

# FAN7556

## Voltage Mode PWM Controller

### Features

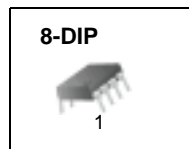
- Voltage Mode Control
- Pulse by Pulse Current Limiting
- Low External Components
- Under Voltage Lockout ( UVLO): 9V/15V
- Stand-by Current: Typ. 100uA
- Power Saving Mode Current: Typ. 200uA
- Operating Current: Typ. 7mA
- Soft Start
- On/off Control
- Over Load Protection (OLP)
- Over Current Protection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

### Applications

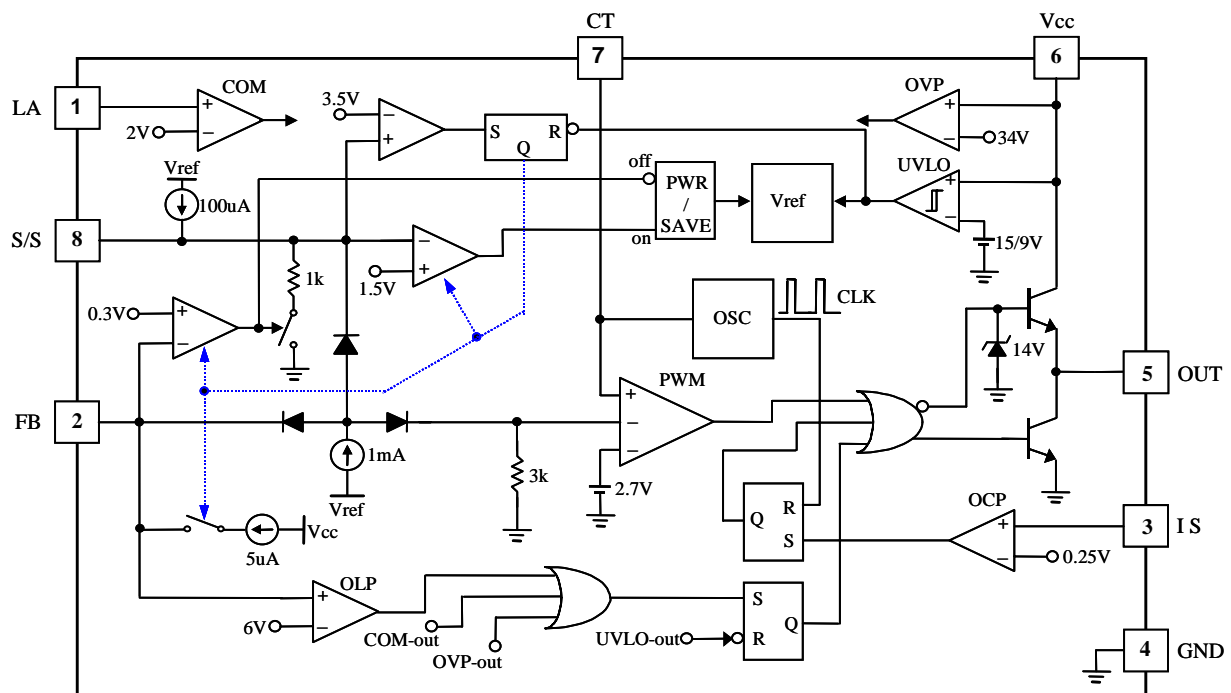
- Off-Line & DC-DC Converter

### 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



## Absolute Maximum Ratings

( Ta = 25°C, unless otherwise specified )

Parameter	Symbol	Value	Unit
Supply Voltage	V <sub>CC</sub>	30	V
Output Current	I <sub>O</sub>	±1	A
Input Voltage to FB Pin	V <sub>FB</sub>	V <sub>SD</sub>	V
Input Voltage to IS Pin	V <sub>IS</sub>	-0.3 to V <sub>OC</sub>	V
Power Dissipation	P <sub>D</sub>	0.85	W
Operating Temperature	T <sub>OPR</sub>	-25 to +85	°C
Storage Temperature	T <sub>STG</sub>	-55 to +150	°C
Thermal Resistance, Junction-to-Air(Note1)	R <sub>θja</sub>	147.8	°C/W

