589W AC/DC Switching Power Supply
Model: TG10-0589-01



E138681

FEATURES

- Universal AC input range 90-264VAC.
- Operating temperature range: -20°C to +70°C.
- Built-in active PFC function.
- Built-in protections: OVP / OCP / SCP /OTP.
- Dual outputs, High efficiency up to 90%.
- RPS redundancy design with active current sharing.
- Designed for IEEE 802.3af / IEEE 802.3at / IEEE 802.3bt applications.
- Operating altitude up to 5000m.
- Complies with IEC/EN/UL 62368-1 standard.

Models & Ratings

Model No.	Output Power	Cooling Method	Output 1 Voltage/ Current	Output 2 Voltage/ Current	Efficiency at 230VAC Typ.
TG10-0589-01	589W	Forced Air Cooling	12.0V / 14.0A	54.0V / 7.8A	90%

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	AC input		90	100 - 240	264	VAC
Input Frequency	-		47	50 - 60	63	Hz
Input Current	115VAC		-	-	7.5	Arms
	230VAC		-	-	3.7	
Inrush Current	115VAC	At 25°C, Cold start	-	-	30	A peak
	230VAC				60	
Power Factor	115VAC	At maximum load	0.98	-	-	-
	230VAC		0.97			
Touch Current	264VAC		-	-	1.5	mA

Output 1 Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage	Output from minimum to maximum load	11.4	12.0	12.6	VDC
Initial setting voltage	At output 2A	11.95	-	12.05	VDC
Output Current	Output range	0.1	-	10.0	A
Load Regulation	Output from minimum to maximum load	-	-	3	%
Ripple & Noise	20MHz bandwidth	-	-	1	%
Turn On Time	100VAC/60Hz rated load from input AC turn on	-	-	2	S
Hold Up Time	230VAC & maximum load, 90% of output voltage	20	-	-	mS
Short Circuit Protection	Output shut down and auto recovery (Hiccup 5s)	-	-	-	-
Over Current Protection	Output shut down and auto recovery (Hiccup 5s)	15	-	20	A
Over Voltage Protection	Output shut down and auto recovery (Hiccup 5s)	13	-	16	V

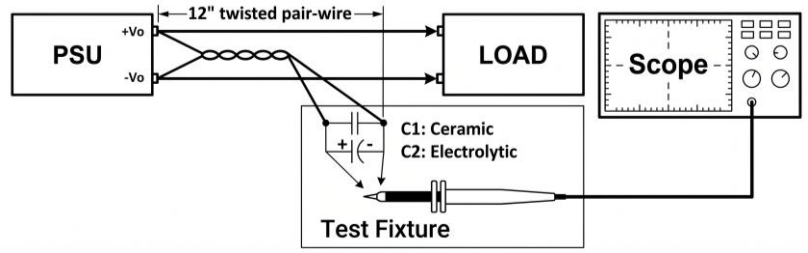
Output 2 Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage	Output from minimum to maximum load	-55.62	-54.0	-52.38	VDC

Initial setting voltage	At output 2A	-54.05	-54.0	-53.95	VDC
Output Current	Output range	0	-	7.8	A
Load Regulation	Output from minimum to maximum load	-	-	3	%
Ripple & Noise	20MHz bandwidth	-	-	1	%
Turn On Time	100VAC/60Hz rated load from input AC turn on	-	-	2	S
Hold Up Time	230VAC & maximum load, 90% of output voltage	20	-	-	mS
Short Circuit Protection	Output shut down and auto recovery (Hiccup 5s)	-	-	-	-
Over Current Protection	Output shut down and auto recovery (Hiccup 5s)	8.5	-	12.0	A
Over Voltage Protection	Output shut down and auto recovery (Hiccup 5s)	-65	-	-59	V

Ripple & Noise :

The output is decoupled with 100μF low ESR aluminum electrolytic (C2) and 0.1μF ceramic capacitor (C1). Measurement is made with a high impedance probe connected across the decoupling capacitance. Measurements shall be made with an oscilloscope with 20MHz bandwidth.



The -54V noise is measured with a resistor load (not an electronic load). The output is decoupled with 470μF low ESR aluminum electrolytic and 0.1μF ceramic capacitor. See the table below for the output ripple and noise limits over frequency. Measurement is made with a high impedance probe connected across the decoupling capacitance. Measurement frequency range is 40Hz to 100MHz.

