



FEATURES

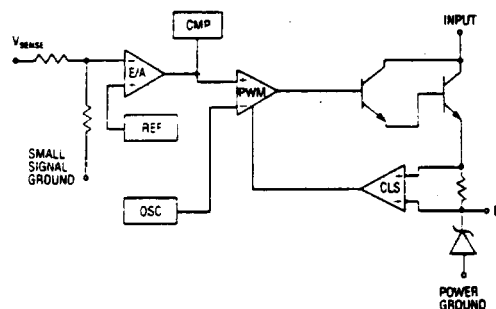
- o Complete DC-to-DC converter
- o 70% minimum efficiency
- o 70kHz switching frequency
- o Programmable output voltage from 5 to 35 volts
- o Preset output voltage of 5.05 Volts \pm 1.5%
- o Current limit and thermal shutdown

DESCRIPTION

The LSH 6325/6425/6525 switching regulator is a micro-hybrid circuit designed for use in step-down applications requiring accurate output voltages over combined variations of line, load and temperature. This unique product greatly simplifies switching power supply design. The LSH 6325/6425/6525 microconverter includes a switching regulator, catch diode and compensation network within a TO-220 style package. Just add a choke and two capacitors to obtain an efficient DC-to-DC converter for 5 Volts at 2 Amps. To increase the output voltage, simply add a programming resistor. The current limit and thermal shutdown features of the LSH 6325/6424/6525 fully protect the device against overstress conditions.

The LSH 6325/6425/6525 TO-220 style plastic package is available in three options to accommodate various mounting requirements. Available lead formations are straight in-line, staggered for vertical mount and staggered for horizontal mount.

