

# PD01

## FEATURES

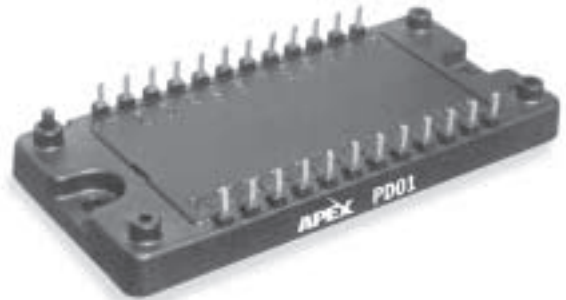
- WIDE SUPPLY RANGE—200V
- UP TO 100A PULSE SOURCE
- THERMAL SHUTDOWN
- SOA SENTRY™

## APPLICATIONS

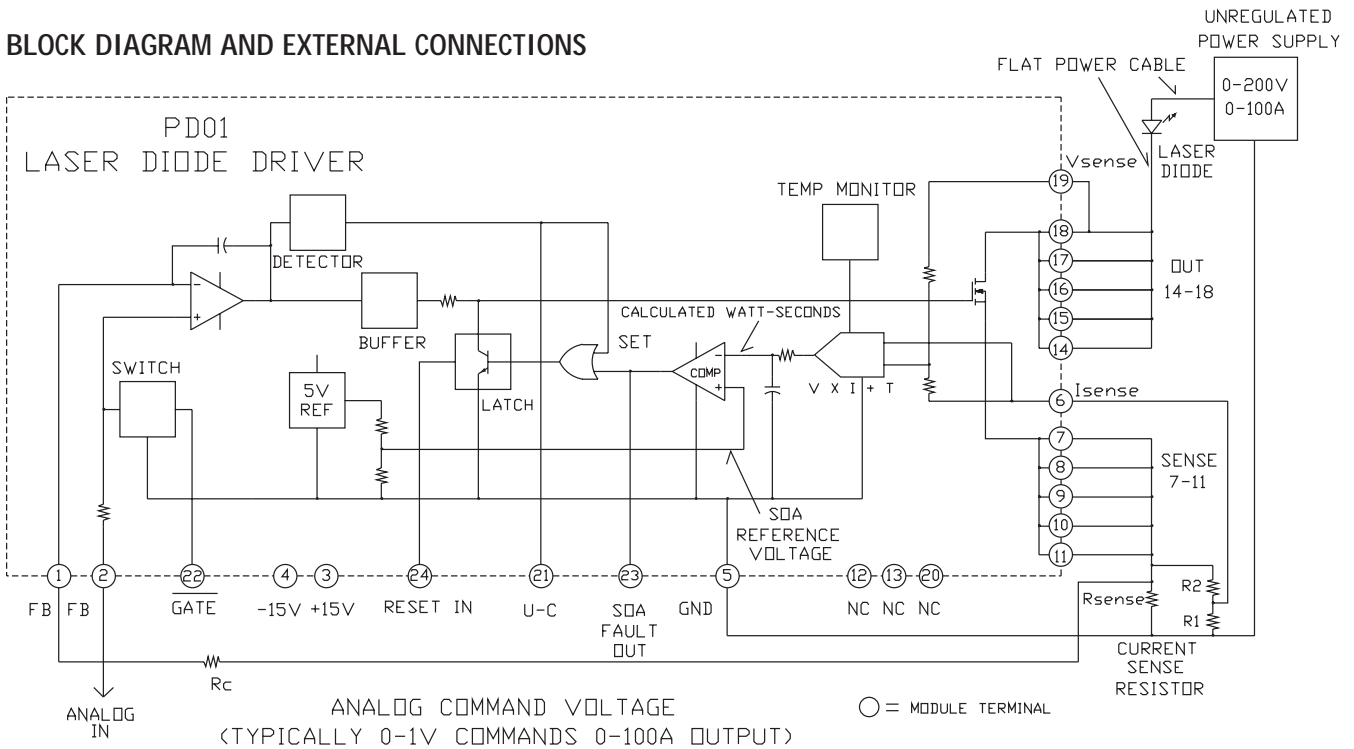
- HIGH POWER LASER DIODE DRIVER

## DESCRIPTION

The PD01 is a precision pulse current source which can sink currents up to 100 amps and work off supply voltages up to 200V. The output current can be controlled by an analog input voltage or analog input and gate signal combination. By gating the analog input voltage it is possible to simultaneously amplitude modulate and pulse width modulate the output current. The PD01 has extensive circuitry that protects not only itself but the load as well. The temperature and instantaneous power dissipation of the output transistors is monitored. Excessive temperature or power dissipation will trip the SOA Sentry™ alarm which shuts down the amplifier. If the output current does not reach the programmed level in 10μS the output is also shutdown and the U-C (under-current) output alarm is activated. Although used primarily as a pulse current source the PD01 can also be operated in a DC mode within its power dissipation limits.



## BLOCK DIAGRAM AND EXTERNAL CONNECTIONS



# PD01

## ABSOLUTE MAXIMUM RATINGS SPECIFICATIONS

### ABSOLUTE MAXIMUM RATINGS

SUPPLY VOLTAGE, +V <sub>s</sub>	200V
POWER DISSIPATION, internal	500W
TEMPERATURE, pin solder - 10s	300°C
TEMPERATURE, junction <sup>2</sup>	150°C
TEMPERATURE, storage	-25°C to +100°C
OPERATING TEMPERATURE RANGE, case	-25°C to +85°C

### SPECIFICATIONS

PARAMETER	TEST CONDITIONS <sup>1</sup>	MIN	TYP	MAX	UNITS
<b>ANALOG INPUT</b>					
INPUT PIN 2		0		2	V
<b>LOGIC IN/OUT</b>					
