

IGBT/MOSFET Gate Drive Optocoupler for Refrigerator

ABSTRACT

Liteon offered the best solution what IGBT/MOSFET Gate Drive Optocoupler for Home Appliance Refrigerator applications. Liteon have High CMR, 2.5A/3.0A Output peak current, Rail-to-Rail Output voltage, etc components.

The **LTV-3120** contains a GaAIAs LED optically coupled to an integrated circuit with a power output stage. It is ideally suited for driving power IGBTs and MOSFETs used in Motor Control, Inverters, SMPS, Induction Heating (Cooking), Home Appliances (such as Refrigerator, Washing Machines and Air Conditioner) and Industrial Applications.

The 2.5A peak output current is capable of directly driving most IGBTs and MOSFETs with ratings of up to 1,200V/100A. For IGBTs and MOSFETs with higher ratings, the LTV-3120 can be used to drive a discrete power stage which drives the IGBT or MOSFET gate.

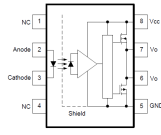
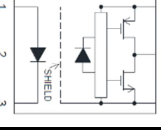
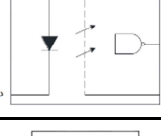
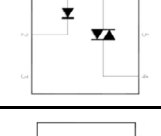
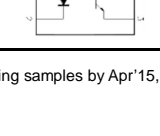
The LTV-3120 has an operating temperature of -40°C to 100°C, this makes it ideal for use in applications that operate in industrial environments.

The **LTV-341** series Optocoupler is ideally suited for driving power IGBTs and MOSFETs used in motor control inverter applications and inverters in power supply system. It contains a AlGaAs LED optically coupled to an integrated circuit with a power output stage. The 1.0A peak output current is capable of directly driving most IGBTs with ratings up to 1200V/100A. For IGBTs with higher ratings, the LTV-341 series can be used to drive a discrete power stage which drives the IGBT gate.

The LTV-341P and LTV-341W have the highest insulation voltage of $V_{IORM} = 891 V_{Peak}$ and $V_{IORM} = 1140 V_{Peak}$ respectively.

Anywise, Liteon have more best solutions what these are High Speed Coupler(**LTV-M601**), PhotoTriac(**MOC30xx** · **LTV-30xx**) and General Purpose Photocoupler(**LTV-817**) for Home Appliances.

Selection Guide

Device	Package	Functional Diagram	Features
LTV-3120	DIP-8		<ul style="list-style-type: none"> ✓ High CMR 25KV/μs @V_{CM}=1500(V) ✓ V_{CC} = 15~30(V) wide operating range ✓ 2.5A Output peak current
LTV-341 series	LSOP6		<ul style="list-style-type: none"> ✓ Rail-to-Rail Output voltage ✓ Under Voltage Lock-Out protection ✓ 3.0A Output peak current
LTV-M601	SOP5		<ul style="list-style-type: none"> ✓ 3.3V/5V Dual Supply Voltages ✓ Low Power Consumption ✓ High Speed 10MBd
MOC30xx LTV-30xx	DIP6 SOP4		<ul style="list-style-type: none"> ✓ High Isolation Voltage ✓ Mini-Flat Package ✓ Rohs compliant
LTV-817	DIP4 DIP4 SMD		<ul style="list-style-type: none"> ✓ High Isolation Voltage ✓ Rohs compliant

Notes: **LTV-3120** (M.P. now) and **LTV-341** (engineering samples by Apr'15, M.P. schedule by Aug'15).

Refrigerator Applications and Topologies

Designing for consumer applications require reliable Photocoupler products that offer more functionality and higher isolation while minimizing power consumption and costs. Liteon have the product technologies and manufacturing capabilities, to help you differentiate your products in the market.

A typical Refrigerator system consists of a Power Supply unit and Control unit. For the Power Supply unit, Liteon has high isolation voltage Photocoupler that is mains used to isolate the PFC and PWM. For the Operation unit, MCU control the Key Entry of Touch Key, Wireless Connectivity interface, LED Display, Buzzer and communication interface of microcontroller, etc. For the Control unit, MCU control the power switch, Damper heater switch and Defrost heater switch combined with PhotoTriac, control the Motor System for Ice maker, Water pump, Damper, Deodorize, Refrigerator and Freezer function, related sensor and peripheral device. And, others MCU control the Compressor Motor combined with IGBT/MOSFET Gate Drive Optocoupler. The main isolate both MCU and related peripheral devices, to ensure the reliability of the circuit. Motor control systems are an integral part of various home appliances. These developments are dictated by safety and environment protection requirements, by performance requirements, and of course by the manufacturing cost. So, when we were designing home appliances, the need to strengthen attention the MCU and peripheral device to the application circuit isolation to ensure lower noise of the circuit.

