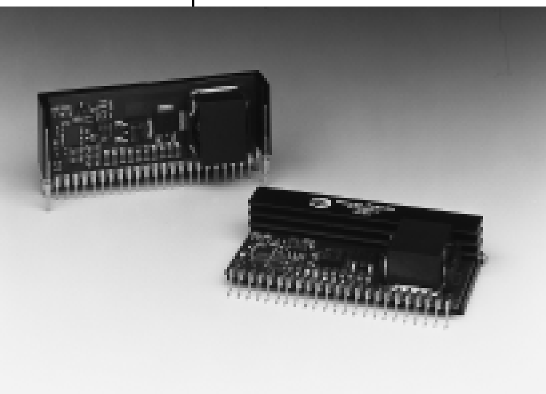
PT6900 Series

12 WATT PLUS TO MINUS VOLTAGE CONVERTER

Revised 11/12/98



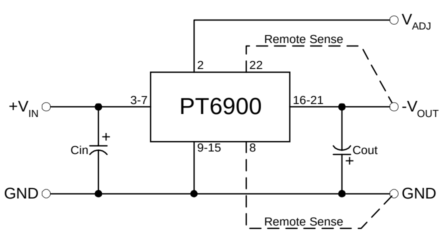
Features

- Single-Device: +5V input
- Remote Sense
- Input Voltage Range: 4.75V to 5.5V
- Adjustable Output Voltage
- 23-pin SIP Package

The PT6900 is a new series of plus to minus high- performance, 12 watt voltage converters housed in a 23-pin SIP package.

The PT6900 is designed to supply regulated negative voltages for powering the latest ECL (-5.2V) and GaAs (-2.0V) ICs used in high-speed fiber optic communications. A 330µF electrolytic capacitor is required on the input and output for proper operation.

Standard Application



C_{in} = Required 330µF electrolytic
C_{out} = Required 330µF electrolytic

Pin-Out Information

Pin	Function	Pin	Function
1	Do not connect	13	GND
2	V_{out} Adjust	14	GND
3	V_{in}	15	GND
4	V_{in}	16	V_{out}
5	V_{in}	17	V_{out}
6	V_{in}	18	V_{out}
7	V_{in}	19	V_{out}
8	Remote Sense GND	20	V_{out}
9	GND	21	V_{out}
10	GND	22	Remote Sense V_{out}
11	GND	23	Do not connect
12	GND		

Note: Case must be connected to ground pins for proper operation

Ordering Information

PT6901❑ = -2.0 Volts
PT6902❑ = -5.2 Volts

PT Series Suffix (PT1234X)

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

(For dimensions and PC board layout, see Package Styles 1100 and 1110.)

Specifications

Characteristics (T_a= 25°C unless noted)	Symbols	Conditions	PT6900 SERIES Min	Typ	Max	Units
Output Current	I_o	T_a = +60°C, 200 LFM, pkg N V_o = -2.0V	0.1*	—	6	A
		V_o = -5.2V	0.1*	—	2.5	A
		T_a = +25°C, natural convection V_o = -2.0V	0.1*	—	6	A
		V_o = -5.2V	0.1*	—	2.5	A
Input Voltage Range	V_{in}	$0.1A \leq I_o \leq I_{max}$	4.75	—	5.5	V
Output Voltage Tolerance	ΔV_o	V_{in} = +5V, $I_o = I_{max}$ 0°C ≤ T_a ≤ +60°C	Vo-0.05	—	Vo+0.05	V
Line Regulation	Reg_{line}	$4.75V \leq V_{in} \leq 5.5V$, $I_o = I_{max}$	—	±0.5	±1.0	%
Load Regulation	Reg_{load}	V_{in} = +5V, $0.1 \leq I_o \leq I_{max}$	—	±0.5	±1.0	%
V_o Ripple/Noise	V_n	V_{in} = +5V, $I_o = I_{max}$ V_o = -2.0V	—	40	—	mV
		V_o = -5.2V	—	100	—	mV
Transient Response with C_{out} = 330µF	t_{tr}	I_o step between $0.5xI_{max}$ and I_{max}	—	100	—	µSec
	V_{os}	V_o over/undershoot V_o = -2.0V	—	100	—	mV
		V_o = -5.2V	—	200	—	mV
Efficiency	η	V_{in} = +5V, $I_o = 0.5xI_{max}$, V_o = -2.0V	—	70	—	%
Switching Frequency	f_o	$4.75V \leq V_{in} \leq 5.5V$ $0.1A \leq I_o \leq I_{max}$	500	—	—	kHz
Absolute Maximum Operating Temperature Range	T_a	—	0	—	+85	°C
Recommended Operating Temperature Range	T_a	Forced airflow = 200 LFM Over V_{in} and I_o Ranges	0	—	+60	°C
Storage Temperature	T_s	—	-40	—	+125	°C
Weight	—	Vertical/Horizontal	—	28/33	—	grams

