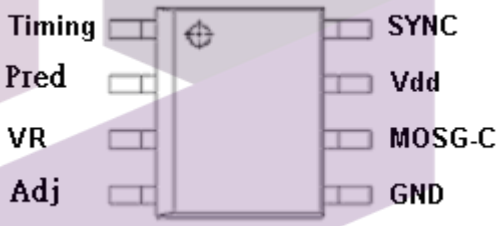
SP6019
Synchronous Rectifier Driver

DESCRIPTION
The fundamental of SP6019 synchronous rectifier (SR) driver IC is based on our U.S. patented methods that utilize the principle of "prediction" logic circuit. The IC deliberates previous cycle timing to control the SR in present cycle by "predictive" algorithm that makes adjustments to the turn-off time, in order to achieve maximum efficiency and avoid cross-conduction at the same time. Specially, SP6019 is designed for Forward .

APPLICATIONS
- Servers & workstations
- Storage area network power supplies
- Telecommunication converters
- Embedded systems
- Industrial & commercial systems using high current processors

FEATURES
- Offers efficiency improvement over Schottky Diode (depends on drive configuration of the SR).
- Drives all Power MOSFET.
- Prediction gate timing control.
- Minimum MOSFET body diode conduction.
- Operating frequency up to 400 KHz.
- Synchronize to transformer secondary voltage waveform.

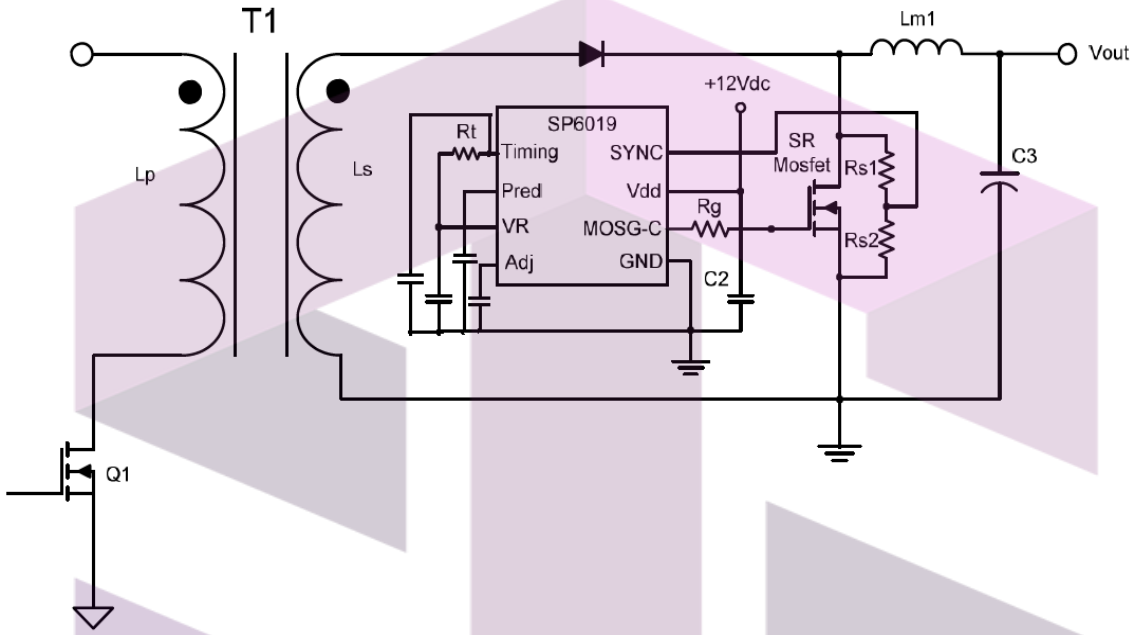
PIN CONFIGURATION (SOP-8)



