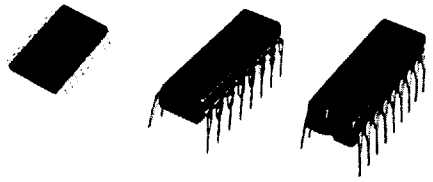
LAS-4082
LAS-4182

100mA PULSE WIDTH MODULATOR CONTROLLER



FEATURES

- Dynamic control of duty cycle for feed forward operation
- Uncommitted current limit comparator for current mode control
- Adjustable maximum on time
- Programmable under-voltage lockout
- Cycle-by-cycle current limit with optional frequency shift

15

DESCRIPTION

The LAS 4082, 4182 Series of PWM controllers are monolithic integrated circuits designed to drive power FET's directly in high frequency single ended forward converters at a duty cycle of up to 80%. This linear, feed forward control concept provides precise definition of the maximum duty cycle and frequency under conditions of transient line and load changes for guaranteed limitation of main switch stress under all operating conditions. The increased duty cycle permits an increase in the transformer turns ratio which results in a reduction in RMS primary current, therefore much lower power losses in the transformer primary and the power FET switch can be achieved. Lower ripple current rating of the input capacity can enable the use of a smaller input filter to further reduce overall volume.

LAS 4082, 4182 Series includes accurate, oscillator circuit with programmable maximum on time, feed forward generator, under voltage lockout and soft start, cycle by cycle current limiting with frequency shift and a push-pull output drive. The LAS 4182 Series includes pin outs for separate I_{B2} drive.

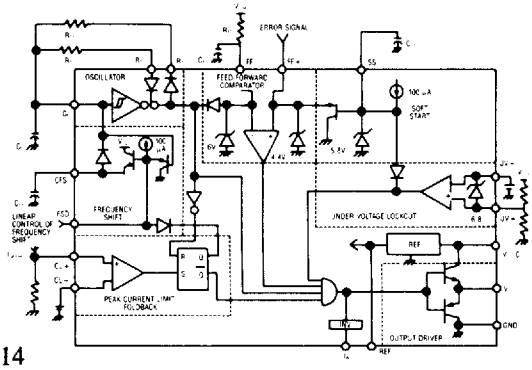
ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MAXIMUM	UNITS
Supply Voltage	V_{CC}	40	Volts
Output Collector - Emitter Voltage	V_O	40	Volts
Sink & Source Current Continuous Peak Repetitive	I_O	 100 500	mA
FF+ Zener Current	FF+	2	mA
Soft Start Zener Current	SS	1	mA
Low Line Comparator Input Current		±2	mA
Low Line Comparator Negative to Positive Input Voltage		6.8	Volts
Current Limit Inputs	CL+, CL−	40	Volts
Low Line Comparator Inputs	LL+, LL−	40	Volts
Power Dissipation	P_D	1	Watt
Thermal Resistance, Junction to Case	θ_{JC}	60	°C/W
Thermal Resistance, Junction to Ambient	θ_{JA}	100	°C/W
Operating Junction Temperature	T_J	−20 to +125	°C

DEVICE SELECTION GUIDE

DEVICE	PACKAGE	SEPARATE I_{B2} DRIVE
LAS 4082P	16 Pin Plastic DIP	No
LAS 4182L	18 Pin Ceramic DIP	Yes
LAS 4182P	18 Pin Plastic DIP	Yes
LAS 4182S	Surface Mount Device	Yes

BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS

Test conditions are as follows: V_{CC} = 15VDC, f = 50kHz, R_{T1} = 10kΩ, R_{T2} = 5kΩ, C_t = 0.00115μF, T_J = 25°C, unless otherwise noted. See test circuit.

