

PART NUMBER: PTK25**DESCRIPTION:** dc-dc converter**features**

- industry standard pin out
- wide 2:1 input range
- fully isolated
- output voltage trimmable
- output on/off control
- over-current protection
- over-voltage protection
- six-sided EMI shielding
- constant switching frequency
- high efficiency
- compact size 2.0"x2.0"x0.4"
- 40°C~85°C models available
- 3 year warranty



| MODEL ¹ | output power (max) | input voltage | output voltage | output current (max) | ripple & noise ² mV P-P | efficiency (typ.) |
|--------------------|--------------------|---------------|----------------|----------------------|------------------------------------|-------------------|
| PTK25-D24-S3 | 19.8W | 18-36VDC | 3.3VDC | 6.0A | 100 | 80% |
| PTK25-D24-S5 | 25.0W | 18-36VDC | 5VDC | 5.0A | 100 | 85% |
| PTK25-D24-S12 | 24.0W | 18-36VDC | 12VDC | 2.0A | 120 | 89% |
| PTK25-D24-S15 | 24.0W | 18-36VDC | 15VDC | 1.6A | 150 | 89% |
| PTK25-D24-D5 | 25.0W | 18-36VDC | ±5VDC | 2.5A | 75/75 | 84% |
| PTK25-D24-D12 | 24.0W | 18-36VDC | ±12VDC | 1.0A | 120/120 | 88% |
| PTK25-D24-D15 | 24.0W | 18-36VDC | ±15VDC | 0.8A | 150/150 | 87% |
| PTK25-D24-T312 | 19.95W | 18-36VDC | 3.3VDC/±12VDC | 3.5A/0.35A | 75/120/120 | 83% |
| PTK25-D24-T512 | 25.9W | 18-36VDC | 5VDC/±12VDC | 3.5A/0.35A | 75/120/120 | 84% |
| PTK25-D24-T315 | 19.95W | 18-36VDC | 3.3VDC/±15VDC | 3.5A/0.28A | 75/150/150 | 83% |
| PTK25-D24-T515 | 25.0W | 18-36VDC | 5VDC/±15VDC | 3.5A/0.25A | 75/150/150 | 84% |
| PTK25-D48-S3 | 19.8W | 36-72VDC | 3.3VDC | 6.0A | 100 | 81% |
| PTK25-D48-S5 | 25.0W | 36-72VDC | 5VDC | 5.0A | 100 | 85% |
| PTK25-D48-S12 | 24.0W | 36-72VDC | 12VDC | 2.0A | 120 | 89% |
| PTK25-D48-S15 | 24.0W | 36-72VDC | 15VDC | 1.6A | 150 | 89% |
| PTK25-D48-D5 | 25.0W | 36-72VDC | ±5VDC | 2.5A | 75/75 | 84% |
| PTK25-D48-D12 | 24.0W | 36-72VDC | ±12VDC | 1.0A | 120/120 | 88% |
| PTK25-D48-D15 | 24.0W | 36-72VDC | ±15VDC | 0.8A | 150/150 | 87% |
| PTK25-D48-T312 | 19.95W | 36-72VDC | 3.3VDC/±12VDC | 3.5A/0.35A | 75/120/120 | 83% |
| PTK25-D48-T512 | 25.9W | 36-72VDC | 5VDC/±12VDC | 3.5A/0.35A | 75/120/120 | 84% |
| PTK25-D48-T315 | 19.95W | 36-72VDC | 3.3VDC/±15VDC | 3.5A/0.28A | 75/150/150 | 83% |
| PTK25-D48-T515 | 25.0W | 36-72VDC | 5VDC/±15VDC | 3.5A/0.25A | 75/150/150 | 84% |

NOTE: 1. All models are also available in an extended temperature range of -40°C~85°C. For these models, append "M" to the model number, e.g. PTK25-Q48-S5M.

2. Ripple & noise measured with a 20MHz bandwidth, off a 10uF electrolytic and a 0.1uF ceramic cap in parallel at the output.

