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FAIRCHILD SEMICONDUCTOR®

February 2007

FAN7547A
LCD Backlight Inverter Drive IC

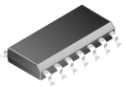
Features

- Backlight Lamp Ballast and Soft Dimming
- Reduced Number of Components
- Wide Range of Operating Voltage (6 to 30V)
- Precision Voltage Reference Reduced to 3.4%
- Low Standby Current (Typically 50μA)
- Soft-Start Function
- PWM Control
- Analog, Mixed, and PWM Dimming Function
- P-Channel MOSFET Drive
- Open-Lamp Protections (OLP)
- Shutdown Protections (SDP)
- 14-Pin SOP

Description

The FAN7547A provides all control functions for a current-fed, push-pull, self-oscillation type converter and also contains a pulse-width-modulated (PWM) controller to develop a supply voltage. Typical operating frequency range is from 30kHz to 100kHz, depending on the cold cathode fluorescent lamp (CCFL) and the transformer's characteristics.

14-SOP



Ordering Information

Part Number	Package	Pb-Free	Operating Temperature Range	Packing Method
FAN7547AM	14-SOP	Yes	-25°C ~ +85°C	Tube
FAN7547AMX				Tape & Reel

Internal Block Diagram

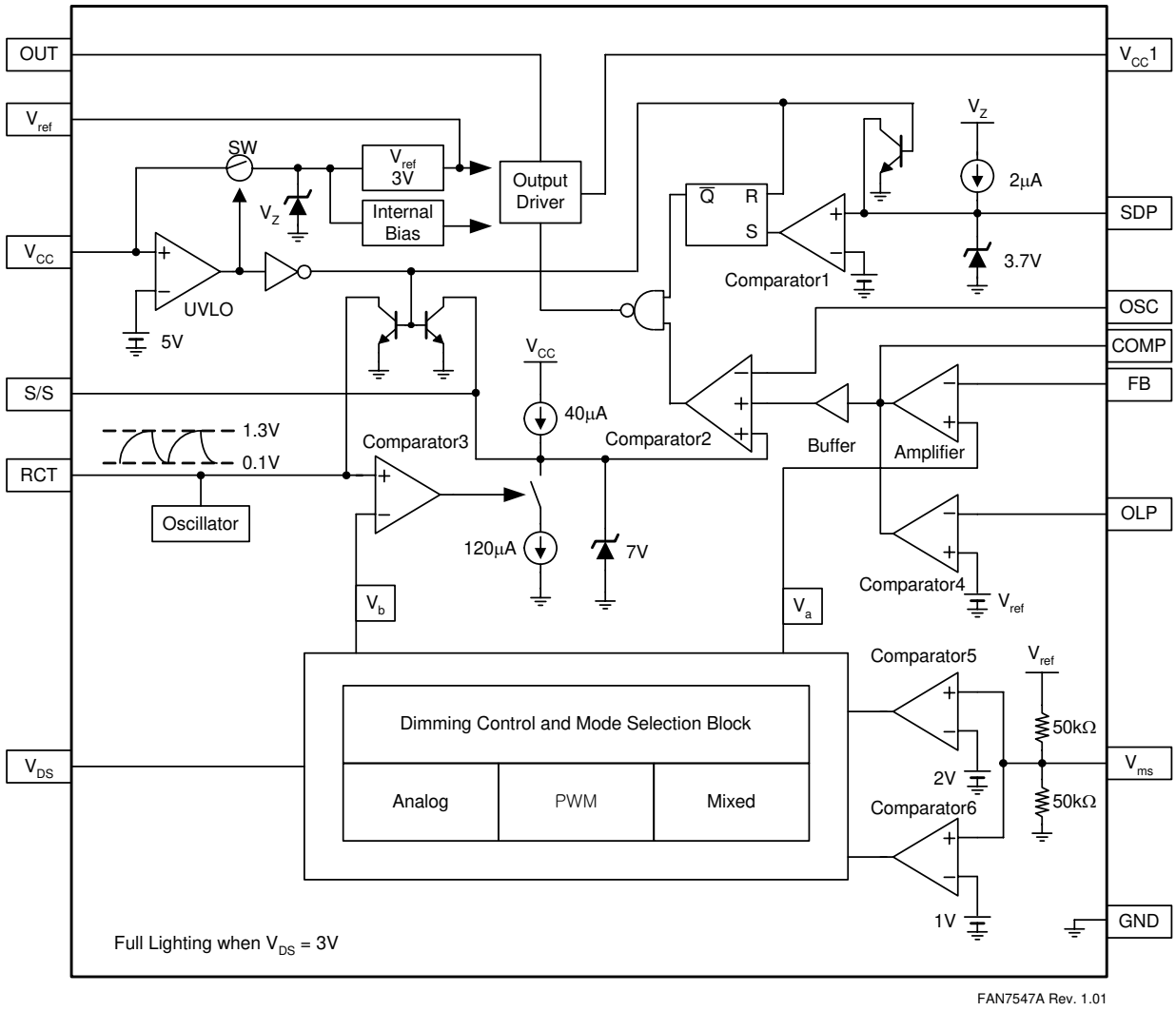


Figure 1. Functional Block Diagram of FAN7547A

Pin Configuration

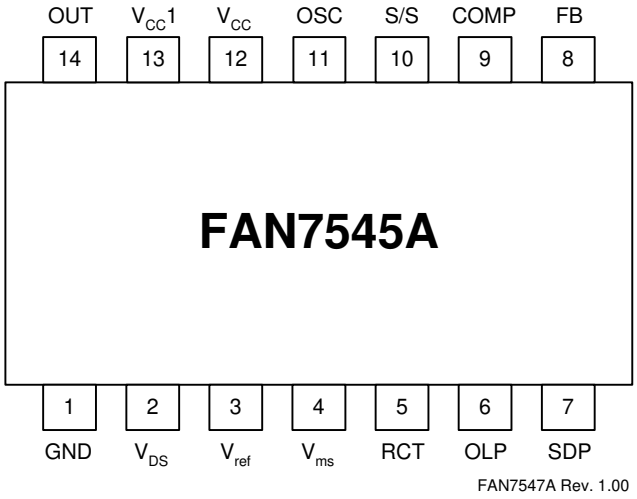


Figure 2. Pin Configuration (Top View)

Pin Definitions

Pin #	Name	I/O	Description
1	GND		Ground
2	V_{DS}	I	Dimming Voltage Input
3	V_{ref}	O	Reference Voltage
4	V_{ms}	I	Dimming Mode Selection
5	RCT		Burst Dimming Frequency Set
6	OLP	I	Open-Lamp Protection
7	SDP	I	Shutdown Protection
8	FB	I	Feedback Input
9	COMP		Error Amplifier Output
10	S/S		Soft-Start
11	OSC	I	Main Ct
12	V_{CC}	I	Supply Voltage
13	V_{CC}1	I	Output Drive Source Voltage
14	OUT	O	Output Drive

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. -25°C ≤ T_A ≤ 85°C and V_{CC}=10V unless otherwise specified.

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	6 to 30	V
T_J	Operating Junction Temperature	150	°C
T_A	Operating Temperature Range	-25 to 85	°C
T_{STG}	Storage Temperature Range	-65 to 150	°C
P_D	Power Dissipation	0.5	W