BLOCK DIAGRAM



PRELIMINARY
9/12/88

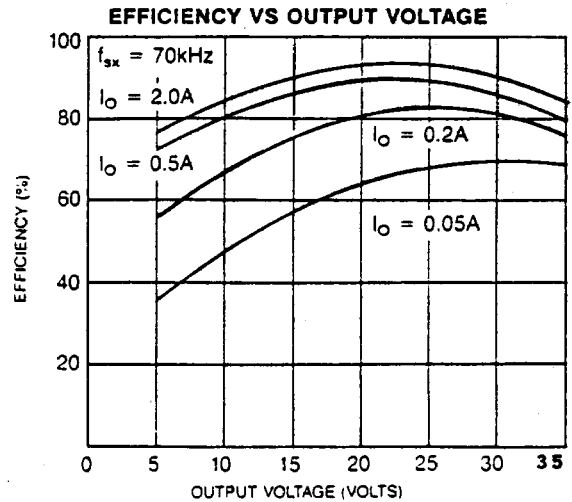
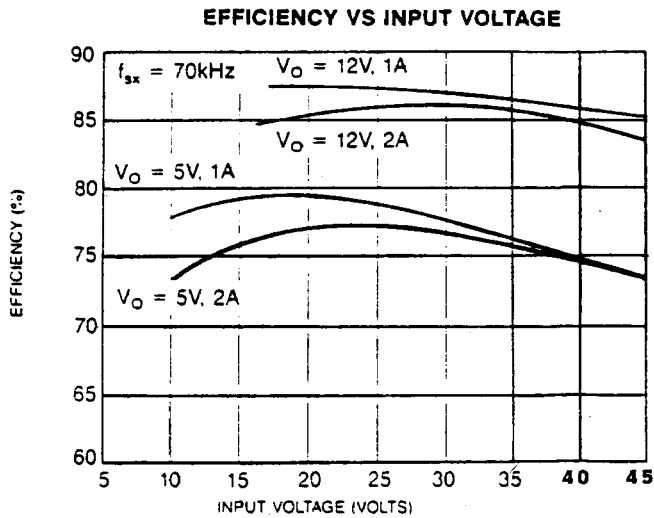
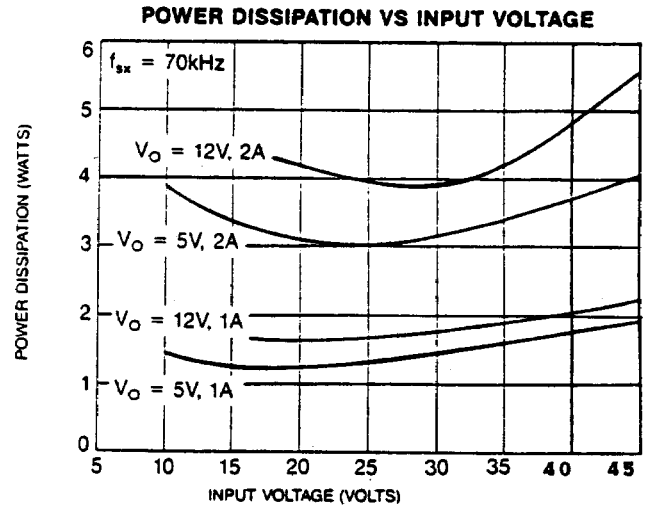
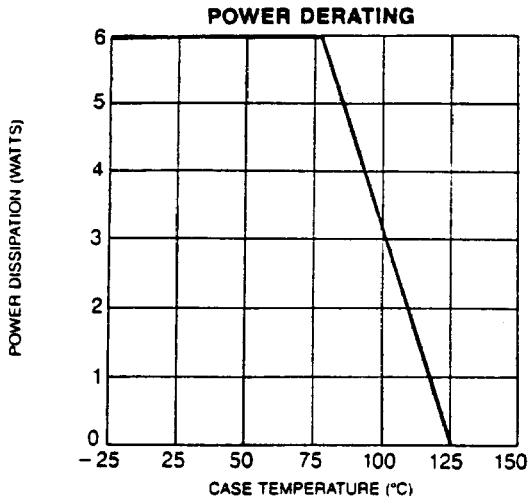
ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MAXIMUM	UNITS
Input Voltage LSH 6325 LSH 6425 LSH 6525	V_{IN}	35 40 45	Volts
Power Dissipation	P_D	Internally Limited	Watts
Thermal Resistance Junction to Case	θ_{JC}	8	°C/W
Operating Junction Temperature Range	T_J	-25 to 125	°C
Storage Tempera- ture Range	T_{STG}	-65 to 150	°C
Lead Temperature (Soldering, 10 Seconds)	T_{LEAD}	260	°C

DEVICE SELECTION GUIDE

DEVICE	V_{IN} MAX	V_{OUT} MAX	LEADS
LSH 6325P	35	27	Straight in-line
LSH 6325PV	35	27	Vertical staggered
LSH 6325PH	35	27	Horizontal staggered
LSH 6425P	40	31	Straight in-line
LSH 6425PV	40	31	Vertical staggered
LSH 6425PH	40	31	Horizontal staggered
LSH 6525P	45	35	Straight in-line
LSH 6525PV	45	35	Vertical staggered
LSH 6525PH	45	35	Horizontal staggered

OPERATIONAL DATA



ELECTRICAL CHARACTERISTICS

Input test conditions are as follows: $V_{IN} = 24VDC$, $V_O = 5VDC$,
 $I_O = 2A$, $T_J = 25^\circ C$, unless otherwise specified.

Parameter	Symbol	Test Conditions			Test Limits			Units
		V_{IN}	I_O	T_J	Minimum	Typical	Maximum	
Output Voltage ¹	V_O	12V to $V_{IN(MAX)}$	0A 0.2A to 2A	- 25 to 125°C	4.97 4.80	5.05	5.13 5.30	Volts
Line Regulation ¹	$REG_{(LINE)}$	12V to $V_{IN(MAX)}$				90		mV
Load Regulation ¹	$REG_{(LOAD)}$		0.2A to 2A			45		mV
System Efficiency	η			- 25 to 125°C	70	75		%
Switching Frequency	f_{SX}		50mA		58	70	86	kHz
Quiescent Current	I_O	$V_{IN(MAX)}$	0A			18	30	mA
Peak Current Limit Threshold	I_{CL}			- 25 to 125°C	2.2		5.0	Amps
Output Noise and Ripple ⁴	V_N					50		mV _{pk-pk}
LSH 6325		30V + 5V _{pk-pk}						
LSH 6425		35V + 5V _{pk-pk}						
LSH 6525		40V + 5V _{pk-pk}						
Turn On Overshoot			0.5A to 2A			0		mV
Unit Step Load Change			0A to 2A 2A to 0.05A			0 250 ²		mV mV _{pk}
Programming Resistance ³		12V to $V_{IN(MAX)}$		- 25 to 125°C		0.2		Volts/k Ω

