



TF0227

Dual 4.0A High Speed Low-Side Gate Driver, Design Document

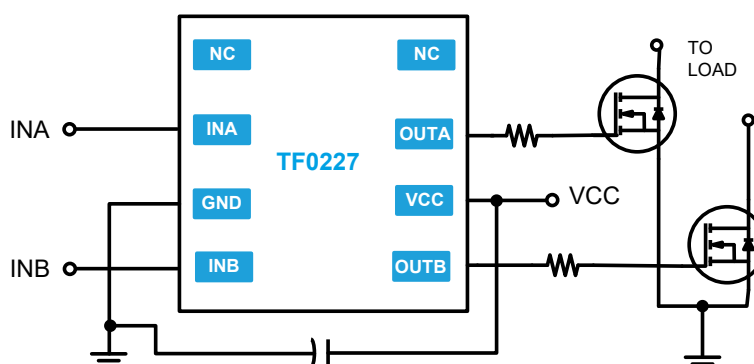
Features

- Efficient, low-cost solution for driving MOSFETs and IGBTs
- Wide supply voltage operating range: 4.5V to 20V
- 4.0A source / 4.0A sink output current capability
- Fast propagation delays (35ns typical)
- Fast rise and fall times (20ns typical)
- Logic input (IN) 3.3V capability
- Extended temperature range: -40°C to +125°C

Applications

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

Typical Application

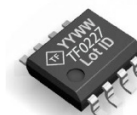


Description

The TF0227, dual, high speed, low side MOSFET and IGBT drivers are capable of driving 4.0A of peak current. The TF0227 logic inputs are compatible with standard TTL and CMOS levels (down to 3.3V) to interface easily with MCUs. Fast and well matched propagation delays allow high speed operation, enabling a smaller, more compact power switching design using smaller associated components.

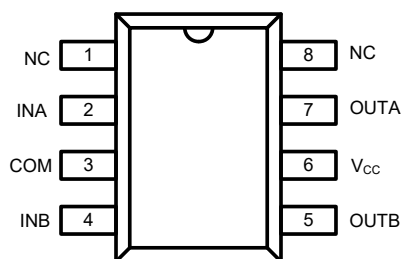
The TF0227 is offered in an SOIC-8(N) package and it operates over an extended -40 °C to +125 °C temperature range.

SOIC-8(N)



Ordering Information

PART NUMBER	PACKAGE	PACK / Qty	MARK
TF0227-TAU	SOIC-8(N)	Tube / 100	YYWW TF0227
TF0227-TAH	SOIC-8(N)	T&R / 2500	Lot ID

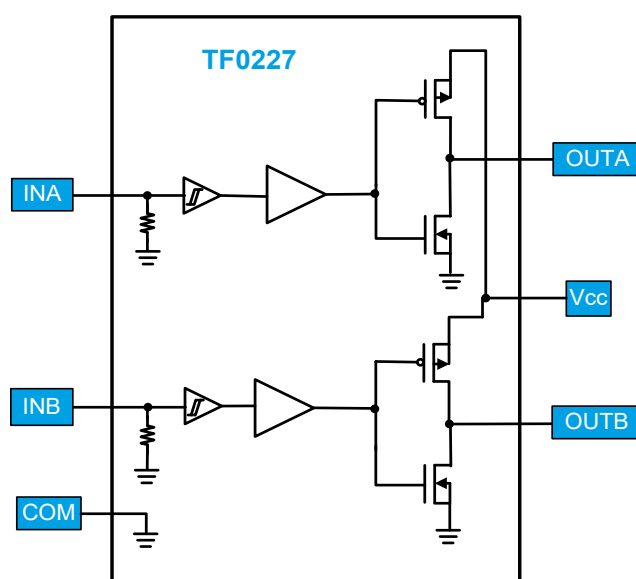


Top View: SOIC8

Pin Descriptions

PIN NAME	PIN NUMBER	PIN DESCRIPTION
NC	1, 8	No Connect
INA	2	Logic input for A phase, in phase with OUTA.
COM	3	Supply return
INB	4	Logic input for B phase, in phase with OUTB.
OUTB	5	Gate driver output B phase
V _{CC}	6	Supply input
OUTA	7	Gate driver output A phase

Functional Block Diagram





Absolute Maximum Ratings (NOTE1)

V_{CC} - Low-side fixed supply voltage.....-0.3V to +22V
 V_{OUT} - Output voltage (OUTA/OUTB).....-0.3V to V_{CC} +0.3V
 V_{IN} - Logic input voltage (INA, INB).....-0.3V to V_{CC} +0.3V
 ESD Protection on all pins.....2kV (HBM)

P_D - Package power dissipation at $T_A \leq 25^\circ\text{C}$
 SOIC80.625W
 SOIC8 Thermal Resistance **(NOTE2)**
 θ_{JA}200 $^\circ\text{C}/\text{W}$
 T_J - Junction operating temperature.....+150 $^\circ\text{C}$
 T_L - Lead Temperature (soldering, 10 seconds).....+300 $^\circ\text{C}$
 T_{stg} - Storage temperature-55 to 150 $^\circ\text{C}$

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.

