FAN7556

Voltage Mode PWM Controller

Features

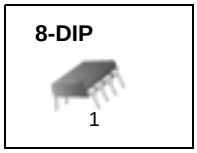
- Voltage Mode Control
- Pulse by Pulse Current Limiting
- Low External Components
- Under Voltage Lockout (UVLO): 9V/15V
- Stand-by Current: Typ. 100uA
- Power Saving Mode Current: Typ. 200uA
- Operating Current: Typ. 7mA
- Soft Start
- On/off Control
- Over Load Protection (OLP)
- Over Current Protection (OCP)
- Over Voltage Protection (OVP)
- Wide Operating Frequency Range (20kHz ~ 500kHz)
- Auto-Restart Function

Applications

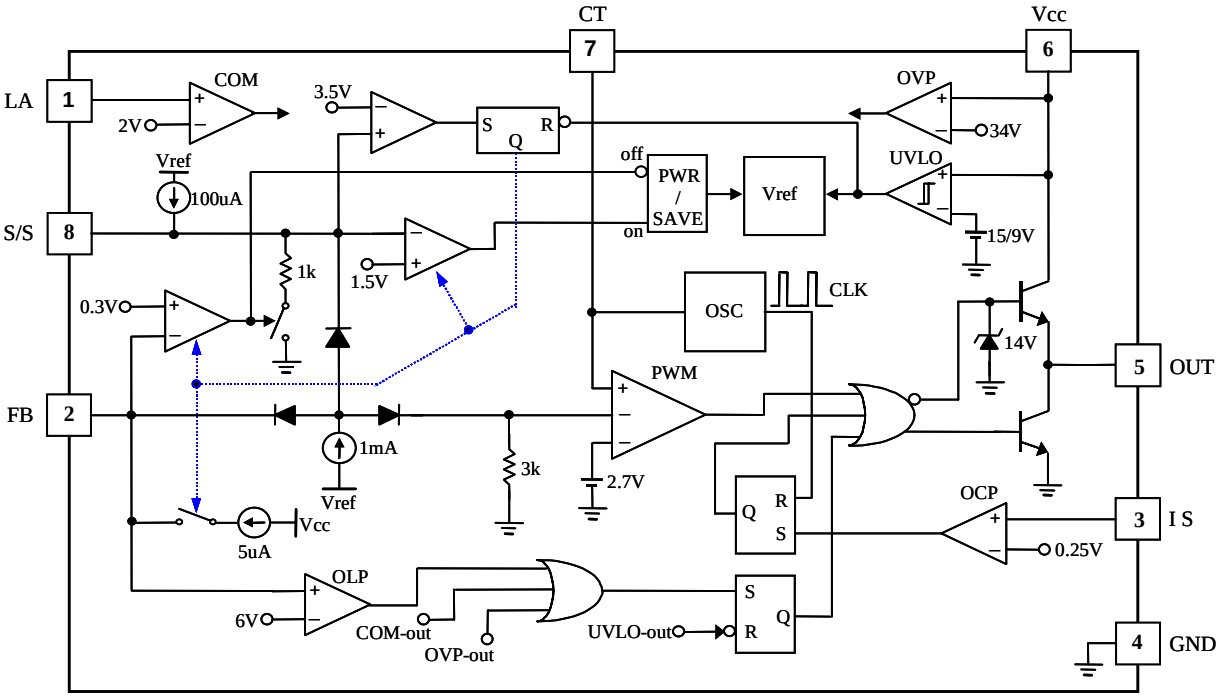
- Off-Line & DC-DC Converter

Description

The FAN7556 is a fixed frequency voltage mode PWM controller. It is specially designed for off-line and DC - DC converter applications with minimal external components. These integrated circuits feature a trimmed oscillator for precise duty cycle control, a temperature compensated reference, an on/off control, a high gain error amplifier, a current sensing comparator, and a high current totem-pole output. The FAN7556 has various protection functions such as an over load protection (OLP), an over current protection(OCP), and an over voltage protection(OVP). The FAN7556 is available in the 8DIP package.



