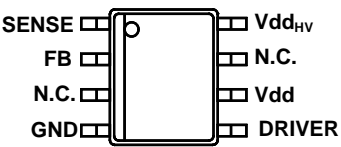
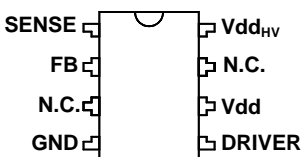


High Voltage Switching Regulator Isolation Controller

SMD912

FEATURES	DESCRIPTION
<ul style="list-style-type: none"> ■ Operate from a rectified 85~265 VAC line source. ■ Typical oscillation frequency: 90 kHz ■ Output voltage external setting (FB) type available. ■ FB terminal voltage (VFB) 1.0 V. ■ Duty ratio: 0% to 5% typ.- PFM control, 5% to 85% typ. - PWM control ■ Built-in current limiting circuit: Assigned by external resistor. ■ Over voltage protection ■ Under voltage protection ■ Soft-start function: Built-in Soft-start circuit. ■ Built-in current source. 	<p>The SMD912 is a monolithic high voltage switching regulator-controller with PWM/PFM control that is specifically designed to operate from a rectified 85~265 VAC line source.</p> <p>This device contains a reference voltage source, oscillation circuit, error amplifier, phase compensation circuit, PWM control circuit, power supply 450 V MOS-transistor, and other components. Since the oscillation frequency is at high 90 kHz, with the addition of a small external component, the IC can function as switching regulator with high efficiency.</p> <p>The SMD912 provides low-ripple power, high-efficiency, and excellent transient characteristics because of the PWM control circuit being capable of varying the duty ratio from 0% to 85% linearly and the optimized error amplifier with the phase compensation circuit.</p> <p>The SMD912 contains PWM/PFM switching control circuit such that it operates in PWM mode at 5% or higher duty ratio and in PFM mode below 5% duty ratio to ensure high efficiency in all load ranges.</p>

APPLICATIONS	
<ul style="list-style-type: none"> ■ LED Drivers ■ Back Lighting ■ Energy Saving Illumination ■ Charger and Adaptor 	

PACKAGE/ORDER INFORMATION	
 <p style="text-align: center;">8-Pin Plastic S.O.I.C. (Top View)</p>	<p>Order Part Number</p> <p>SMD912MST</p>
 <p style="text-align: center;">8-Pin Plastic DIP (Top View)</p>	<p>SMD912M</p>



ABSOLUTE MAXIMUM RATINGS (Note 1)

Item	Symbol	Ratings	Units
Vdd pin voltage	Vdd	-0.3 to 16	V
Vdd _{HV} pin voltage	Vdd _{HV}	-0.3 to 450	V
DRIVER pin voltage	V _{DRIVER}	-0.3 to Vdd + 0.3	V
DRIVER pin current	I _{DRIVER}	250	mA
FB pin voltage	V _{FB}	-0.3 to Vdd + 0.3	V
SENSE pin voltage	V _{SENSE}	-0.3 to Vdd + 0.3	V
Operational ambient temperature	T _A	-25 to +85	°C
Operational junction temperature	T _J	140	°C
Storage Temperature Range	T _{STG}	-65 to 150	°C

Note 1: Exceeding these ratings could cause damage to the device. All voltages are with respect to ground. Currents are positive into, negative out of the specified terminal.

