



# P-DUKE POWER

## TAD65-P Series

AC-DC POWER SUPPLIES  
Up to 65 Watts

**3**  
YEARS  
WARRANTY

ROHS  
COMPLIANT

REACH  
COMPLIANT

+85°C  
-40°C  
AMBIENT TEMP.



Automation



Datacom



IPC



Industry



Measurement



Telecom



Automobile



Boat



Charger



Medical



PV



Railway

UL US CB CE UK CA



PEAK  
POWER

3000  
VAC  
Reinforced  
Insulation

ADJ.  
Output  
Voltage

Internal  
EN55032  
Class  
Filter **B**

LOW  
Standby  
Power

LOW  
Leakage  
Current

Operating  
Altitude  
**5000**  
meter

Protection  
Class I  
Class II

OCP

OVP

SCP

### PART NUMBER STRUCTURE

| T                    | A                                                                         | D              | 65               | U                        | S               | 12                                                                                                                               | C                         | - |                                                                                                           |                                                                      |                                                                             |
|----------------------|---------------------------------------------------------------------------|----------------|------------------|--------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------|---------------------------|---|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Application          | Package Code                                                              | Dimension Code | Output Power (W) | Input Voltage (VAC)      | Output Quantity | Output Voltage (VDC)                                                                                                             | Protection Type           |   | Connector Options                                                                                         | Peak Power Support Options                                           | Conformal Coating Options                                                   |
| Industry Application | A: Open type<br>U: U chassis type<br>E: Enclosed type<br>D: Din rail type |                |                  | U: Universal<br>85 ~ 264 | S: Single       | 05: 5<br>7P5: 7.5<br>09: 9<br>12: 12<br>15: 15<br>18: 18<br>24: 24<br>241: 24<br>28: 28<br>281: 28<br>36: 36<br>48: 48<br>53: 53 | C: CLASS I<br>D: CLASS II |   | <input type="checkbox"/> JST<br><input type="checkbox"/> Molex<br><input type="checkbox"/> Terminal Block | <input type="checkbox"/> None<br><input type="checkbox"/> Peak Power | <input type="checkbox"/> None<br><input type="checkbox"/> Conformal Coating |

## TECHNICAL SPECIFICATION All specifications are typical at 230VAC input, full load and 25°C unless otherwise noted

| Model Number                                                     | Input Range | Output Voltage | Output Current Natural Convection | Max. Output Power | Max. Peak Power | Input Power @ No Load | Efficiency | Maximum Capacitor Load |
|------------------------------------------------------------------|-------------|----------------|-----------------------------------|-------------------|-----------------|-----------------------|------------|------------------------|
|                                                                  | VAC         | VDC            | A                                 | W                 | W               | W                     | %          | μF                     |
| TAD65US05C-P<br>TUD65US05C-P<br>TED65US05C-P<br>TDD65US05C-P     | 85 ~ 264    | 5              | 10                                | 50                | 65              | 0.11                  | 90         | 20000                  |
| TAD65US7P5C-P<br>TUD65US7P5C-P<br>TED65US7P5C-P<br>TDD65US7P5C-P | 85 ~ 264    | 7.5            | 8.67                              | 65                | 90              | 0.11                  | 90         | 11560                  |
| TAD65US09C-P<br>TUD65US09C-P<br>TED65US09C-P<br>TDD65US09C-P     | 85 ~ 264    | 9              | 7.23                              | 65                | 90              | 0.11                  | 91         | 8033                   |
| TAD65US12C-P<br>TUD65US12C-P<br>TED65US12C-P<br>TDD65US12C-P     | 85 ~ 264    | 12             | 5.42                              | 65                | 90              | 0.11                  | 92.5       | 4520                   |
| TAD65US15C-P<br>TUD65US15C-P<br>TED65US15C-P<br>TDD65US15C-P     | 85 ~ 264    | 15             | 4.34                              | 65                | 90              | 0.11                  | 93.5       | 2900                   |
| TAD65US18C-P<br>TUD65US18C-P<br>TED65US18C-P<br>TDD65US18C-P     | 85 ~ 264    | 18             | 3.62                              | 65                | 90              | 0.11                  | 93.0       | 2015                   |
| TAD65US24C-P<br>TUD65US24C-P<br>TED65US24C-P<br>TDD65US24C-P     | 85 ~ 264    | 24             | 2.71                              | 65                | 90              | 0.11                  | 93.5       | 1130                   |
| TAD65US241C-P<br>TUD65US241C-P<br>TED65US241C-P<br>TDD65US241C-P | 85 ~ 264    | 24             | 2.71                              | 65                | 90              | 0.11                  | 92         | 1130                   |
| TAD65US28C-P<br>TUD65US28C-P<br>TED65US28C-P<br>TDD65US28C-P     | 85 ~ 264    | 28             | 2.33                              | 65                | 90              | 0.11                  | 93.5       | 830                    |
| TAD65US281C-P<br>TUD65US281C-P<br>TED65US281C-P<br>TDD65US281C-P | 85 ~ 264    | 28             | 2.33                              | 65                | 90              | 0.11                  | 91.5       | 830                    |
| TAD65US36C-P<br>TUD65US36C-P<br>TED65US36C-P<br>TDD65US36C-P     | 85 ~ 264    | 36             | 1.81                              | 65                | 90              | 0.11                  | 92.5       | 520                    |
| TAD65US48C-P<br>TUD65US48C-P<br>TED65US48C-P<br>TDD65US48C-P     | 85 ~ 264    | 48             | 1.36                              | 65                | 90              | 0.11                  | 93         | 285                    |
| TAD65US53C-P<br>TUD65US53C-P<br>TED65US53C-P<br>TDD65US53C-P     | 85 ~ 264    | 53             | 1.24                              | 65                | 90              | 0.11                  | 92.5       | 235                    |

