

# AC Input Multi Output, General-Purpose

Conformity to RoHS Directive

## F Series FCP/FCP-B

The F series FCP/FCP-B products are 2-output power supplies with a combination of +12V/-12V and +15V/-15V output voltages. With the aim of thin-type products, this series has realized a thickness of 20mm max. with development using the TDK original technology including a transformer and a filter. The FCP-B is supported anew as an onboard type.

### FEATURES

- AC.100V input thin-type 2-output power supply.
- Compact plastic package type.
- Low price.
- Low-noise (FCC class B compliant).
- It is a product conforming to RoHS directive.



### PART NUMBERS AND RATINGS

#### FCP

Part No.	Maximum output power(W)	Output1[V <sub>1</sub> ]		Output2[V <sub>2</sub> ]	
		Voltage(V)	Current(A)	Voltage(V)	Current(A)
FCP-031	2.9	+12	0.01 to 0.12	-12	0.01 to 0.12
FCP-032	3	+15	0.01 to 0.1	-15	0.01 to 0.1
FCP-101	9.6	+12	0.04 to 0.4	-12	0.04 to 0.4
FCP-102	9.6	+15	0.03 to 0.32	-15	0.03 to 0.32

#### FCP-B

Part No.	Maximum output power(W)	Output1[V <sub>1</sub> ]		Output2[V <sub>2</sub> ]	
		Voltage(V)	Current(A)	Voltage(V)	Current(A)
FCP-031B	2.9	+12	0.01 to 0.12	-12	0.01 to 0.12
FCP-032B	3	+15	0.01 to 0.1	-15	0.01 to 0.1
FCP-101B	9.6	+12	0.04 to 0.4	-12	0.04 to 0.4
FCP-102B	9.6	+15	0.03 to 0.32	-15	0.03 to 0.32

- The above products are only produced upon receipt of order. Please check a delivery date.

- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

- All specifications are subject to change without notice.

## FCP3W Type

### SPECIFICATIONS AND STANDARDS

Part No.		FCP-031		FCP-032		
Rated output voltage and current <sup>*1</sup>	V <sub>1</sub>	+12V • 0.12A		+15V • 0.1A		
	V <sub>2</sub>	-12V • 0.12A		-15V • 0.1A		
Maximum output power		W	2.9	3		
Input conditions						
Input voltage Eac		V	85 to 132[Rating: 100 to 120]			
Input frequency		Hz	47 to 66[Rating: 50 to 60](Single phase)			
Input current		A	0.08typ.[25°C, input and output ratings](AC.85V input, rated output: 0.1max.)			
Surge current		A	16max.[25°C, input and output ratings, cold start]			
Leakage current		mA	0.5max.[25°C, input and output ratings]			
Efficiency <sup>*2</sup>		%	64typ.[25°C, input and output ratings]			
Output characteristics						
Rated output voltage Edc		V	+12[V <sub>1</sub> ]	-12[V <sub>2</sub> ]	+15[V <sub>1</sub> ]	-15[V <sub>2</sub> ]
Voltage variable range Edc		V	10.8 to 13.2[V <sub>2</sub> varies simultaneously as V <sub>1</sub> .]		13.5 to 16.5[V <sub>2</sub> varies simultaneously as V <sub>1</sub> .]	
Maximum output current		A	0.12	0.12	0.1	0.1
Minimum output current <sup>*2</sup>		A	0.01	0.01	0.01	0.01
Output setting conditions	[Voltage]	V	12.1	—	15.1	—
	[Current]	A	0.12	0.12	0.1	0.1
Voltage stability	Source effect	%	0.1typ.[Within the input voltage range]			Total effect ±3max.(±1typ.)
	Load effect	%	0.8typ.[10 to 100% load]			
	Temperature effect	%	1typ.[Ambient temperature: 0 to +50°C]			
	Drift(Time effect)	%	1max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]			
	Recovery	%/ms	±4max./1max.[50 to 100% sudden load change]			
Ripple Ep-p		mV	80			
Ripple noise Ep-p		mV	150			
Start up time		ms	100max.			
Hold up time		ms	20min.			
Auxiliary functions						
Indicator display		No				
Overvoltage protection		Uses overvoltage prevention <sup>*3</sup>				
Overcurrent protection		Rectangular type, automatic recovery.				
Remote ON-OFF		No				
Remote sensing		No				
Output voltage external variable function		No				
Standards						
Safety standards		—				
Noise terminal voltage		FCC class B meet.				
Constructions						
External dimensions		mm	19×55×50[H×W×L](Except input and output terminals)			
Weight		g	80max.			
Mounting method		Can be attached to 1 side.				
Case and cover		Nonflammable resin				
Input and output cables		—				