PART MARKING

A : Lot Code
B : Date Code

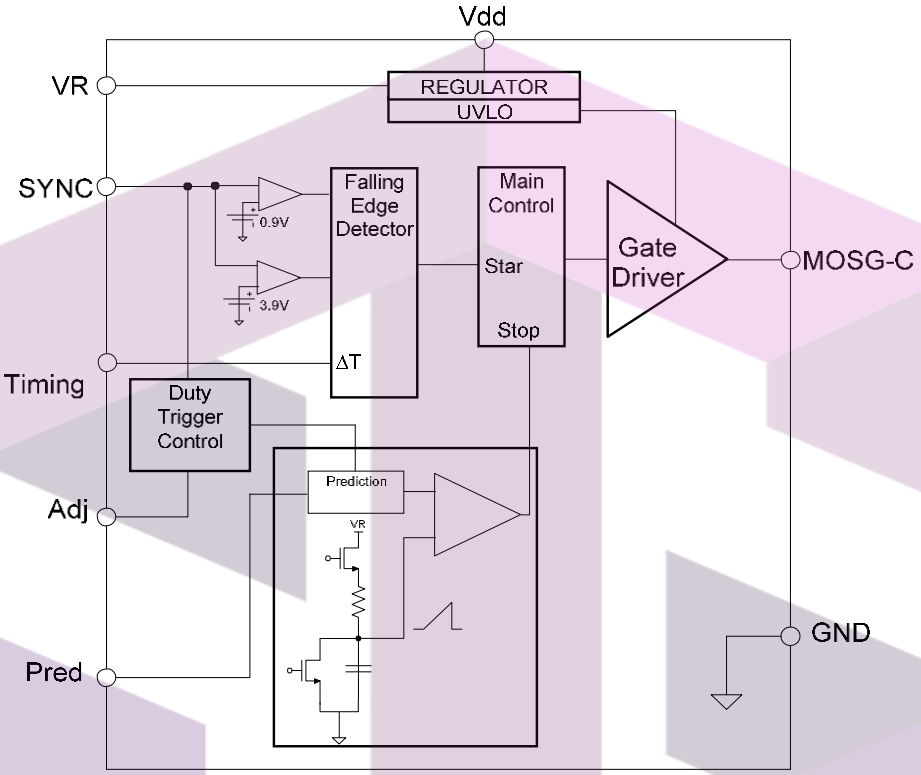
TYPICAL APPLCATION CIRCUIT



PIN DESCRIPTION

Pin	Symbol	Description
1	Timing	Discontinuous current filter timing adjustment resistor connection.
2	Pred	Capacitor to store previous cycle timing for SR MOSFET.
3	VR	Voltage Regulator.
4	Adj	Trigger point adjustment for Dynamic state.
5	GND	Ground connection.
6	MOSG-C	Catch MOSFET gate drive.
7	Vdd	DC supply voltage.
8	SYNC	Synchronized signal from the V_{DS} of SR MOSFET.

BLOCK DIAGRAM



ORDERING INFORMATION

Part Number	Package	Part Marking
SP6019S8RGB	SOP-8	SP6019**I**
SP6019S8TGB	SOP-8	SP6019**I**

※ SP6019S8RGB : Tape Reel ; Pb – Free ; Halgon – Free

※ SP6019S8TGB : Tube ; Pb – Free ; Halgon – Free

ABSOULTE MAXIMUM RATINGS (TA=25℃, unless otherwise specified.)

The following ratings designate persistent limits beyond which damage to the device may occur.

Symbol	Parameter	Value	Unit
V_{dd}	DC Supply Voltage	16	V
V_{MOS-G}	Output Voltage	16	V
V_R	Voltage Regulator	-0.3~8	V
$V_{Timing/pred/Adj/sync}$	Timing/Pred/Adj/Sync Voltage	-0.3~6	V
I_{OUT}	Peak Source Current (Pulsed)	2	A
	Peak Sink Current (Pulsed)	2	A
P_D	Power Dissipation @ T_A=85℃ (*)	0.25	W
T_J	Operating Junction Temperature Range	-40 to125	℃
T_{STG}	Storage Temperature Range	-40 to 150	℃
T_{LEAD}	Lead Soldering Temperature for 5 sec.	260	℃

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance Junction – Case (*)	150	℃/W

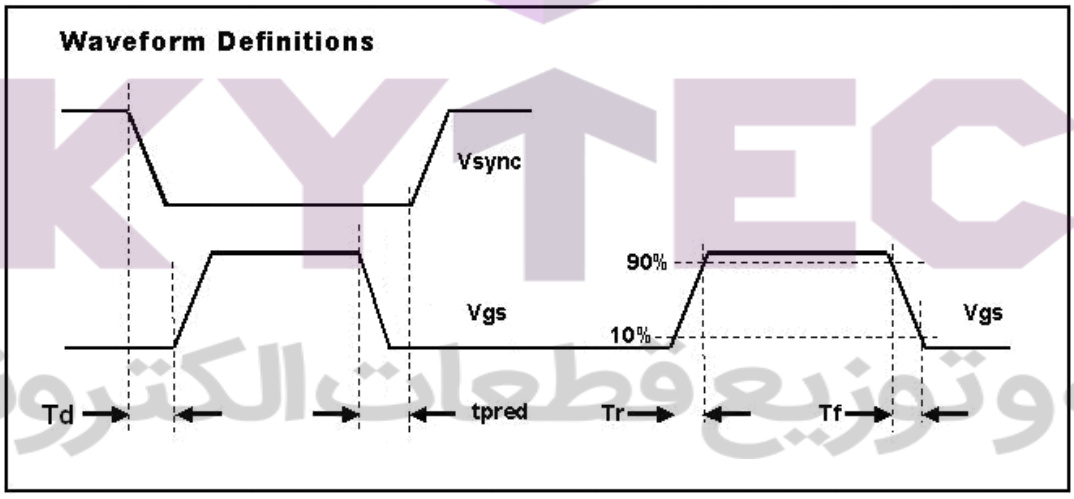
(*) The power dissipation and thermal resistance are evaluated under copper board mounted with free air conditions.