**INPUT SPECIFICATIONS**

| Parameter                     | Conditions           | Min. | Typ. | Max.          | Unit |
|-------------------------------|----------------------|------|------|---------------|------|
| Operating input voltage range | AC input             | 85   |      | 264           | VAC  |
|                               | DC input             | 120  |      | 370           | VDC  |
| Input frequency               | AC input             | 47   |      | 63            | Hz   |
| Input current                 | 100VAC and Full Load |      |      | 1.6           | A    |
|                               | 240VAC and Full Load |      |      | 0.9           | A    |
| No load input power           | 230VAC               |      | 0.11 |               | mW   |
| Leakage current               | 264VAC               |      | 75   |               | μA   |
| Start up time                 |                      |      |      | 1000          | ms   |
| Rise time                     |                      |      | 20   |               | ms   |
| Hold up time                  | 115VAC and Full Load |      | 16   |               | ms   |
| Input inrush current          | 230VAC               |      | 60   |               | A    |
| Input protection              | Internal fuse        |      |      | T3.15A/250VAC |      |

**OUTPUT SPECIFICATIONS**

| Parameter                    | Conditions                                             | Min.  | Typ. | Max.  | Unit                            |
|------------------------------|--------------------------------------------------------|-------|------|-------|---------------------------------|
| Output power                 | Full Load                                              |       |      | 65    | Watts                           |
| Output peak power            | Peak power 5Vout                                       |       |      | 65    | Watts                           |
|                              | Peak power Others                                      |       |      | 90    | Watts                           |
|                              | Peak power time                                        |       | 5    |       | S                               |
|                              | Peak power duty                                        |       | 20   |       | %                               |
|                              | Average operation power ( % of Full Load)              |       | 70   |       | %                               |
| Initial set voltage accuracy | 230VAC and Full Load                                   | -1.0  |      | +1.0  | %                               |
| Line regulation              | Low Line to High Line at Full Load                     | -0.2  |      | +0.2  | %                               |
| Load regulation              | No Load to Full Load 5Vout                             | -0.7  |      | +0.7  | %                               |
|                              |                                                        | -0.5  |      | +0.5  |                                 |
|                              | 10% Load to 90% Load 5Vout                             | -0.6  |      | +0.6  | %                               |
|                              |                                                        | -0.4  |      | +0.4  |                                 |
| Voltage adjustability        |                                                        | -20   |      | +10   | %                               |
| Minimum load                 |                                                        |       | 0    |       | %                               |
| Ripple and noise             | Measured by 20MHz bandwidth                            |       |      |       | mVp-p                           |
|                              | With a 10μF/25V 1206 X7R MLCC 5Vout, 7.5Vout, 9Vout    |       | 75   |       |                                 |
|                              | With a 1μF/50V 1206 X7R MLCC 12Vout, 15Vout, 18Vout    |       | 75   |       |                                 |
|                              | With a 0.1μF/100V 1206 X7R MLCC 24Vout, 28Vout, 36Vout |       | 150  |       |                                 |
| Temperature coefficient      |                                                        | -0.02 |      | +0.02 | %/°C                            |
| Transient response           | Load step from 50 ~ 75% change at 2.5A/μs              |       |      | 3     | %Vout                           |
|                              |                                                        |       | 600  |       | μs                              |
| Over voltage protection      | % of Vout(nom); Automatics recovery                    | 125   |      | 140   | %                               |
| Over load protection         | % of Iout rated; Hiccup mode                           |       | 165  |       | %                               |
| Short circuit protection     |                                                        |       |      |       | Continuous, automatics recovery |

