Product Overview

LM2x0x: TI's First 2mm by 2mm Half-Bridge Gate Driver

LM2x0x Product Overview

The LM2x0x devices are a family of low current half-bridge drivers optimized to drive MOSFETs and IGBTs in industrial applications where BOM costs are very sensitive and power density is critical. The family has five generic parts, most of which are available in a smaller 2mm × 2mm package. This product overview highlights the benefits that this family of devices can provide to your system.

Optimized

LM2x0x features a 0.5A/0.8A drive current to reduce switching losses and improve overall efficiency in lower power systems. This combined with the small WSON package options available make the LM2x0x one of TI's smallest half-bridge drivers. The family keeps the feature offerings simplistic, reducing the number of orderables and streamlines the selection process.

Robust

The LM2x0x 107V $_{HB}$ and -19.5V negative transient handling allows the proper headroom and buffer for the driver to exist and operate in noisy environments without the need for external components.

Features

The LM2x0x family offers a range of features that expand the potential use cases. UVLO options allows designers to choose a voltage level that maintains that FETs remain open when there is not enough potential for the FET to be charged. Inverting input or shutdown features give designers flexibility in implementation and reduces external circuitry needed to implement the driver best for their system.

Table 1. Product Summary

Product Features	Product Benefits	Key Applications
107V V_{HB}, 0.5A/0.8A Drive	Feature optimized Half-bridge driver to reduce BOM costs	BLDC Motors Power Tools Small Home Appliances E-Bikes / E-scooters Low Power Inverters
Wide Recommended G_{VDD} Range	Enables compatibility with many systems	
-19.5V Switching Transient Handling	A good option for handling transients and noise in operation	
5V or 8V UVLO Options	MOSFET and IGBT applications	
2mm × 2mm Package Options	Power Density	

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Target End Equipments

With the product family features discussed, consider the ways that this can improve a system design.

Table 2. End Equipment Impact

System Requirement	System Benefit
Size	2mm × 2mm packages enable small design size
Robustness	-19.5V handling on SH allows the LM2x0x to better withstand noise and transients
Cost	The excellent transient performance reduces the need for external components such as clamping diodes
	Integrating the bootstrap diode saves BOM cost and reduces components needed
Efficiency	5V and 8V UVLO options prevent the driver from partially turning on the power switch
	0.5A/0.8A drive current sufficiently reduces switching losses in motor drives
Flexibility	UVLO and package options help keep the system optimized
	Inverting input (LM2103) and deadtime (LM2104) features provide greater control of power switches

The LM2x0x can be utilized in a wide variety of end equipments. Figure 1 through Figure 3 help explore some of the most popular use cases and respective topologies.

