ Pin1-Pin6、Pin8-Pin10：Copper Needle Diameter is1.02(±0.05)mm，The length of the pin5.4(±0.5)mm.
- ✧ Pin7、Pin11：Copper Needle Diameter is2.03(±0.05)mm，The length of the pin5.4(±0.5)mm.
- ✧ All pins are made of copper alloy and chemically immersed gold.
- ✧ Components without dimensions are for direct reference only.

TEPF（PFC）Series

FEATURES

- **Power density: 800W**
- **Conversion efficiency: 91 %, TYP.**
- **Source voltage effect: ±1%, TYP.**
- **Load effect: ±1%, TYP.**
- **Isolation voltage: 1500Vac**
- **Load enable control**
- **PFC switching frequency: 250KHz, TYP.**

ELECTRICAL SPECIFICATIONS

Parameter		Min.	Typ.	Max.	Units	Notes & Conditions
Absolute Maximum Ratings						
Input Voltage (L1 to L2/N)	TEPF220xxx			300	Vac	
	TEPF220Wxxx			300	Vac	
	TEPF115xxx			200	Vac	
LOAD EN to -Vo Voltage		-0.5		75	Vdc	
TRIM to -Vo Voltage		-0.5		15	Vdc	Continuous Control Voltage
Input Specifications						
Operating Input Voltage Range	TECF220xxx	175	220	265	Vac	Rated Input Voltage Range
	TECF220Wxxx	85	220	265	Vac	Rated Input Voltage Range
	FC115xxx	100	115	140	Vac	Rated Input Voltage Range
Input Under-Voltage Lockout	TECF220xxx	160	163	170	Vac	Undervoltage Shutdown Threshold
		170	173	180	Vac	On-State VoltageThreshold
	TECF220Wxxx	65	75	85	Vac	Undervoltage Shutdown Threshold
		75	85	95	Vac	On-State VoltageThreshold
	TECF115xxx	78	83	88	Vac	Undervoltage Shutdown Threshold
		85	90	95	Vac	On-State VoltageThreshold
Input Up-Voltage Lockout	TECF220xxx	275	280	285	Vac	Overvoltage Shutdown Threshold
		265	270	275	Vac	Overvoltage Recovery Threshold
	TECF220Wxxx	275	280	285	Vac	Overvoltage Shutdown Threshold
		265	270	275	Vac	Overvoltage Recovery Threshold
	TECF115xxx	155	160	165	Vac	Overvoltage Shutdown Threshold
		145	150	155	Vac	Overvoltage Recovery Threshold
Input Frequency		47		63	Hz	Vin=220Vac
		45		800	Hz	Vin=115Vac
Power Factor			0.98			
Total Harmonic Distortion of Input Current			5		%	Vin=220Vac
			1.5		%	Vin=115Vac
Disabled Power Dissipation			2		W	Enable OFF，Rated Input

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Note

1 Input terminal is recommended to be used with input EMI filter.

2. After input overvoltage or undervoltage protection, the PFC Function of the module stops working and the output voltage follows the input voltage

Output Specifications						
Output Voltage Set Point				±1	% Vout	
Line Regulation Rate				±1	% Vout	
Load Regulation Rate				±1	% Vout	
Voltage Temperature Coefficient				±0.02	% /℃	
Regulated Voltage Accuracy				±1	% Vout	
Efficiency			91		%	Vin=220Vac
Output Voltage Ripple and Noise	PK-PK		3		% Vout	Full Load
	RMS		0.7		% Vout	Full Load
Output DC Current-Limit Inception			120		%	Maximum Rated Output Current
Output Voltage Dynamic Load Response	Overshoot Magnitude		5		%	50%-75%-50% Rated Load, Percentage of Output Voltage
	Recovery Time		0.5		s	
Output Voltage TRIM Range		-20		+10	% Vout	TRIM end adjustment, voltage adjustable range see specific model specification.
Output Over-Voltage Protection			150		%Vout	Overvoltage Lock Output 0V, Restart
Output Voltage Overshoot				5	%Vout	Output Maximum Load Capacitor
GENERAL FEATURES						
Dynamic Specifications						
Input Turn-On Time			2		s	The enable end remains ON.. Vin=220Vac,1000μF,50ΩThe enable end remains ON.
Enable Turn-On Time			1		s	Voltage and Enable The Switch
Isolation Specifications						
Isolation Voltage	Output-Case	1500			Vac	5mA，60s
Isolation Resistance	Output-Case	100			MΩ	500Vdc，60s
Other Specifications						
ON/OFF Control	On-State Voltage	Positive Logic	3		15	Vdc
		Negative Logic	-10		0.7	Vdc
	Off-State Voltage	Positive Logic	-10		0.7	Vdc
		Negative Logic	3		15	Vdc
Weight				320		g

