

■ Description

FA3635P is a CMOS IC which includes low on-resistance power MOSFET for PWM-type switching power supply control. This IC achieves high efficiency DC-DC converter and it is suitable for buck converter or inverting converter with high input voltage of 10V to 50V.

■ Features

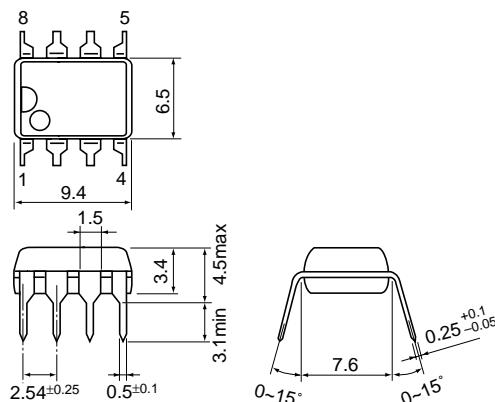
- Built-in low on-resistance Pch power MOSFET 50V/1.1Ω(typ.)/1A(peak)
 - Wide range of 10V to 50V for input voltage
 - 1.2mA low operating current as a Power IC
 - Latch-mode short-circuit protection function
 - Built-in over-temperature protection
- T_j=125°C (min.)

■ Applications

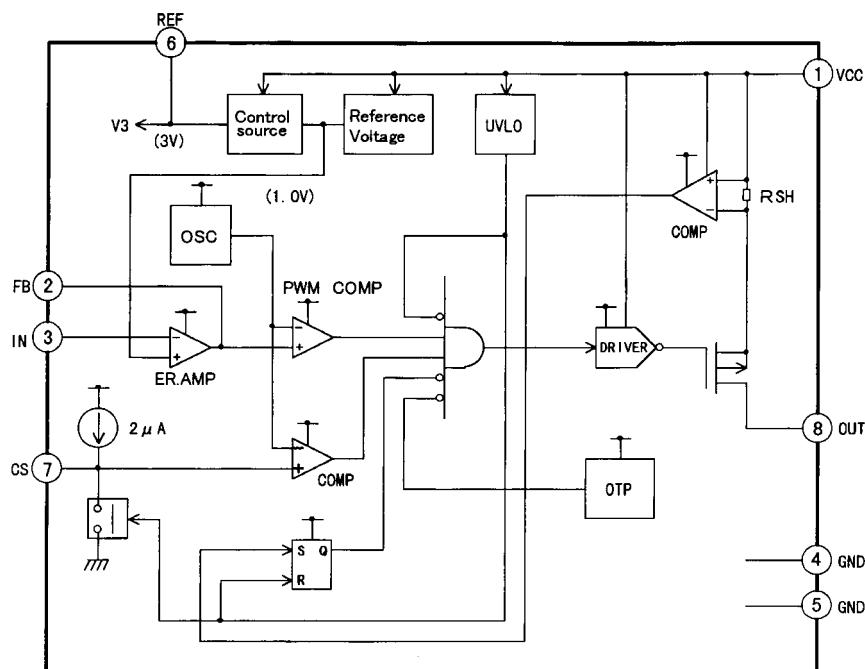
- Power supply for general equipment

■ Dimensions, mm

• DIP-8



■ Block diagram



Pin No.	Pin symbol	Description
1	VCC	Power supply
2	FB	Error amplifier output
3	IN	Inverting input to error amplifier
4	GND	Ground
5	GND	Ground
6	REF	Reference voltage
7	CS	Capacitor for soft-start
8	OUT	Output

■ Absolute maximum ratings

Item	Symbol	Rating	Unit
Supply voltage	V _{CC}	50.0	V
Error amplifier input voltage	V _{IN}	5.5	V
Total Power dissipation (Ta = 25°C)	P _d	1.1	W
Junction temperature	T _j	125	°C
Operating temperature	T _{op}	-20 to +85°C	°C
Storage temperature	T _{stg}	-40 to +150	°C

■ Recommended operating conditions

Item	Symbol	Min.	Max.	Unit
Supply voltage	V _{CC}	10.0	45.0	V
REF terminal by-pass capacitor	C _{REF}	0.047	0.22	μF
V _{CC} terminal by-pass capacitor	C _O	470		μF

■ Electrical characteristics (Ta=25°C, V_{CC}=44V, C_{REF}=0.1μF)

