PFM

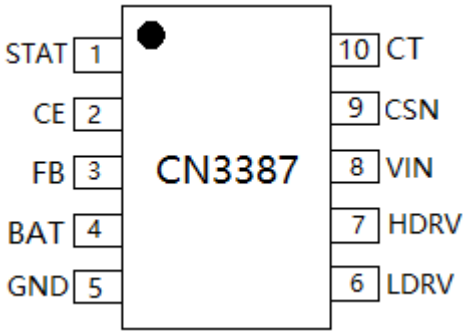
CN3387

CN3387 2.7V 6.5V PFM 2.7V 6.5V
4 12 300 @VIN=5V
CN3387
1MHz

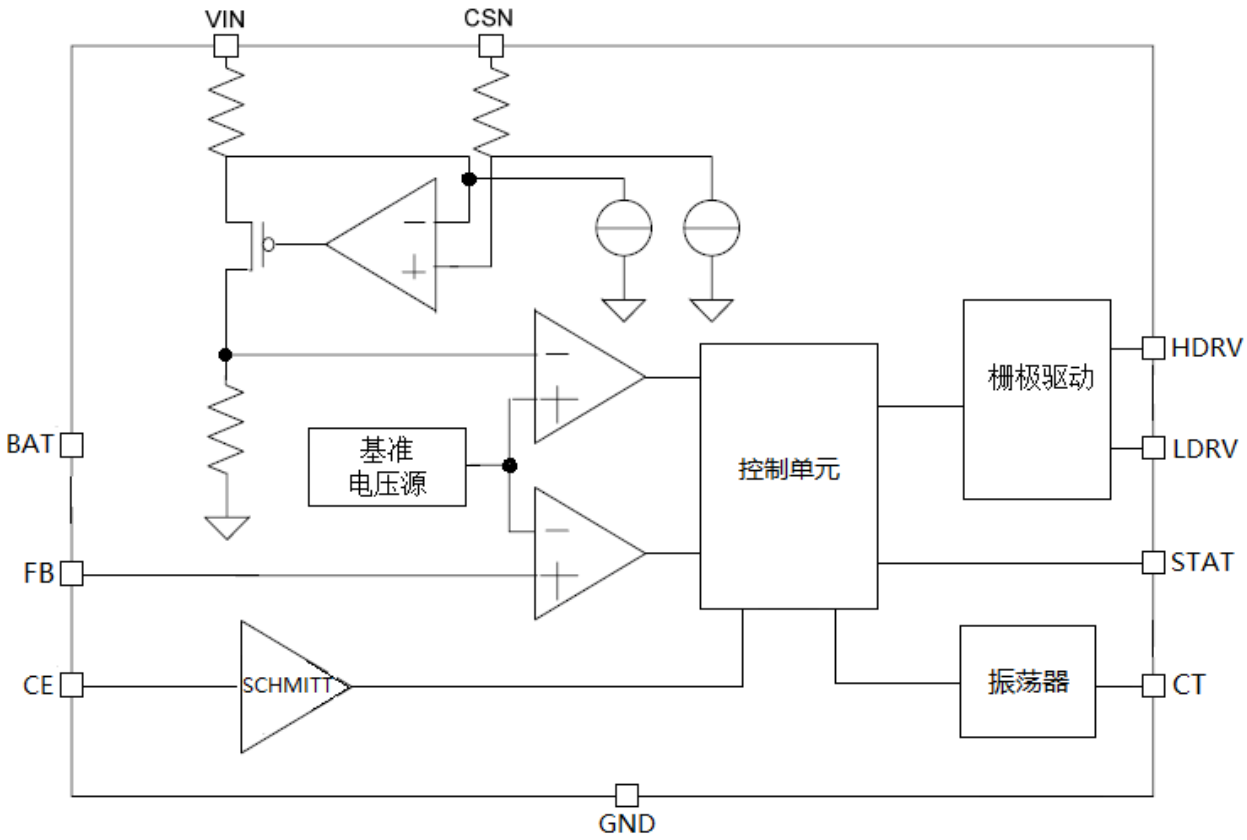
CN3387 35W
N MOSFET
N
MOSFET

N MOSFET
FB 1.125V( )
CN3387 40 85
66% 10 SSOP10
N rohs
MOSFET FB
(1.105V) CN3387
CN3387 1MHz
40 85
CN3387
N MOSFET P MOSFET

