SP6016E
Synchronous Rectifier Driver

DESCRIPTION

The fundamental of SP6016E 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, SP6016E is designed for Resonance. It also maintains the MOSFET's body diode conduction at minimum level. The SP6016E is capable to adapt in almost all existing Resonance converters with few adjustments considered necessary.

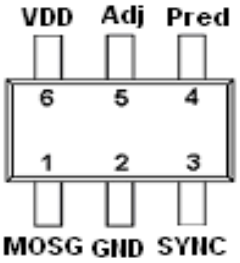
FEATURES

- Offers efficiency improvement over Schottky Diode (depends on drive configuration of the SR).
- Low Standby Power to meet DOE Lot 6 requirement.
- Drives all logic level Power MOSFET.
- Prediction gate timing control.
- Minimum MOSFET body diode conduction.
- Operating frequency up to 300 KHz.
- Synchronize to transformer secondary voltage waveform.
- Internal over voltage protection

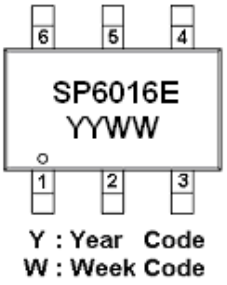
APPLICATIONS

- Switching Mode Power Supply (CCM&DCM&QR)
- Storage area network power supplies
- Telecommunication converters
- Embedded systems
- Industrial & commercial systems using high current processors
- Power converters to meet Lot 6 requirement

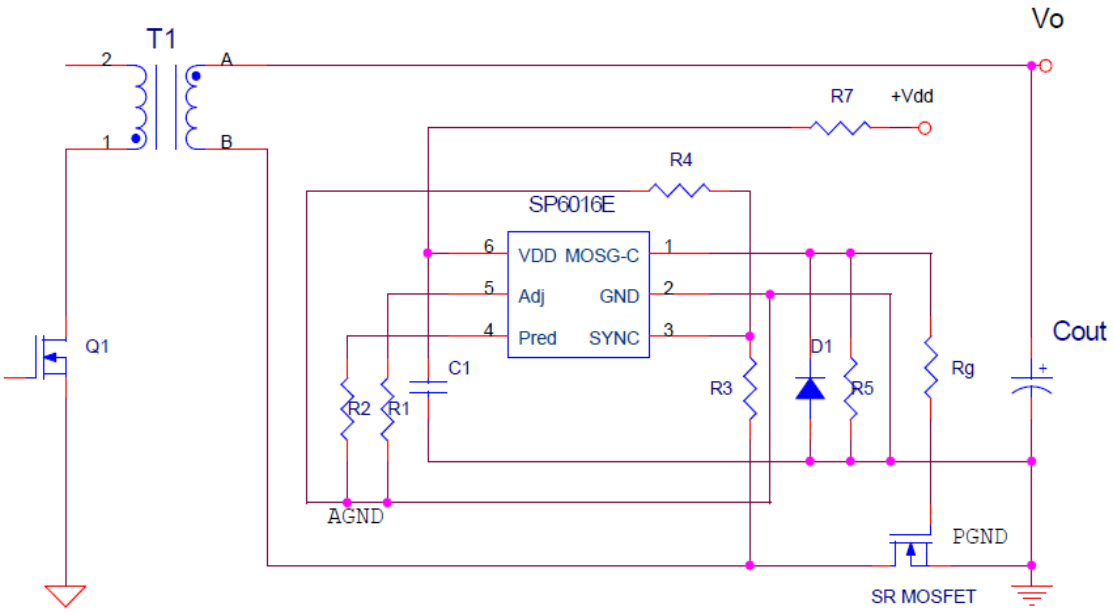
PIN CONFIGURATION (SOT-23-6L)



