### 600V Half-Bridge Driver

#### **PRODUCT SUMMARY**

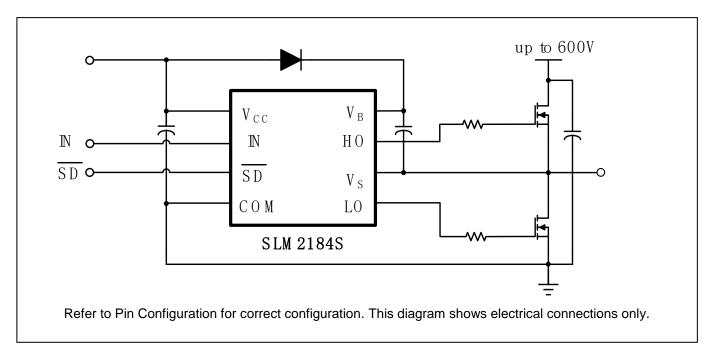
- 600 V max. VOFFSET
- lo+/-450 mA/ 950 mA
- 10 V 20 V Vout
- 680 ns/200 ns ton/off (typ.)
- Deadtime (typ.) 520 ns

#### **GENERAL DESCRIPTION**

The SLM2184S is a high voltage, high speed power MOSFET and IGBT drivers with dependent highreferenced output and low-side channels. Proprietary HVIC and latch immune CMOS technologies enable ruggedized monolithic construction. The logic input is compatible with standard CMOS or LSTTL output, down to 3.3 V logic. The output drivers feature a high pulse current buffer stage designed for minimum driver cross conduction. The floating channel can be used to drive an N-channel power MOSFET or IGBT in the high-side configuration which operates up to 600 V.

#### **FEATURES**

- Floating channel designed for bootstrap operation
- Fully operational to +600 V
- Tolerant to negative transient voltage, dV/dt immune
- Gate drive supply range from 10 V to 20 V •
- Undervoltage lockout
- 3.3 V, 5 V, and 15 V logic compatible •
- Cross-conduction prevention logic .
- Matched propagation delay for both channels •
- Internal set deadtime •
- Shutdown input turns off both channels
- **RoHS** compliant
- SOP-8 package



#### **TYPICAL APPLICATION CIRCUIT**

#### **PIN CONFIGURATION**

Package	Pin Configuration (Top View)
SOP-8	$\begin{bmatrix} 1 & IN & V_B & 8 \end{bmatrix}$ $\begin{bmatrix} 2 & SD & HO & 7 \end{bmatrix}$ $\begin{bmatrix} 3 & COM & V_S & 6 \end{bmatrix}$ $\begin{bmatrix} 4 & LO & V_{CC} & 5 \end{bmatrix}$

#### **PIN DESCRIPTION**

No.	Pin	Description
		Logic input to control the high-side and low-side gate driver output (HO/LO).
1	IN	HO: In phase with IN.
		LO: Out of phase with IN.
2	SD	Input logic for shutdown control. If $\overline{SD}$ is low, both high side and low side gate output is low.
3	СОМ	Low-side return
4	LO	Low-side gate drive output
5	Vcc	Low-side and logic fixed supply
6	Vs	High-side floating supply return
7	HO	High-side gate drive output
8	VB	High-side floating supply

#### **ORDERING INFORMATION**

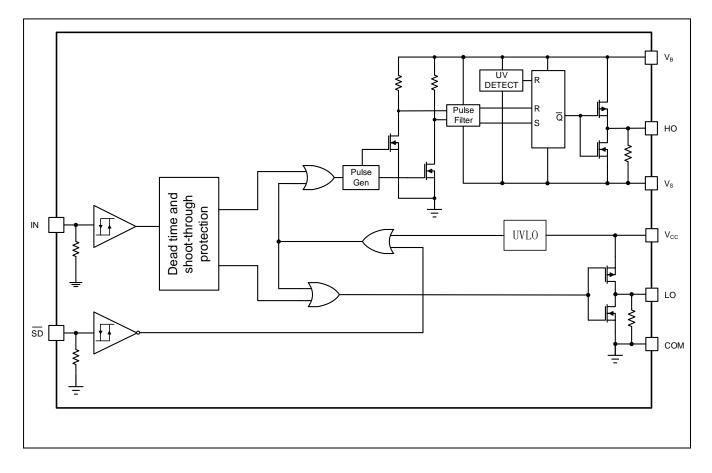
Industrial Range: -40°C to +125°C

Order Part No.PackageQTYSLM2184SCA-13GTRSOP8, Pb-Free2500/Reel

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### FUNCTIONAL BLOCK DIAGRAM



