

Features

- ◇ Ultra-Compact 4 Watt AC/DC Power Module
- ◇ Regulated Output
- ◇ Universal 90~265VAC Input Voltage Range
- ◇ Efficiency up to 77%
- ◇ 3000VAC Isolation Voltage (Class II)
- ◇ Operating Temperature Range -40 °C~70 °C
- ◇ EMI EN55022 Class B Approved
- ◇ UL60950-1 Approved
- ◇ UL94V-0 Package Material
- ◇ PCB Mount Package
- ◇ Output Trim Function (Option for Single Output only)
- ◇ 3 Years Warranty



Description

The TEC4 series are fully encapsulated 4 Watt AC/DC power modules in Ultra-Compact PCB mount packages, and allow an universal input voltage range of 90~265VAC to convert to a regulated and standard output voltage of 3.3V, 5V, 12V, 15V, $\pm 12V$ and $\pm 15V$.

The TEC4 series have Trim as an optional function for single output only, the part number is added suffix "-T".

Applications

- △ Automatic Control System
- △ Industry Computer
- △ Communication System
- △ Distribute Power System
- △ Movable/Portable Test Equipment
- △ Local Power System
- △ Other Applications meet Specifications.

General Specifications

Parameter	Condition	Min.	Typ.	Max.
Storage Temperature	Ambient	-55	---	+125 °C
Operating Temperature	Ambient	-40	---	+70 °C
	Case	-40	---	+90 °C
Relative humidity		---	---	95 %
Isolation Voltage	Input to Output, 60 sec.	3 KVAC	---	---
Isolation Resistance	Input to Output	100M ohm	---	---
Switching Frequency	Max. Load	---	132 KHz	---
Weight	Silicon	---	30 g	---
Case Material	Non-Conductive Black Plastic (Meets UL94V-0)			
Dimensions	1.58 x 1.18 x 0.53 inch (40 x 30 x 13.5 mm)			

Selection Guide

Part Number	Input			Output			Efficiency	Cap. Load ⁽⁷⁾
	Voltage	Current		Voltage	Current			
	Nominal (Low ~ High)	No Load	Max. Load	Typ.	Min.	Max.	Max. Load	Max.
		Typ.	Typ.				Typ.	
VAC	mA	mA	VDC	mA	mA	%	μF	
TEC4-S3.3	115 (90 ~ 265)	5	82	3.3	0	1200	70	10000
TEC4-S5			80.5	5	0	800	72	6000
TEC4-S12			77	12	0	334	76	1000
TEC4-S15			76	15	0	268	77	700
TEC4-S24			76	24	0	167	77	220
TEC4-D12			76	± 12	0	± 167	77	330
TEC4-D15			76	± 15	0	± 134	77	330

* To set P.F. at 0.6 for calculating Efficiency

Note:

- 1) All specifications are measured at nominal input voltage, constant resistive load between Min. and Max. output current, and probe bandwidth should be under 20MHz, $T_a = +25^{\circ}\text{C}$.
- 2) When the Load is at No-Load or lower than Min. output current, the DC/DC converters will not be damaged; however, all the parameters may be not reaching all specifications listed.
- 3) For output ripple & noise test, please consult TRUMPower.
- 4) Load Regulation and Line Regulation calculation please refer to E-Chin Technology Co., Ltd. proposed formula.
- 5) An external fuse is needed at the front end of AC/DC power modules for a protection as a recommended settlement in order to avoid a surge current or a maximum input current.
- 6) "Vin-H" means "Vin-High", "Vin-N" means "Vin-Nominal", and "Vin-L" means "Vin-Low".
- 7) The total Capacitive Loads of output should be lower than the value written above.
- 8) Other Input Voltages, Output Voltages and Specifications would be available, please contact us.

Input Specifications

Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range	All models	90	---	265 VAC
Input Voltage Range		120	---	370 VDC
Input Frequency Range		47	---	440 Hz
No Load power consumption		---	150 mW	---
Inrush Current (115 / 230VAC)	Cold Start at 25°C	---	---	15 / 25 A
MTBF	At 25°C	---	---	350 KHrs
Input Filter	LC-Network	EMI EN55022 Class B Approval		

Output Specifications

Parameter	Condition	Min.	Typ.	Max.	
Output Voltage Accuracy	Vin-N, Max. Load	---	± 1.0	± 2.0 %	
Line Regulation	Vin-L to Vin-H @ Max. Load	---	± 0.2	± 0.5 %	
Load Regulation	Io= 10% to 100% Load @ Vin-N	---	± 0.5	± 1.0 %	
Balance Regulation	Vin-N, Max. Load, Dual Output	---	± 1.0	± 2.0 %	
Temperature Drift	Lowest to Highest Temp.	---	± 0.01	± 0.02 %/°C	
Ripple & Noise	Peak to Peak, Each Output, 20MHz	3.3V, 5V Output	---	100	150 mV
		All others	---	50	100mV
Hold-up Time	Vin-N, Max. Load	15ms	---	---	
Rated Output Power	Vin-L to Vin-H	---	---	4 Watt	

Protection Specifications

Parameter	Condition	Min.	Typ.	Max.
Over Power Protection	Vin-L to Vin-H	110%Io	---	---
Output Short Circuit Protection	Continuous, Auto-Recovery			

