ADVANCED DATA
SG1526A/SG2526A/SG3526A

Performance Data described herein represent design goals. Final device specifications are subject to change.

REGULATING PULSE WIDTH MODULATOR

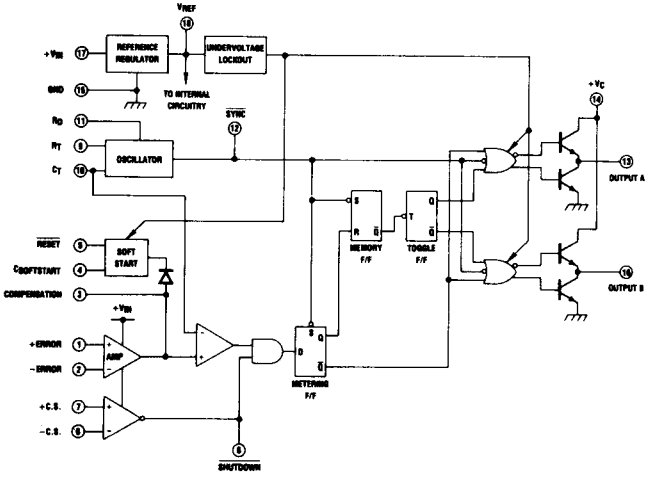
DESCRIPTION

The SG1526A high performance pulse width modulator (PWM) circuit is a direct replacement for the SG1526 in all applications and features improved parametric performance in several key areas. Included are a temperature compensated voltage reference, sawtooth oscillator, error amplifier, pulse width modulator, pulse metering and steering logic, and two low impedance power drivers. Also included are protective features such as soft-start and under-voltage lockout, digital current limiting, double pulse inhibit, a data latch for single pulse metering, adjustable deadtime, and provision for symmetry correction inputs. For ease of interface, all digital control ports are TTL and B-series CMOS compatible. Active LOW logic design allows wired-OR connections for maximum flexibility. This versatile device can be used to implement single-ended or push-pull switching regulators of either polarity, both transformerless and transformer coupled. The SG1526A is characterized for operation over the full military junction temperature range of −55°C to +150°C. The SG2526A is characterized for operation from −25°C to +150°C, and the SG 3526A is characterized for operation from 0°C to +125°C.

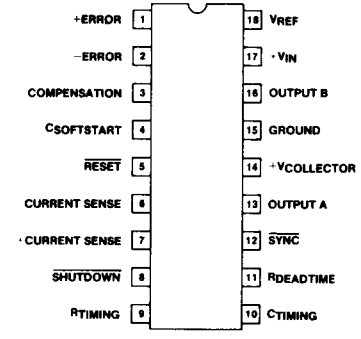
FEATURES

- Low drain and switching currents
- 7 to 35V operation
- High performance 5V ± 1% reference
- Low tempco 1 Hz to 400 kHz oscillator
- Dual 100 mA source/sink outputs
- Digital current limiting
- Double pulse suppression
- Programmable deadtime
- Undervoltage lockout
- Single pulse metering
- Programmable soft-start
- Wide current limit common mode range
- TTL/CMOS compatible logic ports
- Symmetry correction capability
- Guaranteed 6 unit synchronization

BLOCK DIAGRAM



CONNECTION DIAGRAM (TOP VIEW)



J PACKAGE
TO-116 STYLE

CHIP LAYOUT

ORDER INFORMATION

Part Number	OPERATING AMBIENT Temperature Range	Package
SG1526AJ	−55°C to +125°C	18-pin Ceramic DIP
SG2526AJ	−25°C to +85°C	18-pin Ceramic DIP
SG3526AJ	0°C to +70°C	18-pin Ceramic DIP
SG3526AN	0°C to +70°C	18-pin Plastic DIP

Regulating Pulse Width Modulator

ABSOLUTE MAXIMUM RATINGS (Note 1)

Input Voltage (+VIN)	+40V	Power Dissipation at T_A = +25°C (Note 2)	1000 mW
Collector Supply Voltage (+ VC)	+40V	Thermal Resistance: junction to ambient	100°C/W
Logic Inputs	−0.3V to +5.5V	Power Dissipation at T_C = +25°C (Note 3)	3000 mW
Analog Inputs	−0.3V to +VIN	Thermal Resistance: junction to case	42°C/W
Source/Sink Load Current (each output)	200 mA	Operating Junction Temperature	+150°C
Reference Load Current	50 mA	Storage Temperature Range	−65°C to +150°C
Logic Sink Current	15 mA	Lead Temperature (soldering, 10 seconds)	+300°C

Note 1. Values beyond which damage may occur.
Note 2. Derate at 10 mW/°C for ambient temperaures above +50°C.
Note 3. Derate at 24 mW/°C for case temperatures above +25°C.

