PART NUMBER: PK25 **DESCRIPTION:** dc-dc converter

features
- **industry standard pin out**
- **wide 2:1 input range**
- **fully isolated**
- **output voltage trimmable**
- **low ripple & noise**
- **over-current protection**
- **over-voltage protection**
- **output on/off control**
- **HI-POT tested**
- **constant switching frequency**
- **high efficiency**
- **compact size 2.56”x2.0”x0.375”**
- **3 year warranty**

RoHS

MODEL [1]	output power (max)	input voltage	output voltage	output current (min)	output current (max)	ripple & noise [2] mV P-P	efficiency (typ.)
PK25-D5-S3.3	10.6W	4.5-9VDC	3.3VDC	0A	3.2A	75	73%
PK25-D5-S5	16.0W	4.5-9VDC	5VDC	0A	3.2A	75	75%
PK25-D5-S12	20.4W	4.5-9VDC	12VDC	0A	1.7A	120	77%
PK25-D5-S15	21.0W	4.5-9VDC	15VDC	0A	1.4A	150	77%
PK25-D5-D5	16.0W	4.5-9VDC	±5VDC	0A	1.6A	100/100	75%
PK25-D5-D12	20.4W	4.5-9VDC	±12VDC	0A	0.85A	120/120	77%
PK25-D5-D15	21.0W	4.5-9VDC	±15VDC	0A	0.7A	150/150	77%
PK25-D12-S3.3	13.2W	8-16.5VD	3.3VDC	0A	4.0A	75	83%
PK25-D12-S5	20.0W	9-18VDC	5VDC	0A	4.0A	75	85%
PK25-D12-S12	25.2W	9-18VDC	12VDC	0A	2.1A	120	89%
PK25-D12-S15	25.5W	9-18VDC	15VDC	0A	1.7A	150	89%
PK25-D12-D5	20.0W	9-18VDC	±5VDC	0A	2.0A	100/100	80%
PK25-D12-D12	25.2W	9-18VDC	±12VDC	0A	1.05A	120/120	86%
PK25-D12-D15	25.5W	9-18VDC	±15VDC	0A	0.85A	150/150	86%
PK25-D24-S3.3	13.2W	18-36VDC	3.3VDC	0A	4.0A	75	83%
PK25-D24-S5	20.0W	18-36VDC	5VDC	0A	4.0A	75	85%
PK25-D24-S12	25.2W	18-36VDC	12VDC	0A	2.1A	120	89%
PK25-D24-S15	25.5W	18-36VDC	15VDC	0A	1.7A	150	90%
PK25-D24-D5	20.0W	18-36VDC	±5VDC	0A	2.0A	100/100	82%
PK25-D24-D12	25.2W	18-36VDC	±12VDC	0A	1.05A	120/120	86%
PK25-D24-D15	25.5W	18-36VDC	±15VDC	0A	0.85A	150/150	86%
PK25-D48-S3.3	13.2W	32-72VDC	3.3VDC	0A	4.0A	75	83%
PK25-D48-S5	20.0W	32-72VDC	5VDC	0A	4.0A	75	85%
PK25-D48-S12	25.2W	32-72VDC	12VDC	0A	2.1A	120	90%
PK25-D48-S15	25.5W	32-72VDC	15VDC	0A	1.7A	150	90%
PK25-D48-D5	20.0W	32-72VDC	±5VDC	0A	2.0A	100/100	82%
PK25-D48-D12	25.2W	32-72VDC	±12VDC	0A	1.05A	120/120	86%
PK25-D48-D15	25.5W	32-72VDC	±15VDC	0A	0.85A	150/150	86%

NOTE: 1. All models (excluding the 5 V dc input, D5) are also available in an extended temperature range of -40°C~85°C. For these models, append “M” to the model number, e.g. PK25-D12-S3.3M.