#### **ABSOLUTE MAXIMUM RATINGS**

Symbol	Definition	Min.	Max.	Units
VB	High-side floating absolute voltage	-0.3	625	
Vs	High-side floating supply offset voltage	V <sub>B</sub> - 25	V <sub>B</sub> + 0.3	
Vно	High-side floating output voltage	Vs-0.3	V <sub>B</sub> + 0.3	
Vcc	Low-side and logic fixed supply voltage	-0.3	25	V
Vlo	Low-side output voltage	-0.3	Vcc + 0.3	
Vin	Logic input voltage (IN & SD)	-0.3	Vcc + 0.3	
dVs/dt	Allowable offset supply voltage transient		50	V/ns
PD	Package power dissipation @ $T_A \le +25^{\circ}C$		0.625	W
θ <sub>JA</sub>	Thermal resistance, junction to ambient		200	°C/W
TJ	Junction temperature		150	
Ts	Storage temperature	-55	150	°C
ΤL	Lead temperature (soldering, 10 seconds)		300	

Note: Absolute maximum ratings indicate sustained limits beyond which damage to the device may occur. All voltage parameters are absolute voltages referenced to COM. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions.

### **RECOMMENDED OPERATION CONDITIONS**

Symbol	Definition	Min.	Max.	Units
VB	High-side floating absolute voltage	V <sub>S</sub> + 10	V <sub>S</sub> +20	
Vs	High-side floating supply offset voltage		600	-
Vst	Transient high-side floating supply offset voltage	-40 (within 400ns)	600	
Vно	High-side floating output voltage	Vs	VB	V
Vcc	Low-side and logic fixed supply voltage	10	20	-
VLO	Low-side output voltage	0	Vcc	
Vin	Logic input voltage (IN & SD)	0	Vcc	
TA	Ambient temperature	- 40	125	°C

Note: The input/output logic timing diagram is shown in Figure 1. For proper operation the device should be used within the recommended conditions. The Vs offset rating is tested with all supplies biased at a 15 V differential.

### **DYNAMIC ELECTRICAL CHARACTERISTICS**

 $V_{BIAS}$  (V<sub>CC</sub>, V<sub>BS</sub>) = 15 V, C<sub>L</sub> = 1000 pF and T<sub>A</sub> = 25°C unless otherwise specified.

Symbol	Parameter	Condition	Min.	Тур.	Max.	Unit
t <sub>on</sub>	Turn-on propagation delay	Vs = 0 V		680	820	
t <sub>off</sub>	Turn-off propagation delay	Vs = 0 V		200	400	
t <sub>sd</sub>	Shutdown propagation delay			160	220	
tr	Turn-on rise time			40	80	ns
t <sub>f</sub>	Turn-off fall time			20	40	
DT	Deadtime, LS turn-off to HS turn-on & HS turn-on to LS turn-off		400	520	650	
MT	Delay matching, HS & LS turn-on/off				60	

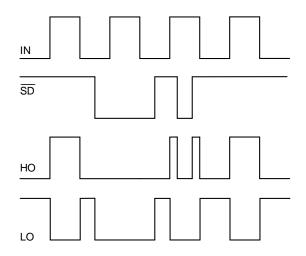
### STATIC ELECTRICAL CHARACTERISTICS

 $V_{BIAS}$  ( $V_{CC}$ ,  $V_{BS}$ ) = 15 V and  $T_A$  = 25°C unless otherwise specified. The  $V_{IN}$ ,  $V_{TH}$ , and  $I_{IN}$  parameters are referenced to COM. The  $V_O$  and  $I_O$  parameters are referenced to COM and are applicable to the respective output leads: HO or LO.

Symbol	Parameter	Condition	Min.	Тур.	Max.	Unit
Vih	Logic "1" input voltage		2.5			
VIL	Logic "0" input voltage	Vcc = 10 V to 20V			0.8	
VSD, TH+	SD input positive going threshold	V(() = 10 V (0 20V	2.5			V
VSD, TH-	SD input negative going threshold				0.8	v
Vон	High level output voltage, V <sub>BIAS</sub> - V <sub>O</sub>	l <sub>0</sub> = 2 mA		0.05	0.2	
Vol	Low level output voltage, $V_0$	10 - 2 11/1		0.02	0.1	
Ilk	Offset supply leakage current	$V_{B} = V_{S} = 600 V$			50	
I <sub>QBS</sub>	Quiescent V <sub>BS</sub> supply current V <sub>IN</sub> = 0 V			60	78	
lacc	Quiescent V <sub>CC</sub> supply current			210	305	μA
l <sub>IN+</sub>	Logic "1" input bias current	V <sub>IN</sub> = 5 V		8	10	
lin-	Logic "0" input bias current	$V_{IN} = 0 V$			5	
Vccuv+ Vbsuv+	V <sub>CC</sub> & V <sub>BS</sub> supply undervoltage positive going threshold		8	8.9	9.8	V

