6-PAK

C&D TECHNOLOGIES
Power Solutions
POWER ELECTRONICS DIVISION

SERIES PROGRAMMABLE DC/DC CONVERTER

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

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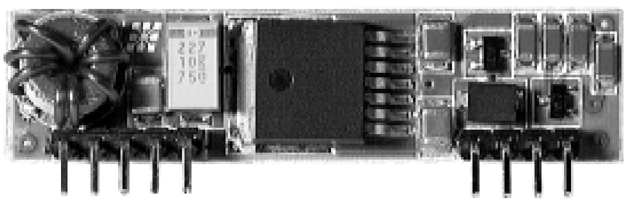
PRODUCT DATA SHEET



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 (±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.

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

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°C, C_{in} = 100µF

Parameter		Conditions	Min	Typ	Max	Units
Input						
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}	*Note 1*	0	100		µF
Output						
Output Voltage	V_o	Nominal	3.25	3.3	3.35	V_{DC}
Output Program Range		*Note 2*	2.5		3.6	V_{DC}
Output Current	I_o	T_A = 60°C	0		6	Amps
Output Ripple		20Mhz BW		50	75	mVp-p
Output Rise Time	Tr	V_{in} = 5V, I_o = 6A Resistive, C_o = 0		430	500	µS
Output Start-Up Time	Tr	V_{in} = 5v, I_o = 6A Resistive, C_O = 5000µF		3.0	4.0	mS
Output Capacitance Range	C_o		0		5000	µF
Line Regulation		I_o = 6A		±0.2	±0.5	%
Load Regulation		I_o min - I_o max, V_{in} = 4.5-5.5V		±0.8	±1.2	%
Temperature Coefficient	T_A = -40°C to +60°C	V_{in} = 5V, I_O = 6A			±0.01	%/°C
Combined Variation		V_{in} min-max &/or I_o min-max T_A= -40°C to +60°C			±2	%
Protection		*Note 3*				
General						
Switching Frequency				800		kHz
Dynamic Response						
$\Delta I_O/\Delta t$ = 1A/10µsec, V_i = 5.0V, T_A = 25°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	µsec
Load change from I_O = 100% to I_O = 0% Peak Deviation				20	35	mV
Settling time (V_O<10% Peak Deviation)				200	300	µsec
Temperature						
Operating Temperature			-40		+60	°C
Storage Temperature			-40		+125	°C

Notes

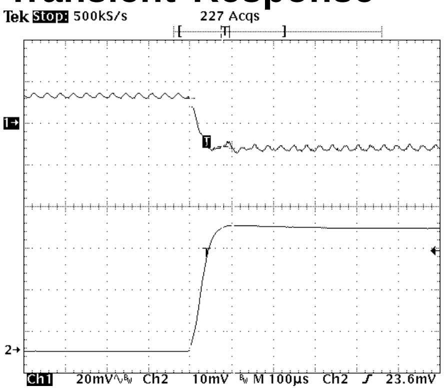
1. Input source<3" from 6-PAK™, load transient <3A per SIP. 100µF low ESR capacitor for load transients >3A per SIP.
2. Optional programming 2.5V - 3.6V. See Table.
3. The unit is protected against short circuit on the output for durations not exceeding 10 seconds and a repetition rate of less than 5%.

Programming

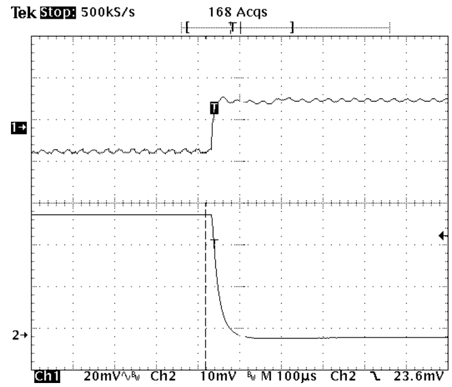
The 6-PAK™ is programmed through the Control SIP. All connected Power Boosters follow the Control SIP programming. To program the 6-PAK™ for V_{out}<3.3, connect a resistor across the TRIM and V_o pins. For V_{out}>3.3, resistor is connected across TRIM and GND.