Parameter	Test Conditions	Minimum	Typical	Maximum	Units
REFERENCE SECTION					
Reference Voltage	V_{CC} = 8.5 to 40V, I = 0 to 2 mA	3.74	3.94	4.14	Volts
Line Regulation	V_{CC} = 8.5V to 40V		25	50	mV
Load Regulation	I = 0 to 2 mA		25	50	mV
Temperature Coefficient	T_J = −20°C to 100°C		0.6	1.5	mV/°C
Output Current		2			mA
Short Circuit Current		5	10	15	mA
OSCILLATOR SECTION					
Maximum Frequency			500		kHz
Line Regulation	V_{CC} = 8.5V to 35V		0.15	0.5	%/Nom.
Temperature Coefficient	T_J = −20°C to 100°C		1.5	3.0	%/Nom.
Initial Frequency Accuracy			±1.0	±3.5	%/Nom.
Maximum Duty Cycle Accuracy	d.c. = 66%			±2.0	%/Nom.
Low Level Threshold Voltage, V_{LL}			2.45		Volts
High Level Threshold Voltage, V_{HL}			4.0		Volts
Timing Resistance Range, R_{T1}, R_{T2}		3.3		220	kΩ
FEED-FORWARD COMPARATOR					
FF+ Zener Voltage	I (FF+) = 1 mA	4.1	4.38	4.60	Volts
FF− Zener Voltage	I(FF−) = 0.5 mA		6.5		Volts
Hysteresis			0.03		Volts
Comparator Delay			700	900	nSec
FF− Reset Voltage	I = 0.5 mA		1.7		Volts
Input Offset Voltage			10		mV
Input Bias Current			1		μA
Common Mode Range		1.58		4.5	Volts
FF+ Zener Temperature Coefficient			0.02		%/°C
FF− Reset Voltage Temperature Coefficient			0.025		%/°C
FF− Sink Current			1		mA
CURRENT LIMIT COMPARATOR					
Common Mode Range		0		4.4	Volts
Delay			700	900	nSec
Minimum t_{off} for Reset				1	μSec
Input Bias Current			1		μA
Input Offset Voltage			10		mV
FREQUENCY SHIFT SECTION					
FSD Current Source		70	100	120	μA
CFS Charging Current		3			mA
FSD Voltage Maximum Shift Minimum Shift Allowable Range		 −6.0	 4.7 3.5 	 5.5	Volts
SOFT START SECTION					
Charging Current		50	100	150	μA
Zener Voltage		5.5	5.8	6.0	Volts
Low Level Voltage			0.3		Volts
LOW LINE COMPARATOR					
Common Mode Range		0		V_{CC} − 2	Volts
Offset Voltage				0.15	Volts
Input Bias Current			1		μA
OUTPUT SECTION					
Source Saturation Voltage	I = 20 mA I = 100 mA		1.7 1.76	 2	Volts Volts
Sink Saturation Voltage	I = 20 mA I = 100 mA		.95 1.74	 1.9	Volts Volts
Rise Time	C = 2.0 nF		300	350	nSec
Fall Time	C = 2.0 nF		100	150	nSec
Standby Current	V_{CC} = 15V V_{CC} = 40V		5.2 5.9	7 8.5	mA mA
I_{B2} Source Current			10		mA

