1. Description

WD1072 is fully integrates a 1200V power MOSFET and SSR controller to provide simplified and low cost off−line power converters. To ensure low switching consumption and high efficiency, WD1702 adopt PWM/PFM control architecture, adjust the switching frequency according to the load condition, and enter burst mode under light load. WD1702 implements several key protective features, such as externally adjustable cycle by cycle over-current protection (OCP), over-power protection (OPP), over-voltage protection (OVP), short circuit protection (SCP), under voltage protection (UVP), over-temperature protection (OTP), and soft start. WD1702 is suited for AC-DC power supply applications, such as the onboard auxiliary power supply of smart power meter system. The device is available in a TO220F-6 package.

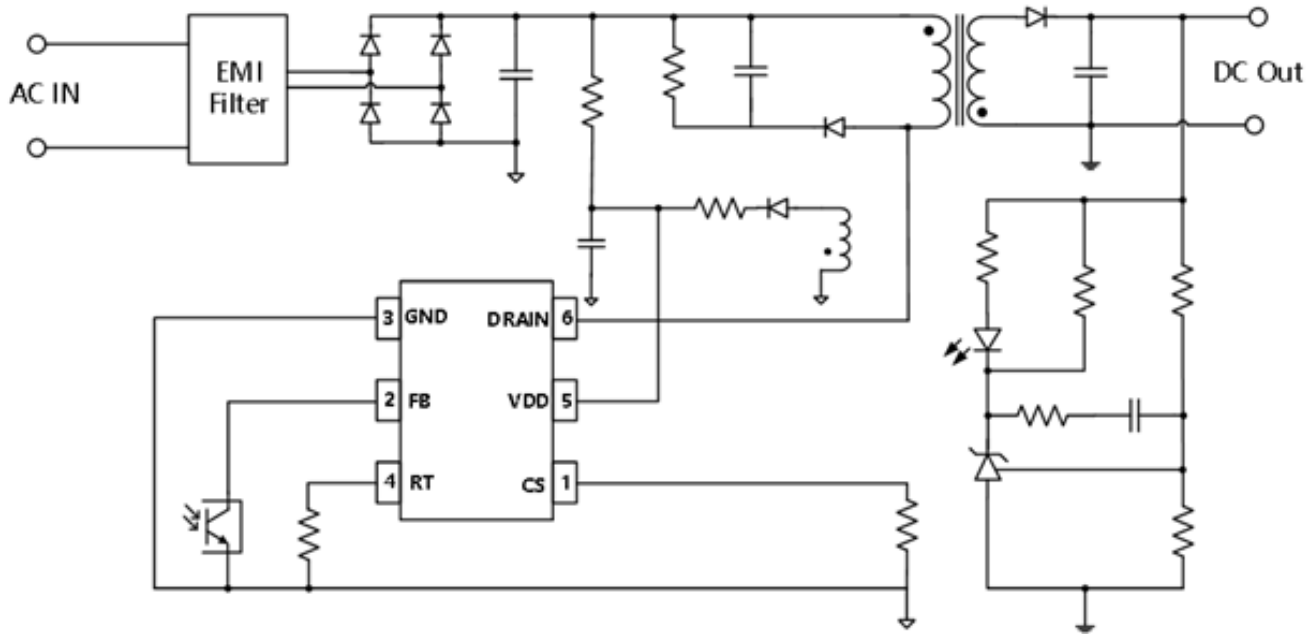
2. Feature

- Soft start to reduce spikes at startup stage
- Low VDD current during startup and operation
- Cycle by cycle over-current protection with line compensation
- Current mode PWM control
- Burst mode in light load
- Frequency rise to 130kHz in peak load mode
- Frequency Jittering for Reduced EMI Signature
- Under voltage lockout（UVLO）
- Over load protection（OLP）
- Fixed internal and programed external Over-temperature protection（OTP）
- Output voltage protection（OVP）
- Output diode short protection (ODSP)
- Auto restart (UVLO,OLP,OTP,OVP,ODSP)
- Integrated 1200V High Power MOSFET

3. Application

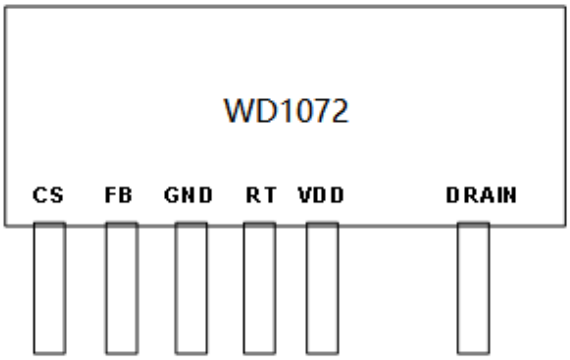
- Smart power meter

4. Typical application circuit



5. Pin configuration

(Top View)



