30V input withstand voltage overvoltage protection chip supporting TYPE_C port

1 Features

- Over-voltage protection :6V
- OVP response time :100ns
- input voltage tolerance up to 32V
- On-resistance 35 mΩ
- Support TYPE_C port charge/discharge function
- Integrated over-temperature protection
- Package：DFN8L-2X3

2 Applications

- Low-Power Handheld Devices
- Mobile phones, tablets and other portable devices

3 Description

The IP2618 is an integrated IC with input overvoltage protection.

Input voltage tolerance up to 30V. When the input voltage is detected to be greater than the OVP protection threshold, the integrated power tube can be quickly shut down to prevent the input high voltage from damaging the device on the output.

The IP2618 has integrated over-temperature protection, which shuts down the power tube output when the internal temperature of the chip is detected to be too high.

IP2618 supports TYPE_C charging and discharging function, and supports charging and discharging voltage range:3.5V-6V.

4 Simplify the application schematic

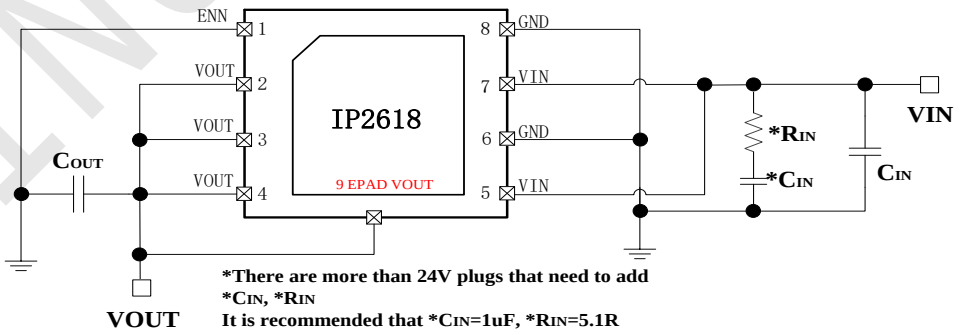


Figure 1 IP2618 Simplify the application schematic

Directory

5 Modify records

NOTE：The page numbers of the previous version may differ from the page numbers of the current version.

Initial release version V1.00（2023.12）

6 Common Custom Product Description

Name	Description
IP2618	Standard model (6V overvoltage protection)

7 Pin Description

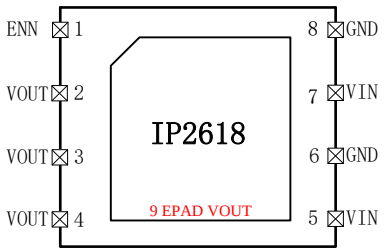


Figure 2 Pin of IP2618

7.1 Pin Description

Number	Name	Description
1	ENN	Enable pin, Ground Enable
2	VOUT	Output pin
3	VOUT	Output pin
4	VOUT	Output pin
5	VIN	Input pin
6	GND	Ground
7	VIN	Input pin
8	GND	Ground
9 (EPAD)	VOUT	Output pin

