



# KA3525A (LX) SG3525A (LX) Voltage-Mode PWM Controller

## Product Specification

### Specification Revision History:

Version	Date	Description
2021-12-A1	2021-12	New



## 1、General Description

The SG3525A/KA3525A is a monolithic integrated circuit that included all of the control circuit necessary for a pulse width modulating regulator. There are a voltage reference, an error amplifier, a pulse width modulator, under-voltage lockout, soft start circuit, and output drivers in the chip.

### Features:

- 5V+1% reference
- Oscillator sync terminal
- Internal soft start
- Deadtime control
- Under-Voltage lockout
- Packaging information: SOP16/DIP16

### Ordering Information:

#### Tube packing specifications:

Type number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Packing box number	Packing quantity	Notes
SG3525A (LX)	SOP16	SG3525A	50 PCS/tube	200 tube/box	10000 PCS/box	5 box/pack	50000 PCS/pack	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing: 1.27mm
KA3525A (LX)	DIP16	KA3525A	25 PCS/tube	40 tube/box	1000 PCS/box	10 box/pack	10000 PCS/pack	Dimensions of plastic enclosure: 19.0mm×6.4mm Pin spacing: 2.54mm

#### Reel packing specifications:

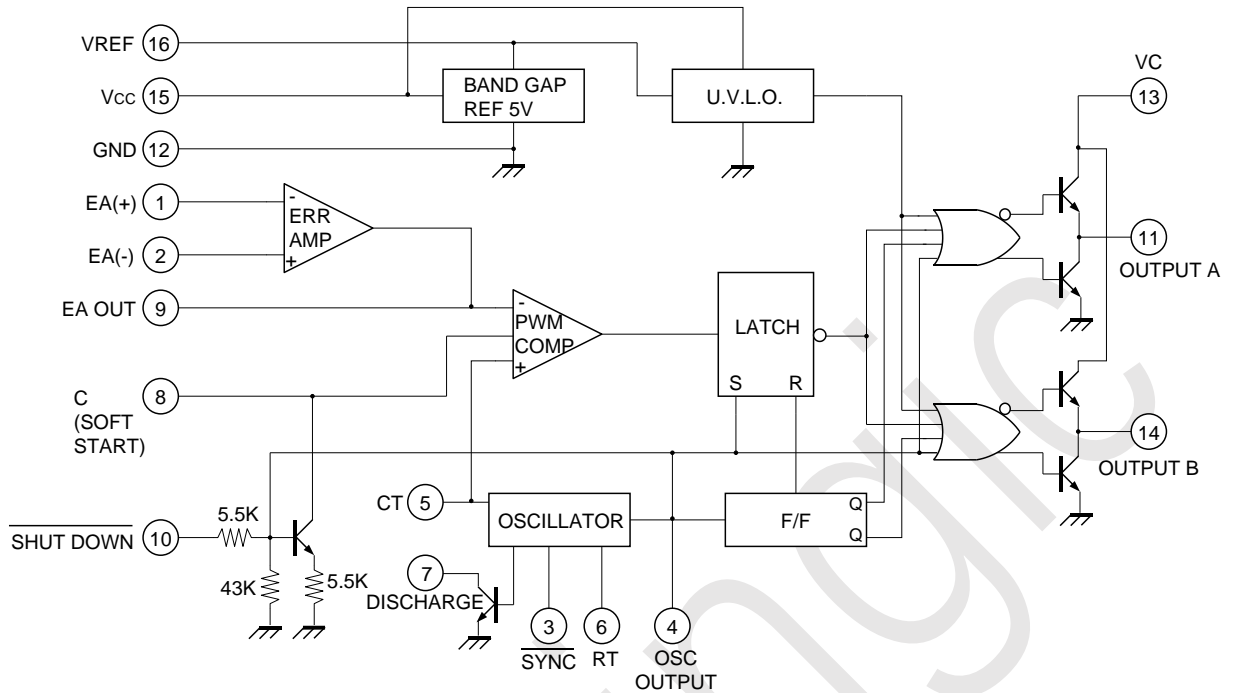
Type number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Packing quantity	Notes
SG3525A (LX)	SOP16(1)	SG3525A	2500PCS/reel	5000PCS/box	20000PCS/pack	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing:1.27mm
SG3525A (LX)	SOP16(2)	SG3525A	2500PCS/reel	2500PCS/box	40000PCS/pack	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing:1.27mm

Note: If the physical information is inconsistent with the ordering information, please refer to the actual product.

