

Regulating Pulse Width Modulator

FEATURES

- $\pm 5\%$ Typ. Oscillator Tolerance
- 20mV/1000 Hrs Typ. Long Term Stability
- Interchangeable with all SG3524 or LM3524 Devices
- Operates Above 100kHz

APPLICATIONS

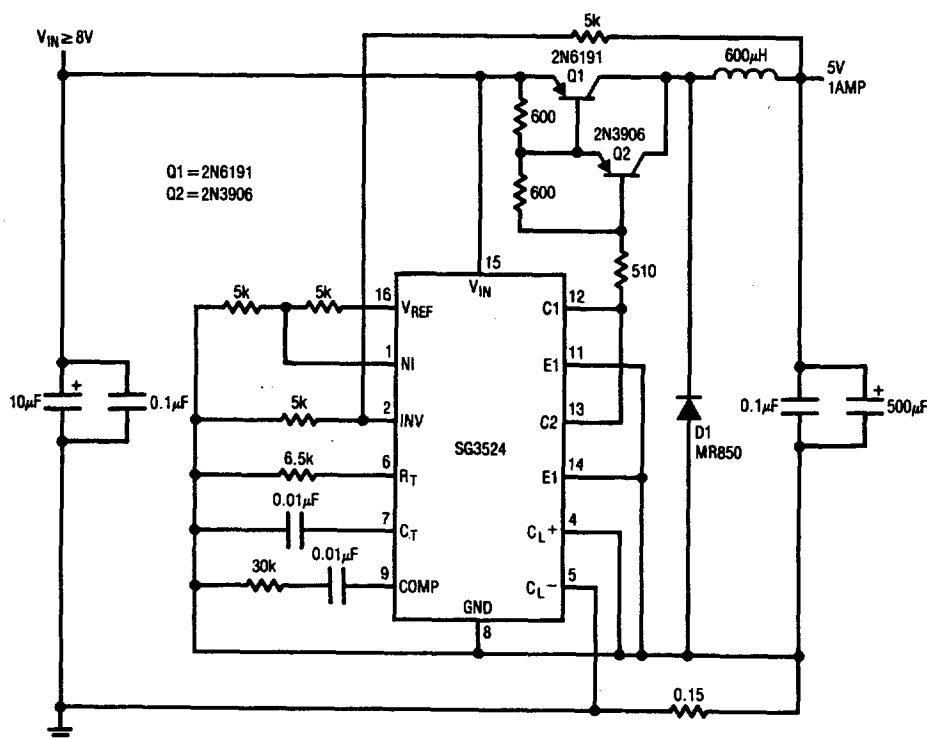
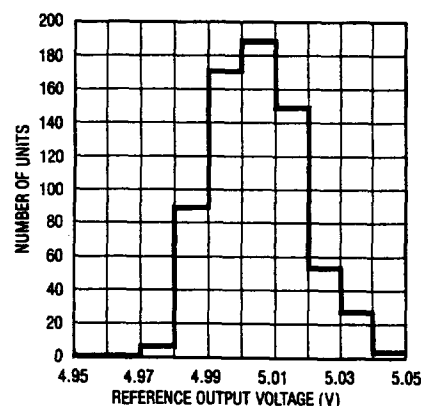
- Switching Power Supplies
- Motor Speed Control
- Off-Line Power Converters

DESCRIPTION

The SG3524 PWM switching regulator control circuit contains all the essential circuitry to implement single-ended or push-pull switching regulators. Included on the circuit are oscillator, voltage reference, a pulse width modulator, error amplifier, overload protection circuitry and output drivers.

Although pin-for-pin and functionally compatible with industry standard 3524 devices, Linear Technology has incorporated several improvements in the design of the 3524. A subsurface zener reference has been used to provide excellent stability with time and the reference is trimmed at the wafer level.

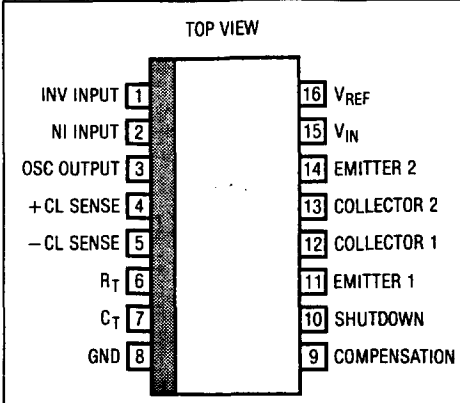
Linear Technology Corporation's advanced processing, design and passivation techniques make the SG3524 a superior and more reliable choice over previous devices.