### Note:

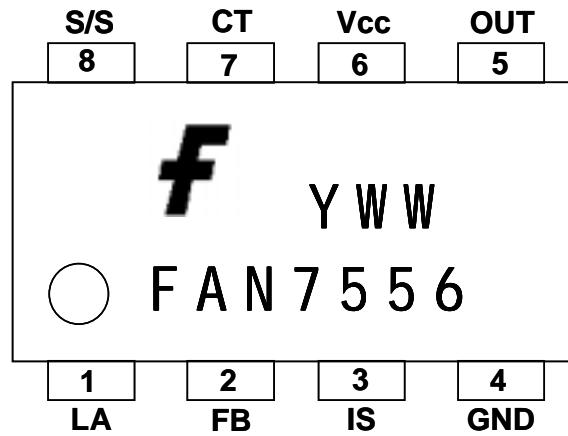
1. Junction -to -air thermal resistance test environments.
  - . Pneumatic heat sink fixture.
  - . Clamping pressure 60psi through 12mm diameter cylinder.
  - . Thermal grease applied between PKG and heat sink fixture

## Temperature Characteristics

( -25°C ≤ Ta ≤ 85°C )

Parameter	Symbol	Value	Unit
Fosc Temperature Stability	ΔFOSC2	±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

( $T_a = 25^\circ\text{C}$ ,  $V_{cc} = 18\text{V}$ ,  $C_t = 1\text{nF}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>&lt; OSCILLATOR SECTION &gt;</b>						
Oscillator Frequency	FOSC	$T_j = 25^\circ\text{C}$ , $C_t = 1\text{nF}$	90	100	110	kHz
Frequency Change With $V_{cc}$	$\Delta\text{FOSC1}$	$V_{cc} = 10\text{V} \sim 30\text{V}$	-	$\pm 1$	-	%
Temperature Stability (Note1)	$\Delta\text{FOSC2}$	$-25^\circ\text{C} \leq T_a \leq 85^\circ\text{C}$	-	$\pm 5$	-	%
<b>&lt; PWM SECTION &gt;</b>						
FB Source Current	IFB	$V_{FB} = 0\text{V}$ , $V_{S/S} = 5\text{V}$	-	1.0	-	mA
FB Threshold Voltage 1	$V_{TH(\text{FBO})}$	Duty = 0%	-	0.85	-	V
FB Threshold Voltage 2	$V_{TH(\text{FBM})}$	Duty = DMAX	-	2.7	-	V
Maximum Duty Cycle	DMAX	-	70	74	78	%
<b>&lt; SOFT START SECTION &gt;</b>						
Soft Start Current	IS/S	$V_{FB} = 5\text{V}$ , $V_{S/S} = 0\text{V}$	-	1.1	-	mA
Soft Start Limit Voltage	$V_{LIM(\text{S/S})}$	-	-	5.2	-	V
<b>&lt; PROTECTION SECTION &gt;</b>						
Shutdown Feedback Voltage	VSD	$V_{FB} > 5\text{V}$	5.4	6	6.6	V
Shutdown Delay Current	ISD	$4\text{V} \leq V_{FB} \leq V_{SD}$	3.5	5	6.5	$\mu\text{A}$
Over Current Protection	VOC	-	0.22	0.26	0.29	V
Over Voltage Protection	VOVP	$V_{FB} = 3\text{V}$ , $V_{S/S} = 5\text{V}$	30	34	38	V
Comparator Threshold Voltage	VLA	-	1.7	2	2.3	V
<b>&lt; UVLO SECTION &gt;</b>						
Start Threshold Voltage	$V_{TH(\text{ST})}$	-	13.2	14.7	16.2	V
Min. Operating Voltage	$V_{OPR(\text{MIN})}$	-	8.2	9.2	10.2	V
<b>&lt; ON/OFF CONTROL SECTION &gt;</b>						
On Threshold Voltage	VON	$V_{IS} = 0\text{V}$	0.2	0.3	0.4	V
Off Threshold Voltage	VOFF	$V_{FB} < V_{ON}$	1.2	1.5	1.8	V
Sink Current	ISINK	$V_{FB} < V_{TH(\text{FB})}$ , $V_{S/S} = 5\text{V}$	3	4	5	mA
<b>&lt; OUTPUT SECTION &gt;</b>						
Low Output Voltage1	VOL1	$I_o = 50\text{mA}$	-	0.15	0.4	V
Low Output Voltage2	VOL2	$I_o = 200\text{mA}$	-	1.5	2.5	V
High Output Voltage1	VOH1	$I_o = -50\text{mA}$	13	15	17	V
High Output Voltage2	VOH2	$I_o = -200\text{mA}$	12	14	16	V
Rise Time (Note1)	$T_R$	$C_L = 1\text{nF}$ , (No load)	-	80	-	ns
Fall Time (Note1)	$T_F$	$C_L = 1\text{nF}$ , (No load)	-	40	-	ns
<b>&lt; OVERALL SECTION &gt;</b>						
Start-Up Current	VST	-	-	0.1	0.2	mA
Operating Supply Current	IOP	$V_{cc} \leq 30\text{V}$	-	7	10	mA
Off State Current	IOFF	$V_{FB} < V_{TH(\text{FB})}$ , $V_{S/S} < V_{OFF}$	-	0.2	0.4	mA

