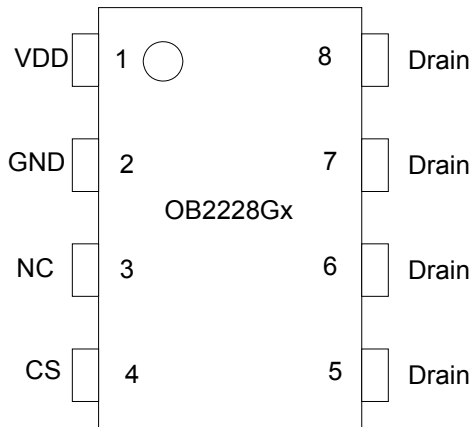


GENERAL INFORMATION

Pin Configuration

The pin map is shown as below for SOP8



Ordering Information

Part Number	Description
OB2228GNCP	SOP8, Pb-free, Tube
OB2228GNCPA	SOP8, Pb-free, T&R
OB2228GRCP-H	SOP8, Halogen-free, Tube
OB2228GRCPA-H	SOP8, Halogen-free, T&R

Package Dissipation Rating

Package	R θ JA (°C/W)
SOP8	90

Note: Drain Pin Connected 100mm² PCB copper clad.

Recommended Operating Condition

Symbol	Parameter	Range
VDD	VDD Supply Voltage	9 to 18V

Output Power Table

Buck / Buck-Boost	90~264Vac (open frame)	176~264Vac (open frame)
OB2228GN	350mA	500mA
OB2228GR	450mA	550mA

Note: Maximum continuous power with drain pattern connected 100mm² PCB copper clad, at 50°C ambient.

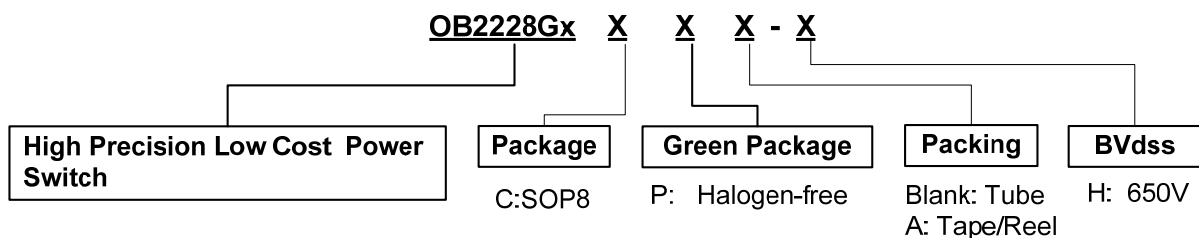
Buck / Buck-Boost	90~264Vac (open frame)	176~264Vac (open frame)
OB2228GN	300mA	420mA
OB2228GR	400mA	500mA

Note: Maximum continuous power with drain pattern connected 100mm² PCB copper clad, at 85°C ambient.

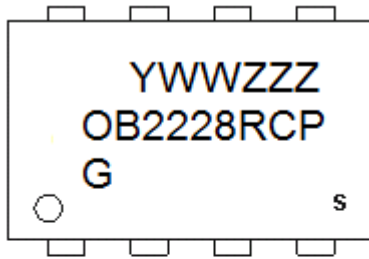
Absolute Maximum Ratings

Parameter	Value
Drain Voltage(off state)	-0.3V to Bvdss
VDD Voltage	-0.3 to 24V
CS Input Voltage	-0.3 to 7V
Min/Max Operating Junction Temperature T _J	-40 to 150 °C
Operating Ambient Temperature T _A	-40 to 85 °C
Min/Max Storage Temperature T _{stg}	-55 to 150 °C
Lead Temperature (Soldering, 10secs)	260 °C

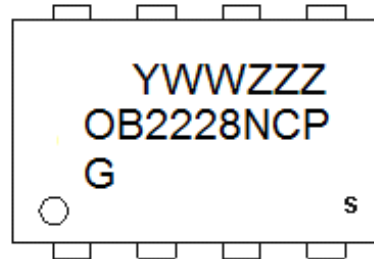
Note: Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute maximum-rated conditions for extended periods may affect device reliability.