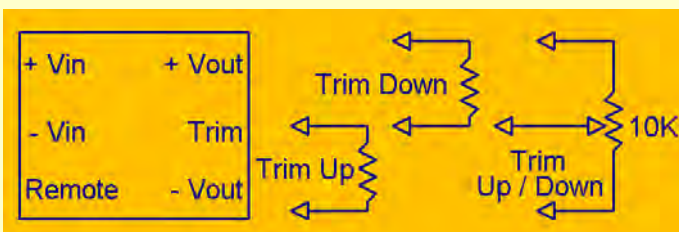
Input Fuse Recommend

All models
1000 mA Slow – Blow Type

TRIM Control Function

Parameter	Condition	Min.	Typ.	Max.
Trim Up Range	Vin-L to Vin-H, 0% to 100% Load	+9	+10	+11%Vo
Trim Down Range		-9	-10	-11%Vo

Output Trim Functions setup:



Trim Up:

$$R_{adj_up} = \frac{43 V_o - 39 V_{adj}}{V_{adj} - V_o}$$

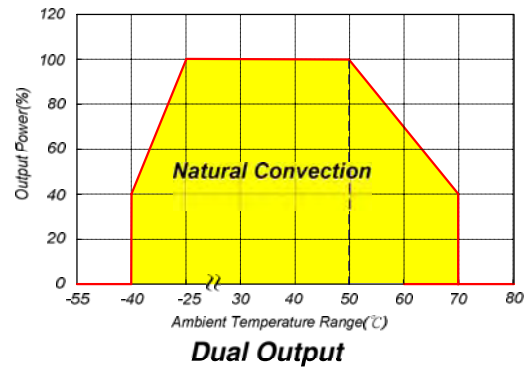
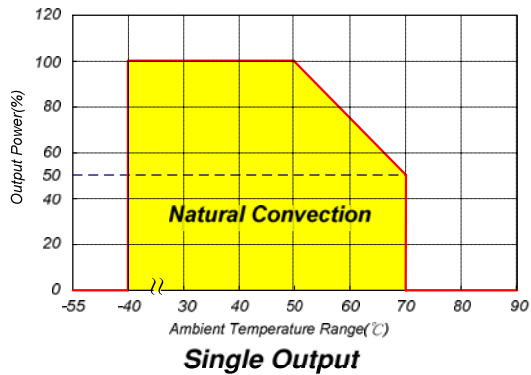
Trim Down:

$$R_{adj_down} = \frac{48.53 V_{adj} - 43 V_o}{V_o - V_{adj}}$$

Note: Vadj : Adjusted Output Voltage
Vo : Nominal Output Voltage
Unit : VDC, KΩ

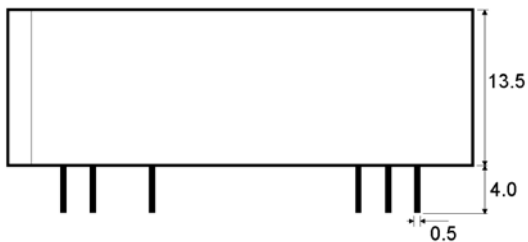
Characteristic Curve

Derating Curve

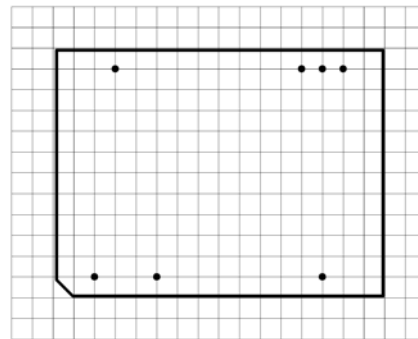


Package Dimension

Front View

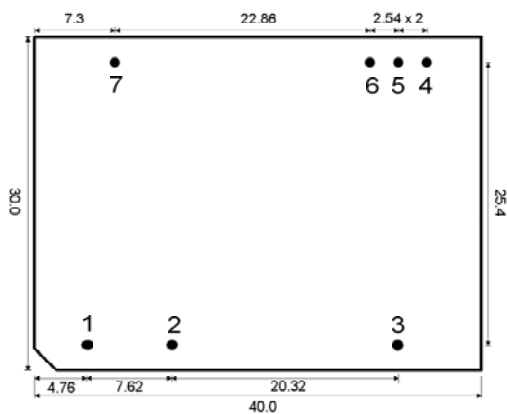


Recommend Footprint Details (Top View)



Grid: 0.1 inch / 2.54 mm
Dot(Drill Hole): $\phi 0.8 +0.2/-0$ mm

Top View



Pin Functions

Pin No.	Single Output	Dual Output
1	AC-N	AC-N
2	AC-L	AC-L
4	N.C. (or Trim)	-Vout
5	-Vout	Common
6	+Vout	+Vout
3, 7	N.C.	N.C.

N.C.: No Connect
Trim: For suffixed "-T" models only

Note:

All dimensions in inch [mm]
Tolerance : XX.X \pm 0.01 [XX.X \pm 0.25]
 XX.XX \pm 0.005 [XX.XX \pm 0.13]
Pin pitch tolerance \pm 0.01 [\pm 0.25]
Pin dimension tolerance \pm 0.004 [\pm 0.1]