

POSITIVE VOLTAGE REGULATOR

DESCRIPTION

This circuit is a positive voltage regulator designed for both linear and switching applications. Inherent component tracking of the monolithic integrated circuit process provides a high degree of stability and accuracy in addition to fast response to both line and load transients. With an input voltage rating of up to 50V, this device will deliver load currents of 20mA (45mA with 305A). Adding external transistors will increase the current capability to greater than 10amps and further improve regulation.

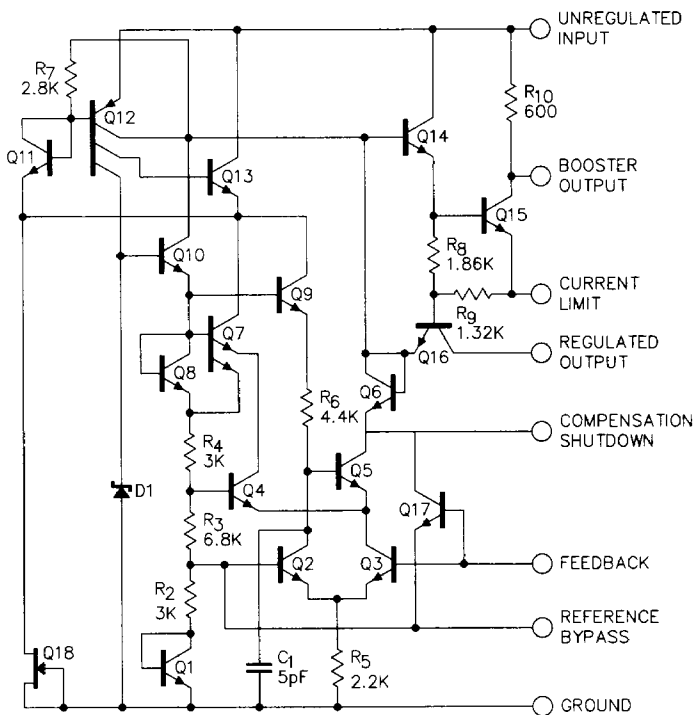
FEATURES

- Output voltage adjustable from 4.5V to 40V
- Load regulation better than 0.01%/mA
- Line regulation better than 0.06%/V
- Ripple rejection of 0.01%/V
- 1.0% maximum temperature variation

HIGH RELIABILITY FEATURES - SG105

- ◆ Available to MIL-STD-883B
- ◆ SG level "S" processing available

BLOCK DIAGRAM



SG105/SG205/SG305/SG305A

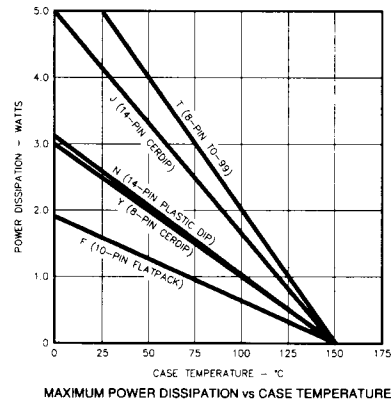
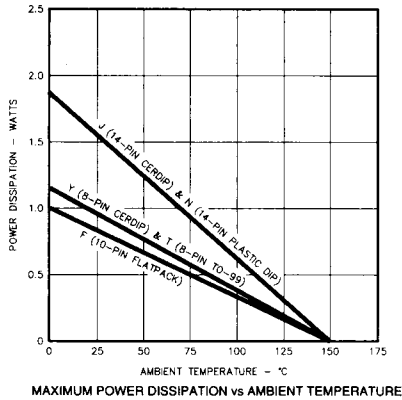
ABSOLUTE MAXIMUM RATINGS (Note 1)

Input Voltage	
SG105	50V
SG205	50V
SG305	40V
SG305A	50V
Storage Temperature Range	
-65°C to 150°C	
Lead Temperature (Soldering, 10 seconds)	
300°C	

Input - Output Voltage Differential	
SG105	30V
SG205	30V
SG305	30V
SG305A	30V
Operating Junction Temperatures	
Hermetic (T, J, F, Y-Packages)	150°C
Plastic (N-Packages)	150°C

Note 1. Values beyond which damage may occur.

