

### Features

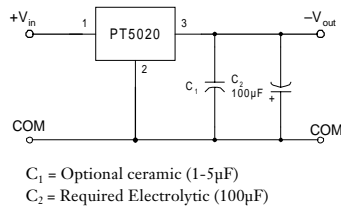
- Negative Output
- Input Voltage Range: +4.75 to +7 Volts
- Laser-Trimmed
- Small Footprint
- Soft Start
- 5-Pin Mount Option (Suffixes L & M)

### 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.

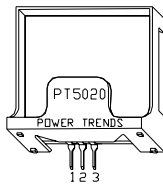
These Plus to Minus ISRs incorporate a “Buck-Boost” topology and are packaged in the 3-pin, single in-line pin (SIP) package configuration.

### Standard Application



### Pin-Out Information

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



### Ordering Information

PT 5021	$\square$ = -3.3 Volts
PT 5022	$\square$ = -5 Volts
PT 5023	$\square$ = -9 Volts
PT 5024	$\square$ = -12 Volts
PT 5025	$\square$ = -15 Volts
PT 5026	$\square$ = -5.2 Volts
PT 5027	$\square$ = -8.0 Volts
PT 5028	$\square$ = -6.5 Volts
PT 5029	$\square$ = -5.5 Volts
PT 5030	$\square$ = -6.0 Volts
PT 5031	$\square$ = -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)

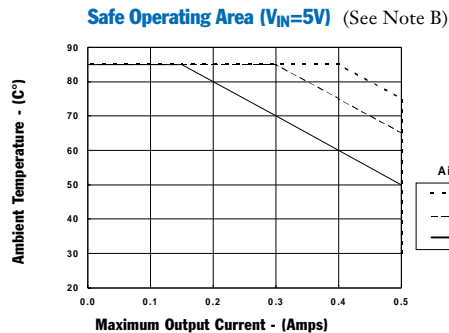
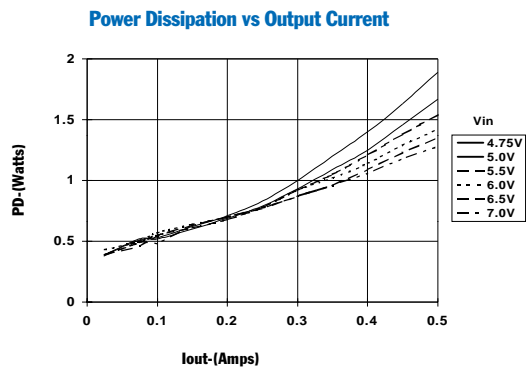
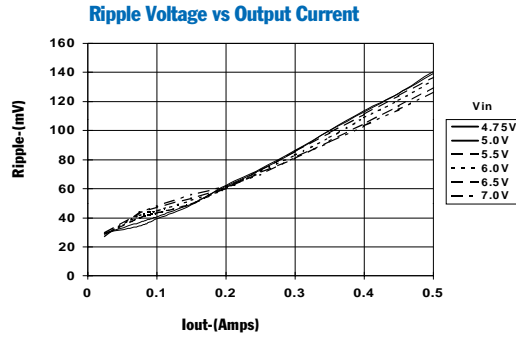
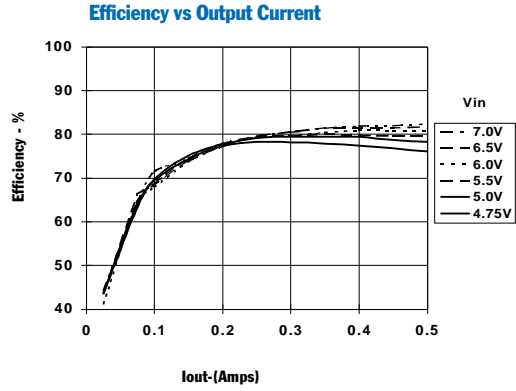
NOTE: PT5020 ISRs are not Short-Circuit Protected.

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

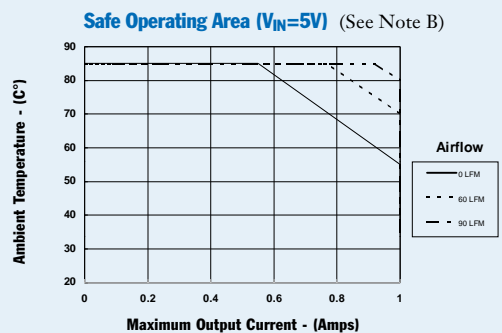
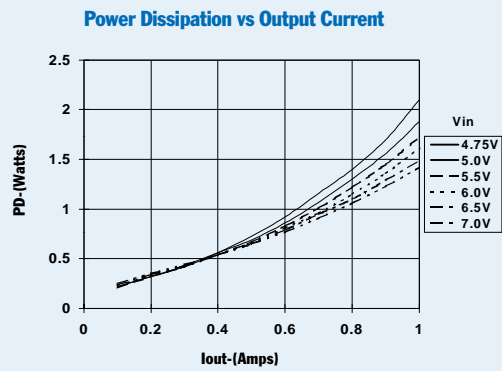
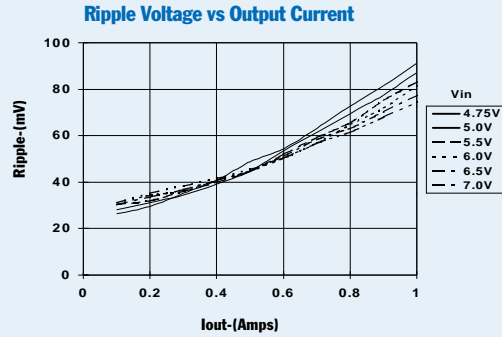
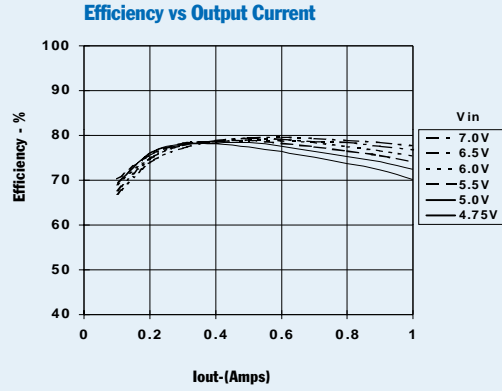
Characteristics	Symbol	Conditions	PT5020 SERIES			Units
			Min	Typ	Max	
Output Current	$I_o$	Over $V_{in}$ range	$V_o = -1.7\text{V to } -6.5\text{V}$ 0.25 (1)	—	1.0	A
			$V_o = -9\text{V}$ 0.10 (1)	—	0.60	
			$V_o = -12\text{V}$ 0.10 (1)	—	0.50	
			$V_o = -15\text{V}$ 0.10 (1)	—	0.30	
Input Voltage 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	$I_{ir}$	On start up	—	1.0 (3)	—	A
	$t_{ir}$		—	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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