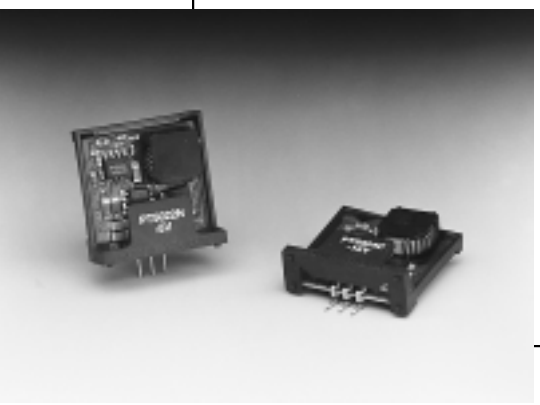
PT5020 Series

POSITIVE INPUT/NEGATIVE OUTPUT INTEGRATED SWITCHING REGULATOR

Revised 5/15/98

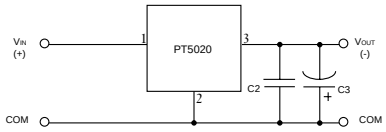


- Input Voltage Range: 4.75 to 7 Volts
- Complete Solution With Only One External Capacitor Required
- Soft Start

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.

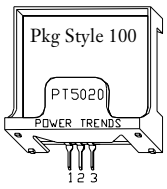
Standard Application



C_2 = Optional ceramic (1-5µF)
C_3 = Required Electrolytic (100µF)

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	
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_a=25°C unless noted)	Symbols	Conditions	PT5020 SERIES Min	Typ	Max	Units
Output Current	I_o	Over V_{in} range V_o=-3.3V to 6.5V V_o=-9V V_o=-12V V_o=-15V	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} = 5V	—	1.5 $I_{o\,max}$	—	A
Inrush Current	I_{ir} t_{ir}	V_{in} = +5V @ max I_o On start up	— —	1.0 1.0	— —	A mSec
Short Circuit Current	I_{sc}	V_{in} = 5V	—	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°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}	$I_{min} \le I_o \le I_{max}$	—	±0.5	±1	%V_o
V_o Ripple/Noise	V_n	V_{in}=5V, 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}=5V, I_o=0.5 I_{max}	—	75	—	%
Switching Frequency	f_O	Over I_o range V_o=3.3 to 8V $V_o \ge$ 8 V	0.8 500	1 650	1.2 800	MHz kHz
Absolute Maximum Operating Temperature Range	T_a	—	-20	—	+85	°C
Recommended Operating Temperature Range	T_a	Free Air Convection, (40-60 LFM) Over V_{in} and I_o range	-20	—	+65***	°C
Thermal Resistance	θ_{ja}	Free Air Convection (40-60LFM)	—	50	—	°C/W
Storage Temperature	T_s		-40	—	+125	°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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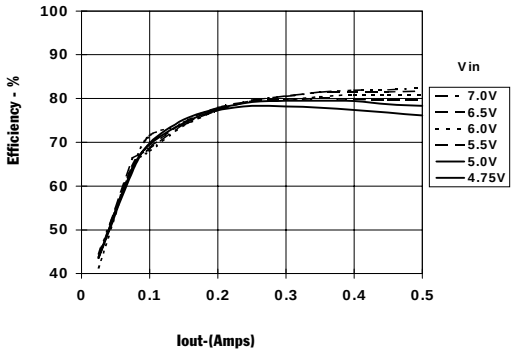
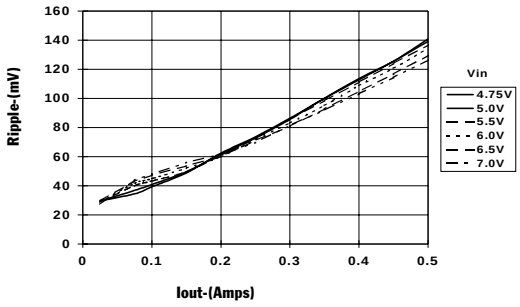
PT5024 (-12VDC) (See Note 1)

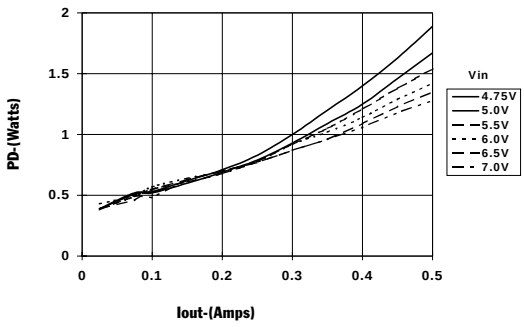
Efficiency vs Output Current



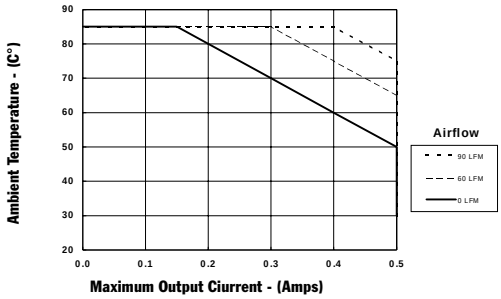
Ripple Voltage vs Output Current



Power Dissipation vs Output Current

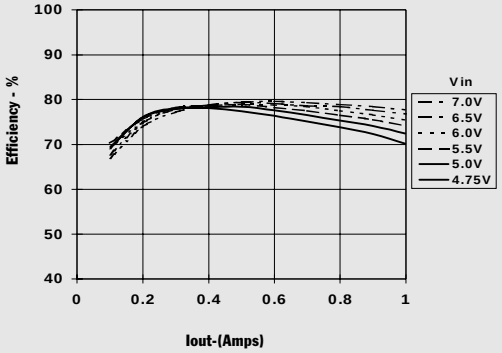


Safe Operating Area (V_{IN}=5V)

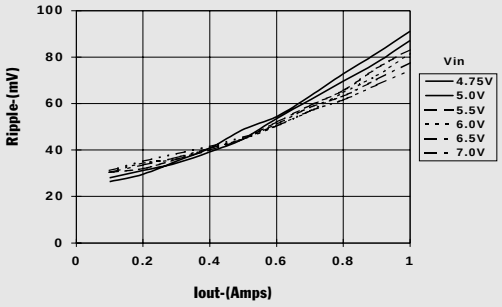


PT5022 (-5VDC) (See Note 1)

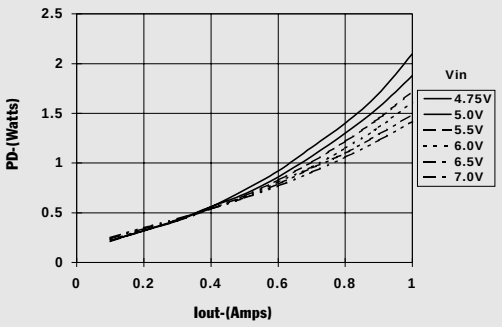
Efficiency vs Output Current



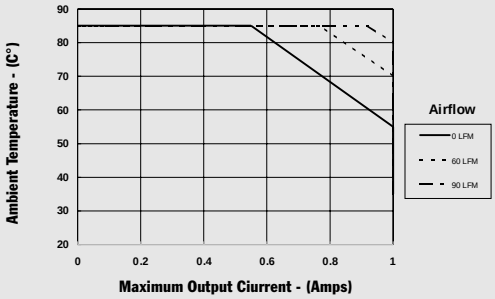
Ripple Voltage vs Output Current



Power Dissipation vs Output Current



Safe Operating Area (V_{IN}=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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