Frequency range	Ripple and noise limit
<500Hz	500mVpk-pk
500Hz-150KHz	200mVpk-pk
150KHz-500KHz	150mVpk-pk
500KHz-100MHz	100mVpk-pk

Turn On/Off Overshoot :

Overshoot at turn on shall be less than 10% of the nominal output voltage.

Dynamic Load :

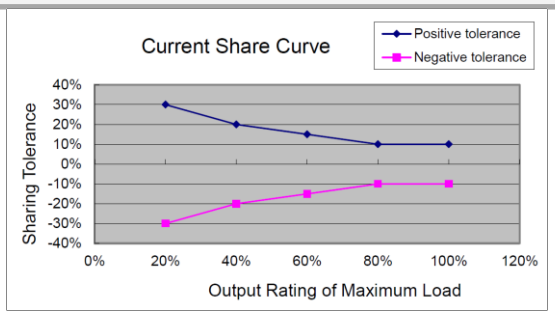
The output voltages shall remain within limits specified for the step loading and capacitive loading specified in the test table below. The load transient repetition rate shall be tested between 50Hz and 5KHz frequency.

Output	△Step Load	Load Slew Rate	Capacitive Load
12V	20% to 80%	1A/μs	1000μF
-54V	20% to 80%	1A/μs	470μF

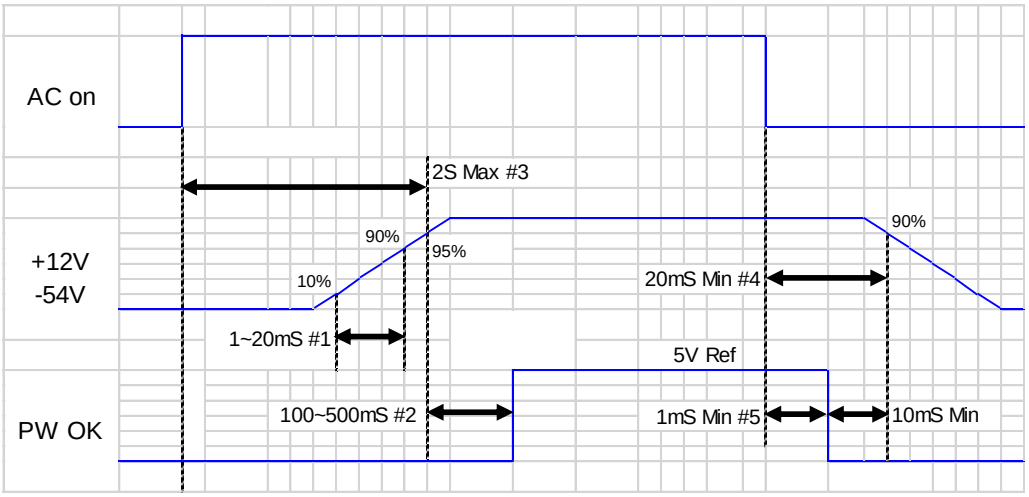
Current Share :

Current share is achieved by means of active current sharing. Provision is made for a current share line for +12V or -54V named +12VCS or -54VCS. +12VCS and -54VCS bus is independent. The current share line is referenced to the negative sense lead. The voltage on each of these lines is characterized in the table and graph below.

PSU built in ORing diode and current sharing for 1+1 redundant application. Two PSU must be same model of PSU and RPS connector connect current sharing function connector (22 pins) for 1+1 current sharing current sharing tolerance <10% at maximum current.



Sequencing :



#1: The +12V / -54V output voltages rise time from 10% to 90% (Loads are C.R mode) during 1ms to 20ms.
#2: PW OK signal turn on delay time of 100~500ms.
#3: The +12V / -54V power on delay time ≦ 2s.
#4: AC loss to +12V / -54V output hold up time ≧ 20ms.
#5: AC loss to PG signal hold up time ≧ 1ms.

PW OK Signal :
PW OK is a "power good" signal. It should be asserted high by the power supply to indicate that the -54V or +12V output is above the under-voltage thresholds (95% of output voltage rating level), Conversely, PW OK should be de-asserted to a low state when any of the -54V or +12V output voltage falls below its under-voltage threshold, or when mains power has been removed for a time sufficiently long such that power supply operation cannot be guaranteed beyond the power-down warning time. The electrical and timing characteristics of the PW OK signal are given in below.

