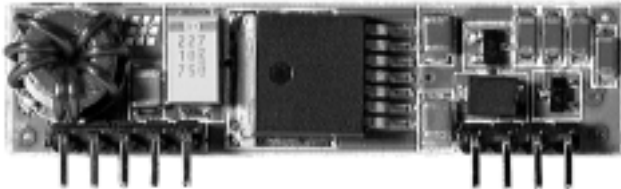


# 6-PAK

SERIES PROGRAMMABLE DC/DC CONVERTER

POWER: 6 Amp Parallelable  
Boost Modules SIZE: 2.00" x  
0.60" x .27"



## FEATURES

- **Small SIP Design**
- **Parallelable Boost SIP**  
One stocking part meets a variety of loads
- **Programmable Control SIP**  
Control/Boost Pair extremely configurable
- **Fast Transient Response**  
No need for large external capacitors  
Extremely small footprint
- **Low Component Count**  
Low cost, high reliability
- **Staked Pins**  
Wave solderable
- **Integrated Input Filter**  
Low input ripple

## APPLICATION NOTE

- **DCAN-34 - 6-PAK Demo Board**  
Downloadable from our website -  
[cdpowerelectronics.com](http://cdpowerelectronics.com)

**Discontinued**

## PRODUCT DATA SHEET

### DESCRIPTION

The 6-PAK™ is a modular system of control and boost SIPs. Each 6A control SIP can also drive up to 8 additional 6A boost SIPs in parallel, for a total of 54A. Each SIP accepts a regulated 5V input ( $\pm 10\%$ ) and provides 2.5V to 3.6Vdc output. The circuit is optimized for high efficiency and fast load transient response needed by telecom, DSP and microprocessor applications.

Advanced thermal design, monolithic power circuitry and synchronous rectification result in outstanding performance and value. With integrated input filter and output capacitors, the 6-PAK system makes a complete power supply which requires no external components over the specified operating range. Pins are staked for wave solderability.

### Ordering Information

Typical examples:

6P	25	-	CA	6A Control SIP
6P	25	-	P	6A Power Booster SIP

## Electrical Specifications

Unless otherwise specified, operating conditions are as follows:  $V_o = 3.3V$ ,  $T_A = 25^\circ C$ ,  $C_{in} = 100\mu F$

Parameter	Conditions	Min	Typ	Max	Units
<b>Input</b>					
Input Voltage $V_{in}$		4.5	5.0	5.5	$V_{DC}$
Input Current Ripple	$V_{in} = 4.5V$ to $5.5V$ , $I_o = 6A$			400	$mA_{RMS}$
Required Capacitance $C_{in}$	<i>Note 1</i>	0	100		$\mu F$
<b>Output</b>					
Output Voltage $V_o$	Nominal	3.25	3.3	3.35	$V_{DC}$
Output Program Range	<i>Note 2</i>	2.5		3.6	$V_{DC}$
Output Current $I_o$	$T_A = 60^\circ C$	0		6	Amps
Output Ripple	20Mhz BW		50	75	mVp-p
Output Rise Time $T_r$	$V_{in} = 5V$ , $I_o = 6A$ Resistive, $C_o = 0$		430	500	$\mu S$
Output Start-Up Time $T_r$	$V_{in} = 5V$ , $I_o = 6A$ Resistive, $C_o = 5000\mu F$		3.0	4.0	mS
Output Capacitance Range $C_o$		0		5000	$\mu F$
Line Regulation	$I_o = 6A$		$\pm 0.2$	$\pm 0.5$	%
Load Regulation	$I_o$ min - $I_o$ max, $V_{in} = 4.5-5.5V$		$\pm 0.8$	$\pm 1.2$	%
Temperature Coefficient $T_A = -40^\circ C$ to $+60^\circ C$	$V_{in} = 5V$ , $I_o = 6A$			$\pm 0.01$	$\%/^\circ C$
Combined Variation	$V_{in}$ min-max &/or $I_o$ min-max $T_A = -40^\circ C$ to $+60^\circ C$			$\pm 2$	%
<b>Protection</b>					
<i>Note 3</i>					
<b>General</b>					
Switching Frequency			800		kHz
<b>Dynamic Response</b>					
$\Delta I_o / \Delta t = 1A / 10\mu sec$ , $V_i = 5.0V$ , $T_A = 25^\circ C$					
Load Change from $I_o = 0\%$ to $I_o = 100\%$					
Peak Deviation			20	30	mV
Settling time ( $V_o < 10\%$ Peak Deviation)			130	200	$\mu sec$
Load change from $I_o = 100\%$ to $I_o = 0\%$					
Peak Deviation			20	35	mV
Settling time ( $V_o < 10\%$ Peak Deviation)			200	300	$\mu sec$
<b>Temperature</b>					
Operating Temperature		-40		+60	$^\circ C$
Storage Temperature		-40		+125	$^\circ C$