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MTBF(Calculated according to GJB/Z 299C-2006)		0.68		10^6Hrs	G_B , +70℃

Temperature Specifications

Quality Grade	Temperature	Operation Temperature	operating ambient temperature	Storage Temperature
F：Mil	H Class	-55 ~ +105℃	-55 ~ +85℃	-55 ~ +125℃
	T Class	-40 ~ +95℃	-40 ~ +75℃	-55 ~ +125℃
	P Class	-25 ~ +85℃	-25 ~ +60℃	-40 ~ +105℃
G：Industrial	H Class	-40 ~ +105℃	-40 ~ +85℃	-55 ~ +125℃
	T Class	-40 ~ +95℃	-40 ~ +75℃	-55 ~ +125℃
	P Class	-25 ~ +85℃	-25 ~ +55℃	-40 ~ +105℃
Over-Temperature Shutdown Restart Hysteresis		15±5℃		

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PRODUCT MODEL (Example)							
Input Specifications		Output Specifications				Efficiency	Product Model (Example)
Rated Input Voltage(Vac)	Input Operating Voltage Range(Vac)	Rated Output Voltage(Vdc)	Output Current	Output Power	Ripple and Noise（PK-PK）		
220 Vac	(165~265) Vac	5V	0~80A	400W	50mV	91%	TEPF220P5H80S
		12V	0~40A	480W	50mV	91%	TEPF220P12H40S
		15V	0~35A	525W	50mV	91%	TEPF220P15H35S
		24V	0~33A	800W	100mV	91%	TEPF220P24H33S
		28V	0~28A	800W	100mV	91%	TEPF220P28H28S
		32V	0~25A	800W	100mV	91%	TEPF220P32H25S
		48V	0~17A	800W	100mV	91%	TEPF220P48H17S
220W	(85~265) Vac	5V	0~80A	400W	50mV	91%	TEPF220WP5H80S
		12V	0~41A	500W	50mV	91%	TEPF220WP12H41S
		15V	0~35A	525W	50mV	91%	TEPF220WP15H35S
		24V	0~33A	800W	100mV	91%	TEPF220WP24H33S
		28V	0~28A	800W	100mV	91%	TEPF220WP28H28S
		32V	0~25A	800W	100mV	91%	TEPF220WP32H25S
		48V	0~17A	800W	100mV	91%	TEPF220WP48H17S
115Vac	(100~140) Vac	5V	0~80A	400W	50mV	91%	TEPF220WP5H80S
		12V	0~60A	720W	50mV	92%	TEPF115P12H60S
		15V	0~35A	525W	50mV	92%	TEPF115P15H35S
		24V	0~31A	750W	100mV	92%	TEPF115P24H31S
		28V	0~28A	750W	100mV	92%	TEPF115P28H28S
		32V	0~23A	750W	100mV	92%	TEPF115P32H23S
		48V	0~15A	720W	100mV	92%	TEPF115P48H15S

F	P	F	220	P	48	H	10	S	-X
Quality Grade F:Mil G:Industrial	Conversion Type P:AC/DC	Package Size F:全 brick	Input Voltage 220：220V	N: Negative Logic P: Positive Logic	Output Voltage 48:48V	Temperature Grade（Case） H: -55℃ ~ +105℃(F) H: -40℃ ~ +105℃(G) T: -40℃ ~ +105℃ P: -25℃ ~ +85℃	Output Current : 10:10A	' S:Single Way	Suffix A ~ Z

Model Description:：

1、 The Table of models only shows the models with the maximum rated power. If you choose products with low power, please change the Output Current in the models by yourself ；

2、 The shelf products can be specially customized according to user requirements. The models should be added with corresponding suffixes, and the company will provide separate corresponding specifications.