THERMAL DERATING CURVES



RECOMMENDED OPERATING CONDITIONS (Note 2)

Input Voltage	
SG105, SG205, SG305A	10V to 48V
SG305	10V to 38V
Input - Output Voltage Differential	
SG105, SG205, SG305, SG305A	5V to 28V

Operating Ambient Temperature Range	
SG105	-55°C to 125°C
SG205	-25°C to 85°C
SG305, SG305A	0°C to 70°C

Note 2: Range over which the device is functional.

ELECTRICAL SPECIFICATIONS

(Unless otherwise specified, these specifications apply over the operating ambient temperatures for SG105 with $-55^{\circ}\text{C} \leq T_A \leq 125^{\circ}\text{C}$, SG205 with $-25^{\circ}\text{C} \leq T_A \leq 85^{\circ}\text{C}$, and SG305 with $0^{\circ}\text{C} \leq T_A \leq 70^{\circ}\text{C}$. Temperature drift effects must be taken into account separately when the unit is operating under conditions of high dissipation. Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.)

Parameter	Test Conditions	SG105/205			SG305			SG305A			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Input Voltage Range		8.5		50	8.0		40	8.5		50	V
Output Voltage Range		4.5		40	4.5		30	4.5		40	V
Input/Output Differential		3.0		30	3.0		30	3.0		30	V
Load Regulation (Note 4)	$I_L < 12\text{mA}$, $R_{SC} = 10\Omega$			0.1			0.1			0.2	%
Line Regulation	$V_{IN} - V_{OUT} \leq 5\text{V}$			0.06			0.06			0.06	%/V
	$V_{IN} - V_{OUT} > 5\text{V}$			0.03			0.03			0.03	%/V
Ripple Feed	$C_{REF} = 10\mu\text{F}$, $f = 120\text{Hz}$			0.01			0.01		0.003		%/V
Temperature Stability (Note 3)				1.0			1.0			1.0	%
Output Noise Voltage	$10\text{Hz} \leq f \leq 10\text{KHz}$, $C_{REF} = 0$		0.005			0.005		0.005			%
Feedback Sense Voltage		1.55	1.7	1.85	1.55	1.7	1.85	1.55		1.85	V
Standby Current Drain				2.0			2.0			2.0	mA
Load Current		0			0			0			mA
Long Term Stability (Note 3)			0.1	1.0		0.1	1.0		0.1	1.0	%

Note 3. This test is guaranteed but not tested.

Note 4. Applies for constant junction temperature.

CHARACTERISTIC CURVES (continued)