Reference voltage section

Item	Symbol	Test condition	Min.	Typ.	Max.	Unit
terminal Voltage	V _{REG}	C _{REF} =0.1μF	3.00	3.12	3.24	V

Oscillator section

Item	Symbol	Test condition	Min.	Typ.	Max.	Unit
Oscillation frequency	f _{OSC}		70	81	100	kHz
Frequency change with supply voltage	f _{dV}	V _{CC} =10 to 45V		±1	±3	%
Frequency change with temperature	f _{dT}	T _a =-20 to +85°C		±3	±5	%

Error amplifier section

Item	Symbol	Test condition	Min.	Typ.	Max.	Unit
Input common mode voltage range	V _{ICOM}		0.2		2.5	V
Open-loop gain	A _{VOL}			55		dB
Unity-gain bandwidth	f _T			1.0		MHz
Output sink current	I _{FBL}	Voltage follower V _{FB} =V _{ref} +0.05V	3.0	3.8		mA
Output source current	I _{FBH}	Voltage follower V _{FB} =V _{ref} -0.05V		-140	-100	μA
Reference Voltage	V _{ref}	Voltage follower V _{CC} =10 to 45V T _a =-20 to +85°C	0.97	1.00	1.03	V
Input threshold voltage (Pin 2)	V _{FB 0}	Duty cycle=0%	0.5	0.6	0.7	V
	V _{FB 100}	Duty cycle=100%	2.3	2.5	2.7	V

Soft-start circuit section

Item	Symbol	Test condition	Min.	Typ.	Max.	Unit
Input threshold voltage (Pin 7)	V _{CS 0}	Duty cycle=0%	0.5	0.6	0.7	V
	V _{CS 100}	Duty cycle=100%	2.3	2.5	2.7	V
Charge current	I _{CS}		-2.8	-2.2	-1.6	μA

Undervoltage lockout circuit section

Item	Symbol	Test condition	Min.	Typ.	Max.	Unit
Operating voltage	V _{UVLO}		5.0	6.1	8.5	V

Overheat protection section

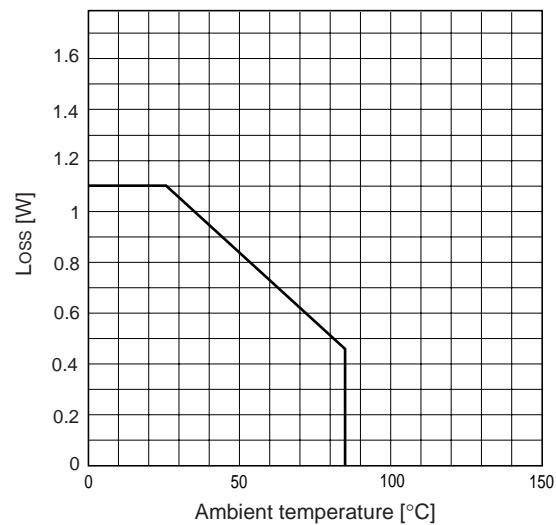
Item	Symbol	Test condition	Min.	Typ.	Max.	Unit
Operating temperature	T_{OH}		125	135	145	°C
Hysteresis width	ΔT_{OH}		45	50	55	°C

Output section

Item	Symbol	Test condition	Min.	Typ.	Max.	Unit
Voltage drop	V_{DROP}	$I_{OUT}=1.0A$ $I_{OUT}=0.7A$ $I_{OUT}=0.1A$		1.1 0.7 0.1	1.4 0.9 0.2	V
Overcurrent limit	I_{OLMT}	Peak current	1.0	1.75	2.0	A

Overall device

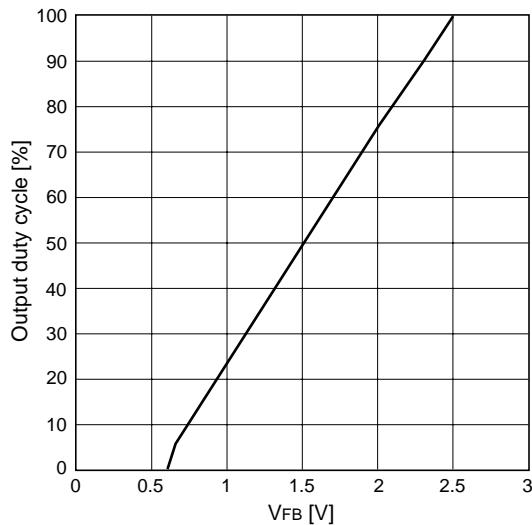
Item	Symbol	Test condition	Min.	Typ.	Max.	Unit
Operating current	I_{CC}	Out pin open, $V_{CC}=44V$ Duty cycle=100%		0.9	4.0	mA