PART MARKING



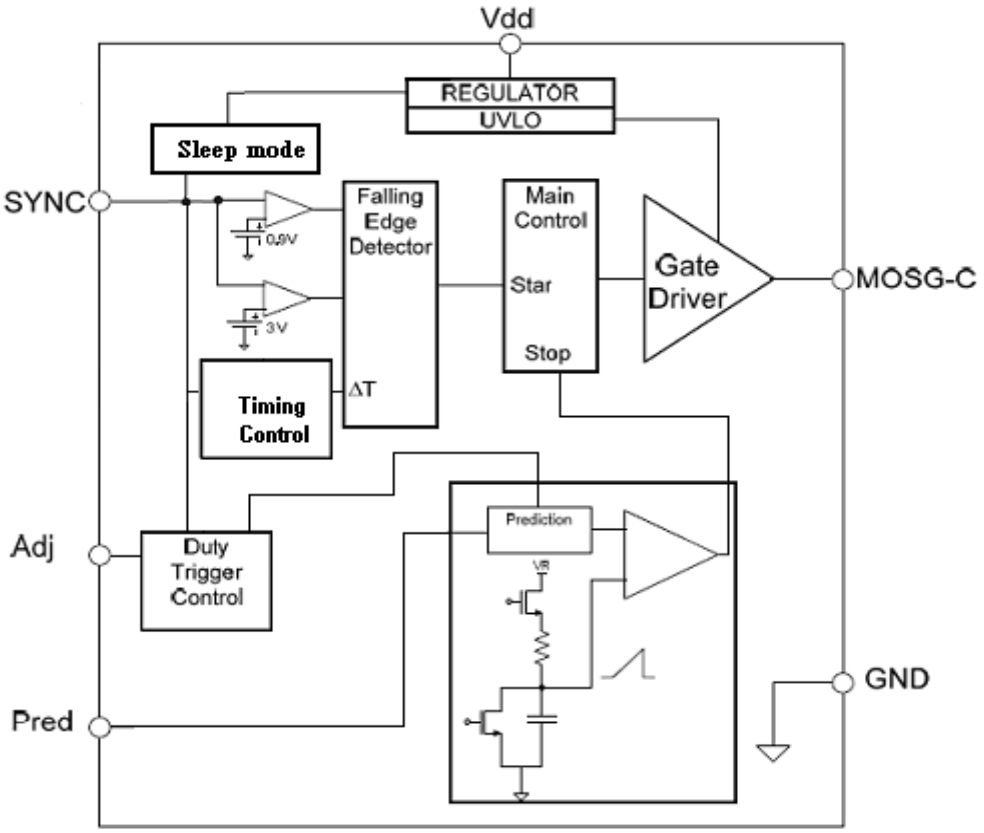
TYPICAL APPLCATION CIRCUIT



PIN DESCRIPTION

Pin	Symbol	Description
1	MOSG-C	Catch MOSFET gate drive.
2	GND	Ground connection.
3	SYNC	Synchronized signal from the VDS of SR MOSFET.
4	Pred	By connecting a resistor to ground to set the dead time.
5	Adj	Trigger point adjustment for Dynamic state.
6	Vdd	DC supply voltage.

BLOCK DIAGRAM



ORDERING INFORMATION

Part Number	Package	Part Marking
SP6016ES26RGB	SOT-23-6L	SP6016E

※ SP6016ES26RGB : 7" Tape Reel ; Pb – Free ; Halogen - 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
I_{OUT}	Peak Source Current (Pulsed)	1.0	A
	Peak Sink Current (Pulsed)	1.5	A
P_D	Power Dissipation @ T_A=85℃ (*)	0.3	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 (*)	110	℃/W

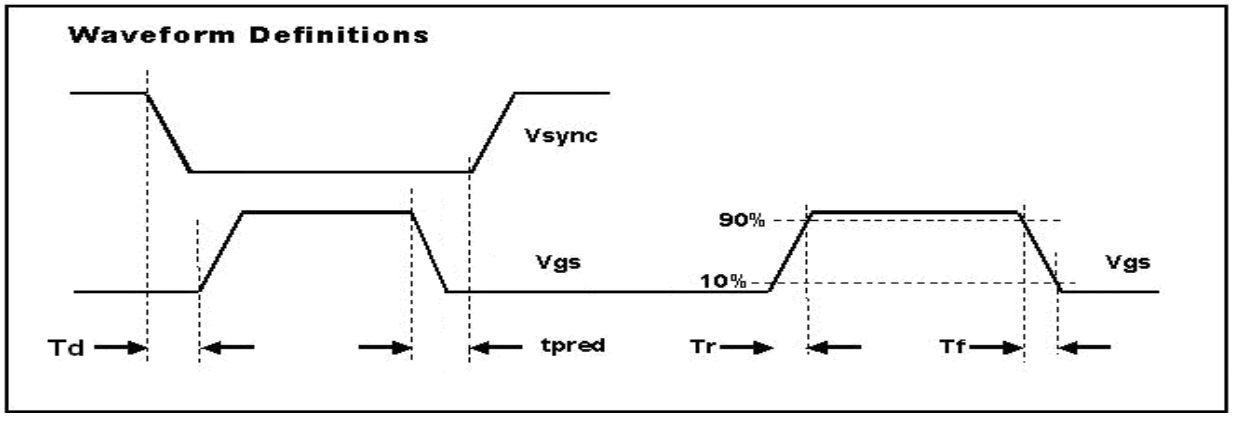
(*) The power dissipation and thermal resistance are evaluated under copper board mounted with free air conditions.

