TF Semiconductor Solutions

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**

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.

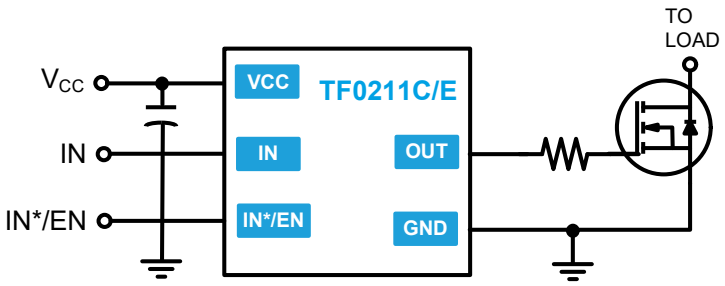
Because of fast propagation times of 35ns typical and rise/fall times of 15ns typical the TF0211 is well suited for high speed applications like switch mode power supplies and PFC circuits. The TF0211 comes in a space-saving SOT23-5L package and it operates over an extended -40 °C to +125 °C temperature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

Applications

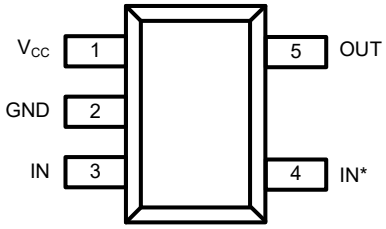
- Switch mode power supplies
- Line Drivers
- DC-DC Converters
- Motor Drive

SOT-23-5L

Typical Application

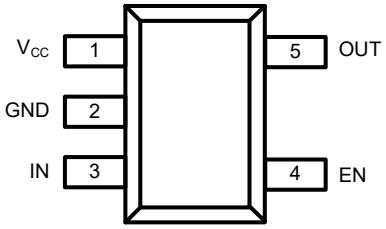


Pin Diagrams



TF0211C

Top View: SOT23-5L

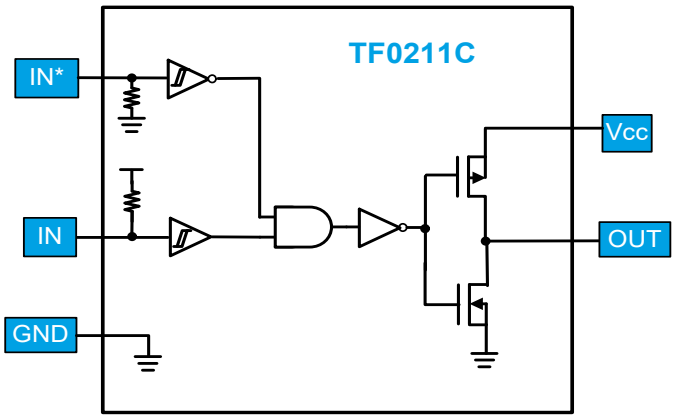


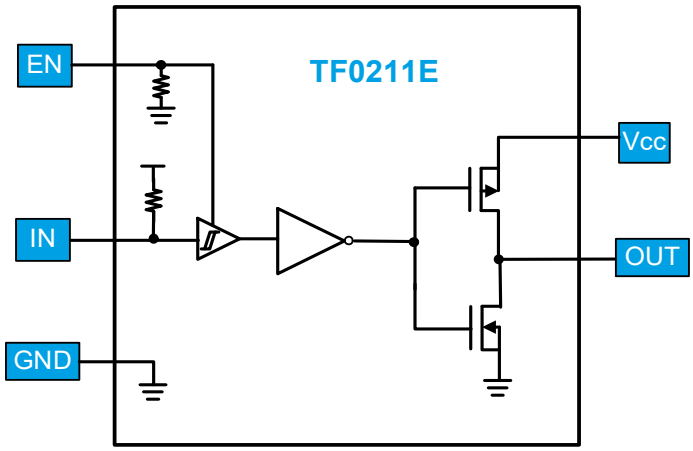
TF0211E

Pin Descriptions

PIN NAME	PIN NUMBER	PIN DESCRIPTION
V_{CC}	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





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 $T_A \leq 25$ °C
SOT23-5L.....TBD
SOT23-5L Thermal Resistance ***(NOTE2)***
θ_{JA}.....TBD °C/W
θ_{JC}.....TBD °C/W

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

Electrical Characteristics *(NOTE3)*

V_{CC} = 12V, T_A = 25 °C , unless otherwise specified.

