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A704

SWITCHING MODE LED DRIVER

www.addmtek.com

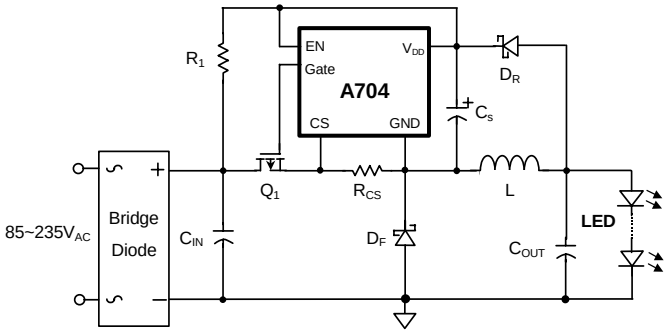
DESCRIPTION

The A704 is a PWM high efficiency LED driver controller. The LED string is driven at constant current rather than constant voltage, thus providing constant light output and enhanced reliability.

FEATURES

- **Low Startup Current (5uA)**
- **Low Operating Current (5mA)**
- **Lead-edge blanking**
- **Internal OVP detected.**
- **150℃ OTP Sensor with Hysteresis**
- **Under Voltage Lockout (UVLO)**
- **Fixed PWM Frequency (65kHz)**
- **Gate Output Voltage Clamped at 16V max**

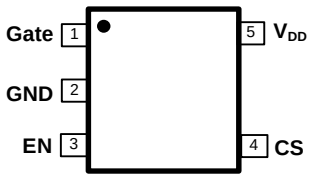
TYPICAL APPLICATION CIRCUIT



APPLICATIONS

- B22, E27 lamp device
- General purpose lighting

PACKAGE PIN OUT



SOT-23-5
(Top View)

Preliminary

ORDER INFORMATION

W	**SOT-23-5**
	5 pin
	A704WFT

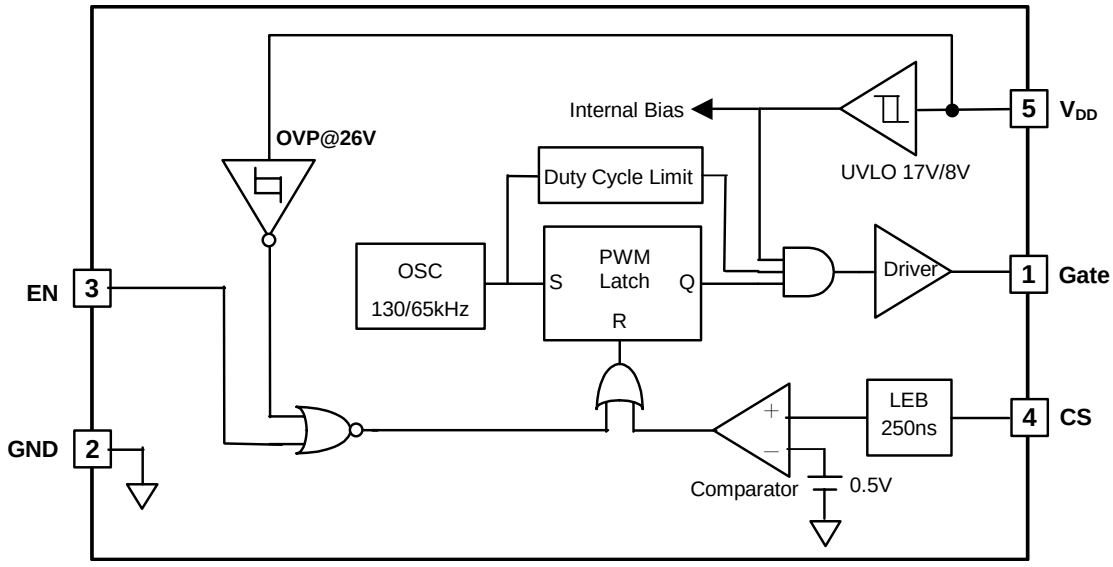
Note: The letter “F” is marked for Lead Free parts, and letter “T” is marked for Tape & Reel.