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



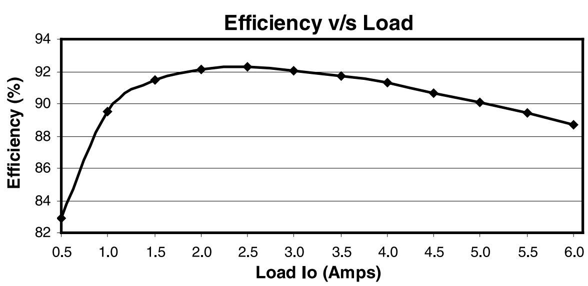
Operating conditions are as follows: V_{in}=5V, V_o=3.3V, Load change from I_o=0% to I_o=100%, T_A=25°C, C_{in}=100µF, C_o=0.

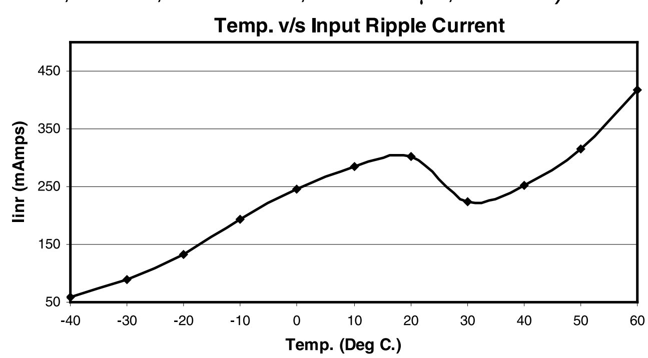


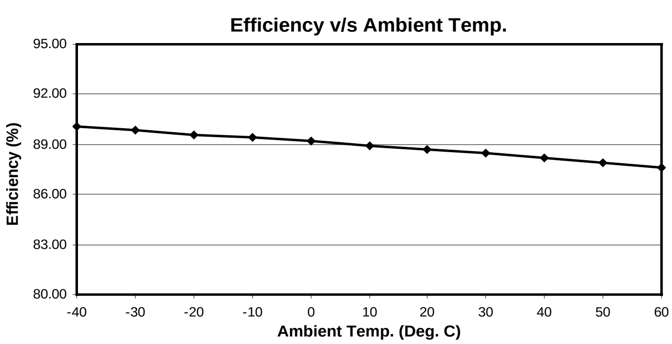
Operating conditions are as follows: Vin=5V, Vo=3.3V, Load change from Io=100% to Io=0%, TA=25°C, Cin=100µF, Co=0.

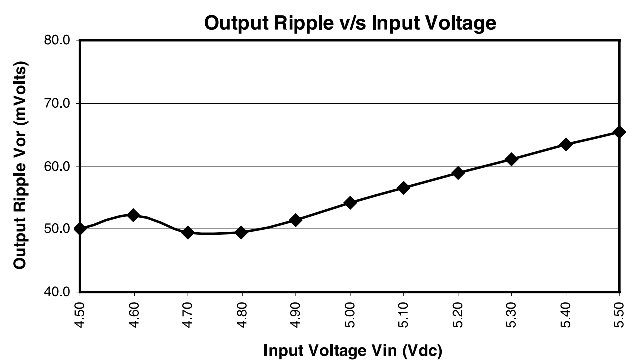
Typical Performance Curves

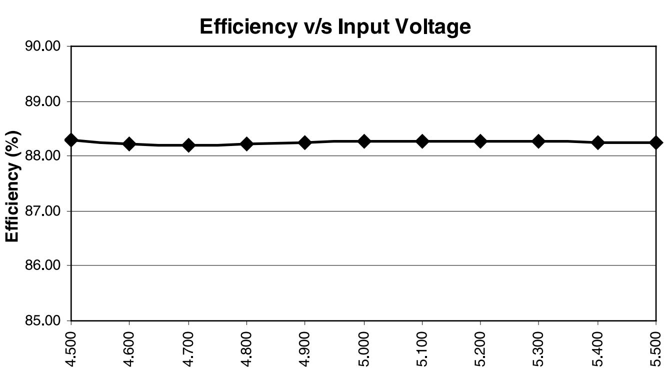
(Unless otherwise specified, operating conditions are as follows: V_{in} = 5.0V, V_o = 3.3V, I_o = 6A, T_A = +25°C, C_{in} = 100µF, C_{out} = 0.)

