Advance Info

TF0211E1

1.9A High Speed, Low-Side, Single 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**
- **Single non-inverting input configuration**
- **Logic input thresholds can be varied with XREF level**
- **Fast propagation delays (55ns typical)**
- **Fast rise and fall times (15ns typical)**
- **Space saving SOT23-5L package**
- **Extended temperature range: -40°C to +125°C**

Description

The TF0211E1 high speed, low side MOSFET and IGBT driver is capable of driving 1.9A of peak current. The TF0211E1 has adjustable logic input thresholds depending on XREF level allowing use with 5.0V, 3.3V, and 2.5V supply systems. Fast and well matched propagation delays allow high speed operation, enabling a smaller, more compact power switching design using smaller associated components.

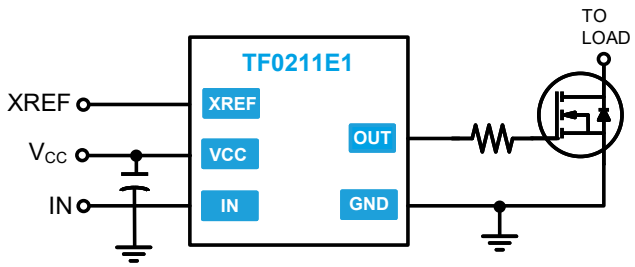
The TF0211E1 provides a single non-inverted input, comes in a space-saving SOT23-5L package, and operates over an extended -40°C to +125°C temperature range.

Applications

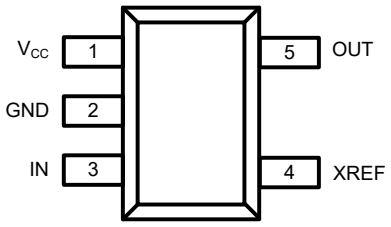
- Switch Mode Power Supplies
- Motor Drive
- Line Drivers
- DC-DC Converters

SOT-23-5L

Typical Application



Pin Diagrams

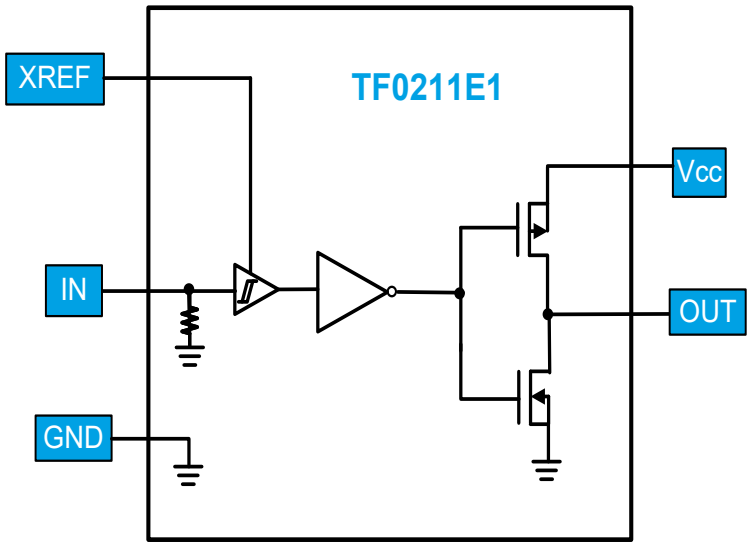


Top View: SOT23-5L

Pin Descriptions

PIN NAME	PIN NUMBER	PIN DESCRIPTION
V_{CC}	1	Supply voltage
GND	2	Ground, supply return
IN	3	Non-inverting logic input, in phase with OUT
XREF	4	External reference voltage, reference for input thresholds.
OUT	5	Gate drive output