**GENERAL SPECIFICATIONS**

| Parameter            | Conditions                       | Min. | Typ. | Max.                    | Unit                       |
|----------------------|----------------------------------|------|------|-------------------------|----------------------------|
| Isolation voltage    | 1 minute (Reinforced insulation) | 3000 |      |                         | VAC                        |
|                      |                                  | 2500 |      |                         |                            |
| Isolation resistance | 500VDC                           | 0.1  |      |                         | GΩ                         |
| Switching frequency  | 230VAC                           |      | 60   |                         | kHz                        |
|                      |                                  |      | 110  |                         |                            |
|                      |                                  |      | 70   |                         |                            |
|                      |                                  |      | 120  |                         |                            |
| Safety approvals     | IEC/ EN/ UL 62368-1              |      |      |                         | UL:E193009<br>CB:UL(Demko) |
| Weight               | TAD<br>TUD<br>TED<br>TDD         |      |      | 117g (4.13oz)           |                            |
|                      |                                  |      |      | 157g (5.54oz)           |                            |
|                      |                                  |      |      | 172g (6.07oz)           |                            |
|                      |                                  |      |      | 193g (6.81oz)           |                            |
| MTBF                 | MIL-HDBK-217F, Full load         |      |      | 1.494 x 10 <sup>6</sup> | hrs                        |

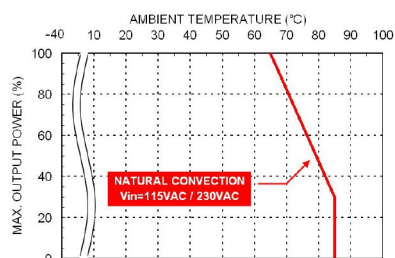
## ENVIRONMENTAL SPECIFICATIONS

| Parameter                     | Conditions                       | Min. | Typ. | Max.          | Unit |
|-------------------------------|----------------------------------|------|------|---------------|------|
| Operating ambient temperature | Natural convection With derating | -40  |      | +85           | °C   |
| Storage temperature range     |                                  | -40  |      | +85           | °C   |
| Operating altitude            |                                  |      |      | 5000          | m    |
| Shock                         |                                  |      |      | IEC60068-2-27 |      |
| Vibration                     |                                  |      |      | IEC60068-2-6  |      |
| Relative humidity             | Non-condensing                   |      |      | 5% to 95% RH  |      |