* ISR-will operate down to no load with reduced specifications. Please note that this product is not short-circuit protected.

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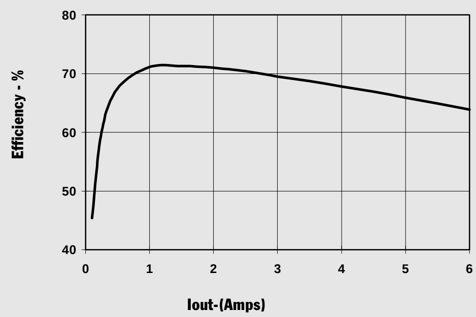
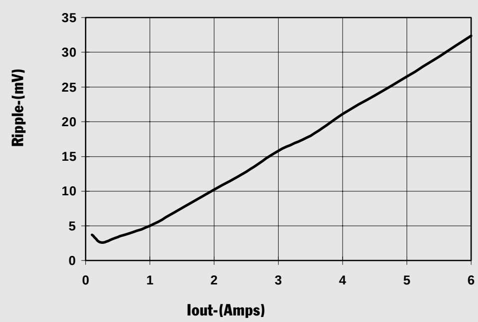
PT6901, -2.0 VDC

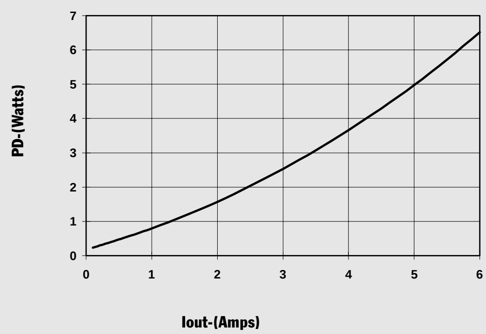
Efficiency vs Output Current (@Vin=+5V)



Ripple vs Output Current (@Vin=+5V)



Power Dissipation vs Output Current



Adjusting the Output Voltage of the PT6900 Positive to Negative Converter Series

The negative output voltage of the Power Trends PT6900 Series ISRs may be adjusted higher or lower than the factory trimmed pre-set voltage with the addition of a single external resistor. Table 1 accordingly gives the allowable adjustment range for each model in the series as V_a (min) and V_a (max).

Adjust Up: An increase in the output voltage is obtained by adding a resistor R2, between pin 2 (V_o adjust) and pin 8 (Remote Sense GND).

Adjust Down: Add a resistor (R1), between pin 2 (V_o adjust) and pin 22 (Remote Sense V_o).

Refer to Figure 1 and Table 2 for both the placement and value of the required resistor, either (R1) or R2 as appropriate.

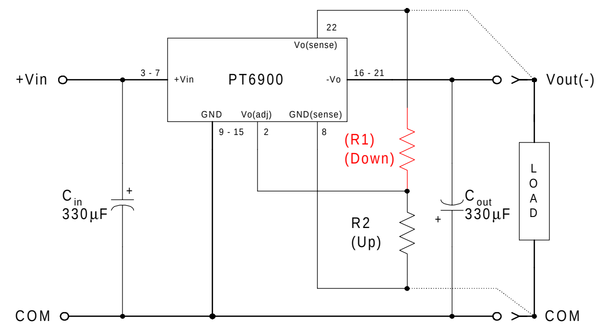
Notes:

1. Use only a single 1% resistor in either the (R1) or R2 location. Place the resistor as close to the ISR as possible.
2. Never connect capacitors from V_o adjust to either GND, V_{out}, or the Sense pins. Any capacitance added to the V_o adjust pin will affect the stability of the ISR.
3. If the sense pins are not being used, the resistors (R1) and R2 can be connected to V_{out} and GND respectively.
4. An increase in the output voltage must be accompanied by a corresponding reduction in the maximum output current. The revised maximum output current must be reduced to the equivalent of 12Watts.

i.e. $$I_{out}\,(\max) = \frac{12}{V_a}\ \text{Adc},$$

where V_a is the adjusted output voltage.

