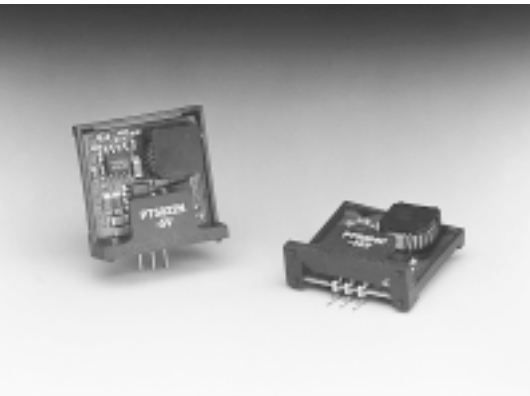




THE DATASHEET OF PT5024M





Features

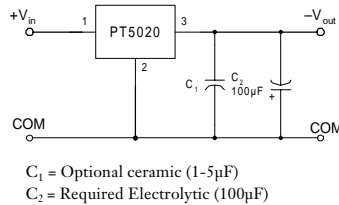
- Negative Output
- Input Voltage Range: +4.75 to +7 Volts
- Laser-Trimmed
- Small Footprint
- Soft Start
- 5-Pin Mount Option (Suffixes L & M)

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.

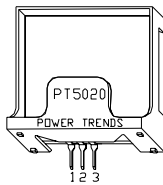
These Plus to Minus ISRs incorporate a “Buck-Boost” topology and are packaged in the 3-pin, single in-line pin (SIP) package configuration.

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	N	(EAD)
Horizontal	A	(EAA)
SMD	C	(EAC)
Horizontal, 2-pin Tab	M	(EAM)
SMD, 2-Pin Tab	L	(EAL)

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

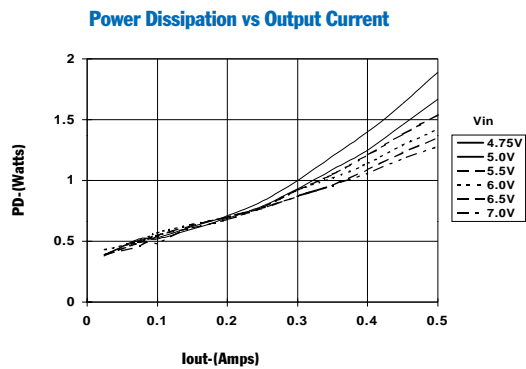
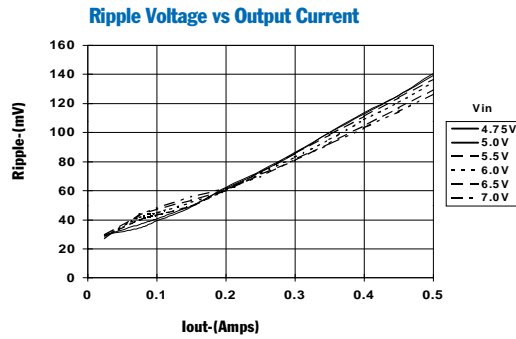
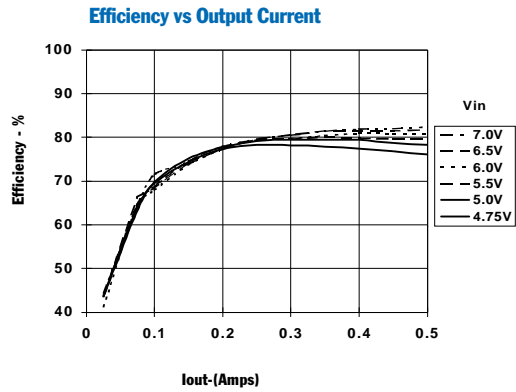
NOTE: PT5020 ISRs are not Short-Circuit Protected.

