

LAS-6320P
LAS-6420P

2 AMP SWITCHING REGULATORS



FEATURES

- DC to 100kHz operation
- Adjustable output voltage
- Cycle-by-cycle current limit
- Internal thermal shutdown
- Inhibit/enable control pin

DESCRIPTION

The LAS-6320P/LAS-6420P Series are monolithic integrated circuits designed for fixed frequency, pulse width modulated, switching converter applications such as step-down, step-up, flyback, forward, C_{uk} and voltage inverting DC-to-DC converters and motor controls. The LAS-6320P/LAS-6420P Series includes a temperature compensated voltage reference, sawtooth oscillator with over-current frequency shift, linear trailing edge pulse width modulator with double pulse suppression logic, transconductance error amplifier, and a 2 amp Darlington output transistor with internal current limit protection.

The LAS-6320P/LAS-6420P allows access to the reference voltage; the LAS-6321P/LAS-6421P provides adjustable current limit.

The LAS-6320P/LAS-6420P and LAS-6321P/LAS-6421P are available in a standard 14 lead plastic dual-in-line power package and are designed for mounting right on the printed circuit board.

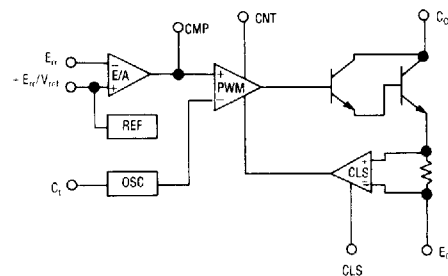
ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MAXIMUM	UNITS
Control Circuit/ Output Collector Voltage LAS-6320/21 LAS-6420/21	V_{CC}/C_O	35 40	Volts
Power Dissipation	P_D	Internally Limited	Watts
Thermal Resistance Junction to Case Junction to Ambient	θ_{JC}	13 60	$^{\circ}\text{C}/\text{W}$
Operating Junction Temperature Range	T_J	-25 to 125	$^{\circ}\text{C}/\text{W}$
Storage Temperature Range	T_{STG}	-65 to 150	$^{\circ}\text{C}$
Lead Temperature (Soldering) 10 sec.	T_{LEAD}	260	$^{\circ}\text{C}$

DEVICE SELECTION GUIDE

DEVICE	V_{IN} MAX	V_{OUT} MAX	CURRENT LIMIT	REFERENCE
LAS-6320P	35	27	Fixed	Accessible
LAS-6321P	35	27	Adjustable	Not Accessible
LAS-6420P	40	31	Fixed	Accessible
LAS-6421P	40	31	Adjustable	Not Accessible

BLOCK DIAGRAM



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ELECTRICAL CHARACTERISTICS¹

Test conditions are as follows: $V_{CC} = 24V$, $V_O = 5V$, $I_O = 2A$, $C_t = 0.0056\mu F$,
 $T_J = 25^\circ C$, unless otherwise specified. $F_{SX} = 55KHz$

