



## FEATURES

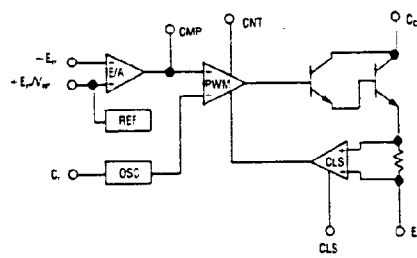
- DC to 100 kHz operation
- Adjustable output voltage
- Cycle-by-cycle current limit
- Internal thermal shutdown
- Inhibit/enable control pin

## DESCRIPTION

The LAS 6380/6480/6580 Series are monolithic integrated circuits designed for fixed frequency, pulse width modulated, switching converter applications such as step-down, step-up, flyback, forward, Cuk and voltage inverting DC-to-DC converters and motor controls. The LAS 6380/6480/6580 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, trans-conductance error amplifier, and a 8 amp Darlington output transistor with internal current limit protection.

The LAS 6380/6480/6580 can be used in step-down or step-up applications. The LAS 6381/6481/6581 are for step-down applications where current limit adjustment is necessary. The LAS 6380/6480/6580 Series is available in TO-3 steel packages for true hermetic seal and board insertable plastic SIP packages.

## BLOCK DIAGRAM



PRELIMINARY  
8/30/88

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MAXIMUM	UNITS
Control Circuit/ Output Collector Voltage LAS 6380/81 LAS 6480/81 LAS 6580/81	$V_{CC} / C_O$ $C_O$	35 40 45	Volts
Power Dissipation	$P_D$	Internally Limited	Watts
Thermal Resistance Junction to Case TO-3 SIP	$\theta_{JC}$	1.5 0.8	$^{\circ}C/W$
Operating Junction and Storage Tempera- ture Range	$T_J$ $T_{STG}$	-25 to 125	$^{\circ}C$
Lead Temperature (Soldering) 60 sec for TO-3 10 sec for SIP	$T_{LEAD}$	300 260	$^{\circ}C$

DEVICE SELECTION GUIDE

DEVICE	$V_{IN}$ MAX	$V_{OUT}$ MAX	CURRENT LIMIT	PACKAGE
LAS 6380	35	27	Fixed	TO-3
LAS 6380P1	35	27	Fixed	Plastic SIP
LAS 6381	35	27	Adjustable	TO-3
LAS 6381P1	35	27	Adjustable	Plastic SIP
LAS 6480	40	30	Fixed	TO-3
LAS 6480P1	40	30	Fixed	Plastic SIP
LAS 6481	40	30	Adjustable	TO-3
LAS 6481P1	40	30	Adjustable	Plastic SIP
LAS 6580	45	35	Fixed	TO-3
LAS 6580P1	45	35	Fixed	Plastic SIP
LAS 6581	45	35	Adjustable	TO-3
LAS 6581P1	45	35	Adjustable	Plastic SIP

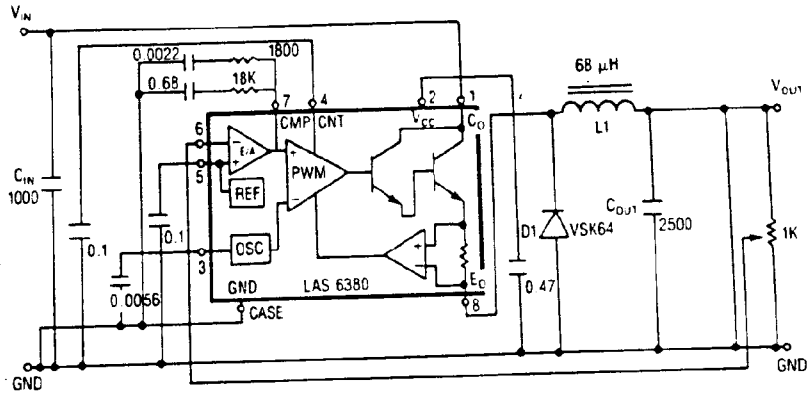
## ELECTRICAL CHARACTERISTICS

Test conditions are as follows:  $V_{CC} = 24V$ ,  $V_O = 5V$ ,  $I_O = 8A$ ,  $C_1 = 0.0056\mu F$ ,  
 $T_J = 25^\circ C$ , unless otherwise specified.