Internal Block Diagram



Rev. 1.0.0

Absolute Maximum Ratings

(Ta = 25°C, unless otherwise specified)

Parameter	Symbol	Value	Unit
Supply Voltage	Vcc	30	V
Output Current	I_O	±1	A
Input Voltage to FB Pin	V_{FB}	V_{SD}	V
Input Voltage to IS Pin	V_{IS}	-0.3 to V_{OC}	V
Power Dissipation	P_D	0.85	W
Operating Temperature	T_{OPR}	-25 to +85	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance, Junction-to-Air(Note1)	Rθja	147.8	°C/W

Note:

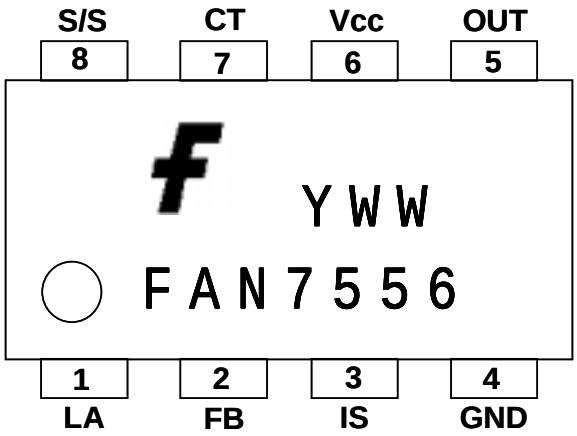
1. Junction -to -air thermal resistance test environments.
-. Pneumatic heat sink fixture.
-. Clamping pressure 60psi through 12mm diameter cylinder.
-. Thermal grease applied between PKG and heat sink fixture

Temperature Characteristics

(-25°C ≤ Ta ≤ 85°C)

Parameter	Symbol	Value	Unit
Fosc Temperature Stability	$\Delta F_{OSC}2$	±5	%

PIN Array



PIN Definitions

Pin Number	Pin Name	Pin Function Description
1	LA	Optional Protection
2	FB	Inverting (-) Input of PWM Comparator, ON/OFF Control & Over Load Sensing
3	IS	Over Current Sensing
4	GND	Ground
5	OUT	Output of Gate Driver
6	Vcc	Power Supply
7	CT	Oscillator Timing Capacitor Ct
8	S/S	Soft Start

Electrical Characteristics

(Ta = 25°C, Vcc=18V, Ct=1nF unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
< OSCILLATOR SECTION >						
Oscillator Frequency	F_{OSC}	T_j =25°C, Ct=1nF	90	100	110	kHz
Frequency Change With Vcc	ΔF_{OSC1}	Vcc=10V~30V	-	±1	-	%
Temperature Stability (Note1)	ΔF_{OSC2}	-25°C ≤ Ta ≤ 85°C	-	±5	-	%
< PWM SECTION >						
FB Source Current	I_{FB}	V_{FB} = 0V, $V_{S/S}$ = 5V	-	1.0	-	mA
FB Threshold Voltage 1	$V_{TH(FBO)}$	Duty = 0%	-	0.85	-	V
FB Threshold Voltage 2	$V_{TH(FBM)}$	Duty = D_{MAX}	-	2.7	-	V
Maximum Duty Cycle	D_{MAX}	-	70	74	78	%
< SOFT START SECTION >						
Soft Start Current	$I_{S/S}$	V_{FB} = 5V, $V_{S/S}$ = 0V	-	1.1	-	mA
Soft Start Limit Voltage	$V_{LIM(S/S)}$	-	-	5.2	-	V
< PROTECTION SECTION >						
Shutdown Feedback Voltage	V_{SD}	V_{FB} > 5V	5.4	6	6.6	V
Shutdown Delay Current	I_{SD}	4V ≤ V_{FB} ≤ V_{SD}	3.5	5	6.5	uA
Over Current Protection	V_{OC}	-	0.22	0.26	0.29	V
Over Voltage Protection	V_{OVP}	V_{FB} = 3V, $V_{S/S}$ = 5V	30	34	38	V
Comparator Threshold Voltage	V_{LA}	-	1.7	2	2.3	V
<UVLO SECTION>						
Start Threshold Voltage	$V_{TH(ST)}$	-	13.2	14.7	16.2	V
Min. Operating Voltage	$V_{OPR(MIN)}$	-	8.2	9.2	10.2	V
< ON/OFF CONTROL SECTION >						
On Threshold Voltage	V_{ON}	V_{IS} = 0V	0.2	0.3	0.4	V
Off Threshold Voltage	V_{OFF}	V_{FB} < V_{ON}	1.2	1.5	1.8	V
Sink Current	I_{SINK}	V_{FB} < $V_{TH(FB)}$, $V_{S/S}$ = 5V	3	4	5	mA
<OUTPUT SECTION>						
Low Output Voltage1	V_{OL1}	Io = 50mA	-	0.15	0.4	V
Low Output Voltage2	V_{OL2}	Io = 200mA	-	1.5	2.5	V
High Output Voltage1	V_{OH1}	Io = -50mA	13	15	17	V
High Output Voltage2	V_{OH2}	I_O = -200mA	12	14	16	V
Rise Time (Note1)	T_R	C_L= 1nF, (No load)	-	80	-	ns
Fall Time (Note1)	T_F	C_L= 1nF, (No load)	-	40	-	ns
< OVERALL SECTION >						
Start-Up Current	V_{ST}	-	-	0.1	0.2	mA
Operating Supply Current	I_{OP}	Vcc ≤ 30V	-	7	10	mA
Off State Current	I_{OFF}	V_{FB} < $V_{TH(FB)}$, $V_{S/S}$ < V_{OFF}	-	0.2	0.4	mA