Functional Block Diagram



Absolute Maximum Ratings *(NOTE1)*

Symbol	Parameter	MIN	MAX	Unit
V_{CC}	Supply voltage	-0.3	24	V
V_{OUT}	Output voltage (OUT)	-0.3	V_{CC}+0.3	
V_{IN}	Logic input voltage (IN)	-0.3	XREF+0.3	
V_{XREF}	Voltage on XREF	-0.3	5.5	
P_D	Package power dissipation @ $T_A \leq 25°C$ (SOT23-5L)	TBD	TBD	W
θ_{JA}	Thermal resistance, junction to ambient (SOT23-5L)***(NOTE2)***	TBD	TBD	°C/W
T_J	Junction temperature	-40	150	°C
T_L	Lead temperature (soldering 10s)		300	
T_S	Storage temperature	-55	150	
ESD	ESD Protection on all pins, HBM		2	kV
	MM		400	V

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.*

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_{IN}	Logic input voltage (IN)	0	XREF	
V_{XREF}	External reference voltage	2.5	5.0	
T_A	Ambient temperature	-40	125	°C

Electrical Characteristics *(NOTE3)*

V_{CC}=12V, T_A = 25°C , XREF=3.3V unless otherwise specified.

Symbol	Parameter	Conditions	MIN	TYP	MAX	Unit
DC Characteristics						
V_{IH}	Logic "1" input voltage	XREF=2.5V-5.0V		52		%XREF
V_{IL}	Logic "0" input voltage			42		
I_{IN+}	Logic "1" input bias current	V_{IN} = 3V, XREF=3V			5	μA
I_{IN-}	Logic "0" input bias current	V_{IN} = 0V, XREF=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	Inputs open		4	10	μA
I_{O+}	Output high short circuit pulsed current			1.9		A
I_{O-}	Output low short circuit pulsed current			1.8		
R_{OH}	Output Resistance, High	I_{OUT} = 10mA, V_{CC} = 12V		3.3		Ω
R_{OL}	Output Resistance, Low	I_{OUT} = 10mA, V_{CC} = 12V		2.3		Ω
Switching Characteristics						
t_r	Turn-on rise time	C_L = 1000pF, V_{CC} = 12V		15	25	ns
t_f	Turn-off fall time	C_L = 1000pF, V_{CC} = 12V		15	25	ns
t_{on}	Turn-on propogation delay	V_{CC} = 12V		35	50	ns
t_{off}	Turn-off propogation delay	V_{CC} = 12V		35	55	ns

NOTE3 *The V_{IN} and I_{IN} parameters are applicable to the logic input pin: IN. The V_0 and I_0 parameters are applicable to the output pin: OUT.*