Explore product information and see block diagram below.



Fig. 1 Refrigerator of on the market

Block Diagram

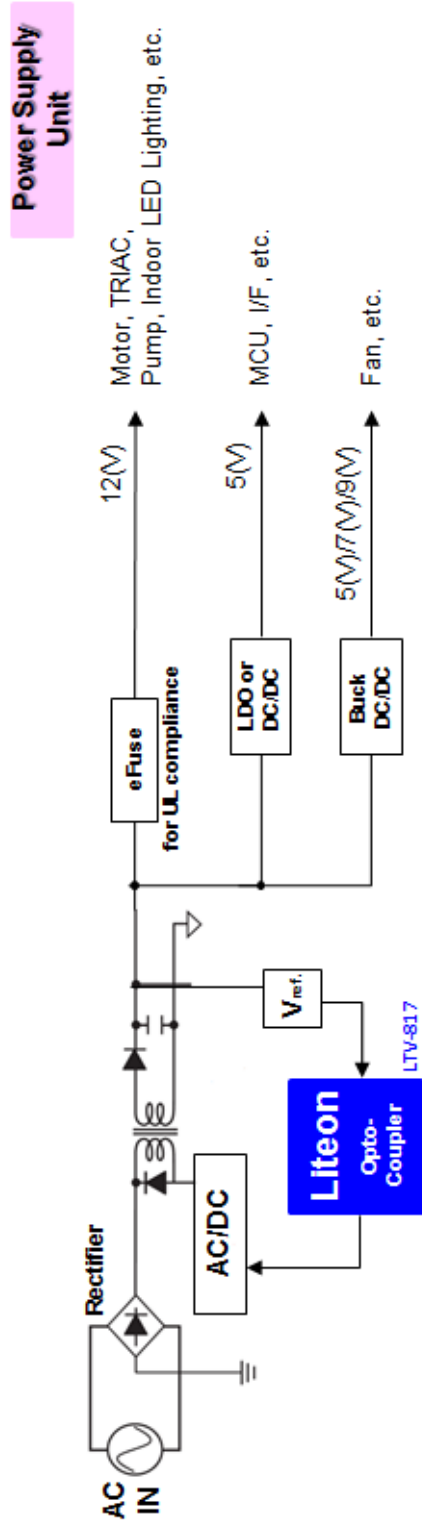


Fig. 2 Block Diagram (1/2) of Refrigerator

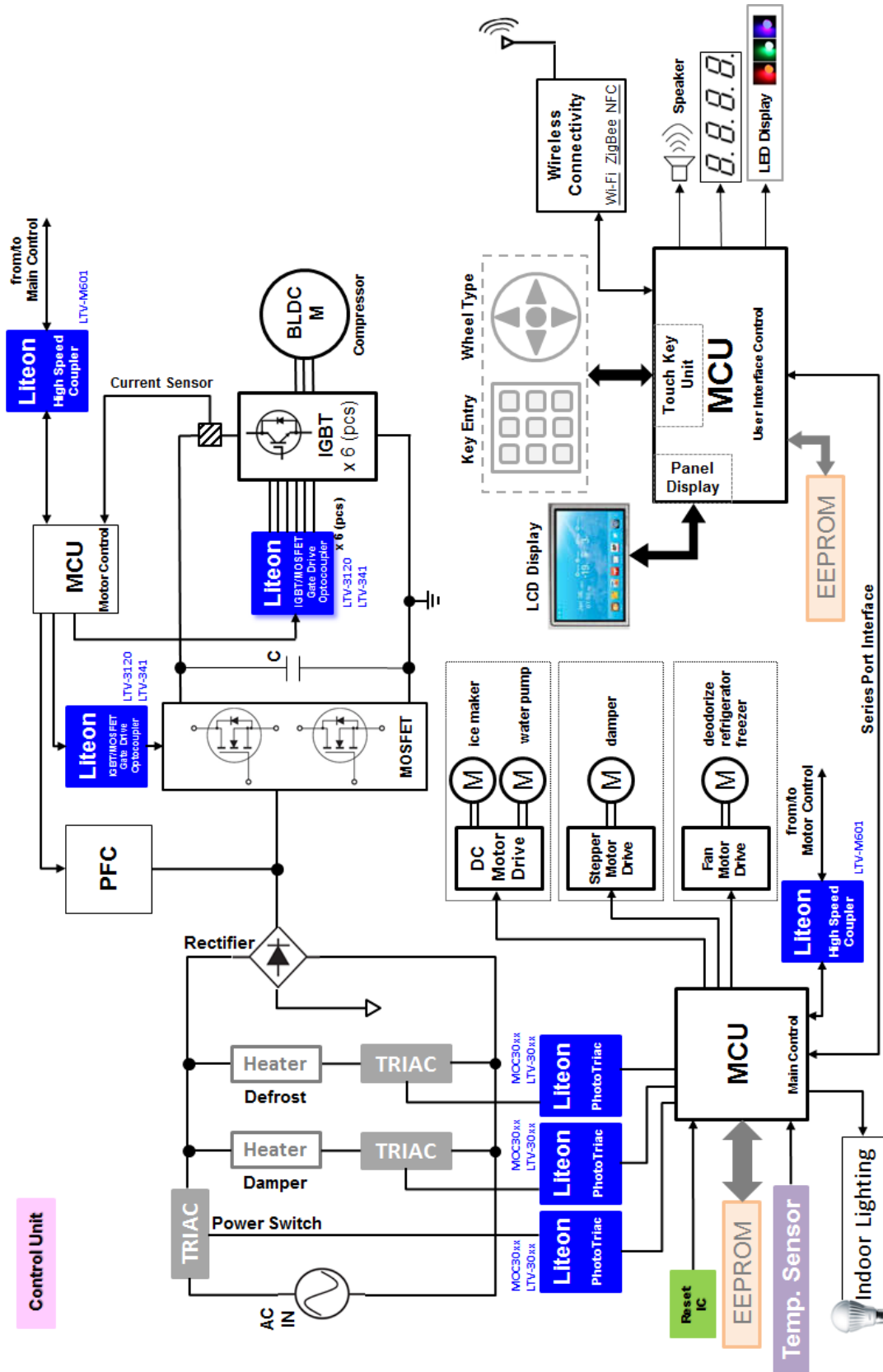


Fig. 3 Block Diagram (2/2) of Refrigerator

Liteon's LTV-3120 and LTV-341 IGBT/MOSFET gate drive optocoupler are used for motor control of Refrigerator, microcontrollers for IGBTs timing control. These are best choice for bridge of motor control system.

For kitchen appliances, since refrigerators work continuously, it is important to reduce their power consumption. The market demand for ample indoor space is driving the need for thinner heat insulators and smaller motors. Because refrigerators are used in homes, it is necessary to improve motor efficiency, even at low speeds, in order to reduce acoustic noise and vibration. An inverter controls a compressor. Various sensors and a microcontroller work in tandem to regulate indoor temperatures and humidity. The refrigerators which are in constant operation, there is an increasing demand for eco-friendly electric home appliances which reduce the overall required power consumption. Refrigerator's critical design factors and challenges for motor control architectures are efficiency, reliability, noise reduction, thermal performance, reduced board space and ease of design. The design engineers face significant challenges such as component spend, complex algorithm development, and numerous design cycles during implementation. Liteon constantly expanding product portfolio, combined with manufacturing process enhancements, innovative topologies, and ours systems expertise, allow circuit designers to develop the most advanced solutions to meet your needs. Liteon offer a broad range of IGBT Gate Driver Optocoupler, IPM Gate Drive Interface Optocoupler, High Speed Coupler, PhotoTriac and General Purpose Photocoupler for every motor control application.

Liteon Technology offered the IGBT/MOSFET gate drive optocoupler that can match different IGBTs/MOSFETs for Refrigerator applications. Optimized for Refrigerator, these IGBTs/MOSFETs gate drive optocoupler contain High CMR, High Output peak current, Rail-to-Rail Output Voltage that are able to attain a balance between switching and conduction losses. In addition, Liteon's solutions notably lead the market with best-performance ratio, as we ensure system efficiency and minimize total losses.

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