



World wide



Safety Approvals



EMI



Inrush current limiting

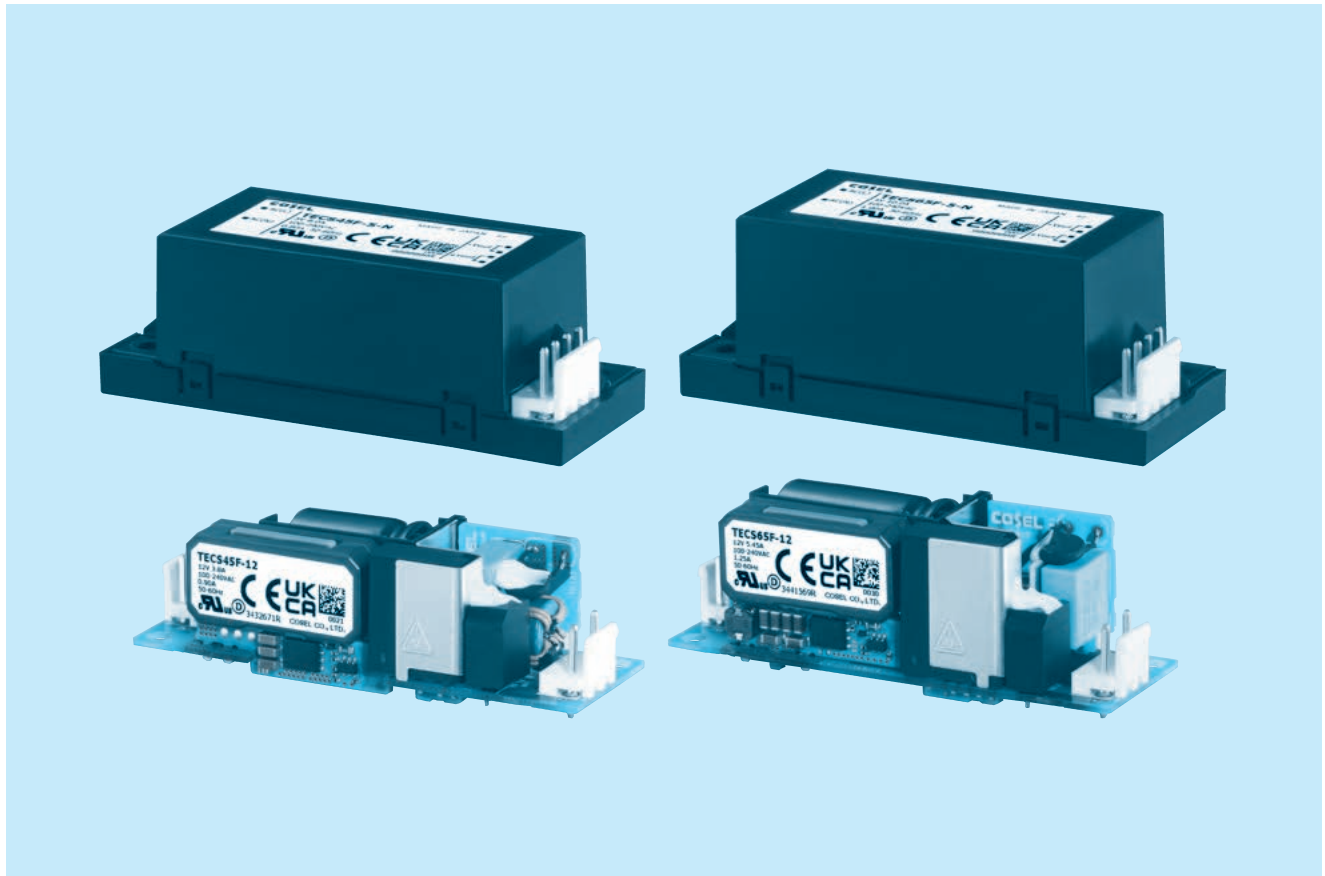


OCP



OVP

# TECS-series



## Feature

Small and Lightweight  
 High efficiency  
 Harmonic attenuator (Complies with IEC61000-3-2)  
 Universal input (85-264VAC)  
 Built-in inrush current, overcurrent and overvoltage protection circuits  
 ClassII

## Safety agency approvals

UL62368-1, C-UL (equivalent to CAN/CSA-C22.2 No.62368-1),  
 EN62368-1  
 Complies with DEN-AN

## 5-year warranty (refer to Instruction Manual)

## CE marking

Low Voltage Directive  
 RoHS Directive

## UKCA marking

Electrical Equipment Safety Regulations  
 RoHS Regulations

## EMI

Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B,  
 FCC Part 15-B, FCC Part 18-B, VCCI-B

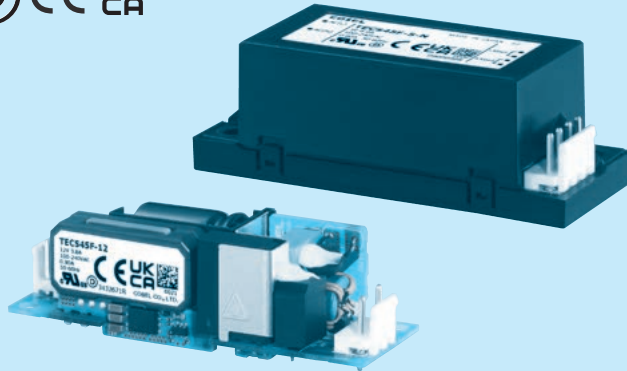
## EMS Compliance : EN61204-3, EN61000-6-2

EN61000-4-2  
 EN61000-4-3  
 EN61000-4-4  
 EN61000-4-5  
 EN61000-4-6  
 EN61000-4-8  
 EN61000-4-11

# TECS45F

TEC S 45 F -□□ -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
EAM-03-000



High voltage pulse noise type : EAP series  
150KHz-1MHz (To safety ground the secondary side) : EAC series

\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*
- E2: Capacitor between Input and Output is changed
- H : with the function to be acceptable to output peak current (12V,24V)
- N: with cover

ClassII

This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care.

\* Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

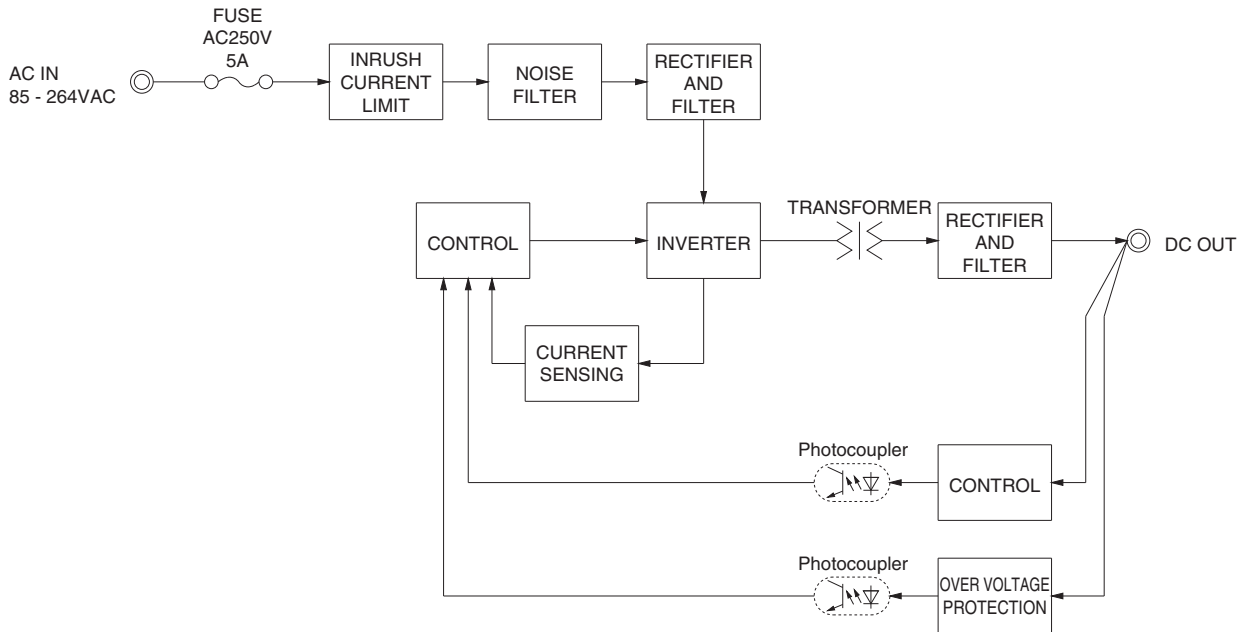
| MODEL                 | TECS45F-5 | TECS45F-12 | TECS45F-12-H     | TECS45F-24 | TECS45F-24-H     |
|-----------------------|-----------|------------|------------------|------------|------------------|
| MAX OUTPUT WATTAGE[W] | 40.0      | 45.6       | 45.6 (65.4)      | 45.6       | 45.6 (66.0)      |
| DC OUTPUT             | 5V 8.0A   | 12V 3.8A   | 12V 3.8 (5.45) A | 24V 1.9A   | 24V 1.9 (2.75) A |