CN3387 10 SSOP10



CN3387	SSOP-10	4000	40 85



3

1	STAT	CMOS CN3387
2	CE	CN3387

(VIN = 5V TA 40°C to +85°C TA +25°C)

	VIN			2.7		6.5
	I_{VIN}	V_{FB} 1.5V No Switching		230	300	370
	I_{off}	CE			0	2
	f_{SW}			200		1000 KHz
	V_{CSHI}		(VIN V_{CSN}) 0V	113	123	133
			V_{LDRV} 0.5V	62	72	82
	V_{CSLO}		(VIN V_{CSN}) 0.2V	77	87	97
			V_{LDRV} (VCC 0.5V)	35	45	55
	t_{DPDH}	(VIN V_{CSN}) 0.15V 0.075V			72	
	t_{DPDL}	(VIN V_{CSN}) 0.06V 0.135V			66	
CSN	I_{CSN}					100
FB						
FB	V_{high}	FB		1.193	1.205	1.217
FB	V_{CCT}	FB		1.1	1.125	1.15
FB	V_{rech}	FB		1.08	1.105	1.13
FB	I_{FB}	V_{FB} 5.5V			0	100
	V_{OV}	BAT		1.255	1.285	1.315
	V_{OVRLS}	BAT		1.205	1.235	1.265
BAT						
BAT	I_{BAT}	V_{BAT} 12V		4.6	5.8	7
LDRV						
LDRV		V_{CSN} VIN, V_{DRV} 0.5 VCC			0.65	

LDRV

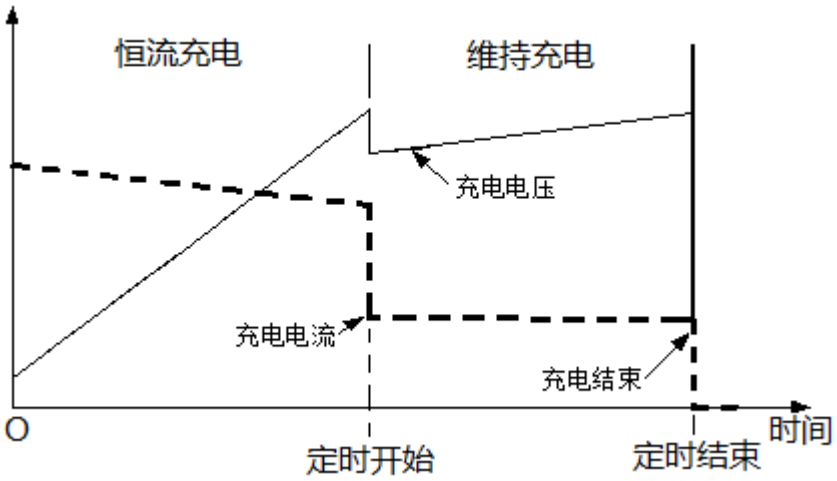
CE				
	V_{CEL}	CE	0.7	
	V_{CEH}	CE	2.2	
	I_{CEL}	CE=GND VIN=6V	1	
	I_{CEH}	CE=VIN=6V	1	
STAT				
	I_{SINK}	V_{STAT}=0.3V	10	
	I_{SRC}	V_{STAT}=4.7V	10	