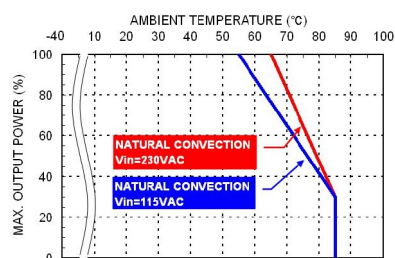
## EMC SPECIFICATIONS

| Parameter                      | Conditions                                                                              | Level                                 |
|--------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------|
| EMI                            | EN55032 and FCC Part 15<br>External components may be required for class I application. | Conducted Class B<br>Radiated Class B |
| Harmonic currents              | EN61000-3-2 Full Load                                                                   | Class A                               |
| Voltage flicker                | EN61000-3-3                                                                             |                                       |
| EMS                            | EN55024 and Complies with EN61850-3                                                     |                                       |
| ESD                            | EN61000-4-2                                                                             | Perf. Criteria A                      |
| Radiated immunity              | EN61000-4-3 20 V/m                                                                      | Perf. Criteria A                      |
| Fast transient                 | EN61000-4-4 $\pm 4$ kV                                                                  | Perf. Criteria A                      |
| Surge                          | EN61000-4-5 DM $\pm 2$ kV and CM $\pm 4$ kV                                             | Perf. Criteria A                      |
| Conducted immunity             | EN61000-4-6 20 V <sub>r.m.s</sub>                                                       | Perf. Criteria A                      |
| Power frequency magnetic field | EN61000-4-8 100 A/m                                                                     | Perf. Criteria A                      |
| Dip and interruptions          | EN61000-4-11                                                                            |                                       |
| Damped Oscillatory Wave        | EN61000-4-18 DM $\pm 1$ kV and CM $\pm 2.5$ kV                                          | Perf. Criteria A                      |

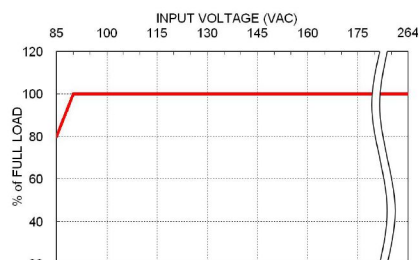
## CHARACTERISTIC CURVE



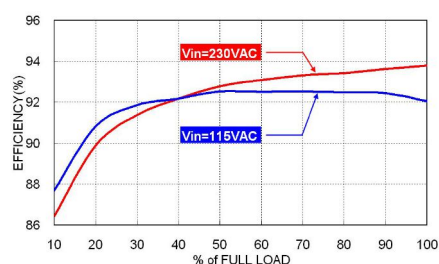
TAD65 & TUD65 Derating Curve vs. Ambient Temperature



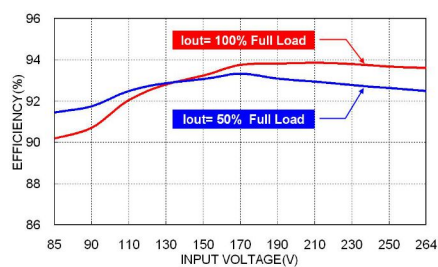
TED65 & TDD65 Derating Curve vs. Ambient Temperature



Derating Curve vs. Input Voltage



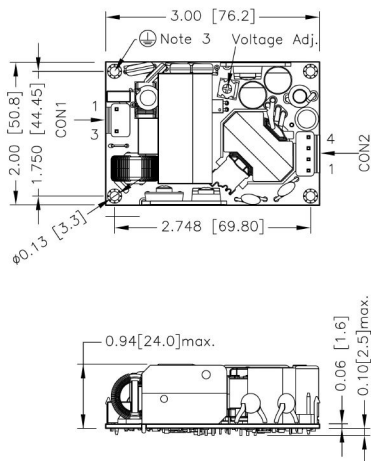
T D65US24C-P Efficiency VS Output Load



T D65US24C-P Efficiency VS Input Voltage

## MECHANICAL DRAWING

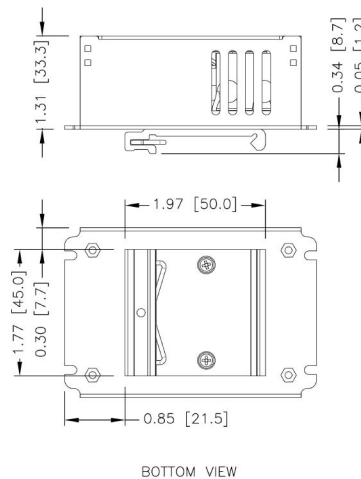
**TAD** Open type



FRONT VIEW

1. All dimensions in inch [mm]  
Tolerance :  $x.xx \pm 0.02$  [ $x.x \pm 0.5$ ]  $x.xxx \pm 0.010$  [ $x.xx \pm 0.25$ ]
2. The screw locked torque: MAX 5.0kgf-cm/0.49N-m
3. The screws holes can be considered as PE connection for CLASS I application.