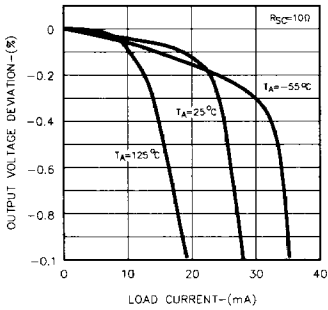


FIGURE 1. LOAD REGULATION

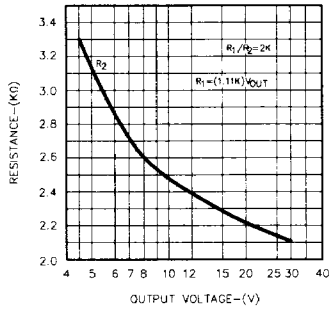


FIGURE 2. OPTIMUM DIVIDER RESISTOR VALUES

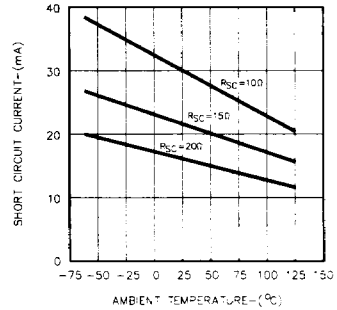


FIGURE 3. CURRENT LIMITING

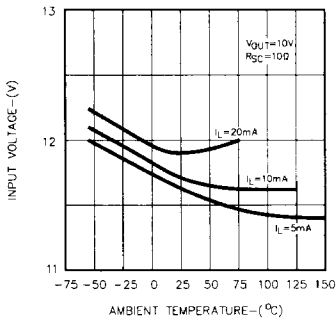


FIGURE 4. DROPOUT VOLTAGE

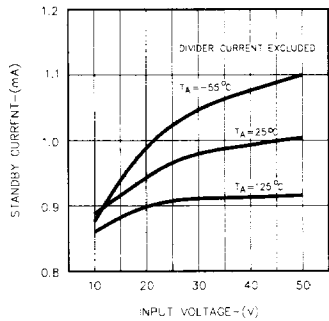


FIGURE 5. STANDBY CURRENT DRAIN

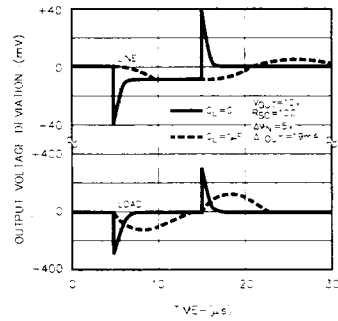


FIGURE 6. TRANSIENT RESPONSE

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APPLICATION CIRCUITS

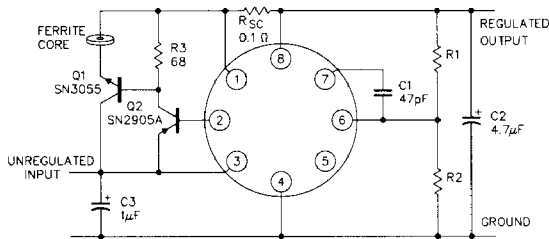


FIGURE 7 - REGULATOR CONNECTED FOR 2 AMP OUTPUT

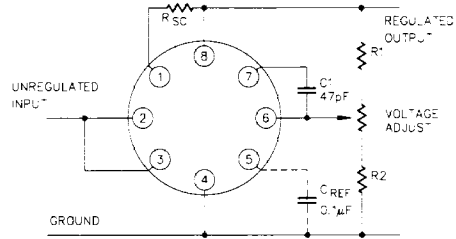


FIGURE 8 - BASIC REGULATOR CIRCUIT

SG105/SG205/SG305/SG305A

CONNECTION DIAGRAMS & ORDERING INFORMATION (See Notes Below)

Package	Part No.	Ambient Temperature Range	Connection Diagram
8-PIN CERAMIC DIP Y - PACKAGE	SG105Y/883B SG105Y SG205Y SG305Y SG305AY	-55°C to 125°C -55°C to 125°C -25°C to 85°C 0°C to 70°C 0°C to 70°C	
14-PIN CERAMIC DIP J - PACKAGE	SG105J/883B SG105J SG205J SG305J SG305AJ	-55°C to 125°C -55°C to 125°C -25°C to 85°C 0°C to 70°C 0°C to 70°C	
14-PIN PLASTIC DIP N - PACKAGE	SG205N SG305N SG305AN	-25°C to 85°C 0°C to 70°C 0°C to 70°C	
10-PIN CERAMIC FLATPACK F - PACKAGE	SG105F/883B SG105F	-55°C to 125°C -55°C to 125°C	
8-PIN TO-99 METAL CAN T-PACKAGE	SG105T/883B SG105T SG205T SG305T SG305AT	-55°C to 125°C -55°C to 125°C -25°C to 85°C 0°C to 70°C 0°C to 70°C	

- Note 1. Contact factory for JAN and DESC product availability.
 2. All packages are viewed from the top.