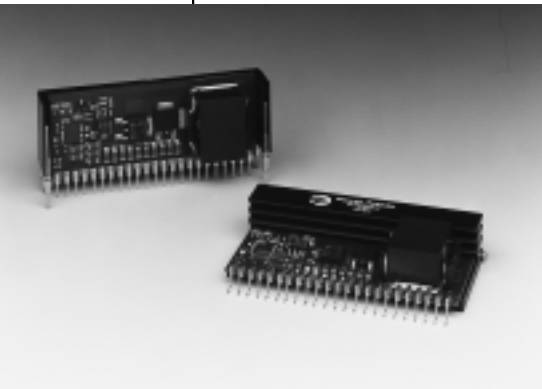


PT6900 Series

12 WATT PLUS TO MINUS VOLTAGE CONVERTER

Revised 11/12/98



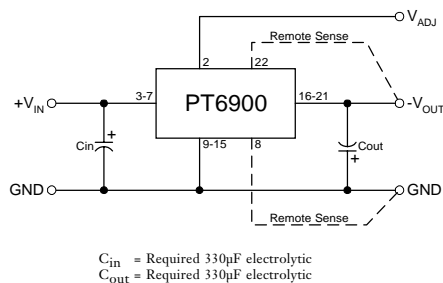
Features

- 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



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		

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.)

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

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 ≤ I _o ≤ 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	V _o -0.05	—	V _o +0.05	V	
Line Regulation	Reg _{line}	4.75V ≤ V _{in} ≤ 5.5V, I _o = I _{max}	—	±0.5	±1.0	%	
Load Regulation	Reg _{load}	V _{in} = +5V, 0.1 ≤ I _o ≤ 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} V _{os}	I _o step between 0.5xI _{max} and I _{max} V _o over/undershoot	V _o = -2.0V	—	100	—	µSec
			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 ≤ V _{in} ≤ 5.5V 0.1A ≤ I _o ≤ 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.

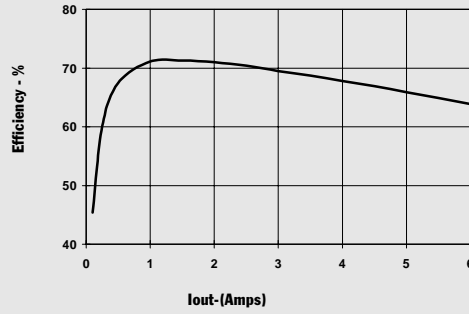
CHARACTERISTIC DATA

PT6900

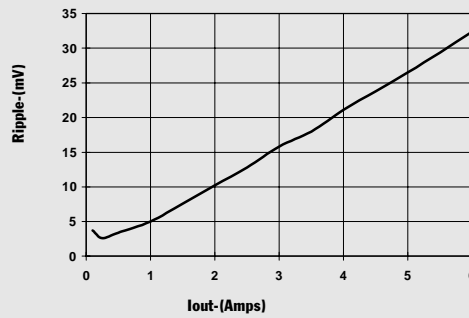
Series

PT6901, -2.0 VDC

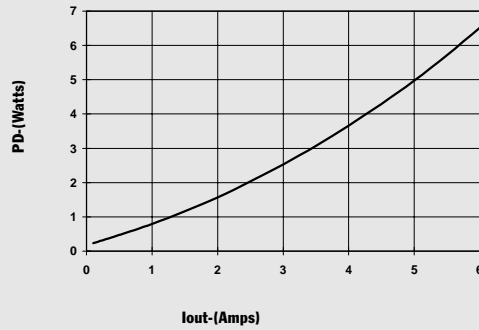
Efficiency vs Output Current (@Vin=+5V)



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



Power Dissipation vs Output Current



[More Application Notes](#)**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).

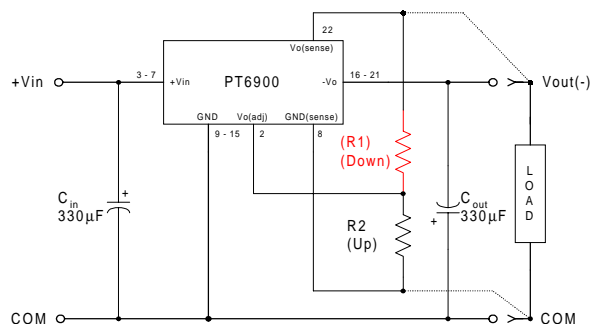
Refer to Figure 1 and Table 2 for both the placement and value of the required resistor, either (R1) or R2 as appropriate.

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.

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

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.

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

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

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

Table 1

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

Series Pt #	PT6903	PT6901	PT6902
Current	6Adc	6Adc	2.5Adc
V _o (nom)	-1.5Vdc	-2.0Vdc	-5.2Vdc
V _a (req'd)			
-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

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