5
5V, 1 Amp Regulator

Distribution of Reference Output Voltage


ABSOLUTE MAXIMUM RATINGS

Input Voltage	40V
Reference Output Current	50mA
Output Current (Each Output)	100mA
Oscillator Charging Current (Pin 6 or 7)	5mA
Internal Power Dissipation (Note 1)	1W
Operating Temperature Range	0°C to 70°C
Storage Temperature Range	-65°C to 150°C
Lead Temperature (Soldering, 10 sec.)	300°C

PACKAGE/ORDER INFORMATION

 TOP VIEW S16 PACKAGE PLASTIC SO		ORDER PART NUMBER
		SG3524S
		PART MARKING
		SG3524S

ELECTRICAL CHARACTERISTICS (Note 2)

PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
Reference Section:						
Output Voltage		●	4.6	5.0	5.4	V
Line Regulation	$V_{IN} = 8V \text{ to } 40V$	●		10	30	mV
Load Regulation	$I_L = 0mA \text{ to } 20mA$	●		20	50	mV
Ripple Rejection	$f = 120Hz$			66		dB
Short Circuit Current Limit	$V_{REF} = 0$			100		mA
Temperature Stability		●		0.3	1	%
Long Term Stability				20		mV/√khr
Oscillator Section:						
Maximum Frequency	$C_T = 0.001\mu F, R_T = 2k\Omega$	●		300		kHz
Initial Accuracy	R_T and C_T Constant			5		%
Voltage Stability	$V_{IN} = 8V \text{ to } 40V$				1	%
Temperature Stability	Note 3	●		2		%
Output Amplitude	Pin 3			3.5		V
Output Pulse Width	$C_T = 0.01\mu F, T_A = 25^\circ C$			0.5		μs
Error Amplifier Section:						
Input Offset Voltage	$V_{CM} = 2.5V$	●		2	10	mV
Input Bias Current	$V_{CM} = 2.5V$	●		2	10	μA
Open Loop Voltage Gain		●	60	80		dB
Common-Mode Voltage			1.8		3.4	V
Common-Mode Rejection Ratio				70		dB
Small Signal Bandwidth	$A_V = 0dB$			3		MHz
Output Voltage			0.5		3.8	V
Comparator Section:						
Duty Cycle	% Each Output On	●	0		45	%
Input Threshold	Zero Duty Cycle	●		1		V
Input Threshold	Max Duty Cycle	●		3.5		V
Input Bias Current		●		1		μA

ELECTRICAL CHARACTERISTICS (Note 2)

PARAMETER	CONDITIONS		SG3524			UNITS
			MIN	TYP	MAX	
Current Limiting Section:						
Sense Voltage	Pin 9 = 2V with Error Amplifier Set for Max Out		180	200	220	mV
Sense Voltage T.C.		●	0.2			mV/°C
Common-Mode Voltage		●	− 1	1		V
Output Section: (Each Output)						
Collector-Emitter Voltage		●	40			V
Collector Leakage Current	V _{CE} = 40V	●		0.1	50	μA
Saturation Voltage	I _C = 50mA	●		1	2	V
Emitter Output Voltage	V _{IN} = 20V	●	17	18		V
Rise Time	R _C = 2kΩ			0.2		μs
Fall Time	R _C = 2kΩ			0.1		μs
Total Standby Current:	V _{IN} = 40V (Note 4)	●		8	10	mA

The ● denotes specifications that apply over the full operating temperature range.

Note 1: For operating at elevated temperatures, the device in the SO package must be derated at 100°C/W to a maximum junction temperature of 115°C.

Note 2: These specifications apply for $V_{IN} = 20V$, $f = 20kHz$, $T_A = 25^\circ C$ unless otherwise noted.

Note 3: Although many manufacturers specify a maximum specification of 2%, Linear Technology's experience is that this specification is not being presently met by other manufacturers. Linear Technology's basic design, although improved, is essentially identical to other manufacturer's devices. Linear Technology is, however, unwilling to place a maximum specification on its data sheet which cannot be met or guaranteed.

Note 4: Standby current does not include the oscillator charging current, error and current limit dividers, and the outputs are open circuit.