8 Internal block diagram of the chip

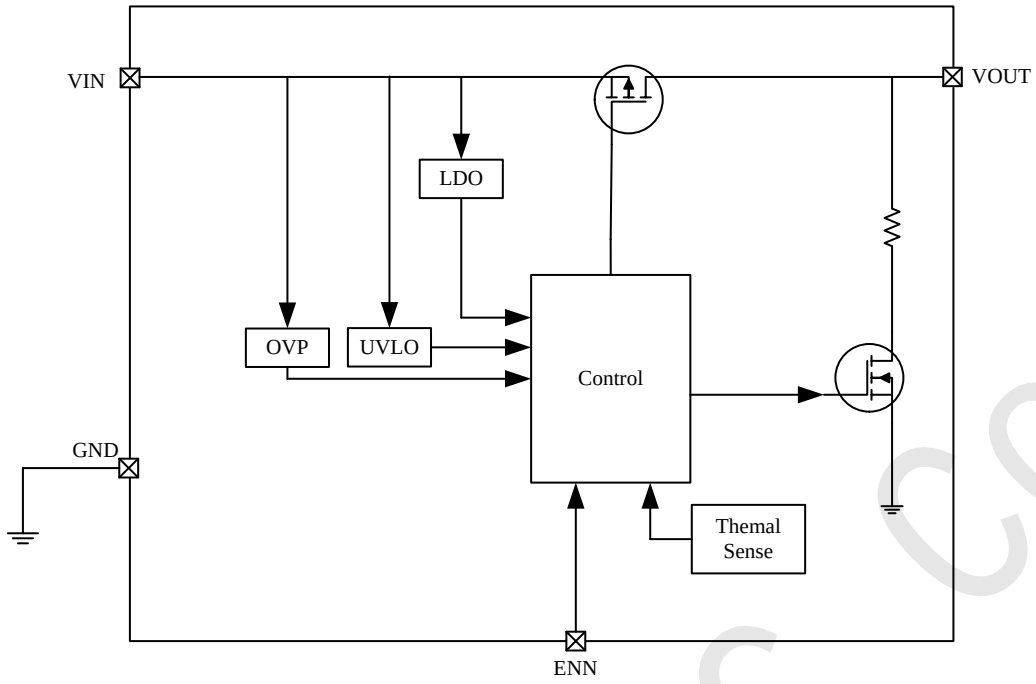


Figure 3 Internal block diagram of IP2618

9 Limit parameters

Parameter	Symbol	Value	Units
VIN voltage Range	V_{IN}	-0.3 ~ 33	V
VOUT voltage Range	V_{OUT}	-0.3 ~ 9	V
ENN voltage Range	V_{ENN}	-0.3 ~ 9	V
Junction temperature Range	T_J	-40 ~ 150	℃
Storage Temperature Range	T_{stg}	-65 ~ 150	℃
Package Thermal Resistance	θ_{JA}	90	℃/W
Human Body Model (HBM)	ESD	4	KV

*Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to Absolute Maximum Rated conditions for extended periods may affect device reliability.

10 Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Input Voltage	V_{IN}	3	5	30	V

*Devices' performance cannot be guaranteed when working beyond those Recommended Operating Conditions.

11 Electrical Characteristics

Unless otherwise specified，T_A=25℃，V_{IN}=5V

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Voltage						
On-resistance	R_{DSON}	VIN=5V，IOUT=2A		35	40	mΩ
standby power	$I_{STANDBY}$	ENN disable，VIN=5V		1	3	uA
Input quiescent current	I_{DD}	ENN enable，VIN=5V，no load at the output		1		mA
Input overvoltage protection						
OVP voltage	V_{OVP}	VIN rises from 5V to 7V	5.8	6	6.2	V
OVP hysteresis voltage	V_{OVP_HYS}	VIN drops from 7V to 5V		200		mV
OVP response time	$t_{PD(OVP)}$			100	200	ns
Startup delay time	T_{DE}	VIN rises from 0V to 5V in 1uS		12	20	ms
OVP Recovery time	$t_{REC(OVP)}$			100		ms
Under voltage lock out threshold	V_{UVLO}	no load at the output		3		V
Enable Threshold Low	$V_{ENN(L)}$	Chip enable			1.2	V
Enable Threshold High	$V_{ENN(H)}$	Chip shutdown	2.6			V
Thermal shutdown junction temperature	T_{OTP}	Rising temperature	130	140	150	℃
Thermal shutdown hysteresis	ΔT_{OTP}		30	40	50	℃