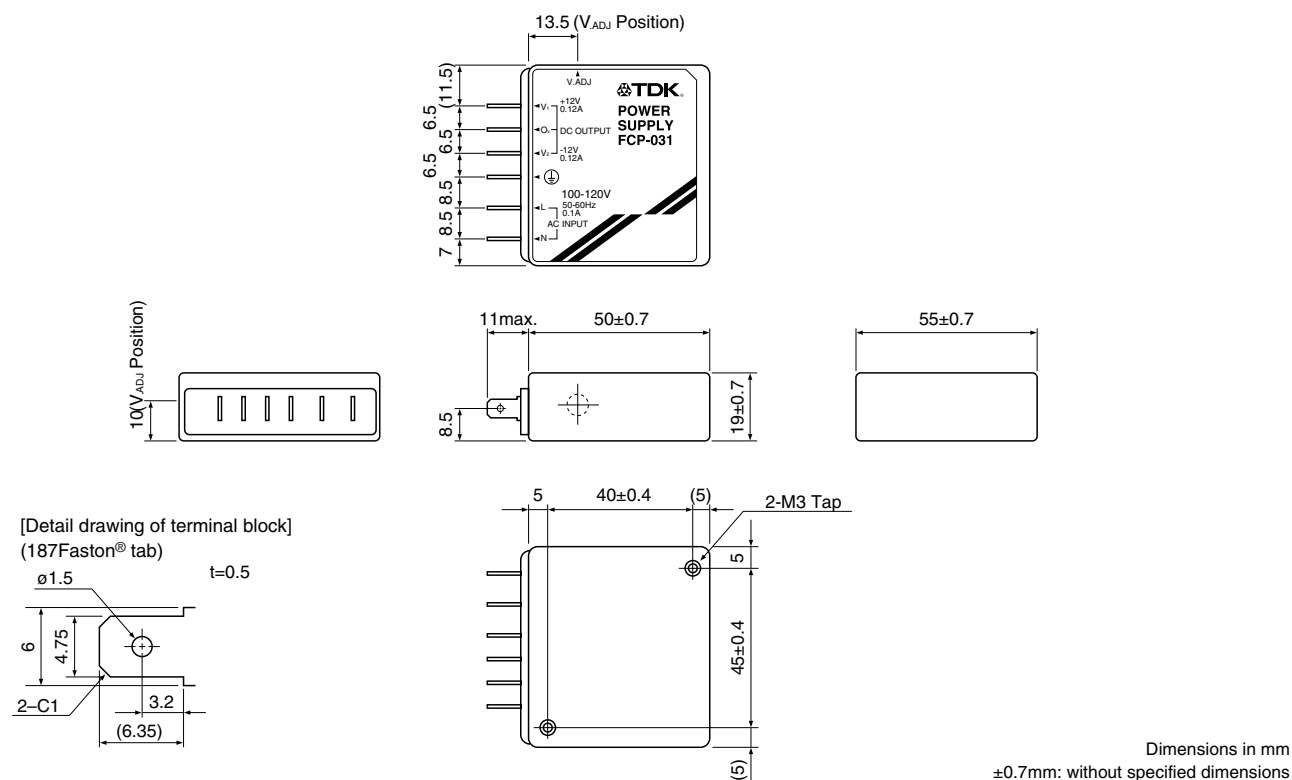
<sup>\*1</sup> Current rating(maximum output current) is determined for 0 to +50°C. Derating is required when used outside this temperature range.

<sup>\*2</sup> The output load variation is determined within the range set by the minimum output current and the maximum output current. Nominal values might possibly not be satisfied when output is below the minimum output current.

<sup>\*3</sup> Although there is no built-in overvoltage protection circuit, the overvoltage prevention method is used for circuit design, thereby preventing overvoltage.

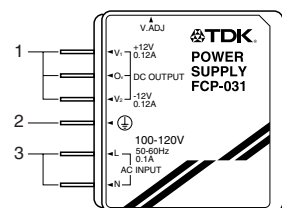
# FCP3W Type

## SHAPES AND DIMENSIONS



- Do not insert M3 installation screws more than 6mm into the power supply(Recommend torque 0.48N • m).
- Faston® is registered trademark of Tyco Electronics AMP Corp. Incorporated.

## TERMINAL DESIGNATIONS AND FUNCTIONS



Terminal No.	Designations and functions	
1	DC output terminals(V1, 0V, V2)	Connect to load. V1: + output V2: - output 0V: Ground common to V1 and V2
2	Ground terminal(G)	Connected to earth pattern for input line.
3	AC input terminals(L, N AC INPUT)	Connect to AC.100-120V single phase input line.

• All specifications are subject to change without notice.

