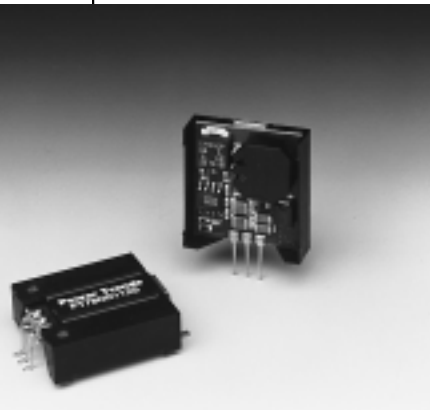


# PT78NR100 Series

**1 AMP PLUS TO MINUS VOLTAGE  
 INTEGRATED SWITCHING REGULATOR**

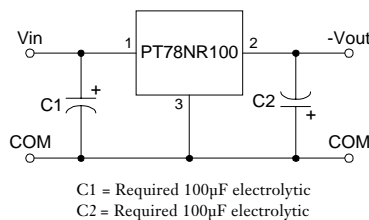
**Revised 5/15/98**



- Negative output from positive input
- Wide Input Range
- Self-Contained Inductor
- Short Circuit Protection
- Over-Temperature Protection
- Fast Transient Response

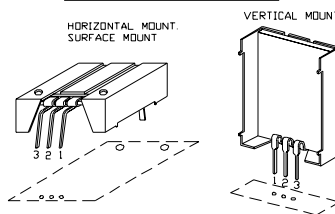
The PT78NR100 Series creates a negative output voltage from a positive input voltage greater than 7V. These easy-to-use, 3-terminal, Integrated Switching Regulators (ISRs) have maximum output power of 5 watts and a negative output voltage that is laser trimmed. They also have excellent line and load regulation.

### Standard Application



### Pin-Out Information

Pin	Function
1	+V <sub>in</sub>
2	-V <sub>out</sub>
3	GND



SUGGESTED BOARD LAYOUT  
 COMPONENT SIDE VIEW  
 Pkg Style 500

### Ordering Information

PT78NR1 **XX** **Y**

#### Output Voltage

- 03** = -3.0 Volts
- 05** = -5.0 Volts
- 52** = -5.2 Volts
- 07** = -7.0 Volts
- 08** = -8.0 Volts
- 09** = -9.0 Volts
- 12** = -12.0 Volts
- 15** = -15.0 Volts

#### Package Suffix

- V** = Vertical Mount
- S** = Surface Mount
- H** = Horizontal Mount

### Specifications

Characteristics (T <sub>a</sub> = 25°C unless noted)	Symbols	Conditions	PT78NR100 SERIES			Units
			Min	Typ	Max	
Output Current	I <sub>o</sub>	Over V <sub>in</sub> range V <sub>o</sub> = -5V V <sub>o</sub> = -7, -8, -9V V <sub>o</sub> = -12V V <sub>o</sub> = -15V	0.05*	—	1.00	A
Short Circuit Current	I <sub>sc</sub>	V <sub>in</sub> = 10V	—	4 × I <sub>max</sub>	—	Apk
Inrush Current	I <sub>ir</sub> t <sub>ir</sub>	V <sub>in</sub> = 10V On start-up	—	4 0.5	—	A mSec
Input Voltage Range	V <sub>in</sub>	0.1 ≤ I <sub>o</sub> ≤ I <sub>max</sub> V <sub>o</sub> = -5V V <sub>o</sub> = -7, -8, -9V V <sub>o</sub> = -12V V <sub>o</sub> = -15V	7 7 7 7	— — — —	25 21 18 15	V V V V
Output Voltage Tolerance	ΔV <sub>o</sub>	Over V <sub>in</sub> range T <sub>a</sub> = -20°C to +70°C	—	±1.0	±3.0	%V <sub>o</sub>
Line Regulation	Reg <sub>line</sub>	Over V <sub>in</sub> range	—	±0.5	±1.0	%V <sub>o</sub>
Load Regulation	Reg <sub>load</sub>	0.1 ≤ I <sub>o</sub> ≤ I <sub>max</sub>	—	±0.5	±1.0	%V <sub>o</sub>
V <sub>o</sub> Ripple/Noise	V <sub>n</sub>	V <sub>in</sub> = 10V, I <sub>o</sub> = I <sub>max</sub>	—	±2	—	%V <sub>o</sub>
Transient Response (with 100µF output cap)	t <sub>tr</sub>	50% load change V <sub>o</sub> over/undershoot	— —	100 5.0	250 —	µSec %V <sub>o</sub>
Efficiency	η	V <sub>in</sub> = 10V, I <sub>o</sub> = 0.5 × I <sub>max</sub> , V <sub>o</sub> = -5V	—	75	—	%
Switching Frequency	f <sub>o</sub>	Over V <sub>in</sub> and I <sub>o</sub> ranges	600	650	700	kHz
Absolute Maximum Operating Temperature Range	T <sub>a</sub>	Free Air Convection, (40-60LFM) Over V <sub>in</sub> and I <sub>o</sub> Ranges	-40	—	+85	°C
Recommended Operating Temperature Range	T <sub>a</sub>	Free Air Convection, (40-60LFM) Over V <sub>in</sub> and I <sub>o</sub> Ranges	-40	—	+60**	°C
Thermal Resistance	θ <sub>ja</sub>	Free Air Convection, (40-60LFM)	—	45	—	°C/W
Storage Temperature	T <sub>s</sub>	—	-40	—	+125	°C
Mechanical Shock	—	Per Mil-STD-883D, Method 2002.3	—	500	—	G's
Mechanical Vibration	—	Per Mil-STD-883D, Method 2007.2, 20-2000 Hz, soldered in a PC board	—	5	—	G's
Weight	—	—	—	6.5	—	Grams

\*ISR will operate down to no load with reduced specifications.