**PART NUMBER:** PTK25**DESCRIPTION:** dc-dc converter**INPUT**

| parameter | conditions/description | min | nom | max | units |
|-----------------------|-----------------------------|------|---------|------|-------|
| input voltage range | | 18 | 24 | 36 | VDC |
| | | 36 | 48 | 72 | VDC |
| remote on/off control | output turn-on ³ | 2.5V | (open) | 5.5V | |
| | output turn-off | 0V | (short) | 0.8V | |
| switching frequency | constant | | 300 | | KHz |

NOTE: 3 output defaults to "on" when there is no connection to the "CNT" pin.**OUTPUT**

| parameter | conditions/description | min | nom | max | units |
|--|---|--------|-----|--------|-------|
| output trim range | with external trim resistors | -5% | | +5% | |
| set point accuracy | single output | -2% | | +2% | |
| | dual output | -3% | | +3% | |
| line regulation (low line to high line) | single output models | -0.25% | | +0.25% | |
| | dual output models | -2.5% | | +2.5% | |
| | triple: main output (Vout) auxillary outputs (+Vaux / -Vaux) | -0.25% | | +0.25% | |
| load regulation | single output models- no load to full load | -0.25% | | +0.25% | |
| | dual output models- balanced loads | -2.5% | | +2.5% | |
| | triple: main output (Vout) auxillary outputs (+Vaux / -Vaux)- with 10% load on Vout and balanced loads on +Vaux and -Vaux | -0.25% | | +0.25% | |
| | | -5% | | +5% | |
| minimum load | converters will not be damaged if loading conditions are less than minimum specified loads, but regulation specs may not be met ⁴ | | | | |
| ripple and noise | see chart | | | | |

NOTE: 4 single output: no min. load required, dual: 10%, triple: balanced loads**PROTECTION**

| parameter | conditions/description | min | nom | max | units |
|--------------|---------------------------------------|------|-----|------|-------|
| over-current | continuous auto recovery ⁵ | 105% | | 135% | |
| over-voltage | internally zener clamped ⁵ | 110% | | 140% | |

NOTE: 5 continuous operation in a protected state may compromise long-term reliability.**GENERAL**

| parameter | conditions/description | min | nom | max | units |
|-----------------------|---|--------|--------------|------|-------------------|
| efficiency | typical at full load | 77% | | 83% | |
| isolation voltage | input/case, input/output, output/case | 500 | | | VAC |
| insulation resistance | at 500 VDC | 100M | | | Ohms |
| agency standards | approved to UL60950(E222889), CSA C22.2 No. 60950, TUV EN60950 (single output only) | | | | |
| case material | | | Zn | | |
| material flammability | | 94 V-0 | | | |
| weight | | | 80 (2.82) | | grams (ounces) |
| MTBF | MIL-HDBK-217F | | 470k | | hours |
| operating temperature | regular models - see derating curve. | -20 | | +71 | °C |
| | extended temperature models | -40 | | +85 | °C |
| storage temperature | | -40 | | +105 | °C |
| humidity | operating (non-condensing) | 5% | | 95% | RH |
| washability | not intended for aqueous wash | | | | |

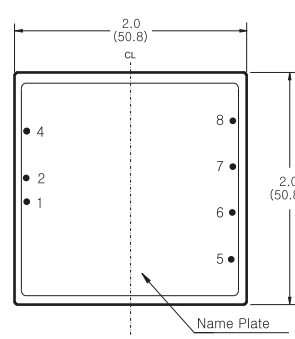
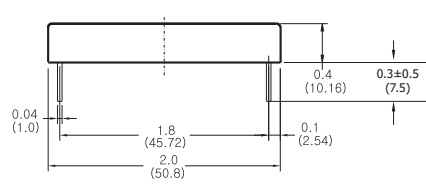
PART NUMBER: PTK25

DESCRIPTION: dc-dc converter

DIMENSIONS (mm)