Figure 1



The respective values of (R1) [adjust down], and R2 [adjust up], can also be calculated using the following formulae.

$$(R1) = \frac{24.9\,(2V_a - V_o)}{2(V_o - V_a)} - R_s \quad k\Omega$$

$$R2 = \frac{24.9\,V_o}{2(V_a - V_o)} - R_s \quad k\Omega$$

Where: V_o = Original output voltage
V_a = Adjusted output voltage
R_s = The resistance given in Table 1

Table1

PT6900 ADJUSTMENT RANGE AND FORMULA PARAMETERS

Series Pt #	PT6903	PT6901	PT6902
V_o (nom)	-1.5V	-2.0V	-5.2V
V_a (min)	-1.1V	-1.4V	-3.7V
V_a (max)	-2.9V	-4.4V	-8.9V
R_s (kΩ)	12.7	10.0	17.4

Table 2

PT6900 ADJUSTMENT RESISTOR VALUES

Series Pt #	PT6903	PT6901	PT6902
Current	6Adc	6Adc	2.5Adc
V_o (nom)	–1.5Vdc	–2.0Vdc	–5.2Vdc
V_a (req'd)			
–1.1	(9.1)kΩ		
–1.2	(24.7)kΩ		
–1.3	(55.8)kΩ		
–1.4	(149.0)kΩ	(6.6)kΩ	
–1.5		(14.9)kΩ	
–1.6	174.0kΩ	(27.4)kΩ	
–1.7	80.7kΩ	(48.1)kΩ	
–1.8	49.6kΩ	(89.6)kΩ	
–1.9	34.0kΩ	(214.0)kΩ	
–2.0	24.7kΩ		
–2.1	18.4kΩ	239.0kΩ	
–2.2	14.0kΩ	115.0kΩ	
–2.3	10.6kΩ	73.0kΩ	
–2.4	8.1kΩ	52.3kΩ	
–2.5	6.0kΩ	39.8kΩ	
–2.6	4.3kΩ	31.5kΩ	
–2.7	2.9kΩ	25.6kΩ	
–2.8	1.7kΩ	21.1kΩ	
–2.9	0.6kΩ	17.7kΩ	
–3.0		14.9kΩ	
–3.1		12.6kΩ	
–3.2		10.8kΩ	
–3.3		9.2kΩ	
–3.4		7.8kΩ	
–3.5		6.6kΩ	
–3.6		5.6kΩ	
–3.7		4.7kΩ	(0.9)kΩ
–3.8		3.8kΩ	(3.9)kΩ
–3.9		3.1kΩ	(7.5)kΩ
–4.0		2.5kΩ	(11.7)kΩ
–4.1		1.9kΩ	(16.6)kΩ
–4.2		1.3kΩ	(22.4)kΩ
–4.3		0.8kΩ	(29.6)kΩ
–4.4		0.4kΩ	(38.6)kΩ
–4.5			(50.2)kΩ
–4.6			(65.6)kΩ
–4.7			(87.2)kΩ
–4.8			(120.0)kΩ
–4.9			(174.0)kΩ
–5.0			(281.0)kΩ
–5.1			(605.0)kΩ
–5.2			
–5.3			630.0kΩ
–5.4			306.0kΩ
–5.5			198.0kΩ
–5.6			144.0kΩ
–5.7			112.0kΩ
–5.8			90.5kΩ
–5.9			75.1kΩ
–6.0			63.5kΩ
–6.2			47.3kΩ
–6.4			36.5kΩ
–6.6			28.8kΩ
–6.8			23.1kΩ
–7.0			18.6kΩ
–7.2			15.0kΩ
–7.4			12.0kΩ
–7.6			9.6kΩ
–7.8			7.5kΩ
–8.0			5.7kΩ
–8.2			4.2kΩ
–8.5			2.2kΩ
–8.9			0.1kΩ

R1 = (Red) R2 = Black

IMPORTANT NOTICE