Marking Information



Y: Year Code
 WW: Week Code(01-52)
 ZZZ: Lot Code
 C: SOP8 Package
 P: Halogen-free Package
 G: Character Code
 S: Internal Code(Optional)

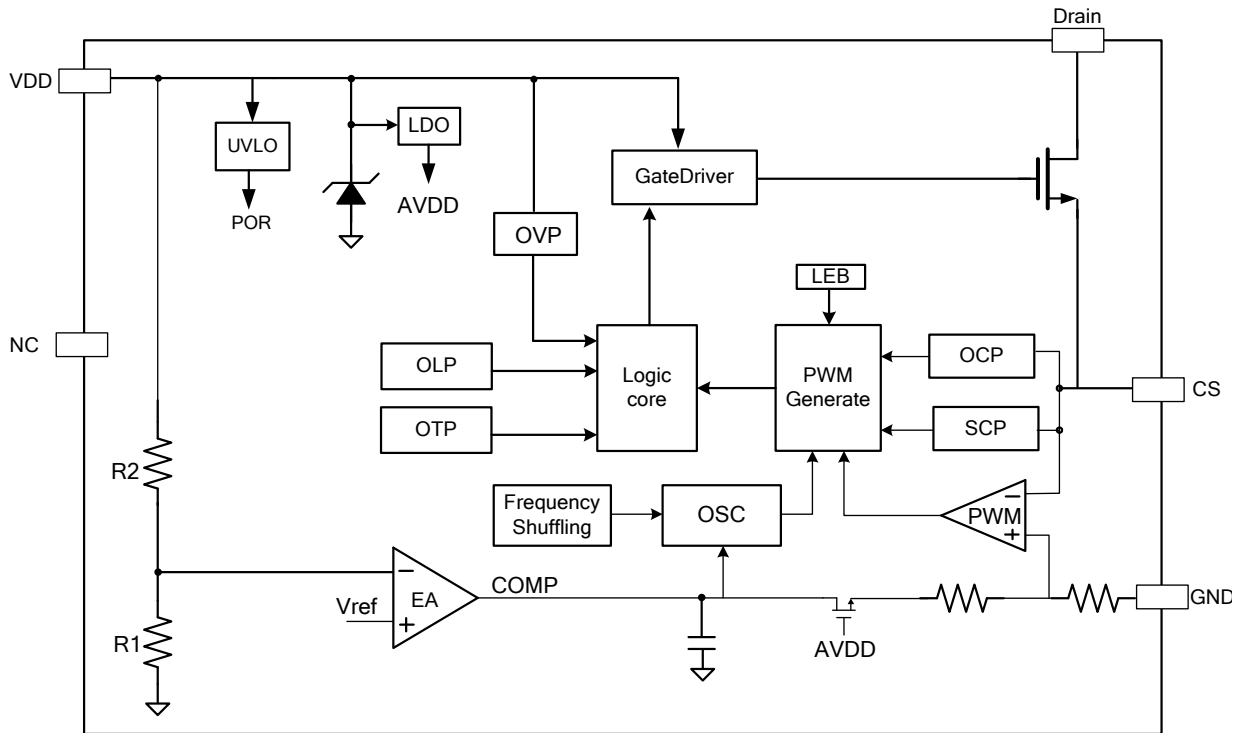


Y: Year Code
 WW: Week Code(01-52)
 ZZZ: Lot Code
 C: SOP8 Package
 P: Pb-free Package
 G: Character Code
 S: Internal Code(Optional)

TERMINAL ASSIGNMENTS

Pin Num	Pin Name	I/O	Description
1	VDD	I	Power Supply and Output Voltage Feedback
2	GND	P	Ground
3	NC	NC	It should be floating or connect ground during normal operation state
4	CS	I	Current sense input
5/6/7/8	Drain	O	Power Mosfet Drain pins.