15

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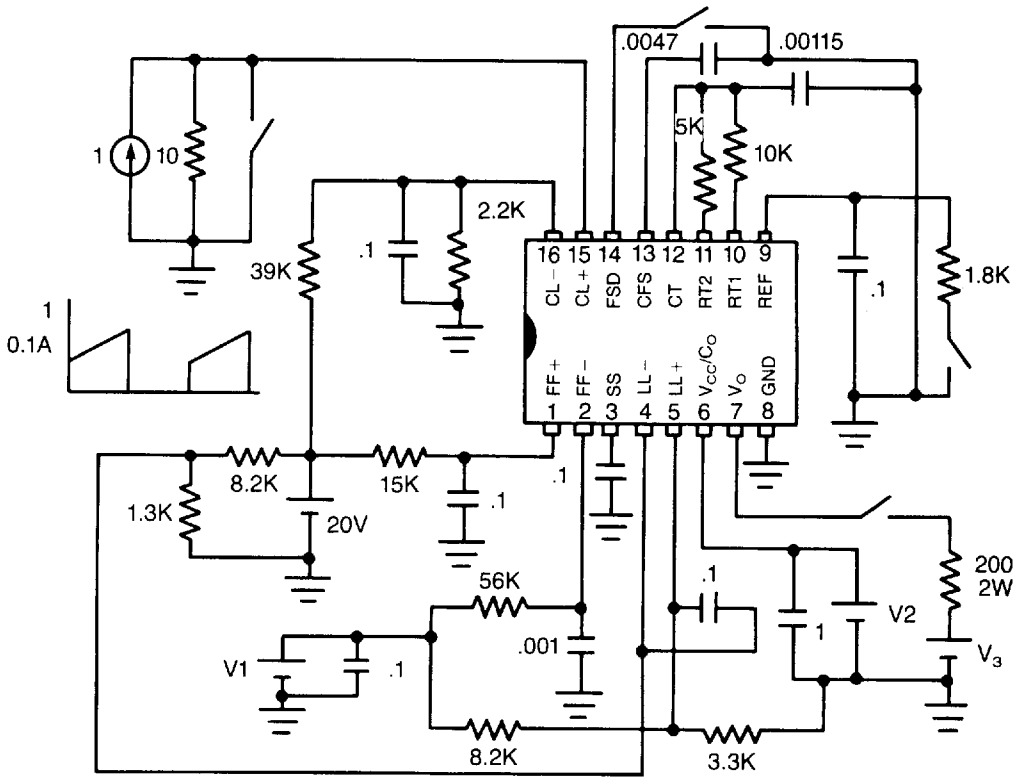
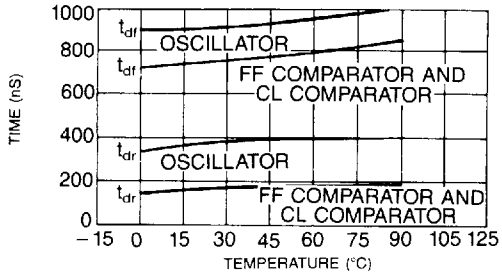
TEST CIRCUIT



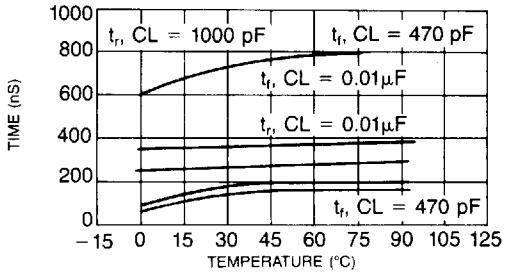
All capacitors in μF.