## FCP10W Type

### SPECIFICATIONS AND STANDARDS

Part No.		FCP-101		FCP-102	
Rated output voltage and current*1		V1	+12V • 0.4A		+15V • 0.32A
		V2	-12V • 0.4A		-15V • 0.32A
Maximum output power		W	9.6		9.6
Input conditions					
Input voltage Eac		V	85 to 132[Rating: 100 to 120]		
Input frequency		Hz	47 to 66[Rating: 50 to 60](Single phase)		
Input current		A	0.25typ.[25°C, input and output ratings](AC.85V input, rated output: 0.1max.)		
Surge current		A	16max.[25°C, input and output ratings, cold start]		
Leakage current		mA	0.5max.[25°C, input and output ratings]		
Efficiency*2		%	75typ.[25°C, input and output ratings]		
Output characteristics					
Rated output voltage Edc		V	+12[V1]	-12[V2]	+15[V1]      -15[V2]
Voltage variable range Edc		V	10.8 to 13.2[V2 varies simultaneously as V1.]		13.5 to 16.5[V2 varies simultaneously as V1.]
Maximum output current		A	0.4	0.4	0.32      0.32
Minimum output current*2		A	0.04	0.04	0.03      0.03
Output setting conditions		[Voltage]	V	12.1	15.1
		[Current]	A	0.4	0.4
Voltage stability		Source effect	%	0.1typ.[Within the input voltage range]	
		Load effect	%	0.8typ.[10 to 100% load]      Total effect ±3max.(±1typ.)	
		Temperature effect	%	1typ.[Ambient temperature: 0 to +50°C]	
		Drift(Time effect)	%	1max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]	
		Recovery	%/ms	±4max./1max.[50 to 100% sudden load change]	
Ripple Ep-p		mV	80		
Ripple noise Ep-p		mV	150		
Start up time		ms	100max.		
Hold up time		ms	20min.		
Auxiliary functions					
Indicator display		No			
Overvoltage protection		Uses overvoltage prevention*3			
Overcurrent protection		Rectangular type, automatic recovery.			
Remote ON-OFF		No			
Remote sensing		No			
Output voltage external variable function		No			
Standards					
Safety standards		—			
Noise terminal voltage		FCC class B meet.			
Constructions					
External dimensions		mm	19×55×80[H×W×L](Except input and output terminals)		
Weight		g	100max.		
Mounting method		Can be attached to 1 side.			
Case and cover		Nonflammable resin			
Input and output cables		—			

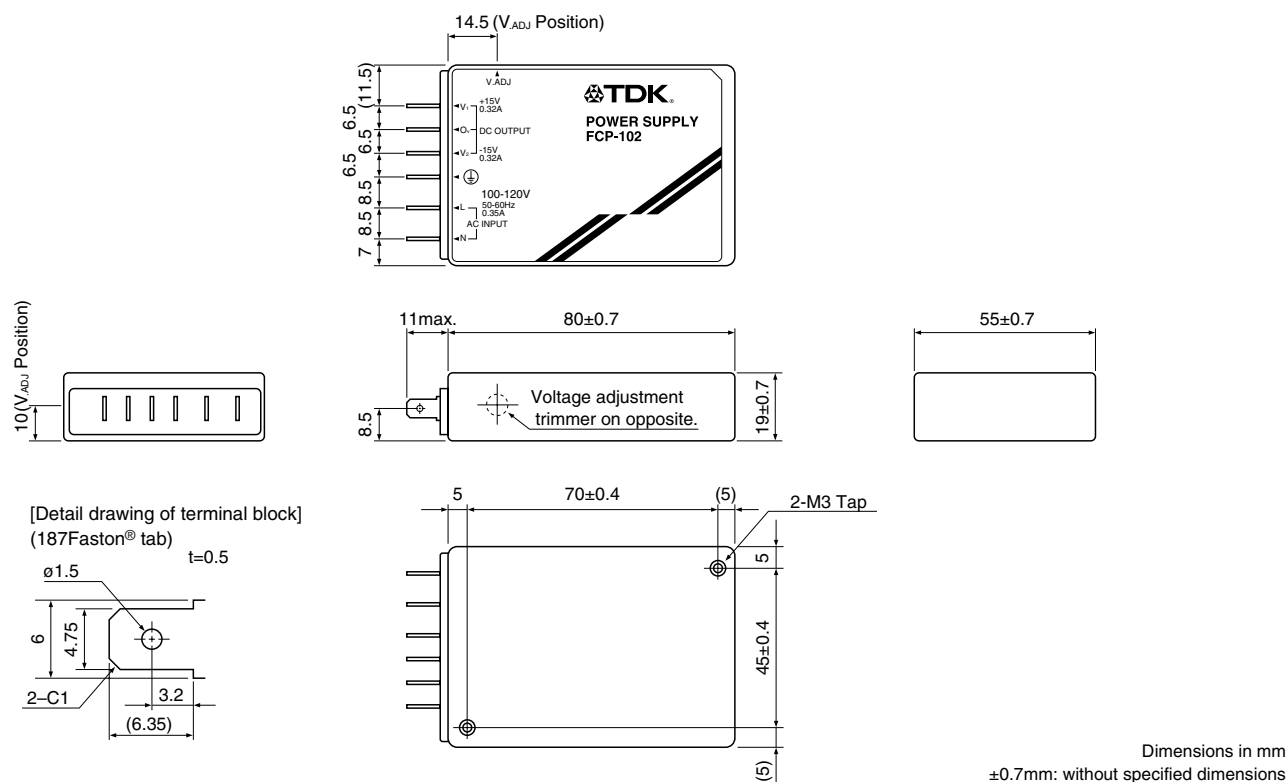
\*1 Current rating(maximum output current) is determined for 0 to +50°C. Derating is required when used outside this temperature range.

