



# TF0211

## Single 1.9A High-Speed, Low-Side Gate Driver

### Features

- Efficient, low-cost solution for driving MOSFETs and IGBTs
- Wide supply voltage operating range: 4.5V to 18V
- 1.9A source / 1.8A sink output current capability
- Non-inverting and inverting inputs (TF0211C)
- Non-inverting input with Enable pin (TF0211E)
- Fast propagation delays (35ns typical)
- Fast rise and fall times (15ns typical)
- Logic inputs (IN, IN\*, and EN) 3.3V capability
- Space saving SOT23-5L package
- Extended temperature range: -40°C to +125°C

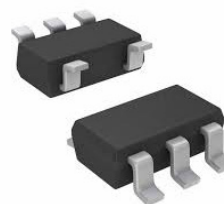
### Applications

- Switch mode power supplies
- Line Drivers
- DC-DC Converters
- Motor Drive

### Description

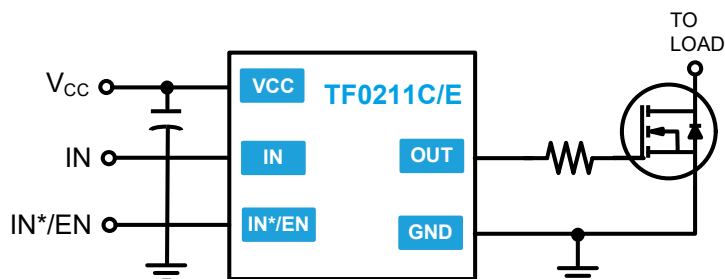
The TF0211 single high speed MOSFET and IGBT drivers are capable of driving 1.9A of peak current in low side driving configurations. The TF0211 logic inputs are compatible with standard TTL and CMOS levels (down to 3.3V) to interface easily with MCUs. The TF0211C provides non-inverting and inverting inputs while the TF0211E provides a non-inverting input with an EN control.

Because of fast propagation times of 35ns typical and rise/fall times of 15ns typical the TF0211 is well suited for high speed applications like switch mode power supplies and PFC circuits. The TF0211 comes in a space-saving SOT23-5L package and it operates over an extended -40 °C to +125 °C temperature range.



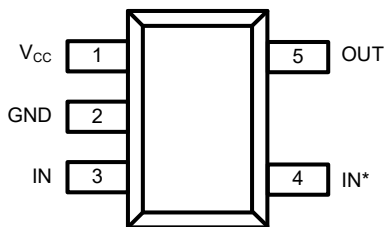
SOT-23-5L

### Typical Application

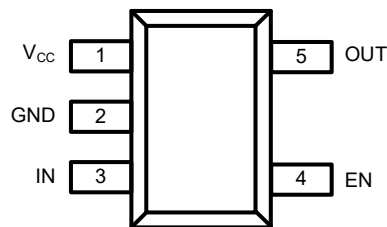




**Pin Diagrams**



TF0211C



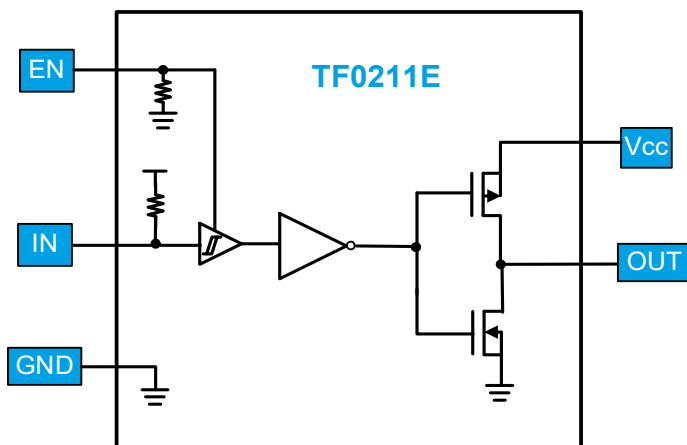
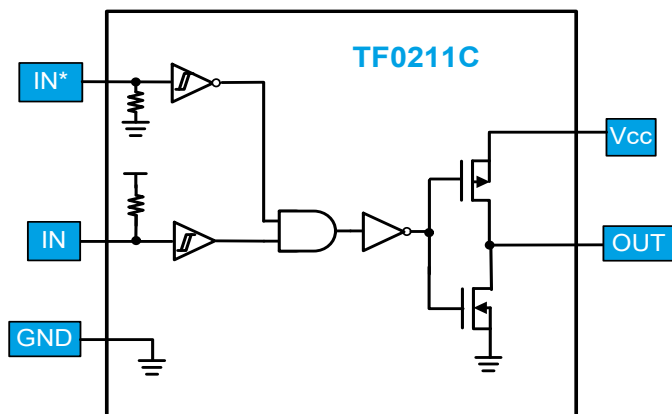
TF0211E

