600 V / 4 A, High-Side Automotive Gate Driver IC

FAD7171MX

Description

The FAD7171MX is a monolithic high−side gate drive IC that can drive high−speed MOSFETs and IGBTs that operate up to +600 V. It has a buffered output stage with all NMOS transistors designed for high pulse current driving capability and minimum cross−conduction. **onsemi**'s high−voltage process and common−mode noise−canceling techniques provide stable operation of the high−side driver under high dv/dt noise circumstances. An advanced level−shift circuit offers °C

MARKING DIAGRAM

FAD7171MX	SOIC8 (Pb−Free / Halogen Free)	2500 / Tape & Reel

Applications

- Common Rail Injection Systems
- DC−DC Converter
- Motor Drive (Electric Power Steering, Fans)

Related Product Resources

- FAN7171 Product Folder
- FAD7171 Product Folder
- AND9674 Design and Application Guide of Bootstrap Circuit for High−Voltage Gate−Drive IC
- AN−8102 Recommendations to Avoid Short Pulse Width Issues in HVIC Gate Driver Applications
- AN−9052 Design Guide for Selection of Bootstrap Components

© Semiconductor Components Industries, LLC, 2022

PIN DESCRIPTION

Pin No.	Symbol	Description
1	V_{DD}	Supply Voltage
2	IN	Logic Input for High−Side Gate Driver Output
3	NC	No Connection
4	GND	Ground
5	NC	No Connection
6	V_S	High−Voltage Floating Supply Return
7	HO	High−Side Driver Output
8	V_B	High−Side Floating Supply

ABSOLUTE MAXIMUM RATINGS

Symbol	Characteristics	Min	Max	Unit
V_S	High−Side Floating Offset Voltage	V_B − 25	V_B + 0.3	V
V_B	High−Side Floating Supply Voltage	−0.3	625.0	V
V_{HO}	High−Side Floating Output Voltage	V_S − 0.3	V_B + 0.3	V
V_{DD}	Low−Side and Logic Supply Voltage	−0.3	25	V
V_{IN}	Logic Input Voltage	−0.3	V_{DD} + 0.3	V
dV_S/dt	Allowable Offset Voltage Slew Rate	−	±50	V/ns
P_D	Power Dissipation (Notes 2, 3, 4)	−	0.625	W
θ_{JA}	Thermal Resistance	−	200	°C/W
T_J	Junction Temperature			

ELECTRICAL CHARACTERISTICS (V_{BIAS} (V_{DD}, V_{BS}) = 15 V, −40°C ≤ T_A ≤ 125°C, unless otherwise specified. The V_{IN} and I_{IN} parameters are referenced to GND. The V_O and I_O parameters are relative to V_S and are applicable to the respective output HO)

