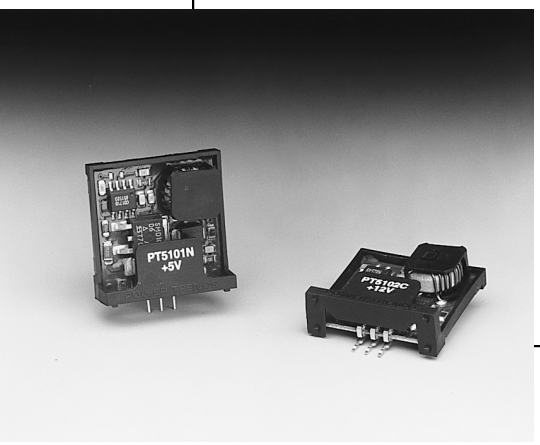
# PT5120 Series

## 1 AMP LOW VOLTAGE INPUT INTEGRATED SWITCHING REGULATOR

**SLTS080**
***(Revised 6/4/98)***

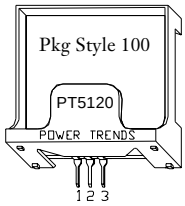



- Low Voltage Input (7V)
- 85% Efficiency
- Internal Short-Circuit Protection
- Over-Temperature Protection
- Laser-Trimmed Output Voltage

The PT5120 series is a low voltage input (typically 7V) version of Power Trends' easy-to-use, 1A positive step-down, 3-terminal Integrated Switching Regulators (ISRs). These ISRs are designed with premium low-threshold FETs for those power regulation applications requiring very low input/output voltage differentials such as battery powered equipment.

### Pin-Out Information

| Pin | Function |
|---|---|
| 1 | $V_{in}$ |
| 2 | GND |
| 3 | $V_{out}$ |



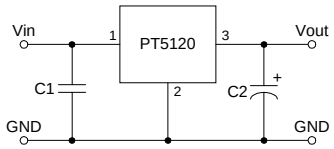

### Ordering Information

**PT5121☐** = + 5 Volts
**PT5123☐** = + 3.3 Volts

### PT Series Suffix (PT1234X)

| Case/Pin Configuration | |
|---|---|
| Vertical Through-Hole | N |
| Horizontal Through-Hole | A |
| Horizontal Surface Mount | C |

### Standard Application




$C_1$ = Optional 1µF ceramic
$C_2$ = Required 100µF electrolytic

### Specifications

| Characteristics ($T_a$=25°C unless noted) | Symbols | Conditions | PT5120 SERIES Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Output Current | $I_o$ | Over $V_{in}$ range | 0.1* | — | 1.0 | A |
| Short Circuit Current | $I_{sc}$ | $V_{in}$ = $V_{in}$ min | — | 3.5 | — | Apk |
| Input Voltage Range | $V_{in}$ | 0.1 ≤ $I_o$ ≤ 1.0 A $V_o$ = 3.3V<br>$V_o$ = 5V | 7<br>7 | — | 26<br>38 | V<br>V |
| Output Voltage Tolerance | $\Delta V_o$ | Over $V_{in}$ Range, $I_o$ = 1.0 A<br>$T_a$ = 0°C to +60°C | — | ±1.5 | ±3.0 | %$V_o$ |
| Line Regulation | $Reg_{line}$ | Over $V_{in}$ range | — | ±0.5 | ±1.0 | %$V_o$ |
| Load Regulation | $Reg_{load}$ | 0.1 ≤ $I_o$ ≤ 1.0 A | — | ±0.5 | ±1.0 | %$V_o$ |
| $V_o$ Ripple/Noise | $V_n$ | $V_{in}$=$V_{in}$ min, $I_o$=1.0 A | — | ±2 | — | %$V_o$ |
| Transient Response<br>with $C_o$ = 100µF | $t_{tr}$<br>$V_{os}$ | 25% load change<br>$V_o$ over/undershoot | —<br>— | 100<br>5.0 | 200<br>— | µSec<br>%$V_o$ |
| Efficiency | η | $V_{in}$=9V, $I_o$=0.5A, $V_o$=3.3V<br>$V_{in}$=9V, $I_o$=0.5A, $V_o$=5V | —<br>— | 82<br>85 | —<br>— | %<br>% |
| Switching Frequency | $f_o$ | Over $V_{in}$ and $I_o$ ranges, $V_o$= 3.3V<br>$V_o$ = >5V | 575<br>500 | 725<br>650 | 875<br>800 | kHz |
| Absolute Maximum Operating Temperature Range | $T_a$ | | -20 | — | +85 | °C |
| Recommended Operating Temperature Range | $T_a$ | Free Air Convection, $V_o$= 3.3V<br>(40-60LFM) $V_o$= 5V | -20<br>-20 | —<br>— | +80**<br>+80** | °C |
| Thermal Resistance | $\theta_{ja}$ | Free Air Convection $V_o$ = 3.3V<br>(40-60LFM) $V_o$ = 5V | —<br>— | 45<br>50 | —<br>— | °C/W |
| Storage Temperature | $T_s$ | | -40 | — | +125 | °C |
| Mechanical Shock | | Per Mil-STD-883D, Method 2002.3<br>1 msec, Half Sine, mounted to a fixture | — | 500 | — | G's |
| Mechanical Vibration | | Per Mil-STD-883D, Method 2007.2<br>20-2000 Hz, Soldered in a PC board | — | 5 | — | G's |
| Weight | | | — | 4.5 | — | grams |