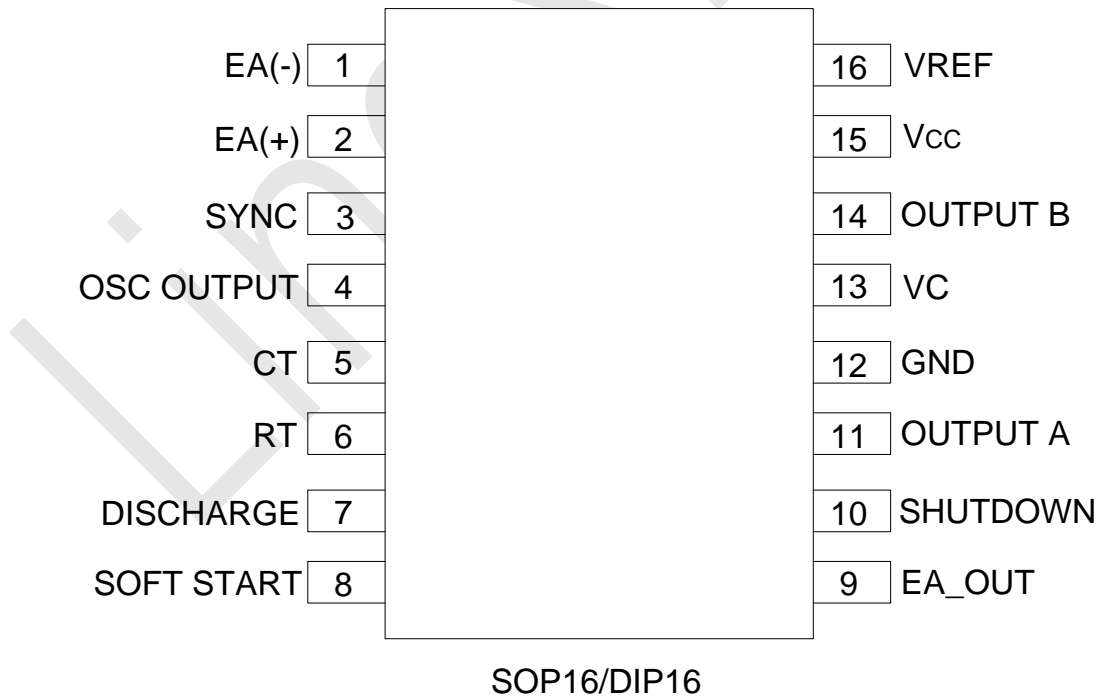


## 2、Block Diagram And Pin Description

### 2.1、Block Diagram



### 2.2、Pin Configurations





### 2.3、Pin Description

Pin No.	Pin Name	Description
1	EA(-)	error amplifier inverting input
2	EA(+)	error amplifier non-inverting input
3	SYNC	external synchronous signal input of oscillator
4	OSC OUTPUT	oscillator output
5	CT	oscillator timing capacitor access
6	RT	oscillator timing resistor access
7	DISCHARGE	oscillator discharge terminal
8	SOFT START	soft-start capacitor access
9	EA_OUT	PWM relatively strong compensation signal input
10	SHUTDOWNM	external shutdown signal input
11	OUTPUT A	output A
12	GND	signal ground
13	VC	Output stage bias voltage access point
14	OUTPUT B	output B
15	V <sub>CC</sub>	bias power access
16	VREF	reference voltage output

