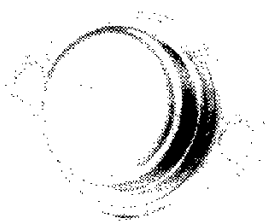
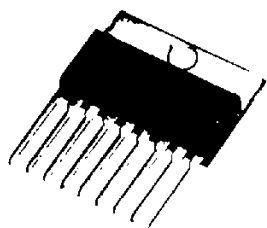


8 AMP SWITCHING REGULATORS



FEATURES

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

DESCRIPTION

The LAS-6380/LAS-6480 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/LAS-6480 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 an 8 amp Darlington output transistor with internal current limit protection.

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

Full military temperature range is available for LAS-6480/LAS-6481 TO-3 models.

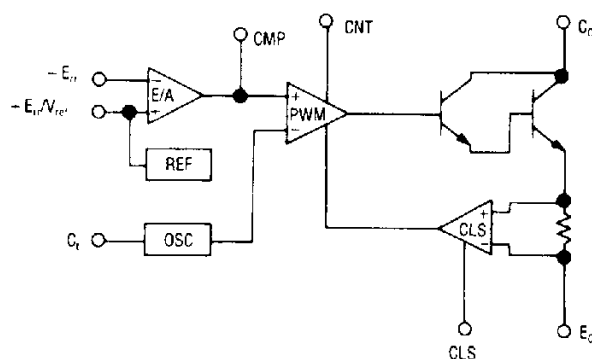
ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MAXIMUM	UNITS
Control Circuit/ Output Collector Voltage LAS-6380/81 LAS-6480/81	V_{CC}/C_O C_O	35 40	Volts
Power Dissipation	P_D	Internally Limited	Watts
Thermal Resistance Junction to Case TO-3 SIP	θ_{JC}	1.5 0.8	$^{\circ}C/W$
Operating Junction Temperature Range TO-3 LAS-6480/81 SIP TO-3 LAS-6380/81	T_J	-55 to 150 -25 to 125 -25 to 125	$^{\circ}C$
Storage Temperature Range	T_{STG}	-65 to 150	$^{\circ}C$
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-6380P ₁	35	27	Fixed	Plastic SIP
LAS-6381	35	27	Adjustable	TO-3
LAS-6381P ₁	35	27	Adjustable	Plastic SIP
LAS-6480	40	31	Fixed	TO-3
LAS-6480P	40	31	Fixed	Plastic SIP
LAS-6481	40	31	Adjustable	TO-3
LAS-6481P	40	31	Adjustable	Plastic SIP

BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS¹

Test conditions are as follows: $V_{CC} = 24V$, $V_O = 5V$, $I_O = 8A$, $C_t = 0.0056\mu F$,
 $T_J = 25^\circ C$, 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)	0.8A to 8A	Over Temp	2.10		2.43	Volts
LAS-6400					2.08		2.45	
Load Regulation ¹	$REG_{(LOAD)}$		0.8A to 8A			0.4	1.0	% V_{REF}
Line Regulation ¹	$REG_{(LINE)}$	12V 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 of Frequency ¹	$REG_{(LINE)}$	12 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						± 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	8.8			Amps
Short Circuit Current Limit	I_{SC}					14		Amps
Output Saturation Voltage	V_O (sat)	$C_O = V_{CC}$	4A			1.6		Volts
		$C_O = V_{CC}$	8A			2.1	2.3	Volts
		$E_O = GND$	4A			0.9		Volts
		$E_O = GND$	8A			1.4	1.8	Volts
Efficiency ³	η				70	79		%
				Over Temp	65			%
Current Rise Time ³	t_R	Inductive Load				50	100	nS
Current Fall Time ³	t_F	Inductive Load				700	900	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 changes must be accounted for separately.