\*2 The output load variation is determined within the range set by the minimum output current and the maximum output current. Nominal values might possibly not be satisfied when output is below the minimum output current.

\*3 Although there is no built-in overvoltage protection circuit, the overvoltage prevention method is used for circuit design, thereby preventing overvoltage.

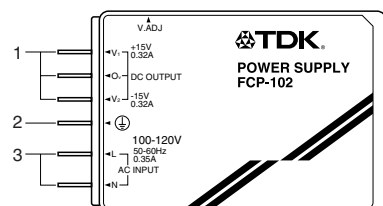
## FCP10W Type

### SHAPES AND DIMENSIONS



- Do not insert M3 installation screws more than 6mm into the power supply(Recommend torque 0.48N • m).
- Faston® is registered trademark of Tyco Electronics AMP Corp. Incorporated.

### TERMINAL DESIGNATIONS AND FUNCTIONS



Terminal No.	Designations and functions	
1	DC output terminals(V1, 0V, V2)	Connect to load. V1: + output V2: - output 0V: Ground common to V1 and V2
2	Ground terminal(G)	Connected to earth pattern for input line.
3	AC input terminals(L, N AC INPUT)	Connect to AC.100-120V single phase input line.

## FCP-B3W Type

### SPECIFICATIONS AND STANDARDS

Part No.		FCP-031B		FCP-032B		
Rated output voltage and current <sup>*1</sup>	V <sub>1</sub>	+12V • 0.12A		+15V • 0.1A		
	V <sub>2</sub>	-12V • 0.12A		-15V • 0.1A		
Maximum output power		W	2.9	3		
Input conditions						
Input voltage Eac		V	85 to 132[Rating: 100 to 120]			
Input frequency		Hz	47 to 66[Rating: 50 to 60](Single phase)			
Input current		A	0.08typ.[25°C, input and output ratings](AC.85V input, rated output: 0.1max.)			
Surge current		A	16max.[25°C, input and output ratings, cold start]			
Leakage current		mA	0.5max.[25°C, input and output ratings]			
Efficiency <sup>*2</sup>		%	64typ.[25°C, input and output ratings]			
Output characteristics						
Rated output voltage Edc		V	+12[V <sub>1</sub> ]	-12[V <sub>2</sub> ]	+15[V <sub>1</sub> ]	-15[V <sub>2</sub> ]
Voltage variable range Edc		V	10.8 to 13.2[V <sub>2</sub> varies simultaneously as V <sub>1</sub> .]		13.5 to 16.5[V <sub>2</sub> varies simultaneously as V <sub>1</sub> .]	
Maximum output current		A	0.12	0.12	0.1	0.1
Minimum output current <sup>*2</sup>		A	0.01	0.01	0.01	0.01
Output setting conditions	[Voltage]	V	12.1	—	15.1	—
	[Current]	A	0.12	0.12	0.1	0.1
Voltage stability	Source effect	%	0.1typ.[Within the input voltage range]			Total effect ±3max.(±1typ.)
	Load effect	%	0.8typ.[10 to 100% load]			
	Temperature effect	%	1typ.[Ambient temperature: 0 to +50°C]			
	Drift(Time effect)	%	1max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]			
	Recovery	%/ms	±4max./1max.[50 to 100% sudden load change]			
Ripple Ep-p		mV	80			
Ripple noise Ep-p		mV	150			
Start up time		ms	100max.			
Hold up time		ms	20min.			
Auxiliary functions						
Indicator display		No				
Overvoltage protection		Uses overvoltage prevention <sup>*3</sup>				
Overcurrent protection		Rectangular type, automatic recovery.				
Remote ON-OFF		No				
Remote sensing		No				
Output voltage external variable function		No				
Standards						
Safety standards		—				
Noise terminal voltage		FCC class B meet.				
Constructions						
External dimensions		mm	19×55×50[H×W×L](Except input and output terminals)			
Weight		g	80max.			
Mounting method		Can be attached to 1 side.				
Case and cover		Nonflammable resin				
Input and output cables		—				