ELECTRICAL CHARACTERISTICS

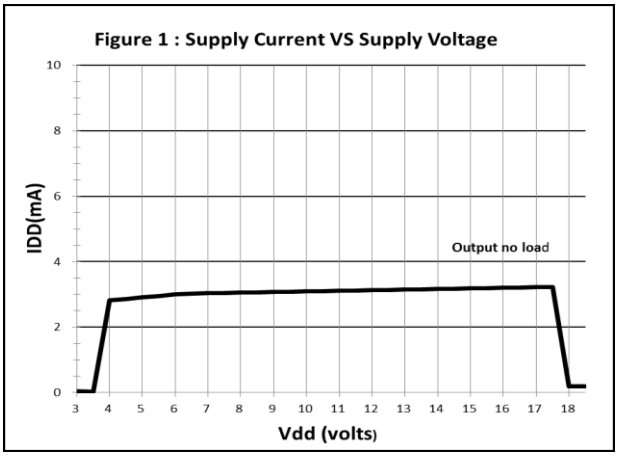
(T_A=25℃, V_{dd}=12V, Freq. =50 KHz, Duty Cycle=50%, unless otherwise specified.)

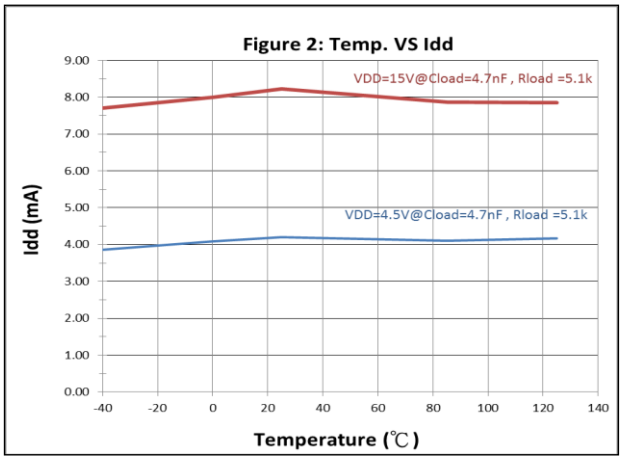
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
SUPPLY INPUT						
Idd	Supply current	No load & Sleep mode		0.2	0.35	mA
		V_{SYNC}=Vdd ,No load	2.0	3.5	4.5	mA
Vdd	Supply voltage	Idd peak < 1A	4.5		16	V
Vdd on	Enable voltage		3.4	3.7	4.1	V
Vdd hysteresis	Enable voltage		0.1	0.3	0.5	V
Vovp	Over voltage protection		17	17.8	18.5	V
Vovp hysteresis			0.5	0.7	1.0	V
SYNC REFERENCE (SYNC)						
Vshth	SYNC high threshold			3.0		V
Vslth	SYNC low threshold			0.9		V
Vsync	SYNC clamp voltage	Isync=3mA	Vdd+1.5			V
Vsync WK	SYNC wake-up voltage	Pulse width >1uS for Vdd=5V	7			V
Vsync WK	SYNC wake-up voltage	Pulse width >1uS for Vdd=12V	8.5			V
Isync	SYNC input current				3	mA
REFERENCE Voltage (V_Pred)						
V_Pred		Pin 4=15KΩ		1.25		V
ON TIME DUTY SETUP (PIN 1)						
Ton-time				23		us
MOSFET GATE DRIVER (MOSG-C)						
Voh	Output high voltage	Io = -200mA		10.7		V
Vol	Output low voltage	Io = 200mA		0.3		V
Td	Propagation delay	No load, Pin4=5.1KΩ		100		ns
Tpred	Dead time	No load, Pin4=5.1KΩ		165		ns
Tr	Rise time	Load = 1nF (*)		11		ns
Tf	Fall time	Load = 1nF (*)		8		ns
Dynamic Protect						
Dt	Dynamic variable	Pin 5=15KΩ		450		ns
Ton-min	MOSG-C on time	PWM adjusts time > Dt		1.3		us

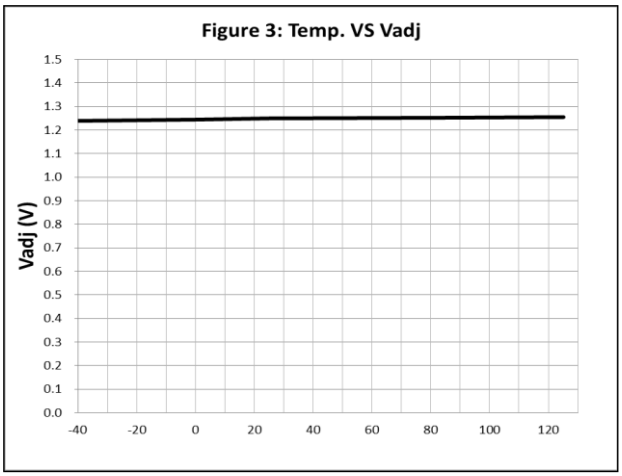
(*) Tr & Tf are measured among 10% and 90% of starting and final voltage.