### 3、Electrical Parameter

#### 3.1、Absolute Maximum Ratings

(T<sub>amb</sub>=25°C, unless otherwise specified)

Characteristic	Symbol	Conditions	Value	Unit	
Supply Voltage	V <sub>CC</sub>	-	40	V	
Collector Supply Voltage	V <sub>C</sub>	-	40	V	
Output Current, Sink or Source	I <sub>O</sub>	-	500	mA	
Reference Output Current	I <sub>REF</sub>	-	50	mA	
Oscillator Charging Current	I <sub>CHG</sub>	-	5	mA	
Power Dissipation(T <sub>amb</sub> =25°C)	P <sub>D</sub>	-	1000	mW	
Operating Temperature	T <sub>amb</sub>	-	0~+70	°C	
Storage Temperature	T <sub>stg</sub>	-	-65~+150	°C	
Soldering Temperature	T <sub>L</sub>	10s	DIP	245	°C
			SOP	250	°C



### 3.2、Electrical Characteristics

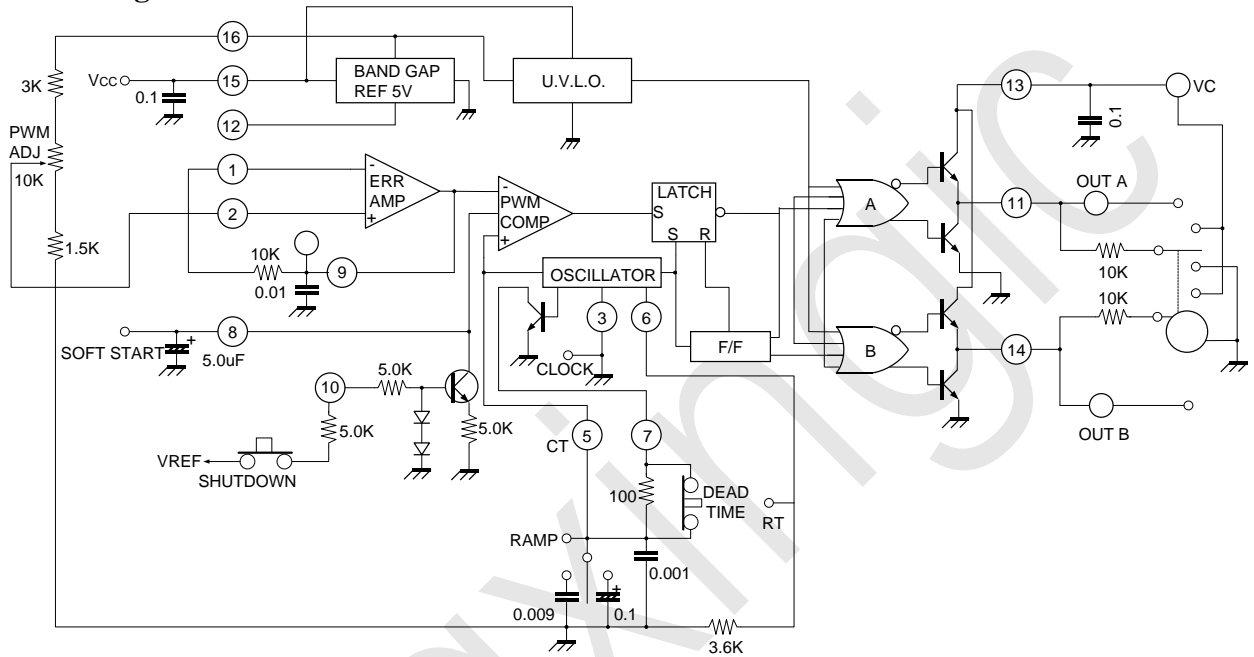
( $T_{amb}=0^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ ,  $V_{CC}=20\text{V}$ , unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Reference Section</b>						
Reference Output Voltage	$V_{REF}$	$T_J=+25^{\circ}\text{C}$	5.0	5.1	5.2	V
Line Regulation	$\Delta V_{REF}$	$V_{CC}=8$ to $35\text{V}$	-	9	20	mV
Load Regulation	$\Delta V_{REF}$	$I_{REF}=0$ to $20\text{mA}$	-	20	50	mV
Short Circuit Output Current	$I_{SC}$	$V_{REF}=0\text{V}, T_J=+25^{\circ}\text{C}$	-	80	100	mA
Frequency Change With Voltage	$\Delta f/\Delta V_{CC}$	$V_{CC}=8$ to $35\text{V}$ , $R_T=3.6\text{K}\Omega, C_T=0.01\mu\text{F}$	-	$\pm 0.8$	$\pm 2$	%
<b>Oscillator Section</b>						
Maximum Frequency	$f_{(MAX)}$	$R_T=2\text{K}\Omega, C_T=470\text{pF}$	400	430	-	KHz
Minimum Frequency	$f_{(MIN)}$	$R_T=200\text{K}\Omega, C_T=0.1\mu\text{F}$	-	60	120	Hz
Medium Frequency	$f_{(Med)}$	$R_T=3.6\text{K}\Omega, C_T=0.01\mu\text{F}$	-	40	-	KHz
Clock Amplitude	$V_{(CLK)}$	$R_T=3.6\text{K}\Omega, C_T=0.01\mu\text{F}$	3	4	-	V