ELECTRICAL CHARACTERISTICS

(T_A=25℃, V_{dd}=12V, Freq. =300 KHz, Duty Cycle=50%, unless otherwise specified.)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
SUPPLY INPUT						
Idd	Supply current	No load		4	7	mA
		V_{SYNC}=0V, No load		5	8	mA
Vdd	Supply voltage	Idd_{peak} < 2A			16	V
Vdd on	Enable voltage		9.4	10.0	10.5	V
SYNC REFERENCE (SYNC)						
Vshth	SYNC high threshold			3.9		V
Vslth	SYNC low threshold			0.9		V
Vsync	SYNC clamp voltage	Isync=3mA		5		V
Isync	SYNC input current				3	mA
Voltage Regulator REFERENCE (VR)						
I_{VR}	VR Output Current				20	mA
ON TIME DUTY SETUP (PIN 6)						
$T_{on\text{-}time}$				20		us
MOSFET GATE DRIVER (MOSG-C)						
Voh	Output high voltage	Io = -200mA	10.5	11		V
Vol	Output low voltage	Io = 200mA		0.5	0.8	V
Td	Propagation delay	No load	50	80		ns
Tpred		No load		120		ns
Tr	Rise time	No load		10	25	ns
Tf	Fall time	No load		10	25	ns
Dynamic Protect						
Dt	Dynamic variable	Pin 4 open		600		ns
Ton-min	MOSG-C on time	PWM adjusts time > Dt		1		us

(*) Tr & Tf are measured among 10% and 90% of starting and final voltage.



PERFORMANCE CHARACTERISTICS (T_A=25℃, unless otherwise specified.)

Figure 1 : Supply Current vs Supply Voltage

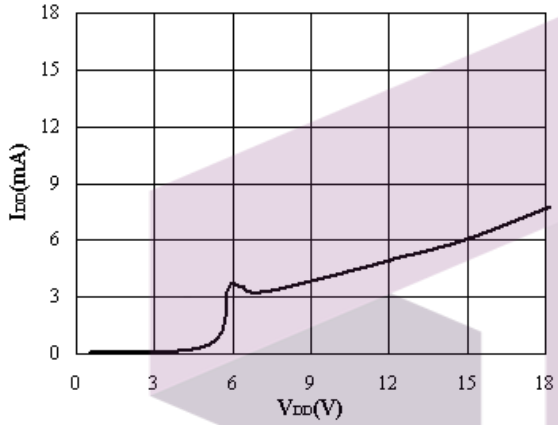


Figure 2 : Supply Current vs Freq. @ No Load

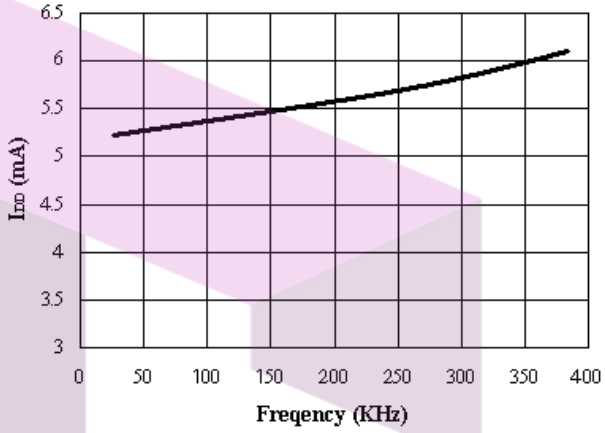
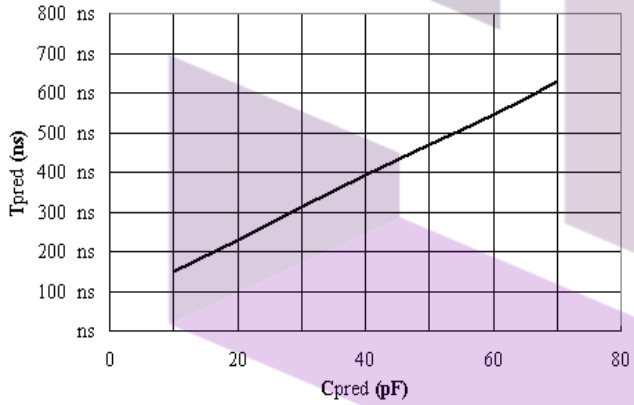
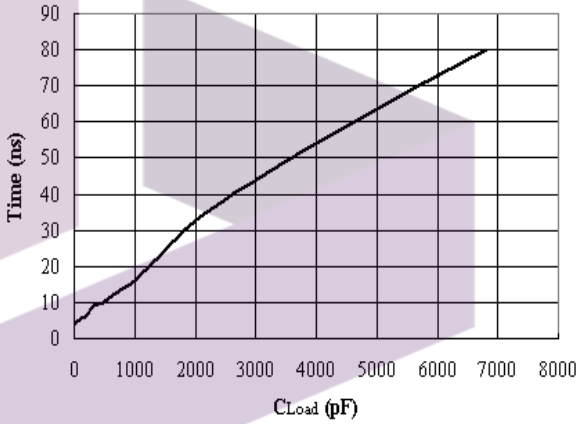