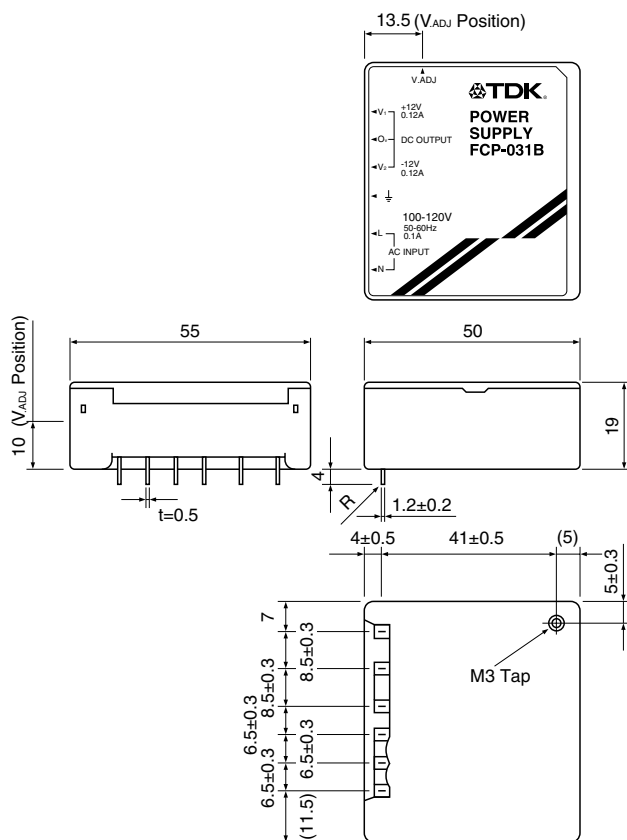
<sup>\*1</sup> Current rating(maximum output current) is determined for 0 to +50°C. Derating is required when used outside this temperature range.

<sup>\*2</sup> The output load variation is determined within the range set by the minimum output current and the maximum output current. Nominal values might possibly not be satisfied when output is below the minimum output current.

<sup>\*3</sup> Although there is no built-in overvoltage protection circuit, the overvoltage prevention method is used for circuit design, thereby preventing overvoltage.

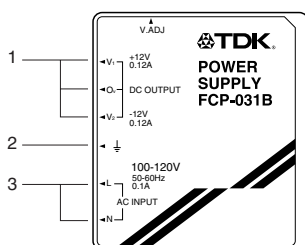
## FCP-B3W Type

### SHAPES AND DIMENSIONS



- Do not insert M3 installation screws more than 6mm into the power supply(Recommend torque 0.48N • m).
- When mounted onto PCB, must solder after insert M3 installation screws.

### TERMINAL DESIGNATIONS AND FUNCTIONS



#### Terminal No. Designations and functions

Terminal No.	Designations and functions	Connect to load.
1	DC output terminals(V <sub>1</sub> , 0V, V <sub>2</sub> )	V <sub>1</sub> : + output V <sub>2</sub> : - output 0V: Ground common to V <sub>1</sub> and V <sub>2</sub>
2	Ground terminal(G)	Connected to earth pattern for input line.
3	AC input terminals(L, N AC INPUT)	Connect to AC.100-120V single phase input line.

• All specifications are subject to change without notice.

## FCP-B10W Type

### SPECIFICATIONS AND STANDARDS

Part No.		FCP-101B		FCP-102B	
Rated output voltage and current*1		V1	+12V • 0.4A		+15V • 0.32A
		V2	-12V • 0.4A		-15V • 0.32A
Maximum output power		W	9.6		9.6
Input conditions					
Input voltage Eac		V	85 to 132[Rating: 100 to 120]		
Input frequency		Hz	47 to 66[Rating: 50 to 60](Single phase)		
Input current		A	0.25typ.[25°C, input and output ratings](AC.85V input, rated output: 0.1max.)		
Surge current		A	16max.[25°C, input and output ratings, cold start]		
Leakage current		mA	0.5max.[25°C, input and output ratings]		
Efficiency*2		%	75typ.[25°C, input and output ratings]		
Output characteristics					
Rated output voltage Edc		V	+12[V1]	-12[V2]	+15[V1]      -15[V2]
Voltage variable range Edc		V	10.8 to 13.2[V2 varies simultaneously as V1.]		13.5 to 16.5[V2 varies simultaneously as V1.]
Maximum output current		A	0.4	0.4	0.32      0.32
Minimum output current*2		A	0.04	0.04	0.03      0.03
Output setting conditions		[Voltage]	V	12.1	15.1
		[Current]	A	0.4	0.4
Voltage stability		Source effect	%	0.1typ.[Within the input voltage range]	
		Load effect	%	0.8typ.[10 to 100% load]      Total effect ±3max.(±1typ.)	
		Temperature effect	%	1typ.[Ambient temperature: 0 to +50°C]	
		Drift(Time effect)	%	1max.[25°C, input and output ratings, after input voltage ON for 30min to 8h]	
		Recovery	%/ms	±4max./1max.[50 to 100% sudden load change]	
Ripple Ep-p		mV	80		
Ripple noise Ep-p		mV	150		
Start up time		ms	100max.		
Hold up time		ms	20min.		
Auxiliary functions					
Indicator display		No			
Overvoltage protection		Uses overvoltage prevention*3			
Overcurrent protection		Rectangular type, automatic recovery.			
Remote ON-OFF		No			
Remote sensing		No			
Output voltage external variable function		No			
Standards					
Safety standards		—			
Noise terminal voltage		FCC class B meet.			
Constructions					
External dimensions		mm	19×55×80[H×W×L](Except input and output terminals)		
Weight		g	100max.		
Mounting method		Can be attached to 1 side.			
Case and cover		Nonflammable resin			
Input and output cables		—			

\*1 Current rating(maximum output current) is determined for 0 to +50°C. Derating is required when used outside this temperature range.