\*\*See Thermal Derating chart.

**Note:** The PT78NR100 Series requires a 100µF electrolytic or tantalum output capacitor for proper operation in all applications.

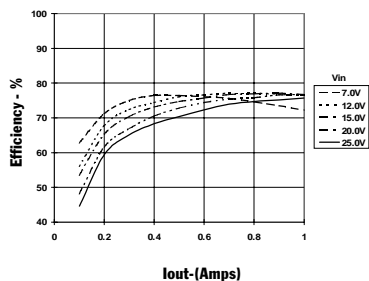
# PT78NR100 Series

## CHARACTERISTIC DATA

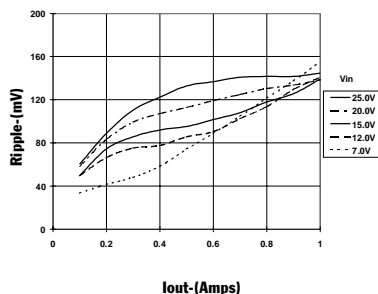
Wide Input Range Products  
DATA SHEETS

**PT78NR105 -5.0 VDC** (See Note 1)

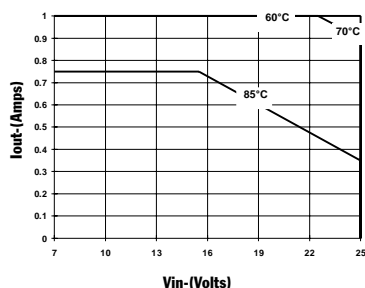
**Efficiency vs Output Current**



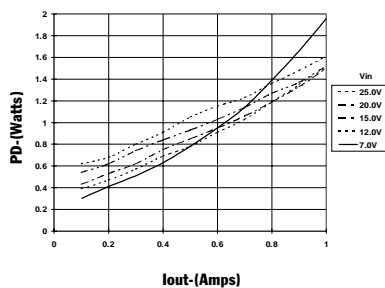
**Ripple vs Output Current**



**Thermal Derating (Ta)** (See Note 2)

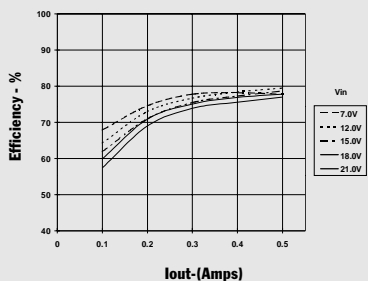


**Power Dissipation vs Output Current**

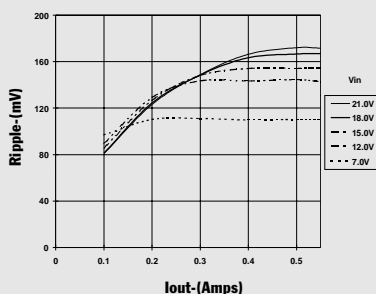


**PT78NR109 -9.0 VDC** (See Note 1)

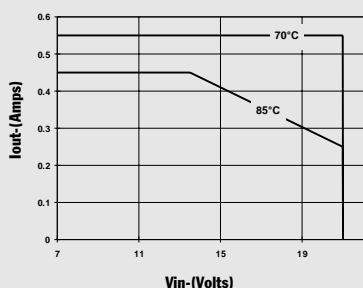
**Efficiency vs Output Current**



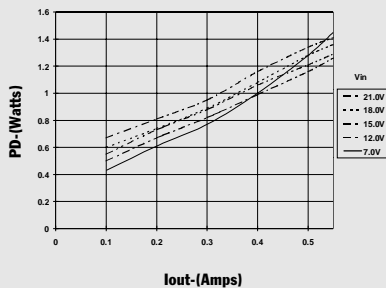
**Ripple vs Output Current**



**Thermal Derating (Ta)** (See Note 2)

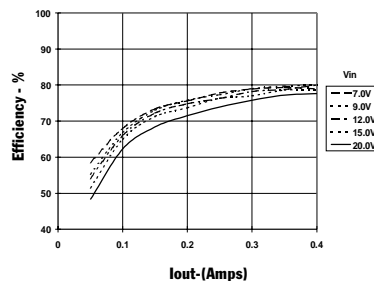


**Power Dissipation vs Output Current**

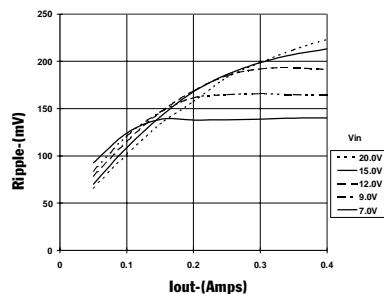


**PT78NR112 -12.0 VDC** (See Note 1)

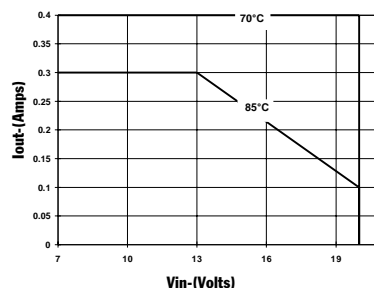
**Efficiency vs Output Current**



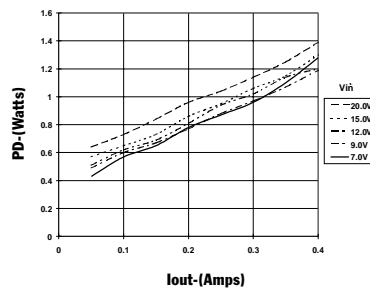
**Ripple vs Output Current**



**Thermal Derating (Ta)** (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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