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A704

SWITCHING MODE LED DRIVER

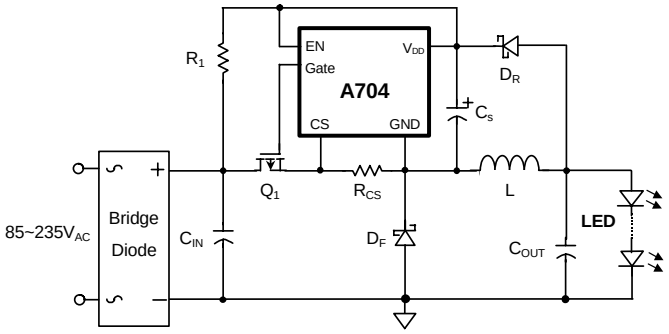
DESCRIPTION

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**

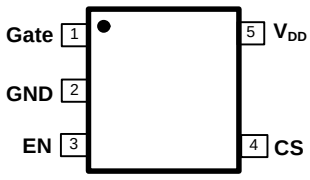
TYPICAL APPLICATION CIRCUIT



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

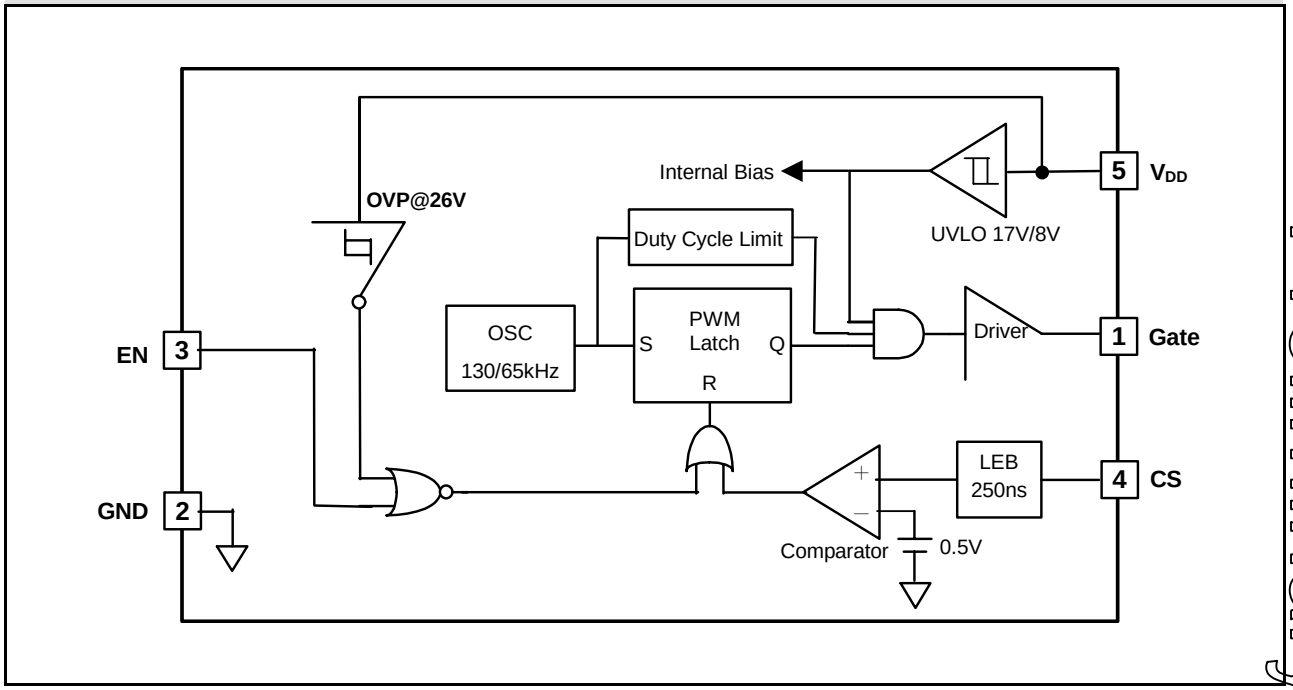
Note: The letter “F” is marked for Lead Free parts, and letter “T” is marked for Tape & Reel.

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



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
$\triangle V_{UVLO}$	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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