

LINEAR INTEGRATED CIRCUITS

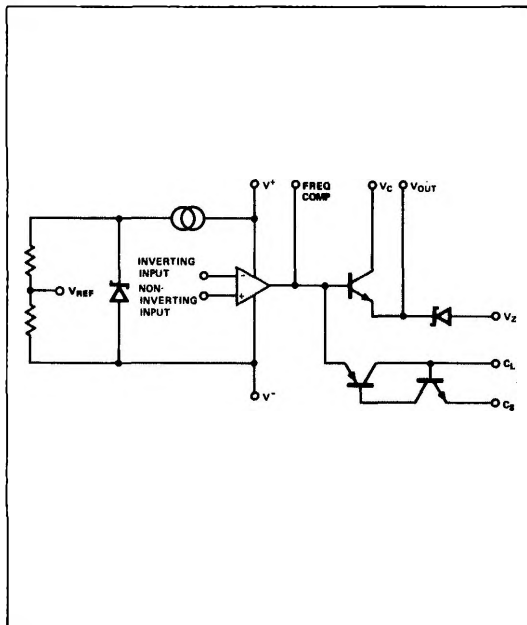
DESCRIPTION

The 550 is a precision monolithic voltage regulator capable of positive or negative supply operation as series, shunt, switching or floating regulator. Guaranteed line regulation is provided for input voltages ranging from 8.5 volts to as high as 50 volts. The output voltage can be continuously adjusted from 2 volts to 40 volts. Foldback current limiting can be accomplished through the use of one external resistor. Internal circuitry permits on and off strobing with DTL and TTL logic inputs and latched shut-down with a pulsed input.

FEATURES:

- LINE REGULATION GUARANTEED OVER INPUT VOLTAGE RANGE OF 8.5 VOLTS TO AS HIGH AS 50 VOLTS.
- OUTPUT VOLTAGE CONTINUOUSLY ADJUSTABLE FROM 2 VOLTS TO 40 VOLTS
- .01% LINE AND LOAD REGULATION
- ADJUSTABLE LIMITING OF SHORT CIRCUIT CURRENT
- FOLDBACK CURRENT LIMITING WITH ONE EXTERNAL RESISTOR
- REMOTE AND LATCHING SHUTDOWN
- OUTPUT CURRENT UP TO 150mA WITHOUT EXTERNAL POWER TRANSISTORS

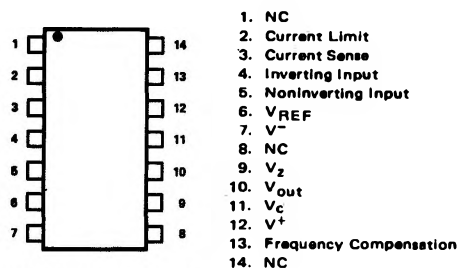
BASIC CIRCUIT SCHEMATIC



PIN CONFIGURATIONS

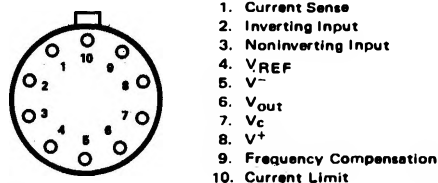
A PACKAGE

(Top View)



ORDER PART NO. NE550A

L PACKAGE



ORDER PART NOS. NE550L/SE550L

ABSOLUTE MAXIMUM RATINGS:

	SE550	NE550
Voltage from V+ to V-	50V	40V
Input-Output Voltage		
Differential	45V	37V
Maximum Output Current	150mA	150mA
Current from Vz	15mA	15mA
Internal Power		
Dissipation (Note 1)	800mW	800mW
Operating Temperature		
Range	-55°C to +125°C	-0°C to 70°C
Storage Temperature		
Range	-65°C to +150°C	-65°C to +150°C
Lead Temperature	300°C	300°C

NOTE:

1. Rating applies for case temperatures to 125°C; derate linearly at 6.5mW/°C for ambient temperatures above +75°C.

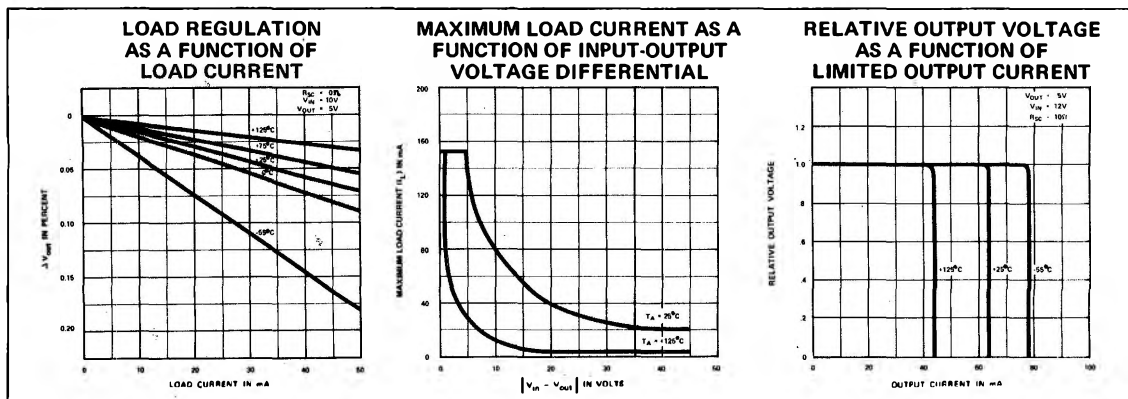
PHYSICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise specified) (Notes 1 and 2)

PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
NE550					
Line Regulation		.08	0.3	% V_{out}	$V_{in} = 8.5$ to 40V $0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$, $V_{in} = 12$ to 40V
Load Regulation		.03	0.2	% V_{out}	$I_L = 1\text{mA}$ to 50mA
Ripple Rejection		75	0.4	% V_{out}	$0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$, $I_L = 1\text{mA}$ to 50mA
Average Temperature Coefficient of Output Voltage		90		dB	$f = 50\text{ Hz}$ to 10 kHz , $C_{REF} = 0$ $f = 50\text{ Hz}$ to 10 kHz , $C_{REF} = 5\mu\text{F}$
Short Circuit Current Limit		.002	.015	%/ $^\circ\text{C}$	$0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$
Reference Voltage	50	60	70	mA	$R_{SC} = 10\Omega$, $V_{out} = 0$
Output Noise Voltage	1.53	1.63	1.73	V	
Long Term Stability		20		$\mu\text{V rms}$	$BW = 100\text{ Hz}$ to 10 kHz , $C_{REF} = 0$
Standby Current Drain		2.5		$\mu\text{V rms}$	$BW = 100\text{ Hz}$ to 10 kHz , $C_{REF} = 5\mu\text{F}$
Input Voltage Range		0.1		%/1000 hrs.	
Output Voltage Range		1.6	3.0	mA	$I_L = 0$, $V_{in} = 40\text{V}$
Input-Output Voltage Differential	8.5		40	V	
	2.0		37	V	
	3.0		38	V	
SE550					
Line Regulation		0.05	0.1	% V_{out}	$V_{in} = 12$ to 40V
Load Regulation		0.2	0.6	% V_{out}	$V_{in} = 8.5$ to 50V
Ripple Rejection		0.25		% V_{out}	$-55^\circ\text{C} \leq T_A \leq +125^\circ\text{C}$, $V_{in} = 12$ to 40V
Average Temperature Coefficient of Output Voltage		0.03	.10	% V_{out}	$I_L = 1\text{mA}$ to 50mA
Short Circuit Limit		.6		% V_{out}	$-55^\circ\text{C} \leq T_A \leq +125^\circ\text{C}$, $I_L = \text{mA}$ to 50mA
Reference Voltage		75		dB	$F = 50\text{ Hz}$ to 10 kHz , $C_{REF} = 0$
Output Noise Voltage		90		dB	$F = 50\text{ Hz}$ to 10 kHz , $C_{REF} = 5\mu\text{F}$
Long Term Stability		.002	.012	%/ $^\circ\text{C}$	$-55^\circ\text{C} \leq T_A \leq +125^\circ\text{C}$
Standby Current Drain	50	60	70	mA	$R_{SC} = 10\Omega$, $V_{out} = 0$
Input Voltage Range	1.58	1.63	1.68	V	
Output Voltage Range		20		$\mu\text{V rms}$	$BW = 100\text{ Hz}$ to 10 kHz , $C_{REF} = 0$
Input-Output Voltage Differential		2.5		$\mu\text{V rms}$	$BW = 100\text{ Hz}$ to 10 kHz , $C_{REF} = 5\mu\text{F}$
		0.1		%/1000 hrs.	
		1.3	2.0	mA	$I_L = 0$, $V_{in} = 50\text{V}$
	8.5		50	V	
	2.0		40	V	
	3.0		45	V	