Clock Width	$t_{w(CLK)}$	$R_T=3.6\text{K}\Omega, C_T=0.01\mu\text{F}$	0.3	0.6	1	us
Sync Threshold	$V_{TH(SYNC)}$	-	1.2	2	2.8	V
Sync Input Current	$I_{I(SYNC)}$	Sync = 3.5V	-	1.3	2.5	mA
<b>Error Amplifier Section</b>						
Input Offset Voltage	$V_{IO}$	-	-	1.5	10	mV
Input Bias Current	$I_{BAIS}$	-	-	1	10	uA
Input Offset Current	$I_{IO}$	-	-	0.1	1	uA
Open Loop Voltage Gain	$G_{VO}$	$R_L \geq 10\text{M}\Omega$	60	80	-	dB
Common Mode Rejection Ratio	CMRR	$V_{CM}=1.5$ to $5.2\text{V}$	60	90	-	dB
<b>PWM Comparator Section</b>						
Minimum Duty Cycle	$D_{(MIN)}$	-	-	-	0	%
Maximum Duty Cycle	$D_{(MAX)}$	$R_T=3.6\text{K}\Omega, C_T=1\text{nF}$	45	49	-	%
Input Threshold Voltage	$V_{TH1}$	Zero Duty Cycle, $R_T=3.6\text{K}\Omega, C_T=0.01\mu\text{F}$	0.7	0.9	-	V
Input Threshold Voltage	$V_{TH2}$	Max Duty Cycle, $R_T=3.6\text{K}\Omega, C_T=0.01\mu\text{F}$	-	3.2	3.6	V
<b>Soft-Start Section</b>						
Soft Start Current	$I_{SOFT}$	$V_{SD}=0\text{V}, V_{SS}=0\text{V}$	25	51	80	uA
Soft Start Low Level Voltage	$V_{SL}$	$V_{SD}=25\text{V}$	-	0.3	0.7	V
Shutdown Threshold Voltage	$V_{TH(SD)}$	-	0.7	1.3	1.7	V
Shutdown Input Current	$I_{N(SD)}$	$V_{SD}=2.5\text{V}$	-	0.3	1	mA
<b>Output Section</b>						
Low Output Voltage I	$V_{OL I}$	$I_{SINK}=20\text{mA}$ , $R_T=3.6\text{K}\Omega, C_T=0.1\mu\text{F}$	-	0.1	0.4	mV
Low Output Voltage II	$V_{OL II}$	$I_{SINK}=100\text{mA}$ , $R_T=3.6\text{K}\Omega, C_T=0.1\mu\text{F}$	-	0.05	2	V
High Output Voltage I	$V_{OH I}$	$I_{SOURCE}=20\text{mA}$ , $R_T=3.6\text{K}\Omega, C_T=0.1\mu\text{F}$	18	19	-	V
High Output Voltage II	$V_{OH II}$	$I_{SOURCE}=100\text{mA}$ , $R_T=3.6\text{K}\Omega, C_T=0.1\mu\text{F}$	17	18	-	V



