

Current Mode PWM Controller

Description

SKI2263 is a high-precision PWM control integrated circuit, mainly used in low-power AC/DC chargers and power adapters. The operating frequency of SKI2263 is adjustable and variable according to load conditions. Under light-load or no-load conditions, the chip enters burst-mode operation to reduce switching losses, resulting in low standby power consumption and high conversion efficiency. The low start-up and operating currents at the VDD pin offer great flexibility in start-up circuit design. A high-value start-up resistor can be used to effectively reduce system standby power consumption. The built-in slope compensation module improves system stability under large-signal conditions and suppresses subharmonic oscillation at high PWM duty cycles. The integrated leading-edge blanking (LEB) at the CS pin effectively eliminates timing faults caused by reverse recovery signals of snubber diodes, greatly reducing the number of external diodes and saving cost.

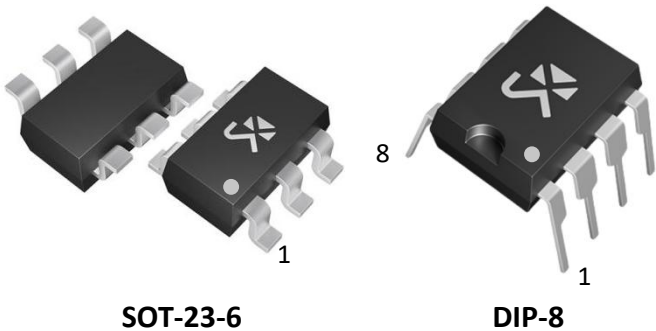
SKI2263 also provides multiple effective protection features, including over-current protection (OCP), over-load protection (OLP), VDD over-voltage clamping, and under-voltage lockout (UVLO). The maximum clamp voltage at the GATE output is 18V, which reliably protects the external MOSFET from over-voltage damage. In addition, the chip features excellent frequency jittering and soft-start functions to ensure good EMI performance during normal operation.

SKI2263 is available in SOT-23-6 and DIP8 packages.

Features

- Low standby power consumption
- Noise-free operation
- Low start-up current(typ:3μA)
- Low operating current(typ:1.4mA)
- External programmable PWM switching frequency
- Built-on leading-edge blanking
- Comprehensive protection: OCP, OLP, UVLO, etc.
- Soft gate drive for MOSFET
- Few external components, reduced BOM cost
- Excellent EMI performance (frequency jittering)

Package Outline Drawing



Typical Application

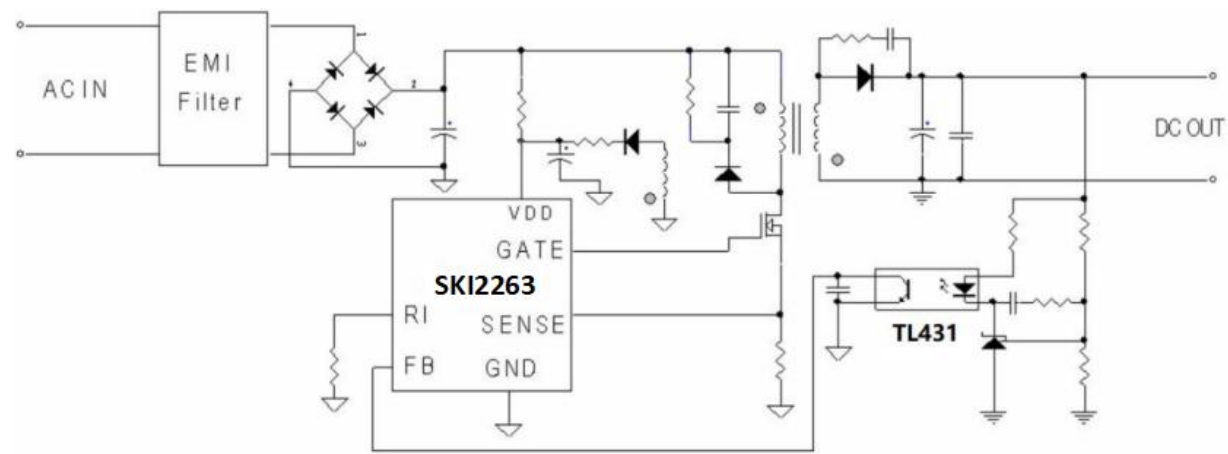
- Battery chargers
- Low-power power adapters
- Set-top box power supplies

