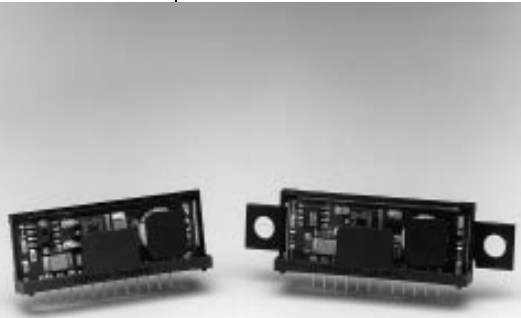
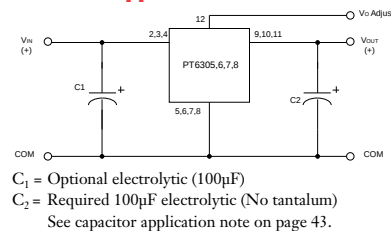


**PT6305 Series****3 AMP HIGH-PERFORMANCE  
ADJUSTABLE ISR**

- Single-Device 5V to 3V Power
- 85% Efficiency
- Small SIP Footprint:  
0.36" x 2.00" x 0.60"(H)
- Wide Input Voltage Range:  
+4.5V to +9.0V
- Internal Short Circuit Protection
- Over-Temperature Protection

The PT6305N is Power Trends' new high performance +5V to +3.3V, 3

Amp, 12-Pin SIP (Single In-line-Package) Integrated Switching Regulator (ISR). This high-performance ISR allows easy integration of low-power 3.3V logic IC's into existing 5V systems without redesigning the central power supply. Only one external capacitor is required for proper operation. The PT6306,7,8 can be used to power high-speed data buses (+2.1V), or the new GTL (+1.2V) logic buses.

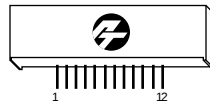
**Standard Application****Specifications**

