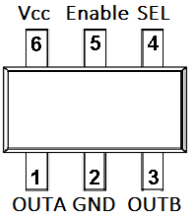
SP986
High-Low Side Transformer Driver

DESCRIPTION
The SP986 is a dual channel, push-pull driver that is suited to drive transformers. The push and pull driver duties are balanced with a preset dead time of about 220ns. During the dead time, both drivers are in the pulling state with output at GND. Push and pull drivers have a peak current capability of 1A. The applications of push and pull driver include high/low side bridge converters with single or dual output transformers. It would provide the users a superior AC/DC power application with higher efficiency and lower standby power. With low external component counts, SP986 is a low cost solution for the applications.
SP986 is available in either SOT-23-6L or DFN3x3 package.

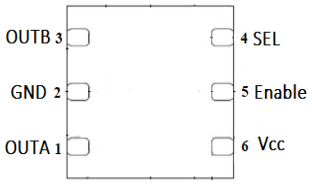
APPLICATIONS
- AC/DC Switching Power Adaptor
- Battery Charger
- Open-Frame Switching Power Supply
- LED Power Supply

FEATURES
- 220nS Dead Time
- Soft Start
- OTP with Hysteresis
- 1A Driving Capability
- SOT23-6L and DFN3x3-6 Package

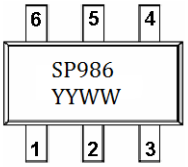
PIN CONFIGURATION
SOT23-6



DFN3x3-6

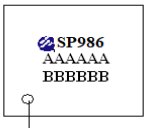


PART MARKING
SOT-23-6L



YY : Year Code
WW: Week Code

DFN3x3-6



AAAAAA : Wafer lot no.
BBBBBB : YYMMDD

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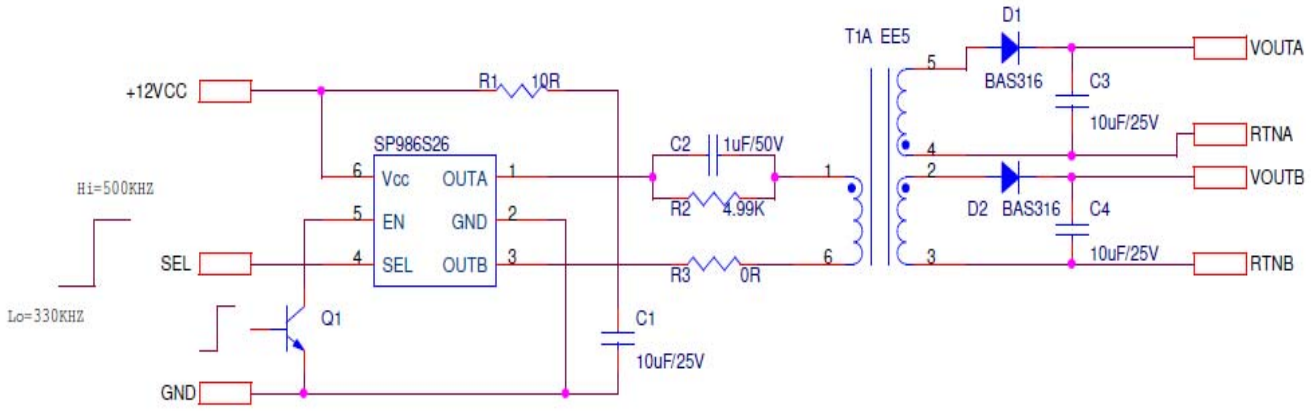
TYPICAL APPLICATION CIRCUIT



PIN DESCRIPTION

Pin	Symbol	Description
1	OUTA	Output A
2	GND	Ground
3	OUTB	Output B
4	SEL	Frequency Selection, Default Frequency @500KHz When Floating
5	Enable	Enable Output when Floating
6	Vcc	Supply Voltage

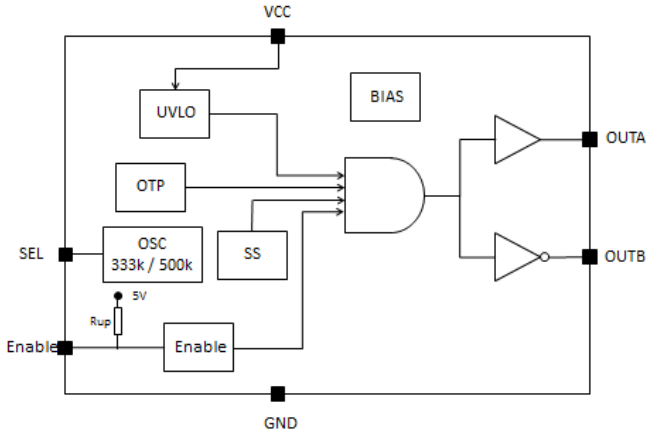
ORDERING INFORMATION

Part Number	Package	Part Marking
SP986S26RGB	SOT-23-6L	986YW
SP986DN6RGB	DFN3x3	SP986