■ Characteristic curve**• Thermal characteristic**

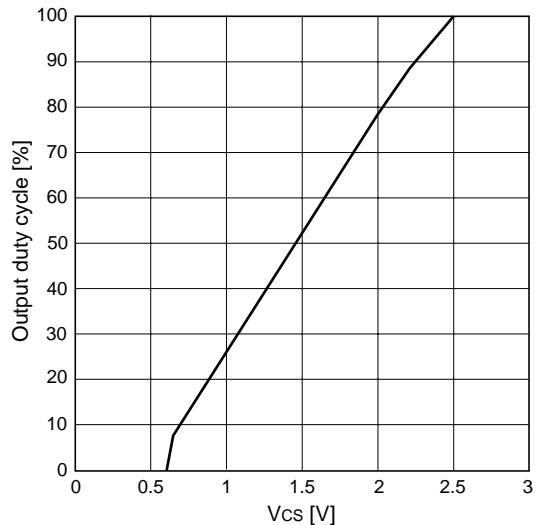
Thermal resistance : θ_{j-c} (Junction to case) = 30°C/W
 θ_{j-a} (Junction to air) = 90°C/W

■ Characteristic curves ($T_a=25^\circ\text{C}$)

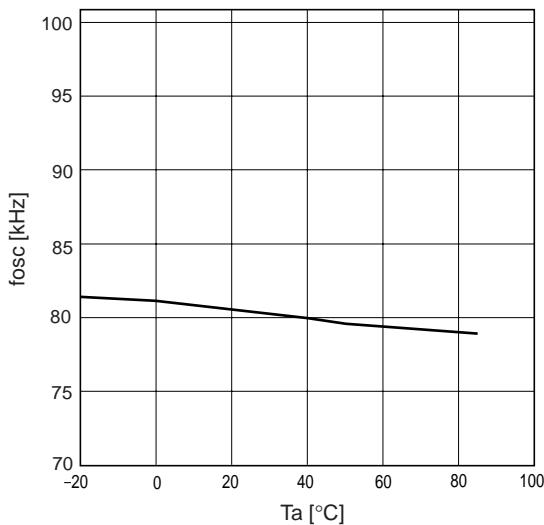
Output duty cycle vs. FB terminal voltage (V_{FB})



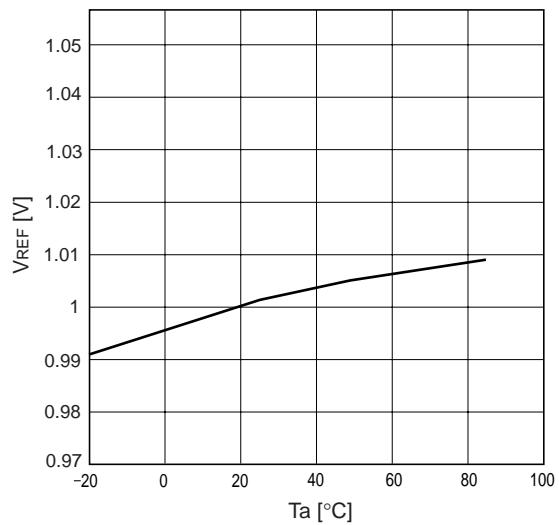
Output duty cycle vs. CS terminal voltage (V_{CS})



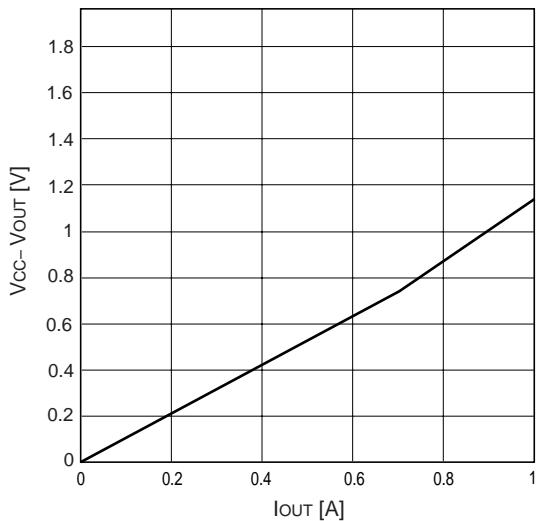
Oscillation frequency (f_{osc}) vs. ambient temperature (T_a)