CN3387 PFM 4 12 CN3387
2.7V 6.5V
5V

CN3387 STAT N

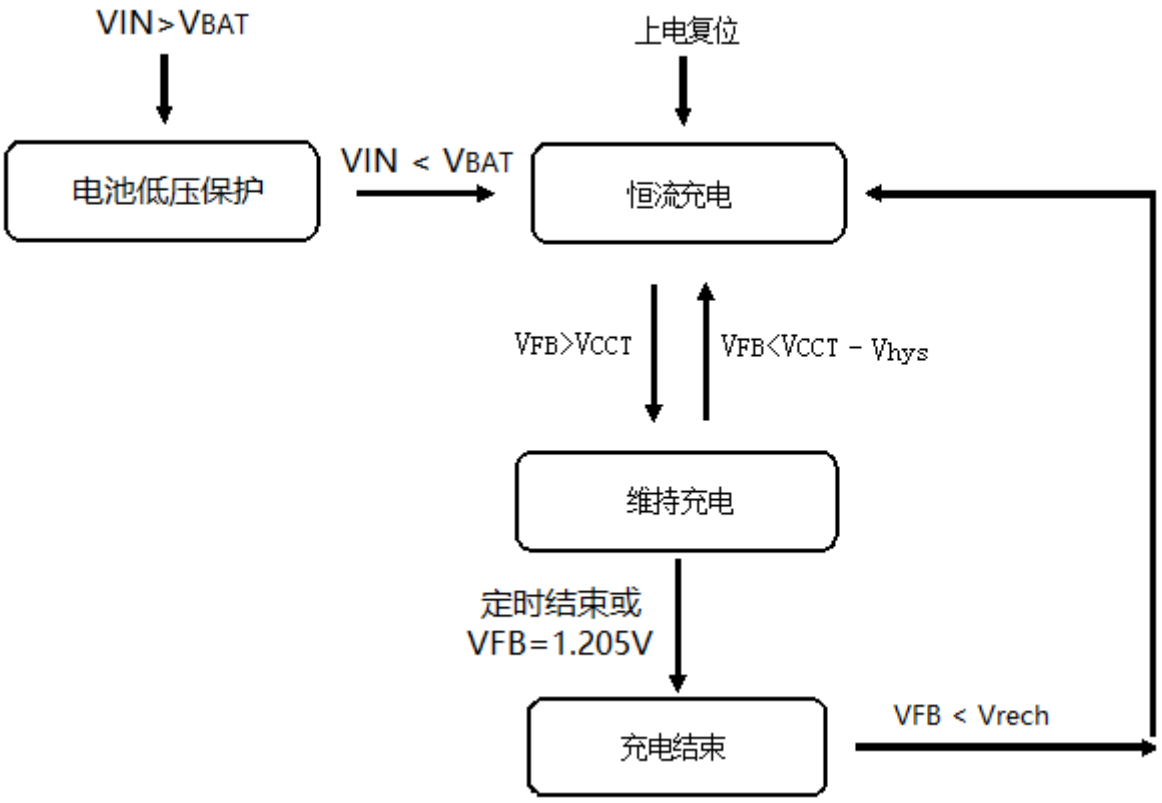
N
N
CN3387 FB FB 1.125V( ) CN3387
66% N
MOSFET CN3387 STAT
FB 1.105V( ) CN3387 CN3387
1MHz
CN3387
N

4



4

5



5

CN3387 2.7V 6.5V CN3387
2.65V( ) CN3387

CE 0.7V CN3387 CN3387 CE 2.2V
CN3387
CE 0.7V 2.2V CN3387

CN3387

FB
V_{BAT} V_{FB} 1 R1 R2
V_{FB} 1.205V( )
1.205 1 R1 R2
R1 R2 1 2 R1 R2

FB 1.125V 93.3% CN3387
CN3387

T(s)=12.18 C2 10

T s

C2 1 2 C2 C2 1nF

1 2 CN3387 VIN CSN R_{CS}

N ( )

$I_{Lhigh} = 0.123V / R_{CS}$

$I_{Lhigh} = 0.0720V / R_{CS}$

N

( )

$I_{Llow} = 0.087V / R_{CS}$

$I_{Llow} = 0.045V / R_{CS}$

N

$I_L = 0.105V / R_{CS}$

$I_L = 0.06V / R_{CS}$

I_{Lhigh} (A)

I_{Llow} (A)

R_{CS} ( )

1 N

$$ton = \frac{0.04 \times L}{VIN \times R_{CS}} \quad ----------(1)$$

N

$$toff = \frac{0.04 \times L}{(V_{BAT}+V_D-VIN) \times R_{CS}} \quad ------(2)$$

CN3387

$$f_{sw} = \frac{1}{ton+toff} = \frac{1}{\frac{0.04 \times L}{VIN \times R_{CS}} + \frac{0.04 \times L}{(V_{BAT}+V_D-VIN) \times R_{CS}}}$$