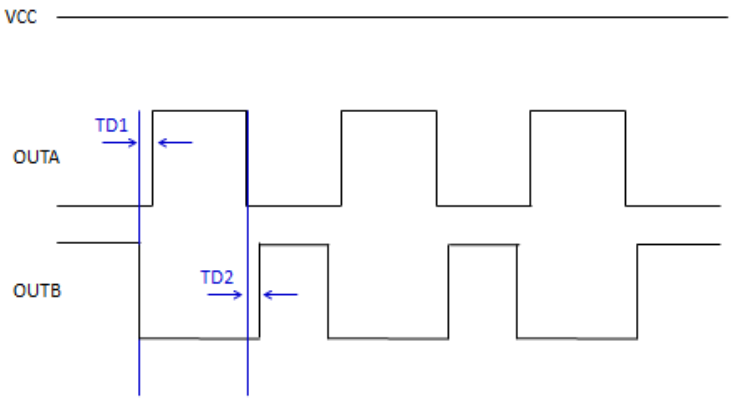
※ SP986S26RGB : Tape Reel ; Pb – Free ; Halogen-Free

※ SP986DN6RGB : Tape Reel ; Pb – Free ; Halogen-Free

BLOCK DIAGRAM



TIMING DIAGRAM



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

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

Symbol	Parameter		Value	Unit
V_{CC} /	VCC Voltage		-0.3 ~ 16	V
I_{OUT-DC}	Output Current, DC		0.3	A
P_D	Power Dissipation @ T_A=85℃ (*)		0.3	W
ESD	Human Body Model		2	KV
	Machine Model		200	V
T_J	Operating Junction Temperature Range		-40 ~ 150	℃
T_{STG}	Storage Temperature Range		-40 ~ 150	℃
$R_{\Theta JC}$	Thermal Resistance Junction – Case (*)	SOT-23-6L	210	℃/W