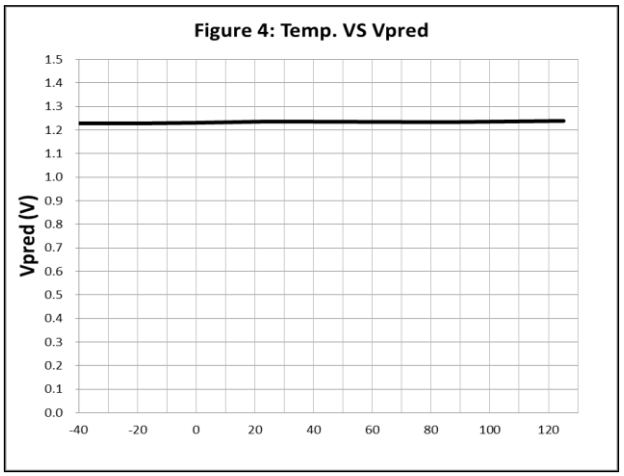


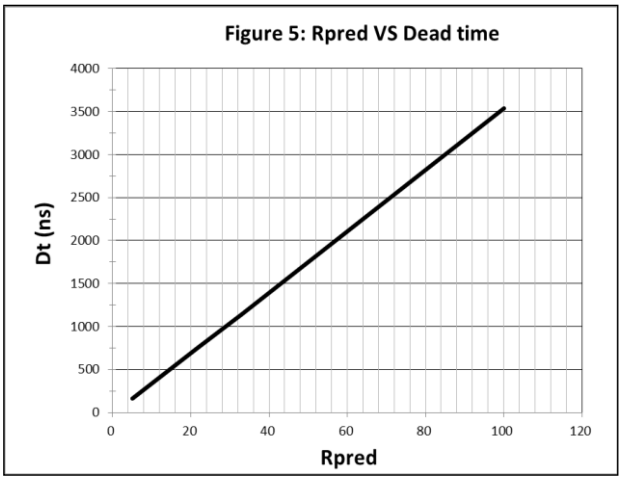
PERFORMANCE CHARACTERISTICS (TA=25℃, unless otherwise specified.)