## SPECIFICATIONS

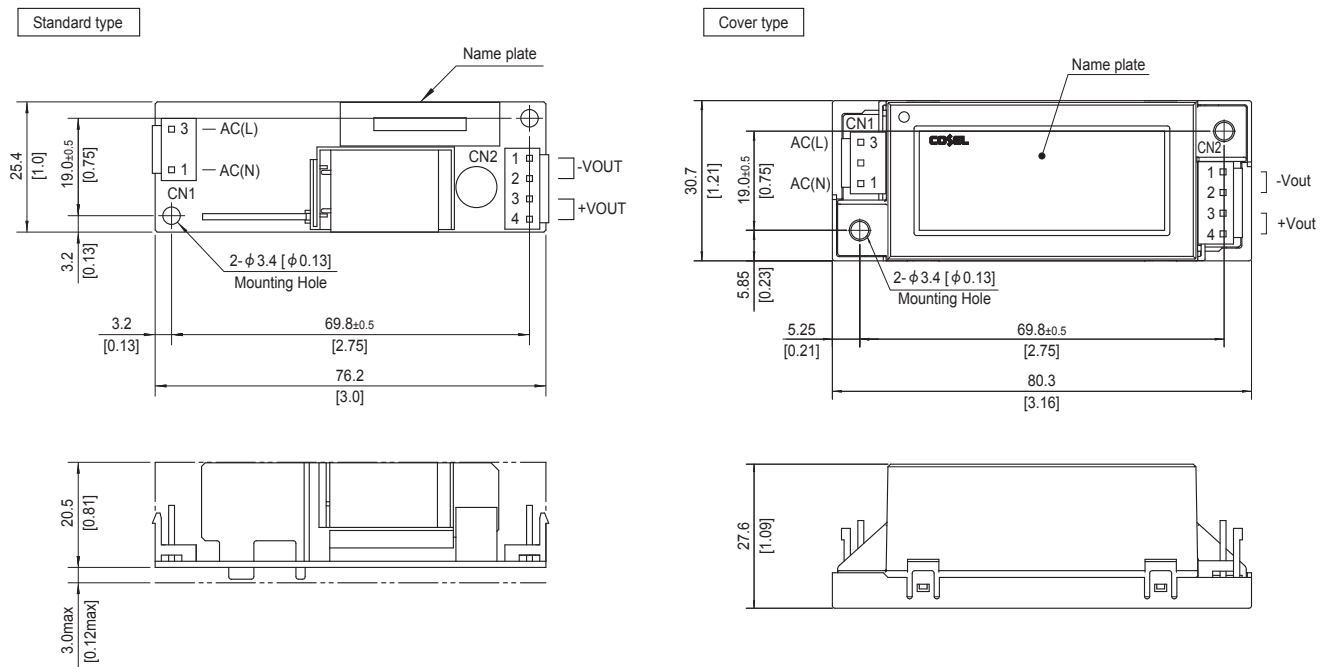
|                               | MODEL                                | TECS45F-5                                                                                           | TECS45F-12     | TECS45F-12-H    | TECS45F-24     | TECS45F-24      |
|-------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------|----------------|-----------------|----------------|-----------------|
| INPUT                         | VOLTAGE[VAC]                         | 85 - 264 1 φ (Refer to "Derating" and Instruction Manual 1.1)                                       |                |                 |                |                 |
|                               | CURRENT[A]                           | ACIN 100V 0.80typ                                                                                   | 0.90typ        |                 |                |                 |
|                               |                                      | ACIN 230V 0.45typ                                                                                   | 0.50typ        |                 |                |                 |
|                               | FREQUENCY[Hz]                        | 50 / 60 (45 - 66)                                                                                   |                |                 |                |                 |
|                               | EFFICIENCY[%]                        | ACIN 100V 90.0typ                                                                                   | 90.5typ        | 90.5typ         | 91.5typ        | 91.5typ         |
|                               |                                      | ACIN 230V 90.5typ                                                                                   | 91.5typ        | 91.5typ         | 92.5typ        | 92.5typ         |
| OUTPUT                        | INRUSH CURRENT[A]                    | ACIN 100V 30typ (Io=100%) Ta=25°C at cold start                                                     |                |                 |                |                 |
|                               |                                      | ACIN 230V 65typ (Io=100%) Ta=25°C at cold start                                                     |                |                 |                |                 |
|                               | LEAKAGE CURRENT[ma]                  | 0.25max (ACIN 240V, 60Hz, Io=100%, According to IEC62368-1, and DEN-AN)                             |                |                 |                |                 |
|                               | VOLTAGE[V]                           | 5                                                                                                   | 12             | 12              | 24             | 24              |
|                               | CURRENT[A]                           | 8.0                                                                                                 | 3.8            | 3.8 (Peak 5.45) | 1.9            | 1.9 (Peak 2.75) |
|                               | LINE REGULATION[mV]                  | 20max                                                                                               | 48max          | 48max           | 96max          | 96max           |
| PROTECTION CIRCUIT AND OTHERS | LOAD REGULATION[mV]                  | 40max                                                                                               | 100max         | 100max          | 150max         | 150max          |
|                               | RIPPLE[mVp-p]                        | 240max                                                                                              | 300max         | 300max          | 360max         | 360max          |
|                               | RIPPLE NOISE[mVp-p]                  | 300max                                                                                              | 380max         | 380max          | 480max         | 480max          |
|                               | TEMPERATURE REGULATION[mV]           | 50max                                                                                               | 120max         | 120max          | 240max         | 240max          |
|                               |                                      | 60max                                                                                               | 150max         | 150max          | 290max         | 290max          |
|                               | DRIFT[mV]                            | 20max                                                                                               | 48max          | 48max           | 96max          | 96max           |
| ISOLATION                     | START-UP TIME[ms]                    | 200typ (ACIN 100V, Io=100%)                                                                         |                |                 |                |                 |
|                               | HOLD-UP TIME[ms]                     | 10typ (ACIN 100V, Io=80%) / 60typ (ACIN 230V, Io=100%)                                              |                |                 |                |                 |
|                               | OUTPUT VOLTAGE SETTING[V]            | 4.90 to 5.30                                                                                        | 11.50 to 12.50 | 11.50 to 12.50  | 23.00 to 25.00 | 23.00 to 25.00  |
|                               | OVERCURRENT PROTECTION               | Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically |                |                 |                |                 |
|                               | OVERVOLTAGE PROTECTION[V]            | 5.50 to 6.50                                                                                        | 13.20 to 15.60 | 13.20 to 15.60  | 26.40 to 31.20 | 26.40 to 31.20  |
|                               | OPERATING INDICATION                 | Not provided                                                                                        |                |                 |                |                 |
| ENVIRONMENT                   | REMOTE SENSING                       | Not provided                                                                                        |                |                 |                |                 |
|                               | INPUT-OUTPUT                         | 3,000VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At Room Temperature)                      |                |                 |                |                 |
|                               | OPERATING TEMP., HUMID. AND ALTITUDE | -10 to +70°C, 20 - 90%RH (Non condensing), (Refer to "Derating"), 5,000m (16,500feet) max           |                |                 |                |                 |
|                               | STORAGE TEMP., HUMID. AND ALTITUDE   | -20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max                                  |                |                 |                |                 |
|                               | VIBRATION                            | 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis         |                |                 |                |                 |
|                               | IMPACT                               | 196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis                                        |                |                 |                |                 |
| SAFETY AND NOISE REGULATIONS  | AGENCY APPROVALS                     | UL62368-1, C-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1, Complies with DEN-AN            |                |                 |                |                 |
|                               | CONDUCTED NOISE                      | Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B      |                |                 |                |                 |
|                               | HARMONIC ATTENUATOR                  | Complies with IEC61000-3-2 (Class A) (No built-in power factor correction)                          |                |                 |                |                 |
|                               | CASE SIZE/WEIGHT                     | 25.4 X 23.5 X 76.2mm [1.00 X 0.93 X 3.00 inches] (W X H X D) / 60g max (with cover : 80g max)       |                |                 |                |                 |
|                               | COOLING METHOD                       | Convection/Forced air (Requires external fan) (Refer to "Derating")                                 |                |                 |                |                 |
|                               | OTHERS                               |                                                                                                     |                |                 |                |                 |

