

IGBT/MOSFET Gate Drive Optocoupler for Washing Machine

ABSTRACT

Liteon offered the best solution what IGBT/MOSFET Gate Drive Optocoupler for Home Appliance Washing Machine 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 Washing Machines, Refrigerator 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.

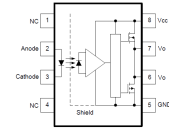
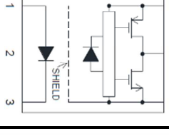
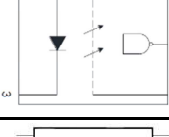
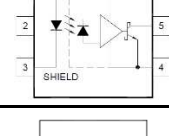
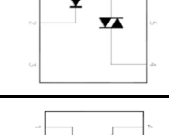
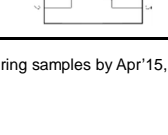
The LTV-3120 has an operating temperature of -40°C to 100°C, this makes it ideal for use in applications that operate in industrial environments.

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**), IPM Gate Drive Interface Optocoupler(**LTV-456**), 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
LTV-456	LSOP6		<ul style="list-style-type: none"> ✓ High CTR ✓ High CMTI ✓ Minimized PWD
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). **LTV-456** (engineering samples by Q2'15, M.P. schedule by Q3'15)

Washing Machine 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 Washing Machine system consists of a Power Supply unit, an Operation unit and a Control unit. For the Power Supply unit, Liteon has high isolation voltage Photocoupler that is mainly 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, water valve, drain valve, softener valve, bath-water pump and heater switch combined with PhotoTriac, control the Motor System for Tub motor, Fan motor circulation pump and Dryer Fan combined with IGBT/MOSFET Gate Drive Optocoupler and IPM Gate Drive Interface Optocoupler, related sensor and peripheral device. 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 Washing Machine of on the market

Block Diagram (Power Supply/Operation Unit)

