PT78NR200 Series

10-12W Plus to Minus Voltage Integrated Switching Regulator

Power Trends Products from Texas Instruments

SLTS074A

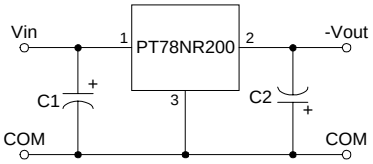
(Revised 6/30/2000)

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

The PT78NR200 series creates negative output voltage from a positive input voltage greater than 9V. These easy-to-use, 3-terminal, Integrated Switching Regulators (ISRs) have maximum output power of 10 to 12 watts and a negative output voltage that is laser trimmed. They also have excellent line and load regulation.

The PT78NR200 requires 100 LFM of airflow at its maximum output current.

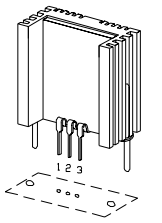
Standard Application



C1 = Required 100µF electrolytic
C2 = Required 100µF electrolytic

Pin-Out Information

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



Pkg Style 600

Ordering Information

PT78NR2 XX Y

Output Voltage	Package Suffix
52 = -5.2 Volts	**H** = Horizontal Mount
06 = -6.0 Volts	**S** = Surface Mount
12 = -12.0 Volts	**V** = Vertical Mount
15 = -15.0 Volts	

(For dimensions and PC board layout, see Package Styles 600 and 610.)

Specifications

Characteristics (T_a= 25°C unless noted)	Symbols	Conditions		PT78NR200 SERIES Min	Typ	Max	Units
Output Current	I_o	Over V_{in} range	V_o= -5.2V V_o= -12.0V	0.1* 0.1*	— —	2.0 1.0	A A
Short Circuit Current	I_{sc}	V_{in}=10V		—	4×I_{max}	—	Apk
Inrush Current	I_{ir} t_{ir}	V_{in}=10V On start-up		— —	4 0.5	— —	A mSec
Input Voltage Range	V_{in}	0.1 ≤ I_o ≤ I_{max}		9	—	15	V
Output Voltage Tolerance	ΔV_o	Over V_{in} range T_a= 0°C to +70°C		—	±1.0	±3.0	%V_o
Line Regulation	Reg_{line}	Over V_{in} range		—	±0.5	±1.0	%V_o
Load Regulation	Reg_{load}	0.3 ≤ I_o ≤ I_{max}		—	±0.5	±1.0	%V_o
V_o Ripple/Noise	V_n	V_{in}=10V, I_o=I_{max}		—	±2	—	%V_o
Transient Response (with 100µF output cap)	t_{tr}	50% load change V_o over/undershoot		— —	100 5.0	250 —	µSec %V_o
Efficiency	η	V_{in}=9V, I_o=0.5×I_{max}, V_o=-12V		—	78	—	%
Switching Frequency	f_o	Over V_{in} and I_o ranges		600	650	700	kHz
Absolute Maximum Operating Temperaturte Range	T_a	100 LFM airflow Over V_{in} and I_o Ranges		0	—	+85	°C
Recommended Operating Temperature Range	T_a	100 LFM airflow Over V_{in} and I_o Ranges		0	—	+60**	°C
Thermal Resistance	θ_{ja}	100 LFM airflow		—	35	—	°C/W
Storage Temperature	T_s	—		-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		—	10	—	G's
Weight	—	—		—	11		Grams

*ISR will operate down to no load with reduced specifications. **See Thermal Derating chart.

Note: *The PT78NR200 series requires a 100µF electrolytic or tantalum output capacitor for proper operation in all applications.*

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
PT78NR206H	ACTIVE	SIP MOD ULE	EFH	3	20	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT78NR212H	ACTIVE	SIP MOD ULE	EFH	3	20	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT78NR212S	ACTIVE	SIP MOD ULE	EFJ	3	20	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT78NR212ST	ACTIVE	SIP MOD ULE	EFJ	3	200	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT78NR212V	ACTIVE	SIP MOD ULE	EFF	3	20	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT78NR215H	ACTIVE	SIP MOD ULE	EFH	3	20	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT78NR215S	ACTIVE	SIP MOD ULE	EFJ	3	20	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT78NR215V	ACTIVE	SIP MOD ULE	EFF	3	20	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT78NR252H	ACTIVE	SIP MOD ULE	EFH	3	20	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT78NR252S	ACTIVE	SIP MOD ULE	EFJ	3	20	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT78NR252V	ACTIVE	SIP MOD ULE	EFF	3	20	Pb-Free (RoHS)	Call TI	N / A for Pkg Type

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

to Customer on an annual basis.

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