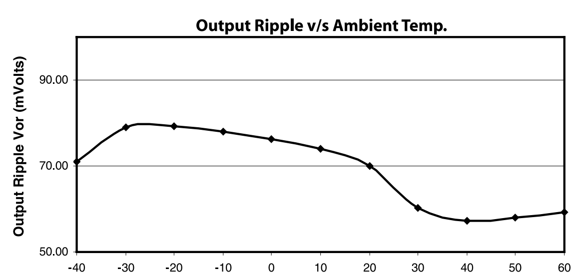






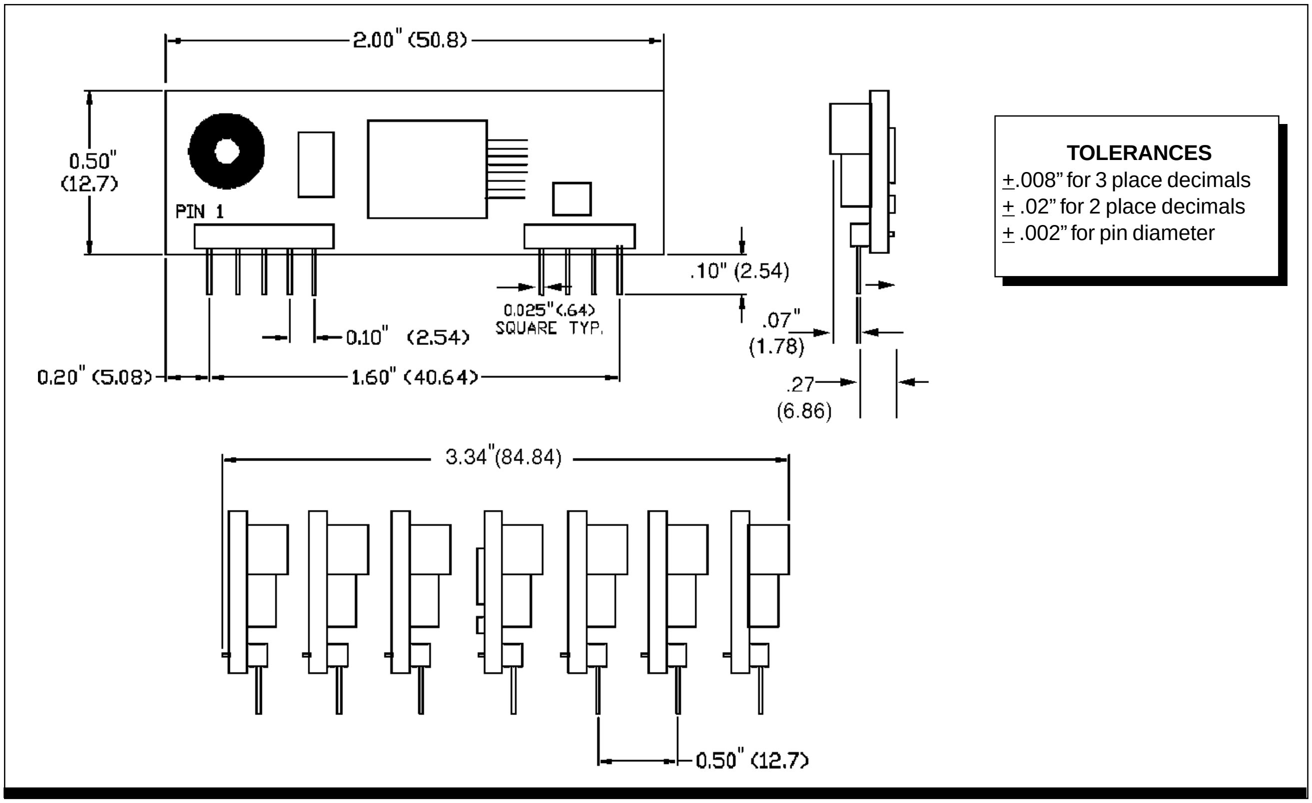






NOTE: The ambient temperature is as measured at approx. 1/4" away on the back side of the unit, with the probe end at approx. center (vertical & horizontal). For thermal performance, the unit was mounted on a 4"x4" PCB (with ground plane) & enclosed in a box so that it operates in a controlled environment.

Mechanical Outline



Pin Out

Pin	Function	Description
1	V_o	Output Voltage
2	V_o	Output Voltage
3	TRIM	Output Adjust*
4	GND	Ground
5	INTI	InterModule 1
6	Gnd	Ground
7	INT2	InterModule 2
8	V_i	5V Input Voltage
9	V_i	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.

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