

### Features

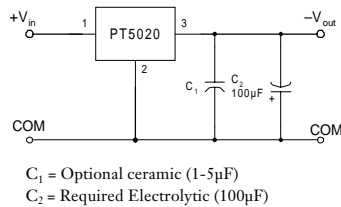
- Negative Output
- Input Voltage Range: +4.75 to +7 Volts
- Laser-Trimmed
- Small Footprint
- Soft Start
- 5-Pin Mount Option (Suffixes L & M)

### Description

The PT5020 series of integrated switching regulators (ISRs) convert a positive input voltage, typically +5V, to a negative output voltage for a wide range of analog and datacom applications.

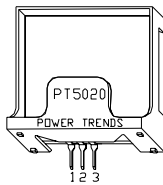
These Plus to Minus ISRs incorporate a “Buck-Boost” topology and are packaged in the 3-pin, single in-line pin (SIP) package configuration.

### Standard Application



### Pin-Out Information

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



### Ordering Information

- PT5021 □ = -3.3 Volts  
 PT5022 □ = -5 Volts  
 PT5023 □ = -9 Volts  
 PT5024 □ = -12 Volts  
 PT5025 □ = -15 Volts  
 PT5026 □ = -5.2 Volts  
 PT5027 □ = -8.0 Volts  
 PT5028 □ = -6.5 Volts  
 PT5029 □ = -5.5 Volts  
 PT5030 □ = -6.0 Volts  
 PT5031 □ = -1.7 Volts

### PT Series Suffix (PT1234x)

Case/Pin Configuration	Order Suffix	Package Code*
Vertical	<b>N</b>	(EAD)
Horizontal	<b>A</b>	(EAA)
SMD	<b>C</b>	(EAC)
Horizontal, 2-pin Tab	<b>M</b>	(EAM)
SMD, 2-Pin Tab	<b>L</b>	(EAL)

\* Previously known as package styles 100/110.  
 (Reference the applicable package code drawing for the dimensions and PC board layout)

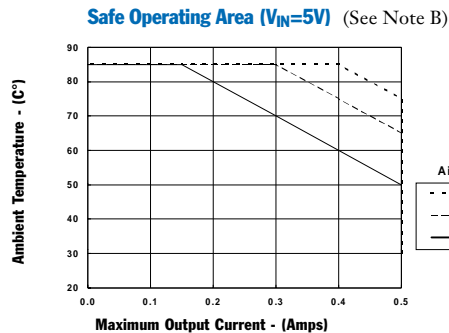
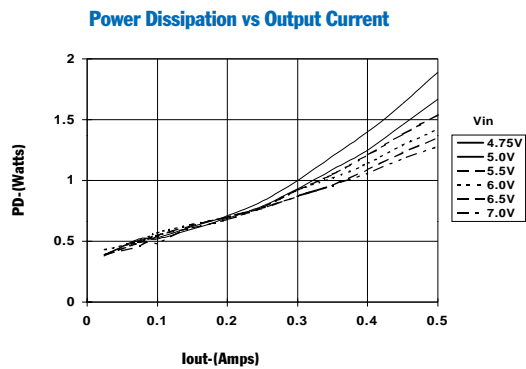
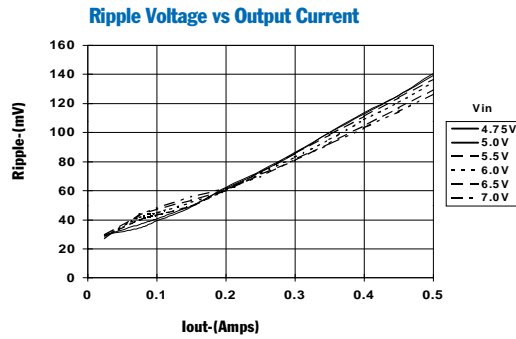
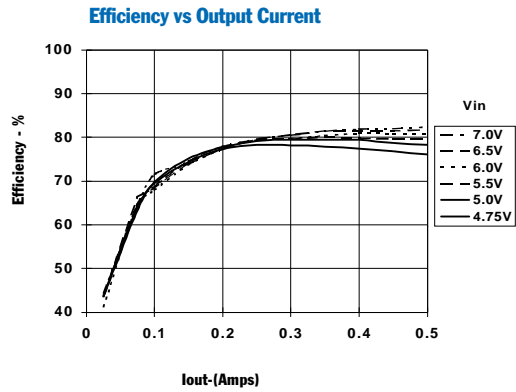
NOTE: PT5020 ISRs are not Short-Circuit Protected.

### Specifications (Unless otherwise stated, $T_a = 25^\circ\text{C}$ , $V_{in} = 5\text{V}$ , $I_o = I_{o,max}$ , $C_2 = 100\mu\text{F}$ )