Ordering Information

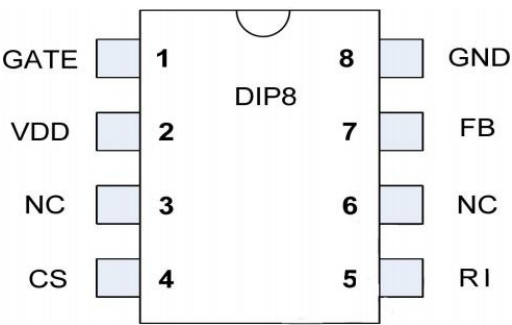
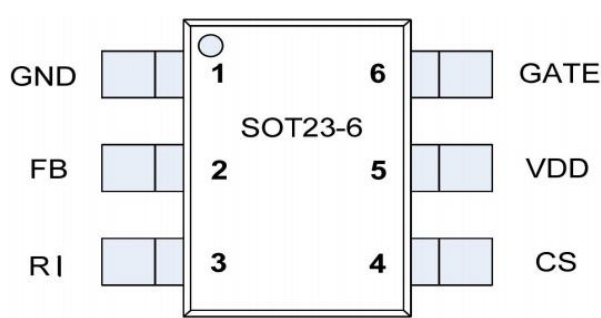
Type	Marking	Package
SKI2263-DM	2263	SOT-23-6
SKI2263-D8	2263	DIP-8