POWER DISSIPATION TABLE

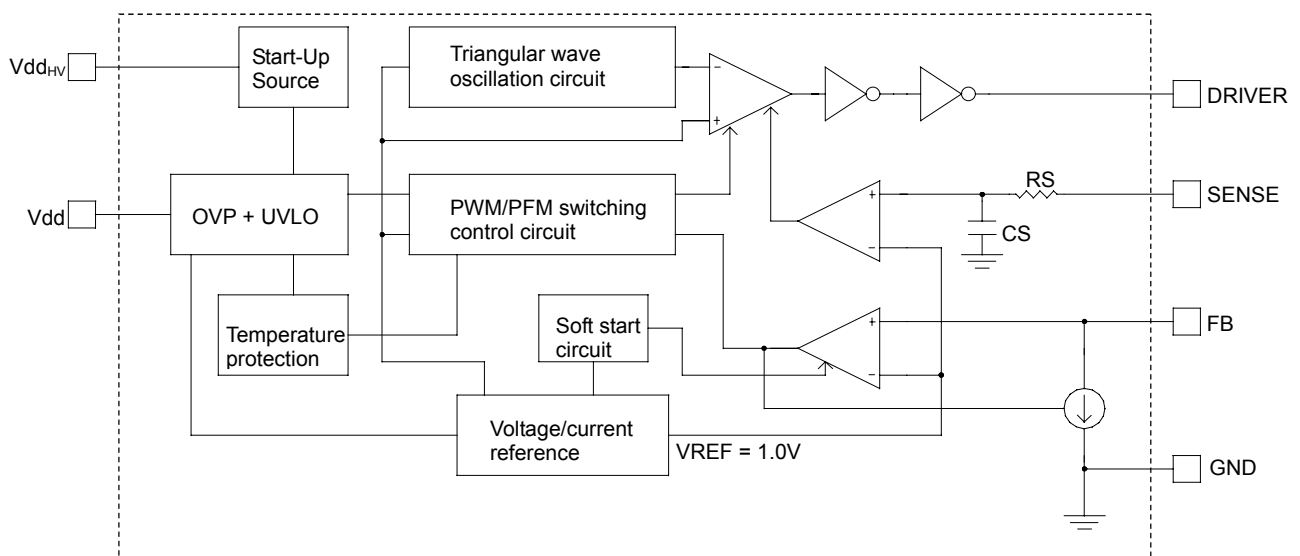
DIP 8 PACKAGE

Power dissipation (P _D), T _A = 25 °C	1.1W
Thermal Resistance-Junction to Ambient, θ _{JA}	95°C /W

SO 8 PACKAGE

Power dissipation (P _D), T _A = 25 °C	670mW
Thermal Resistance-Junction to Ambient, θ _{JA}	165°C /W

