

PT5020 Series

POSITIVE INPUT/NEGATIVE OUTPUT INTEGRATED SWITCHING REGULATOR

Revised 5/15/98

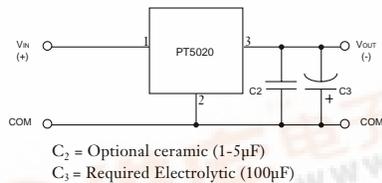
- Input Voltage Range: 4.75 to 7 Volts
- Complete Solution With Only One External Capacitor Required
- Soft Start

The Power Trends' PT5020 ISRs convert a positive input voltage (typ +5V) to a negative output voltage for a wide range of analog and communication circuit applications.

The Plus to Minus ISRs use a "Buck-Boost" topology and are packaged in the 3 pin SIP 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

PT Series Suffix (PT12345X)

Case/Pin Configuration	Suffix
Vertical Through-Hole	N
Horizontal Through-Hole	A
Horizontal Surface Mount	C

Specifications

NOTE: Buck-Boost Topology ISRs are not Short-Circuit Protected.

Characteristics ($T_c=25^\circ\text{C}$ unless noted)	Symbols	Conditions	PT5020 SERIES			
			Min	Typ	Max	Units
Output Current	I_o	Over V_{in} range $V_o=-3.3\text{V to }6.5\text{V}$ $V_o=-9\text{V}$ $V_o=-12\text{V}$ $V_o=-15\text{V}$	0.25* 0.10* 0.10* 0.10*	— — — —	1.0 0.60 0.50 0.30	A A A A
Current Limit	I_{cl}	$V_{in} = 5\text{V}$	—	$1.5 I_{o\max}$	—	A
Inrush Current	I_{ir} t_{ir}	$V_{in} = +5\text{V @ max } I_o$ On start up	— —	1.0 1.0	— —	A mSec
Short Circuit Current	I_{sc}	$V_{in} = 5\text{V}$	—	$2 I_{o\max}$	—	A
Input Voltage Range	V_{in}	$I_o = 0.1$ to $I_{o\max}$	4.75	—	7**	V
Output Voltage Tolerance	ΔV_o	Over V_{in} Range $I_o = I_{\max}$ $T_a = -20^\circ\text{C}$ to shutdown	—	± 1.5	± 3	% V_o
Line Regulation	Reg_{line}	Over V_{in} range	—	± 0.5	± 1	% V_o
Load Regulation	Reg_{load}	$I_{\min} \leq I_o \leq I_{\max}$	—	± 0.5	± 1	% V_o
V_o Ripple/Noise	V_n	$V_{in}=5\text{V}, I_o=I_{\max}$	—	± 2	± 5	% V_o
Transient Response	t_{tr}	25% load change V_o over/undershoot	— —	500 3.0	— 5.0	μSec % V_o
Efficiency	η	$V_{in}=5\text{V}, I_o=0.5 I_{\max}$	—	75	—	%
Switching Frequency	f_o	Over I_o range $V_o=3.3$ to 8V $V_o \geq 8\text{V}$	0.8 500	1 650	1.2 800	MHz kHz
Absolute Maximum Operating Temperature Range	T_a	—	-20	—	+85	$^\circ\text{C}$
Recommended Operating Temperature Range	T_a	Free Air Convection, (40-60 LFM) Over V_{in} and I_o range	-20	—	+65***	$^\circ\text{C}$
Thermal Resistance	θ_{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	—	Per Mil-STD-883D, Method 2007.2, 20-2000 Hz, Soldered in a PC board	—	5	—	G's
Weight	—	—	—	4.5	—	grams

* ISR will operate down to no load with reduced specifications.
 ** For applications with input voltages greater than 7 VDC, use the PT78NR100 Series.
 *** See SOA Curves.