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	20	V
V_{OUT}	Output voltage (OUTA/OUTB)	0	V_{CC}	V
V_{IN}	Logic input voltage (INA, INB)	0	5	V
T_A	Ambient temperature	-40	125	$^\circ\text{C}$



Electrical Characteristics (NOTE3)

V_{BIAS} (4.5V < V_{CC} < 20V), $T_A = 25\text{ }^\circ\text{C}$, unless otherwise specified.

Symbol	Parameter	Conditions	MIN	TYP	MAX	Unit
DC Characteristics						
V_{IH}	Logic "1" input voltage		2.4			V
V_{IL}	Logic "0" input voltage				0.7	
I_{IN+}	Logic "1" input bias current	$V_{IN} = 3.3V$			10	μA
I_{IN-}	Logic "0" input bias current	$V_{IN} = 0V$			10	
V_{OH}	High level output voltage, $V_{BIAS} - V_O$	$I_{OUT} = -10\text{mA}$		30	100	mV
V_{OL}	Low level output voltage	$I_{OUT} = 10\text{mA}$		16	50	
I_{CCQ}	V_{CC} quiescent supply current	$V_{IN} = 0V$ or $3.3V$		40	100	μA
I_O	Output short circuit pulsed current	$V_{CC} = 14V$		4.0		A
R_{OH}	Output Resistance, High	$I_{OUT} = -10\text{mA}$, $V_{CC} = 14V$		1.5		Ω
R_{OL}	Output Resistance, Low	$I_{OUT} = 10\text{mA}$, $V_{CC} = 14V$		1		Ω
Switching Characteristics						
t_r	Turn-on rise time	$C_L = 1000\text{pF}$, $V_{CC} = 14V$		20	40	ns
t_f	Turn-off fall time	$C_L = 1000\text{pF}$, $V_{CC} = 14V$		20	40	ns
t_{on}	Turn-on propagation delay	$C_L = 1000\text{pF}$, $V_{CC} = 14V$		40	100	ns
t_{off}	Turn-off propagation delay	$C_L = 1000\text{pF}$, $V_{CC} = 14V$		35	50	ns

NOTE3 The V_{IN} and I_{IN} parameters are applicable to the logic input pin: INA and INB. The V_O and I_O parameters are applicable to the output pins: OUTA and OUTB.

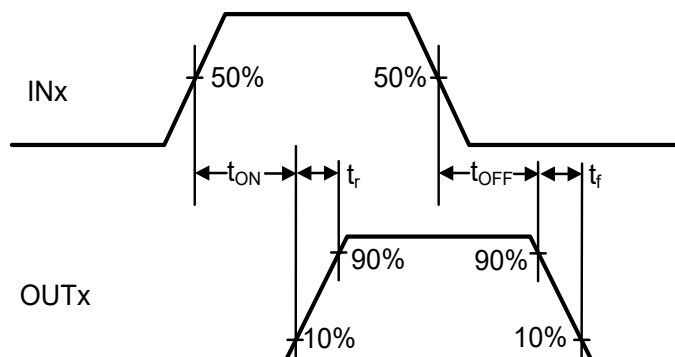


Figure 1. Switching Time Waveform Definitions



Revision History

Rev.	Change	Owner	Date
1.0	First release, Advance Info datasheet	Keith Spaulding	9/15/2017
1.1	Spec change match to early production data	Keith Spaulding	2/2/2018

TF Semiconductor Solutions (TFSS) PRODUCTS ARE NEITHER DESIGNED NOR INTENDED FOR USE IN MILITARY AND/OR AEROSPACE, AUTOMOTIVE OR MEDICAL DEVICES OR SYSTEMS UNLESS THE SPECIFIC TFSS PRODUCTS ARE SPECIFICALLY DESIGNATED BY TFSS FOR SUCH USE. BUYERS ACKNOWLEDGE AND AGREE THAT ANY SUCH USE OF TFSS PRODUCTS WHICH TFSS HAS NOT DESIGNATED FOR USE IN MILITARY AND/OR AEROSPACE, AUTOMOTIVE OR MEDICAL DEVICES OR SYSTEMS IS SOLELY AT THE BUYER'S RISK.

TFSS assumes no liability for application assistance or customer product design. Customers are responsible for their products and applications using TFSS products.

Resale of TFSS products or services with statements different from or beyond the parameters stated by TFSS for that product or service voids all express and any implied warranties for the associated TFSS product or service. TFSS is not responsible or liable for any such statements.

©2017 TFSS. All Rights Reserved. Information and data in this document are owned by TFSS wholly and may not be edited, reproduced, or redistributed in any way without the express written consent from TFSS.

For additional information please contact support@tfsemi.com or visit www.tfsemi.com