GATE, RESET, U-C SOA FAULT OUT	5V Logic Levels		5		V
<b>POWER OUTPUT</b>					
CURRENT, peak <sup>2</sup>		100			A
DUTY CYCLE, WITHIN SOA				100	%
PULSE WIDTH		10		DC	µsec
RISE/FALL TIME				5	µsec
ACCURACY, I <sub>o</sub> =100A	1V full scale	1			%
OUTPUT VOLTAGE	I <sub>o</sub> = 100A			3	V
<b>POWER SUPPLY</b>					
VOLTAGE, V <sub>s</sub>	Full temperature range			200	V
VOLTAGE, V <sub>CC</sub>			± 15	±15.5	V
<b>PROTECTION</b>					
SOA VIOLATION SHUTDOWN SOA FAULT FLAG	5V Logic Levels		5	10	µsec V
<b>THERMAL</b>					
RESISTANCE, junction to case	Full temperature range			.25	°C/W
RESISTANCE, junction to air	Full temperature range		8		°C/W
TEMPERATURE RANGE, case	Meets full range specifications	-25		+85	°C

- NOTES: 1. Unless otherwise noted: T<sub>C</sub> = 25°C, V<sub>s</sub>, V<sub>CC</sub> at typical specification.  
2. Guaranteed but not tested.

### CAUTION

The PD01 is constructed from MOSFET transistors. ESD handling procedures must be observed.

**PROTECTION CIRCUITS AND START-UP CONDITIONS**

When the commanded output current is not reached within about 10µS the PD01 output is latched off and the U-C (under-current) pin 21 is set high. This will likely occur at power-up. It is therefore recommended that a power-up reset be implemented using the RESET pin (24). In addition it is recommended that the analog input (pin 2) be set to zero at power-up and that GATE pin 22 is required to be set high on power-up.

The PD01 monitors the temperature of the output transistors as well as the output voltage and current and continually calculates the power dissipation in the output transistors. When the SOA of the output transistors is exceeded the output is latched off and the SOA FAULT pin 23 is set high.