(1) Low duty cycle, pulse testing with Kelvin connections required.

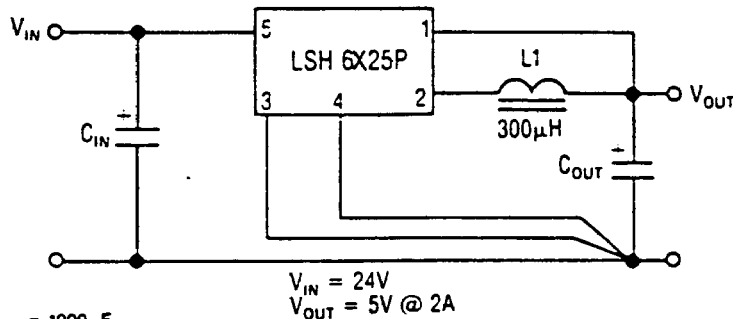
(2) 10mS duration.

(3) V_O programming above 5.05V.

(4) 120 Hz input ripple.

TYPICAL APPLICATION

DC-TO-DC STEP-DOWN CONVERTER^{1,2}



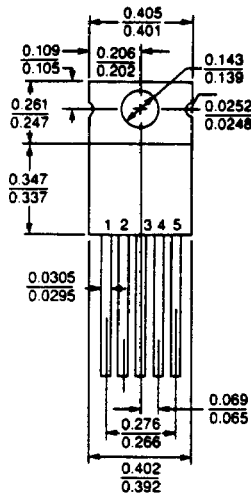
¹ $C_{IN} = 330\mu F$; $C_{OUT} = 1000\mu F$

² For output voltages above 5V, add programming resistor between Pin 1 and V_{OUT} .

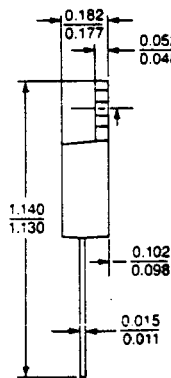
DEVICE OUTLINE

LSH 6X25P

(Front View)

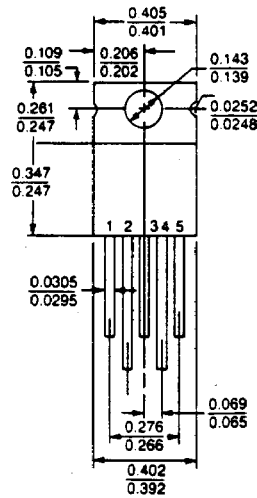


(Side View)

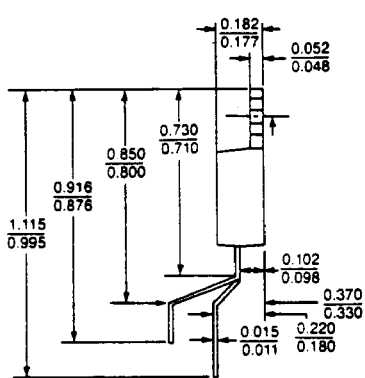


LSH 6X25PV

(Front View)

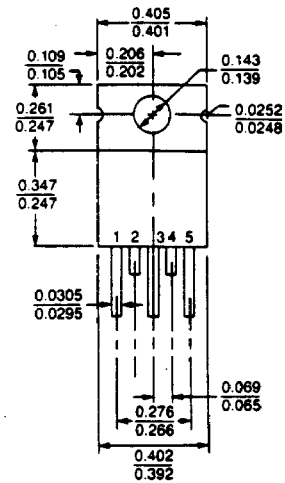


(Side View)