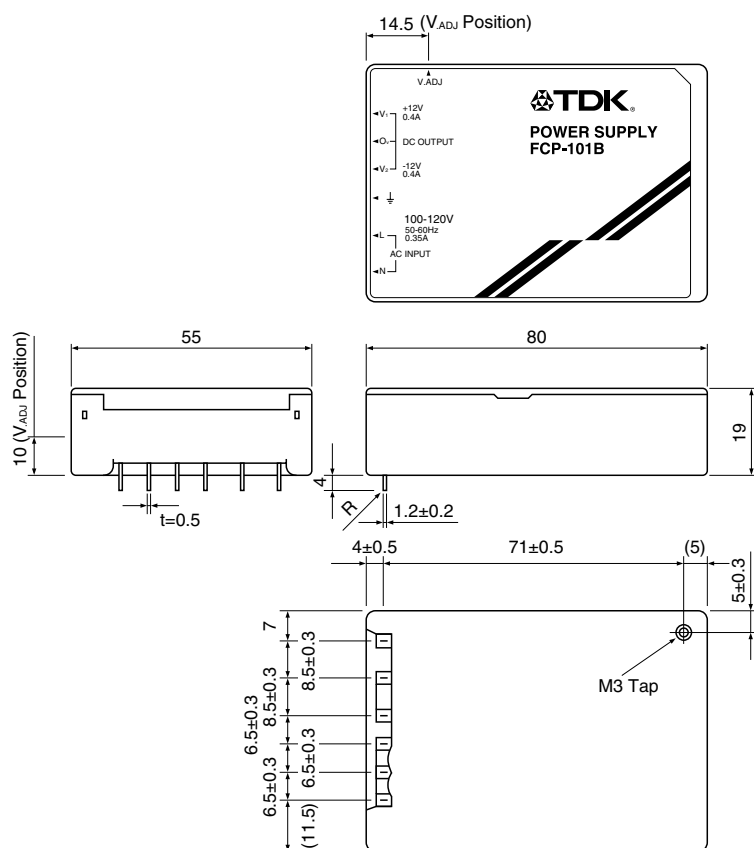
\*2 The output load variation is determined within the range set by the minimum output current and the maximum output current. Nominal values might possibly not be satisfied when output is below the minimum output current.

\*3 Although there is no built-in overvoltage protection circuit, the overvoltage prevention method is used for circuit design, thereby preventing overvoltage.



## FCP-B10W Type

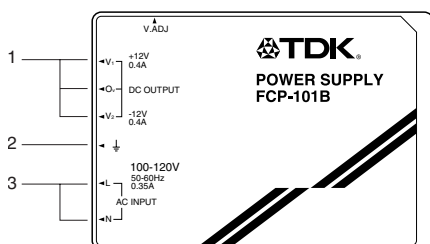
### SHAPES AND DIMENSIONS



Dimensions in mm  
±0.7mm: without specified dimensions

- Do not insert M3 installation screws more than 6mm into the power supply(Recommend torque 0.48N • m).
- When mounted onto PCB, must solder after insert M3 installation screws.

### TERMINAL DESIGNATIONS AND FUNCTIONS



#### Terminal No. Designations and functions

Terminal No.	Designations and functions	Connect to load.
1	DC output terminals(V <sub>1</sub> , 0V, V <sub>2</sub> )	Connect to load. V <sub>1</sub> : + output V <sub>2</sub> : - output 0V: Ground common to V <sub>1</sub> and V <sub>2</sub>
2	Ground terminal(G)	Connected to earth pattern for input line.
3	AC input terminals(L, N AC INPUT)	Connect to AC.100-120V single phase input line.

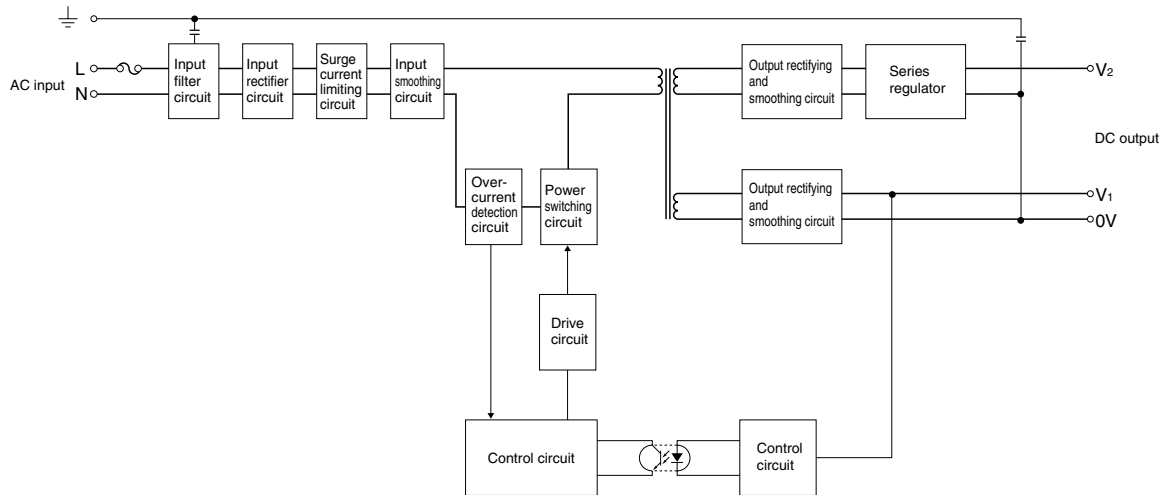
• All specifications are subject to change without notice.