BLOCK DIAGRAM



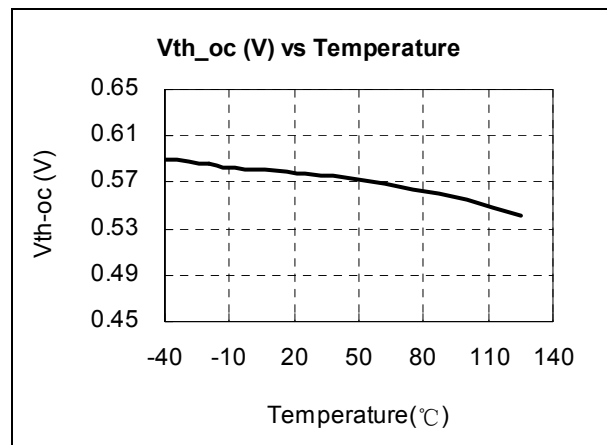
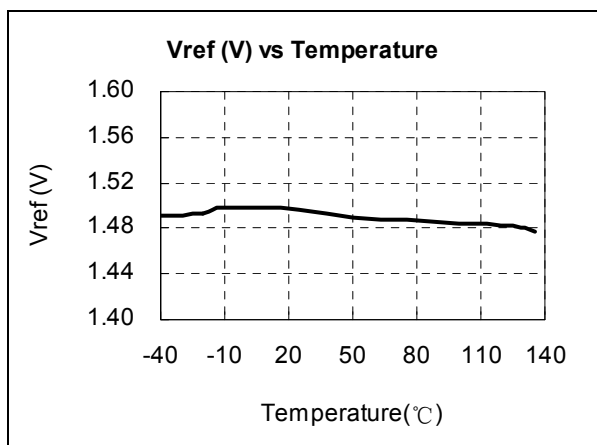
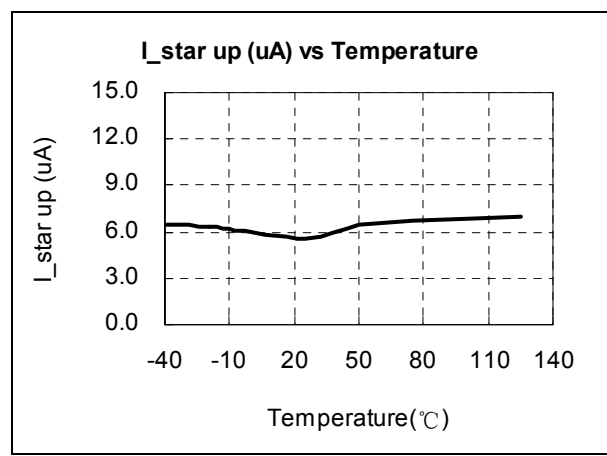
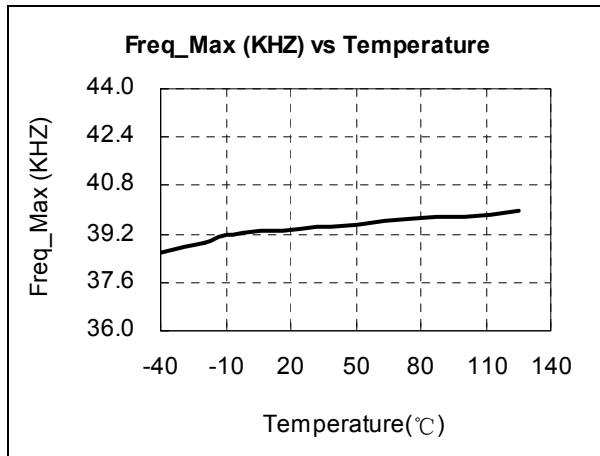
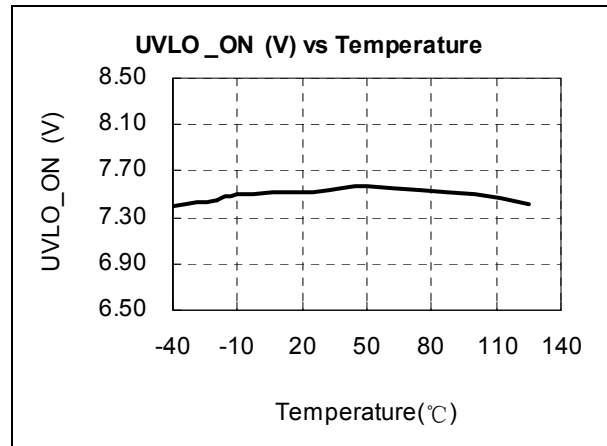
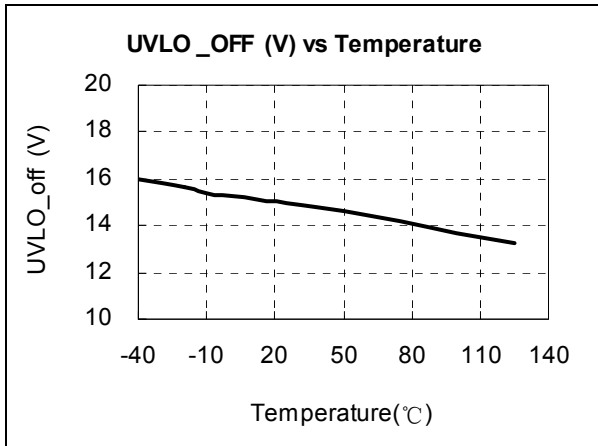
ELECTRICAL CHARACTERISTICS

