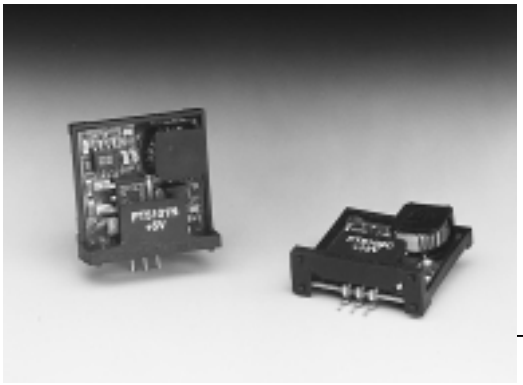
PT5100 Series

1-A Positive Step-down Integrated Switching Regulator

SLTS028B

(Revised 11/8/2001)



Features

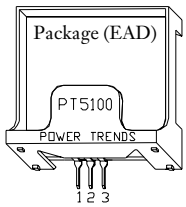
- 90%+ Efficiency
- Internal Short-Circuit Protection
- Pin-Compatible with 3-Terminal Linear Regulators
- Laser-Trimmed Output Voltage
- Over-Temperature Protection
- Small Footprint
- Wide Input Range
- 5-Pin Mount Option (Suffixes L & M)

Description

The PT5100 modules are a series of economical, easy-to-use 1-A positive step-down, Integrated Switching Regulators (ISRs). These ISRs are compatible with most TO-220 style linear regulators, and when employed as a linear replacement, provide significant benefits in both efficiency and power dissipation. They are recommended for use in a wide variety of on-board power regulation applications. These include computer, data storage, industrial controls, and battery powered equipment. Modules are laser-trimmed for optimal output voltage accuracy, and exhibit excellent line and load regulation. The PT5100 also features output current limiting and thermal shutdown protection.

Ordering Information

PT 5101☐	=	+5.0 Volts
PT 5102☐	=	+12.0 Volts
PT 5103☐	=	+3.3 Volts
PT 5105☐	=	+6.5 Volts
PT 5107☐	=	+15.0 Volts
PT 5109☐	=	+5.6 Volts
PT 5110☐	=	+9.0 Volts
PT 5111☐	=	+10.0 Volts
PT 5112☐	=	+8.0 Volts



PT Series Suffix (PT1234x)

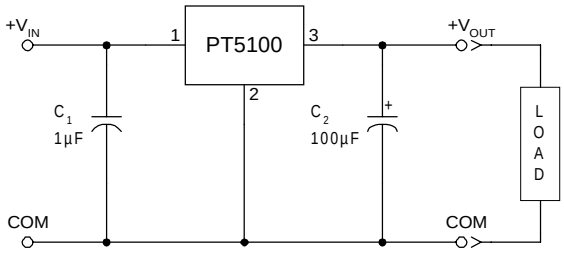
Case/Pin Configuration	Order Suffix	Package Code
Vertical	**N**	(EAD)
Horizontal	**A**	(EAA)
SMD	**C**	(EAC)
Horizontal, 2-pin Tab	**M**	(EAM)
SMD, 2-Pin Tab	**L**	(EAL)

(Reference the applicable package code drawing for the dimensions and PC board layout)

Pin-Out Information

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

Standard Application



C_1 = Optional 1µF ceramic capacitor
C_2 = Required 100µF electrolytic

Specifications (Unless otherwise stated, T_a =25°C, V_{in} =V_{in}min, C_{out} =100µF, and I_o =$I_o$max)

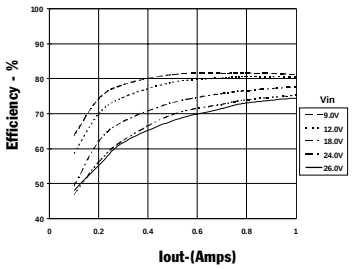
Characteristic	Symbol	Conditions		PT5100 SERIES Min	Typ	Max	Units
Output Current	I_o	Over V_{in} range		0.1 (1)	—	1.0	A
Input Voltage Range	V_{in}	Over I_o Range	V_o=3.3V V_o=5.0V V_o>5.0V	9 9 V_o + 4	— — —	26 38 38	VDC
Set Point Voltage Tolerance	V_o tol			—	±1	±2	%V_o
Temperature Variation	Reg_{temp}	0° ≤T_a ≤ +60°C, I_o =$I_o$min		—	±0.5	—	%V_o
Line Regulation	Reg_{line}	Over V_{in} range		—	±5	±10	mV
Load Regulation	Reg_{load}	Over I_o range		—	±5	±10	mV
Total Output Voltage Variation	ΔV_otot	Includes set-point, line, load, 0° ≤T_a ≤ +60°C		—	±1.5	±3	%V_o
Efficiency	η		V_o = 15V V_o = 12V V_o = 10V V_o =5.0V V_o =3.3V	— — — — —	95 94 92 90 82	— — — — —	%
V_o Ripple (pk-pk)	V_r	20MHz bandwidth		—	2	—	%V_o
Transient Response	t_{tr}	1A/µs load step, 50% to 100% $I_o$max		—	100	200	µs
	ΔV_{tr}	V_o over/undershoot		—	±5.0	—	%V_o
Current Limit	I_{lim}	ΔV_o = –1%		1.2	2.6	—	A
Switching Frequency	f_s	Over V_{in} range	V_o ≥ 5.0V V_o ≤ 3.3V	500 575	650 725	800 875	kHz
External Output Capacitance	C_{out}			100	—	—	µF
Operating Temperature Range	T_a	Over V_{in} range		–40 (2)	—	+85 (3)	°C
Thermal Resistance	θ_{ja}	Free-air convection (40-60LFM)	V_o =3.3V V_o =5.0V V_o ≥ 12V	— — —	45 50 60	— — —	°C/W
Storage Temperature	T_s	—		–40	—	+125	°C
Reliability	MTBF	Per Bellcore TR-332 50% stress, T_a =40°C, ground benign		11.3	—	—	10^6 Hrs
Mechanical Shock	—	Per Mil-Std-883D, method 2002.3, 1mS, half-sine, mounted to a fixture		—	500	—	G's
Mechanical Vibration	—	Per Mil-Std-883D, Method 2007.2 20-2000Hz, soldered in PC board		—	5 (4)	—	G's
Weight	—	Suffixes N, A, & C Suffixes L & M		— —	4.5 6.5	— —	grams
Flammability	—	Materials meet UL 94V-0					