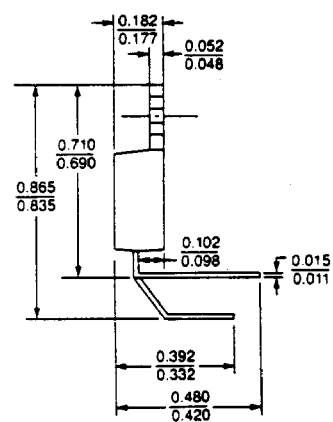


LSH 6X25PH

(Front View)



(Side View)



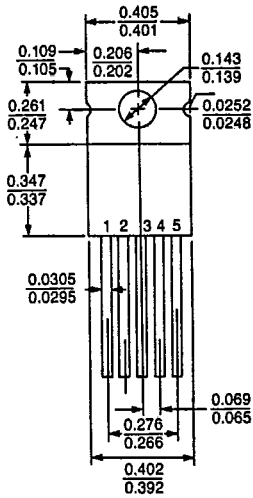
- | | | |
|-----|----|---------------------|
| 1 | - | V _{SENSE} |
| 2 | - | E _O |
| 3 | - | Small Signal Ground |
| 4 | - | Power Ground |
| 5 | - | Input |
| Tab | is | Small Signal Ground |

NOTE: All dimensions are in inches.

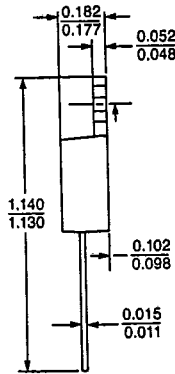
DEVICE OUTLINE

LSH 6X25P

(Front View)

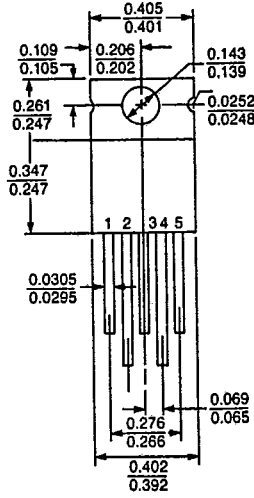


(Side View)

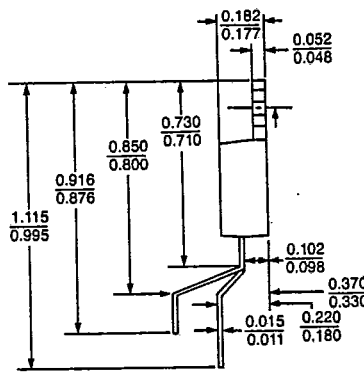


LSH 6X25PV

(Front View)

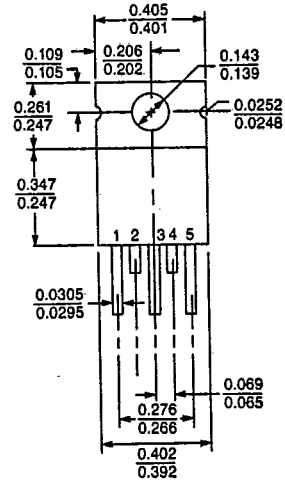


(Side View)

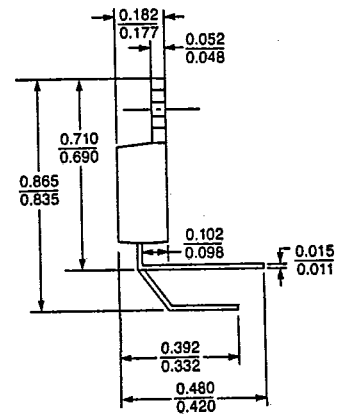


LSH 6X25PH

(Front View)



(Side View)



- 1 - V_{SENSE}
- 2 - E_O
- 3 - Small Signal Ground
- 4 - Power Ground
- 5 - Input
- Tab is Small Signal Ground

NOTE: All dimensions are in inches.

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