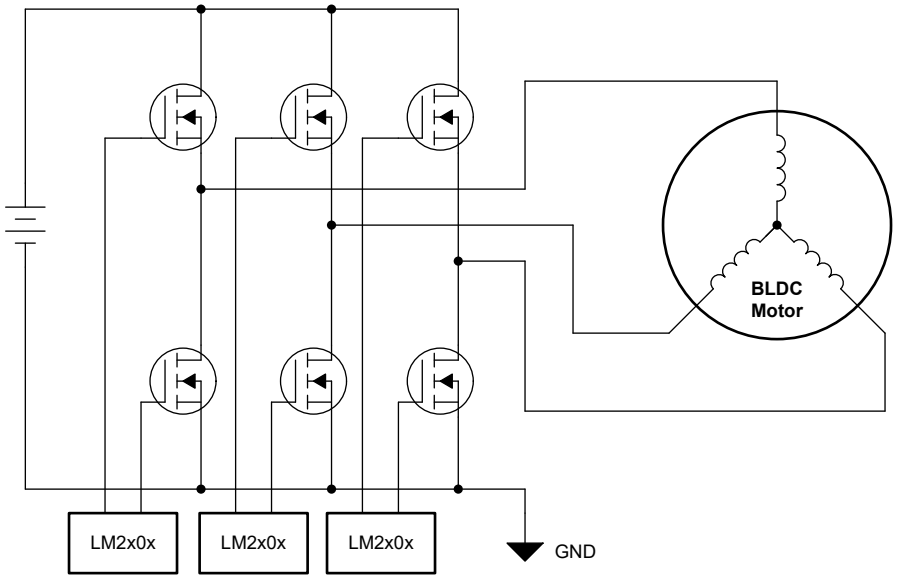

Figure 1. 3-Phase Motor Drive

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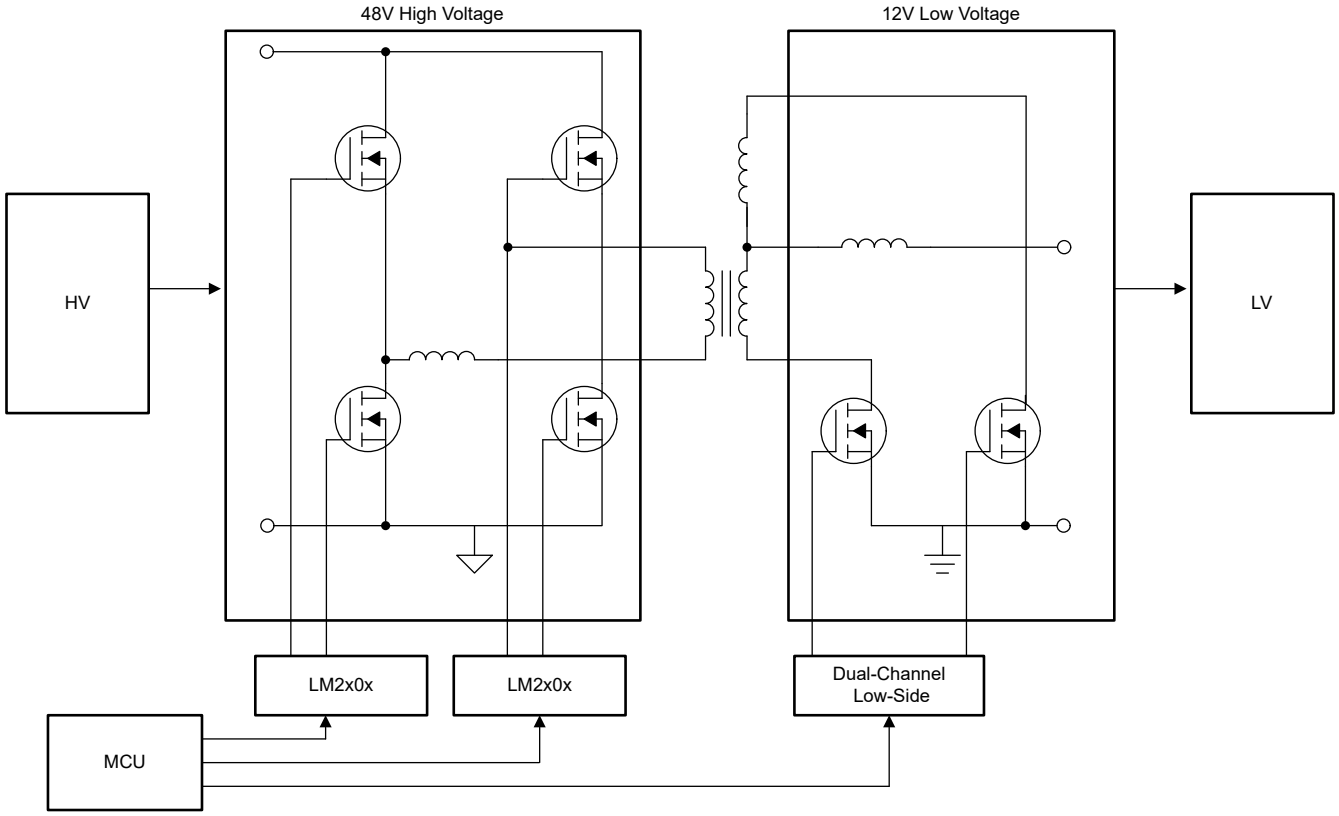