### Notes

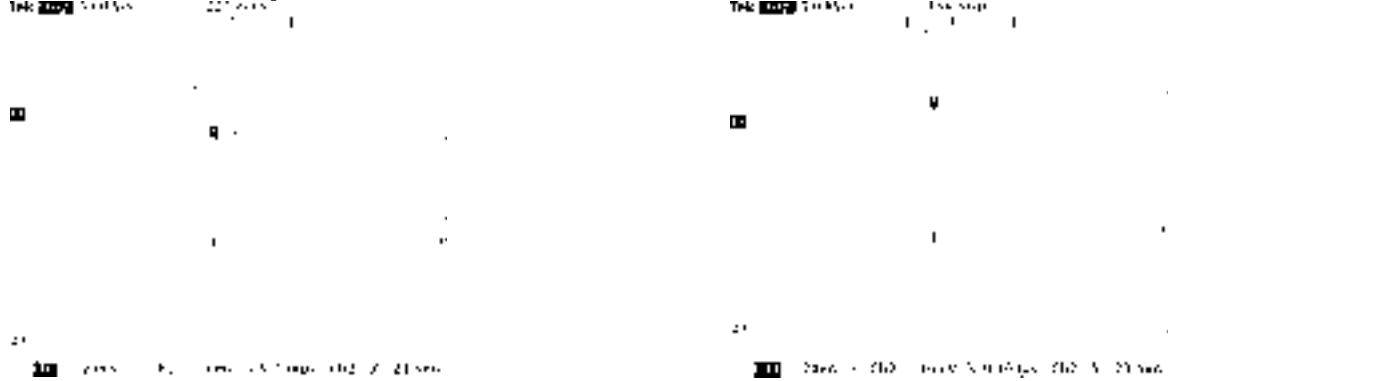
1. Input source <3" from 6-PAK™, load transient <3A per SIP. 100 $\mu F$  low ESR capacitor for load transients >3A per SIP.
2. Optional programming 2.5V - 3.6V. See Table.
3. The unit is protected against short circuit on the output for durations not exceeding 10 seconds and a repetition rate of less than 5%.

## Programming

The 6-PAK™ is programmed through the Control SIP. All connected Power Boosters follow the Control SIP programming. To program the 6-PAK™ for  $V_{out} < 3.3$ , connect a resistor across the TRIM and  $V_o$  pins. For  $V_{out} > 3.3$ , resistor is connected across TRIM and GND.

$V_{out}$	Resistor Value	$V_{out}$	Resistor Value
2.5	196Ω	3.1	1.37k
2.6	255Ω	3.2	2.80k
2.7	332Ω	3.3	Open
2.8	442Ω	3.4	2.32k
2.9	604Ω	3.5	1.00k
3.0	866Ω	3.6	649Ω