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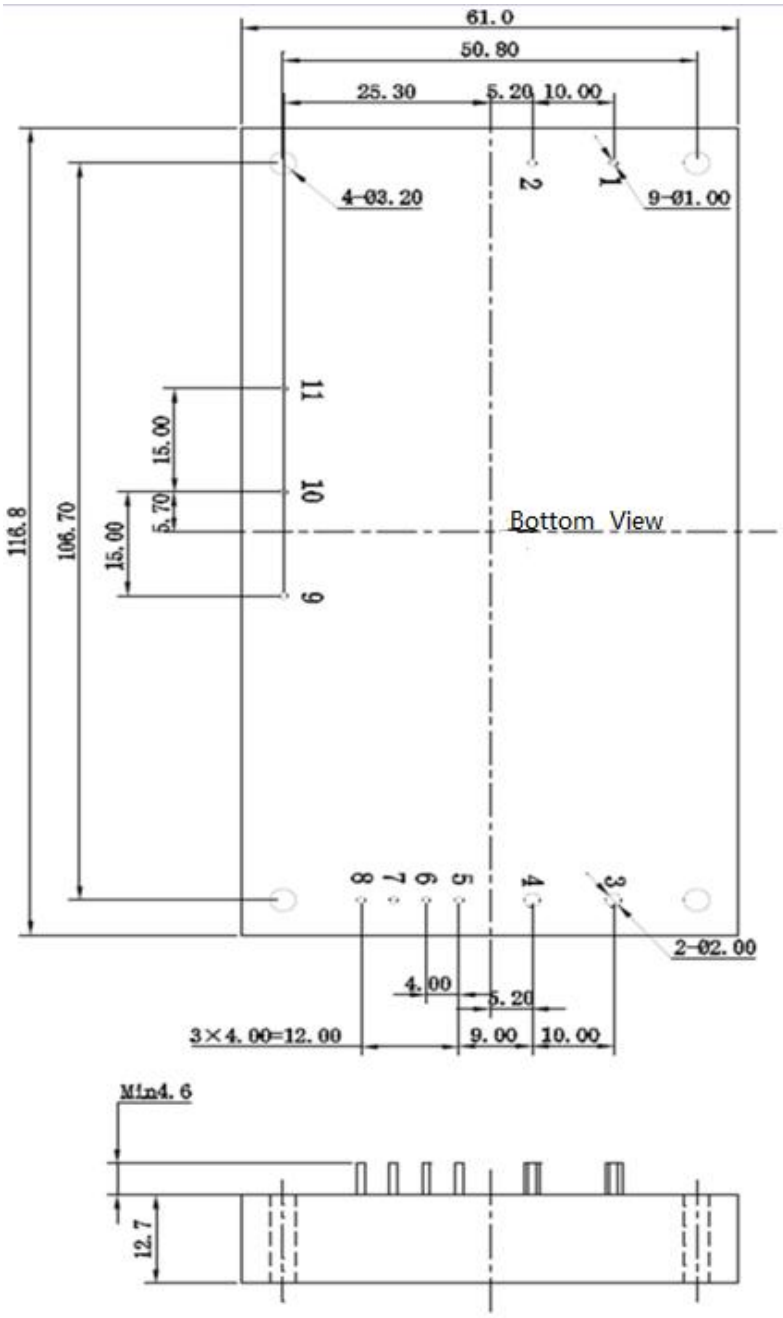
PACKAGE PIN



Outline drawing

Table 8 Pin Definition

Pin	名称	Function
1	AC(N)	AC Input Zero Line
2	AC(L)	AC Input Live Wire
3	-Vo	Negative Output Voltage
4	+Vo	Output Voltage Positive Terminal
5	-S	Output Voltage Compensates The
6	+S	Output Voltage Compensation
7	TRIM	Output Voltage Regulation
8	LOAD EN	Output Enable Terminal
9	-BC	PFCOutput The Cathode
10	+BC	PFCOutput The Anode
11	R	Surge Suppression Terminal

Notes:

- ✧ L×W×H：116.8mm × 61.0mm × 12.7mm
- ✧ Pin：The length of the pin4.6mm，All pins are made of copper alloy and chemically immersed gold.
- ✧ Shell material: aluminum substrate + plastic cover.
- ✧ Components without dimensions are for direct reference only.
- ✧ Installation method: M3 bolt is used to fix substrate and other devices.
- ✧ Recommended Pin welding temperature: 425℃, welding time less than 5s.

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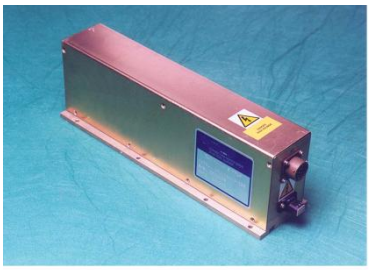
General features of high voltage Power Supply Series



FEATURES

- **Perfect protection and monitoring function**
- **High efficiency**
- **High power density**
- **High reliability**
- **Compact structure, small volume**

TEZT-4KC1CA-1, TwT , CW

FEATURES

- **Conduction cooling**
- **Modular organization**
- **Travelling wave tube protection function**

ELECTRICAL SPECIFICATIONS

1) Input power: AC115V (400Hz, three-phase)

