

DESCRIPTION

The LXMG2203 is a fully enclosed compact solid-state LED lighting driver module. It operates from a universal AC input supply in the range of 100V_{AC} to 277V_{AC}, 50/60Hz to drive a string of LEDs with active power factor correction. LED string voltage can range from 14V to 48V at a constant current of 700mA to drive a wide variety of LED lamp string requirements.

Control terminal leads include a dimming input BRITE_A with a dedicated RETURN lead. The amplitude of the output LED string current will vary from 10% to 100% corresponding to a 1V_{DC} to 10V_{DC} signal on the BRITE_A input following the 0V to 10V ESTA E1.3-2001 Analog Control Specification Standard. The BRITE_A terminal when pulled down below minimum dimming will turn off the LEDs and enter a low power consumption mode. A second control terminal lead provides a FAULT indicator.

In the case that there is an LED string short between OUT(+) and OUT(-), or string open, or a product over temperature condition the FAULT terminal will go low. The FAULT terminal includes an open collector device that can be pulled up to a maximum of 48V and will sink 8mA typical to 0.8V when a short or open fault occurs.

To reduce audible noise the internal switching frequency remains above 30kHz. Safety features include open output circuit protection, whole string short circuit protection. The maximum allowable hot spot case temperature is 90°C (above this temperature the module will be thermally self-protected). The recommended operating ambient temperature range is -30°C to 70°C, as long as the maximum case temperature is not exceeded. The compact enclosure is rated to IP66, meets UL8750 and UL1310 class 2, CE pending.

KEY FEATURES

- High Efficiency (90%)
- Active Power Factor Correction (Typical 0.99 at 120V_{AC})
- Universal AC Input 100~277V_{AC}
- Constant Current 700mA Typical Output
- Anode Supply Adjusts for String Voltage between 14V and 48V
- Dimming Input Provides 10% to 100% Range, Plus Shutdown
- Small Compact Size With a Hole in the Middle for Easier Mounting and Wiring
- Fully Isolated Plastic Case (IP66)
- Long Life Expectancy
- Full Protection: OVP, SCP, OTP, Maximum Power Limit
- Complies with UL8750 & UL1310 (File E337545)
- FCC Class B & CE Pending
- RoHS Compliant
- Unique Fault Detection and Management

APPLICATIONS

Worldwide Residential and Commercial LED Lighting Fixtures such as:

- LED Down Lights
- LED Street Lights

IMPORTANT: For the most current data, consult MICROSEMI's website: <http://www.microsemi.com>
Patents Pending

PRODUCT HIGHLIGHT

ORDER INFORMATION

Part Number	Input Voltage	Output Current
LXMG2203	100V _{AC} to 277V _{AC} 50/60Hz	700mA Dimmable Current Source 14V to 48V Anode Voltage

ABSOLUTE MAXIMUM RATINGS

Input Voltage (V_{IN})	90 V_{AC} to 305 V_{AC}
Input Frequency (V_{IN})	47 to 63Hz
Input Power	40W
Output LED String Current	800mA (Internally Limited)
Output String Voltage	52V (Internally Limited)
Output Power	38W (Internally Limited)
Input Signal Voltage (BRITE_A Input)	-0.3V to 52V
Output Signal Voltage (FAULT)	52V
Cold Start Temperature	-30°C
Hot Spot Case Temperature, zero airflow	90°C
Storage Temperature Range	-40°C to 85°C

Note: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of specified terminal.

RECOMMENDED OPERATING CONDITIONS (R.C.)

This module has been designed to operate over a wide range of input and output conditions. However, best efficiency and performance will be obtained if the module is operated under the condition listed in the 'R.C.' column. Min. and Max. columns indicate values beyond which the inverter, although operational, might not function optimally.

Parameter	Symbol	Min	R.C.	Max	Units
Input Supply Voltage Range	V_{IN}	100		277	V_{AC}
Linear BRITE_A Control Input Voltage Range	V_{BRITE_A}	0		10	V
Linear BRITE_A Control PWM Frequency Range (Open Collector)	V_{BRITE_PWM}	0.2		10	kHz
Linear BRITE_A Control PWM Amplitude Range (Totem Pole)	V_{BRITE_PWM}	10		52	V
Linear BRITE_A Control PWM Frequency Range (Totem Pole)	V_{BRITE_PWM}	0.2		25	kHz
Linear BRITE_A Control PWM Duty Cycle Range	V_{BRITE_DC}	9.5		100	%
LED String Voltage	V_{LED}	14		48	V
OUT(-) Sink Current	OUT(-) _{ISINK}		700		mA
Maximum Allowable Case Temperature	T_C			90	°C
Cold Start Temperature	T_{COLD}	-30			°C