Electrical Characteristics

Unless otherwise noted, these specifications apply to the operating ambient temperatures for the FAN7547A with $-25°C \le T_A \le 85°C$ and $V_{CC} = 10V$.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
UVLO SECTION						
V_{ST}	Start Voltage		4.9	5.4	5.9	V
I_{ST}	Start Current	$V_{CC} = 4.5V$		50	200	μA
I_{CC}	Operating Current	$7V < V_{CC} < 30V$		5.5	8.0	mA
REFERENCE SECTION						
V_{ref}	Reference Voltage	$T_J = 25°C$, $I_{ref} = 0mA$, $7V < V_{CC} < 30V$	2.95	3.05	3.15	V
SOFT-START SECTION						
I_{SS}	Soft -Start Charge Current	$C_{SS} = 4V$	33	40	47	μA
I_{pwm}	PWM Discharge Current	$C_{SS} = 4V$	48	70	85	μA
OSCILLATOR SECTION						
f_{pwm}	Operating Frequency	$7V < V_{CC} < 30V$	170	200	230	Hz
V_{pwmh}	Osc High Voltage			1.3		V
V_{pwml}	Osc Low Voltage			0.1		V
DIMMING SECTION						
V_a	Analog Dimming Range	$V_{ms} > 2V$	0		3	V
V_b				3		V
V_a	PWM Dimming Range	$V_{ms} < 1V$	2.1	2.5	2.9	V
V_b			0		2.5	V
V_a	Mixed Dimming Range	V_{ms} =1.5V or open	1.2		3.0	V
V_b			0		3	V
MODE SELECTION						
V_{sa}	Analog Dimming Select Voltage		1.5	2.0	2.5	V
V_{sp}	PWM Dimming Select Voltage		0.7	1.0	1.3	V
V_{sc}	Mixed Dimming Select Voltage		1.2	1.5	1.8	V
OPEN-LAMP PROTECTION						
V_{open}	Open-Lamp Detect Voltage	$7V < V_{CC} < 30V$	2.5	3.0	3.5	V
SHUTDOWN PROTECTION						
I_{sd}	Shutdown Current	$7V < V_{CC} < 30V$	1	2	3	μA
V_{sd}	Shutdown Voltage		2.5	3.0	3.5	V
OUTPUT SECTION						
V_{OH}	Output High Voltage	$V_{CC} = 10V$	8	9	10	V
V_{OL}	Output Low Voltage	$V_{CC} = 10V$			1	V
t_r	Rising Time	$V_{CC} = 10V$		120	200	ns
t_f	Falling Time	$V_{CC} = 10V$		60	120	ns
V_{UV}	Output Voltage with UVLO Activated	$V_{CC} = 4V$	2		4	V