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

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INPUT

parameter	conditions/description	min	nom	max	units
input voltage range		4.5	5	9	VDC
		9	12	18	VDC
		18	24	36	VDC
		36	48	72	VDC
switching frequency	constant		300		KHz

OUTPUT

parameter	conditions/description	min	nom	max	units
set point accuracy		-2%		+2%	
line regulation	all models	-0.5%		+0.5%	
load regulation	single output models	-1.0%		+1.0%	
	dual output models (10% min. load)	-2.5%		+2.5%	
minimum load		0.0			Amps
ripple and noise	20 MHz bandwidth			1.0% Vout	mVpp

PROTECTION

parameter	conditions/description	min	nom	max	units
over-current	continuous auto recovery [3]	105%		135%	
over-voltage	internally zener clamped [3]	110%		140%	

NOTE: 3 continuous operation in a protected state may compromise long-term reliability.

GENERAL

parameter	conditions/description	min	nom	max	units
efficiency	typical at full load	80%		89%	
dielectric withstand	input/case, input/output, output/case	500			VAC
insulation resistance	at 500 VDC	100M			Ohms
agency standards	approved to UL1950, EN60950, CISPR22, CE				
case material			STS		
material flammability			94 V-0		
weight			65		grams
			(2.29)		(ounces)
MTBF	MIL-HDBK-217F		470k		hours
operating temperature	regular models	-20		+71	°C
	extended temperature models	-40		+85	°C
storage temperature		-40		+105	°C
humidity	operating (non-condensing)	20%		90%	RH
washability	not intended for aqueous wash				

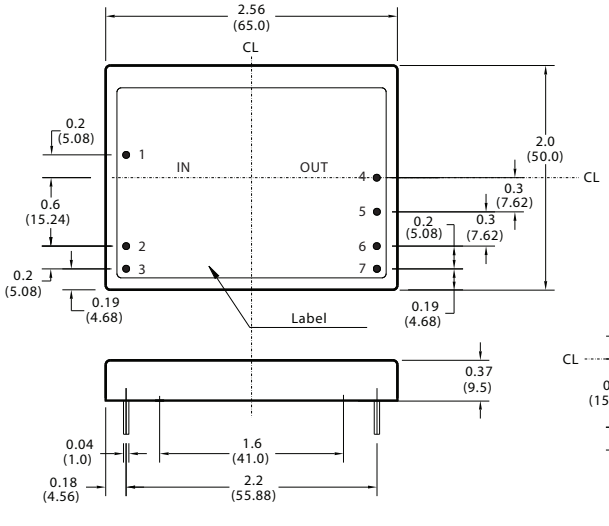
PART NUMBER: PK25 **DESCRIPTION:** dc-dc converter

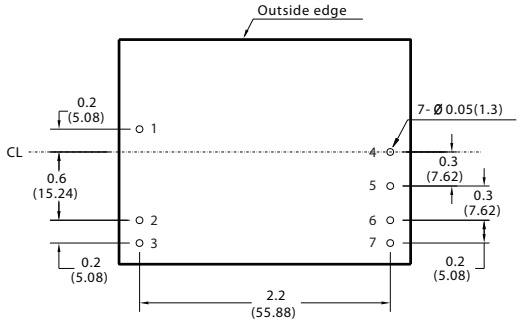
DIMENSIONS (mm)

All dimensions are in inches (mm).

Pin Assignments

Single Output	Dual Output
1. +Vin	1. +Vin
2. -Vin	2. -Vin
3. CNT	3. CNT
4. +Vout	4. +Vout
5. No pin	5. Com
6. Gnd	6. -Vout
7. Trim	7. Trim





TOP VIEW

PART NUMBER: PK25 **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.

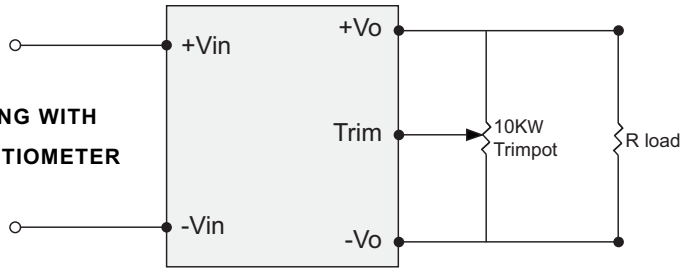
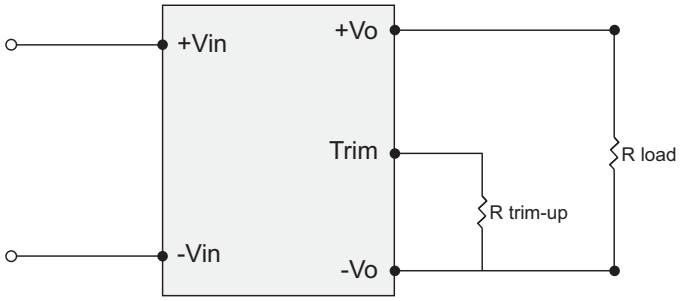