Under Voltage Lockout	$V_{UV}$	V8 and V9=High	6	7	8	V
Rise Time	$t_R$	$C_L=1nF, T_J=+25^\circ C$	-	80	600	us
Fall Time	$t_F$	$C_L=1nF, T_J=+25^\circ C$	-	70	300	us
<b>Standby Current</b>						
Supply Current	$I_{CC}$	$V_{CC}=35V,$ $R_T=3.6K\Omega, C_T=1nF$	-	12	20	mA

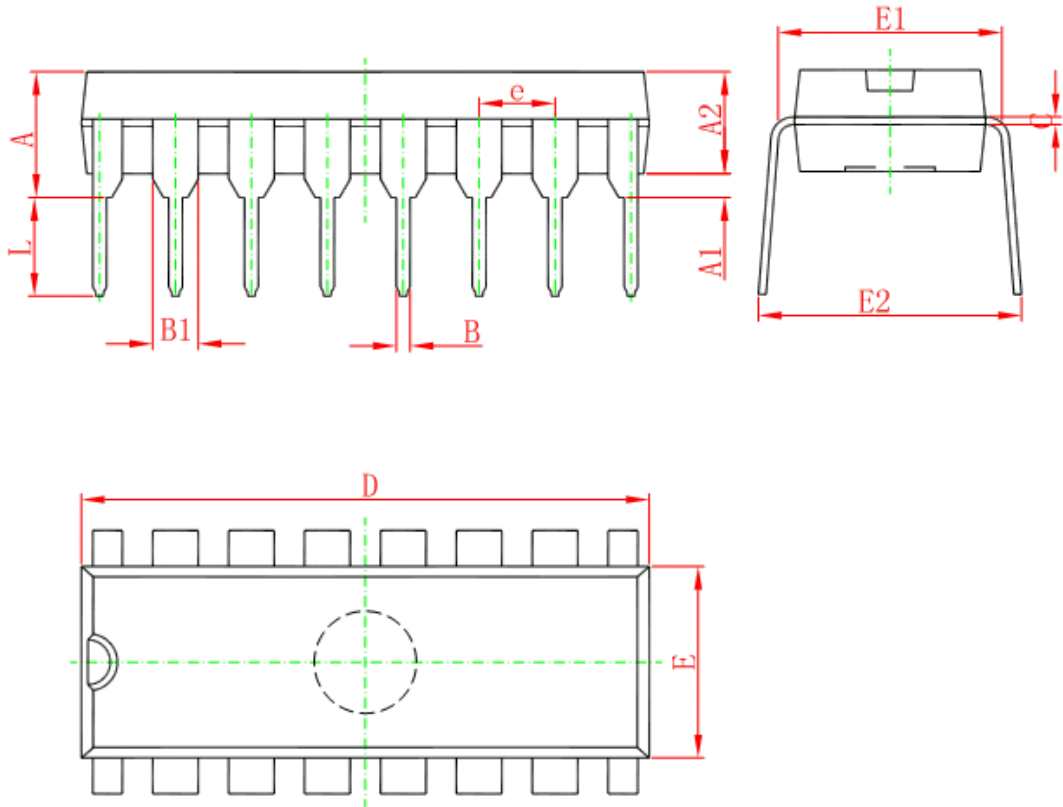
## 4、Testing Circuit





## 5、Package Information

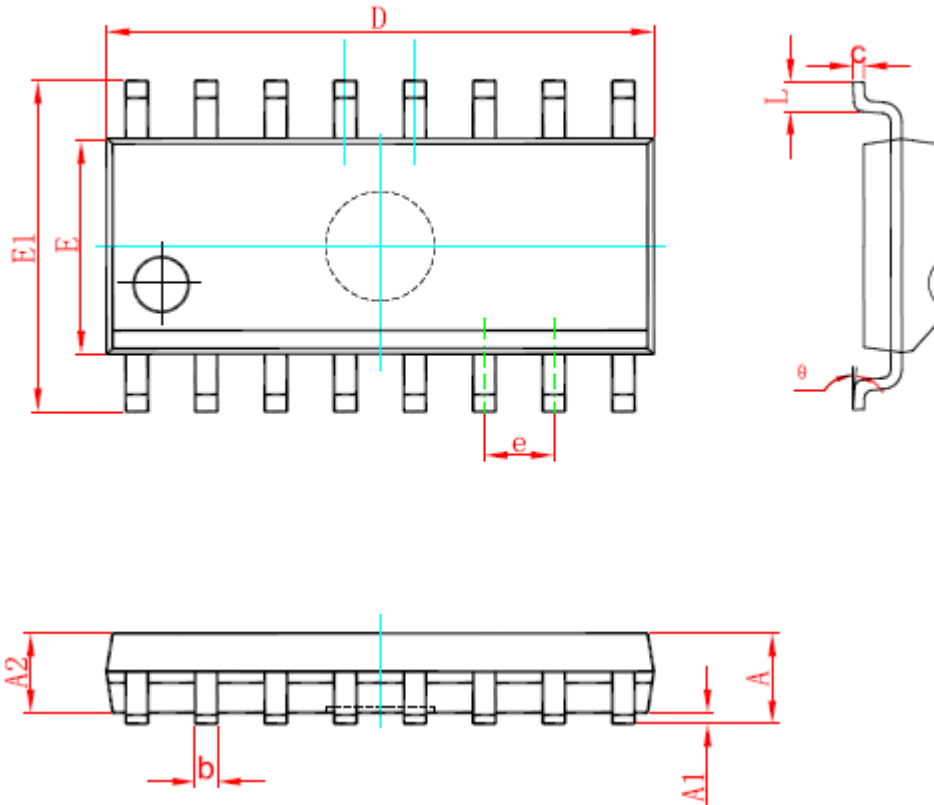
### 5.1、DIP16



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.710	4.310	0.146	0.170
A1	0.510		0.020	
A2	3.200	3.600	0.126	0.142
B	0.380	0.570	0.015	0.022
B1	1.524 (BSC)		0.060 (BSC)	
C	0.204	0.360	0.008	0.014
D	18.800	19.200	0.740	0.756
E	6.200	6.600	0.244	0.260
E1	7.320	7.920	0.288	0.312
e	2.540 (BSC)		0.100 (BSC)	
L	3.000	3.600	0.118	0.142
E2	8.400	9.000	0.331	0.354



5.2、SOP16



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	0.007	0.010
D	9.800	10.200	0.386	0.402
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°





## 6、 Statements And Notes

### 6.1、 The name and content of Hazardous substances or Elements in the product

Part name	Hazardous substances or Elements									
	Lead and lead compounds	Mercury and mercury compounds	Cadmium and cadmium compounds	Hexavalent chromium compounds	Polybrominated biphenyls	Polybrominated biphenyl ethers	Dibutyl phthalate	Butylbenzyl phthalate	Di-2-ethylhexyl phthalate	Diisobutyl phthalate
Lead frame	○	○	○	○	○	○	○	○	○	○
Plastic resin	○	○	○	○	○	○	○	○	○	○
Chip	○	○	○	○	○	○	○	○	○	○
The lead	○	○	○	○	○	○	○	○	○	○
Plastic sheet installed	○	○	○	○	○	○	○	○	○	○
explanation	○: Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard. ×: Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.									

### 6.2、 Notion

Recommended carefully reading this information before the use of this product;

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