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6. Pin functions

Number	Name	Description
1	CS	Current sensing. Connect to external resistor
2	FB	Feedback signal input. Connect to opto-couple output side
3	GND	Ground reference
4	RT	Multi-function pin. Connect with NTC resistor to GND to perform OTP function, or connect resistor to auxiliary winding to perform OVP function, place a diode between NTC resistor and RT pin for both OTP and OVP function.
5	VDD	positive supply of the IC
6	DRAIN	Drain of internal power MOSFET

7. Absolute maximum ratings[1]

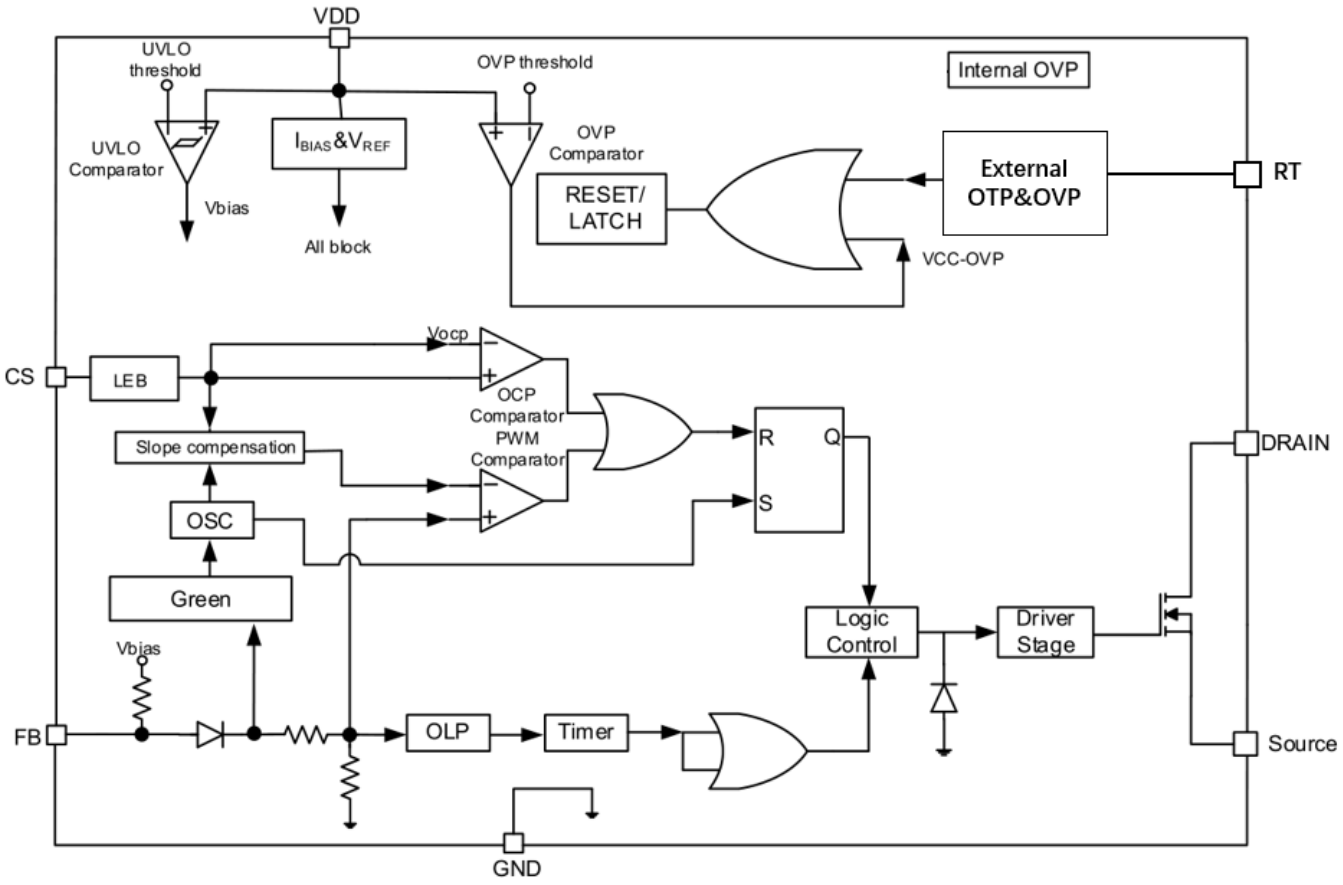
Parameter	Value	Unit
VDD	V_{OVP}-1	V
RT	-0.3 to 7	V
CS	-0.3 to 7	V
FB	-0.3 to 7	V
T_J	-40 to 150	°C
T_A	-40 to 85	°C
T_{stg}	-55 to 150	°C
T_{wed} (soldering 10secs)	260	°C
Recommend VDD operation	12 to 26	V

Note1: Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may be occurred and reliability may be affected.