RECOMMENDED OPERATING CONDITIONS (Note 4)

Input Voltage	+ 7V to + 35V	Oscillator Timing Capacitor	1nF to 20μF
Collector Supply Voltage	+4.5V to +35V	Available Deadtime Range at 40kHz	3% to 50%
Sink/Source Load Current (each output)	0 to 100 mA	Operating Junction Temperature Range	
Reference Load Current	− 5 to 20 mA	SG1526A	−55°C to +150°C
Oscillator Frequency Range	1 Hz to 400 kHz	SG2526A	−25°C to +150°C
Oscillator Timing Resistor	2 kΩ to 150 kΩ	SG3526A	0°C to +125°C

Note 4. Range over which the device is functional and parameter limits are guaranteed.

ELECTRICAL CHARACTERISTICS

(+VIN = 15V, and over operating junction temperature, unless otherwise specified)

PARAMETER	CONDITIONS	SG1526A/2526A			SG3526A			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
REFERENCE SECTION (Note 5)								
Output Voltage	T_j = +25°C	4.95	5.00	5.05	4.90	5.00	5.10	V
Line Regulation	+ VIN = 7 to 35V		2	10		2	15	mV
Load Regulation	I_L = − 5 to + 20 mA		5	10		5	20	mV
Temperature Stability	Over Operating T_j		15	50		15	50	mV
Total Output Voltage Range	Over Recommended Operating Conditions	4.90	5.00	5.10	4.85	5.00	5.15	V
Short Circuit Current	VREF = 0V	25	50	100	25	50	100	mA
UNDERVOLTAGE LOCKOUT								
$\overline{\text{RESET}}$ Output Voltage	VREF = 3.8V		0.2	0.4		0.2	0.4	V
$\overline{\text{RESET}}$ Output Voltage	VREF = 4.8V	2.4	4.8		2.4	4.8		V
OSCILLATOR SECTION (Note 6)								
Initial Accuracy	T_j = +25°C		±3	±8		±3	±8	%
Voltage Stability	+ VIN = 7 to 35V		0.5	1		0.5	1	%
Temperature Stability	Over Operating T_j		1	3		1	3	%
Minimum Frequency	R_T = 150 kΩ, C_T = 20 μF			1			1	Hz
Maximum Frequency	R_T = 2 kΩ, C_T = 1.0 nF	400			400			kHz
Sawtooth Peak Voltage	+VIN = 35V		3.0	3.5		3.0	3.5	V
Sawtooth Valley Voltage	+ VIN = 7V	0.5	1.0		0.5	1.0		V

Note 5. I_L = 0 mA.
Note 6. FOSC = 40 kHz (R_T = 4.12 kΩ ± 1%, C_T = .01 μF ± 1%, R_D = 0Ω

ELECTRICAL CHARACTERISTICS (continued)

PARAMETER	CONDITIONS	SG1526A/2526A			SG3526A			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
ERROR AMPLIFIER SECTION (Note 7)								
Input Offset Voltage	RS ≤ 2 kΩ		2	5		2	10	mV
Input Bias Current			−350	−1000		−350	−2000	nA
Input Offset Current			35	100		35	200	nA
DC Open Loop Gain	RL ≥ 10 Meg Ω	64	72		60	72		dB
High Output Voltage	Vpin1 −Vpin2≥150mV, I_{source} = 100μA	3.6	4.2		3.6	4.2		V
Low Output Voltage	Vpin2 −Vpin1≥150mV, I_{sink} = 100μA		0.2	0.4		0.2	0.4	V
Common Mode Rejection	RS ≤ 2kΩ	70	94		70	94		dB
Supply Voltage Rejection	+VIN = 12 to 18V	66	80		66	80		dB
P.W.M. COMPARATOR (Note 6)								
Minimum Duty Cycle	Vcompensation = +0.4V			0			0	%
Maximum Duty Cycle	Vcompensation = +3.6V	45	49		45	49		%
DIGITAL PORTS (SYNC, SHUTDOWN, and RESET)								
HIGH Ouput Voltage	Isource = 40 μA	2.4	4.0		2.4	4.0		V
LOW Output Voltage	Isink = 3.6 mA		0.2	0.4		0.2	0.4	V
HIGH Input Current	VIH = +2.4V		−125	−200		−125	−200	μA
LOW Input Current	VIL = +0.4V		−225	−360		−225	−360	μA
CURRENT LIMIT COMPARATOR (Note 8)								
Sense Voltage	RS ≤ 50 Ω	90	100	110	80	100	120	mV
Input Bias Current			−3	−10		−3	−10	μA
SOFT-START SECTION								
Error Clamp Voltage	RESET = +0.4V		0.1	0.4		0.1	0.4	V
CS Charging Current	RESET = +2.4V	50	100	150	50	100	150	μA
OUTPUT DRIVERS (Each Output) (Note 9)								
HIGH Output Voltage	Isource = 20 mA	12.5	13.5		12.5	13.5		V
	Isource = 100 mA	12	13		12	13		V
LOW Output Voltage	Isink = 20 mA		0.2	0.3		0.2	0.3	V
	Isink = 100 mA		1.2	2.0		1.2	2.0	V
Collector Leakage	VC = 40V		50	150		50	150	μA
Rise Time	CL = 1000 pF		0.3	0.6		0.3	0.6	μSec
Fall Time	CL = 1000 pF		0.1	0.2		0.1	0.2	μSec
POWER CONSUMPTION (Note 10)								
Standby Current	SHUTDOWN = +0.4V		14	20		14	20	mA