Parameter	Symbol	Test Conditions			Test Limits			Units
		V_{CC}	I_O	T_J^2	Minimum	Typical	Maximum	
REFERENCE SECTION								
Reference Voltage ¹	V_{REF}				2.137	2.25	2.363	Volts
LAS-6300		12 to V_{IN} (max)	0.2A to 2A	Over Temp	2.10		2.43	Volts
LAS-6400					2.08		2.45	
Load Regulation ¹	$REG_{(LOAD)}$		0.2A to 2A			0.4	1.0	% V_{REF}
Line Regulation ¹	$REG_{(LINE)}$	12 to V_{IN} (max)				0.9	1.0	% V_{REF}
Temperature Coefficient	T_C			Over Temp		0.01		%/ $^\circ C$
OSCILLATOR SECTION								
Initial Frequency Accuracy	F_{SX}				-33	± 10	+33	%
Line Regulation ¹ of Frequency	$REG_{(LINE)}$	12V to V_{IN} (max)				0.12	2.7	% F_{SX}
Frequency Temperature Coefficient	T_C			Over Temp		0.05		%/ $^\circ C$
Sawtooth Duty Cycle	d.c.					85		%
ERROR AMPLIFIER SECTION								
Input Offset Voltage						± 5		mV
Transconductance						2.7		mA/V
Output Sink/Source Current						0.26		mA
Input Common Mode Range					1.5		3.0	Volts
Open Loop Voltage Gain					50	60		dB
OUTPUT SECTION								
Peak Current Limit Knee	I_P			Over Temp	2.2			Amps
Short Circuit Current Limit	I_{SC}					4		Amps
Output Saturation Voltage	V_O (sat)	$C_O = V_{CC}$ $C_O = V_{CC}$ $E_O = GND$ $E_O = GND$	0.5A 2A 0.5A 2A			1.6 2.1 0.9 1.4	2.3	Volts Volts Volts Volts
Efficiency ³	η				70	79		%
				Over Temp	65			%
Current Rise Time ³	t_R		Inductive Load			200		nS
Current Fall Time ³	t_F		Inductive Load			200		nS
CONTROL PIN								
Output Inhibit					0.64	0.75	1.06	Volts
Quiescent Current	I_Q		Output E_O Off			18		mA
			Output E_O On				30	mA

(1) Low duty cycle Pulse Testing with Kelvin Connections required. Die Temperature change must be accounted for separately.

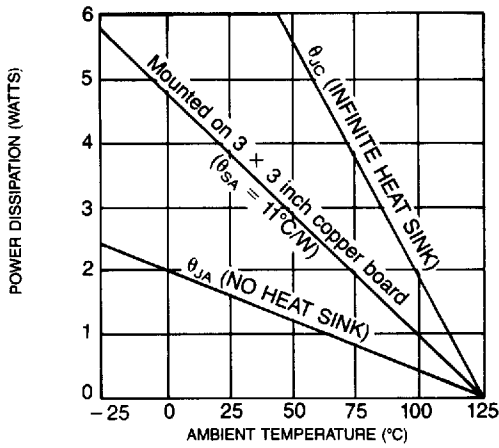
(2) Over Temperature, $T_J = -25^\circ C$ to $125^\circ C$.

(3) Per Test Circuit.

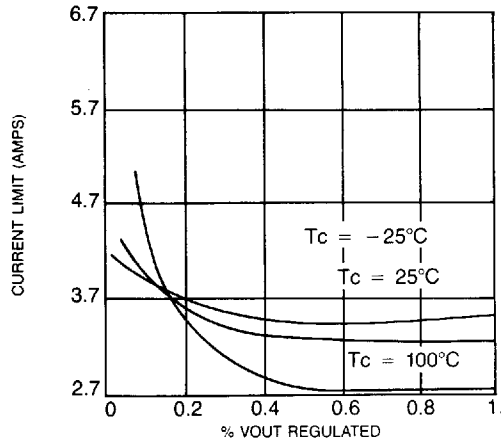
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OPERATIONAL DATA