| Characteristics<br>( $T_a=25^\circ\text{C}$ unless noted) | Symbols                                                                              | Conditions                                                                                    | PT6305 SERIES |          |          |                    |     |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------------|----------|----------|--------------------|-----|
|                                                           |                                                                                      |                                                                                               | Min           | Typ      | Max      | Units              |     |
| Output Current                                            | $I_o$                                                                                | $4.5 \leq V_{in} \leq V_{in\text{ MAX}}$                                                      | 0.3           | —        | 3.0**    | ADC                |     |
| Current Limit                                             | $I_{cl}$                                                                             | $V_{in} = +5\text{V}$                                                                         | —             | 3.6      | 5.0      | ADC                |     |
| Short Circuit Current                                     | $I_{sc}$                                                                             | $V_{in} = +5\text{V}$                                                                         | —             | 5.0      | —        | Apk                |     |
| Input Voltage Range                                       | $V_{in}$                                                                             | $0.3\text{A} \leq I_o \leq 3.0\text{A}$                                                       | PT6305N       | 4.5      | —        | 9                  | VDC |
|                                                           |                                                                                      |                                                                                               | PT6306N       | 4.5      | —        | 9                  | VDC |
|                                                           |                                                                                      |                                                                                               | PT6307N       | 4.5      | —        | 9                  | VDC |
|                                                           |                                                                                      |                                                                                               | PT6308N       | 4.5      | —        | 6.0                | VDC |
| Static Voltage Tolerance                                  | $V_o$                                                                                | $V_{in} = +5\text{V}, I_o = 3.0\text{A}$<br>$0^\circ\text{C} \leq T_a \leq +70^\circ\text{C}$ | PT6305N       | 3.2      | 3.3      | 3.4                | VDC |
|                                                           |                                                                                      |                                                                                               | PT6306N       | 1.7      | 1.8      | 1.9                | VDC |
|                                                           |                                                                                      |                                                                                               | PT6307N       | 2.0      | 2.1      | 2.2                | VDC |
|                                                           |                                                                                      |                                                                                               | PT6308N       | 1.1      | 1.2      | 1.3                | VDC |
| Line Regulation                                           | $\text{Reg}_{line}$                                                                  | $4.5\text{V} \leq V_{in} \leq 5.5\text{V}, I_o = 3.0\text{A}$                                 | —             | $\pm 25$ | $\pm 50$ | mV                 |     |
| Load Regulation                                           | $\text{Reg}_{load}$                                                                  | $V_{in} = +5\text{V}, 0.3 \leq I_o \leq 3.0\text{A}$                                          | —             | $\pm 25$ | $\pm 50$ | mV                 |     |
| $V_o$ Ripple/Noise pk-pk                                  | $V_n$                                                                                | $V_{in} = 5\text{V}, I_o = 3.0\text{A}$                                                       | —             | 66       | —        | mV                 |     |
| Transient Response<br>with $C_2 = 100\mu\text{F}$         | $t_{tr}$                                                                             | $I_o$ step between 1.5A and 3.0A                                                              | —             | 200      | —        | $\mu\text{Sec}$    |     |
|                                                           | $V_{os}$                                                                             | $V_o$ over/undershoot                                                                         | —             | 200      | —        | mV                 |     |
| Efficiency                                                | $\eta$                                                                               | $V_{in} = +5\text{V}, I_o = 1.5\text{A}$                                                      | PT6305N       | —        | 85       | —                  | %   |
|                                                           |                                                                                      |                                                                                               | PT6306N       | —        | 74       | —                  | %   |
|                                                           |                                                                                      |                                                                                               | PT6307N       | —        | 77       | —                  | %   |
|                                                           |                                                                                      |                                                                                               | PT6308N       | —        | 63       | —                  | %   |
|                                                           |                                                                                      | $V_{in} = +5\text{V}, I_o = 3.0\text{A}$                                                      | PT6305N       | —        | 80       | —                  | %   |
|                                                           |                                                                                      |                                                                                               | PT6306N       | —        | 68       | —                  | %   |
|                                                           |                                                                                      |                                                                                               | PT6307N       | —        | 72       | —                  | %   |
|                                                           |                                                                                      |                                                                                               | PT6308N       | —        | 57       | —                  | %   |
| Switching Frequency                                       | $f_o$                                                                                | $4.5 \leq V_{in} \leq V_{in\text{ MAX}}$<br>$0.3\text{A} \leq I_o \leq 3.0\text{A}$           | 500           | 650      | 800      | KHz                |     |
| Operating Temperature                                     | $T_a$                                                                                | Free Air Convection (40-60 LFM)<br>Over $V_{in}$ and $I_o$ Ranges                             | 0             | —        | +70*     | $^\circ\text{C}$   |     |
| Thermal Resistance                                        | $\theta_{ja}$                                                                        | Free Air Convection (40-60 LFM)                                                               | —             | 25       | —        | $^\circ\text{C/W}$ |     |
| Storage Temperature                                       | $T_s$                                                                                | —                                                                                             | -40           | —        | +125     | $^\circ\text{C}$   |     |
| Mechanical Shock                                          | Per Mil-STD-883D, Method 2002.3 Condition A, 1 msec, Half Sine, mounted to a fixture |                                                                                               | —             | —        | 500      | G's                |     |
| Mechanical Vibration                                      | Per Mil-STD-883D, Method 2007.2 Condition A, 20-2000 Hz                              |                                                                                               | —             | —        | 15       | G's                |     |
| Weight                                                    | —                                                                                    | —                                                                                             | —             | 11.2     | —        | grams              |     |
| Relative Humidity                                         | —                                                                                    | Non-condensing                                                                                | 0             | —        | 95       | %                  |     |

\*See Thermal Derating chart. \*\*The PT6305 Series can be easily paralleled to provide output current in multiples of 3 amps. Please contact a Power Trends' Application Engineer for the appropriate application note. **Note:** The PT6305 Series requires a 100 $\mu\text{F}$  electrolytic capacitor for proper operation in all applications.

**Pin-Out Information**

| Pin No. | Function | Pin No. | Function                 |
|---------|----------|---------|--------------------------|
| 1       | N/C      | 7       | GND                      |
| 2       | $V_{in}$ | 8       | GND                      |
| 3       | $V_{in}$ | 9       | $V_{out}$                |
| 4       | $V_{in}$ | 10      | $V_{out}$                |
| 5       | GND      | 11      | $V_{out}$                |
| 6       | GND      | 12      | Adjust<br>(See page 40.) |

**Ordering Information**

PT6305□ = +3.3 Volts

PT6306□ = +1.8 Volts

PT6307□ = +2.1 Volts

PT6308□ = +1.2 Volts

(For dimensions, see page 66.)