CN3387 200KHz 300KHz 600KHz

1.2n

n

3.3uH 15uH

CN3387 LDRV

$$D = \frac{ton}{ton+toff} = \frac{V_{BAT}+V_D-VIN}{V_{BAT}+V_D}$$

L H

VIN V

V_{BAT} V

V_D V

R_{CS}

CN3387

$$I_{CH} = \frac{VIN \times I_L \times \eta}{V_{BAT}}$$

I_{CH} (A)

VIN (V)

I_L 0.106 R_{CS} (A)

80% 90% 85%

V_{BAT} 1.2V (V)

FB 1.205V N CN3387

FB 1.105V( ) CN3387

N MOS

CN3387 N

MOS

(Qg) MOS

1 2 D1

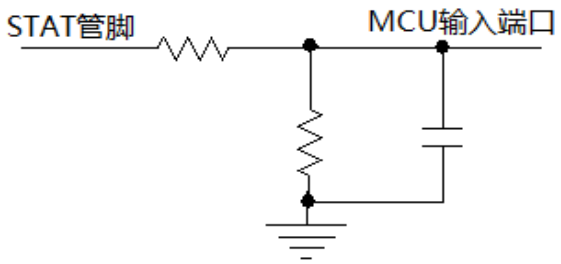
2 D2 D2

VIN 4.7 1 2 C1

t_{off} 6 (2)
Co
Resr
Rcs 1 2
(ESR) X5R X7R

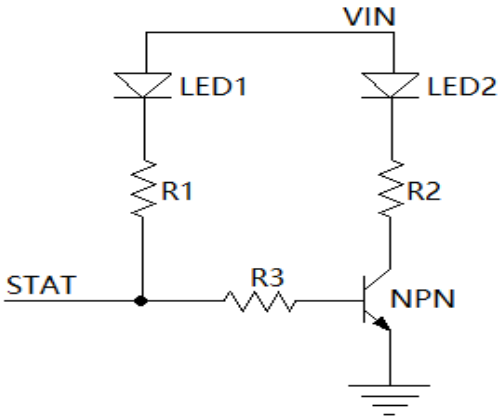
CN3387
CN3387
STAT

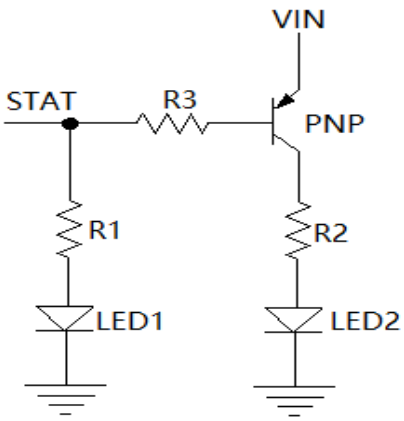
CN3387 CMOS STAT STAT
STAT
STAT (LED) (MCU)
1 2 STAT
STAT CN3387
5



5 STAT

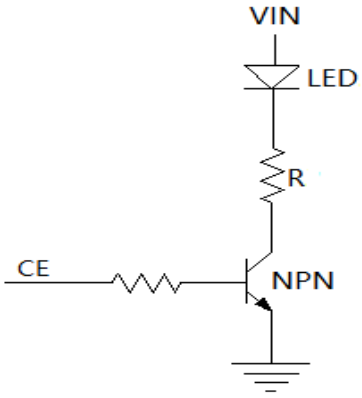
STAT 6





6

CE STAT LED 7



7 CE LED

1

2 CN3387 LDRV HDRV N P
N P
N P D1 D2
5

CN3387 2.7V 6.5V CN3387
2.68V( )
2.68V MOS
2.4V

1 2

1
55% C
t = 0.55C 0.66I_{CH} I_{CH}
2 C2
= 12.18 10^9 C2
3 R1 R2
1.46V n n
1.46V n = 1.205 (1+R1 R2)
R2 100K
4
5
6 N P
7 R_{CS}
8 200KHz 1MHz
300KHz 600KHz
9