Note:

1. These parameters, although guaranteed, are not 100% tested in production.

Typical Performance Characteristics

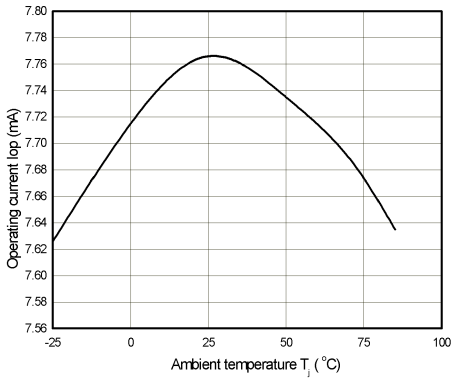


Figure 1. Operating Current vs. Ambient Temperature

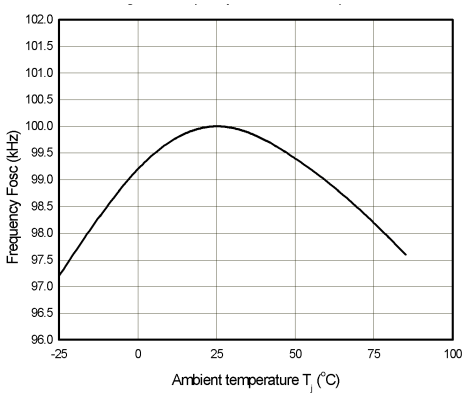


Figure 2. Frequency vs. Ambient Temperature

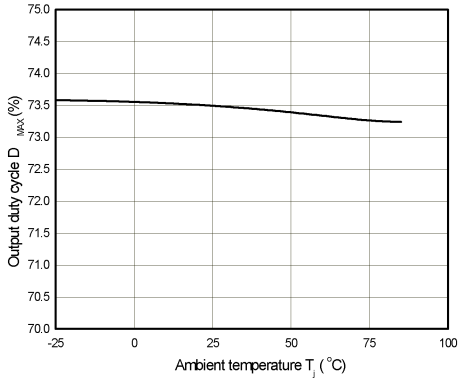


Figure 3. Output Duty Cycle vs. Ambient Temperature

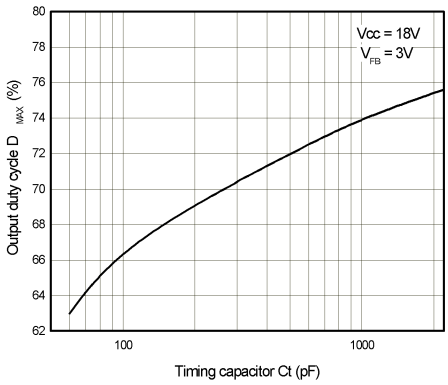


Figure 4. Output Duty Cycle vs. Timing Capacitor

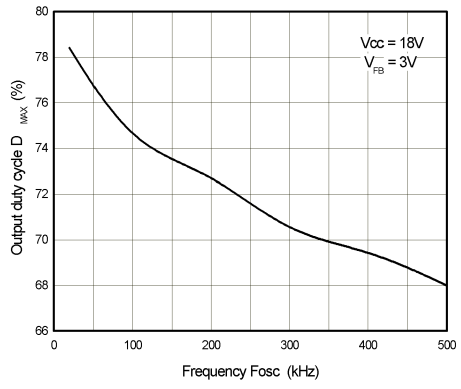


Figure 5. Output Duty Cycle vs. Frequency

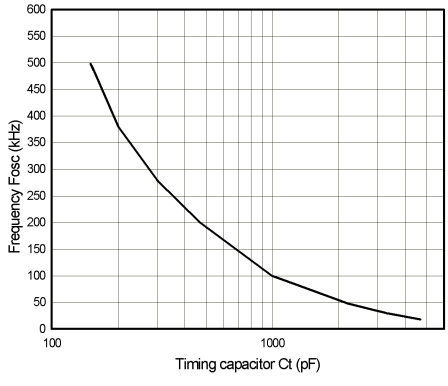


Figure 6. Frequency vs. Timing Capacitor

Typical Performance Characteristics (Continued)