Typical Applications



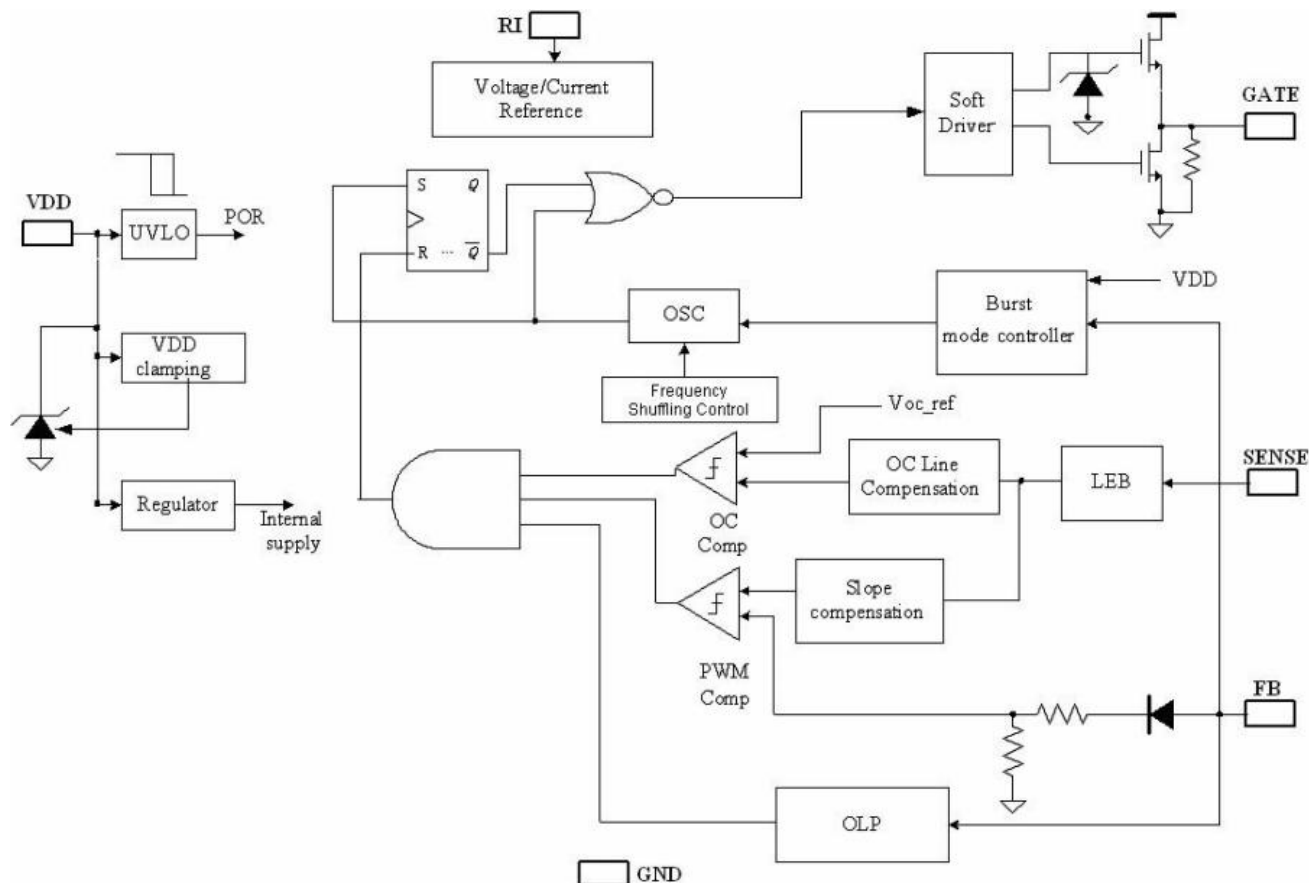
Pin Configuration



Pin Number		Pin Name	I/O	Description
SOT-23-6	DIP-8			
1	8	GND	P	Ground
2	7	FB	I	Feedback input, PWM duty cycle determined by FB and CS
3	5	RI	I	Internal oscillator frequency setting, resistor from RI to GND sets PWM frequency
4	4	CS	I	Current sense input
5	2	VDD	P	Power Supply
6	1	GATE	O	Gate drive output to MOSFET
-	3	NC	-	No connection
-	6	NC	-	No connection



Function Block Diagram



Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
DC Supply Voltage at VDD	VDD	30	V
VDD Clamp Voltage	VDD_Clamp	33	V
Continuous Clamp Current at VDD	I _{VDD_Clamp}	10	mA
Input Voltage at FB	V _{FB}	-0.3~7	V
Input Voltage at SENSE	V _{CS}	-0.3~7	V
Input Voltage at RI	V _{RI}	-0.3~7	V
Junction Temperature	T _J	150	°C
Operating Ambient Temperature	T _A	-20~+85	°C
Storage Temperature	T _S	-55~+150	°C
Lead Temperature(soldering 10s)	T _W	260	°C

Note: Exceeding the above limit values may cause permanent damage to the chip.



Recommended Operating Conditions($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Min	Max	Unit
Supply Voltage	VDD	10	30	V
Frequency Setting Resistor at RI	RI	50	150	K Ω

Electrical Characteristics($T_A=25^{\circ}\text{C}$, $V_{DD}=16\text{V}$, $R_I=100\text{K}\Omega$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
VDD Section						
VDD start-up current	I_{ST}	$V_{DD}=15\text{V}$		3	20	μA
VDD operating current	I_{OP}	$V_{FB}=3\text{V}$		1.2	2	mA
UVLO threshold(turn-off)	UVLO(Enter)	VDD falling	7.8	9.6	10.4	V
UVLO threshold(turn-on)	UVLO(Exit)	VDD rising	13	15.2	16.5	V
VDD clamp voltage	VDD_Clamp	IDD=5mA		33		V
FB Section						
FB open-circuit voltage	V_{FB_Open}			5.1		V
PWM voltage gain	A_{VCS}	$\Delta V_{FB}/\Delta V_{CS}$		2.8		V/V
FB short-circuit current	I_{FB_Short}	FB=GND		0.95		mA
FB threshold at zero duty cycle	V_{TH_0D}				0.75	V
FB threshold in burst mode	V_{TH_BM}			1.7		V
FB threshold at overload	V_{TH_PL}			3.8		V
Response time at overload	T_{D_PL}			60		ms
SENSE Section						
Input impedance at SENSE	Z_{SENSE_IN}			40		K Ω
Leading-edge blanking time	$T_{Blanking}$			300		ns
Current limit threshold (uncompensated)	V_{TH_OC}	$I_{VIN}=0\mu\text{A}$	0.70	0.75	0.80	V