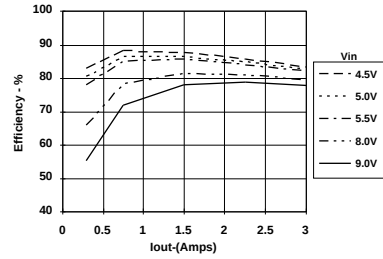
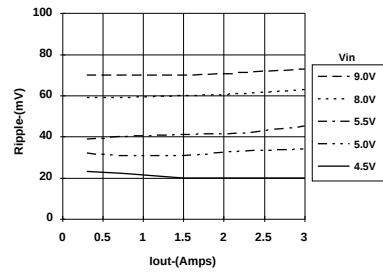
**PT Series Suffix (PT1234X)**

| Case/Pin Configuration   | Heat Tab Configuration |      |
|--------------------------|------------------------|------|
|                          | None                   | Side |
| Vertical Through-Hole    | N                      | R    |
| Horizontal Through-Hole  | A                      | G    |
| Horizontal Surface Mount | C                      | B    |

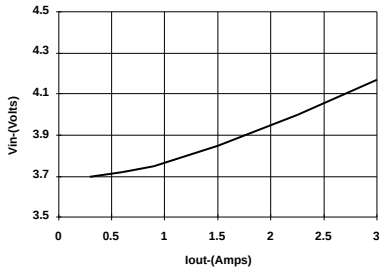
(See Thermal Application Notes on page 44 for heat tab application data.)

**C H A R A C T E R I S T I C   D A T A****PT6305, 3.3 VDC**

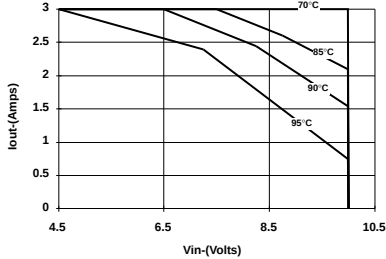
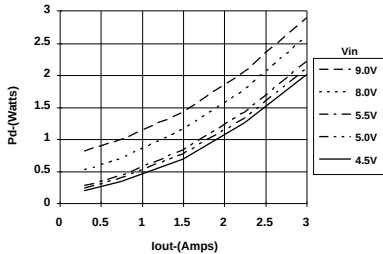
(See Note 1)

**Efficiency vs Output Current****Ripple vs Output Current****Minimum Input Voltage**

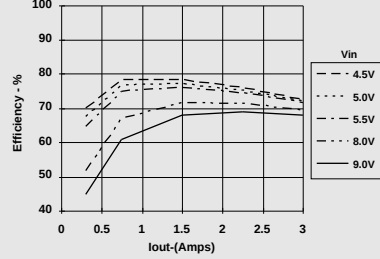
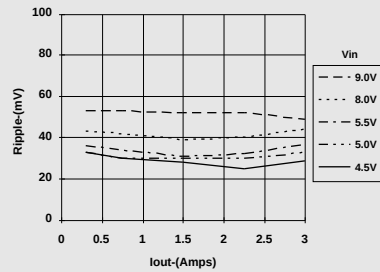
(See Note 2)

**Thermal Derating ( $T_a$ )**

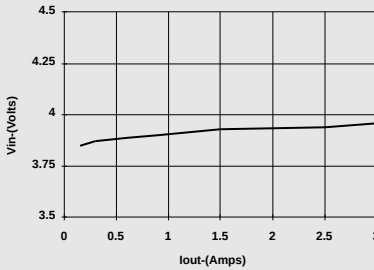
(See Note 3)