NOTES

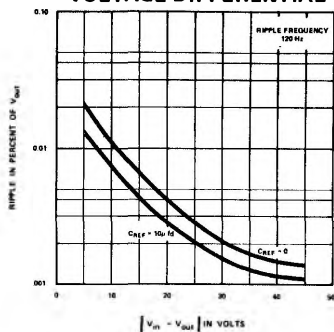
1. Unless otherwise specified, $T_A = 25^\circ\text{C}$, $V_{in} = V^+ - V_- = 12\text{V}$, $V_- = 0\text{V}$, $V_{out} = 5\text{V}$, $I_L = 1\text{mA}$, $R_{SC} = 0$, $C_T = 100\text{pF}$, and divider impedance as seen by error amplifier $\approx 2\text{k}\Omega$ when connected as shown in Figure 1.
2. The load and line regulation specifications are for constant junction temperature. Temperature drift effects must be taken into account separately when the unit is operating under conditions of high or varying dissipation.

PHYSICAL CHARACTERISTIC CURVES

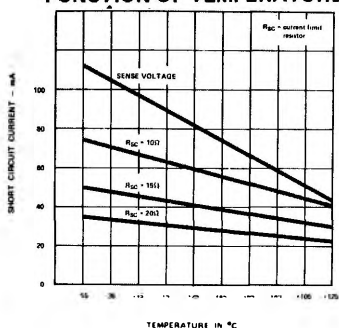


TYPICAL CHARACTERISTIC CURVES (Cont'd.)

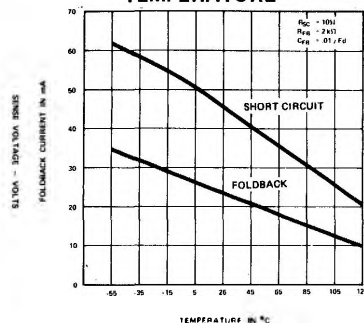
RIPPLE REJECTION AS A FUNCTION OF INPUT-OUTPUT VOLTAGE DIFFERENTIAL



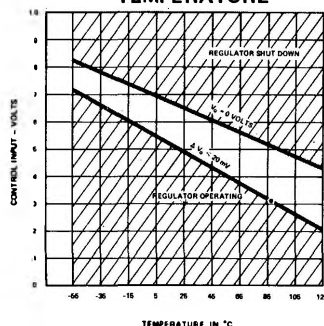
SENSE VOLTAGE AND SHORT CIRCUIT CURRENT LIMIT AS A FUNCTION OF TEMPERATURE



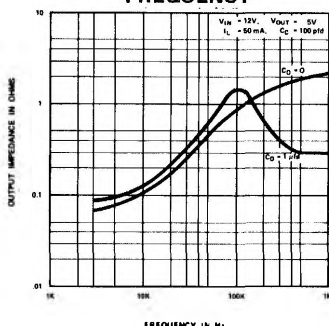
SHORT CIRCUIT AND FOLDBACK CURRENTS AS A FUNCTION OF TEMPERATURE



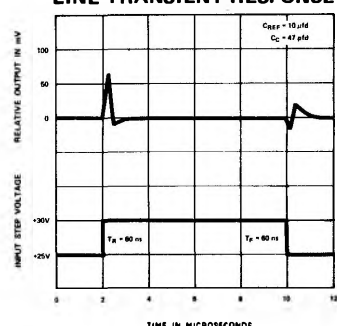
REMOTE CONTROL CHARACTERISTICS AS A FUNCTION OF TEMPERATURE



