A201

PWM CONTROLLER FOR LED LIGHTING AND BACKLIGHT DRIVER

ADDtek
www.addmtek.com

Preliminary

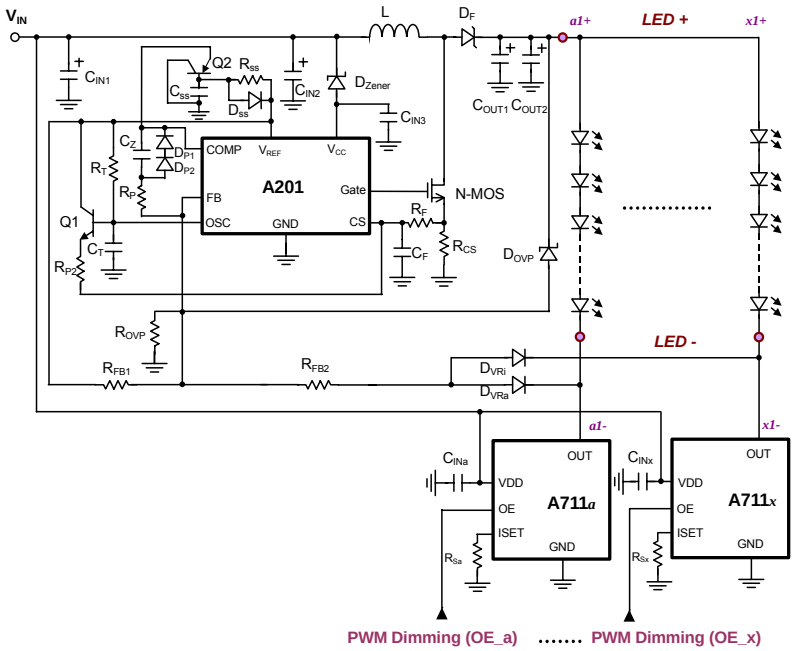
DESCRIPTION

The A201 is a current-mode PWM controller specially designed for Boost driver of a LED lighting or LED backlight unit. The driving capability is flexible due to external power switch and power diode. A201 features a trimmed oscillator for precise duty cycle control, a temperature compensated reference, high gain error amplifier, current sensing comparator, and high current driver which is suitable for driving MOSFETs.

FEATURES

- **Optimized for Boost Driver of LED Lighting and LED Backlight Unit.**
- **U.V.L.O. with Hysteresis.**
- **Internal Trimmed Bandgap Reference.**
- **Operating Frequency Up to 500KHz.**
- **High Current MOSFET Driver.**
- **Low Start-Up Current (max. 200μA).**
- **Error Amplifier With Low Output Resistance.**
- **Available in 8-Pin TSSOP.**

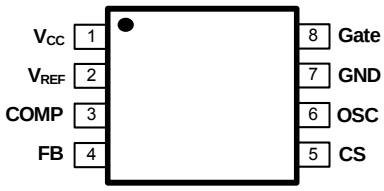
TYPICAL APPLICATION CIRCUIT



APPLICATIONS

- LED Lighting.
- LED Backlight Driver for LCD TV.

PACKAGE PIN OUT



TSSOP-8
(Top View)

ORDER INFORMATION

T_A (°C)	M	TSSOP
		8-pin
-20 to 85	**A201FFT**	

Note: 1. All surface-mount packages are available in Tape & Reel. Append the letter "T" to part number (i.e. A201FFT).
2. The second letter "F" is marked for Lead Free process.

ABSOLUTE MAXIMUM RATINGS (Note)	
Supply Voltage, V_{CC}	35V
OSC, FB, and CS Pins	-0.3V to 6.3V
Error amp output sink current, $I_{SINK(EA)}$	10mA
Maximum juncture temperature, T_J	150°C
Storage temperature range	-65°C to 150°C
Lead temperature (soldiering, 10 seconds)	260°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 the specified terminal.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Recommended Operating Conditions			Units
		Min.	Typ.	Max.	
Supply Voltage	V_{CC}			30	V
Supply Current	I_{CC}			25	mA
OSC, FB, and CS Pins Input Voltage	V_{OSC}, V_{FB}, V_{CS}	0		5.5	V
Gate Voltage	V_{Gate}	0		30	V
Gate Current	I_{Gate}			200	mA
V_{REF} Pin Output Current	I_{REF}			-20	mA
Timing Capacitor	C_T	1			nF
Oscillator Frequency	f_{OSC}		100	500	KHz
Operating Free-air Temperature	T_A	0		70	°C

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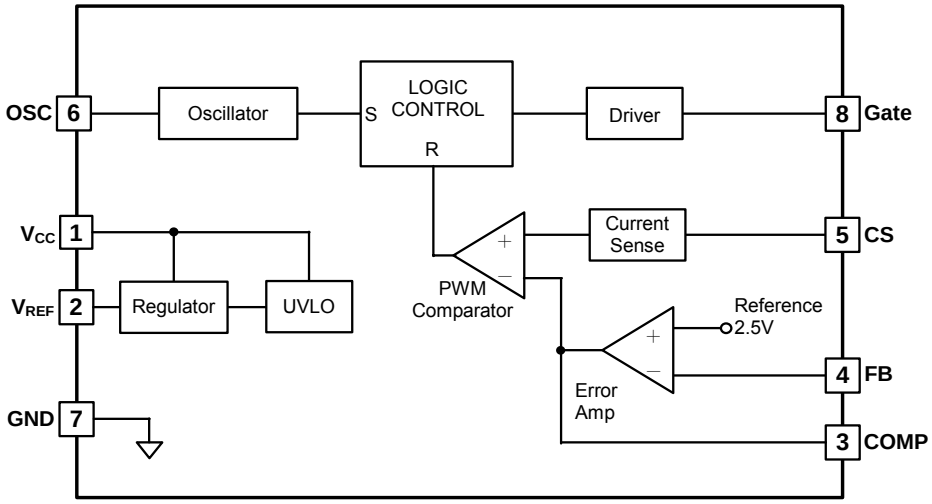
THERMAL DATA