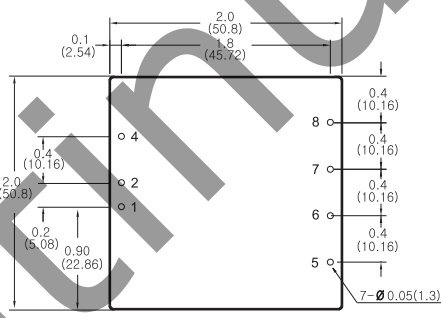
NOTES

- All dimensions are in inches and (mm).
- Weight : 75g or less

Pin Assignments

| Single Output | Dual Output | Triple Output |
|---------------|-------------|---------------|
| 1. +Vin | 1. +Vin | 1. +Vin |
| 2. -Vin | 2. -Vin | 2. -Vin |
| 3. No pin | 3. No pin | 3. No pin |
| 4. CNT | 4. CNT | 4. CNT |
| 5. NC | 5. +Vout | 5. +Vaux |
| 6. +Vout | 6. Com | 6. +Vout |
| 7. -Vout | 7. -Vout | 7. Com |
| 8. Trim | 8. Trim | 8. -Vaux |

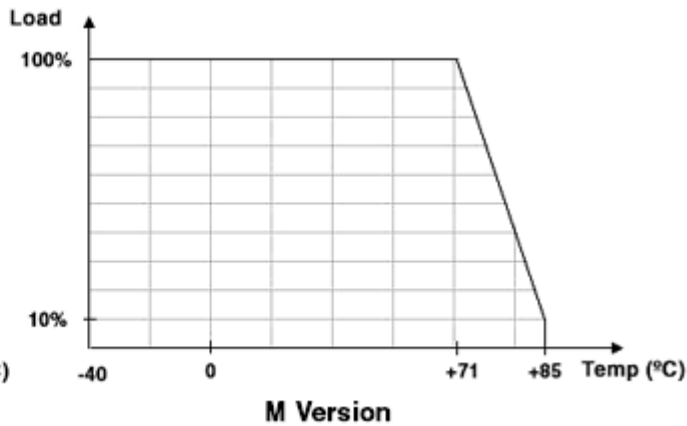
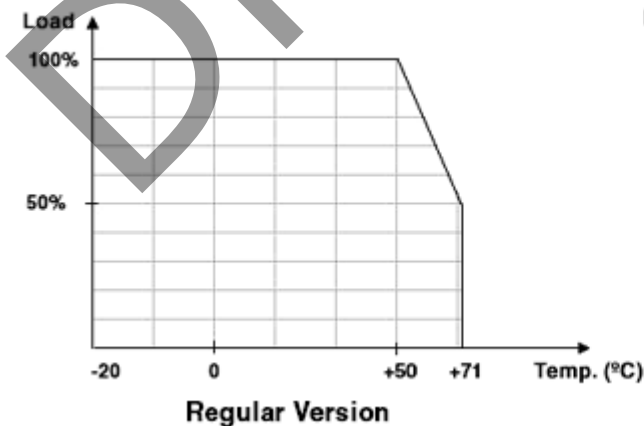


PCB Layout

PIN DEFINITIONS

- +Vin: Input positive terminal
- Vin: Input negative terminal
- CNT: Remote On/Off control of output voltage. Referenced to -Vin
- +Vout: Main output positive terminal
- Vout: Output negative terminal
- +Vaux: Positive auxiliary output
- Vaux: Negative auxiliary output
- Com: Common node for dual- or triple-output models
- Trim: For trimming output voltage on single- or dual-output models

DERATING CURVES



PART NUMBER: PTK25**DESCRIPTION:** dc-dc converter

APPLICATION NOTES

1. OUTPUT TRIMMING

The output voltages are preset to nominal values as indicated by the models table at the factory. If desired, the output voltage may optionally be trimmed to a different value (+/- 10%) with external resistors and/or potentiometer as shown below.

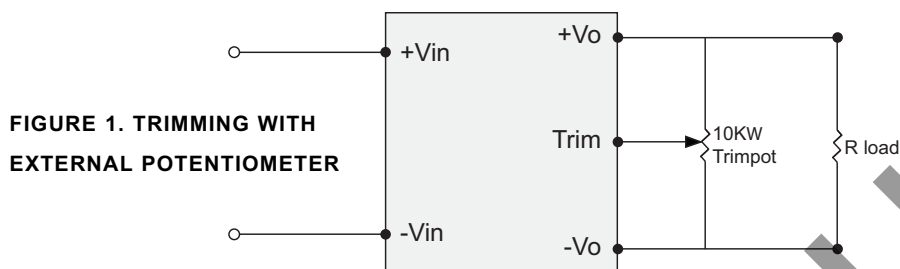
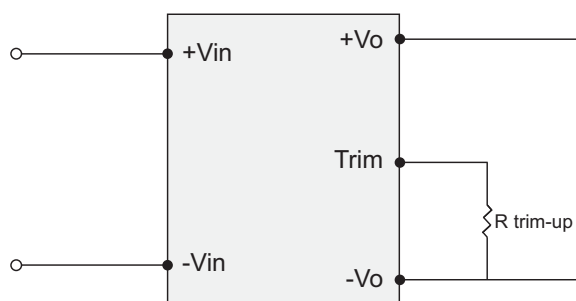