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, the following specifications apply over the recommended operating condition except where otherwise noted; V_{IN} = 90 V_{AC} to 305 V_{AC} ; BRITE_A = 8k Ω to RETURN; FAULT = 1k Ω pull up to 10V Full Load condition is 48V/700mA unless otherwise noted

Parameter	Symbol	Test Conditions / Comment	Min	Typ	Max	Units
Input Voltage	V_{IN}	Line Frequency 47 to 63 Hz	90		305	V_{AC}
Off Power	$P_{IN(MIN)}$	BRITE_A $\leq$ 0.5V, V_{IN} = 120 V_{AC}		0.3		W
Input AC Current	I_{120}	Measured at Full Load and 120 V_{AC} Input		0.31		A
	I_{277}	Measured at Full Load and 277 V_{AC} Input		0.14		A
Maximum Inrush Current	I_{INRUSH}	Measure at 277 V_{AC} Peak AC Line; Maximum Duration 10 μ s			60	A

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Parameter	Symbol	Test Conditions / Comment	Min	Typ	Max	Units
		Measure at 277V _{AC} Peak AC Line Measured after 10 μ s			5	A
Power Factor		Full Load, 100V _{AC} to 277V _{AC}	0.9			PF
Peak Efficiency	η	Full Load, $V_{LED} = 48V$		90		%
Efficiency	η	Full Load, $V_{LED} = 48V$, $V_{IN} = 120V_{AC}$	88	89		%
Total Harmonic Distortion	THD	Full load, 100V _{AC} to 277V _{AC}			10	%

OUTPUTS

Average Sink Current	I_{OUT-}	$T_A = 25^\circ C$	665	700	735	mA
LED String Voltage	V_{LED}	Rated LED current	14		48	V
Ripple (pk-pk)	$I_{OUT-RIPPLE}$	Full Load, $V_{LED} = 48V$, (pk to pk)/Average			20	%
Line Regulation	$I_{OUT-LINE}$	$V_{IN} = \text{Nominal} \pm 10\%$ (i.e. 120V _{AC} $\pm 10\%$)			1	%
Load Regulation	$I_{OUT-LOAD}$	OUT(+) 14V to 48V		1	4	%
Turn-on Time	DELAY	Cold Start, Power ON		1		Sec
Output Overshoot / Undershoot	$I_{OUTSHOOT}$	Turning Power On or Off			10	%

Dimming

BRITE_A Voltage for Full Bright	$V_{BRITE_A_MAX}$		9.5	10	10.5	V
BRITE_A Potentiometer Value at Full Bright	POT	BRITE_A to RETURN	8	10	12	k Ω
BRITE_A Voltage for Full Dim	$V_{BRITE_A_MIN}$		0.95	1	1.05	V
Minimum Output Current	I_{MIN}	BRITE_A = 0.95V	8	10	12	% of Max
Output Current Dim Range (Analog Dimming)		$I_{LED} = 700mA$, BRITE_A = 0.95V Versus BRITE_A $\geq 10V$		10		RATIO
Shutdown Voltage	V_{BRITE_SD}				0.6	V

FAULT

Maximum Pull-up Voltage	$FAULT_{VMAX}$			48	52	V
Output Voltage Low	$FAULT_{VOL}$	Short OUT(+) to OUT(-), $FAULT = 8mA$			0.8	V

Protection

Overvoltage Protection	V_{OV}	Maximum OUT(+)			52	V
Over Temperature Shutdown	T_{OT}	Over Case Temperature Protection Hot Spot	95			$^\circ C$

Safety & EMC Compliance

UL / CE	Compliance to UL8750 & UL1310 Class 2 File E337545	
	EN 61347-1, EN61347-2-13 Pending	
FCC Title 47, Part 15	Conducted and Radiated Emission, Class B	
EN 55015	Conducted emission	
EN 61000-3-2	Harmonic current emissions	