**Top View: SOT23-5L**

**Pin Descriptions**

PIN NAME	PIN NUMBER	PIN DESCRIPTION
V <sub>CC</sub>	1	Supply input
GND	2	Supply return
IN	3	Logic input, see input/output response table pg. 3
IN* (TF0211C)	4	Logic input, see input/output response table pg. 3
EN (TF0211E)	4	Enable input, see input/output response table pg. 3

**Functional Block Diagram**





## Single 1.9A High-Speed, Low-Side Gate Driver

### Absolute Maximum Ratings (NOTE1)

$V_{CC}$  - Low-side fixed supply voltage.....-0.3V to +22V  
 $V_{OUT}$  - Output voltage (OUT).....-0.3V to  $V_{CC} + 0.3V$   
 $V_{IN}$  - Logic input voltage (IN, IN\*, EN).....-0.3V to  $V_{CC} + 0.3V$

**NOTE1** Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

$P_D$  - Package power dissipation at  $T_A \leq 25^\circ C$   
 SOT23-5L.....TBD  
 SOT23-5L Thermal Resistance (**NOTE2**)  
 $\theta_{JA}$ .....TBD  $^\circ C/W$   
 $\theta_{JC}$ .....TBD  $^\circ C/W$

$T_J$  - Junction operating temperature.....+150  $^\circ C$   
 $T_L$  - Lead Temperature (soldering, 10 seconds).....+300  $^\circ C$   
 $T_{stg}$  - Storage temperature .....-55 to 150  $^\circ C$

**NOTE2** When mounted on a standard JEDEC 2-layer FR-4 board.

### Recommended Operating Conditions

Symbol	Parameter	MIN	MAX	Unit
$V_{CC}$	Supply voltage	4.5	18	V
$V_{OUT}$	Output voltage (OUT)	0	$V_{CC}$	V
$V_{IN}$	Logic input voltage (IN, IN*, EN)	0	5	V
$T_A$	Ambient temperature	-40	125	$^\circ C$

### Input/Output response table

IN	IN*(TF0211C)/ EN(TF0211E)	OUT (TF0211C)	OUT (TF0211E)
0	0	0	1
0	1	0	0
1	0	1	1
1	1	0	1



## Single 1.9A High-Speed, Low-Side Gate Driver

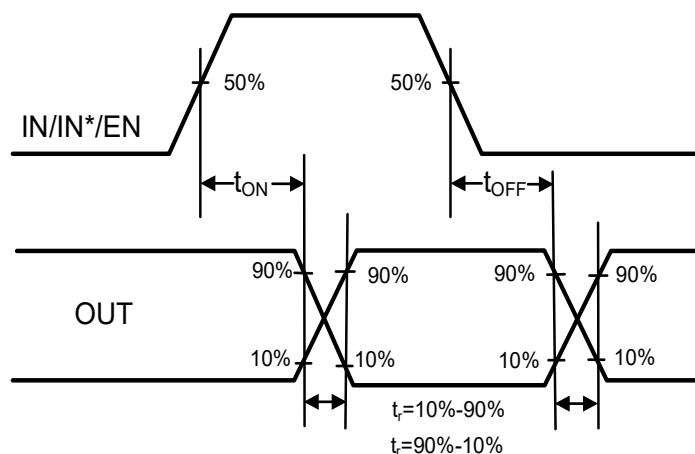
## Electrical Characteristics (NOTE3)

$V_{CC} = 12V$ ,  $T_A = 25^\circ C$ , unless otherwise specified.