OPERATIONAL DATA

TURN-ON (t_{dr}) & TURN-OFF (t_{df}) DELAY VS TEMPERATURE



OUTPUT VOLTAGE RISE (t_r) & FALL (t_f) TIME VS TEMPERATURE



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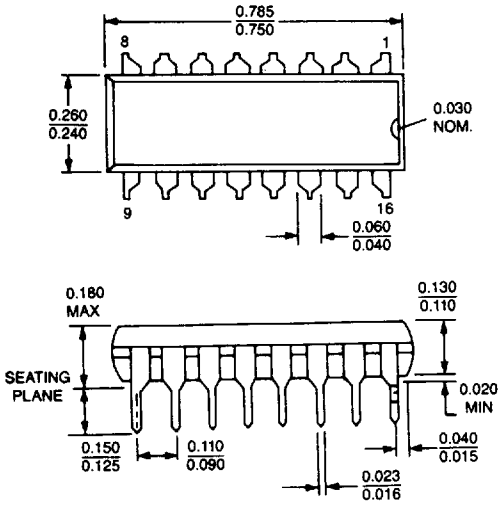
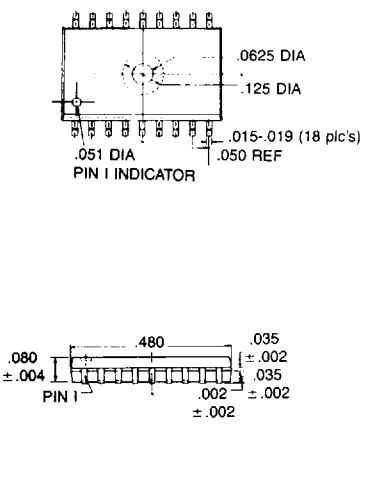
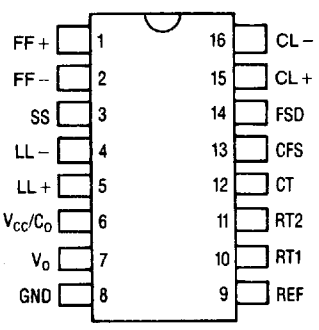
DEVICE OUTLINE

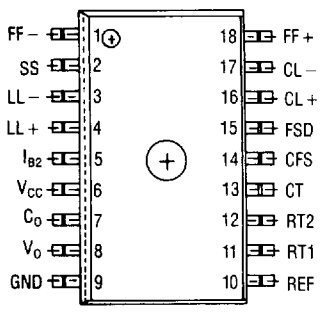
LAS 4082 (PLASTIC)



LAS 4182S







NOTE: All dimensions are in inches.

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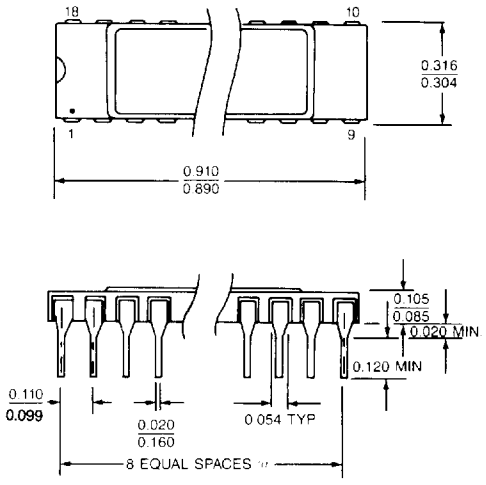
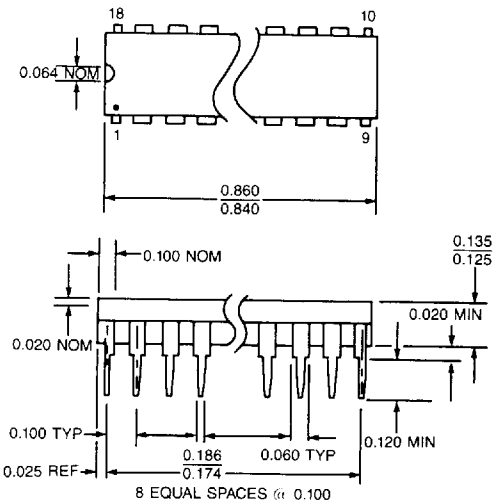
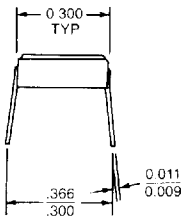
DEVICE OUTLINE

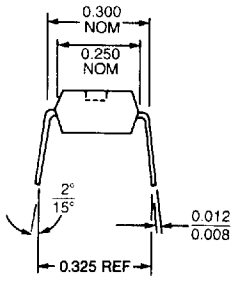
LAS 4182L (CERAMIC)

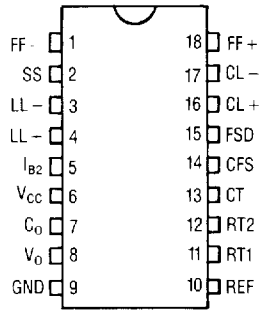


LAS 4182P (PLASTIC)









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