### Note:

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

## Typical Performance Characteristics

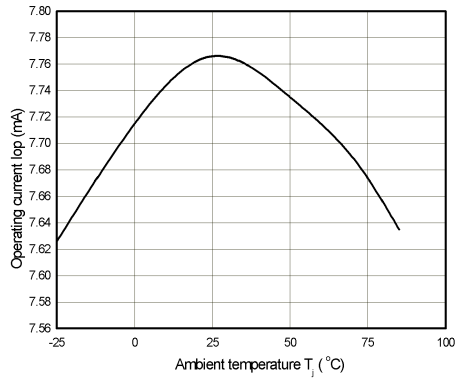


Figure 1. Operating Current vs. Ambient Temperature

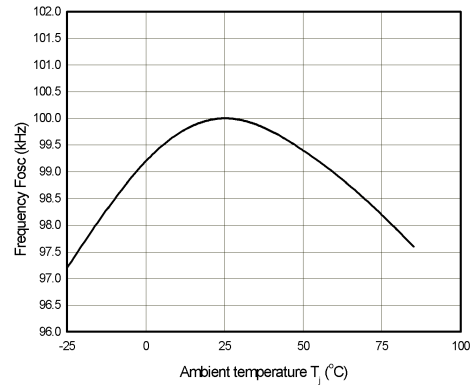


Figure 2. Frequency vs. Ambient Temperature

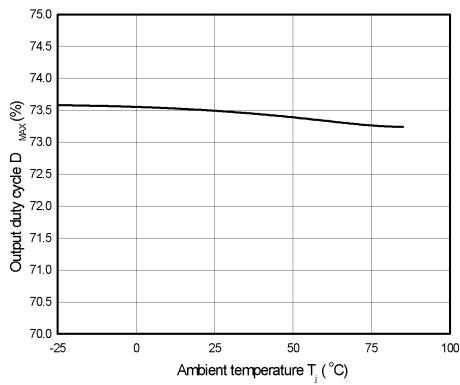


Figure 3. Output Duty Cycle vs. Ambient Temperature

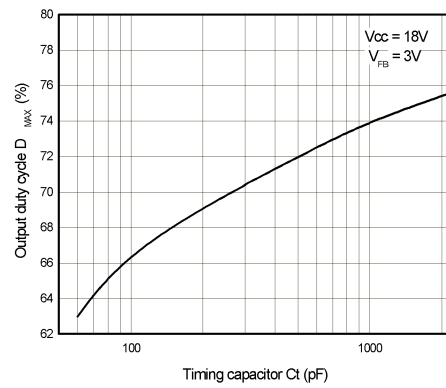


Figure 4. Output Duty Cycle vs. Timing Capacitor

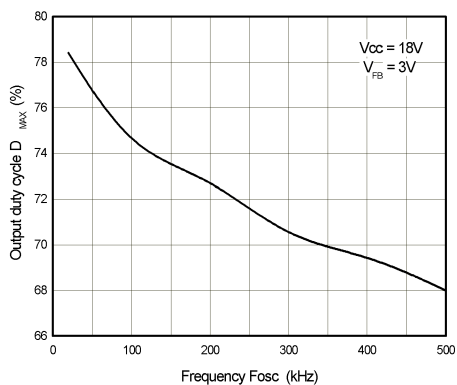