BLOCK DIAGRAM



TYPICAL APPLICATIONS

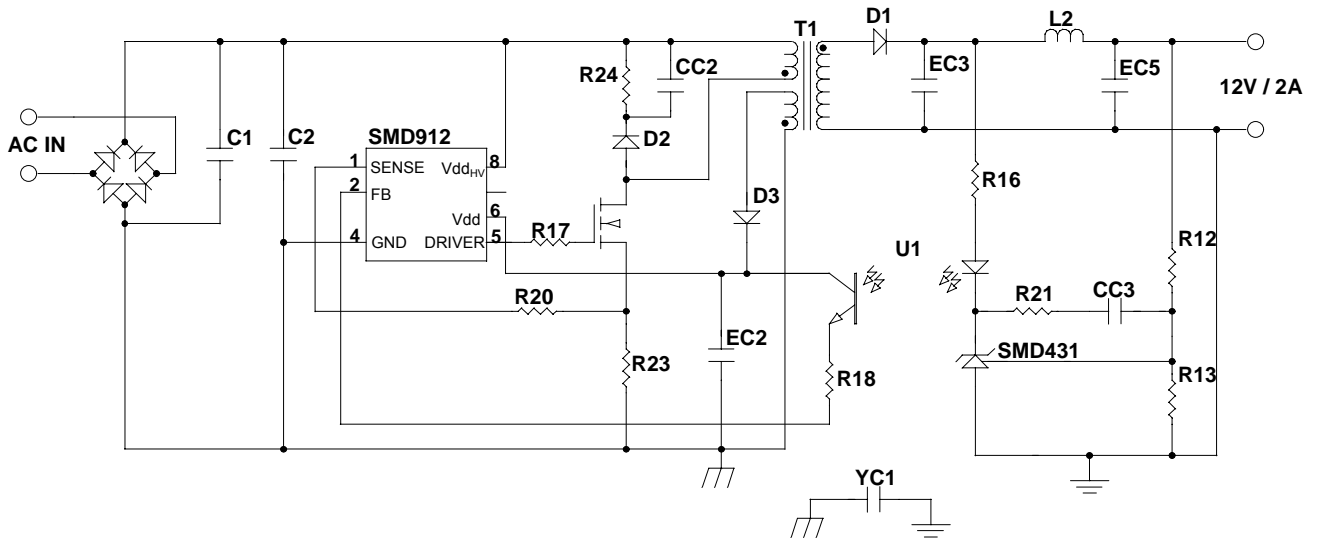


Fig. 1. 85 ~ 265V_{AC} input, 12V/2A Flyback Converter

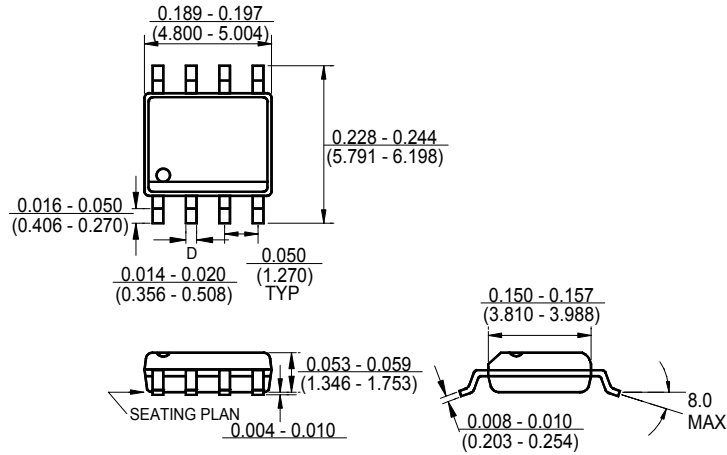
ELECTRICAL CHARACTERISTICS

Unless otherwise specified, $T_A = -25^{\circ}\text{C} \sim 85^{\circ}\text{C}$; $V_{dd} = 12\text{V}$.