 (T_A = 25°C, VDD=18V, if not otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Unit
Supply Voltage (VDD) Section						
I _{startup}	Standby Current	VDD=UVLO(off) -1V			10	uA
I _{VDD_op}	Operation Current	Operation supply current CS=0V	-	1.0	2.0	mA
		Operation supply current VDD=19V		0.5	0.6	mA
UVLO_ON	VDD Under Voltage Lockout Enter	VDD falling, gate disappear	6.5	7.5	8.5	V
UVLO_OFF	VDD Under Voltage Lockout Exit	VDD rising	13.8	14.8	15.8	V
OVP	Over voltage protection Threshold	Ramp VDD until gate shut down	20	21	22	V
Current Sense Input Section						
TLEB	LEB time		250	300	350	ns
Vth_oc	Over current detection Threshold voltage		550	575	600	mV
Td_oc	OCP propagation delay			50		ns
Vth_scp	Short Current protection threshold voltage		0.6	0.7	0.8	V
Vth_fit	CS floating protection threshold voltage		0.9	1.0	1.1	V
EA Section						
Vref	EA reference		1.44	1.5	1.56	V
Kvdd/vref	VDD divider coefficient			12.5		
Frequency Section						
Freq_Max	IC Maximum frequency		36	40	44	KHz
Δf/Freq	Frequency shuffling range			+/-8		%
F_shuffling	Shuffling frequency			78		Hz
Dmax	Maximum Duty Cycle		47	50	53	%
F_Burst	Burst Mode Switch Frequency			20		KHz
Protection Section						
Td_olp	Over Loading Debounce Time			130		ms
OTP	Power MOSFET temperature for over temperature protection			160		°C

Power MOSFET Section						
Parameter	BV _{dss} (V) MOSFET Drain-Source Breakdown Voltage			R _{ds,on} (Ω) On resistance		
	Min	Typ.	Max	Min	Typ.	Max
Product						
OB2228Gx	600				15	
OB2228GR	650				3.3	

CHARACTERIZATION PLOTS



OPERATION DESCRIPTION

OB2228Gx is a cost effective PWM power switch optimized for off-line non-isolated buck or buck-boost applications for small home appliances and linear regulator replacement. It operates in current mode and regulates output voltage with dedicated features. High integration can afford low cost and component count solution.

Startup Current and Start up Control

Startup current of OB2228Gx is designed to be very low so that VDD could be charged up above UVLO threshold and starts up quickly. A large value startup resistor can therefore be used to minimize the power loss in application.

Operating Current

The Operating current of OB2228Gx is as low as 1.0mA (typical). Good efficiency is achieved with the low operation current together with 'Multi-mode' control features.

PWM operation

The maximum switching frequency of OB2228Gx is internally fixed at 40KHz (typical). No external frequency setting components are required for PCB design simplification.

At light load or zero load condition, most of the power dissipation in a switching mode power supply is from switching loss on the MOSFET. The magnitude of power loss is in proportion to the switching frequency. Lower switching frequency leads to the reduction on the power loss and thus conserves the energy. The frequency reduction and burst mode operation are implemented to achieve high efficiency at light load. The minimum switching frequency is 20KHz (typical).

Frequency shuffling for EMI improvement

The frequency shuffling (switching frequency modulation) is implemented in OB2228Gx. The oscillation frequency is modulated so that the tone energy is spread out. The spread spectrum minimizes the conduction band EMI and therefore eases the system design.