FIGURE 1. TRIMMING WITH EXTERNAL POTENTIOMETER

To trim the output voltage with fixed resistors, the output voltage can be calculated as follows.



Trim-Up

FIGURE 2: TRIM-UP VOLTAGE SETUP

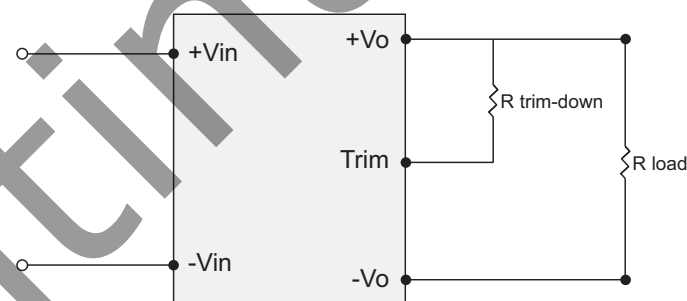
$$R_{trim_up} = \frac{V_r \cdot R_1 \cdot R_2}{R_2 \cdot (V_o - V_r) - V_r \cdot R_1}$$

The value of $R_{trim-up}$ is defined as:

Where: $R_{trim-up}$ is the external resistor in $K\Omega$. V_o is the desired output voltage. R_1 and R_2 and V_r are internal to the unit and are defined in Table 1. For example to trim up the PTK25-D5-D12 up by 5% to 25.2 V, $R_{trim-up}$ is calculated as follows:

$$V_o = 25.2 / R_1 = 21 \text{ K}\Omega / R_2 = 2.43 \text{ K}\Omega / V_r = 2.5$$

$$R_{trim_up} = \frac{2.5 \cdot 21 \cdot 2.43}{2.43 \cdot (25.2 - 2.5) - 2.5 \cdot 21} = 47.94 \text{ K}\Omega$$



Trim-Down

FIGURE 3: TRIM-DOWN VOLTAGE SETUP

$$R_{trim_down} = \frac{(V_o - V_r) \cdot R_1 \cdot R_2}{V_r \cdot R_1 - (V_o - V_r) \cdot R_2}$$

The value of $R_{trim-down}$ is defined as:

Where: $R_{trim-down}$ is the external resistor in $K\Omega$. V_o is the desired output voltage. R_1 and R_2 and V_r are internal to the unit and are defined in Table 1. For example to trim down the PTK25-D5-D12 down by 5% to 22.8 V, $R_{trim-down}$ is calculated as follows:

$$V_o = 22.8 / R_1 = 21 \text{ K}\Omega / R_2 = 2.43 \text{ K}\Omega / V_r = 2.5$$

$$R_{trim_down} = \frac{(22.8 - 2.5) \cdot 21 \cdot 2.43}{2.5 - 2.1 (22.8 - 2.5) \cdot 2.43} = 326.68 \text{ K}\Omega$$

Table 1

| Model | R1 (K Ω) | R2 (K Ω) | Vr (V) |
|----------------|------------------|------------------|--------|
| PTK25-DXX-S3.3 | 1.13 | 0.68 | 1.25 |
| PTK25-DXX-S5 | 2.43 | 2.43 | 2.5 |
| PTK25-DXX-S12 | 9.31 | 2.43 | 2.5 |
| PTK25-DXX-S15 | 12.1 | 2.4 | 2.5 |
| PTK25-DXX-D5 | 7.32 | 2.43 | 2.5 |
| PTK25-DXX-D12 | 21 | 2.43 | 2.5 |
| PTK25-DXX-D15 | 26.7 | 2.43 | 2.5 |