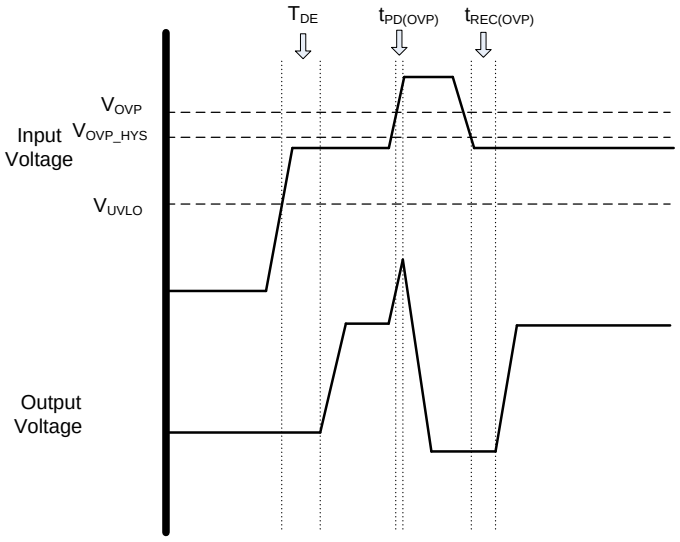


Figure 4 timing diagram

12 Function description

When the input voltage is 5V and the output current is 2A, the chip conduction internal resistance is 35mΩ.

12.1 Input overvoltage protection

When the input voltage exceeds the set V_{OVP}, the internal power tube will turn off within 100ns, turning off the output. When the input voltage drops to V_{OVP_HYS}, the output is turned back on.

12.2 Over-temperature protection

When the chip junction temperature is detected to be greater than 140°, it will enter the over-temperature protection state. Close internal power tube and stop the output.

12.3 Support TPYE_C port charging and discharging

Support TYPE_C port bi-directional charging and discharging, charging and discharging voltage range:3.5V~6V.