Signal type	+3.3V TTL compatible
Logic level low	≦ 0.5V while sinking 3 mA
Logic level high	Between 2.4V and 3.6V output while sourcing 0.5 mA
PG delay time	100mS ≦ #3 ≦ 500mS
AC loss to PG hold up time	#5 ≧ 1mS

PS Present :
This signal connects to +12V_return inside the power supply via 1KΩ resistor.

Output Fault Protection Isolation :
The power supply shall have an output isolation circuit (also known as ORing or paralleling circuit) in series with the positive output terminals for -54V, and the +12V bias (keep alive circuit)

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature	Refer to power de-rating curve	-20	-	+55	℃
Power De-rating	Operating Temperature at +55°C to +65°C	1.5			%/℃
	Operating Temperature at +65°C to +70°C	7.8			%/℃
Storage Temperature	Non-operation	-40	-	+85	
Operating Humidity	Non-condensing	10	-	90	%
Storage Humidity		5	-	95	
Altitude	Operating altitude	-	-	5000	meter
Dielectric Strength Test	Input - FG	1800	-	-	VAC
	-54V output to +12V output	1800			VAC
	-54V output to FG	1800			VAC
Insulation Resistance	Input– FG, 500VDC, 3 seconds at 25°C and 70% RH	20	-	-	MΩ
Mean Time Between Failure	At 230VAC/50Hz, 100% load, 25°C, Telcordia SR332, issue 4.	500,000	-	-	Hrs.
Vibration	Operating：2.94 m/s^2 , 5-150Hz, 10 minutes per cycle, 30 minutes for each X, Y and Z axis.				
	Non-operating：5.88 m/s^2 , 5-150Hz, 10 minutes per cycle, 30 minutes for each X, Y and Z axis.				
Shock	Operating：The power supply shall not be damaged during a shock of half sine 10G, 11mS pulse, 100 pulses in each direction.				
	Non-operating：The power supply shall not be damaged during a shock of 50G with an 11mS half sine wave.				

Operating Temperature :
Some specifications may not be met below 0°C.
Altitude :
For every 305 meters of altitude increase, the operating ambient temperature needs to be decreased by 1°C.

Safety Approvals

Safety Standard	-	UL/cUL UL 62368-1, 3rd Edition CB IEC 62368-1, 3rd Edition
Safety Class	-	Class I