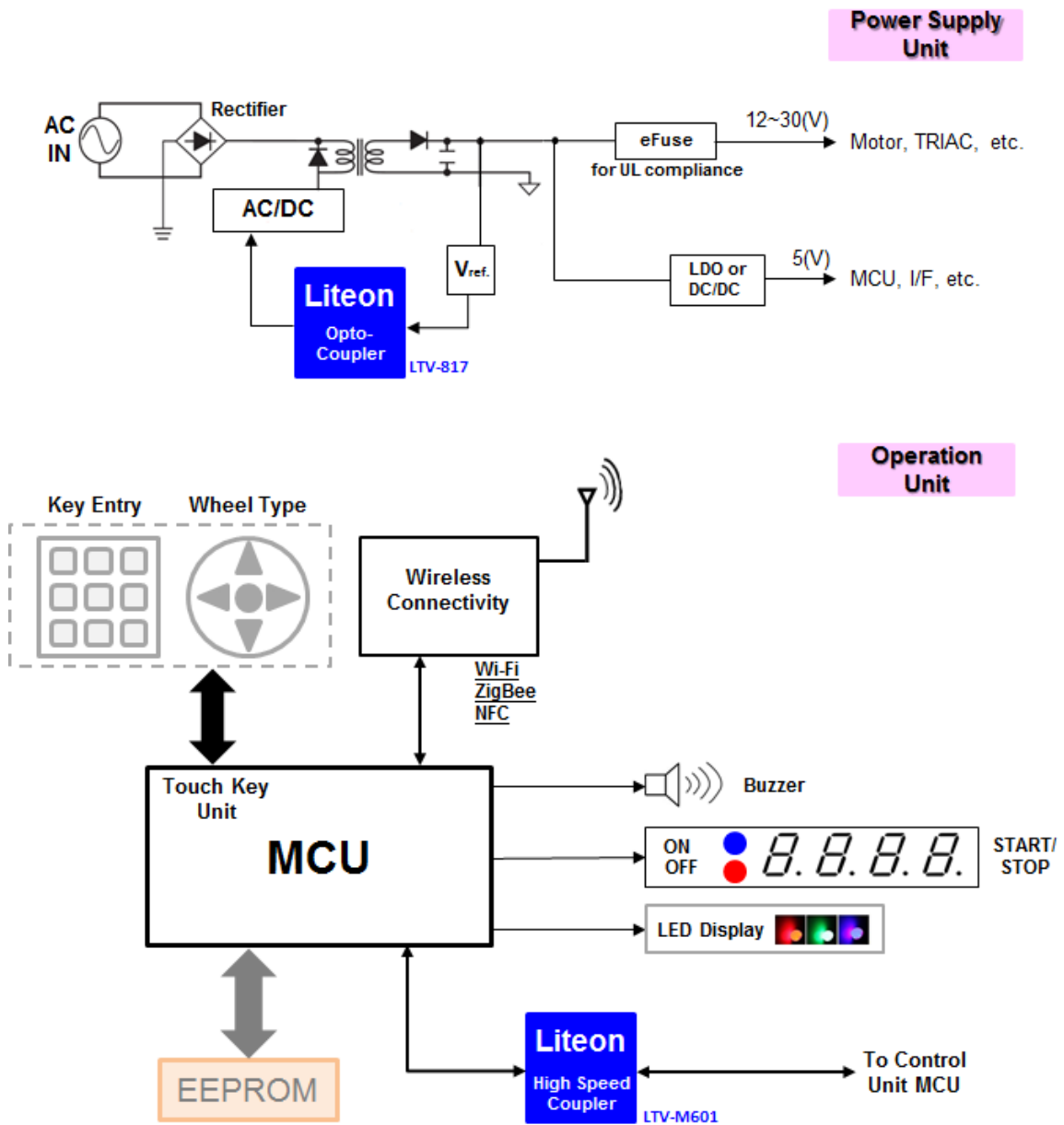


Fig. 2 Block Diagram (1/2) of Washing Machine

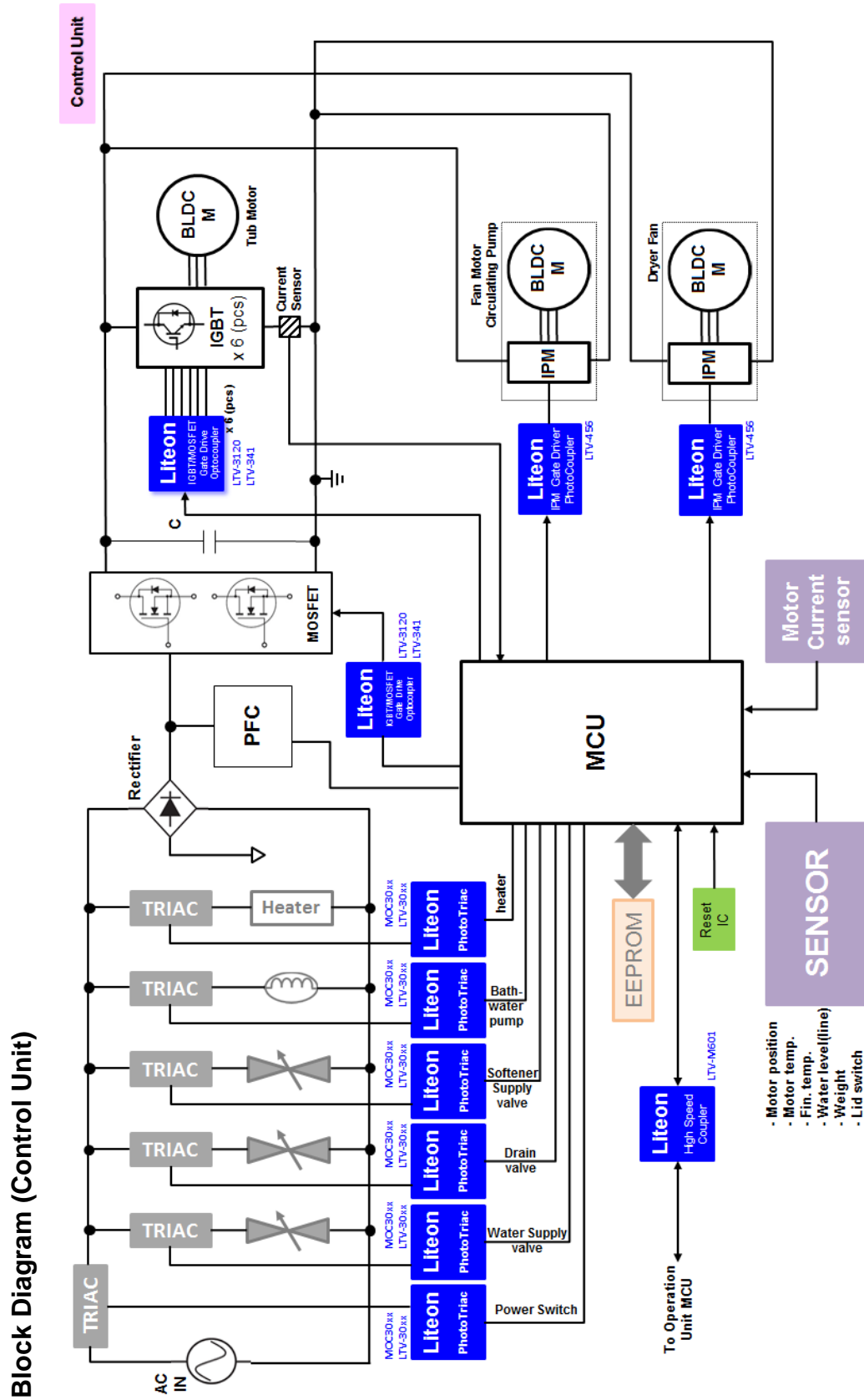


Fig. 3 Block Diagram (2/2) of Washing Machine

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

The universal use of Washing Machines in domestic usage is driving the demand for reduced power consumption and convenient. Modern high performance washing machines now have to be environment-friendly (eco-friendly) electric household appliances, providing modern technology advances that cleans clothes, whilst using less water, less power and are quieter in their operation. Higher specification products also have ion cleaning functions to eliminate odors and the trend towards multifunctional use is set to continue. A modern washing machine requires a motor that can deliver high torque during the agitation portion of the wash cycle, high-speed rotation during the spin cycle, and a high degree of durability. As some models function not only as washers but as dryers as well, they must also incorporate inverter control technology for the drying function. Washing Machine'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 Washing Machine applications. Optimized for Washing Machine, 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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