2) Typical output parameters (corresponding to typical values of 25W TWT)

	Voltage	Current	Ripple (effective value)	Voltage Stability	Conversion Speed
Screw thread	3900 (to cathode)	10mA	0.1%	0.1%	
Collect very1	2000 (To cathode)	125mA	2%	1%	
Grid	-1000 (To cathode)	--	--	--	1uS
Filament	6.3 (To cathode)	1.2A	1%	1%	

3) Efficiency : > 85%

MECHANICAL SPECIFICATIONS

Parameter	Value
Dimension	320*60*100mm^3 (Including the socket)
Weight	3kg
Coolinng	Conduction through the bottom plate

FUNCTION

Parameter	Specification
Protection	Screw overcurrent protection, power supply overvoltage protection
Monitor	Screw and Power overcurrent output
Time delay	180±20s

ENVIRONMENTAL SPECIFICATIONS

Parameter	Value
Operating Temp.	-55℃~ +70℃
Baseplate Temp.	85℃
Altitude	70000feet

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TEZT-4.5KP1CA-1, TwT , CW

FEATURES

- **Conduction cooling**
- **Modular organization**
- **Travelling wave tube protection function**

ELECTRICAL SPECIFICATIONS

1) Input power: AC115V (400Hz, three-phase)

2) Typical output parameters (Corresponding to 150W small continuous wave traveling wave tube)

	Voltage	Current	Ripple (effective value)	Voltage Stability	Conversion Speed
Screw thread	4500 (to cathode)	5mA	0.1%	0.1%	
Collect very 1	3500 (To cathode)	100mA	2%	1%	
Electron collector	2300 (To cathode)	180mA	2%	1%	
Electron collector	1000 (To cathode)	180mA	2%	1%	
Grid	-1000 (To cathode)	--	--	--	200nS
Filament	6.3 (To cathode)	0.7A	1%	1%	

3) Efficiency : > 87%

MECHANICAL SPECIFICATIONS

Parameter	Value
Dimension	300*110*70mm^3 (Including the socket)
Weight	4kg
Coolinng	Conduction through the bottom plate

FUNCTION

Parameter	Specification
Protection	Screw & Power supply overcurrent protection
Monitor	Screw and power overcurrent output Screw and power overcurrent output
Time delay	180±20s

ENVIRONMENTAL SPECIFICATIONS

Parameter	Value
Operating Temp.	-55℃~ +70℃
Baseplate Temp.	85℃
Altitude	50000feet

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TED2-3KP1CB-2, Klystron

FEATURES

- **Conduction cooling**
- **Modular organization**
- **Protection function**
- **Function self-check**

ELECTRICAL SPECIFICATIONS

1) Input power: DC56V /12A DC28V /2A

2) Typical output parameters (corresponding to typical values of 25W TWT)

	Voltage	Current	Ripple (effective value)	Voltage Stability
Screw thread	2800±200 (to cathode)	200mA	0.1%	0.1%
Grid	65-+0 (To cathode)	--	--	0.1% (To cathode)
Grid negative	-820 (To cathode)	--	--	0.1% (To cathode)
Filament	-6.3 (To cathode)	2A	1%	1%

3) Efficiency : > 85%

4) the duty ratio: 30%

5) Modulation frequency: 20 KHz to 500 KHz

6) Total gate rise/fall time: The < 50 nS

MECHANICAL SPECIFICATIONS

Parameter	Value
Dimension	140*125*62mm^3
Weight	1.5kg
Coolinng	Conduction through the bottom plate

FUNCTION

Parameter	Specification
Protection	Screw overcurrent protection, power supply overvoltage protection
Monitor	Screw and Power overcurrent output
Time delay	180±20s

ENVIRONMENTAL SPECIFICATIONS

Parameter	Value
Operating Temp.	-55℃~ +70℃
Baseplate Temp.	85℃
Altitude	70000feet

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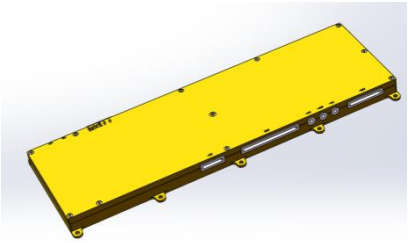
Customized Products(example)

