

SWITCHED-MODE POWER SUPPLY CONTROL CIRCUIT

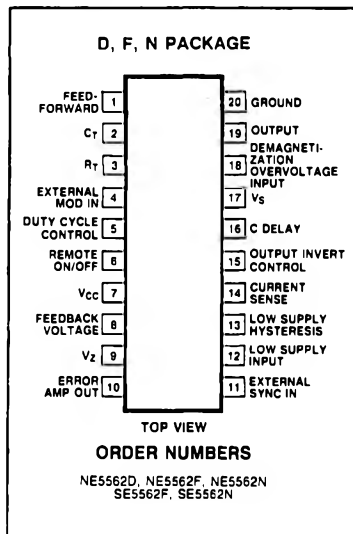
SE/NE5562

Preliminary**DESCRIPTION**

The SE/NE5562 is a single output control circuit for Switched Mode Power Supplies. This single monolithic IC contains all control and protection features needed for full featured Switched Mode Power Supplies.

FEATURES

- Stabilized power supply
- Temperature compensated reference source
- Sawtooth generator
- Pulse width modulator
- Remote on/off switching
- Current limiting (2 levels)
- Low supply voltage, with adjustable hysteresis
- Loop fault protection
- Demagnetization/over voltage protection
- Duty cycle adjust and clamp
- Feed forward control
- External synchronization
- Total shutdown after adjustable number of overcurrent faults

PIN CONFIGURATION**ABSOLUTE MAXIMUM RATINGS**

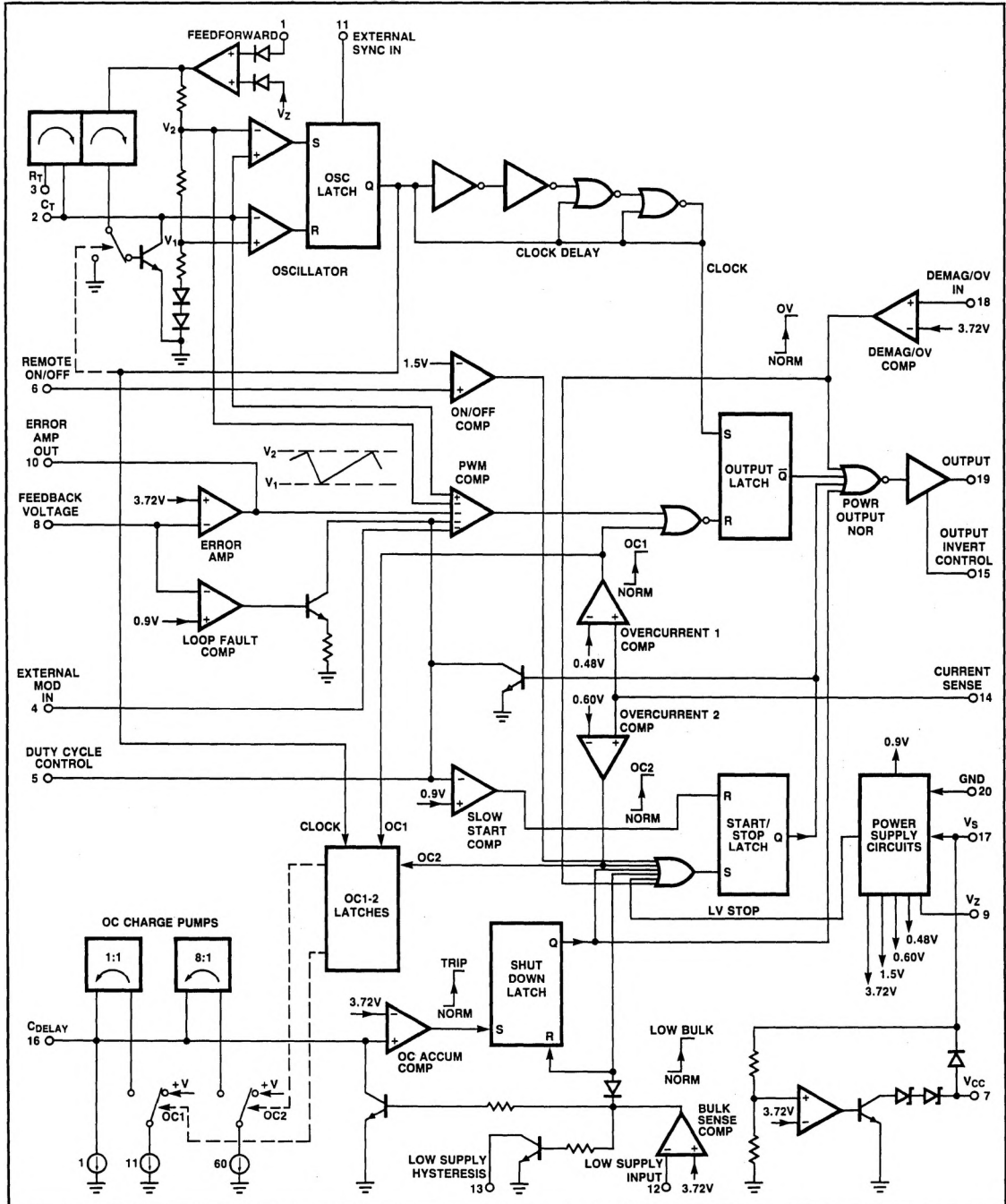
SYMBOL AND PARAMETER	RATING	UNIT
Supply (pin 15)		
Voltage sourced	+15	V
Current sourced	30	mA
Output transistor		
Output current	100	mA
Sync (pin 11) positive		
negative		
Remote on/off (pin 6) positive		
negative		
Feedback pin (pin 8) positive		
negative		
External mod in (pin 4) positive		
negative		
Feedforward (pin 1) positive		
negative		
Error amp out (pin 10) positive		
negative		
Demag/O.V. in (pin 18) positive		
negative		
Current sense (pin 14) positive		
negative		
Low supply sense and hysteresis (Pin 12, 13) positive		
negative		