- \*1 The listed options may affect the published standard specifications. Please contact us for detailed product specifications.
- \*2 Derating is required. ( ) means peak current. There is a possibility that an internal device is damaged when the specification is exceeded. Please contact us about the detail.
- \*3 At low load conditions, the burst mode operation will start. To check load regulation, you will need to measure the characteristics at average mode with instruments.
- \*4 This is the value that measured on measuring board with capacitor of 22 μF and 0.1 μF at 150mm from output terminal. (Refer to Instruction Manual)
- \*5 5V output product, the maximum temperature of 35°C. 12V output product, the maximum temperature of 40°C.
- \*6 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.
- \*7 When secondary circuit will be connected to earth, the spec will be changed. (Refer to Instruction Manual 2)
- \*8 Please contact us about another class. When two or more units are operating it may not comply with the IEC61000-3-2. Please contact us for details.
- \* To meet the specification, do not operate overload condition.
- \* Parallel operation is not possible.
- \* Sound noise may be emitted from the power supply depending on operating conditions.

## Block diagram



## External view



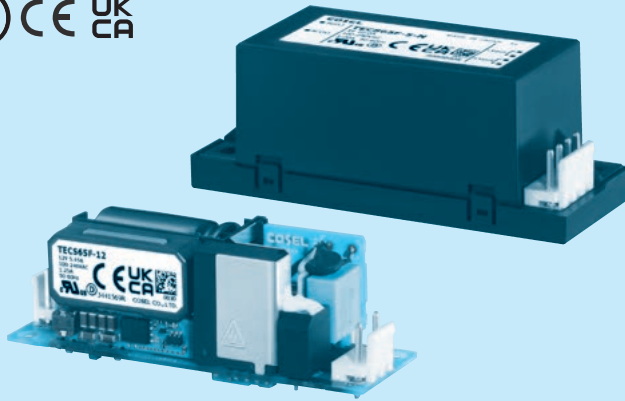
Mating connector and terminal of CN1, CN2

| I/O Connector | Mating connector | Terminal                                     | Mfr.   |
|---------------|------------------|----------------------------------------------|--------|
| CN1           | B2P3-VH          | Chain : SVH-21T-P1.1<br>Loose : BVH-21T-P1.1 | J.S.T. |
| CN2           | B4P-VH           | Chain : SVH-21T-P1.1<br>Loose : BVH-21T-P1.1 | J.S.T. |

- ※ Dimensions in mm, [ ]=inches
- ※ Tolerance :  $\pm 1.5$  [ $\pm 0.06$ ]
- ※ Weight : 60g max (with cover : 80g max)
- ※ PCB Material / thickness : FR-4 / 1.1mm [0.04]
- ※ Optional Case Material : PBT
- ※ Maximum current per contact at CN2 is 5A.
- ※ There are two mounting holes.

# TECS65F

TEC S 65 F -□□ -□  
① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
EAC-03-000



High voltage pulse noise type : EAP series  
150KHz-1MHz (To safety ground the secondary side) : EAC series

\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*
- E2: Capacitor between Input and Output is changed
- H : with the function to be acceptable to output peak current (12V,24V)
- N: with cover

Class II

This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

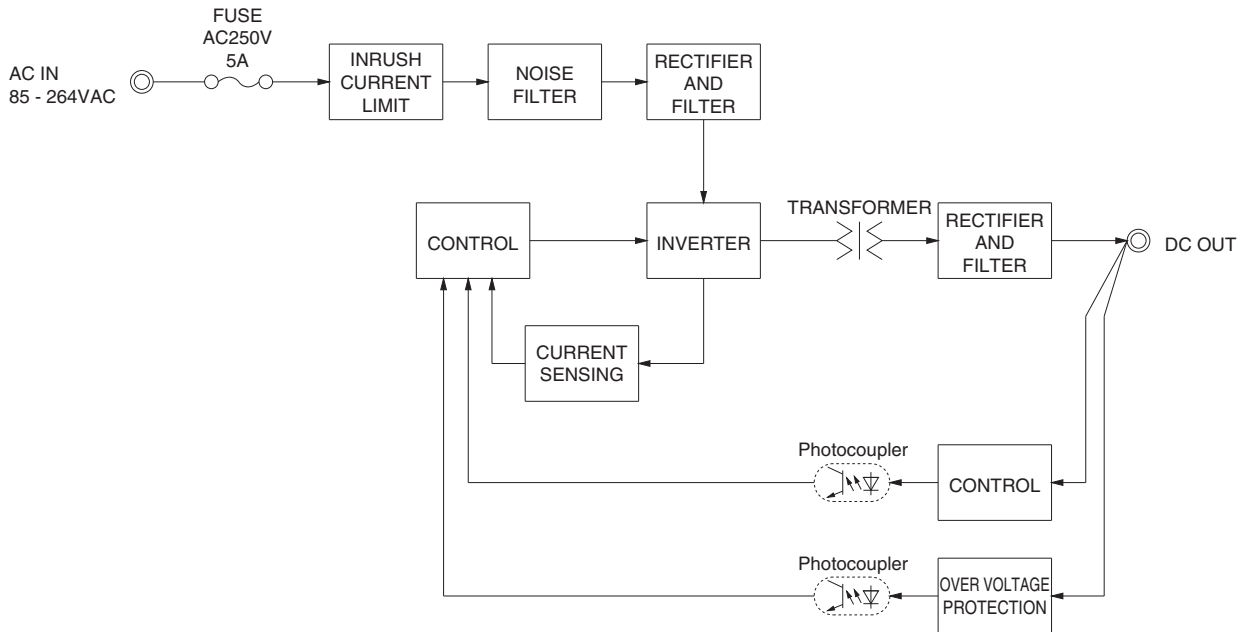
| MODEL                 | TECS65F-5 | TECS65F-12 | TECS65F-12-H      | TECS65F-24 | TECS65F-24-H      |
|-----------------------|-----------|------------|-------------------|------------|-------------------|
| MAX OUTPUT WATTAGE[W] | 50.0      | 65.4       | 65.4 (90.0)       | 66.0       | 66.0 (90.0)       |
| DC OUTPUT             | 5V 10.0A  | 12V 5.45A  | 12V 5.45 (7.50) A | 24V 2.75A  | 24V 2.75 (3.75) A |