## Characteristics, Functions, and Applications

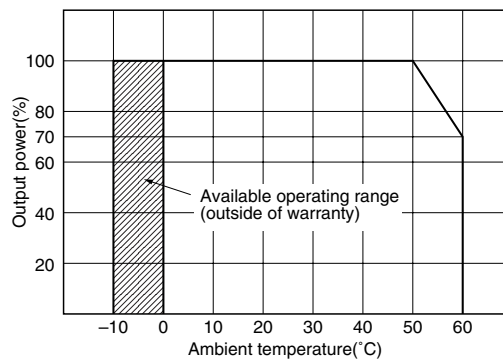
### COMMON SPECIFICATIONS

Temperature and humidity		
Temperature range	Operating(°C)	0 to +60[Derating is necessary when operating environment temperature exceed 50°C.]
	Storage(°C)	-25 to +75
Humidity range	Operating(%RH)	20 to 95[Maximum wet-bulb temperature: 35°C, without dewing]
	Storage(%RH)	
Vibration and shock		
Vibration	5 to 10Hz	All amplitude 10mm[3 directions, each 1h]
	10 to 55Hz	Acceleration 19.6m/s <sup>2</sup> (2G)[3 directions, each 1h]
Shock	Acceleration	196m/s <sup>2</sup> (20G)[3 directions, each 3 times]
	Pulse duration	11±5ms
Withstand voltage and insulation resistance		
Withstand voltage	Input terminal to ground terminal(G)	Eac: 2kV, 1min[Normal temperature, normal humidity, cutout current 10mA]
	Input terminal to output terminal	
Insulation resistance	Input terminal to ground terminal(G)	Edc: 500V, 100MΩ min. [Normal temperature, normal humidity]
	Input terminal to output terminal	
	Output terminal to ground terminal(G)	

### BLOCK DIAGRAM

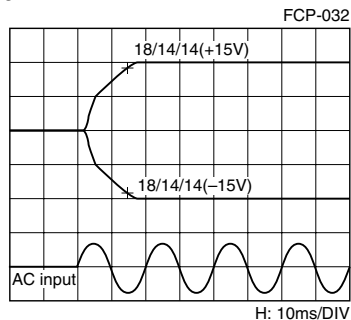


### OUTPUT POWER-AMBIENT TEMPERATURE(DERATINGS)

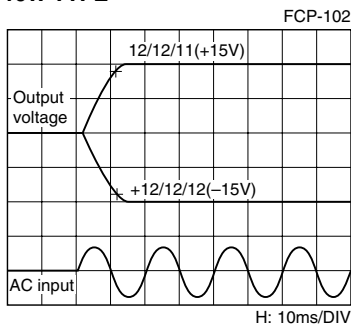


# Characteristics, Functions, and Applications

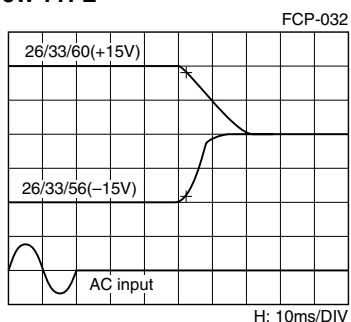
## START UP TIME(25°C, INPUT AND OUTPUT RATINGS) 3W TYPE