Symbol

TYPICAL PERFORMANCE CHARACTERISTICS

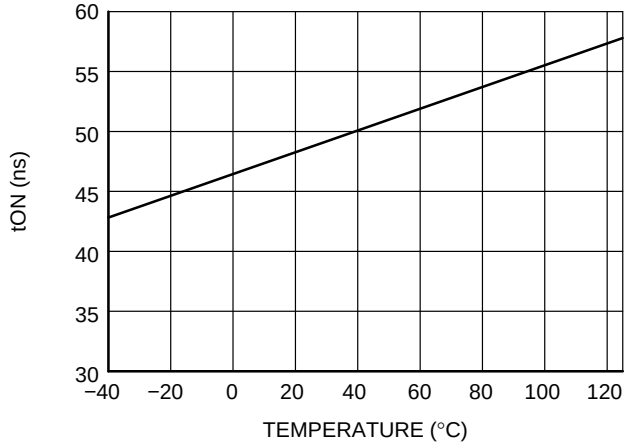


Figure 4. Turn−On Propagation Delay vs. Temperature

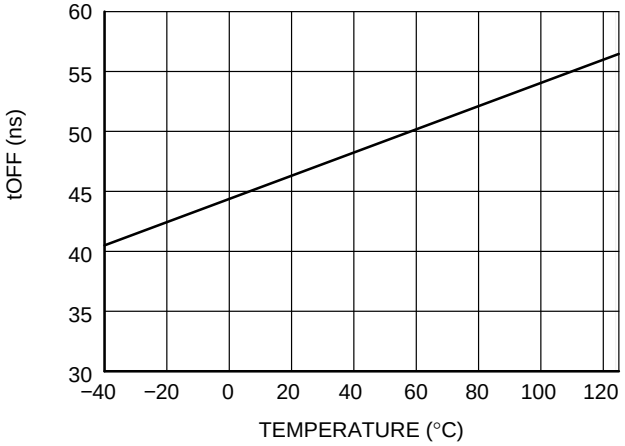


Figure 5. Turn−Off Propagation Delay vs. Temperature

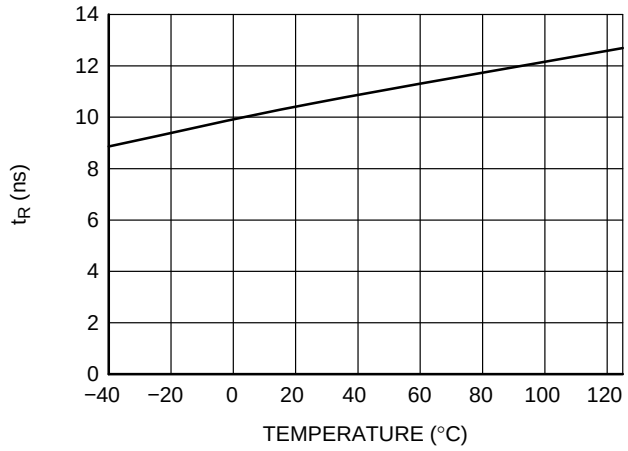


Figure 6. Turn−On Rise Time vs. Temperature

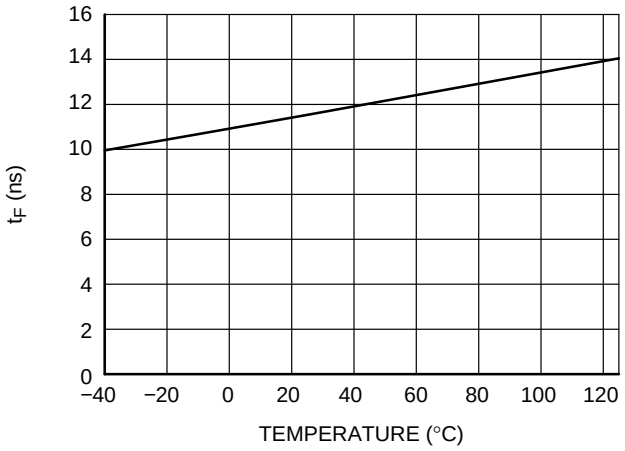


Figure 7. Turn−Off Fall Time vs. Temperature

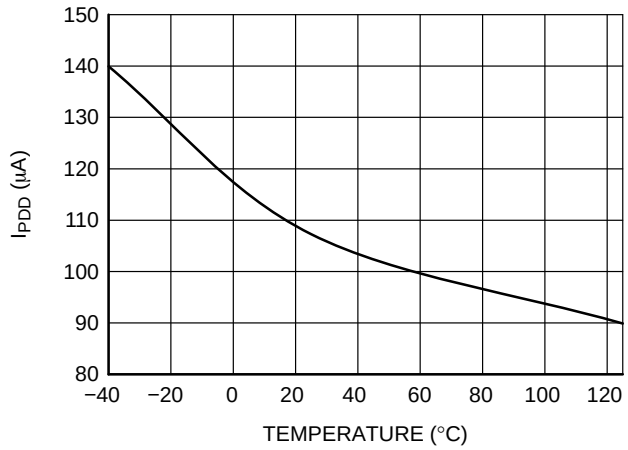


Figure 8. Operating V_{DD} Supply Current vs. Temperature

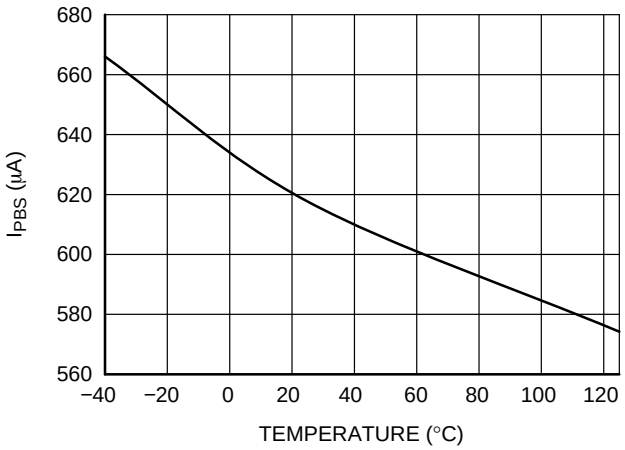


Figure 9. Operating V_{BS} Supply Current vs. Temperature

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