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

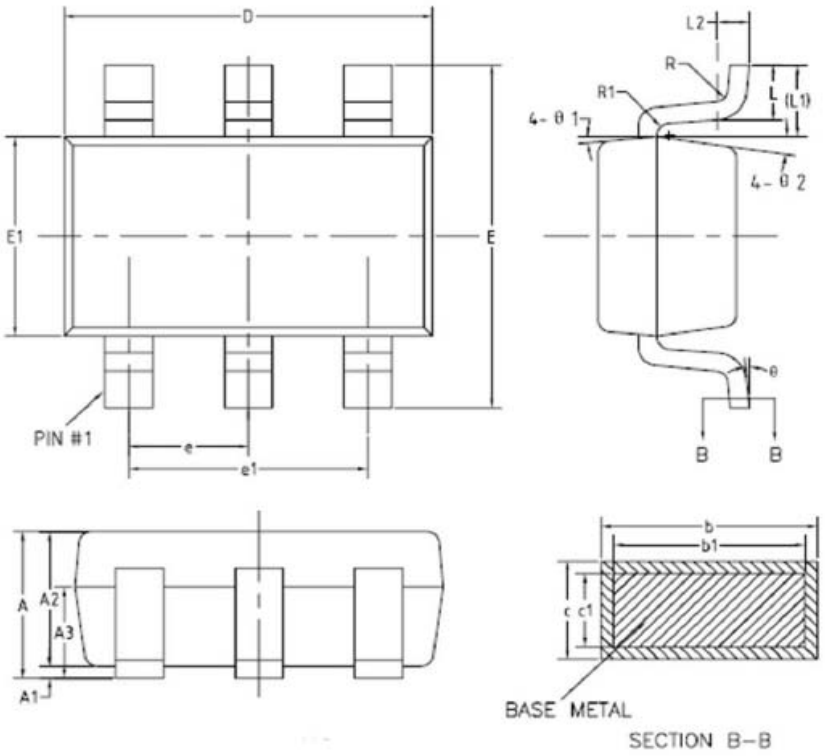
ELECTRICAL CHARACTERISTICS

(T_A=25℃, unless otherwise specified.)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{CC}	Supply Voltage		9		16	V
I_{CC}	Supply Current	Vcc = 12V, No Load	0.9		1.8	mA
$UVLO_{ON}$	Under Voltage Lock On			8	9	V
$UVLO_{OFF}$	Under Voltage Lock Off		6	7		V
F_{500}	Switching Frequency@500KHz		450	500	550	KHz
F_{333}	Switching Frequency@333KHz		300	333	370	KHz
SEL_{Low}	Frequency Selection Low 333KHz				0.8	V
SEL_{Hi}	Frequency Selection High 500KHz		2.7		5	V
$I_{SNK/SRC}$*	OUTA and OUTB Sink/Source Peak Current	C_{LOAD} = 1 nF	1			A
V_{CC}-V_{OH}	High Output Voltage for OUTA and OUTB	I_{OUT} = -10mA		30	45	mV
V_{OL}	Low Output Voltage for OUTA and OUTB	I_{OUT} = 10mA		30	45	mV
R_{OH}	Pull Up Resistance for OUTA and OUTB	I_{OUT} = -10mA		3	4.5	Ω
R_{OL}	Pull Down Resistance for OUTA and OUTB	I_{OUT} = 10mA		3	4.5	Ω
T_{DF500}	Dead Time between OUTA and OUTB at 50% Vcc	C_{LOAD} = 1nF	50		320	nS
T_{DF333}	Dead Time between OUTA and OUTB at 50% Vcc	C_{LOAD} = 1nF	50		360	nS
ΔTon	Turn On time between OUTA and OUTB			2	4	%
$\lvert T_{D1}- T_{D2}\rvert$	Dead Time Difference Between T_{D1} and T_{D2}	F = 500KHz		40		nS
$\lvert T_{D1}- T_{D2}\rvert$	Dead Time Difference Between T_{D1} and T_{D2}	F = 333KHz		60		nS
SS_{333}	Soft Start Time @333KHz		1.2	1.5	1.8	mS
SS_{500}	Soft Start Time @500KHz		0.8	1.0	1.2	mS
Vth(en)	Enable Output Threshold Voltage		2.7		5	V
	Disable Output Threshold Voltage				0.8	V

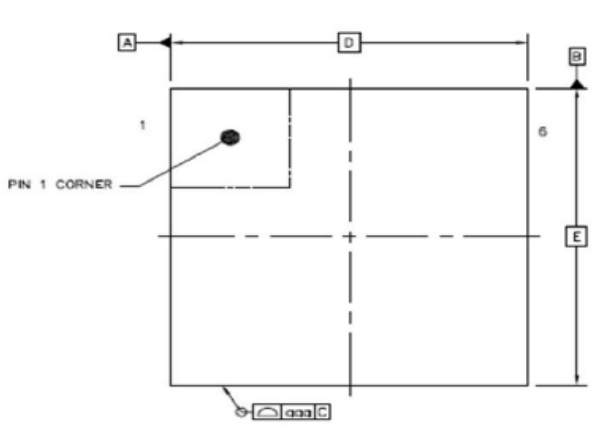
*Guaranteed by design. With SOT23-6, the typical output current is 220mA with ambient temperature of 60℃ and junction temperature of 125℃.

SOT-23-6L PACKAGE OUTLINE

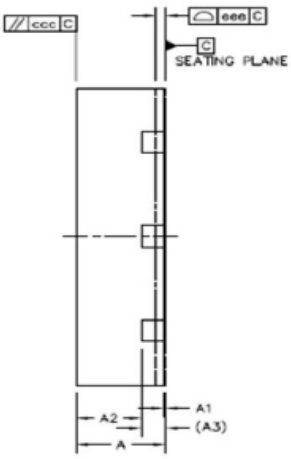


SYMBOL	MIN	NOM	MAX
A	1.05	--	1.30
A1	0.00	--	0.15
A2	0.90	1.10	1.30
A3	0.60	0.65	0.70
b	0.30	--	0.50
b1	0.32	--	0.45
c	0.10	--	0.25
c1	0.10	--	0.20
D	2.80	2.93	3.05
E	2.60	2.80	3.00
E1	1.50	1.60	1.75
e	0.95 REF		
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1	0.59 REF		
L2	0.25BSC		
θ	0°	--	8°
θ1	3°	5°	7°
θ2	6°	8°	10°

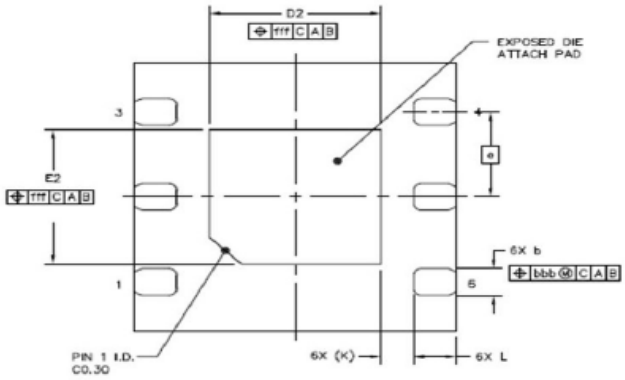
DFN3x3-6L PACKAGE OUTLINE



TOP VIEW



SIDE VIEW



BOTTOM VIEW

SYMBOL	MILLIMETERS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A2	--	0.55	--
A3	0.203 REF		
D	3.0 BSC		
E	3.0 BSC		
D2	1.50	1.60	1.70
E2	1.40	1.50	1.60
e	0.95 BSC		
K	0.30 REF		
L	0.30	0.40	0.50
b	0.25	0.30	0.35
aaa	0.10		
ccc	0.10		
eee	0.08		
bbb	0.10		
fff	0.10		

SYNC Power Corporation
7F-2, No.3-1, Park Street
NanKang District (NKSP), Taipei, Taiwan, 115, R.O.C
Phone: 886-2-2655-8178
Fax: 886-2-2655-8468
http://www.syncpower.com