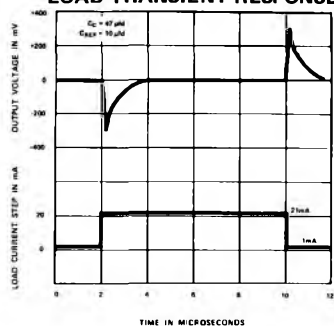
OUTPUT IMPEDANCE AS A FUNCTION OF FREQUENCY



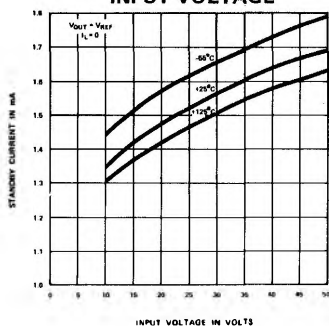
LINE TRANSIENT RESPONSE



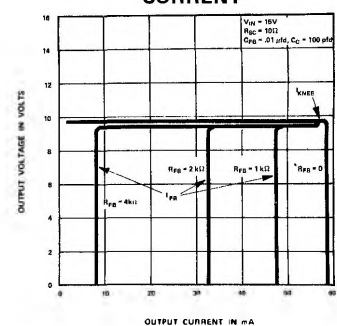
LOAD TRANSIENT RESPONSE



STANDBY CURRENT AS A FUNCTION OF INPUT VOLTAGE



FOLDBACK CURRENT LIMITED OUTPUT VOLTAGE AS A FUNCTION OF OUTPUT CURRENT



TYPICAL APPLICATIONS

BASIC POSITIVE VOLTAGE REGULATOR

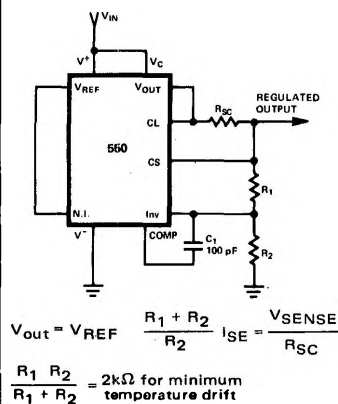


FIGURE 1

NEGATIVE VOLTAGE REGULATOR

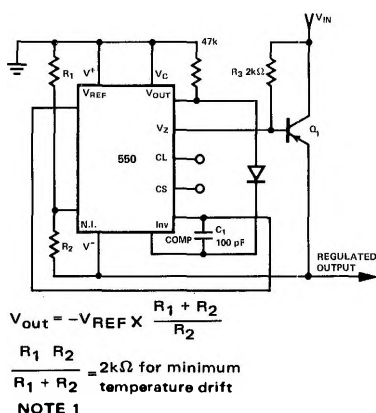


FIGURE 2

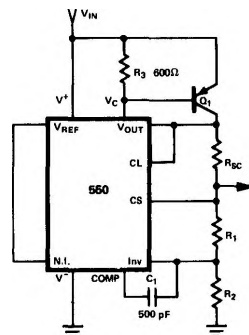
POSITIVE VOLTAGE REGULATOR
(External PNP Pass Transistor)

FIGURE 3

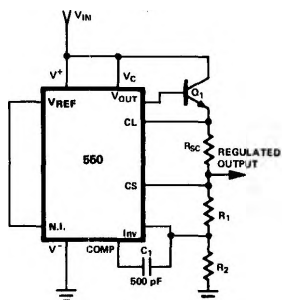
POSITIVE VOLTAGE REGULATOR
(External NPN Pass Transistor)

FIGURE 4.