8. Package thermal resistance

Package	$R_{\theta JA}$ (℃/W)
TO220F-6	54

9. Functional block diagram



10. Electrical characteristics

(V_{DD}=20V, T_A = 25℃ for typical value, unless otherwise noted)

Symbol	Parameter	test condition	Min	Typ	Max	Unit
Supply voltage（VDD）						
I_{DD_ST}	Start-up current	VDD=16V		2	5	uA
I_{DD_OP}	operation current	VDD=20V FB=3V CS=3.8V		1.5	2.5	mA
I_{DD_Burst}	Burst current	VDD=20V FB=0.5V CS=0V		0.57	0.75	mA
$V_{UVLO(ON)}$	UVLO on threshold	VDD dropping		8.3		V
$V_{UVLO(OFF)}$	UVLO off threshold	VDD rising		18.1		
V_{PULL_UP}	PMOS pullup voltage			10.2		V
Vdebounce_burst	burst mode disable threshold			9.4		V
OVP	VDD protection threshold	FB=3V CS=0V VDD rising until Gate no output	27.7	29.2	30.7	V
Feedback（FB）						
A_{VCS}	PWM Gain	$\Delta V_{FB}/\Delta V_{CS}$		3.5		V/V
V_{FB_OPEN}	FB pin open voltage			5.0		V
I_{FB_SHORT}	FB pin short voltage	FB=0V		0.21		mA
$V_{TH\_Burst\_L}$	Enter Burst threshold			1.23		V
$V_{TH\_Burst\_H}$	Exit Burst threshold			1.33		V
V_{TH_green}	Enter Green mode threshold			2.1		
V_{TH_PL}	OLP threshold			4.3		V

Symbol	Parameter	test condition	Min	Typ	Max	Unit
t_{D_PL}	Blanking time of OLP			15		ms
Z_{FB_IN}	input impedance			30		kΩ
D_{MAX}	Max duty cycle	VDD=20V FB=3V CS=0V	75	80	85	%
Current sensing (CS)						
t_{LEB}	lead edge blanking time			300		ns
V_{TH_OC}	OCP threshold	Duty cycle=0	0.43	0.45	0.47	V
t_{D_OC}	time delay from sense to control	From CS=TH to Gate off		100		ns
$V_{TH\_OC\_Clamp}$	OCP threshold	Duty cycle≈50%		0.70		V
t_{D_OCP}	OCP blanking time			60		ms
T_{SS_CS}	Soft start time			4		ms
Oscillation						
f_{NOM}	Oscillation frequency	VDD=20V FB=3V CS=3.8V	60	65	70	kHz
f_{PK}	Maximum frequency	FB=3.8V，CS=0V，VDD=20V other PAD open TEST DELAY 35MS		130		kHz
SST_frequecy	soft start time of Frequency modulation			30		ms
Δf_T	frequency temperature drift coefficient			1		%
Δf_{VDD}	frequency voltage drift coefficient			1		%
f_{BURST}	Base frequency of Burst mode			24		kHz

Symbol	Parameter	test condition	Min	Typ	Max	Unit
Δf_{OSC}	modulation range/base frequency		-6		6	%
$f_{JITTERING}$	Jitter frequency			32		Hz
Integrated MOSFET						
V_{DS}	Drain voltage			1200		V
R_{DSON}	Static Drain-Source On resistance			5.2		R
Muti-function pin（RT）						
I_{RT}	OTP output current		95	100	105	uA
V_{OTP}	OTP voltage threshold		0.95	1	1.05	V
I_{OUT_OVP}	OVPcurrent threshold			60		uA
$t_{D\_OUT\_OVP}$	OVP blanking			8		Cycles
Internal over temperature protection（OTP）						
T_{Enter}	Enter OTP threshold			135		℃
T_{EXIT}	Exit OTP threshold			123		℃