Typical Characteristics

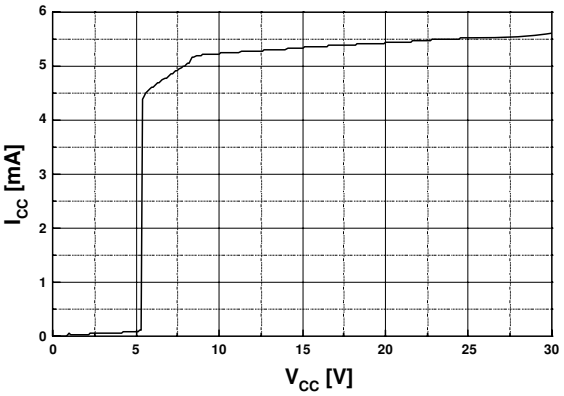


Figure 3. Start Voltage

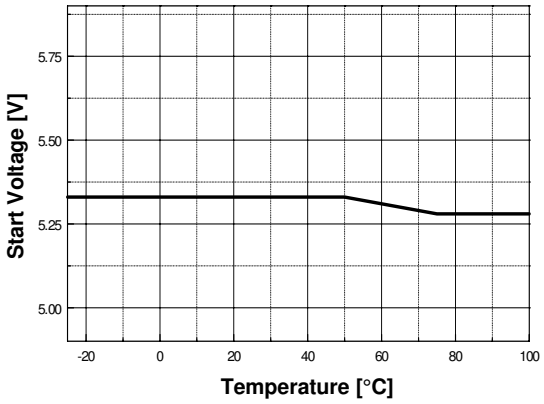


Figure 4. Start Voltage vs. Temperature

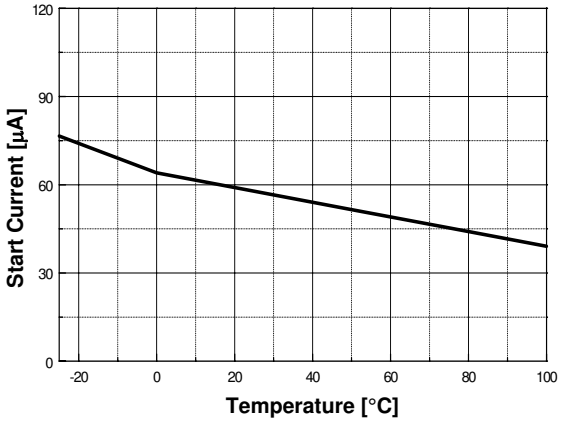


Figure 5. Output vs. Temperature

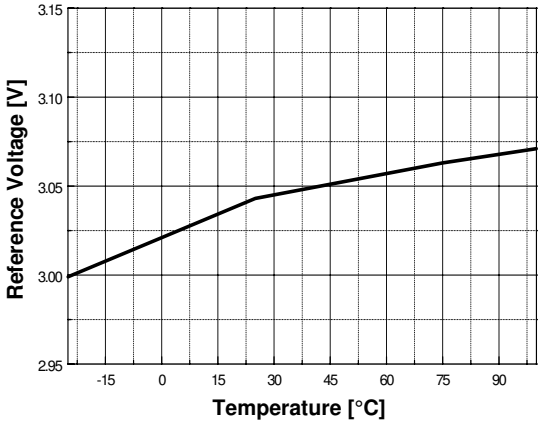


Figure 6. Reference Voltage vs. Temperature

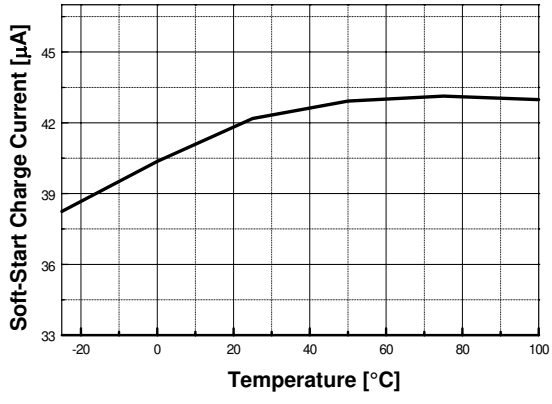


Figure 7. Soft-Start Charge Current vs. Temperature

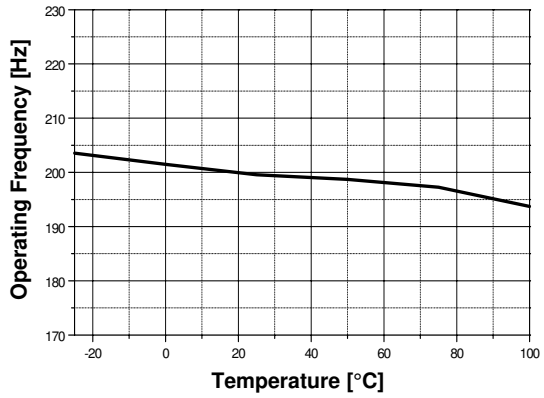


Figure 8. Operating Frequency vs. Temperature

Typical Characteristics (Continued)