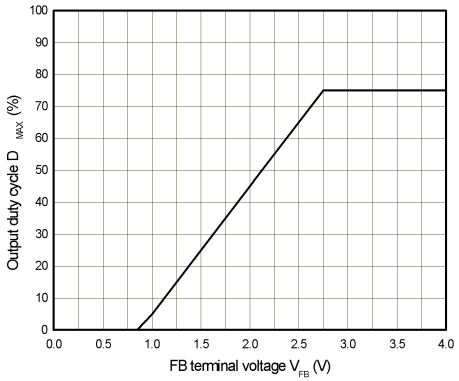


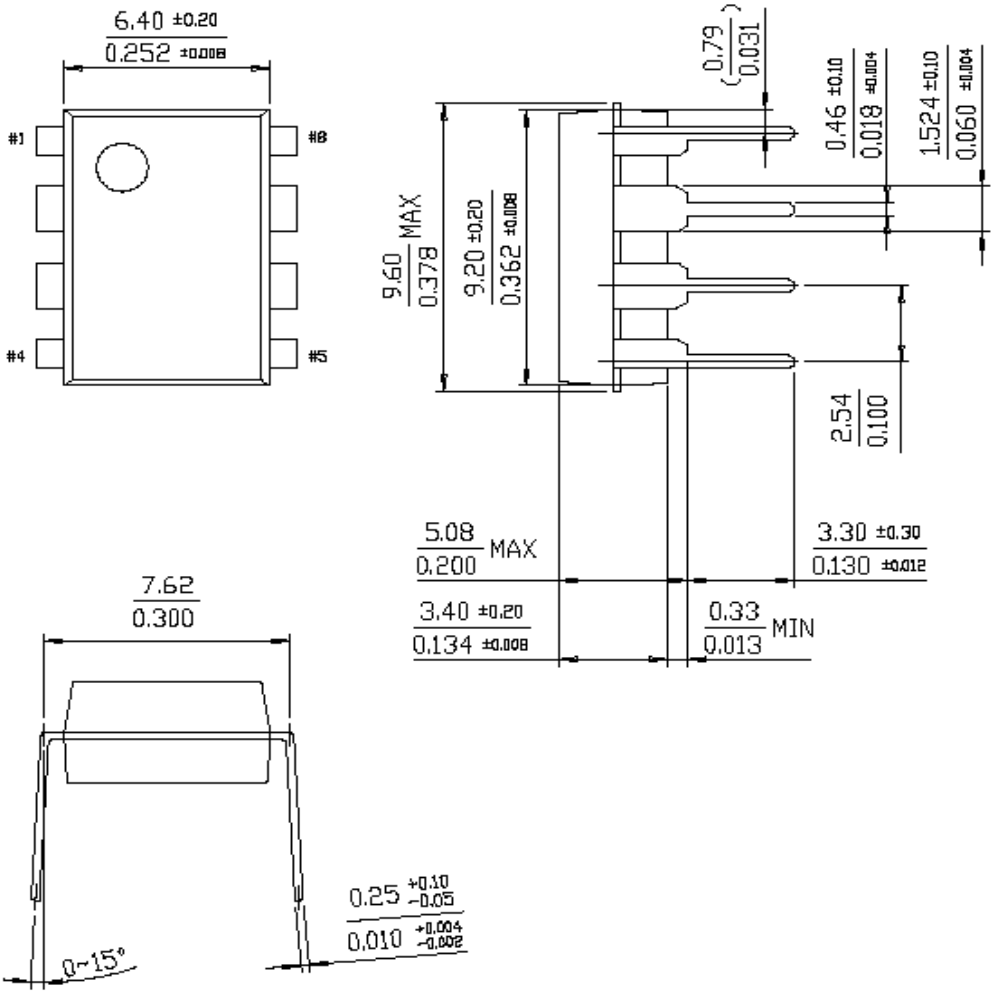
Figure 7. Output Duty Cycle vs. FB Terminal Voltage

Mechanical Dimensions

Package

Dimensions in millimeters

8-DIP



Ordering Information

Product Number	Package	Operating Temperature
FAN7556N	8-DIP	-25°C ~ 85°C