Soft Start

OB2228Gx features an internal 36 cycles (typical) soft start to soften the electrical stress occurring in the power supply during startup. It is activated during the power on sequence. After VDD reaches UVLO(OFF), the switching frequency is gradually increased from 10KHz to 40KHz. Every restart up is followed by a soft start.

Current Sensing and Leading Edge Blanking

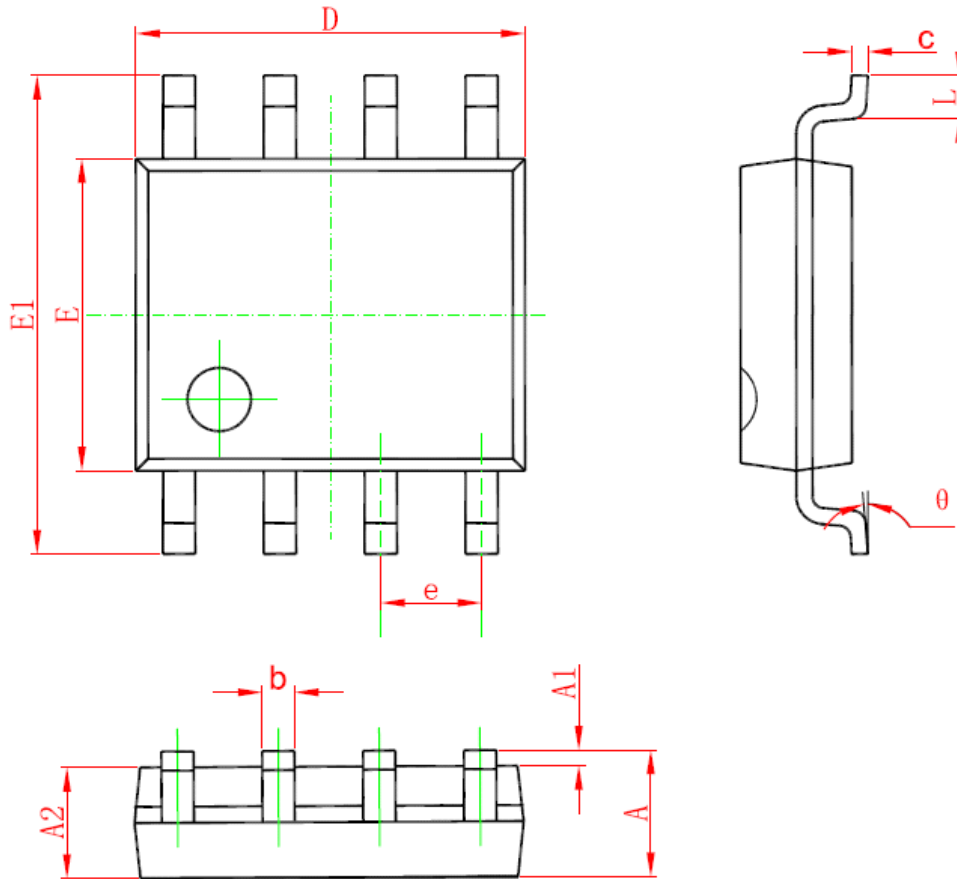
Cycle-by-Cycle current limiting is offered in OB2228Gx current mode PWM control. The switch current is detected by a sense resistor into the CS pin. An internal leading edge blanking circuit chops off the sensed voltage spike at initial internal MOSFET on state so that the external RC filtering on sense input is no longer needed. The PWM duty cycle is determined by the current sense input voltage and the EA output voltage.

Protection Control

Good power supply system reliability is achieved with its rich protection features including cycle-by-cycle current limiting, Output short circuit protection, on-chip Over Temperature Protection (OTP), VDD Over Voltage Protection (OVP), Over Loading Protection(OLP) and VDD Under Voltage Lockout Protection (UVLO).

PACKAGE MECHANICAL DATA

SOP8 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Min
A	1.350	1.750	0.053	0.069
A1	0.050	0.250	0.002	0.010
A2	1.250	1.650	0.049	0.065
b	0.310	0.510	0.012	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.150	0.185	0.203
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.05 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

IMPORTANT NOTICE

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