1 2

5V 7

	0.9A	**1.8A**	**3.6A**	**5.4A**	**7.2A**
C1	10uF,0805	22uF,1206	2 22uF,1206	3 22uF,1206	4 22uF,1206
D1	SS24 SS34	SS24 SS34	SS24 SS34	SS54 1N5824	SS54 1N5824
D2	SS24 SS34	SS24 SS34	SS24 SS34	SS34	SS34
N MOS M1	SI2300,SI2302	AO4468, NCE3012S	AO4468, AO4410	AO4410, NCE3018S	AON7140
P MOS M2	SI2301,SI2305	AO4435	AO4435	AO4407A	AO4407A
R_{CS}	120m , 0.15W	60 m ,0.25W	30 m ,0.5W	20 m ,1W	15 m ,1W
L1	10uH, I_{SAT}>2A	6.8uH,I_{SAT}>3A	3.3uH,I_{SAT}>5A	2.2uH,I_{SAT}>7.5A	2.2uH,I_{SAT}>7.5A
	560KHz	415KHz	420KHz	420KHz	320KHz
Co	10uF,0805	22uF,1206	2 22uF,1206	3 22uF,1206	4 22uF,1206

0805 10uF

(EMI)

(EMI) PCB

CN3387 LDRV 35 N

(MOSFET) Qg LDRV

1 2 R3 LDRV

R3 LDRV 60 0603 0805

PCB

PCB

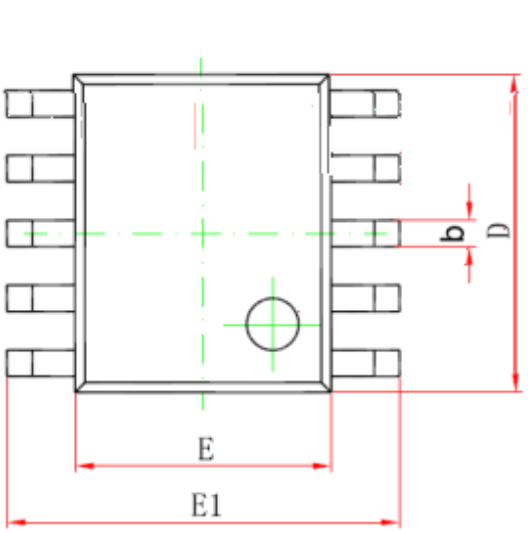
PCB

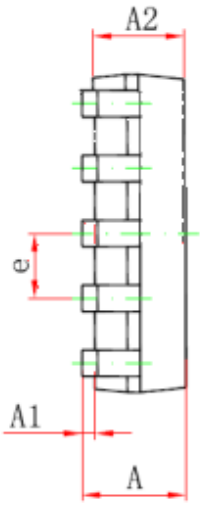
N PCB

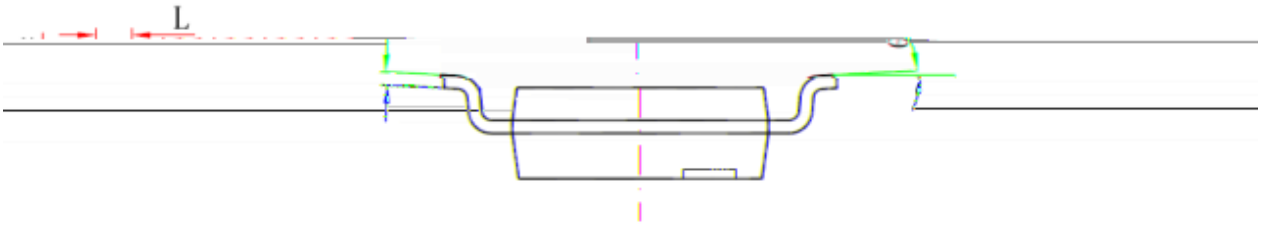
CN3387 5

N MOS

R_{CS}


b
D
E
E1


A2
e
A1
A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