Timing Waveforms

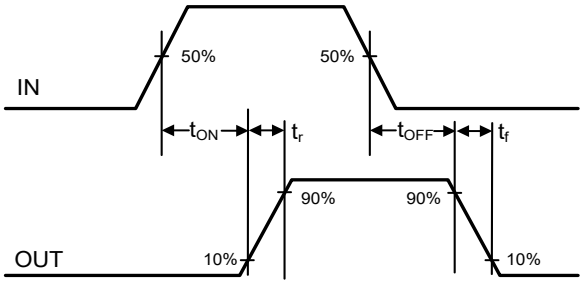
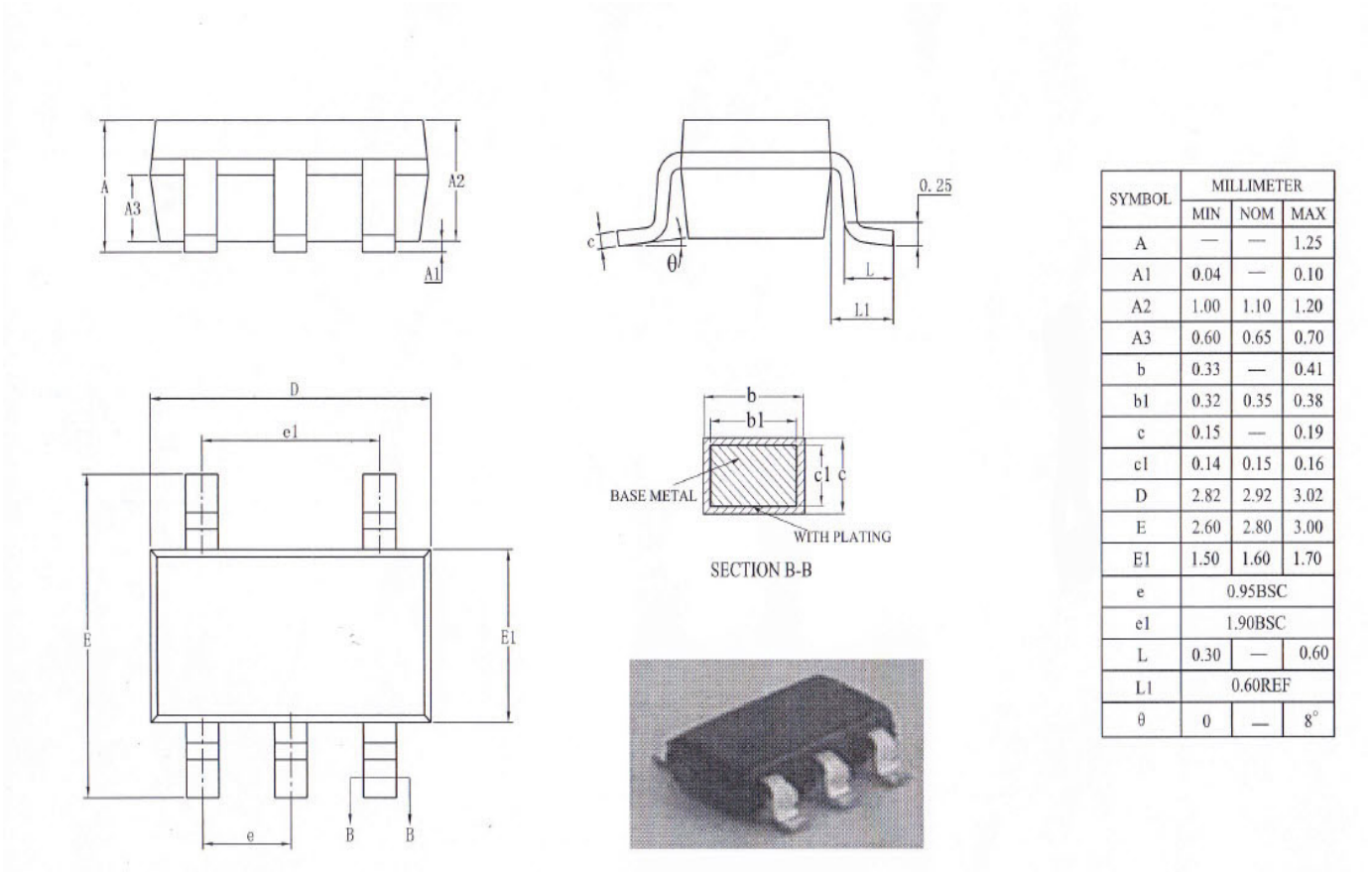


Figure 1. Switching Time Waveform Definitions

Package Dimensions (SOT23-5L)

Please contact support@tfsemi.com for package availability.



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.25
A1	0.04	—	0.10
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.33	—	0.41
b1	0.32	0.35	0.38
c	0.15	—	0.19
c1	0.14	0.15	0.16
D	2.82	2.92	3.02
E	2.60	2.80	3.00
E1	1.50	1.60	1.70
e	0.95BSC		
e1	1.90BSC		
L	0.30	—	0.60
L1	0.60REF		
θ	0	—	8°

Revision History

Rev.	Change	Owner	Date
1.0	First release, Advance Info datasheet	Keith Spaulding	1/5/2024

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