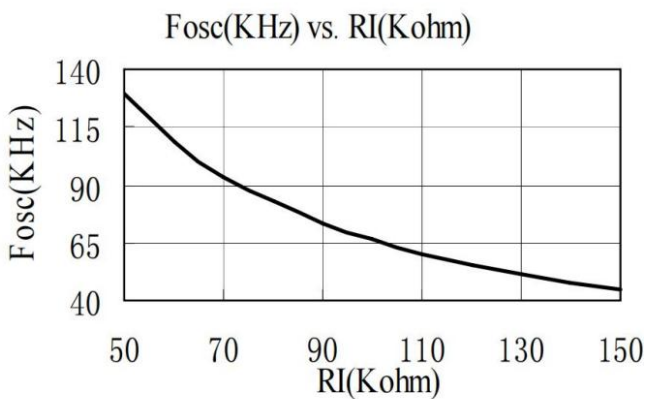
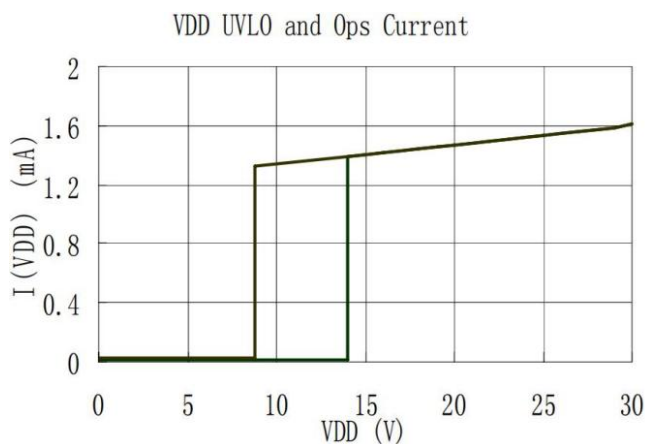
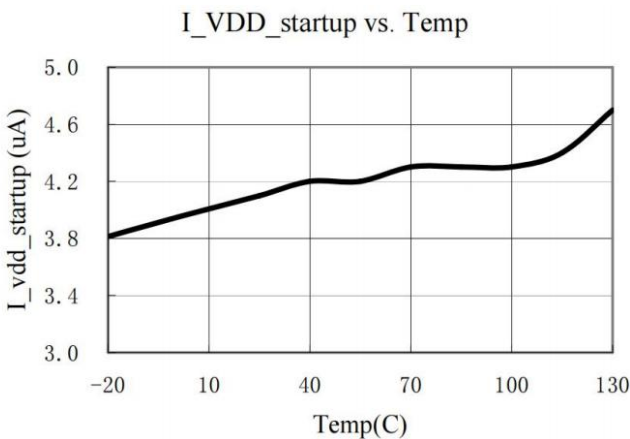
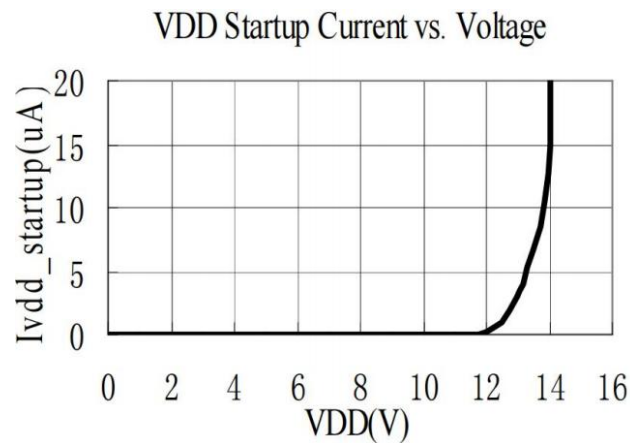


SKI2263

OCP control delay	T_{D_OC}	$CL=1nf$		75		ns
OSC and RI Section						
Normal operating frequency	F_{OSC}		60	65	70	KHz
Frequency temperature stability	Δf_Temp	-20~100°C		5		%
Frequency supply voltage stability	Δf_VDD	VDD=12~25V		5		%
RI frequency setting range	RI_Range		50	100	150	KΩ
RI open-circuit voltage	RI_Open			2		V
Operating frequency in burst mode	F_{BM}			22		kHZ
Maximum duty cycle	DC_Max		75	80	85	%
Minimum duty cycle	DC_Min			0		%
GATE Section						
Output low level	VOL	$I_o=-20mA$		0.8		V
Output high level	VOH	$I_o=20mA$	10			V
Output clamp voltage	VG_Clamp	VDD=20V		18		V
Output rise time	T_r	$CL=1nf$		220		ns
Output fall time	T_f	$CL=1nf$		70		ns
Frequency Jitter						
Frequency modulation range	Δf_OSC	RI=100KΩ	-3		3	%