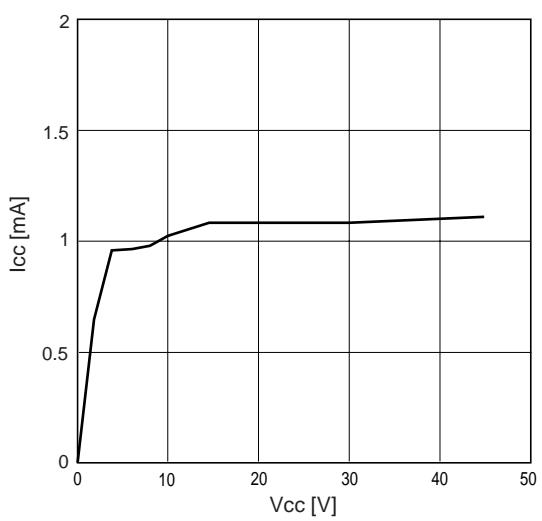
Reference voltage (V_{REF}) vs. ambient temperature (T_a)

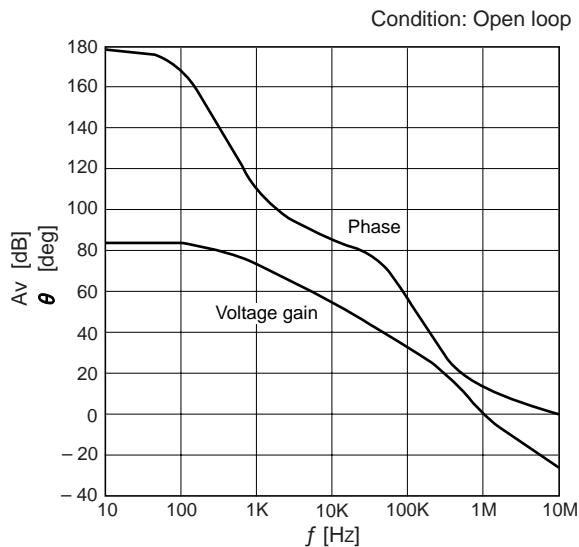


Output voltage (V_{OUT}) vs. output current (I_{OUT})

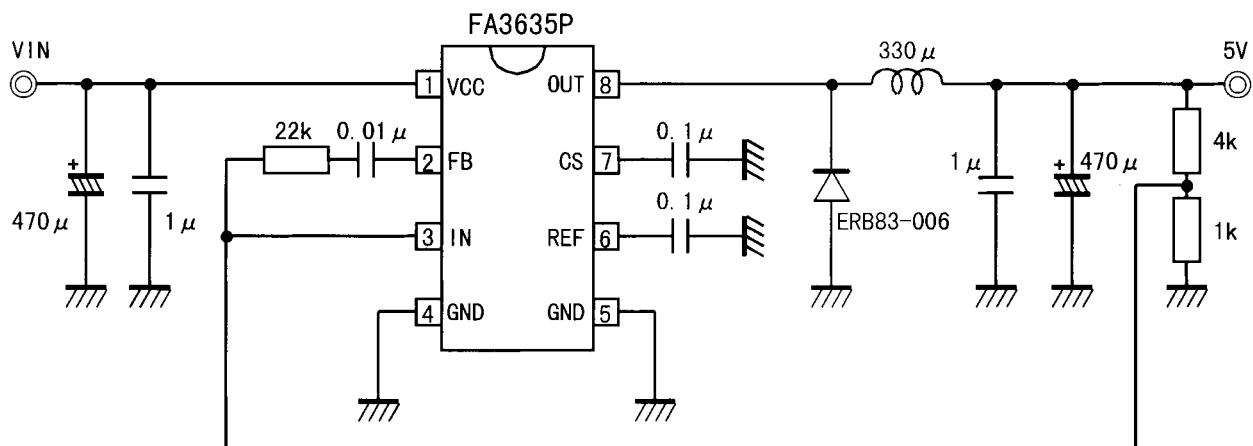


Supply current (I_{CC}) vs. supply voltage (V_{CC})



Error amplifier voltage gain (A_v)/ phase (θ) vs. frequency (f)

■ Application circuit



Parts tolerances characteristics are not defined in the circuit design sample shown above. When designing an actual circuit for a product, you must determine parts tolerances and characteristics for safe and economical operation.