**Power Dissipation vs Output Current****PT6307, 2.1 VDC**

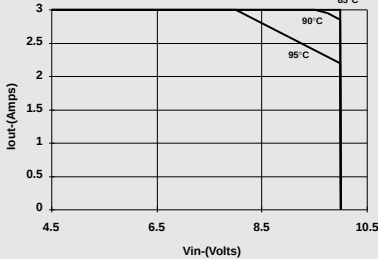
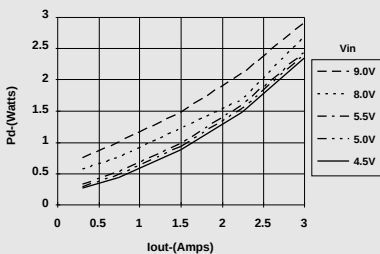
(See Note 1)

**Efficiency vs Output Current****Ripple vs Output Current****Minimum Input Voltage**

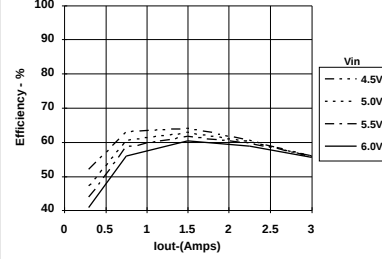
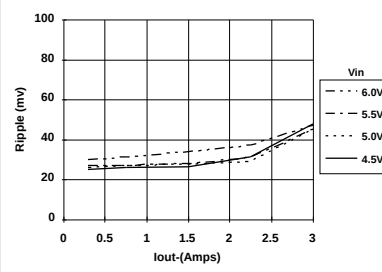
(See Note 2)

**Thermal Derating ( $T_a$ )**

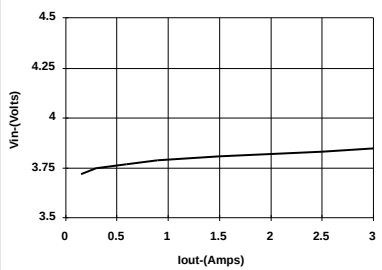
(See Note 3)

**Power Dissipation vs Output Current****PT6308, 1.2 VDC**

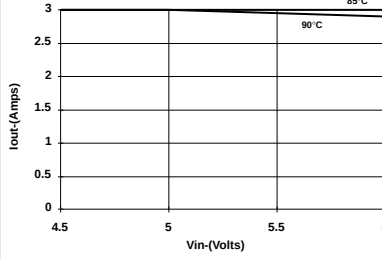
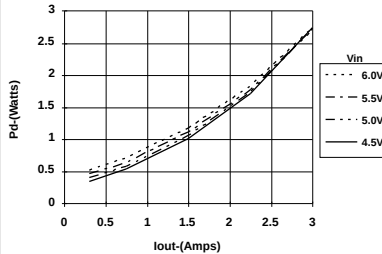
(See Note 1)

**Efficiency vs Output Current****Ripple vs Output Current****Minimum Input Voltage**

(See Note 2)

**Thermal Derating ( $T_a$ )**

(See Note 3)

**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:** Minimum  $V_{in}$  data is typical and is not guaranteed. The data corresponds to a 2% output voltage drop.**Note 3:** Thermal derating graphs are developed in free air convection cooling of 40-60 LFM with no optional heat tab soldered in a printed circuit board. (See Thermal Application Notes).