Symbol	Parameter	Conditions	MIN	TYP	MAX	Unit
<b>DC Characteristics</b>						
$V_{IH}$	Logic "1" input voltage		2.4	1.6		V
$V_{IL}$	Logic "0" input voltage			1.3	0.8	
$I_{IN+}$	Logic "1" input bias current	$V_{IN} = 3V, V_{IN^*}/V_{EN} = 0V$			5	$\mu A$
$I_{IN-}$	Logic "0" input bias current	$V_{IN} = 0V, V_{IN^*}/V_{EN} = 3V$			2	
$V_{OH}$	High level output voltage, $V_{BIAS} - V_O$			25		mV
$V_{OL}$	Low level output voltage			25		
$I_{CCQ}$	$V_{CC}$ quiescent supply current	$V_{IN} = 0V$ or $3V$		50	100	$\mu A$
$I_{O+}$	Output high short circuit pulsed current			1.9		A
$I_{O-}$	Output low short circuit pulsed current			1.8		
$I_{RVS}$	Output reverse current withstand			250		mA
<b>Switching Characteristics</b>						
$t_r$	Turn-on rise time	$C_L = 1000pF$		15	25	ns
$t_f$	Turn-off fall time	$C_L = 1000pF$		15	25	ns
$t_{on}$	Turn-on propagation delay			35	50	ns
$t_{off}$	Turn-off propagation delay			35	55	ns

**NOTE3** The  $V_{IN}$  and  $I_{IN}$  parameters are applicable to the logic input pin: IN, IN\*, and EN. The  $V_O$  and  $I_O$  parameters are applicable to the output pin: OUT.

## Timing Waveforms



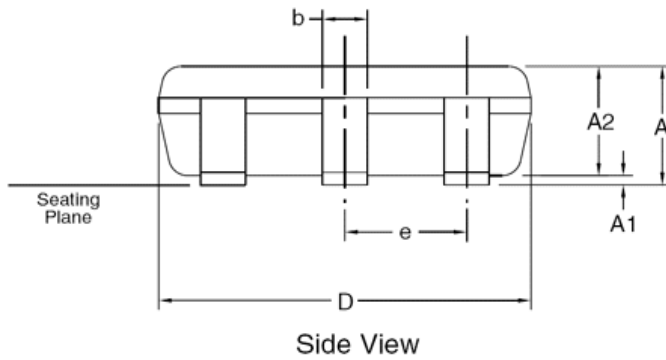
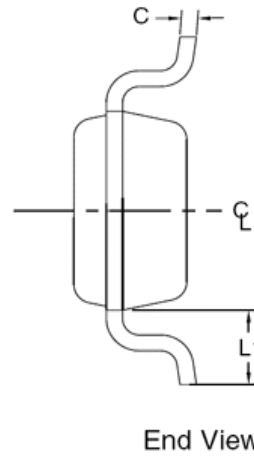
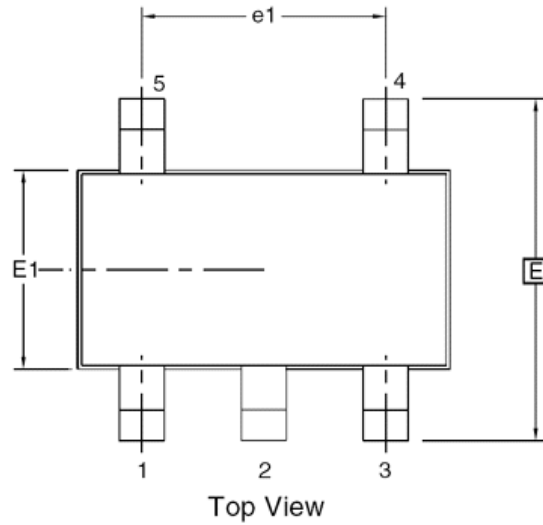
**Figure 1.** Switching Time Waveform Definitions



## Package Dimensions (SOT23-5L)

### Single 1.9A High-Speed, Low-Side Gate Driver

Please contact support@tfsemi.com for package availability.



**COMMON DIMENSIONS**  
(Unit of Measure = mm)

SYMBOL	MIN	NOM	MAX	NOTE
A	-	-	1.10	
A1	0.00	-	0.10	
A2	0.70	0.90	1.00	
c	0.08	-	0.20	4
D	2.90 BSC			2, 3
E	2.80 BSC			2, 3
E1	1.60 BSC			2, 3
L1	0.60 REF			
e	0.95 BSC			
e1	1.90 BSC			
b	0.30	-	0.50	4, 5



## Revision History

Rev.	Change	Owner	Date
1.0	First release	Keith Spaulding	3/20/2019

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