## SPECIFICATIONS

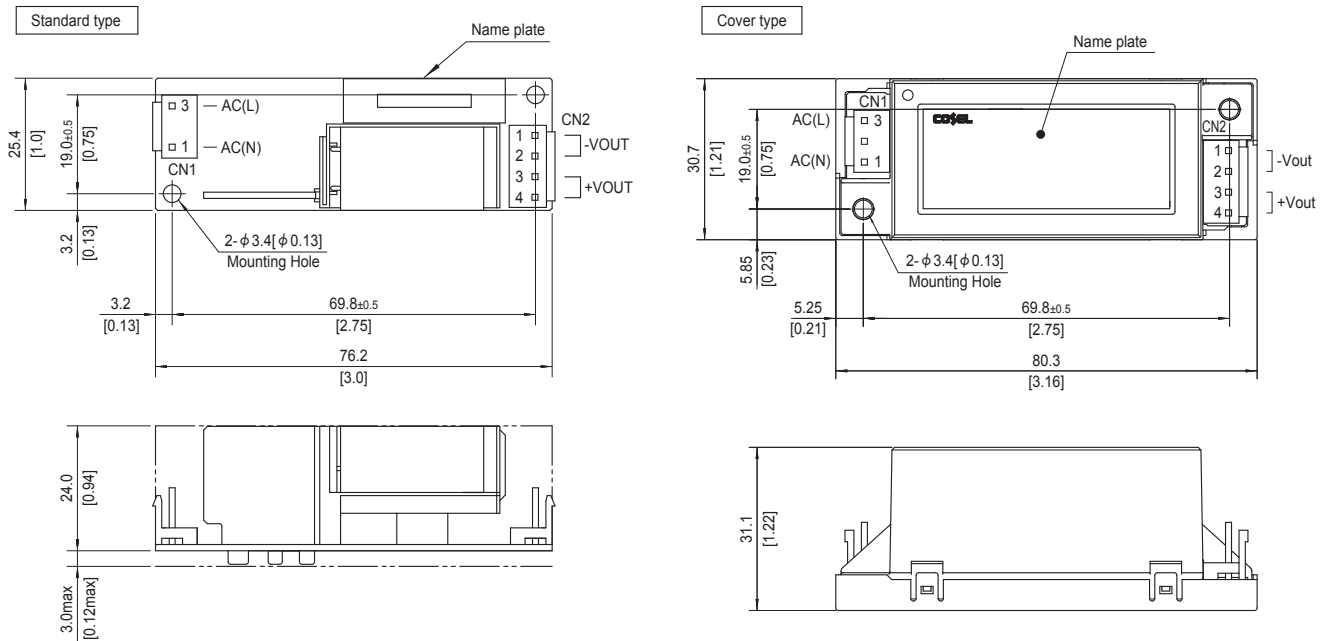
|                               | MODEL                              |                                      | TECS65F-5                                                                                           | TECS65F-12     | TECS65F-12-H     | TECS65F-24     | TECS65F-24-H   |                  |
|-------------------------------|------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------|----------------|------------------|----------------|----------------|------------------|
| INPUT                         | VOLTAGE[VAC]                       |                                      | *2 85 - 264 1 φ (Refer to “Derating” and Instruction Manual 3.1)                                    |                |                  |                |                |                  |
|                               | CURRENT[A]                         | ACIN 100V                            | 1.00typ                                                                                             | 1.25typ        |                  |                |                |                  |
|                               |                                    | ACIN 230V                            | 0.55typ                                                                                             | 0.70typ        |                  |                |                |                  |
|                               | FREQUENCY[Hz]                      |                                      | 50 / 60 (45 - 66)                                                                                   |                |                  |                |                |                  |
|                               | EFFICIENCY[%]                      | ACIN 100V                            | 90.0typ                                                                                             | 91.5typ        | 91.5typ          | 92.5typ        | 92.5typ        |                  |
|                               |                                    | ACIN 230V                            | 91.5typ                                                                                             | 93.0typ        | 93.0typ          | 93.5typ        | 93.5typ        |                  |
|                               | INRUSH CURRENT[A]                  | ACIN 100V                            | 30typ (Io=100%) Ta=25℃ at cold start                                                                |                |                  |                |                |                  |
|                               | ACIN 230V                          | 65typ (Io=100%) Ta=25℃ at cold start |                                                                                                     |                |                  |                |                |                  |
|                               | LEAKAGE CURRENT[ma]                |                                      | 0.25max (ACIN 240V, 60Hz, Io=100%, According to IEC62368-1, and DEN-AN)                             |                |                  |                |                |                  |
| OUTPUT                        | VOLTAGE[V]                         |                                      | 5                                                                                                   | 12             | 12               | 24             | 24             |                  |
|                               | CURRENT[A]                         |                                      | *2 10.0                                                                                             | 5.45           | 5.45 (Peak 7.50) |                | 2.75           | 2.75 (Peak 3.75) |
|                               | LINE REGULATION[mV]                |                                      | *3 20max                                                                                            | 48max          | 48max            | 96max          | 96max          |                  |
|                               | LOAD REGULATION[mV]                |                                      | *3 40max                                                                                            | 100max         | 100max           | 150max         | 150max         |                  |
|                               | RIPPLE[mVp-p]                      |                                      | *4 -10 to 45℃ *5 240max                                                                             | 300max         | 300max           | 360max         | 360max         |                  |
|                               | RIPPLE NOISE[mVp-p]                |                                      | *4 -10 to 45℃ *5 300max                                                                             | 380max         | 380max           | 480max         | 480max         |                  |
|                               | TEMPERATURE REGULATION[mV]         | 0 to +45℃ *5                         | 50max                                                                                               | 120max         | 120max           | 240max         | 240max         |                  |
|                               |                                    | -10 to +45℃ *5                       | 60max                                                                                               | 150max         | 150max           | 290max         | 290max         |                  |
|                               | DRIFT[mV]                          |                                      | *6 20max                                                                                            | 48max          | 48max            | 96max          | 96max          |                  |
|                               | START-UP TIME[ms]                  |                                      | 500typ (ACIN 100V, Io=100%)                                                                         |                |                  |                |                |                  |
|                               | HOLD-UP TIME[ms]                   |                                      | 10typ (ACIN 100V, Io=80%) / 60typ (ACIN 230V, Io=100%)                                              |                |                  |                |                |                  |
| OUTPUT VOLTAGE SETTING[V]     |                                    | 4.90 to 5.30                         | 11.50 to 12.50                                                                                      | 11.50 to 12.50 | 23.00 to 25.00   | 23.00 to 25.00 |                |                  |
| PROTECTION CIRCUIT AND OTHERS | OVERCURRENT PROTECTION             |                                      | Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically |                |                  |                |                |                  |
|                               | OVERVOLTAGE PROTECTION[V]          |                                      | 5.50 to 6.50                                                                                        | 13.20 to 15.60 | 13.20 to 15.60   | 26.40 to 31.20 | 26.40 to 31.20 |                  |
|                               | OPERATING INDICATION               |                                      | Not provided                                                                                        |                |                  |                |                |                  |
|                               | REMOTE SENSING                     |                                      | Not provided                                                                                        |                |                  |                |                |                  |
| ISOLATION                     | INPUT-OUTPUT                       |                                      | 3,000VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At Room Temperature)                      |                |                  |                |                |                  |
| ENVIRONMENT                   | OPERATING TEMP.,HUMID.AND ALTITUDE |                                      | *2 -10 to +70℃, 20 - 90%RH (Non condensing), (Refer to “Derating”), 5,000m (16,500feet) max         |                |                  |                |                |                  |
|                               | STORAGE TEMP.,HUMID.AND ALTITUDE   |                                      | -20 to +75℃, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max                                   |                |                  |                |                |                  |
|                               | VIBRATION                          |                                      | 10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis                     |                |                  |                |                |                  |
|                               | IMPACT                             |                                      | 196.1m/s² (20G), 11ms, once each X, Y and Z axis                                                    |                |                  |                |                |                  |
| SAFETY AND NOISE REGULATIONS  | AGENCY APPROVALS                   |                                      | UL62368-1, C-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1, Complies with DEN-AN            |                |                  |                |                |                  |
|                               | CONDUCTED NOISE                    |                                      | *7 Complies with CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, FCC Part 15-B, FCC Part 18-B, VCCI-B   |                |                  |                |                |                  |
|                               | HARMONIC ATTENUATOR                |                                      | *8 Complies with IEC61000-3-2 (Class A) (No built-in power factor correction)                       |                |                  |                |                |                  |
| OTHERS                        | CASE SIZE/WEIGHT                   |                                      | 25.4×27.0×76.2mm [1.00×1.06×3.00 inches] (W×H×D) / 70g max (with cover : 90g max)                   |                |                  |                |                |                  |
|                               | COOLING METHOD                     |                                      | *2 Convection/Forced air (Requires external fan) (Refer to “Derating”)                              |                |                  |                |                |                  |