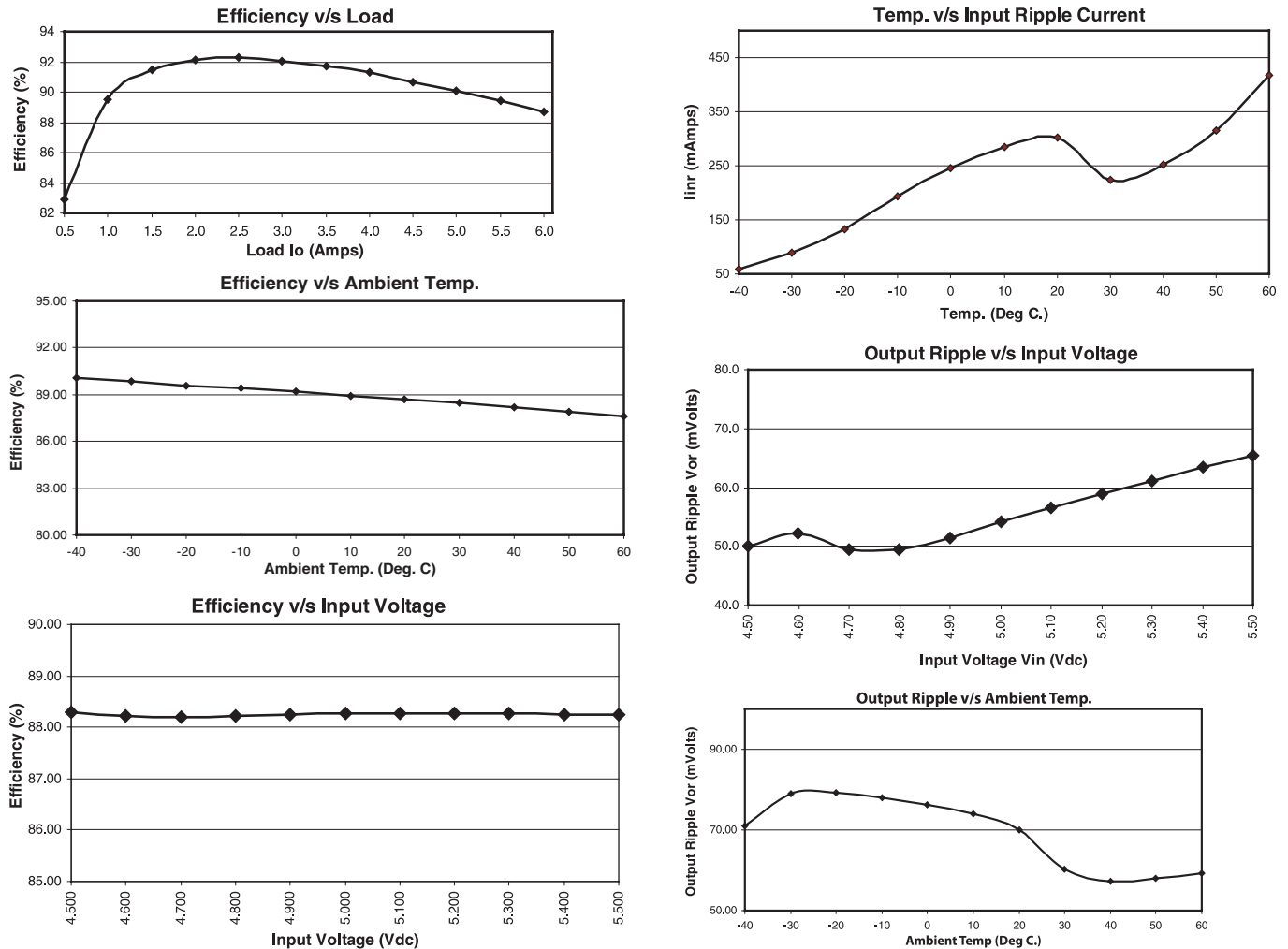
## Transient Response



Operating conditions are as follows:  $V_{in}=5V$ ,  $V_o=3.3V$ , Load change from  $I_o=0\%$  to  $I_o=100\%$ ,  $T_A=25^\circ C$ ,  $C_{in}=100\mu F$ ,  $C_o=0$ .