Notes: *(1) The ISR will operate at no load with reduced specifications.*
(2) For operation below 0°C, use a tantalum type capacitor for C_2.
(3) See Thermal Derating curves.
(4) 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.

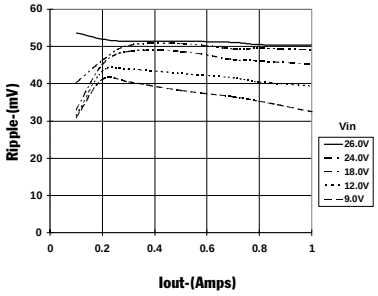
Typical Characteristics

PT5103, 3.3 VDC (See Note A)

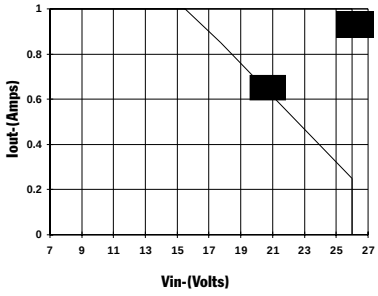
Efficiency vs Output Current



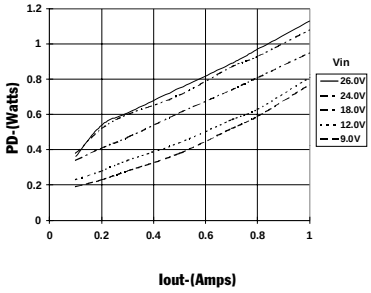
Ripple vs Output Current



Thermal Derating (T_a) (See Note B)

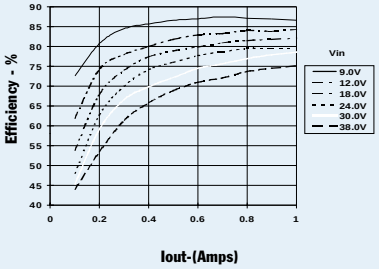


Power Dissipation vs Output Current

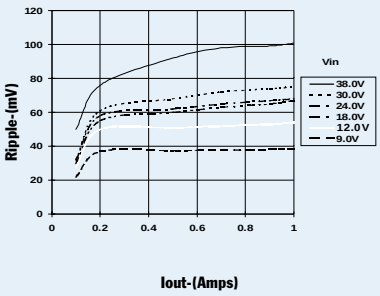


PT5101, 5.0 VDC (See Note A)

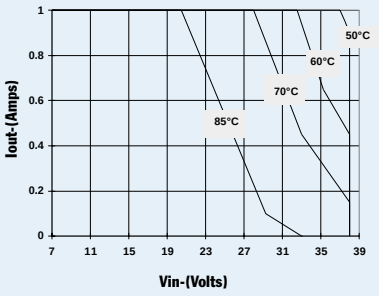
Efficiency vs Output Current



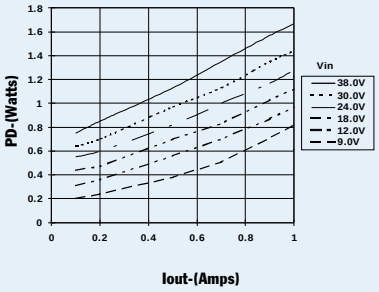
Ripple vs Output Current



Thermal Derating (T_a) (See Note B)

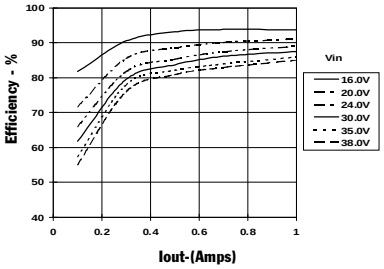


Power Dissipation vs Output Current

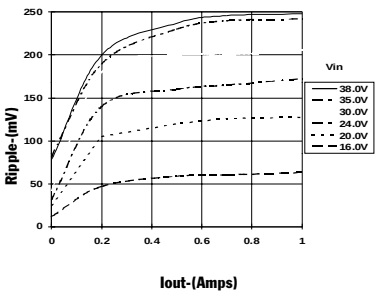


PT5102, 12.0 VDC (See Note A)

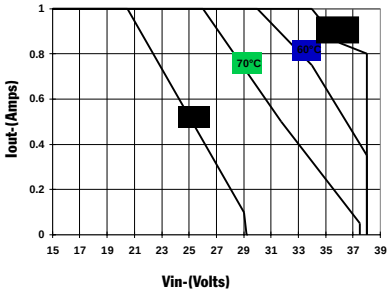
Efficiency vs Output Current



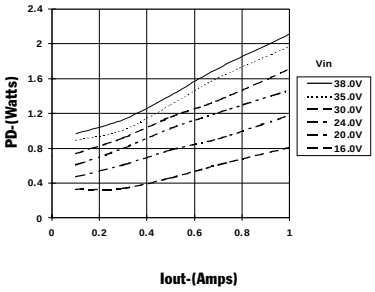
Ripple vs Output Current



Thermal Derating (T_a) (See Note B)



Power Dissipation vs Output Current



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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