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

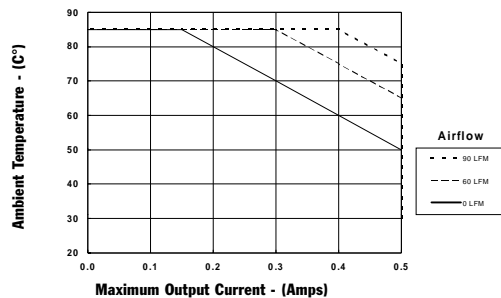
Characteristics	Symbol	Conditions	PT5020 SERIES			Units
			Min	Typ	Max	
Output Current	I_o	Over V_{in} range	$V_o = -1.7\text{V to } -6.5\text{V}$ 0.25 (1)	—	1.0	A
			$V_o = -9\text{V}$ 0.10 (1)	—	0.60	
			$V_o = -12\text{V}$ 0.10 (1)	—	0.50	
			$V_o = -15\text{V}$ 0.10 (1)	—	0.30	
Input Voltage Range	V_{in}	Over I_o range	4.75	—	7 (2)	V
Output Voltage Tolerance	ΔV_o	Over V_{in} Range $T_a = -20^\circ\text{C to SOA limit } (3)$	—	± 1.5	± 3	% V_o
Line Regulation	Reg_{line}	Over V_{in} range	—	± 0.5	± 1	% V_o
Load Regulation	Reg_{load}	$I_{o,min} \leq I_o \leq I_{o,max}$	—	± 0.5	± 1	% V_o
Efficiency	η	$I_o = 0.5 I_{o,max}$	—	75	—	%
V_o Ripple (pk-pk)	V_r	20MHz bandwidth	—	± 2	± 5	% V_o
Transient Response	t_{tr}	25% load change V_o over/undershoot	—	500	—	μSec
			—	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	1	1.2	MHz
			500	650	800	
Operating Temperature Range	T_a	—	-20	—	+85 (4)	$^\circ\text{C}$
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		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.

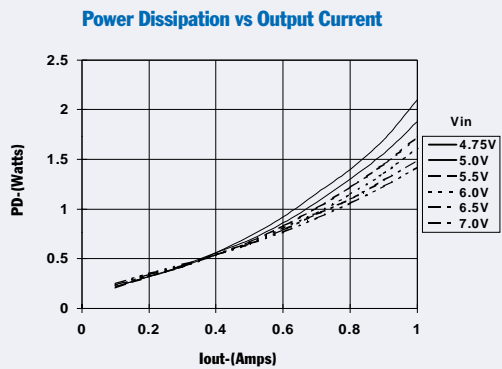
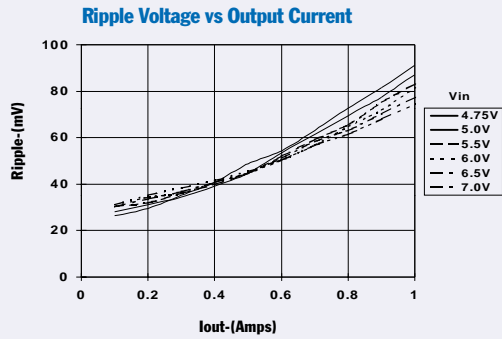
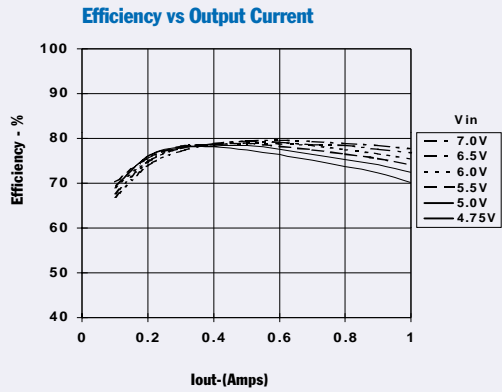
PT5024 (-12VDC) (See Note A)



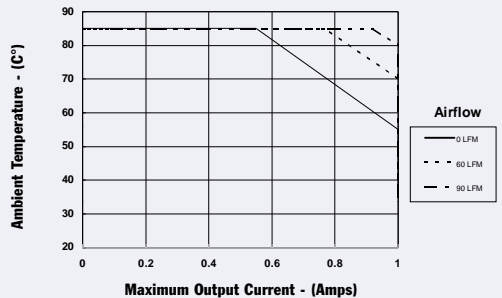
Safe Operating Area (VIN=5V) (See Note B)



PT5022 (-5VDC) (See Note A)



Safe Operating Area (VIN=5V) (See Note B)



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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