- \*1 The listed options may affect the published standard specifications. Please contact us for detailed product specifications.
- \*2 Derating is required. ( ) means peak current. There is a possibility that an internal device is damaged when the specification is exceeded. Please contact us about the detail.
- \*3 At low load conditions, the burst mode operation will start. To check load regulation, you will need to measure the characteristics at average mode with instruments.
- \*4 This is the value that measured on measuring board with capacitor of 22 μF and 0.1 μF at 150mm from output terminal. (Refer to Instruction Manual)
- \*5 5V, 12V output product, the maximum temperature of 40°C.
- \*6 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.
- \*7 When secondary circuit will be connected to earth, the spec will be changed. (Refer to Instruction Manual 2)
- \*8 Please contact us about another class. When two or more units are operating it may not comply with the IEC61000-3-2. Please contact us for details.
- \* To meet the specification, do not operate overload condition.
- \* Parallel operation is not possible.
- \* Sound noise may be emitted from the power supply depending on operating conditions.

## Block diagram



## External view



Mating connector and terminal of CN1, CN2

| I/O Connector | Mating connector | Terminal | Mfr.   |
|---------------|------------------|----------|--------|
| CN1           | B2P3-VH          | VHR-3N   | J.S.T. |
| CN2           | B4P-VH           | VHR-4N   | J.S.T. |

※ Dimensions in mm, [ ]=inches  
 ※ Tolerance :  $\pm 1.5$  [ $\pm 0.06$ ]  
 ※ Weight : 70g max (with cover : 90g max)  
 ※ PCB Material / thickness : FR-4 / 1.1mm [0.04]  
 ※ Optional Case Material : PBT  
 ※ Maximum current per contact at CN2 is 5A.  
 ※ There are two mounting holes.