12.4 Apply curves

yellow VIN,green VOUT

Figure 5 VIN power-on start（VIN=5V）

Figure 6 VIN voltage protection（VIN=5V-15V）

Figure 7 VIN voltage recovery（VIN=9V-5V）

12.5 Temperature characteristic curve

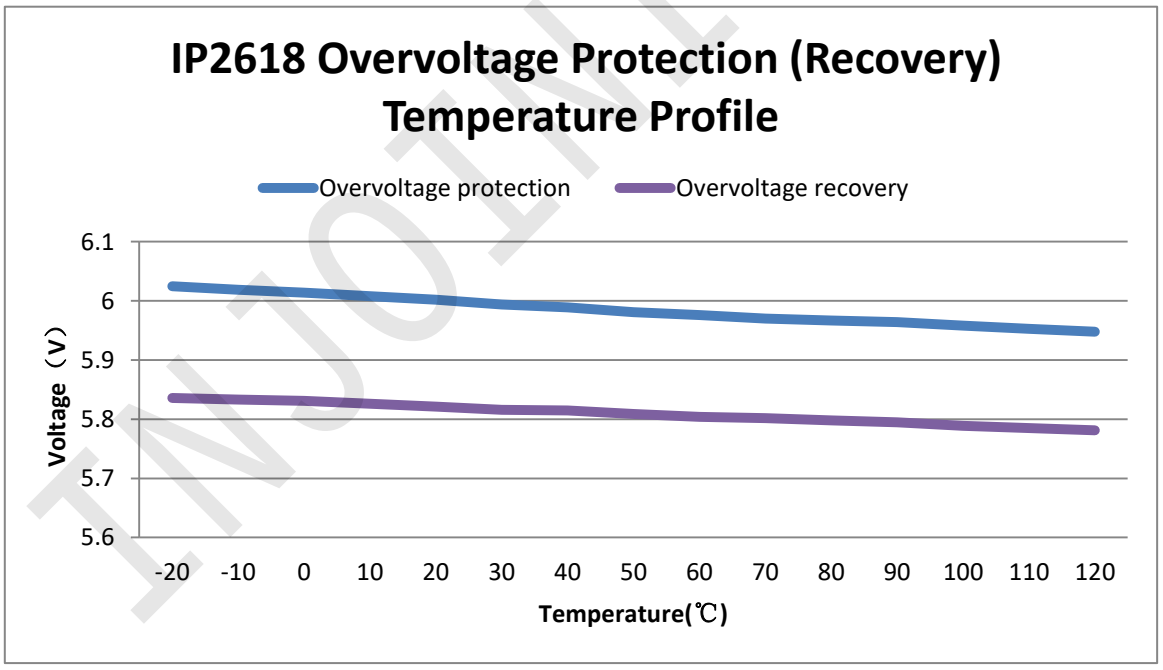


Figure 8 voltage protection (recovery) temperature curve

13 Typical application schematic

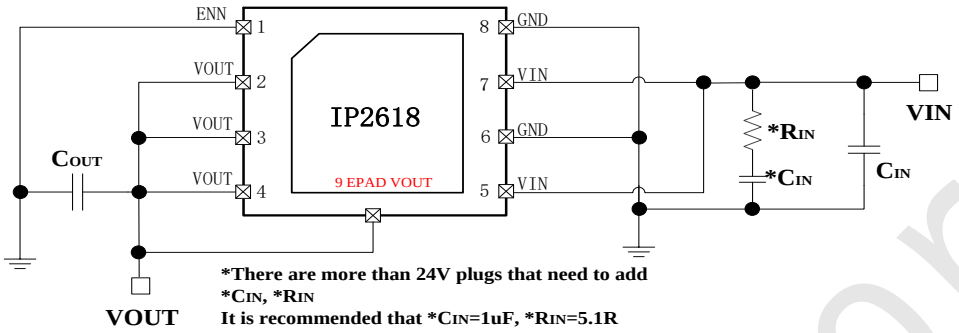
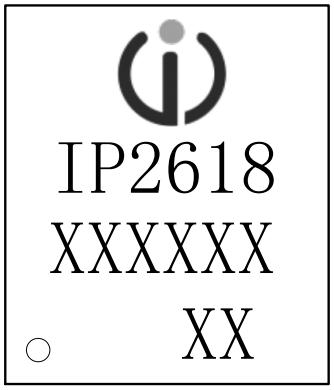


Figure 9 Typical Application Schematic

14 BOM

No.	Part Name	Type &Specification	Units	Quantity	Location	Note
1	IC	IP2618	PCS	1	U1	
2	SMD capacitors	0603 104 50V 10%	PCS	2	C_{IN}、C_{OUT}	
3	SMD capacitors	0603 1uF 50V 10%	PCS	1	*C_{IN}	
4	SMD resistors	0603 5.1Ω	PCS	1	*R_{IN}	

15 Silkscreen

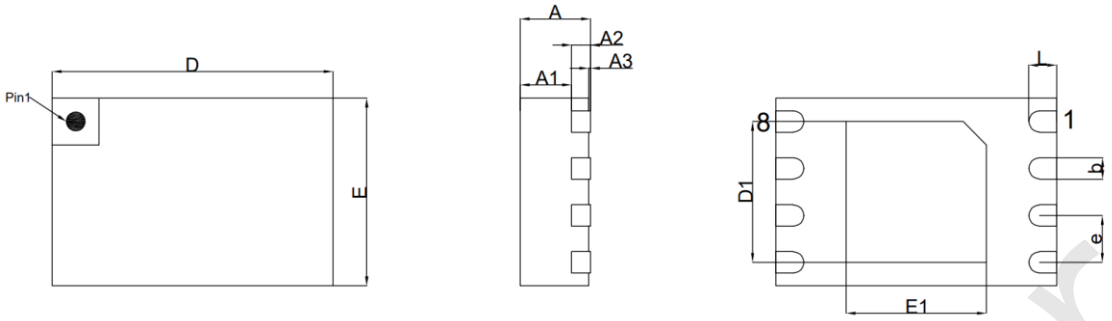


Instruction:

1、 --INJOINIC logo
2、IP2618 --Product name
3、XXXXXX --Product number
4、XX --Product number
5、○ --Pin1 position

Figure 10 IP2618 Screen printing

16 Package



	POD	DFNWB2×3-8L-NA(P0.5T0.75)		
		Size unit: mm		
	Symbol	Minimum	Normal	Maximum
Total Thickness	A	0.70	0.75	0.80
Molding Thickness	A1	-	0.55	-
LF Thickness	A2	-	0.203	-
Stand Off	A3	0.00	-	0.05
Body Size	D	2.90	3.00	3.10
	E	1.90	2.00	2.10
Exposed Pad Size	D1	1.40	1.50	1.60
	E1	1.40	1.50	1.60
Lead Width	b	0.18	0.23	0.28
Lead Length	L	0.25	0.30	0.35
Lead Pitch	e	0.50 BSC		

Figure 11 IP2618 DFN8L-2X3 Package outline dimension

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