Note 7. V_{CM} = 0 to +5.2V

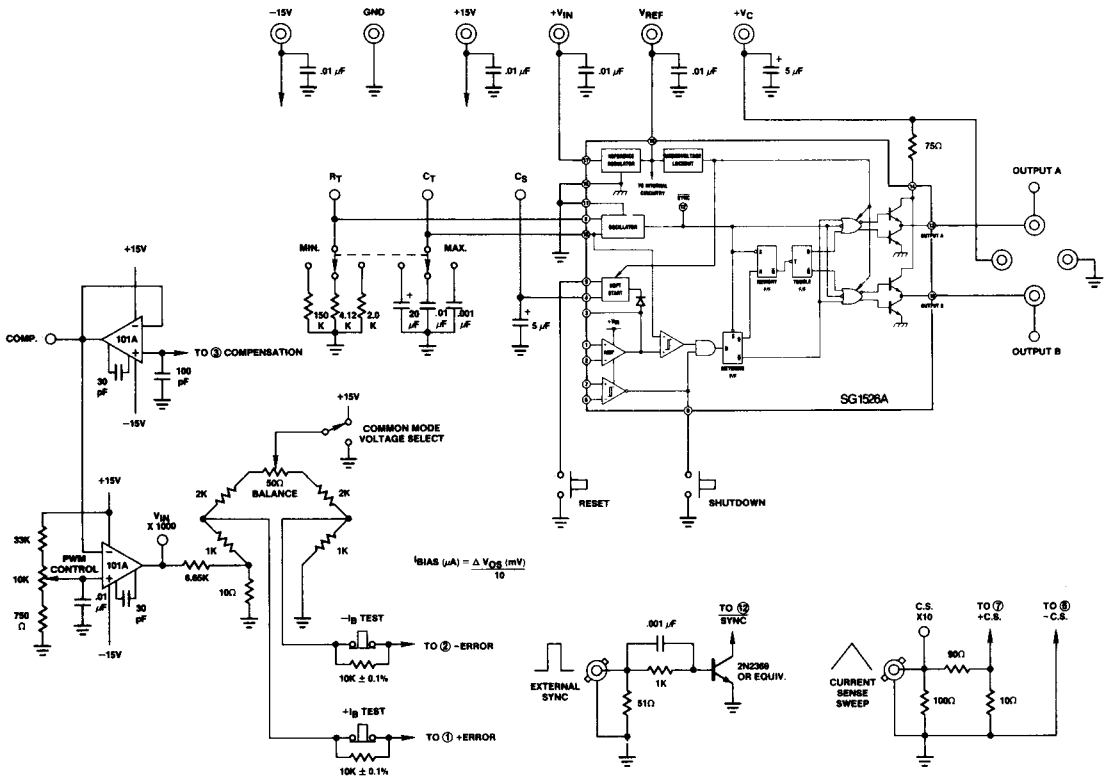
Note 8. V_{CM} = 0 to V_{IN} − 2.5V

Note 9. V_C = +15V

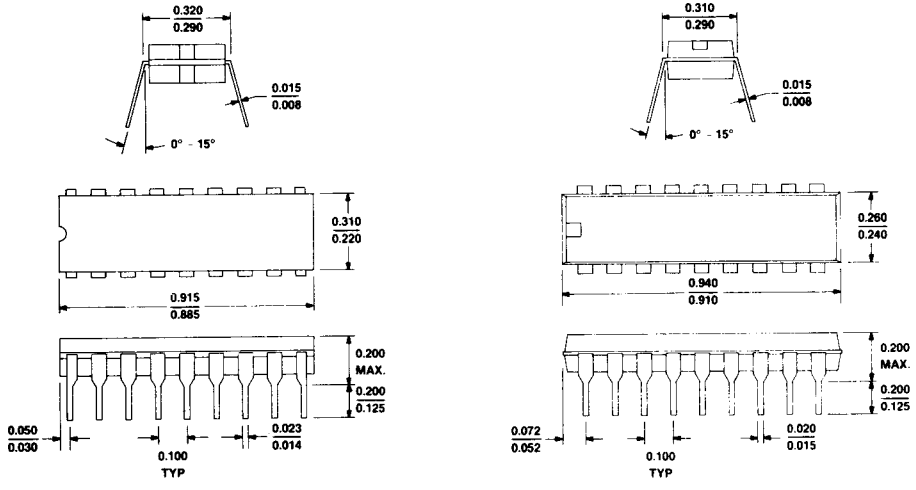
Note 10. $+V_{IN}$ = + 35V, R_T = 4.12kΩ

Regulating Pulse Width Modulator

SG1526A LAB TEST FIXTURE



PACKAGE DIMENSIONS



J PACKAGE
18 PIN CERDIP
ALLOY 42 LEADFRAME

N PACKAGE
18 PIN PLASTIC DIP
COPPER ALLOY LEADFRAME