* ISR will operate down to no load with reduced specifications.
**See Thermal Derating chart.
***Note:*** *The PT5120 Series requires a 100µF electrolytic or tantalum output capacitor for proper operation in all applications.*



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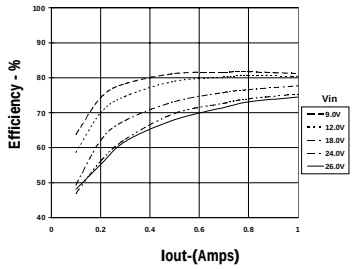
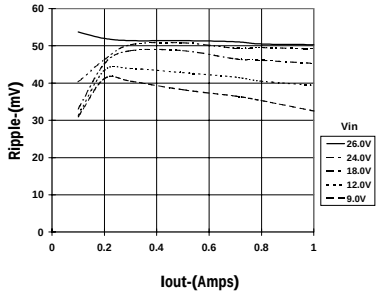
## PT5123, 3.3 VDC (See Note 1)

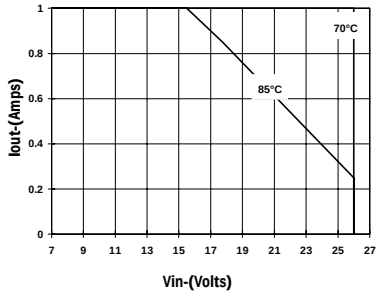
### Efficiency vs Output Current



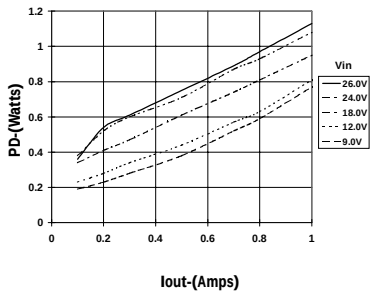

### Ripple vs Output Current




### Thermal Derating ($T_a$) (See Note 2)

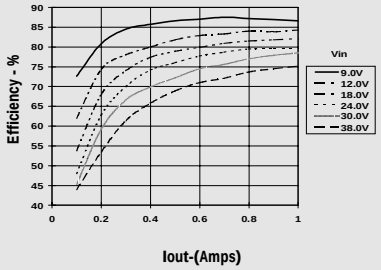



### Power Dissipation vs Output Current

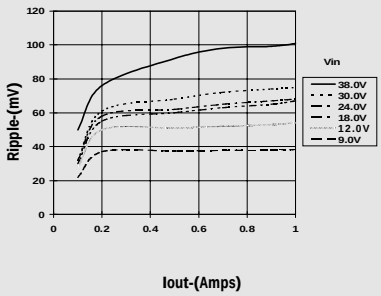



## PT5121, 5.0 VDC (See Note 1)

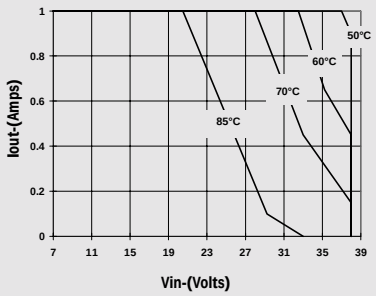
### Efficiency vs Output Current



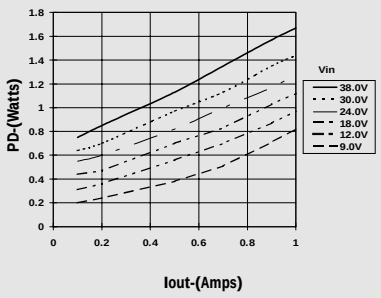

### Ripple vs Output Current




### Thermal Derating ($T_a$) (See Note 2)




### Power Dissipation vs Output Current




**Note 1:** *All data listed in the above graphs, except for derating data, has been developed from actual products tested at 25°C. This data is considered typical data for the ISR.*
**Note 2:** *Thermal derating graphs are developed in free air convection cooling of 40-60 LFM. (See Thermal Application Notes.)*

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