## **SLM2184S**

Symbol	Parameter	Condition	Min.	Тур.	Max.	Unit
V <sub>CCUV-</sub> V <sub>BSUV-</sub>	$V_{\text{CC}}$ & $V_{\text{BS}}$ supply undervoltage negative going threshold		7.4	8.2	9	
lo+	Output high short circuit pulsed current		320	450		mA
lo-	Output low short circuit pulsed current	$      V_{\text{O}} = 15 \text{ V}, \text{ V}_{\text{IN}} = \text{V}_{\text{IL}}, \\       PW \leqslant 10 \ \mu s $	680	950		



#### Figure 1. Input/Output Timing Diagram

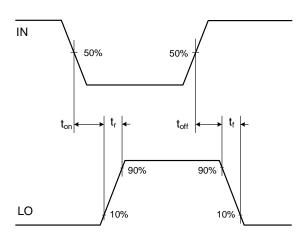


Figure 3. Low Side Switching Time Waveform

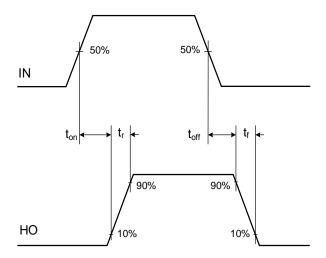


Figure 2. High Side Switching Time Waveform

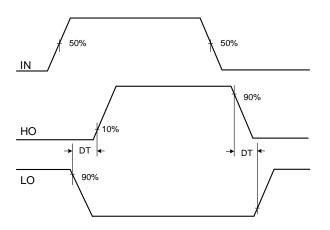


Figure 4. Dead Time Waveform



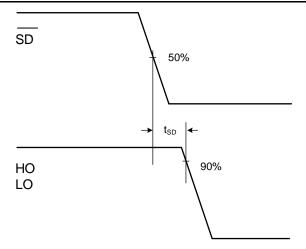
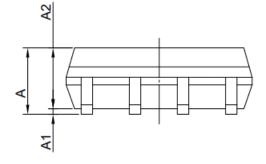
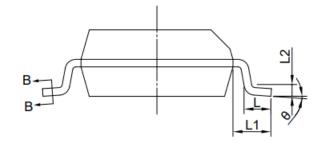
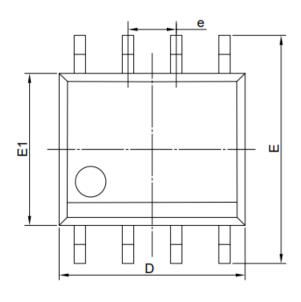


Figure 5. Shutdown Time Waveform

### PACKAGE CASE OUTLINES







B-B	U			
b1	Dimension	MIN	NOM	MAX
	A	-	-	1.75
	A1	0.1	-	0.25
	A2	1.25	-	-
	L	0.4	0.835	1.27
	L1	-	1.04	-
	L2	-	0.25	-
	θ	0	-	8
	b	0.31	-	0.51
	b1	0.28	-	0.48
	С	0.1	-	0.25
	c1	0.1	-	0.25
	D	-	4.9	-
	E	-	6	-
	E1	-	3.9	-
	е		1.27 BSC	
		Unit	mm	

Figure 6. SOP8 Outline Dimensions

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#### **REVISION HISTORY**

Note: page numbers for previous revisions may differ from page numbers in current version

Page or Item	Subjects (major changes since previous revision)
Rev 1.0 Datasheet, 2019	9-8-27
Whole document	New company logo released
Page 1	Remove "Figure 1." and "June 2019"
Rev 1.1 Datasheet, 2027	1-9-7
Whole datasheet	Update the Logo and format
Page 1	Remove package option PDIP-8
Page 2	Remove the order part No. SLM2184SCA-GT and SLM2184SDA-GT in the ordering information
Page 3	Updated the Functional Block Diagram
Page 5	Update the toff value in the Dynamic Electrical Characteristics.
	Update the $I_{QCC}$ , $I_{IN+}$ , $I_{O+}$ and $I_{O-}$ value in the Static Electrical Characteristics.
Rev 1.2 Datasheet, 2022	2-12-29
Page 8	SOP8 Outline Dimensions Update