12. Package outline

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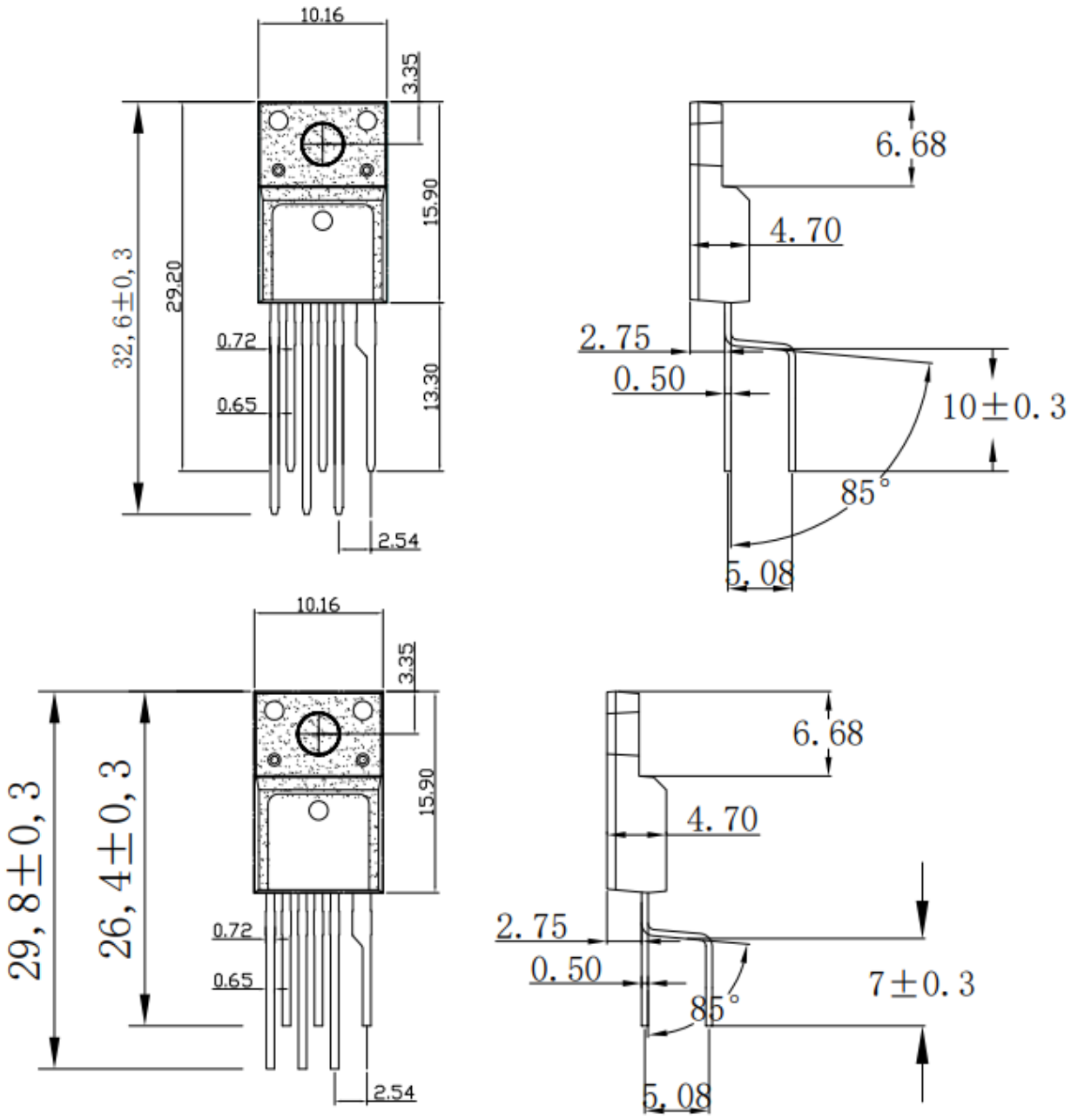

13. Ordering information

Part Number	Package	Shipping
WD1072DET	TO220F-6	50/Tube

STATEMENTS

WAY-ON provides data sheets based on the actual performance of the device, and users should verify actual device performance in their specific applications. The device characteristics and parameters in this data sheet can and do vary from application to application, and actual device performance may change over time. This information is intended for developers designing with WAY-ON products. Users are responsible for selecting the appropriate WAY-ON product for their application and for designing and verifying the application to ensure that your application meets the appropriate standards or other requirements, and users are responsible for all consequences. Specifications are subject to change without notice.

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