## Assembling and Installation Method

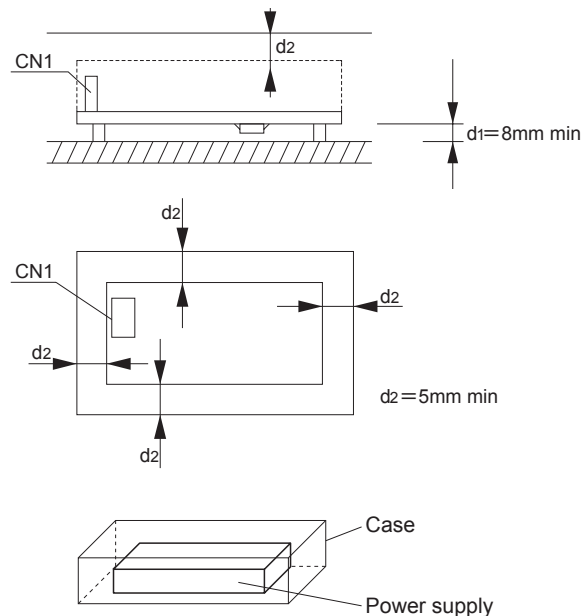
### Installation method

■ This power supply is manufactured by SMD technology. Do not touch any SMD components on the unit. Be especially careful when handling.

■ If using a metal chassis, keep proper insulation between the component and metal chassis, use the spacer of 8mm or more between bottom of power supply and metal chassis (except -N model).

If  $d_1$  and/or  $d_2$  are less than the value mentioned in right figure, insert an insulating sheet with reinforced insulation between the power supply unit and metal chassis (except -N model).

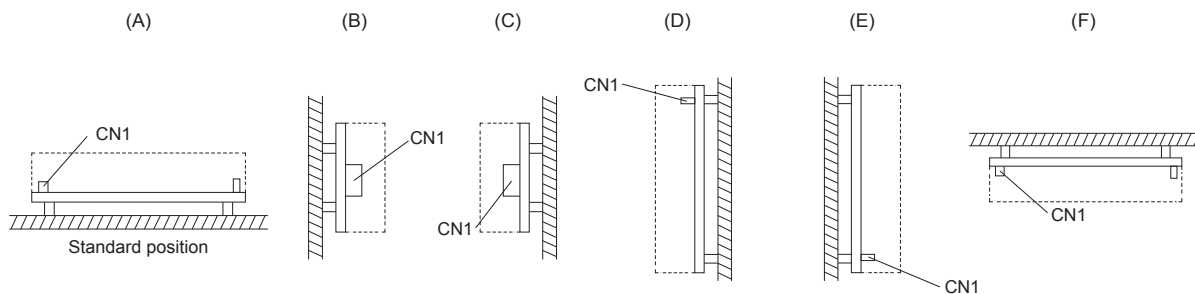
The following distance is not satisfactory for cooling condition. Please refer to "Derating" and Instruction Manual 4 for cooling method.



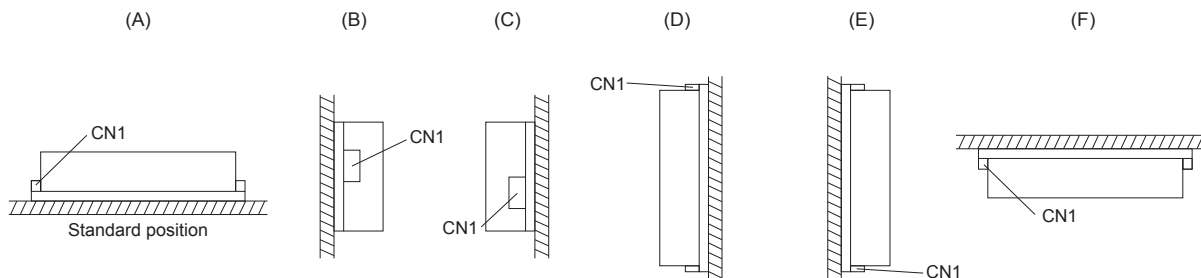
■ There is a possibility that it is not possible to cool enough when the power supply is used by the sealing up space as showing in right figure.

Please use it after confirming the temperature of points ① of Instruction Manual 4.

■ Standard model can be mounted in the mounting position shown in the figure below.

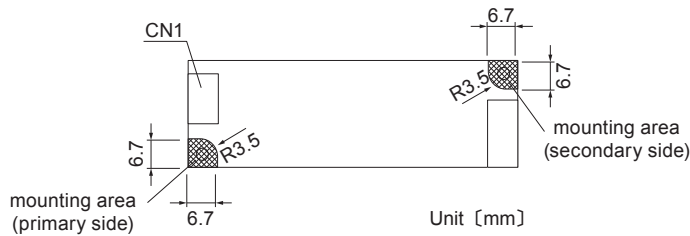


■ Option-N model can be mounted in the mounting position shown in the figure below. The installation of (F) possible only forced air cooling.



## Mounting Area

■ The mounting screw should be M3. The hatched area shows the allowance of mounting area.



■ The mounting area (primary side) must be insulated from areas that user accessible parts of the final product, so if the enclosure is metal and the mounting components and spacers are metal, be careful to insulate them.

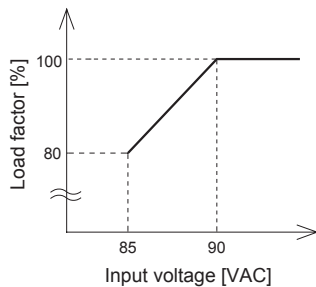
■ When installing, be careful to avoid contact with mounted components.

■ This product uses SMD technology. Please avoid the PCB installation method which includes the twisting stress or the bending stress.