vehicle power supply	
	● Size: 300mm×95mm×16mm ● Power: 4000W, input: 500Vdc ● 6independent precision voltage regulator output ● Conversion efficiency: 95%, TYP. ● Input and output over-voltage and under-voltage protection ● Hiccup mode overload short circuit protection ● Self-recovery overtemperature protection ● Isolation voltage: 2200Vdc ● PCB embedded plane transformer ● 422 communication function
Onboard power supply	
	● Size: 40mm×30mm×12.7mm ● Power: 25W, input: 28Vdc ● 3independent precision voltage regulator output ● Conversion efficiency: 91%, TYP. ● Input and output over-voltage and under-voltage protection ● Hiccup mode overload short circuit protection ● Self-recovery overtemperature protection ● Isolation voltage: 1500Vdc ● PCB embedded plane transformer
Airborne power	
	● Size: 90mm x 50mm x 14mm ● power: 54W, input: 28Vdc ● Single precision voltage regulator output ● Keep power failure over 50ms ● Conversion efficiency: 85%, TYP. ● Input and output over-voltage and under-voltage protection ● Hiccup mode overload short circuit protection ● Self-recovery overtemperature protection ● Isolation voltage: 500Vdc ● PCB embedded plane transformer
Airborne communication power supply	
	● Shaped size: 275mm×175mm×15mm ● Power: 650W, input: 270Vdc ● 8independent precision voltage regulator output ● Conversion efficiency: 90%, TYP. ● 50ms power failure protection ● Timing control ● Input and output over-voltage and under-voltage protection ● Hiccup mode overload short circuit protection ● Self-recovery overtemperature protection ● Isolation voltage: 1500Vdc ● PCB embedded plane transformer ● Digital PWM control ● 485 communication function ● Meet the power supply Specificationsrequirements of GJB181 aircraft

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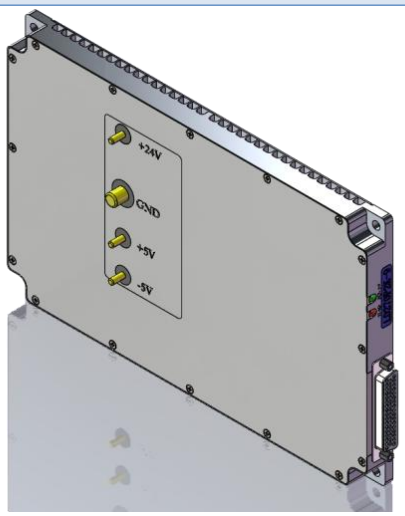
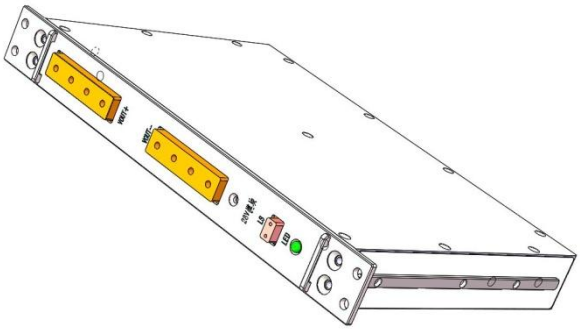
Airborne radar power supply	
	● Rectangular size: 356mm×212mm×22mm ● Power: 2500W, Input: 200~400Vdc ● Weight: 2.45kg ● 8 independent precision voltage regulator output ● Conversion efficiency: 92%, TYP. ● 50ms power failure protection ● Timing control ● Input and output over-voltage and under-voltage protection ● Hiccup mode overload short circuit protection ● Self-recovery overtemperature protection ● Isolation voltage: 1500Vdc ● PCB embedded plane transformer ● Digital PWM control ● 485 communication function ● Air cooling heat dissipation ● Meet the power supply Specificationsrequirements of GJB181 aircraft
Vehicle-mounted radar power supply	
	● Dimensions: 280mm×180mm×140mm ● Power: 5000W ● Weight: 2.45kg ● Input: 450 to 610Vdc ● Output: 500V ● Conversion efficiency: 95%, TYP. ● Input and output over-voltage and under-voltage protection ● Hiccup mode overload short circuit protection ● Self-recovery overtemperature protection ● Isolation voltage: 1500Vdc ● PCB embedded plane transformer ● Digital PWM control ● Air cooling system ● 485 communication function
Airborne radar power supply	
	● Dimensions: 233mm×165mm×30mm ● Power: 12KW ● Weight: 3.5Kg ● Input: 200~400Vdc ● Output: 28V ● Conversion efficiency: 95%, TYP. ● With liquid cooling channel ● Can be used in parallel ● Input and output over-voltage and under-voltage protection ● Burp mode overload short circuit protection ● Self-recovery overtemperature protection ● Isolation voltage: 1500Vdc ● PCB embedded plane transformer ● Digital PWM control ● Air cooling system ● 485 communication function

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