Parameter	Symbol	Test Conditions			Test Limits			Units
		$V_{CC}$	$I_O$	$T_J$	Minimum	Typical	Maximum	
<b>REFERENCE SECTION</b>								
Reference Voltage	$V_{REF}$				2.137	2.25	2.363	Volts
Line Regulation	$REG_{(LINE)}$	12V to $V_{IN(MAX)}$				0.015	0.04	%/V
Temperature Coefficient	$T_C$			0 to 125°C		0.01	0.02	%/°C
<b>OSCILLATOR SECTION</b>								
Initial Frequency Accuracy					-33	±10	+33	%
Line Regulation of Frequency	$REG_{(LINE)}$	12V to $V_{IN(MAX)}$				0.1	0.15	%/V
Frequency Temperature Coefficient	$T_C$			0 to 125°C		0.05		%/°C
Sawtooth Duty Cycle	d. c.					85		%
<b>ERROR AMPLIFIER SECTION</b>								
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
<b>OUTPUT SECTION</b>								
Peak Switching Current Limit	$I_{CL}$				9	11	13	Amps
Output Saturation Voltage	$V_O (sat)$	$C_O = V_{CC}$	4A			1.6		Volts
		$C_O = V_{CC}$	8A			2.1	2.5	Volts
		$E_O = GND$	4A			0.9		Volts
		$E_O = GND$	8A			1.4	1.8	Volts
Efficiency	$\eta$				70	75		%
Current Rise Time	$t_r$	Inductive Load				50	100	nS
Current Fall Time	$t_f$	Inductive Load				700	900	nS
<b>CONTROL PIN</b>								
Output Inhibit					0.64	0.75	1.06	Volts
Quiescent Current	$I_Q$	$V_O = 0V$				18	30	mA

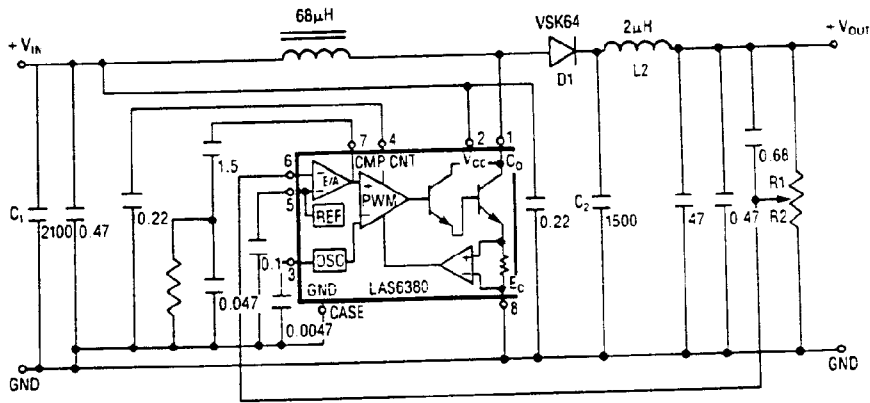
# TYPICAL APPLICATIONS

## DC-TO-DC STEP-DOWN CONVERTER



$V_{IN} = 24V$   
 $V_{OUT} = 5V @ 8A$

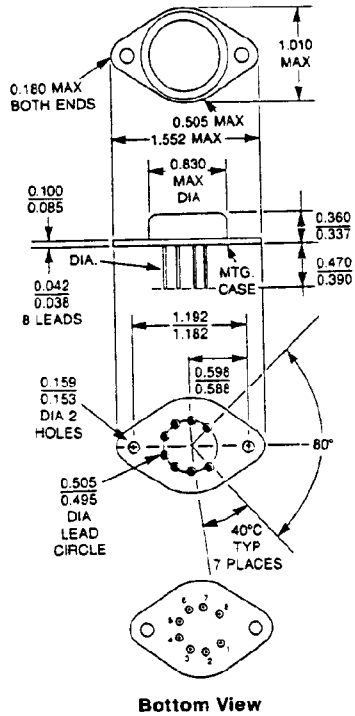
## DC-TO-DC STEP-UP CONVERTER



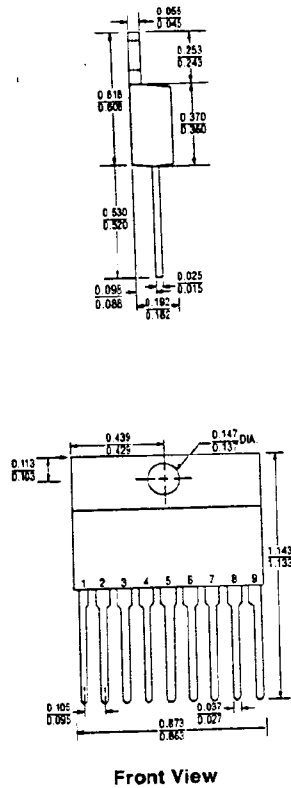
$V_{IN} = 12V$   
 $V_{OUT} = 24V @ 2.5A$

# DEVICE OUTLINE

**LAS6X80, 6X81**



**LAS6X80P1, 6X81P1**



**LAS6X80**

1 - $C_O$
2 - $V_{CC}$
3 - $C_1$
4 - CNT
5 - $V_{REF}$
6 - $E_{rr}(-)$
7 - CMP
8 - $E_O$
Case is Ground