Symbol	Parameter	Conditions	MIN	TYP	MAX	Unit
DC Characteristics						
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	µA
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	µA
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
Switching Characteristics						
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 propogation delay			35	50	ns
t_{off}	Turn-off propogation 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_0 and I_0 parameters are applicable to the output pin: OUT.*

Timing Waveforms

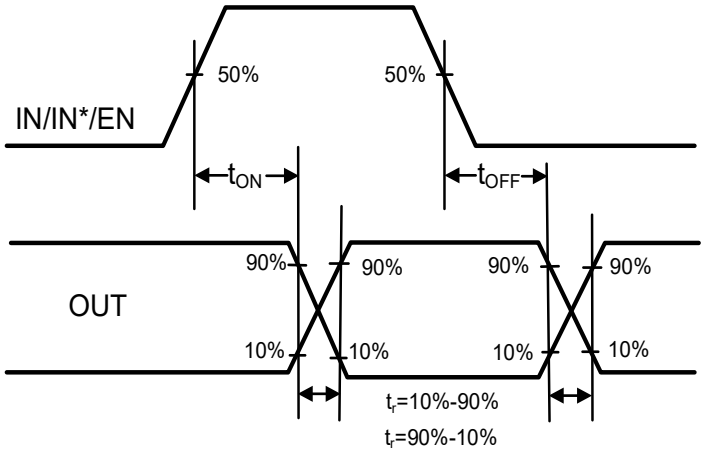
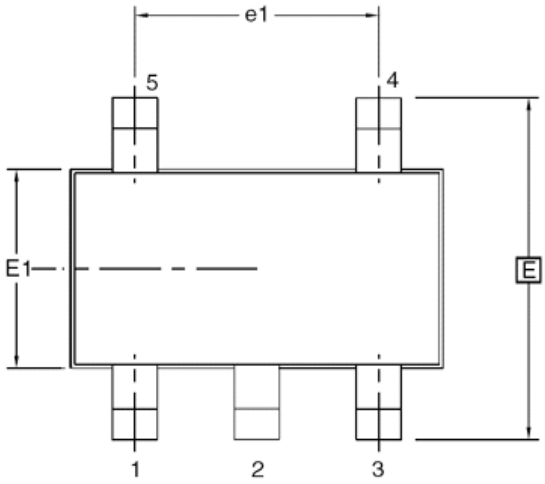


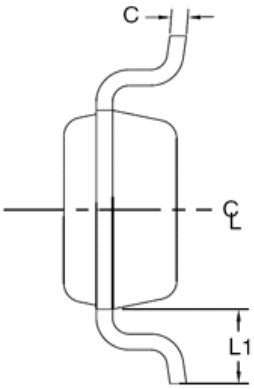
Figure 1. Switching Time Waveform Definitions

Package Dimensions (SOT23-5L)

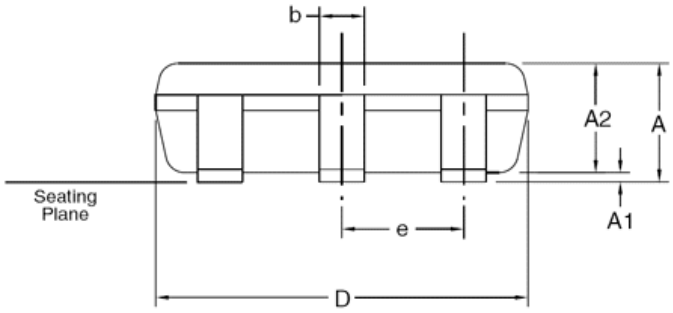
Please contact support@tfsemi.com for package availability.



Top View



End View



Side View

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

Important Notice

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