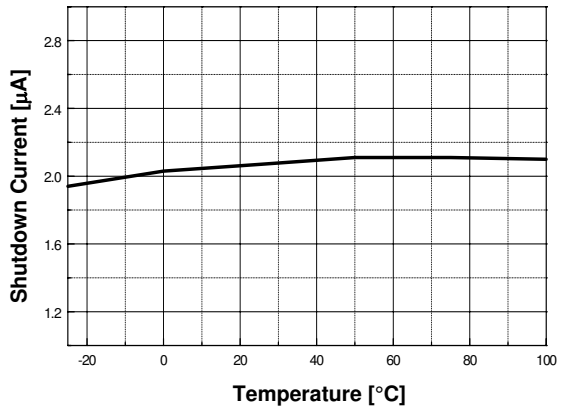


Figure 9. Protection Current vs. Temperature

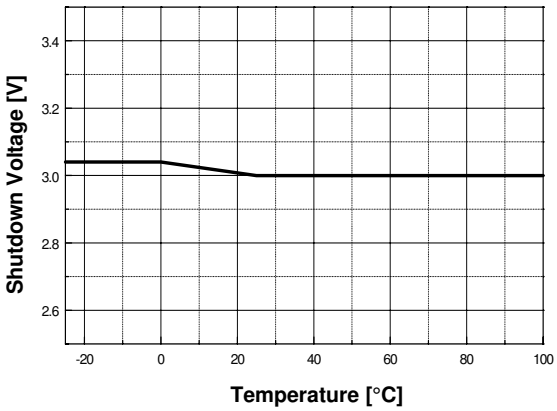


Figure 10. Protection Voltage vs. Temperature

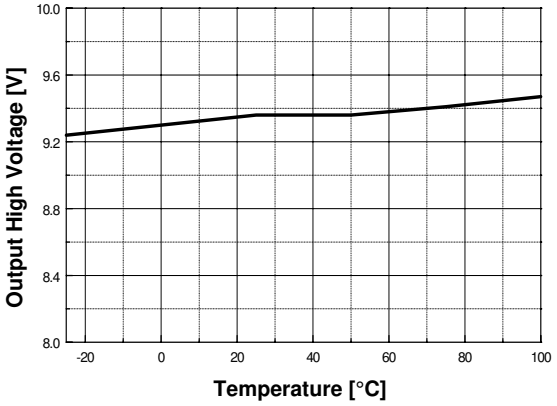


Figure 11. Output High Voltage vs. Temperature

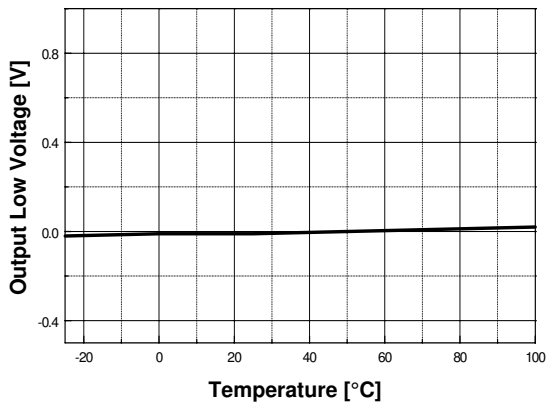


Figure 12. Output Low Voltage vs. Temperature

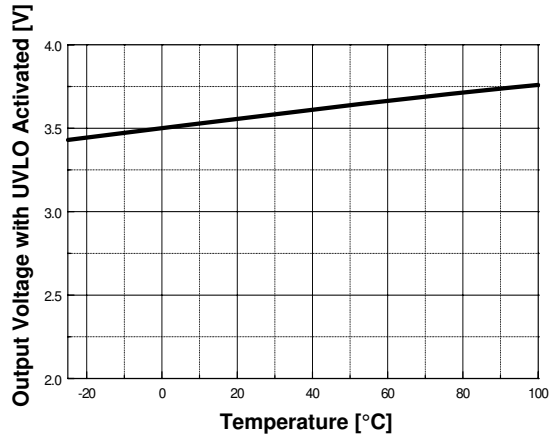


Figure 13. Output Voltage with UVLO Activated vs. Temperature

Package Dimensions

14-SOP

Dimensions are in millimeters unless otherwise noted.