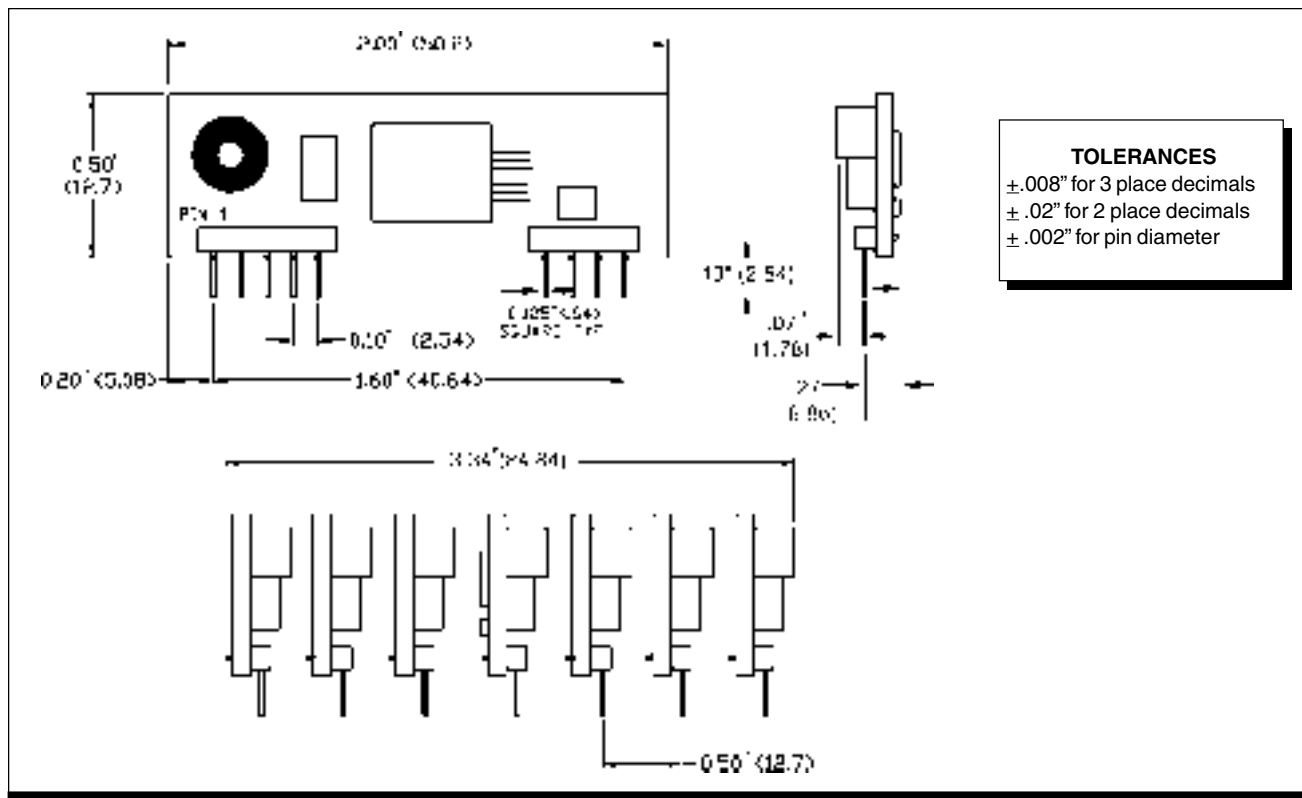
Operating conditions are as follows:  $V_{in}=5V$ ,  $V_o=3.3V$ , Load change from  $I_o=100\%$  to  $I_o=0\%$ ,  $T_A=25^\circ C$ ,  $C_{in}=100\mu F$ ,  $C_o=0$ .

## Typical Performance Curves (Unless otherwise specified, operating conditions are as follows: $V_{in} = 5.0V$ , $V_o = 3.3V$ , $I_o = 6A$ , $T_A = +25^\circ C$ , $C_{in} = 100\mu F$ , $C_{out} = 0$ .)



NOTE: The ambient temperature is as measured at approx. 1/4" away on the back side of the unit, with the probe end at approx. center (vertical & horizontal). For thermal performance, the unit was mounted on a 4"x4" PCB (with ground plane) & enclosed in a box so that it operates in a controlled environment.

## Mechanical Outline



### Pin Out

Pin	Function	Description
1	V <sub>o</sub>	Output Voltage
2	V <sub>o</sub>	Output Voltage
3	TRIM	Output Adjust*
4	GND	Ground
5	INT1	InterModule 1
6	Gnd	Ground
7	INT2	InterModule 2
8	V <sub>i</sub>	5V Input Voltage
9	V <sub>i</sub>	5V Input Voltage

\* not connected on Boosters

### System Interconnection Guidelines

1. Each SIP must have input, ground and output pins sunk into common input ground and output planes in the host PC board.
2. Two additional common signal traces are required to interconnect INT1 and INT2 pins. These traces must be a least 0.06" wide and make a straight connection among the modules.
3. Power Booster SIP must be adjacent to the Control SIP located in the center of the layout, as shown in the Typical Example figure. Recommended distance between SIP pin centers is 0.5".
4. A 300 LFM air flow is required in direction from Pin 9 to Pin 1, to draw rated power from booster configuration. Each application using boosters should be evaluated for thermal performance.

Standard Options are shown, consult factory for other available options.