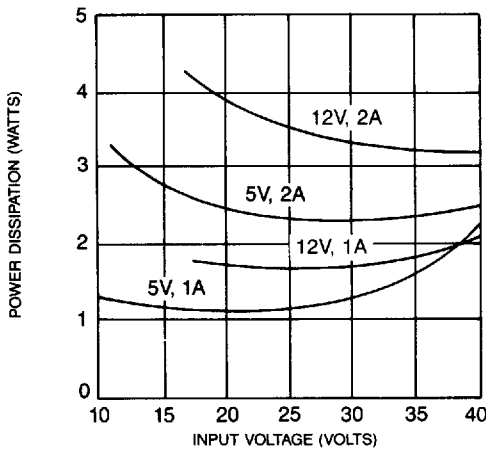
POWER DERATING



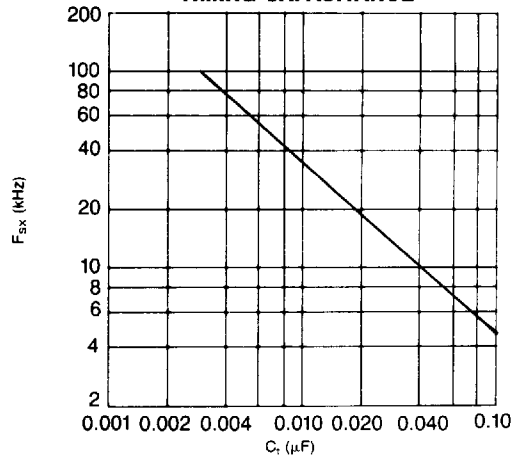
CURRENT LIMIT VS. % V_{OUT} REGULATED



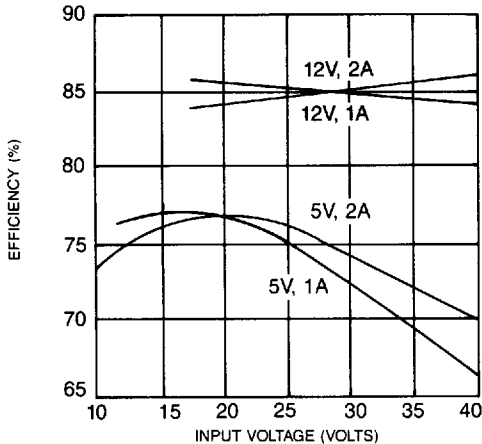
POWER DISSIPATION VS INPUT VOLTAGE



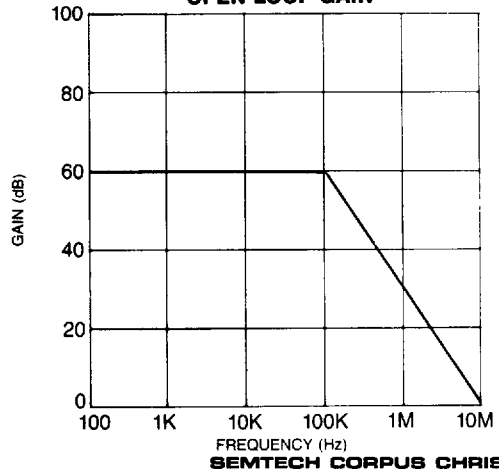
FREQUENCY VS TIMING CAPACITANCE



EFFICIENCY VS. INPUT VOLTAGE



ERROR AMPLIFIER OPEN LOOP GAIN



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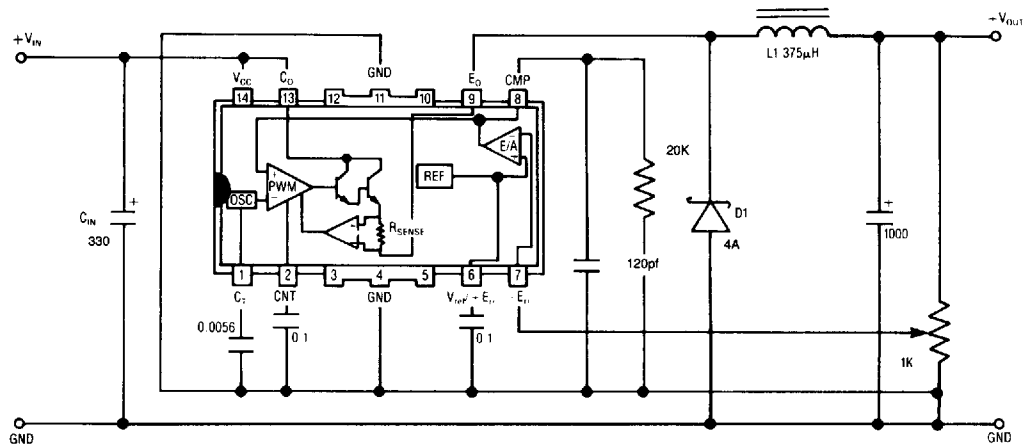
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TYPICAL APPLICATIONS