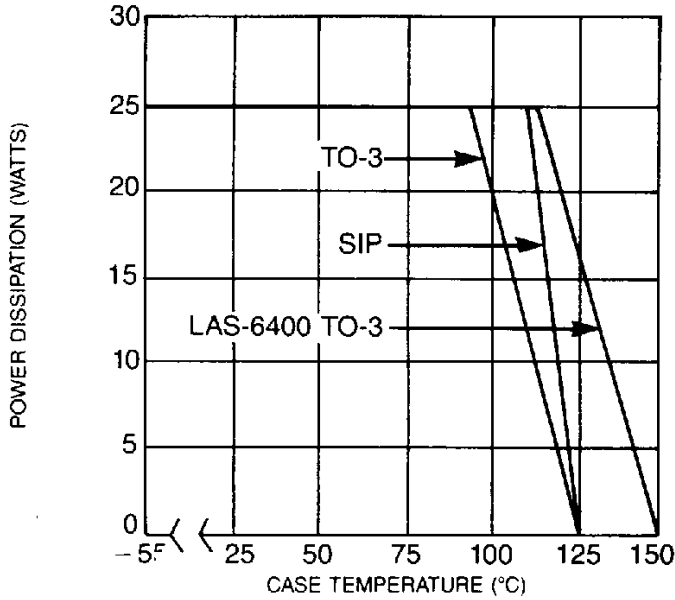
² Over Temperature, $T_J = -25^\circ C$ to $125^\circ C$ for LAS-6300
 TO-3, SIP; LAS-6400 SIP, and $-55^\circ C$ to $150^\circ C$ for LAS-6400 TO-3