Figure 2. DC/DC Converter

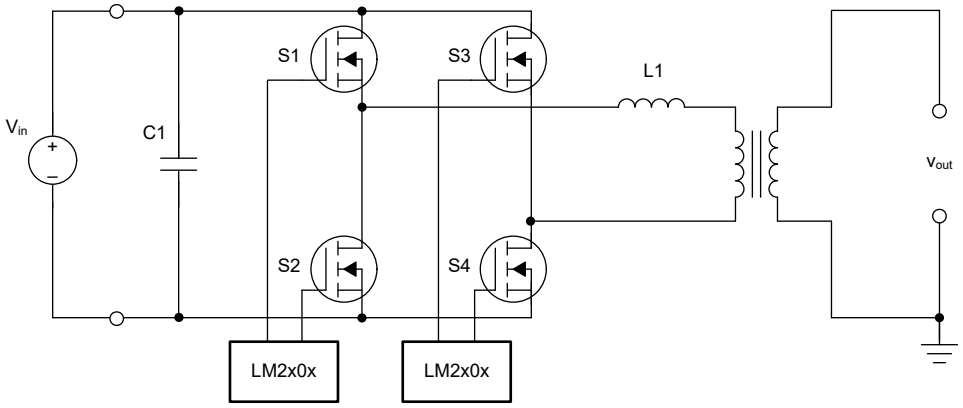

Figure 3. AC Inverter

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Device Selection Guides

The LM2x0x devices have distinct features, electrical specifications, and pinouts. To aid in selection, Table 3 through Table 5 help distinguish major differences between part numbers and variants.

Table 3. Device Key Specs

Part Number	UVLO	Feature	Package Options
LM2005	8V	Dual Input, Integrated Diode	D, DSG
LM2105	5V	Dual Input, Integrated Diode	D, DSG
LM2101	8V	Dual Input	D, DSG
LM2103	8V	Dual Input, Inverting Input	D
LM2104	8V	Single PWM, Fixed Deadtime, Shutdown	D

Table 4. Pinout Maps and Availability

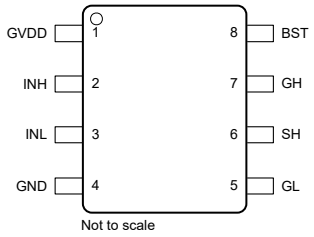	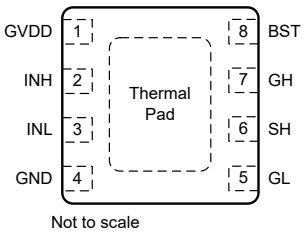	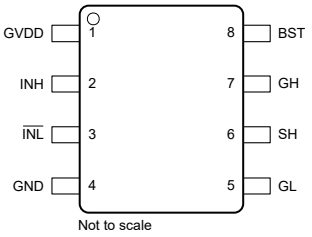	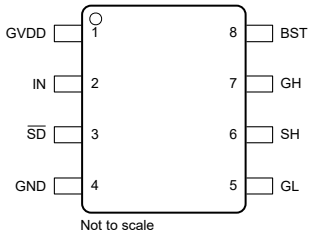
D 4.9mm × 3.9mm SOIC-8	DSG 2mm × 2mm WSON-8	D 4.9mm × 3.9mm SOIC-8	D 4.9mm × 3.9mm SOIC-8
Typical Family Pinout	Typical Family Pinout	LM2103 Variant	LM2104 Variant

Table 5. Legacy Devices Similar to LM2x0x

Legacy Device	New GPN Replacement	Pin-to-Pin?	Key Advantages
LM5109(B)	LM2101	Yes	Cost optimized
LM5101C	LM2105	No	Smaller package options allow for reduced design size
UCC27710	LM2005	Yes	Optimized for lower bus voltage systems and integrates boot diode

Additional Information

Table 6. Orderable Table

Orderable Device	Package Type	Pins	Op Temp (°C)	Device Marking	Samples
LM2005DR	SOIC	8	-40 to 125	L2005D	Samples
LM2005DSGR	WSON	8	-40 to 125	L005	Samples
LM2105DR	SOIC	8	-40 to 125	L2105D	Samples
LM2105DSGR	WSON	8	-40 to 125	L105	Samples
LM2101DR	SOIC	8	-40 to 125	L2101D	Samples
LM2101DSGR	WSON	8	-40 to 125	L101	Samples
LM2103DR	SOIC	8	-40 to 125	L2103D	Samples
LM2104DR	SOIC	8	-40 to 125	L2104D	Samples

Additional References:

- *How to Choose a Gate Driver for DC Motor Drives*
- *Small Price Competitive 100-V Driver for 48-V BLDC Motor Drives*
- *Half-bridge Minimum Current Calculator*

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