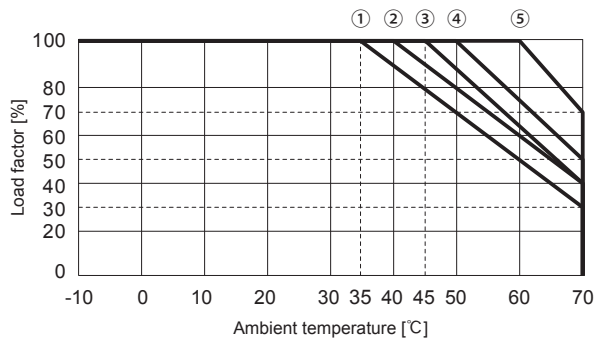
■ Do not touch any SMD components on the unit and soldering points.

## Derating

### Derating curve for input voltage

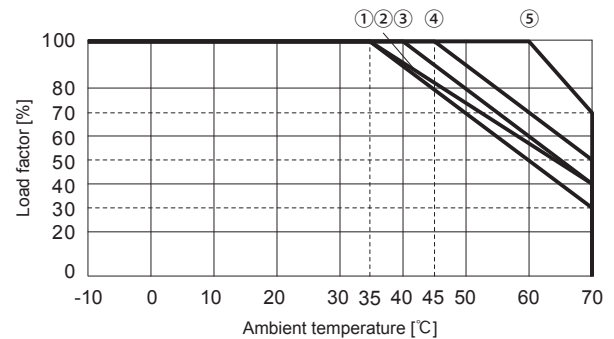


### TECS45F Ambient temperature derating curve at rated input (Reference value)



| Cooling method            | Output voltage | Installation condition |   |
|---------------------------|----------------|------------------------|---|
|                           |                | A,B,C,D,E              | F |
| Convection                | 5V             | ①                      | ① |
|                           | 12V            | ②                      | ① |
|                           | 24V            | ④                      | ③ |
| Forced air<br>(0.5m³/min) | 5V,12V,24V     | ⑤                      |   |

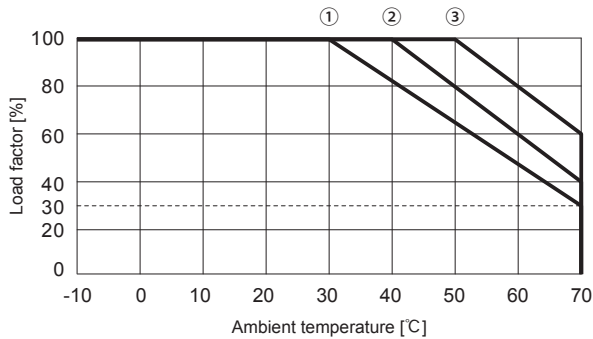
### TECS65F Ambient temperature derating curve at rated input (Reference value)



| Cooling method            | Output voltage | Installation condition |   |   |
|---------------------------|----------------|------------------------|---|---|
|                           |                | A,B,C,E                | D | F |
| Convection                | 5V             | ③                      | ③ | ② |
|                           | 12V            | ③                      | ③ | ① |
|                           | 24V            | ④                      | ③ | ③ |
| Forced air<br>(0.5m³/min) | 5V,12V,24V     | ⑤                      |   |   |

● TECS45F-N

Ambient temperature derating curve at rated input (Reference value)

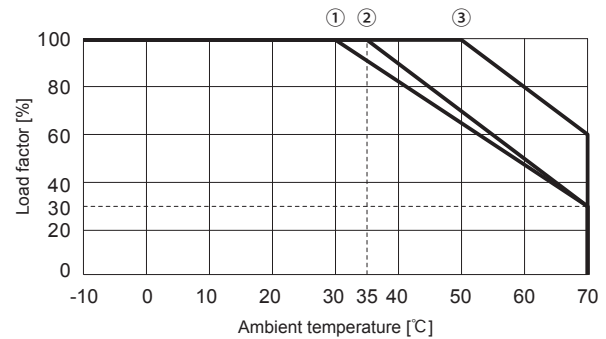


| Cooling method            | Output voltage | Installation condition |   |
|---------------------------|----------------|------------------------|---|
|                           |                | A,B,C,D,E              | F |
| Convection                | 5V             | ①                      | - |
|                           | 12V            | ①                      |   |
|                           | 24V            | ②                      |   |
| Forced air<br>(0.5m³/min) | 5V,12V,24V     | ③                      |   |

■ In case of forced air cooling, ventilation must be uniform.

● TECS65F-N

Ambient temperature derating curve at rated input (Reference value)



| Cooling method            | Output voltage | Installation condition |   |
|---------------------------|----------------|------------------------|---|
|                           |                | A,B,C,D,E              | F |
| Convection                | 5V             | ①                      | - |
|                           | 12V            | ①                      |   |
|                           | 24V            | ②                      |   |
| Forced air<br>(0.5m³/min) | 5V,12V,24V     | ③                      |   |

■ In case of forced air cooling, ventilation must be uniform.

Instruction Manual

◆ Please see catalog and instructionmanual before you use.

Instruction Manual <https://www.cosel.co.jp/redirect/catalog/en/TECS/>  
Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

TECS



NOTICE



Basic Characteristics Data

| Model   | Circuit method    | Switching frequency [kHz] | Input current [A]<br>*1 | Inrush current protection | PCB/Pattern |              |              | Series/Parallel operation availability |                    |
|---------|-------------------|---------------------------|-------------------------|---------------------------|-------------|--------------|--------------|----------------------------------------|--------------------|
|         |                   |                           |                         |                           | Material    | Single sided | Double sided | Series operation                       | Parallel operation |
| TECS45F | Flyback converter | 20 to 250                 | 0.9                     | Thermistor                | FR-4        |              | Yes          | Yes                                    | No                 |
| TECS65F | Flyback converter | 20 to 800                 | 1.25                    | Thermistor                | FR-4        |              | Multilayer   | Yes                                    | No                 |

\*1 The value of input current is at ACIN 100V and rated load.