³ Per Test Circuit

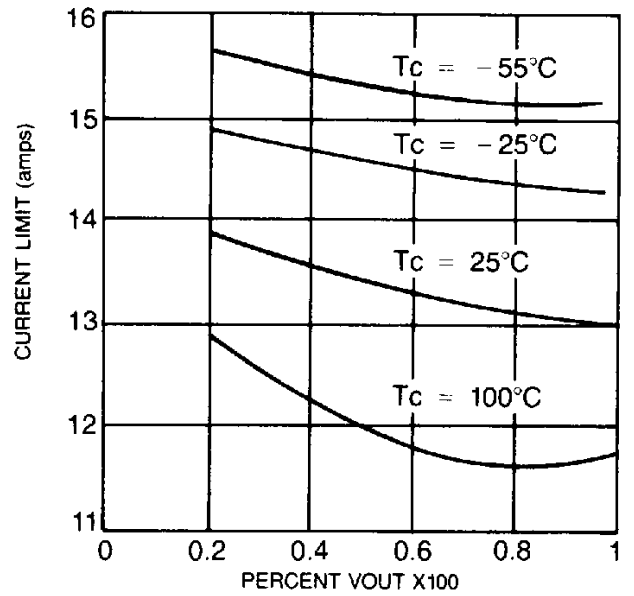
8 AMP SWITCHING REGULATORS

OPERATIONAL DATA

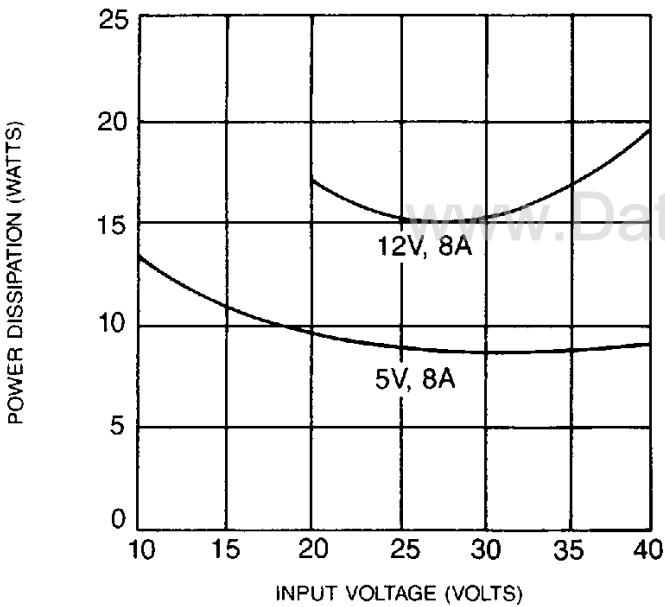
POWER DERATING



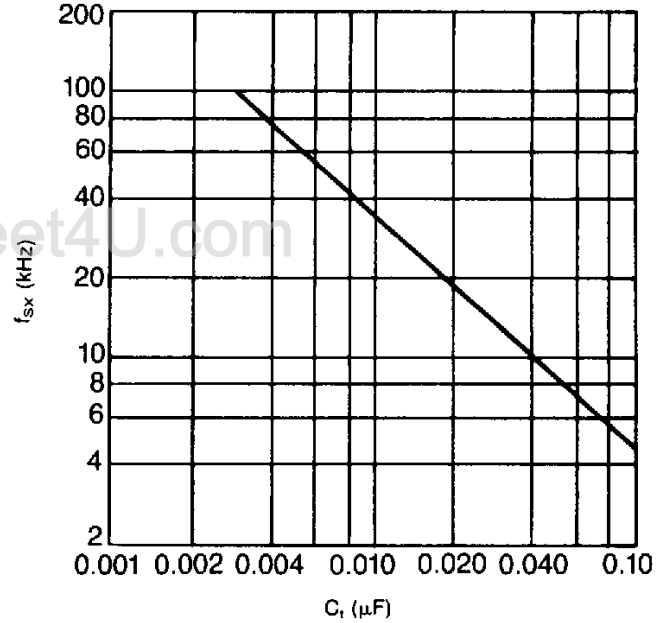
PERCENT V_{OUT} VS OUTPUT CURRENT LIMIT



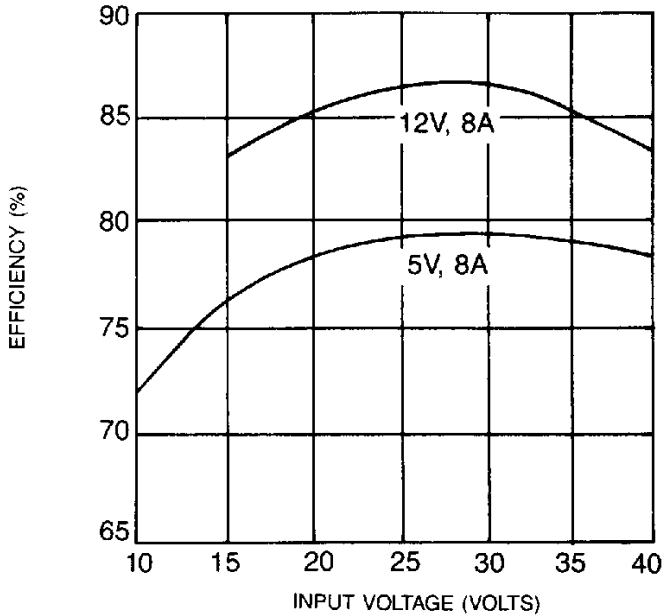
POWER DISSIPATION VS INPUT VOLTAGE



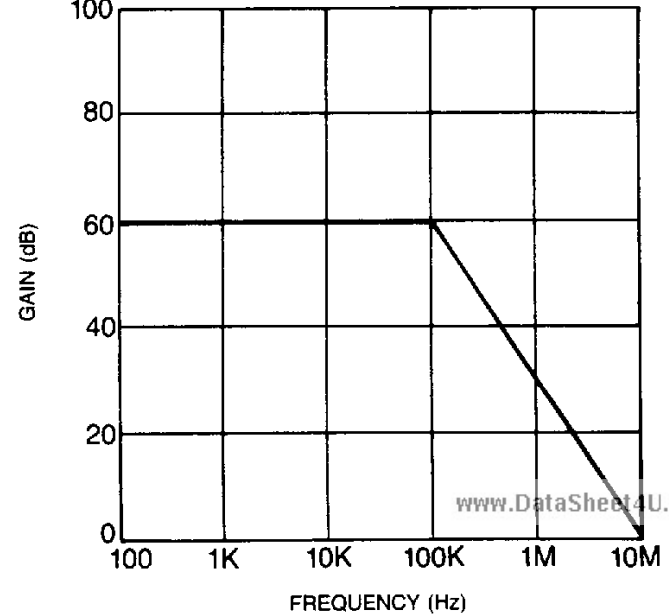
FREQUENCY VS TIMING CAPACITANCE