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BLOCK DIAGRAM



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Preliminary**DC ELECTRICAL CHARACTERISTICS:** $V_{CC} = 12V$ unless otherwise specified

SYMBOL AND PARAMETER	TEST CONDITIONS	SE5562			NE5562			UNIT
		Min	Typ	Max	Min	Typ	Max	
REFERENCE SECTION								
Reference Voltage V_R	25°C ± 50 ppm/°C (± 1%) Over Temp	3.68	3.72	3.76		3.72		V
Zener Voltage V_Z	IL = 7mA	7.22	7.60	7.98		7.60		V
OSCILLATOR SECTION								
Frequency Range				300			300	kHz
MODULATOR SECTION								
Modulator Input Current	Over Temp $V_{IN} = 1V$		2	20		2	20	μA
HOUSEKEEPING FUNCTIONS								
Deltamax Input Current	Over Temp $V_{IN} = 1V$		2	20		2	20	μA
Accuracy of Duty Cycle Control	f = 15kHz to 150kHz $V_{IN} = 55\%$ of V_Z		50			50		% of Duty Cycle
Low Supply Voltage Shutdown	V_S for Restart Condition	$V_Z + .2$	$V_Z + .7$	$V_Z + 1.5$	$V_Z + .2$	$V_Z + .7$	$V_Z + 1.7$	V
Loop Fault Protection Threshold		.72	.9	.98	.72	.9	.98	V
Demag/Over Voltage Threshold Voltage		3.60	3.72	3.84	3.60	3.72	3.84	V
Over Voltage Input Bias Current			1	10		1	10	μA
FEED FORWARD FUNCTION								
Duty Cycle Reduction at 50% Duty Cycle	Feedforward Voltage V_{FF} $V_{FF} = 2V_Z$		12.785			12.8		% of Duty Cycle
Feedforward Bias Current	Feedforward Voltage V_{FF} $V_{FF} = 2V_Z$		.2	5		.2	5	μA
EXTERNAL SYNC								
"ON" Input voltage		.2		.8	.2		.8	V
"OFF" Input Voltage		2		V_Z	2		V_Z	V
Input Low Current	$V_{IN} = 0V$		1	10		1	10	μA
ERROR AMPLIFIER SECTION								
Amplifier Open Loop Gain	$R_L \geq 100K$	60	80		60	80		dB
Amplifier Bias Current			.5	5		5	5	μA
Amplifier Output Current		-1		+1	-1		+1	μA
Amplifier Output Swing		1		$V_Z - 1$	1		$V_Z - 1$	V
REMOTE ON/OFF								
"OFF" Input Voltage		0		.8	0		.8	V
"ON" Input Voltage		2		V_Z	2		V_Z	V
Input Low Current	$V_{IN} = 0V$		1	10		1	10	μA
LOW SUPPLY SHUTDOWN								
Comparator Input Bias Current	$V_{IN} = 0V$		2	10		2	10	μA
Comparator Threshold Voltage		3.50	3.72	3.90		3.72		V
V_{CE} Sat. of Hysteresis Transistor	$I_{OUT} = 1.0mA$ $V_{IN} = 3.0V$		.3	.6		.3		V
C_{DELAY} Discharge Current	$V_C = 1.0V$ $V_{IN} = 3.0V$	1	10		1	10		mA

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PreliminaryDC ELECTRICAL CHARACTERISTICS: $V_{CC} = 12V$ unless otherwise specified (cont)

SYMBOL AND PARAMETER	TEST CONDITIONS	SE5562			NE5562			UNIT
		Min	Typ	Max	Min	Typ	Max	
CURRENT SENSE								
OC1 Threshold Voltage		.456	.480	.504		.480		V
OC1 C _{DELAY} Charge Current	V _{ISENS} = .510V		10			10		μA
OC2 Threshold Voltage		.570	.600	.630	.560	.600	.640	V
OC2 C _{DELAY} Charge Current	V _{ISENS} = .640V		490			490		μA
C _{DELAY} Discharge Current	V _{ISENS} = 0V	.5	1	1.5	.4	1	1.6	μA
OUTPUT STAGE								
V _S - V _{OH}	11 ≤ V _S ≤ 15V I _O = 100mA						2	V
V _{OL}	11 ≤ V _S ≤ 15V I _O = 100mA			1.5			1.5	V
V _{OL}	11 ≤ V _S ≤ 15V I _O = 2mA			.4			.4	V
SUPPLY VOLTAGE/CURRENT								
I _{CC}	I _Z = 0, V _S = 15V		7.5			7.5		mA
CURRENT FEED SHUNT REGULATOR								
V _S	I _{IN} = 10mA	14.25			14			V
V _S	I _{IN} = 20mA			16			16	V