Figure 5. Output Duty Cycle vs. Frequency

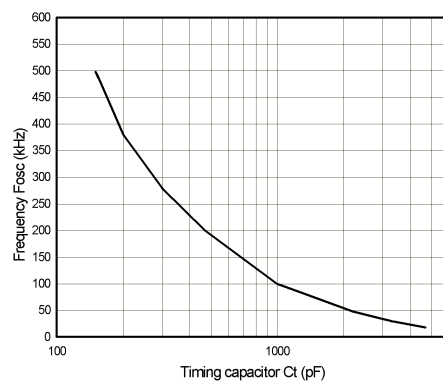


Figure 6. Frequency vs. Timing Capacitor

## Typical Performance Characteristics (Continued)

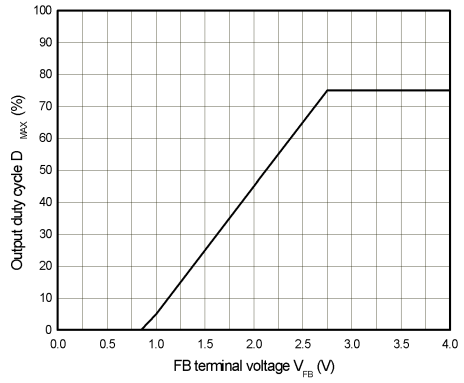


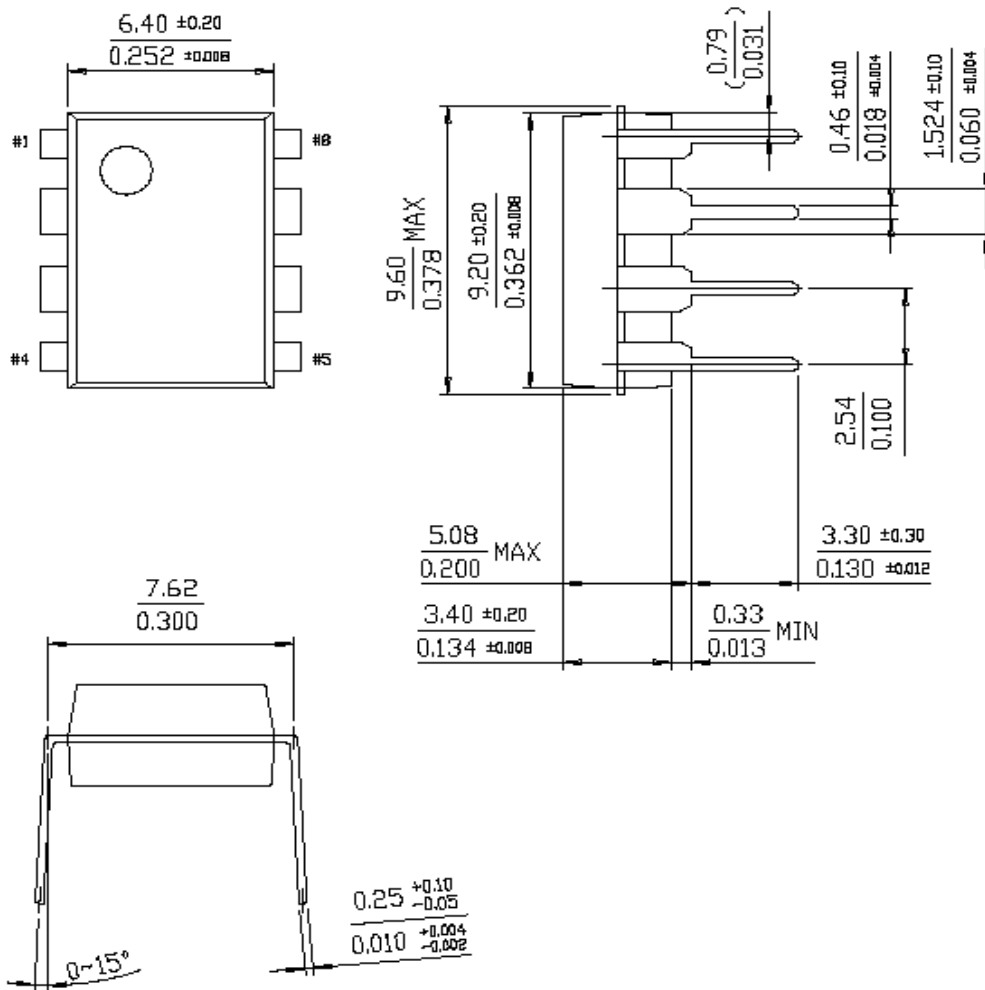
Figure 7. Output Duty Cycle vs. FB Terminal Voltage

# Mechanical Dimensions

Package

Dimensions in millimeters

## 8-DIP



## Ordering Information

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

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