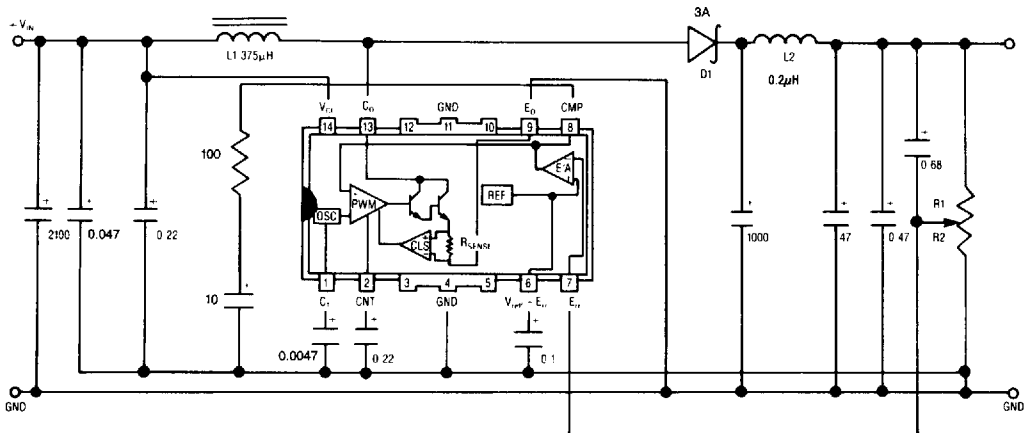
DC-TO-DC STEP-DOWN CONVERTER



$$V_{IN} = 24V$$

$$V_{OUT} = 5V @ 2A$$

DC-TO-DC STEP-UP CONVERTER



$$V_{IN} = 6V$$

$$V_{OUT} = 12V @ 750mA$$

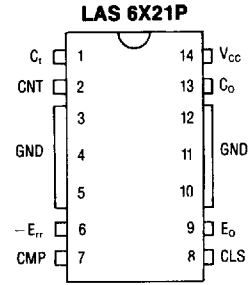
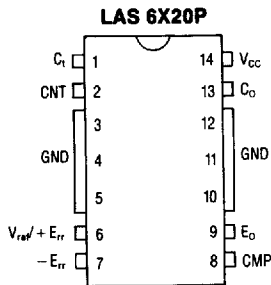
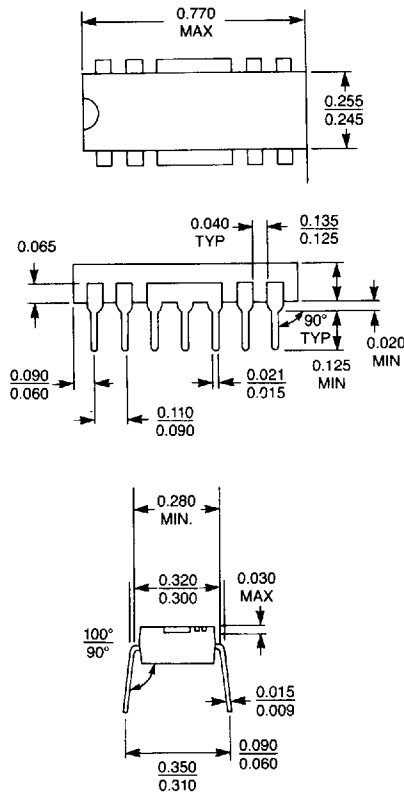
All Capacitors in μ F.

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DEVICE OUTLINE



NOTE: All dimensions are in inches.