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Parameter	Symbol	Test Conditions / Comment	Min	Typ	Max	Units
EN 61000-3-3		Voltage fluctuations and flicker				
EN 61547 Pending		Specification for equipment for general lighting purposes. EMC immunity requirements				
		Standard	Test Items			
		EN61000-4-2	Electrostatic Discharge Immunity			
		EN61000-4-3	Radiated Susceptibility test			
		EN61000-4-4	Electrical Fast Transient			
		EN61000-4-5	Surge Immunity Test, AC Power Line, Line to Line 2kV, Line to Earth 4 kV			
		EN61000-4-6	Conducted Susceptibility Immunity test			
		EN61000-4-8	Power Frequency Magnetic Field Immunity Test			
		EN61000-4-11	Voltage Dips and Interruption Immunity			
Life Expectancy		5 years / 50,000 hours @ 100% duty at maximum case temperature 55°C				
Environmental Standards		EU RoHS, REACH				

LEAD DESCRIPTION

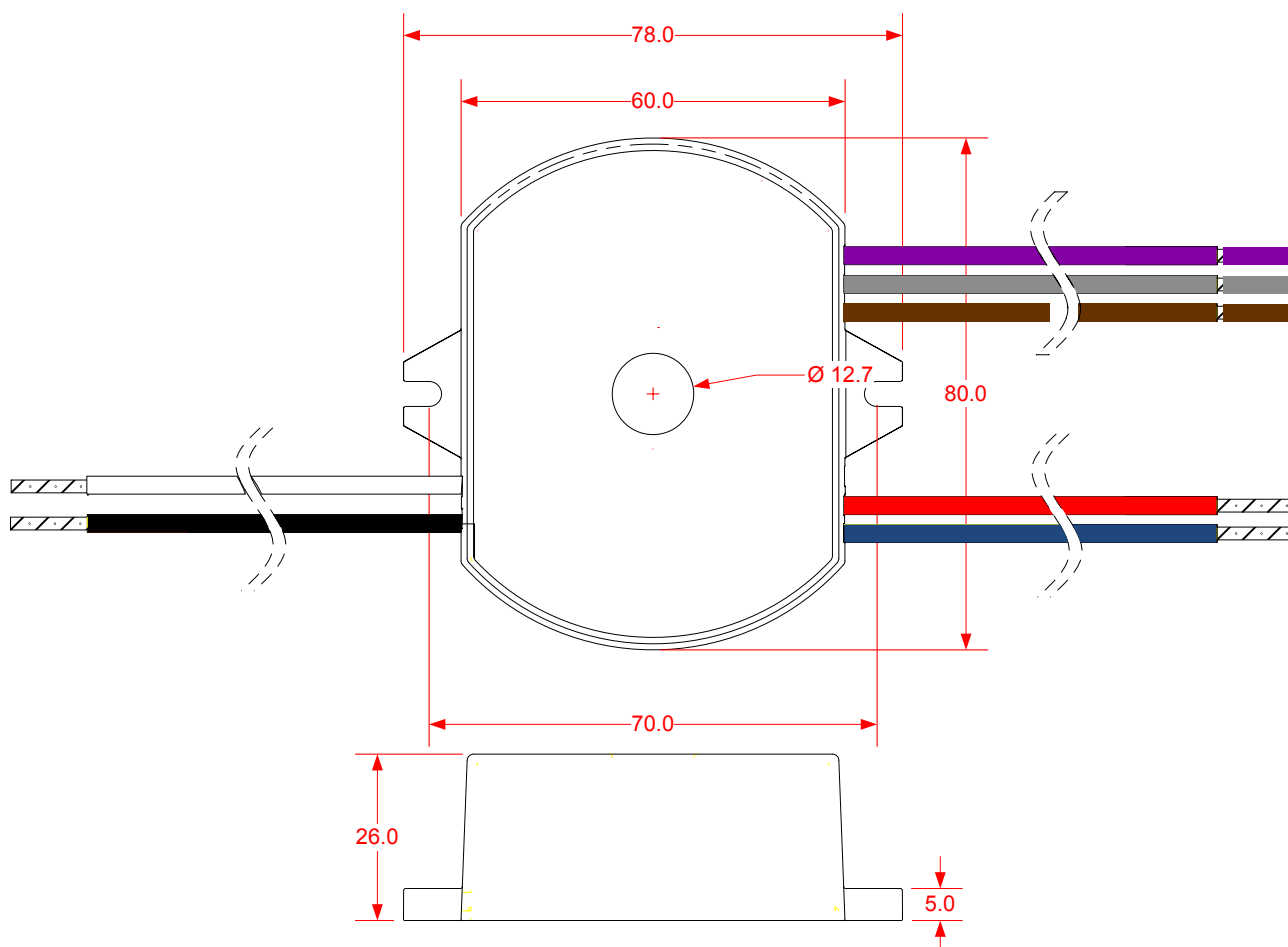
Name	Pin #	Description
INPUT TERMINAL LEADS (18AWG)		
BLACK	AC L	Main Input Power Supply Line 100V _{AC} to 277V _{AC}
WHITE	AC N	Main Input Power Supply Neutral
CONTROL TERMINAL LEADS (22AWG)		
PURPLE	BRITE_A	Analog Dimming Input (Full Brightness if Open)
GRAY	RETURN	Dimming Return
BROWN	FAULT	Fault Signal (Low During Whole LED String Short or Open)
OUTPUT TERMINAL LEADS (18AWG)		
RED	OUT(+)	LED String Anode Voltage (High Side)
BLUE	OUT(-)	OUT(-) LED Cathode Voltage (Low Side) 700mA