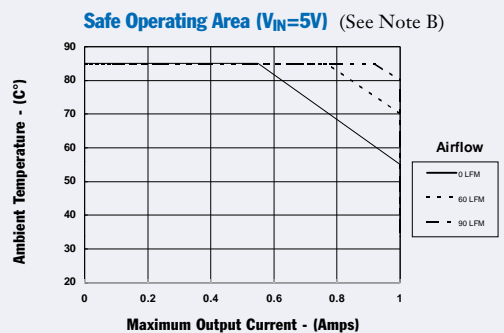
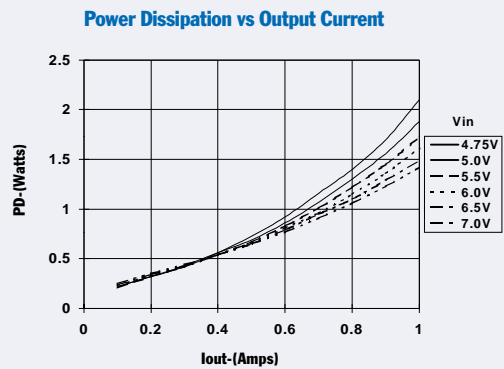
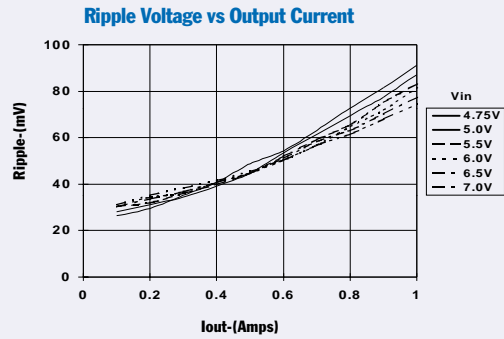
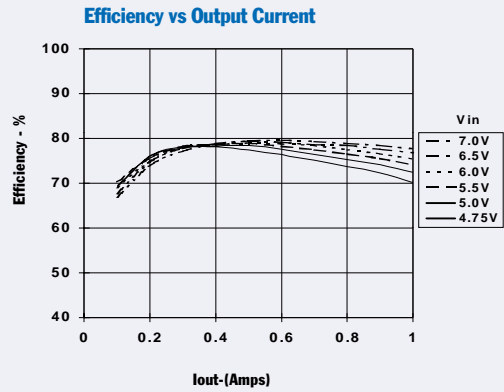
Characteristics	Symbol	Conditions	PT5020 SERIES			Units
			Min	Typ	Max	
Output Current	$I_o$	Over $V_{in}$ range	$V_o = -1.7\text{V to } -6.5\text{V}$ 0.25 (1)	—	1.0	A
			$V_o = -9\text{V}$ 0.10 (1)	—	0.60	
			$V_o = -12\text{V}$ 0.10 (1)	—	0.50	
			$V_o = -15\text{V}$ 0.10 (1)	—	0.30	
Input Voltage Range	$V_{in}$	Over $I_o$ range	4.75	—	7 (2)	V
Output Voltage Tolerance	$\Delta V_o$	Over $V_{in}$ Range $T_a = -20^\circ\text{C to SOA limit}^{(3)}$	—	$\pm 1.5$	$\pm 3$	% $V_o$
Line Regulation	$Reg_{line}$	Over $V_{in}$ range	—	$\pm 0.5$	$\pm 1$	% $V_o$
Load Regulation	$Reg_{load}$	$I_{o,min} \leq I_o \leq I_{o,max}$	—	$\pm 0.5$	$\pm 1$	% $V_o$
Efficiency	$\eta$	$I_o = 0.5 I_{o,max}$	—	75	—	%
$V_o$ Ripple (pk-pk)	$V_r$	20MHz bandwidth	—	$\pm 2$	$\pm 5$	% $V_o$
Transient Response	$t_{tr}$	25% load change $V_o$ over/undershoot	—	500	—	$\mu\text{Sec}$
			—	3.0	5.0	% $V_o$
Current Limit	$I_{lim}$		—	150	—	% $I_{o,max}$
Inrush Current	$I_{ir}$ $t_{ir}$	On start up	—	1.0 (3)	—	A
			—	1.0	—	mSec
Switching Frequency	$f_s$	Over $I_o$ range	$ V_o  = 1.7 \text{ to } 8\text{V}$ 0.8 500	1 650	1.2 800	MHz kHz
Operating Temperature Range	$T_a$	—	-20	—	+85 (4)	$^\circ\text{C}$
Thermal Resistance	$\theta_{ja}$	Free Air Convection (40-60LFM)	—	50	—	$^\circ\text{C/W}$
Storage Temperature	$T_s$		-40	—	+125	$^\circ\text{C}$
Mechanical Shock		Per Mil-STD-883D, Method 2002.3 1 msec, Half Sine, mounted to a fixture	—	500	—	G's
Mechanical Vibration		Suffixes N, A, & C	—	5	—	G's
Per Mil-STD-883D, 20-2000 Hz		Suffixes L & M	—	20	—	
Weight		Suffixes N, A, & C	—	4.5	—	grams
		Suffixes L & M	—	6.5 (5)	—	

- Notes:** (1) The ISR will operate at no load with reduced specifications.  
 (2) For applications with input voltages greater than 7 VDC, use the PT78NR100 Series.  
 (3) The inrush current stated is above the normal input current for the associated output load.  
 (4) See Safe Operating Area curves or consult the factory for the appropriate derating  
 (5) The tab pins on the 5-pin mount package types (suffixes L & M) must be soldered. For more information see the applicable package outline drawing.

**PT5024 (-12VDC)** (See Note A)



**PT5022 (-5VDC)** (See Note A)



**Note A:** Characteristic data has been developed from actual products tested at 25°C. This data is considered typical data for the Converter.  
**Note B:** Thermal derating graphs are developed in free-air convection cooling, which corresponds to approximately 40–60LFM of airflow.

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