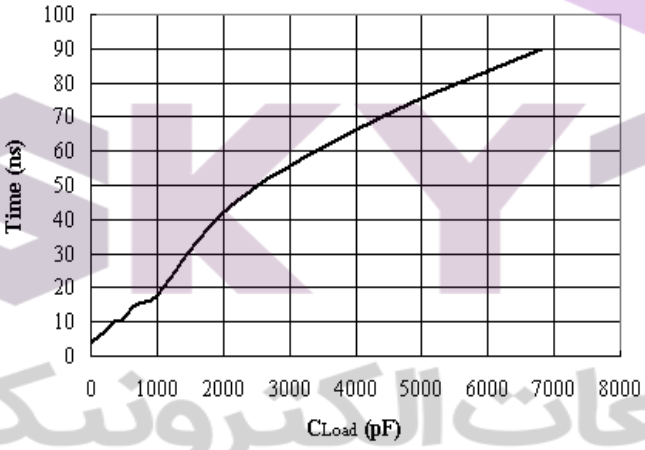
Figure 3 : Tpred vs Cpred @ Freq =100 KHz ; V_{DD} =10V



Fihure 4 : Output Rise Time vs Load Capacitor



Fihure 5 : Output Fall Time vs Load Capacitor



Fihure 6 : Dynamic time vs Load Capacitor

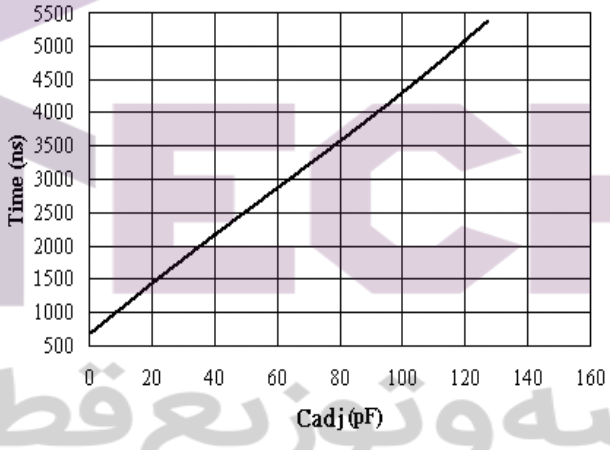
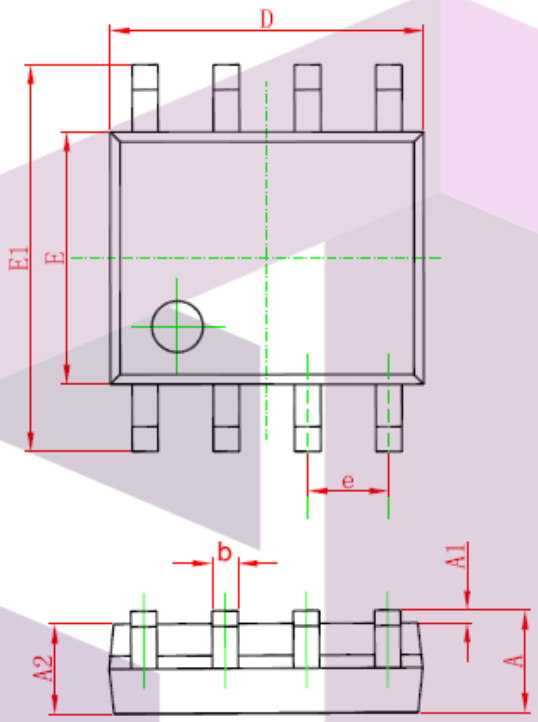


*Fig. 1 : No Load ; No SYNC
*Fig. 4~5 : Frequency = 100 kHz.

SOP- 8 PACKAGE OUTLINE



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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