**LAS6X81**

1 - $C_O/V_{CC}$
2 - $C_1$
3 - CNT
4 - $V_{REF}$
5 - $E_{rr}(-)$
6 - CMP
7 - CLS
8 - $E_O$
Case is Ground

**LAS6X80P1**

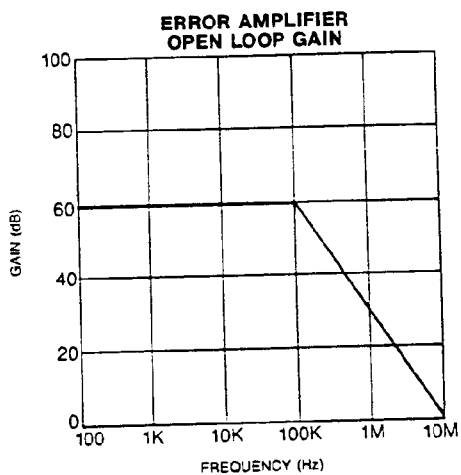
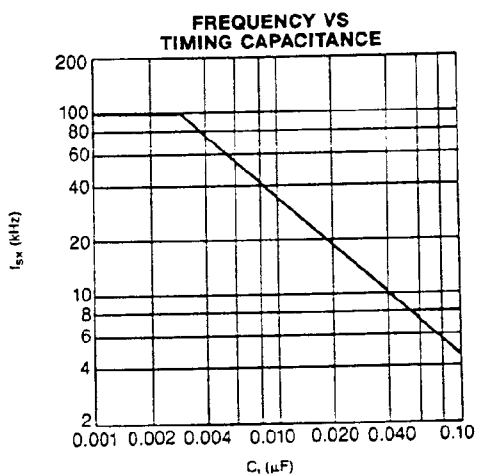
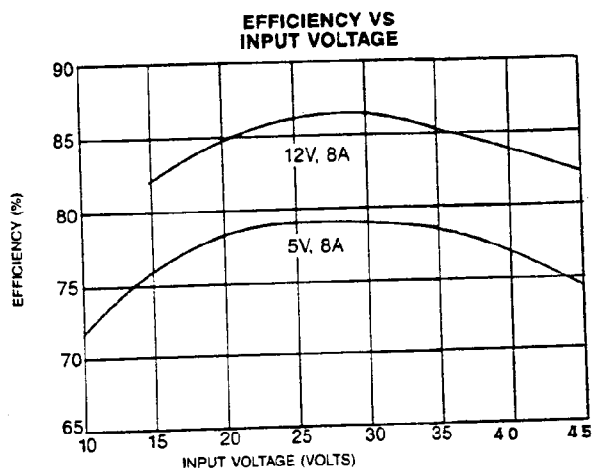
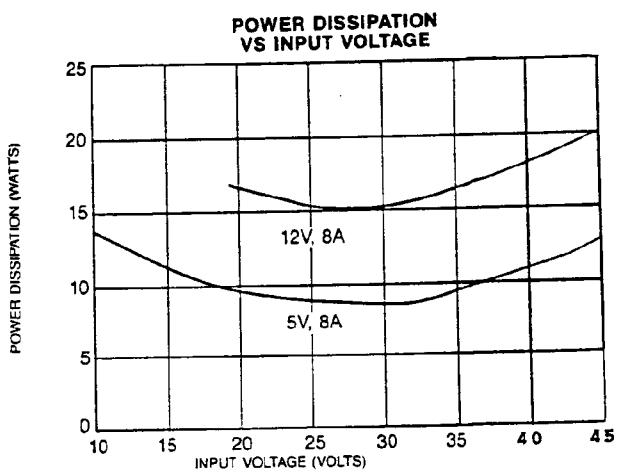
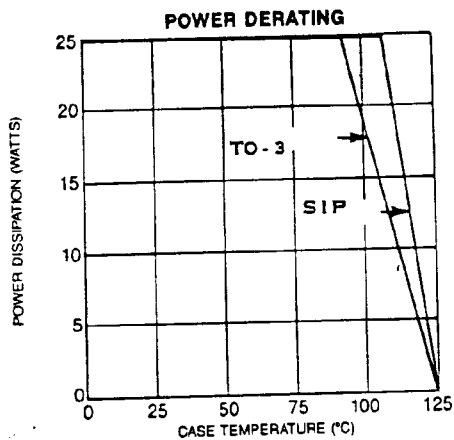
1 - $C_O$
2 - $V_{CC}$
3 - $C_1$
4 - CNT
5 - GND
6 - $V_{REF}$
7 - $E_{rr}(-)$
8 - CMP
9 - $E_O$
Tab is Ground

**LAS6X81P1**

1 - $C_O/V_{CC}$
2 - $C_1$
3 - CNT
4 - $V_{REF}$
5 - GND
6 - $E_{rr}(-)$
7 - CMP
8 - CLS
9 - $E_O$
Tab is Ground

NOTE: All dimensions are in inches.

# OPERATIONAL DATA



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