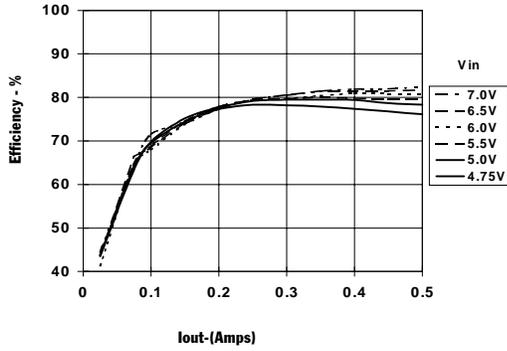


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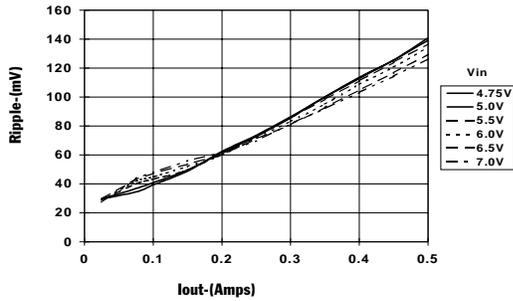
CHARACTERISTIC DATA

PT5024 (-12VDC) (See Note 1)

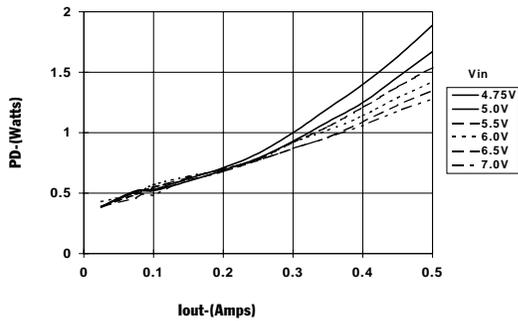
Efficiency vs Output Current



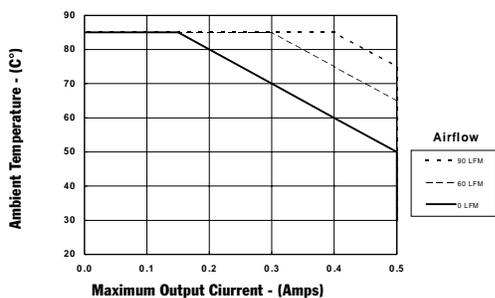
Ripple Voltage vs Output Current



Power Dissipation vs Output Current

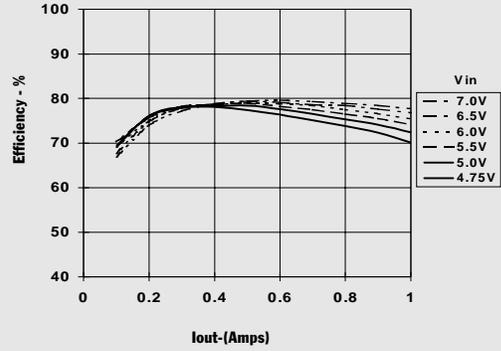


Safe Operating Area (VIN=5V)

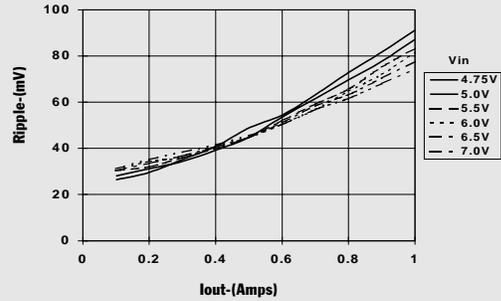


PT5022 (-5VDC) (See Note 1)

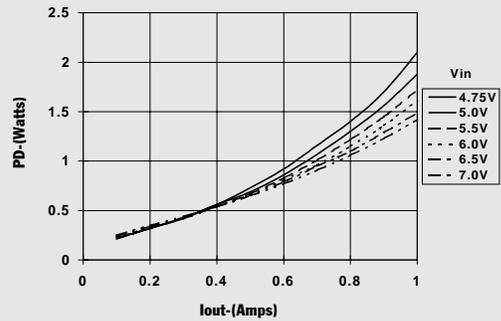
Efficiency vs Output Current



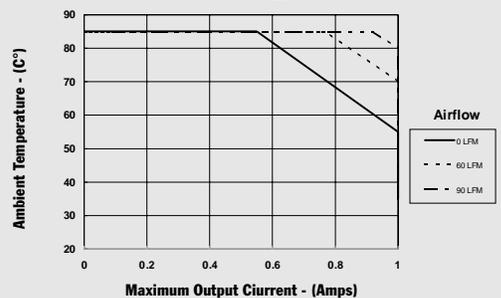
Ripple Voltage vs Output Current



Power Dissipation vs Output Current



Safe Operating Area (VIN=5V)



Note 1: All data listed in the above graphs has been developed from actual products tested at 25°C. This data is considered typical data for the ISR.

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