ABSOLUTE MAXIMUM RATINGS (Note)

Input Voltage, V_{DD}	32V
Operating temperature	-20℃~85℃
Maximum Operating Junction Temperature, T_J	150℃
Storage Temperature Range	-65℃ to 150 ℃
Lead Temperature (Soldering, 10 seconds)	260℃

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.

BLOCK DIAGRAM



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PIN DESCRIPTION

Pin Name	Pin Function
Gate	Drives the gate of the external MOSFET.
GND	Power Ground Pin.
EN	Enable Pin.
CS	Current Sense Pin
V_{DD}	Input Power Supply Pin and Over Voltage Protected Pin.

THERMAL DATA

Thermal Resistance from Junction to Ambient, θ_{JA}	TBD ^{O}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.
Connect the ground pin to ground using a large pad or ground plane for better heat dissipation.
All of the above assume no ambient airflow.

Maximum Power Calculation:

$$P_{D(MAX)} = \frac{T_{J(MAX)} - T_{A(MAX)}}{\theta_{JA}}$$

$T_J(^{O}C)$: Maximum recommended junction temperature

$T_A(^{O}C)$: Ambient temperature of the application

$\theta_{JA}(^{O}C/W)$: Junction-to-Ambient thermal resistance of the package, and other heat dissipating materials.

The maximum power dissipation for a single-output regulator is:

$$P_{D(MAX)} = [(V_{IN(MAX)} - V_{OUT(NOM)})] \times I_{OUT(NOM)} + V_{IN(MAX)} \times I_Q$$

Where: $V_{OUT(NOM)}$ = the nominal output voltage
$I_{OUT(NOM)}$ = the nominal output current, and
I_Q = the quiescent current the regulator consumes at $I_{OUT(MAX)}$
$V_{IN(MAX)}$ = the maximum input voltage

Then $\theta_{JA} = (+150\,^{O}C - T_A)/P_D$

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ELECTRICAL CHARACTERISTICS

V_{DD}=10V_{DC}, C_{Load}=1nF, R_{loasd}=2.2Ω in series, Unless otherwise noted; Test condition: Typical value measured by T_A=25°C

Parameter	Description & Conditions	Min	Typ	Max	Unit
V_{DD}	V_{DD}, Input supply voltage range	8		32	V
I_{DD}	Input supply Operating Current (After start-up V_{DD}=15V)		3	5	mA
I_{QC}	Input Quiescent current (before start up threshold voltage)		5	30	uA
I_{SD}	I_{CC}, Shutdown current (Vcc=15V, EN pin is low, after turn on)		1	2	mA
V_{UVLO}	Under-voltage lockout, Turn On		17		V
ΔV_{UVLO}	V_{DD} UVLO Hysteresis voltage		9		V
V_{OVP}	Vcc, Over-voltage Protection, Clamped		22		V
V_{EN}	Enable pin logic “High” voltage	2.2		6	V
V_{EN}	Enable pin logic “low” voltage			0.8	V
D_{MAX}					
	Maximum Oscillator PWM Duty Cycle, A704			50	%
T_{LEB}	Leading Edge Blanking	150	200	250	nS
T_{PD}	Cs to PWM Pin Delay time (Cs pin “1”, Gate “0”)			50	nS
$T_{ON,MIN}$	Minimum turn on time	300			nS
T_{SD}	Thermal Shutdown		150		°C
T_{REC}	Thermal shutdown recovery temperature	120			°C
Fsw	A704 Switching frequency	60	65	70	kHz
I_{SOURCE}	Gate Pin, source current, C_{Load}=1nF		300		mA
I_{SINK}	Gate pin, sink current, C_{Load}=1nF		500		mA

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