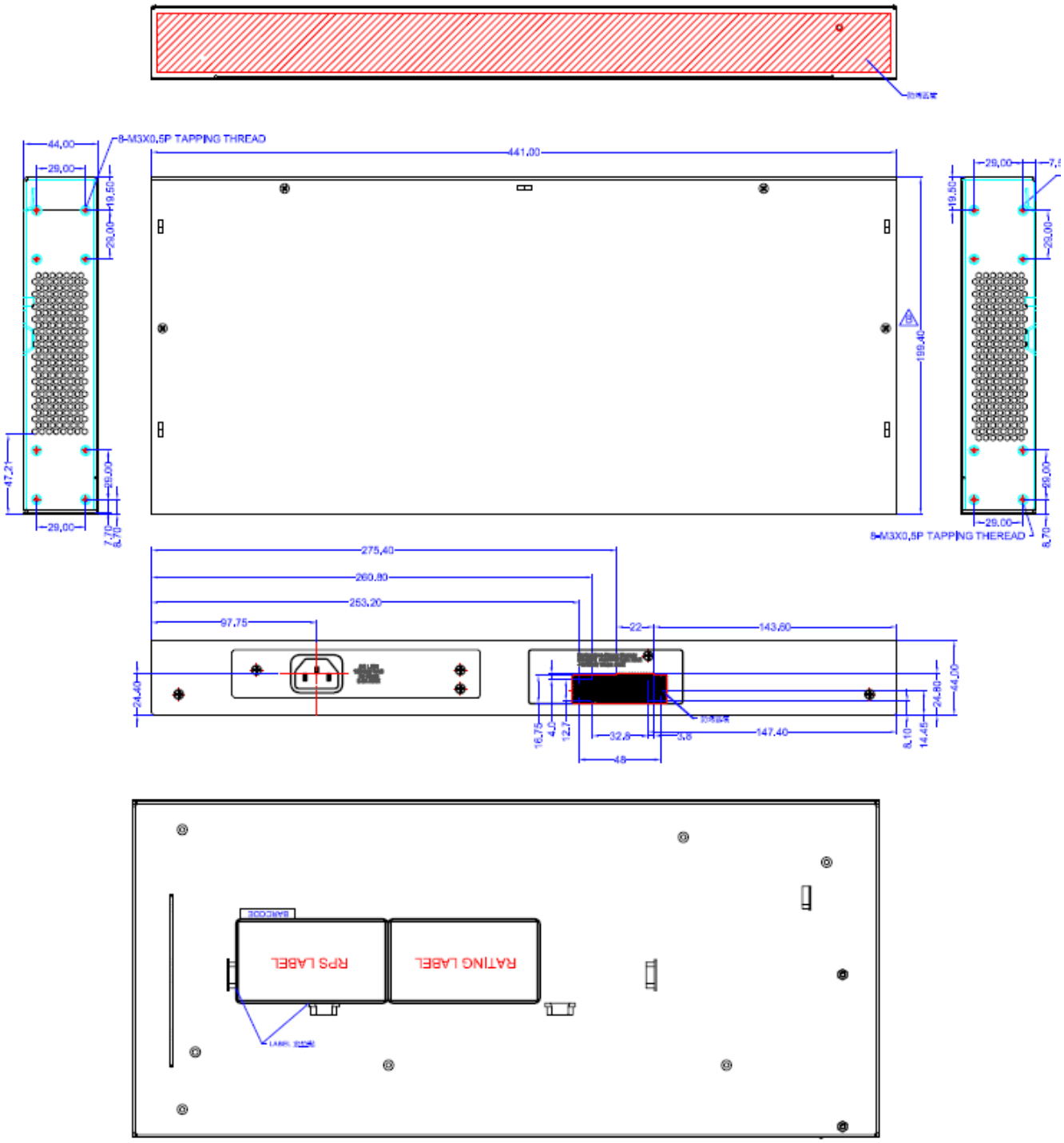
Electromagnetic Compatibility (EMC)

Emissions	CE	EN55032 (CISPR32) Class B	
	RE	EN55032 (CISPR32) Class B	
	Harmonic Current	EN/IEC 61000-3-2 Class D	
	Flicker	EN/IEC 61000-3-3	
Immunity	ESD	EN/IEC 61000-4-2, level 4, Contact +/- 8KV; Air discharge +/-15KV	Criteria A
	RS	EN/IEC 61000-4-3, level 3, 10V/m	Criteria A
	EFT	EN/IEC 61000-4-4, level 3, +/- 2KV	Criteria A
	Surge	EN/IEC 61000-4-5, level 4, Line to Line +/-2KV; Line to Earth +/-4KV	Criteria A
	CS	EN/IEC 61000-4-6, level 2	Criteria A
	PFMF	EN/IEC 61000-4-8, level 1	Criteria A
	DIP	EN/IEC 61000-4-11	Criteria B

Dimensions and Recommended Layout

Item	Value	Unit
Weight (Typ.)	3,654	g
Size (L x W x H)	441 x 199.8 x 44	mm

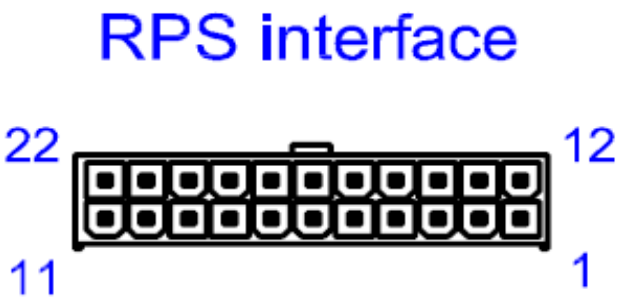
Outline Drawing: (Unit: mm, Tolerance: ±0.5 mm)



RPS Interface

V1： +12V output

V2： -54V output



PIN NO.	DESIGNATION
1	V2Vrtn
2	V2
3	V1
4	V1
5	V1
6	V1
7	GND
8	V1sen
9	LS-V2
10	V2
11	V2Vrtn
12	N/C/GND
13	GND
14	RPS Present
15	Status 1
16	Status 2
17	RPS P_G
18	GND
19	V1RTNsen
20	LSV1
21	V2 sen
22	V2 RTNsen