Typical Characteristics

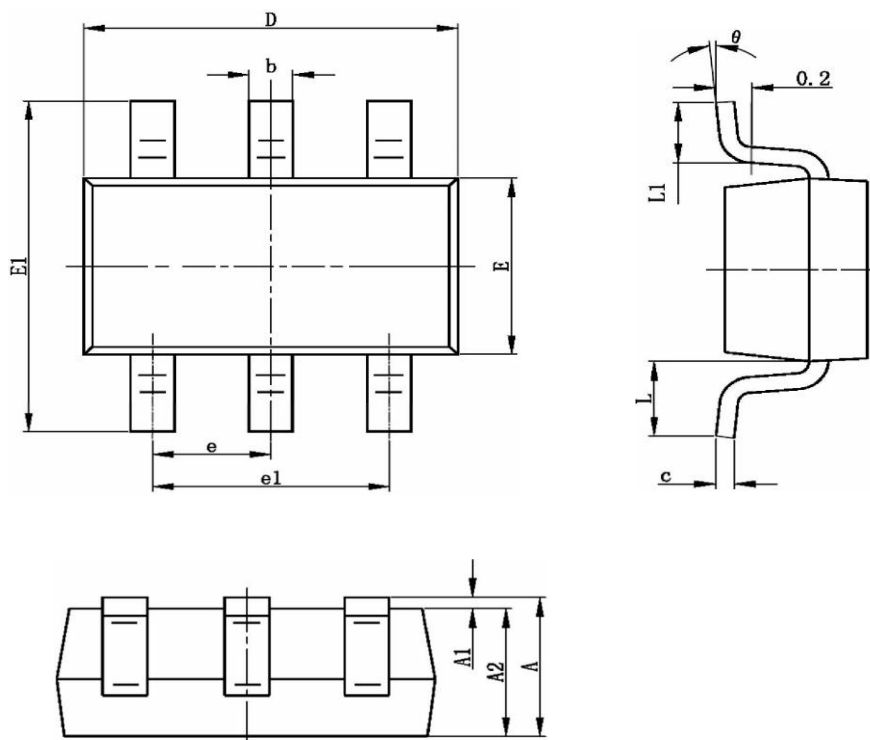




Package Information

SOP-8

Dimensions in mm

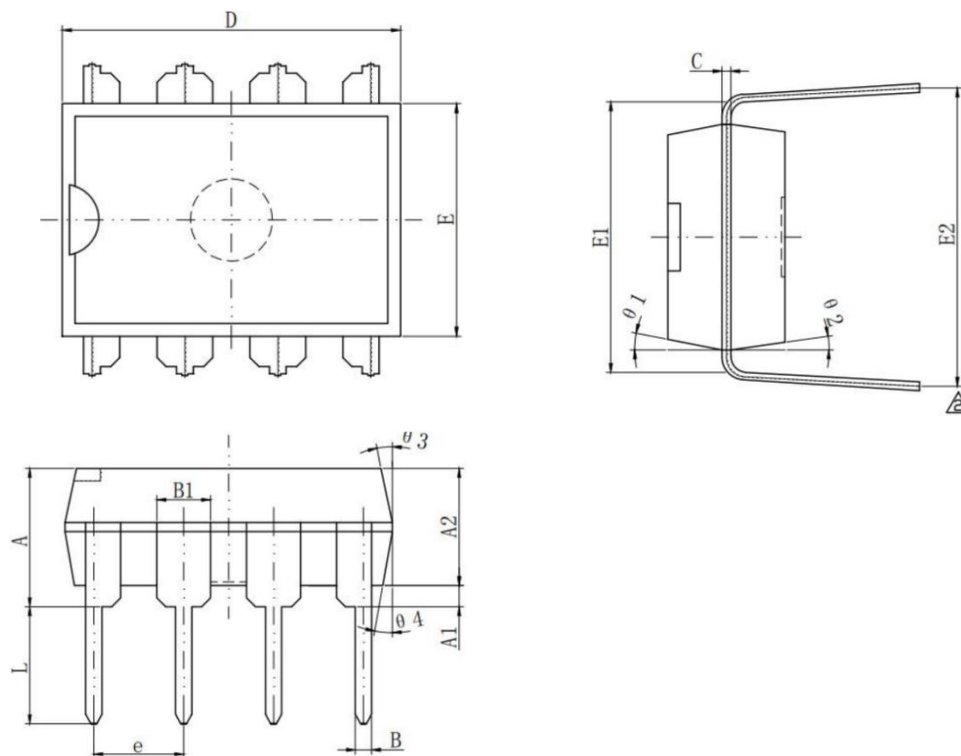


Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	Min	Nom	Max		Min	Nom	Max
A	1.050	-	1.250	E1	2.650	-	2.950
A1	0.000	-	0.001	e	0.950 TYP		
A2	1.050	-	1.150	e1	1.800	-	2.000
b	0.300	-	0.400	L	0.700 REF		
c	0.100	-	0.200	L1	0.300	-	0.600
D	2.820	-	3.020	θ	0°	-	8°
E	1.500	-	1.700				

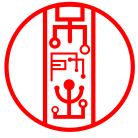


DIP-8

Dimensions in mm



Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	Min	Nom	Max		Min	Nom	Max
A	3.75	3.90	4.15	E1	7.35	7.62	7.85
A1	0.60	-	-	E2	8.00	8.40	8.80
A2	3.15	3.30	3.40	e	2.54 BSC		
B	0.38	0.46	0.56	L	3.00	3.30	3.60
B1	1.52 BSC			θ1	10°	-	14°
C	0.20	0.25	0.34	θ2	8°	-	12°
D	9.00	9.25	9.40	θ3	10°	-	14°
E	6.20	6.35	6.50	θ4	8°	-	12°



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