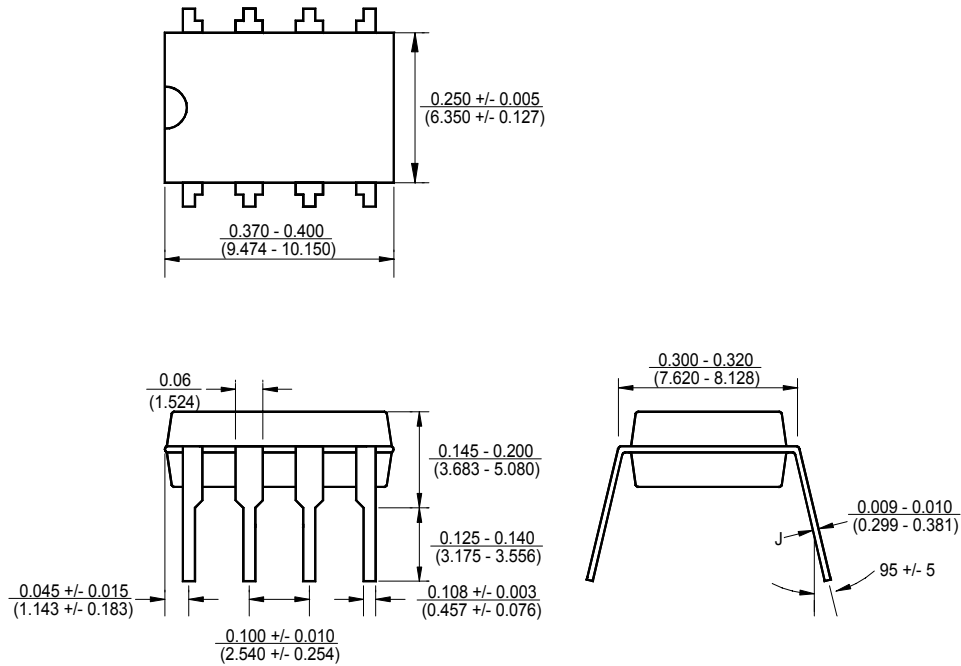
Parameter	Test Conditions	Symbol	Min	Typ	Max	Units
Output resistance at low level output voltage	$I_{OL} = 20\text{mA}$	R_{OL}	4.4	6.5	16	Ω
Output resistance at high level output voltage	$I_{OH} = -20\text{mA}$	R_{OH}	13	16	30	Ω
Minimum start voltage at $V_{dd_{HV}}$ pin		V_{HVmin}	---	22	30	V
Start current	$V_{dd}=11\text{V}$, $V_{dd_{HV}}=100\text{V}$	$I_{CC-stup}$	2.5	4.5	5.5	mA
Leakage current	$V_{dd}=15\text{V}$, $V_{dd_{HV}}=500\text{V}$	I_{CC-hv}	---	---	100	μA
Current consumption without load		I_{CC1}	0.4	0.67	1.0	mA
Current consumption with load	1nF Output Load on Pin 5	I_{CC2}	1.2	1.72	2.2	mA
Current consumption in static mode	$V_{dd}=15\text{V}$	$I_{CC-latch}$	0.3	0.61	1.0	mA
Operating frequency		f_{OSC}	80	90	100	kHz
Maximum duty ratio	$I_{FB}=1\mu\text{A}$	d_{max}	77	81	89	%
PWM/PFM switch duty ratio		d_{min}		5.0		%
Duty ratio	$I_{FB}=0.1\text{mA}$	$d_{01\text{mA}}$		32		%
Maximum control current at FB pin	Duty Cycle = 0 %	I_{FBmax}		140	200	μA
Shut down supply voltage		V_{uvlo1}	7.0	7.5	8.0	V
Restart cycle voltage		V_{uvlo2}	5.6	6.1	6.5	V
Start voltage at V_{dd} pin		V_{stup}	12.2	13.0	13.4	V
Over voltage protection threshold		V_{CC-OVP}	14.4	15.4	16	V
FB pin voltage	Switching Phase, $I_{FB}=0.1\text{mA}$ (25°C)	V_{FB}	0.98	1	1.02	V
FB pin voltage	Switching Phase, $I_{FB}=0.1\text{mA}$	V_{FB}	0.96		1.04	V
Load regulation	$I_{FB}=0.02\text{mA} \sim 0.25\text{mA}$	ΔV_{FB1}		25	40	mV
Line regulation	$V_{dd}=11\text{V} \sim 14\text{V}$	ΔV_{FB2}		0.4	40	mV
Input bias current	Through Pin 1	I_{B-CS}	-4.0	0	4.0	μA
Threshold at current detector input		V_{CS-th}	0.9	0.98	1.05	V
Output voltage fall time	$C_{DRIVER}=1\text{nF}$, from 90% down to 10% of Output Signal	t_f		---	250	ns
Output voltage rise time	$C_{DRIVER}=1\text{nF}$, from 10% up to 90% of Output Signal	t_r		---	250	ns
Soft-start time	From appearance pulses at DRIVER pin to increase Duty Cycle more 50%	t_{SS}	4	9	15	ms
Thermal Shutdown		T_{OTP}		150		$^{\circ}\text{C}$

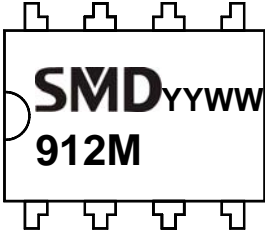
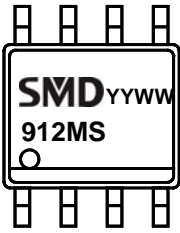
PACKAGE DESCRIPTION Dimensions in inches (millimeters) unless otherwise specified

S08



DIP 8



MARKING DIAGRAM	
DIP 8	SO 8
 <p>The diagram shows a rectangular DIP 8 package with eight pins. The marking on the top surface is "SMD_{YYWW}" followed by "912M" on the line below. A small circle is located to the left of the "SMD" text.</p>	 <p>The diagram shows a rectangular SO 8 package with eight pins. The marking on the top surface is "SMD_{YYWW}" followed by "912MS" on the line below. A small circle is located to the left of the "SMD" text.</p>
YY = Year, WW = Working Week	

IMPORTANT NOTICE

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