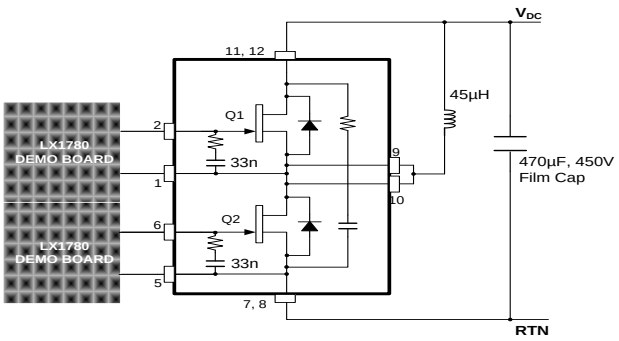
PRELIMINARY PRODUCT BRIEF (Subject to change)

LX1780

Enhancement Mode Silicon Carbide JFET and Bipolar Transistors Driver

DESCRIPTION

The LX1780 is an extremely fast-switching Gate driver IC for driving normally-off silicon carbide JFET switches. It replaces several components compared to traditional applications, and delivers 15A from a single- supply.



KEY FEATURES

- One High Peak Current Drive: R_{SOURCE} 0.35Ω, R_{SINK} 0.45Ω, T_J = 25°C
- Positive and Negative Voltage Drive for extremely Fast switching
- Prevents spurious dV/dt (Miller Effect) turn-on by generating a negative drive
- 15A I_{PK} (Sourcing and Sinking) Drive Current
- Drive Stage Latch-up Immunity 2A (Minimum)
- Resistor Programmable High Current On-Time (50ns to 200ns)
- Switching Frequency up to 250 kHz
- Onboard Internal PWM Controller for Bias Current Regulation and Negative Supply Regulation (PWM more than 80% efficient)
- Wide Operating Voltage Range(±8V to ±18V)
- Non-Symmetrical Supply Operation Acceptable
- t_{RISE}, t_{FALL} < 12ns, t_{PROP} delay < 30ns
- Ambient -40°C to +125°C

BENEFITS

- Allows user to have a single supply voltage and smaller footprint
- Better utilization of SiC JFET investment, higher efficiency
- RoHS Compliant & Halogen Free

APPLICATIONS

- Drives discrete and modular SiC Vertical JFETs
- Drives SiC Bipolars
- Rack-mount power systems
- High-power solar inverters
- Very high performance motor drives
- Extra high-efficiency converters

Microsemi
Analog Mixed Signal Group
One Enterprise, Aliso Viejo, CA 92656 USA, +1 (949) 380-6100, Fax: +1 (949) 215-4996

Part Number	PACKAGE ORDER INFO	THERMAL DATA
LX1780QLQ	LQ Plastic 48 Pin 7x7 QFN	θJA = 27 °C/W θJC = 3 °C/W(ESTIMATED)

Application Note is available from Microsemi Marketing including guidance on calculating drive currents for various FET configurations. Single channel demo board is available now from Microsemi Marketing and Isolated two channel demo board will be available shortly.

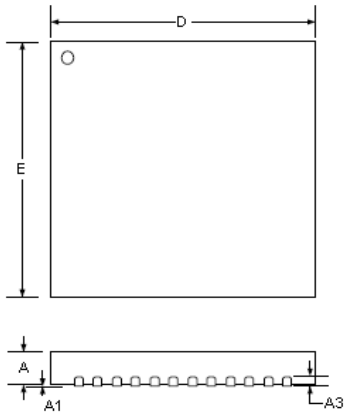
An updated list of Microsemi product and support contacts can be found at www.microsemi.com or by calling +1 (949)-380-6100

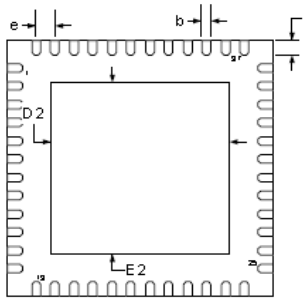
RECOMMENDED OPERATING CONDITIONS

Parameters	Symbol	Min	Typ	Max	Units
Positive Supply Voltage	V_{DCCD}	8	15	18	V
Negative Supply Voltage (Selectable, can be overridden by external power supply)	V_{EE}	-15	-12	-8	V
Average Bias (Conduction) Current	I_{BIAS}	50		300	mA
Bias Current Ripple (Function of external L & C)			10		%
Operating Ambient Temperature	T_A	-40		125	°C

PACKAGE DIMENSIONS

LQ 48-Pin 7x7 mm QFN Package





Dim	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.80	1.00	0.031	0.039
A1	0	0.05	0	0.002
A3	0.20 REF		0.008 REF	
b	0.18	0.30	0.007	0.012
D	7.00 BSC		0.276 BSC	
D2	5.00	5.25	0.197	0.207
E	7.00 BSC		0.276 BSC	
E2	5.00	5.25	0.197	0.207
e	0.50 BSC		0.020 BSC	
L	0.30	0.50	0.012	0.020

Note:

1. Dimensions do not include mold flash or protrusions; these shall not exceed 0.155mm(.006") on any side. Lead dimension shall not include solder coverage.