FAULT TABLE

CONDITION	LED ON	FAULT	DRIVER STATUS	COMMENT
OUT(+) String OUT(-) (700mA)	YES	OFF	ON	
OUT(+) OPEN OUT(-)	NO	ON	OUT(+) Max Voltage	
OUT(+) Short OUT(-)	NO	ON	SHUTDOWN	
OUT(+) String OUT(-) w/ 1 or more LED short	YES	OFF	ON	STAYLIT™, OUT(+) ≥ 14V
Over Temperature at the Case Hot Spot	NO	ON	SHUTDOWN	When the temperature goes down, the module turns on again (no user intervention)
Power Loss (Blackout) Event	NO	ON	SHUTDOWN	When Power comes back, the module turns on again (no user intervention)
BRITE_A SHORTED TO RETURN or OUT(-)	NO	OFF	SHUTDOWN	
BRITE_A OPEN (or Resistor > 12kOhm)	YES	OFF	ON	



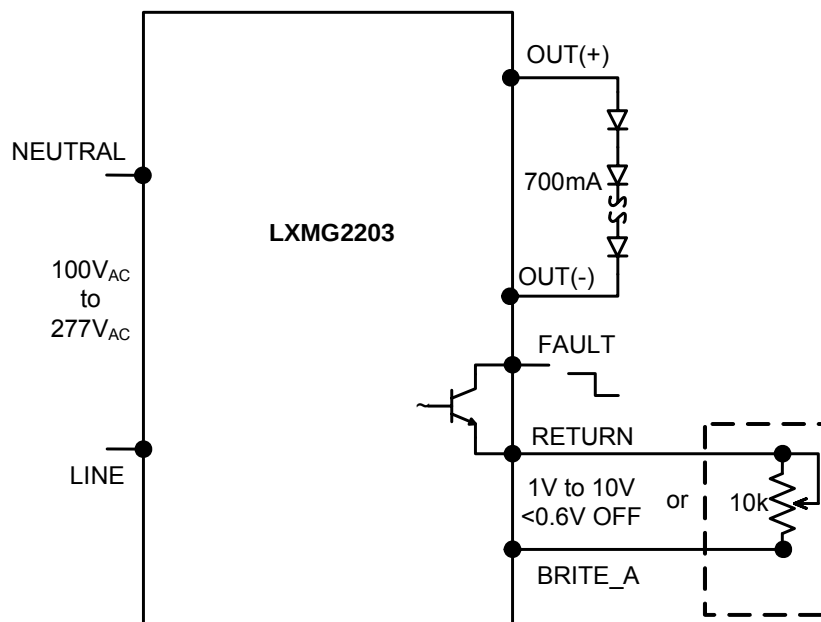
MECHANICAL DRAWING



Wire length is 160mm $\pm$ 5mm, stripped 12mm $\pm$ 2mm UL1015 AWG#18 16/30 stranded 105°C Input & Output wires; AWG#22 7/30 stranded Control wires, all wires tinned. Please insure the wire nuts are installed correctly to prevent intermittent operation. Connecting the AC input to Control or Output wires will result in damage to the module. Hole in center, mounting tab slot width 4mm.



APPLICATION INFORMATION





Microsemi[®]

LXMG2203

34W 700mA Dimmable LED Driver Module

PRODUCTION DATASHEET

NOTES

PRODUCTION DATA – Information contained in this document is proprietary to Microsemi and is current as of publication date. This document may not be modified in any way without the express written consent of Microsemi. Product processing does not necessarily include testing of all parameters. Microsemi reserves the right to change the configuration and performance of the product and to discontinue product at any time.