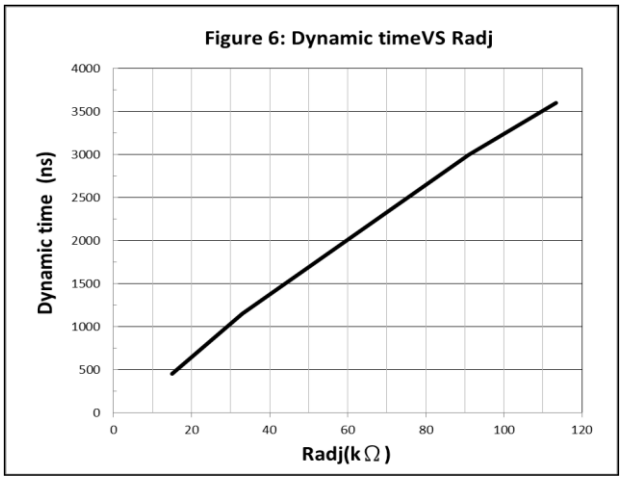












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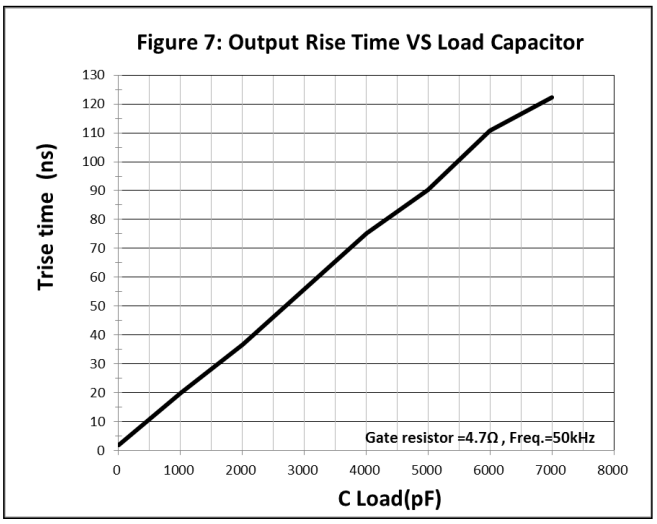
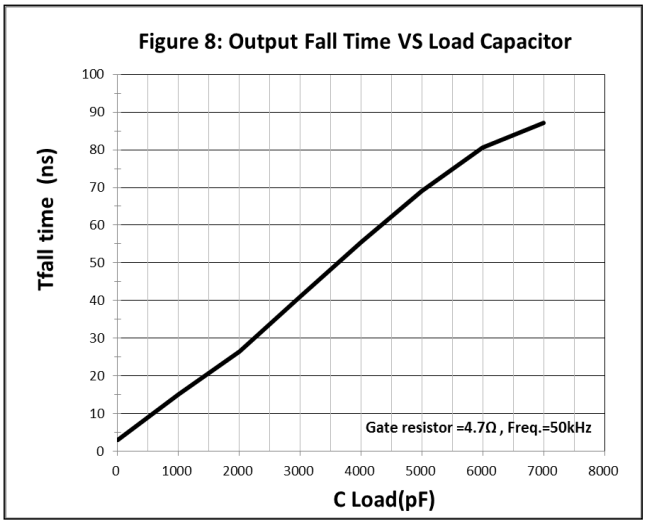
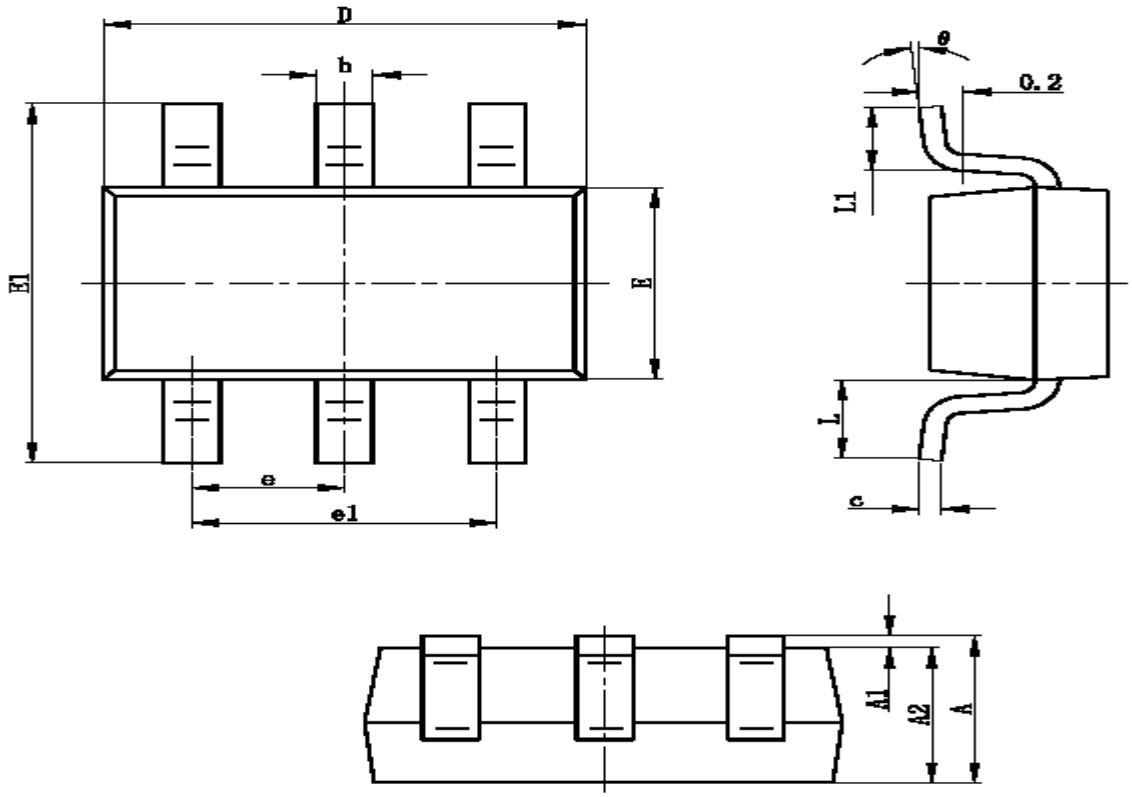




SOT-23-6L PACKAGE OUTLINE



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.400	0.012	0.016
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.700REF		0.028REF	
L1	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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