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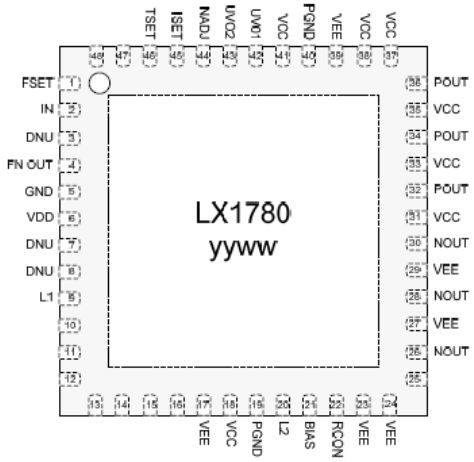
ABSOLUTE MAXIMUM RATINGS

Supply Voltage (VEE) ..... -15V to +0.5V
Supply Voltages(VCC) ..... -0.5V to +18V
Digital Inputs ..... VEE-0.3V to VCC+0.3V
Digital Output Open Drain ..... -0.5V to 18V
Analog Inputs..... -0.3V to VCC+0.3V
Analog Outputs (except L1, POUT, NOUT) ..... -0.5V to VCC+0.3V
Analog Outputs (L1, POUT, NOUT) ..... VEE-0.3V to VCC+0.3V
Conduction Bias Current Peak (Set by Resistor to RCON) 400mA
Peak Output Drive Current (Device design minimum) 15A
Power Dissipation (TJ = 125°C for FSW= 50kHz, 200ns pulse) 1550mW
Junction Temperature Range ..... -40°C to 150°C
Storage Temperature Range ..... -65°C to 150°C
Peak Package Solder Reflow Temperature (40 seconds maximum exposure) ..... 260°C
ESD (all pin, HBM) 2000V
Lead Temperature. (Soldering 10 seconds) ..... 260°C
Notes: Exceeding these ratings could cause damage to the device. All voltages are with respect to GND. Currents are positive into, negative out of specified terminal. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" are not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability

PACKAGE PIN OUT



LQ PACKAGE
(Top View)
yyww = Year/Week/
RoHS / Pb-free Matte Tin Pin Finish

FUNCTIONAL BLOCK DIAGRAM

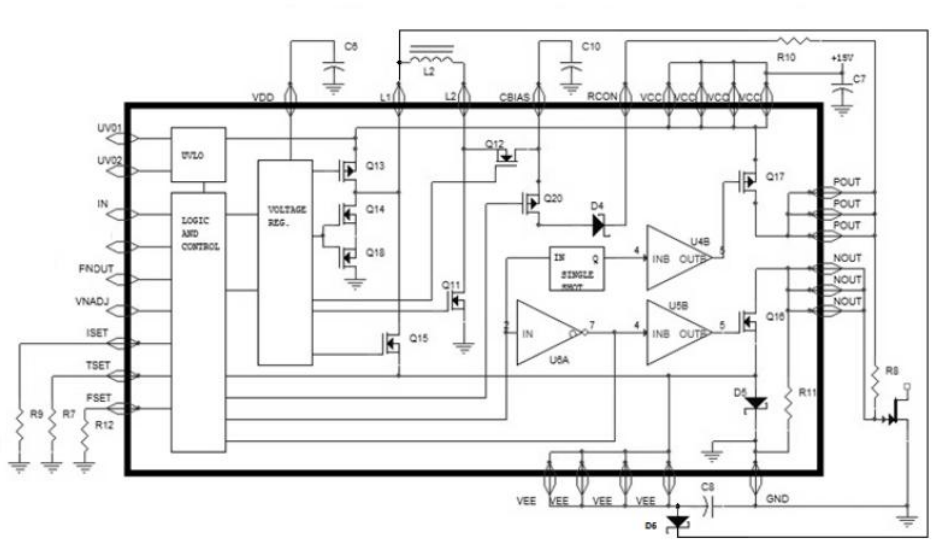


Figure 1. LX1780 Functional Block Diagram.