**MODULATING THE OUTPUT**

The output current can be set and modulated in two ways or a combination of the two ways:

1. When the GATE pin 22 is set high an analog input pulse can drive the output to the desired value (see Scaling below).
2. With a DC voltage on the analog input pin 2 set to the desired value the GATE pin 22 can be toggled to produce an output current pulse similar to the gate pulse.
3. Both the ANALOG INPUT voltage and GATE pins can be varied simultaneously to modulate the output in amplitude and time.

**SCALING**

Refer to the block diagram of the PD01 for this discussion. Any analog input voltage up to 2V can be used to represent the full-scale output current of 100 amps. However, the protection circuits are scaled to consider 1V across the current sense resistor as 100 amps. The accuracy of the PD01 is also referenced to 1V full scale. In the case where 100 amps is the required full scale current connect Isense pin 6 to pin 7. When the full scale current is less than 100 amps scale the current sense resistor to produce 1V at the desired full scale current and divide down that voltage with R1 and R2 so that the correct voltage is supplied to I<sub>SENSE</sub> pin 6 to represent the actual current as a portion of the 100 amps full scale capability.

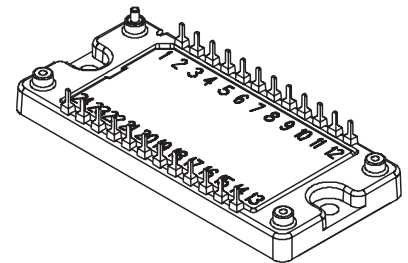
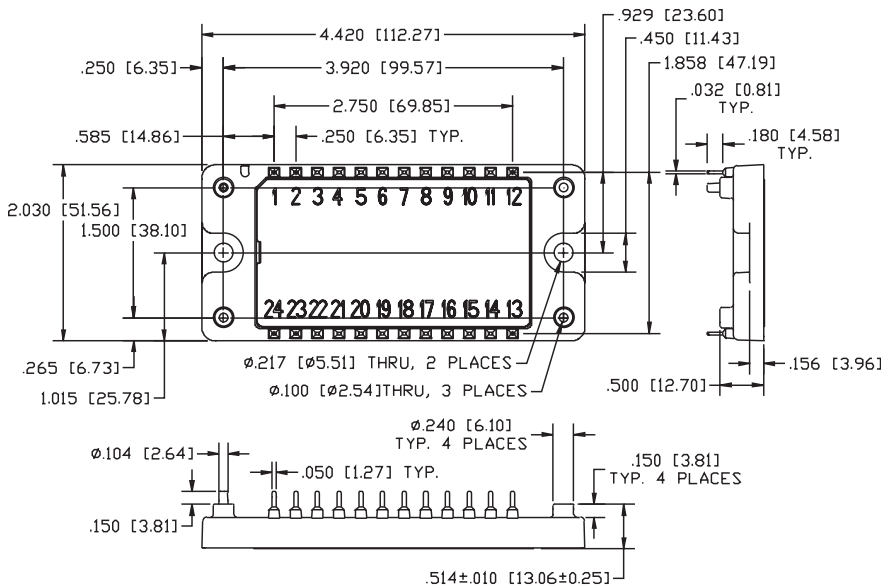
**STABILITY**

Refer to the block diagram for this discussion. Circuit stability can be achieved by varying R<sub>c</sub> in the block diagram. This will affect current rise time and overshoot. Experimentation is the best way to determine the value needed in the application circuit. The suggested starting value is 1k ohms.

**POWER SUPPLIES**

The small signal portion of the PD01 is power by ±15V. The supplies should be regulated and bypassed at the supply pins. An unregulated power supply must be used to power the laser diode otherwise a conflict develops between that regulated supply and the PD01 which can also be considered as a regulated supply.

**DIP9 PACKAGE**



WEIGHT: 69 g or 2.4 oz  
DIMENSIONS ARE IN INCHES  
ALTERNATE UNITS ARE [MM]