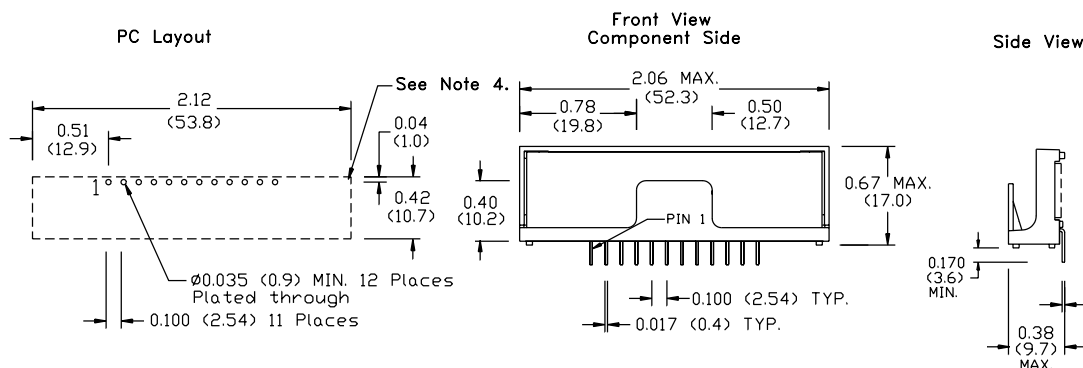
# Package Style 300

Suffix A, C, D, E, N, P

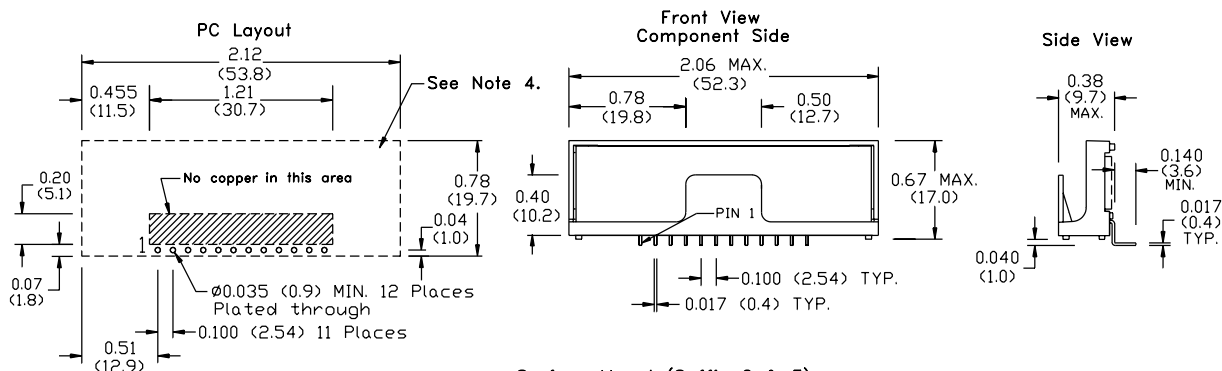
## PACKAGE INFORMATION AND DIMENSIONS

Revised 2/11/2000

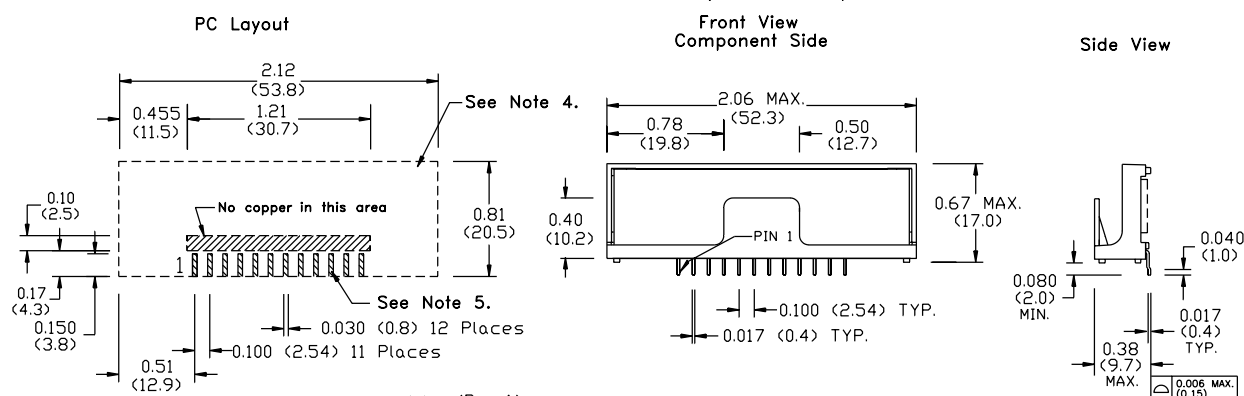
### Vertical Through-Hole Mount (Suffix N & P)



### Horizontal Through-Hole Mount (Suffix A & D)



### Surface Mount (Suffix C & E)



#### Notes: (Rev.A)

- 1: All dimensions are in inches (mm).
- 2: 2 place decimals are  $\pm 0.30$  ( $\pm 0.8$ mm).
- 3: 3 place decimals are  $\pm 0.10$  ( $\pm 0.3$ mm).
- 4: Recommended mechanical keep out area.
- 5: Power pin connections should utilize two or more vias per input, ground and output pin.