EFFICIENCY VS INPUT VOLTAGE



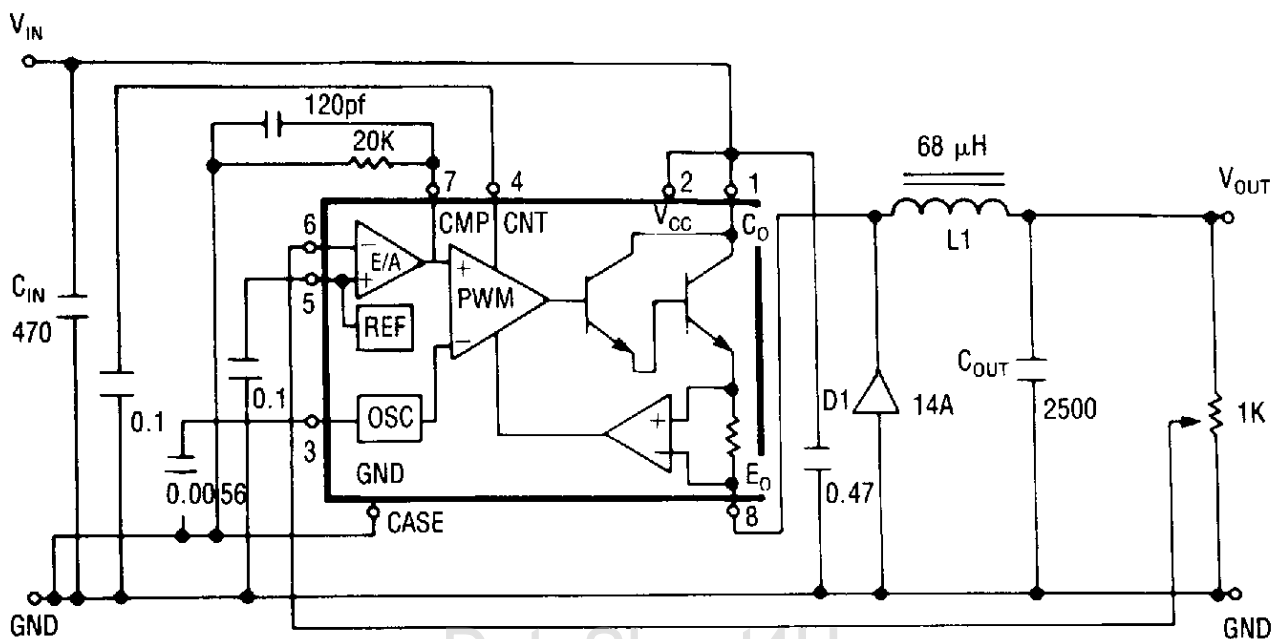
ERROR AMPLIFIER OPEN LOOP GAIN



8 AMP SWITCHING REGULATORS

TYPICAL APPLICATIONS

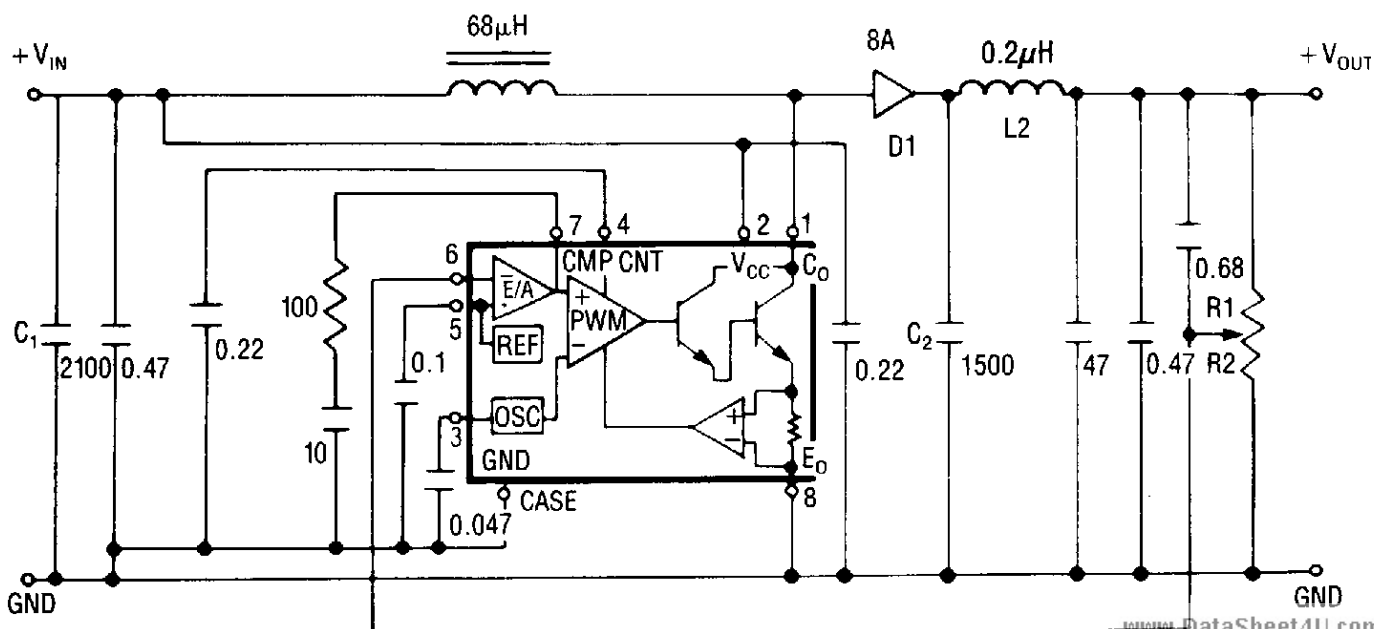
DC-TO-DC STEP-DOWN CONVERTER



$$V_{IN} = 24V$$

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

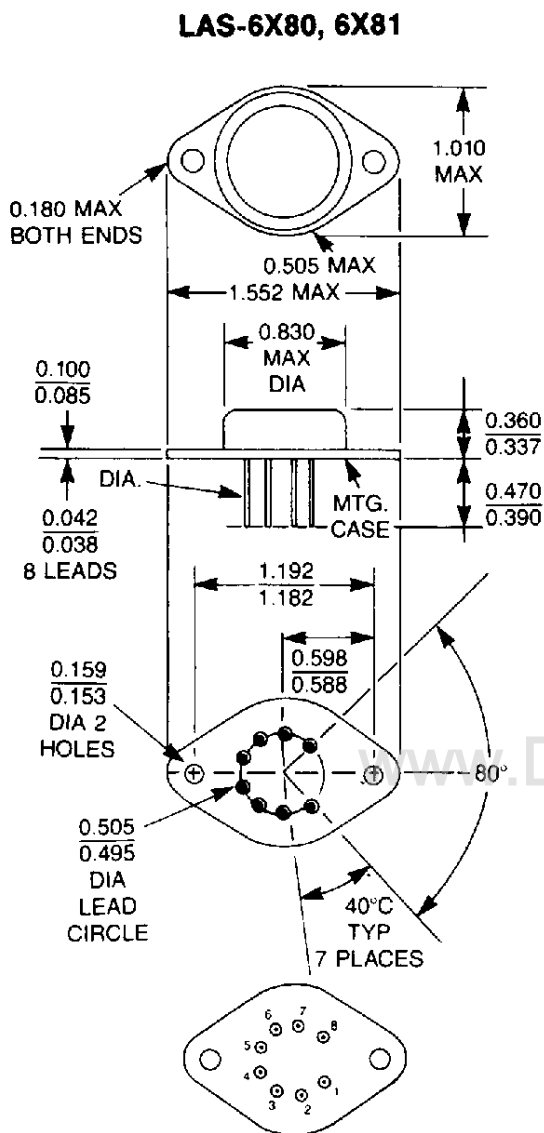
DC-TO-DC STEP-UP CONVERTER



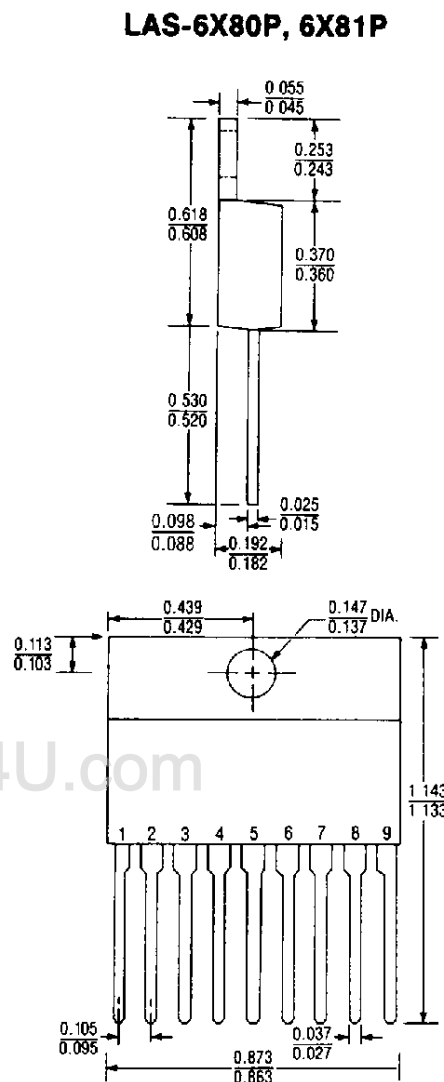
$$V_{IN} = 12V$$

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

DEVICE OUTLINE



Bottom View



Front View

LAS-6X80

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

LAS-6X81

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

LAS-6X80P

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

LAS-6X81P

1 - C_O/V_{CC}
2 - C_t
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.