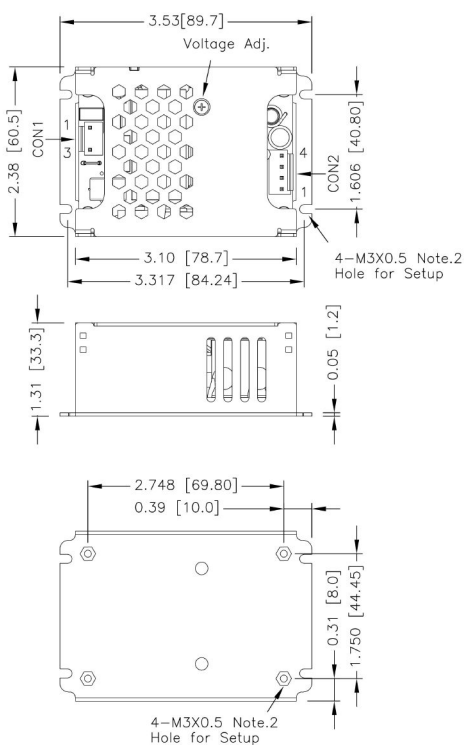
**TDD** Din rail type



BOTTOM VIEW

1. All dimensions in inch [mm]  
Tolerance :  $x.xx \pm 0.02$  [ $x.x \pm 0.5$ ]  $x.xxx \pm 0.010$  [ $x.xx \pm 0.25$ ]

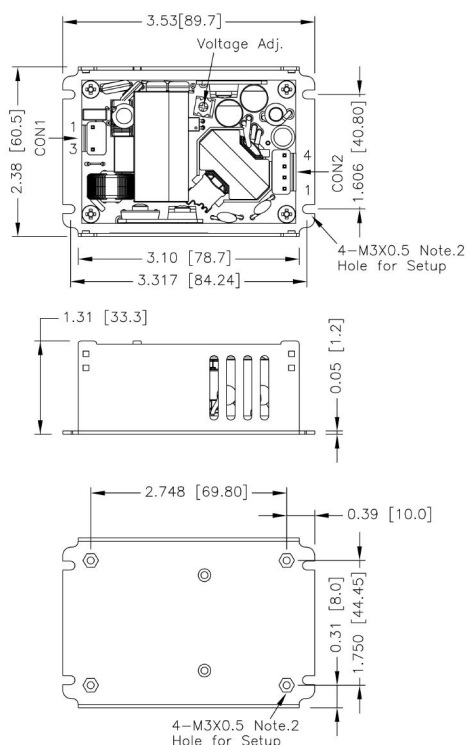
**TED** Enclosed type



BOTTOM VIEW

1. All dimensions in inch [mm]  
Tolerance :  $x.xx \pm 0.02$  [ $x.x \pm 0.5$ ]  $x.xxx \pm 0.010$  [ $x.xx \pm 0.25$ ]
2. The screw locked torque: MAX 5.0kgf-cm/0.49N-m

**TUD** U chassis type



BOTTOM VIEW

1. All dimensions in inch [mm]  
Tolerance :  $x.xx \pm 0.02$  [ $x.x \pm 0.5$ ]  $x.xxx \pm 0.010$  [ $x.xx \pm 0.25$ ]
2. The screw locked torque: MAX 5.0kgf-cm/0.49N-m

## CONNECTOR CONNECTIONS

| CON1 – Input Connector |         |
|------------------------|---------|
| Pin 1                  | Line    |
| Pin 3                  | Neutral |

| CON2 – Output Connector |       |
|-------------------------|-------|
| Pin 1,2                 | -Vout |
| Pin 3,4                 | +Vout |

\*Either one of four screws holes of Chassis type can be considered as PE connection for CLASS I application.

## CONNECTOR OPTIONS

| Blank: | JST Type                  | -M | Molex Type              | -T | Terminal Block              |
|--------|---------------------------|----|-------------------------|----|-----------------------------|
|        | Housing                   |    | Housing                 |    | Mates with                  |
|        | CON1: <b>VHR-3N</b>       |    | CON1: <b>09-50-8031</b> |    | <b>Screw locked torque</b>  |
|        | CON2: <b>VHR-4N</b>       |    | CON2: <b>09-50-8041</b> |    | <b>MAX 2Kgf.cm/0.2N.m</b>   |
|        | Crimp terminals           |    | Crimp terminals         |    | <b>Wire dimension range</b> |
|        | CON1: <b>SVH-21T-P1.1</b> |    | CON1: <b>SD-2478</b>    |    | <b>26 ~ 16AWG</b>           |
|        | CON2: <b>SVH-21T-P1.1</b> |    | CON2: <b>SD-2478</b>    |    |                             |