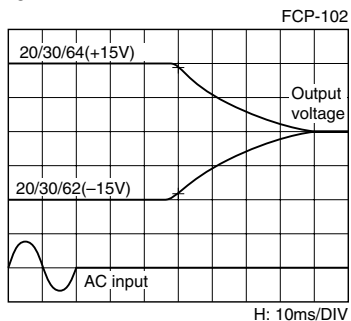
## 10W TYPE



## HOLD UP TIME(25°C, INPUT AND OUTPUT RATINGS) 3W TYPE

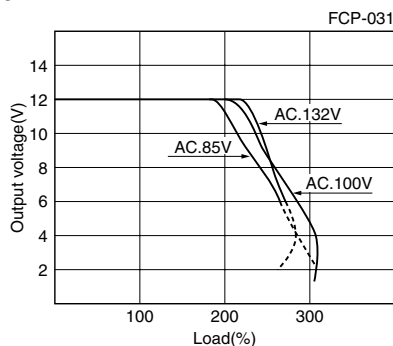


## 10W TYPE

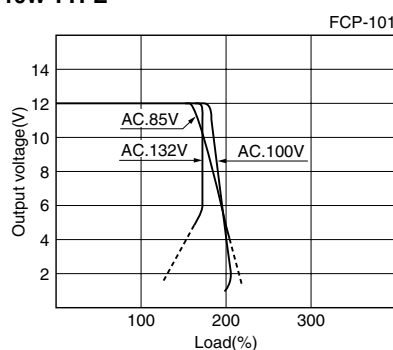


- Three numeric values in the above data indicate output voltages exceed 90% of the rated output voltage at the input voltage AC.85/100/132V.

## OUTPUT CHARACTERISTICS(25°C) 3W TYPE



## 10W TYPE



Respective characteristics are variable for a single channel and the other is fixed to a rated value. Both of the + and - output voltages have almost the same characteristics.

## INPUT FUSE

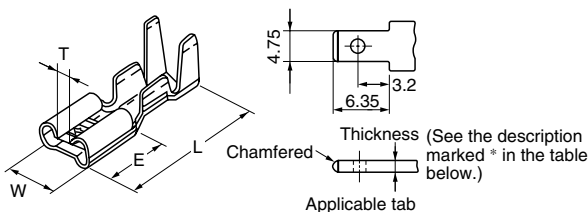
Since the F series FCP contains a mounted circuit protection element, it does not have a built-in input fuse (a glass-tube fuse). It is recommended to mount a fuse at an AC input terminal (L terminal) in order to further improve safety of the FCP-incorporated device. Ratings of recommended external fuse

- FCP3W: 0.63A
- FCP10W: 1A

## Characteristics, Functions, and Applications

### INPUT/OUTPUT TERMINAL

For input/output terminals, 187-type Faston® tabs are used. These terminals are commercially available from various terminal manufacturers. Two manufacturing companies among them will be introduced below. These terminals can be soldered, though it is undesirable to heat them for a long time.



### 187 TAB PRODUCT INTRODUCTION A

#### 4.8 mm series tab connection terminal (187 tab-on connector)

Unit: mm

Part No.	Applicable wires	External diameter of insulated coating(mm)	Material	Surface treatment	W	L	E	T (approx.)	Plate thickness	Thickness of applicable tab*	Quantity/reel
STO-01-187N	FS4.8B-0.5-5(STO-01T-187N)*1*2	0.2 to 0.5	Brass	Tinning	5.6	15	6.3	1.5	0.32	0.5	10,000
STO-41-187N*2											
FS4.8B-1.25-5(STO-41-187N)*1*2	0.5 to 1.25	2.6 to 3.5	Brass	Tinning	5.6	15	6.3	1.5	0.32	0.5	10,000

\*1 JIS standard product (JIS C2809). The number in parentheses ( ) indicates a conventional part number.

\*2 UL registered product.

• This data is cited from the catalog No. TER-017A-14P (P. 8) of Japan Pressure Terminal Sales Co., Ltd., titled "Continuous Pressure Terminal and Connector."

### 187 TAB PRODUCT INTRODUCTION B

#### 187 series receptacle

Unit: mm

Range of applicable wires		External diameter of coating	Thickness of tab in the other side	Plate thickness	Size		Material and finishing	Part No. of receptacle		Quantity per reel Unit: Thousand					
AWG	(mm <sup>2</sup> )				L	T		In chain	In loose						
24-20	0.2 to 0.51	1.02 to 1.78	0.51	0.3	15	1.5	Brass	60573-2	60711-2*	20					
								1.5 to 2.5	0.5		0.32	14.9	Copper and nickel	60573-1	60711-1*
														170214-2	170203-2
20-16	0.5 to 1.42	2.29 to 3.3	0.51	0.32	15.2	1.5	Brass	60621-1	61020-1*	20					
								Phosphor bronze and tin	170037-1		170038-1	9			
									170037-2		170038-2				
18-16 or 18x2	0.75 to 1.42 or (0.75 to 0.89)x2	2.67x2 max.	0.51	0.3	15	1	Brass and tin	60487-2	—	20					
18-14	0.75 to 2.27	2.2 to 3.4	0.51	0.3	15.2	1.5	Phosphor bronze and tin	170466-1	170467-1	9					

\* No preform of a wire barrel.

• This data is cited from the catalog No. F.FF-21 (P. 20) of Tyco Electronics AMP Corp. titled "Faston® Connector and Fastine Faston® Connector."

### OTHER CONDITIONS

- Unless conditions are otherwise specified in the specifications or standards, 25°C and rated input-output should be applied.
- Ripple and noise (50MHz max.) were determined for 0 to +50°C temperature range and 10 to 100% load.

• Faston® and Fastine Faston® is registered trademark of Tyco Electronics AMP Corp. Incorporated.

• All specifications are subject to change without notice.