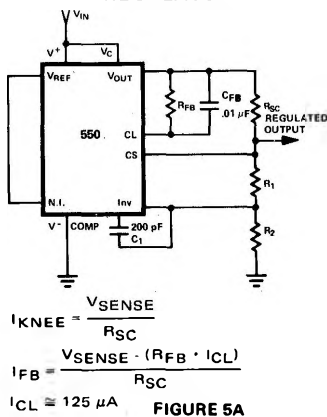
FOLDBACK CURRENT LIMITED
REGULATOR

FIGURE 5A

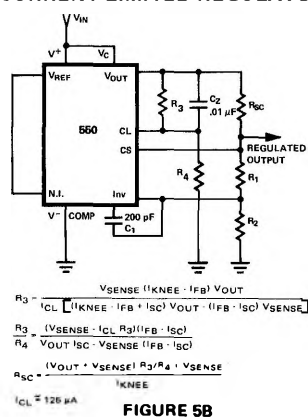
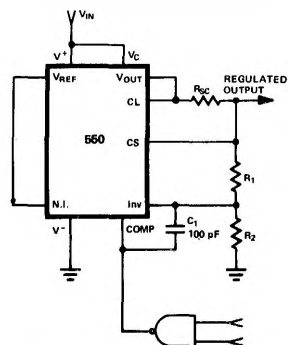
SECOND ORDER FOLDBACK
CURRENT LIMITED REGULATOR

FIGURE 5B

REMOTE SHUTDOWN REGULATOR
WITH CURRENT LIMITING

1/4 8T80, 1/6 8T90, 1/10 8T01B, etc.

FIGURE 6

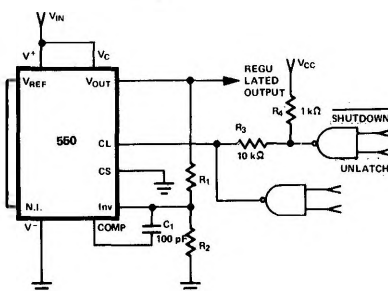
REMOTE LATCHING SHUTDOWN
REGULATOR8415, 8417, 2/3 8471, 1/3 8891,
8T90, 1/2 8481, 8881, 8T90
NOTE 2

FIGURE 7

POSITIVE SWITCHING REGULATOR

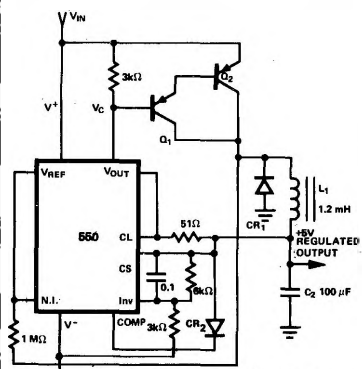
 L_1 is 50 turns of #22 wire wound
on Ferroxcube. 42/29-377 A400

FIGURE 8

TYPICAL APPLICATIONS (Cont'd.)

POSITIVE FLOATING REGULATOR

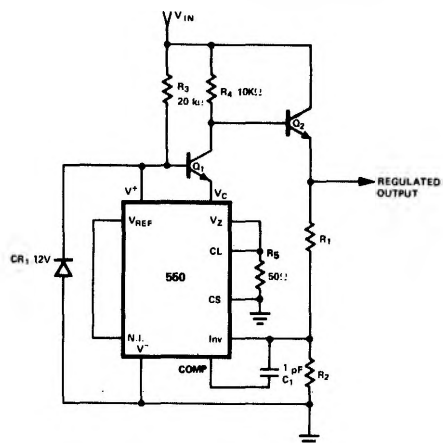


FIGURE 9

NEGATIVE FLOATING REGULATOR

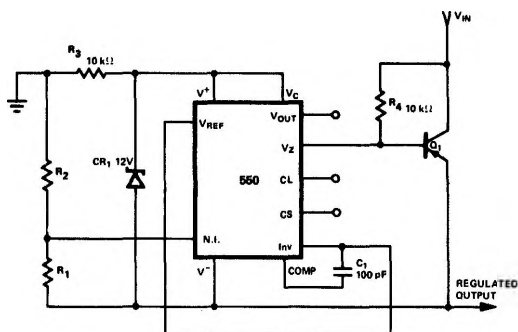


FIGURE 10

NOTES:

1. To utilize the SE550L in applications which require V_z , an external 6.2 volt zener diode should be connected in series with V_{OUT} .
2. The "Shut-down" gate need only be pulsed to latch the regulator output to zero. R_4 may be omitted for active pull-up devices. The "Unlatch" gate must have an open collector.

EQUIVALENT CIRCUIT