FIGURE 1. TRIMMING WITH EXTERNAL POTENTIOMETER

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



Trim-Up

FIGURE 2: TRIM-UP VOLTAGE SETUP

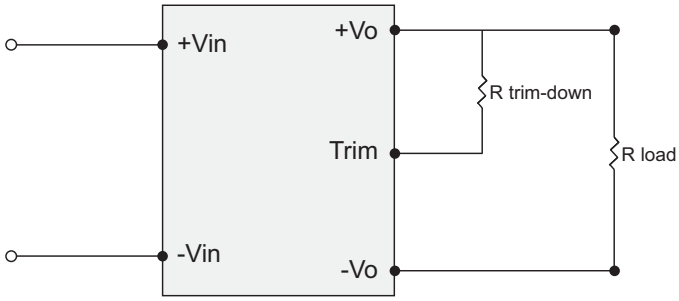
$$R_{trim\_up} = \frac{V_r \cdot R_1 \cdot R_2}{R_2 \cdot (V_o - V_r) - V_r \cdot R_1}$$

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

Where: $R_{trim\text{-}up}$ 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 PK25-D5-D12 up by 5% to 25.2 V, $R_{trim\text{-}up}$ 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 $R_{trim\text{-}down}$ is defined as:

Where: $R_{trim\text{-}down}$ 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 PK25-D5-D12 down by 5% to 22.8 V, $R_{trim\text{-}down}$ is calculated as follows:

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

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

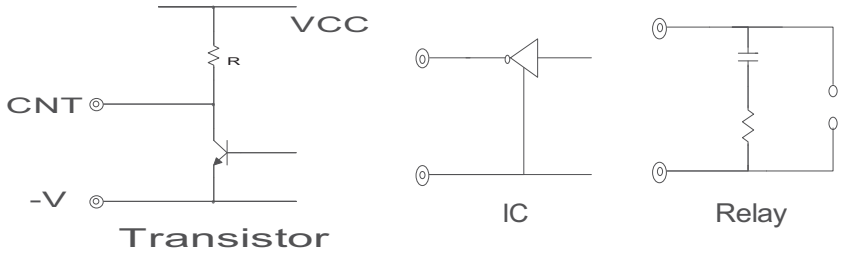
Table 1

Model	R1 (KΩ)	R2 (KΩ)	Vr (V)
PK25-DXX-S3.3	4.12	2.49	1.25
PK25-DXX-S5	2.43	2.43	2.5
PK25-DXX-S12	9.31	2.43	2.5
PK25-DXX-S15	12.7	2.49	2.5
PK25-DXX-D5	7.5	2.49	2.5
PK25-DXX-D12	21	2.43	2.5
PK25-DXX-D15	26.7	2.43	2.5
*PK25-D5-S3.3	0.787	2.43	2.5

2. ON/OFF CONTROL (CNT)

The ground terminal of remote ON/OFF circuit is connected with -V input terminal. Between CNT and -V input: output voltage is ON at "low" level or short circuit (0~1.2 V). Between CNT and -V input: output voltage is OFF at "high" level or open circuit (2.4~5.5 V).

FIGURE 4. CONNECTION EXAMPLE



When CNT terminal is "low" level, fan out current is 1 mA typical. When Vcc is applied, use 5 V ≤ Vcc ≤ 24 V. When remote ON/OFF function is not used, please short between CNT and -V input.

CNT level for INPUT -V	OUTPUT
L(Less than 1.2V) OR Short	ON
HL(More than 2.4V) OR Open	OFF