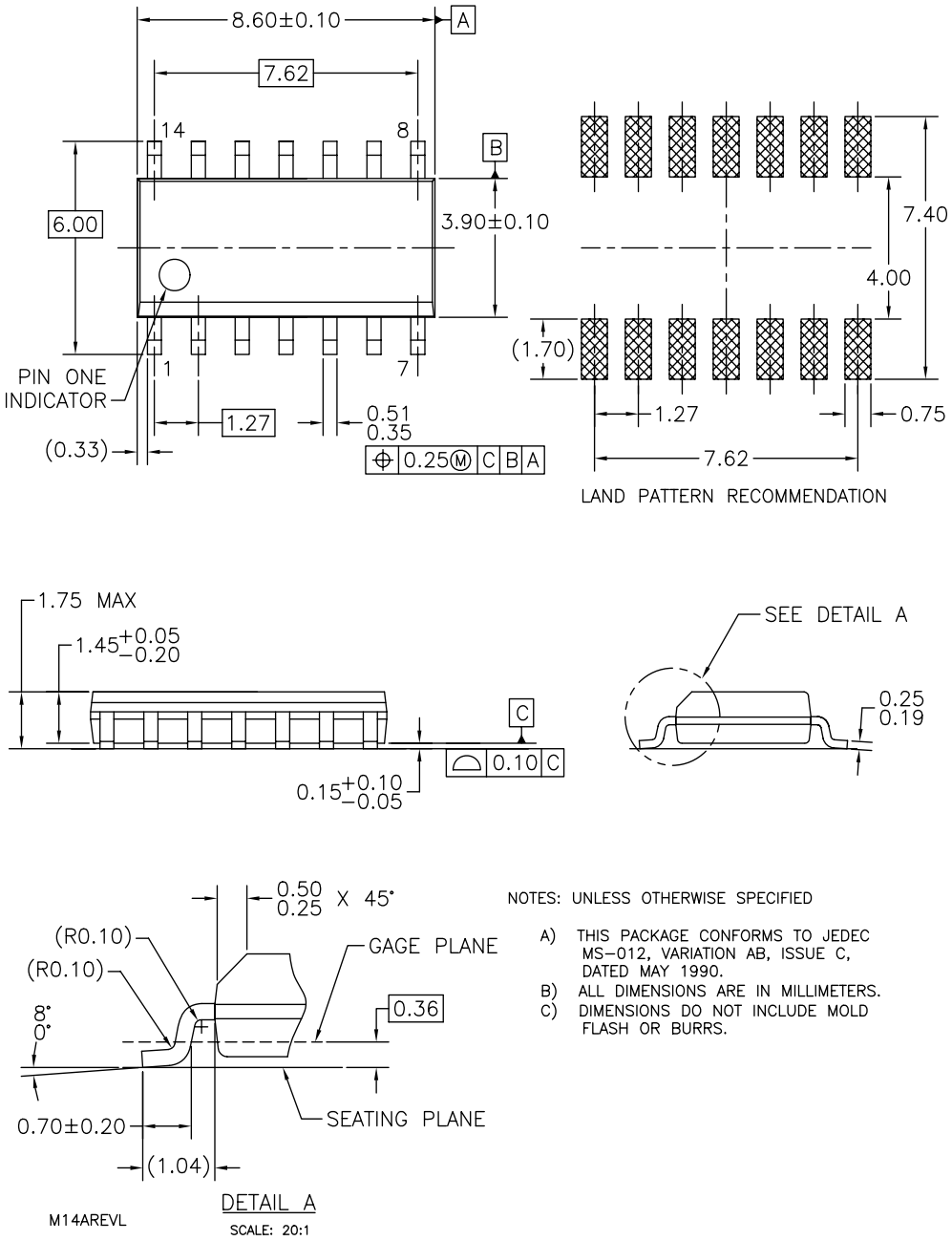


Figure 14. 14-Lead Small Outline Package (SOP)

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