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LINFINITY DIVISION

LXE1810 Evaluation Board Warning
Read First

1. Do not exceed the maximum output current rating of the Eval Board.
2. The maximum output current is set by the maximum output voltage limit divided by the resistance of the TEC device.
3. Use a dummy resistor load first (20 to 50 ohms), not the TEC device, to set up the output voltage clamp. Read the application document to find out which resistor value changes to set the maximum output voltage limit. It is up to the user to make the resistor value change to fix the output voltage limit for the TEC device that you are using.
4. The purpose of the evaluation board is to show the power efficiency of using the LX1810 Class D power amplifier to drive a TEC device. The purpose is not to provide an accurate temperature control solution. There are many solutions for controlling the temperature setting and accuracy and it's not possible to provide this information in a general way because each application is different.
5. The closed loop feedback compensation will need to change for each different TEC device used. The parameters for each TEC device change with the size and capacity to heat and cool. It's not possible to provide the feedback compensation solution in a general way. Either the engineer designing the control system will need to know how to do these calculations or they will have to hire an engineering consultant to do the control system design.

LXE1810-100

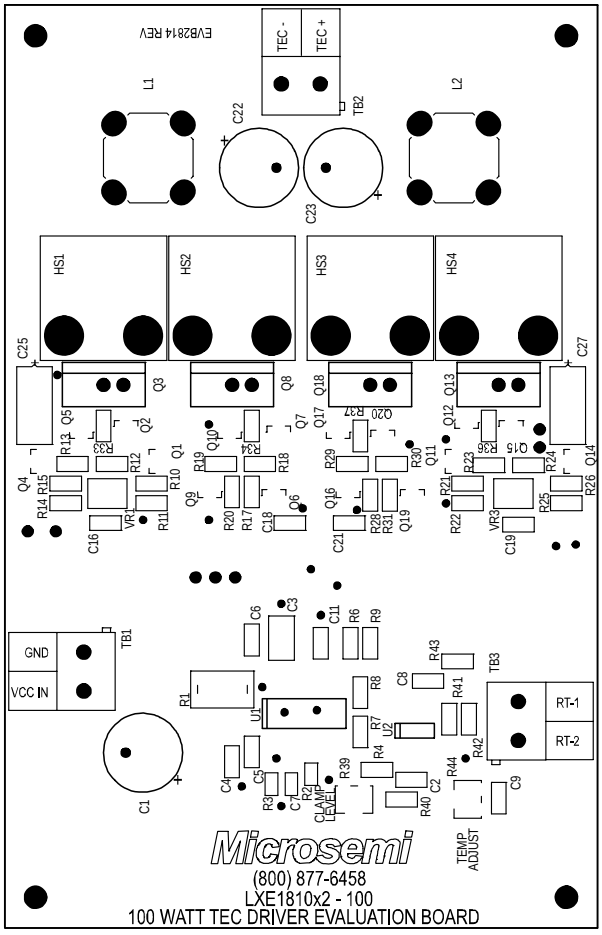
Thermo Electric Cooler Drive

DESCRIPTION

KEY FEATURES

- 100 Watt Output.
- Input Voltage +12 to +15 Volts Max.
- Output current is 10A Maximum at 10V.
- Assy # LXEVB1810-100.
- Thermister Input is not polarity sensitive for RT-1 and RT-2.
- If the set temperature is lower than the room temperature when power is applied; the output drive will put a positive potential across the Thermo electric cooler.
- Adjust R44 for Temperature setting.
- Adjust R39 for Maximum voltage output.
- Maximum Voltage output divided by TEC device resistance is maximum current output. Maximum current not to exceed 10A.
- Air flow required on heatsink for continuous 100W operation.

IMPORTANT: For the most current data, consult *MICROSEMI*'s website: http://www.microsemi.com/



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LXE1810-100

APPLICATION NOTE

The LX1810 has an internal 5V reference at PIN 1. This reference is used with the POT adjustment that is the temperature setting and with the thermister resister divider that is the temperature feedback. The value of R43 is set equal to the value of the thermister at the temperature of operation, (±20%).

The values for R42, R41, R40, C8, & C2 are used to set the loop compensation for stable closed loop operation. This Eval board has been compensated for a Marlow Industries Inc. MI1012T-01, TEC device.

The value of R39 sets the peak output voltage limit of the power amplifier. The pot allows the user to adjust the output voltage for the TEC device resistance which sets the maximum output current. The LX1810 has an internal cycle by cycle current limit that is activated after a count of 9 cycles of over current. When activated the LX1810 goes into a hiccup mode until it has 2 cycles of normal current. This mode will prevent damage when the output has a short circuit.

The inductors, L1 and L2 are designed for the continuous current rating required by the device being driven by the power amplifier. At the 300kHz switching frequency an inductance value between 5µH and 10µH should be used. C22 and C23 provide an LC low pass filter. The TEC devices have a slow rate of change of temperature with time, which means the loop bandwidth will probably be under 10Hz. This means that the LC filters can be set in the range of 500Hz. Therefore, you can use the largest cap value with the voltage and package size required by your design.

The LX1810 has its FET drivers buffered so that the Eval board is capable of driving the highest power TO-220 package MOSFETs. An example of these devices are the Fairchild NDP6030PL P-Channel MOSFET, capable of 20 amps and the SUP70N03-09BP N-Channel MOSFET, capable of 20 amps. With these devices and the proper inductors, and the correct amount of heat sink, the power amplifier is capable of 10 amps continuous at an output voltage of 10 volts. So, any output power design is feasible up to this maximum design with the proper selection of components.

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APPLICATION