TSSOP-8 Thermal Resistance — Junction to Ambient, θ_{JA}	°C/W

Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$.
The θ_{JA} numbers are guidelines for the thermal performance of the device/pc-board system.
All of the above assume no ambient airflow.

BLOCK DIAGRAM



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ELECTRICAL CHARACTERISTICS

V_{CC} = 15V [* NOTE 1], R_T = 10K, C_T = 3.3nF, and 0°C ≤ T_A ≤70°C, unless otherwise specified. Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
System						
Under Voltage Lockout Voltage	V_{UVLO}		7.0	7.6	8.2	V
UVLO Start Threshold	$V_{TH(ST)}$		7.8	8.4	9.0	V
UVLO Hysteresis				0.8		V
Startup Current					0.2	mA
Maximum Duty Cycle	D_{MAX}			97		%
Operating Supply Current	I_{CC}	V_{FB} = V_{CS} = 0V		14	17	mA
Reference Section						
Reference output Voltage	V_{REF}	T_J = 25°C, I_{REF} = 1mA	4.9	5.0	5.1	V
Line Regulation		12V ≤ V_{CC} ≤ 25V, T_J = 25°C		6	20	mV
Load Regulation		1mA ≤ I_{REF} ≤ 20mA		6	25	mV
Short Ciruit Output Current	I_{SC}	T_J = 25°C	-30	-100	-180	mA
Oscillator Section						
Oscillation Frequency [* NOTE 2]	f_{OSC}	T_J = 25°C	47	52	57	KHz
Peak-to-peak Amplitude at OSC	V_{OSC}			1.7		V
Error Amplifier Section						
Input Voltage	$V_{I(EA)}$	COMP = 2.5V	2.42	2.50	2.58	V
Output Sink Current	I_{SINK}	V_{FB} = 2.7V, COMP = 1.1V	2	7		mA
Output Source Current	I_{SOURCE}	V_{FB} = 2.3V, COMP = 5.0V	-0.5	-1.0		mA
High Output Voltage	V_{OH}	V_{FB} = 2.3V, R_L = 15KΩ to GND	5	6		V
Low Output Voltage	V_{OL}	V_{FB} = 2.7V, R_L = 15KΩ to V_{REF}		0.7	1.1	V
Gate Driver Section						
Output Low Level	V_{OL}	I_{SINK} = 20mA		0.1	0.4	V
		I_{SINK} = 200mA		1.4	2.2	
Output High Level	V_{OH}	I_{SOURCE} = 20mA	13	13.5		V
		I_{SOURCE} = 200mA	12	13.0		
Rise Time [* NOTE 3]	t_R	T_J = 25°C, C_L = 1nF		50	150	ns
Fall Time [* NOTE 3]	t_F	T_J = 25°C, C_L = 1nF		50	150	ns

Note 1: Adjust V_{CC} above the start threshold before setting at 15V

Note 2: For R_T < 5K, f_{OSC} =1.72/R_TC_T

Note 3: Parameters are measured at trip point of latch with V_{FB} = 2V

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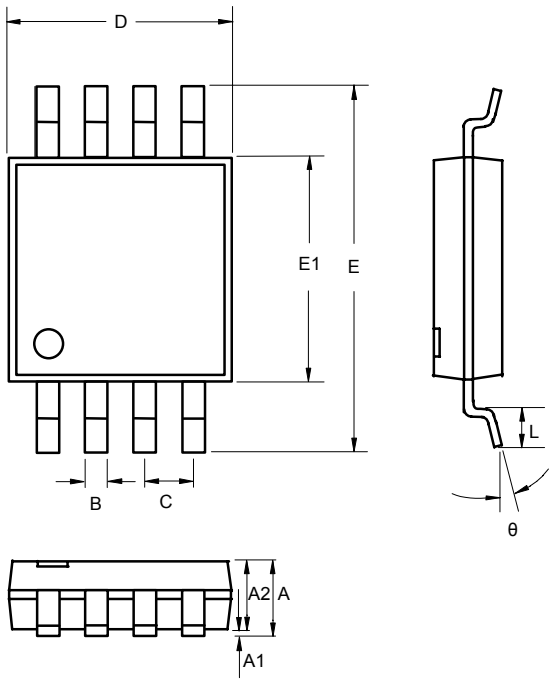
CHARACTERIZATION CURVES

APPLICATION INFORMATION

PACKAGE

MSOP – 8 Pin



	MILLIMETERS		
	MIN	TYP	MAX
A	-	-	1.20
A1	0.05	-	0.15
A2	0.96	1.01	1.06
B	-	0.22	-
C	-	0.65	-
D	2.90	3.00	3.10
E	-	6.4BSC	-
E1	4.30	4.40	4.50
L	0.45	0.60	0.75
θ°	0	-	8

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