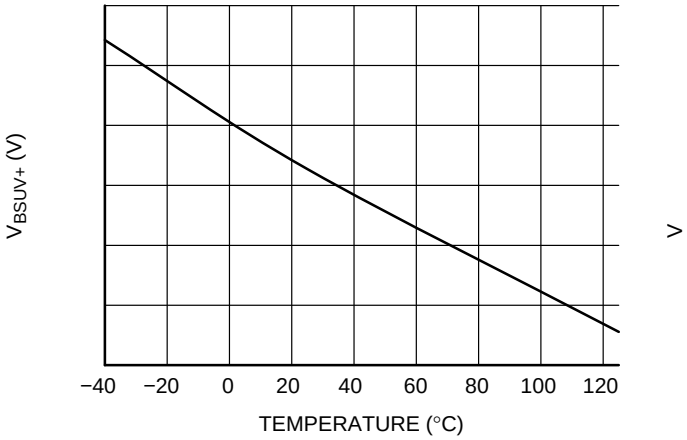


Figure 10. V_{BS} UVLO+ vs. Temperature

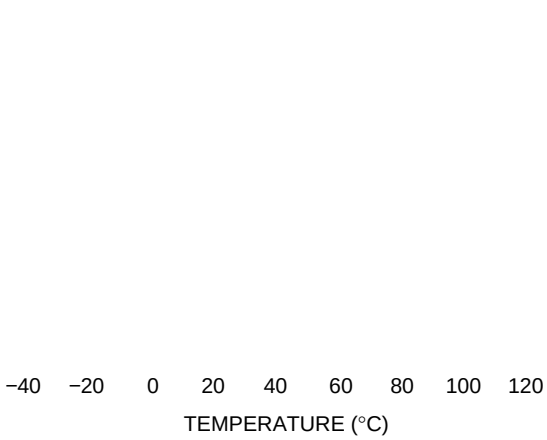


Figure 11. V_{BS} UVLO− vs. Temperature

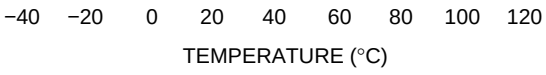


Figure 12. Logic High Input Voltage vs. Temperature

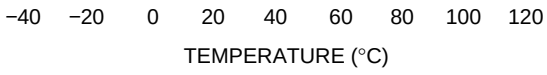


Figure 13. Logic Low Input Voltage vs. Temperature

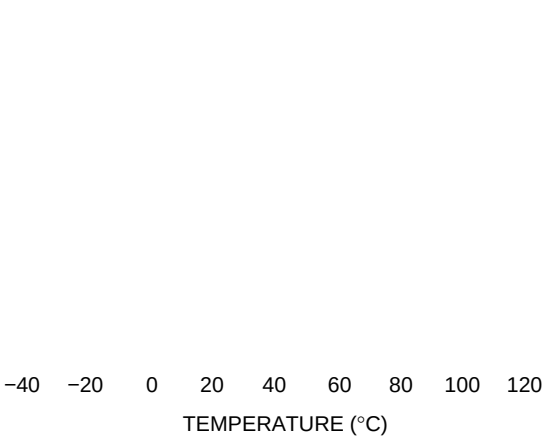


Figure 14. RIN vs. Temperature

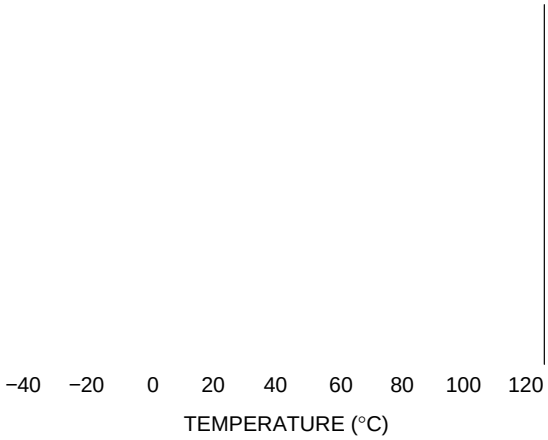


Figure 15. Output Voltage vs. Temperature

SWITCHING TIME DEFINITIONS

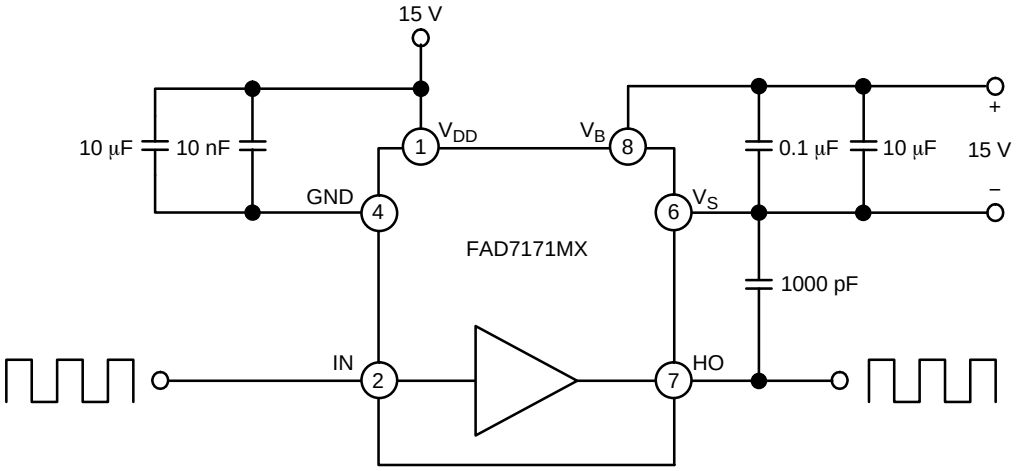


Figure 22. Switching Time Test Circuit (Referenced 8−SOIC)

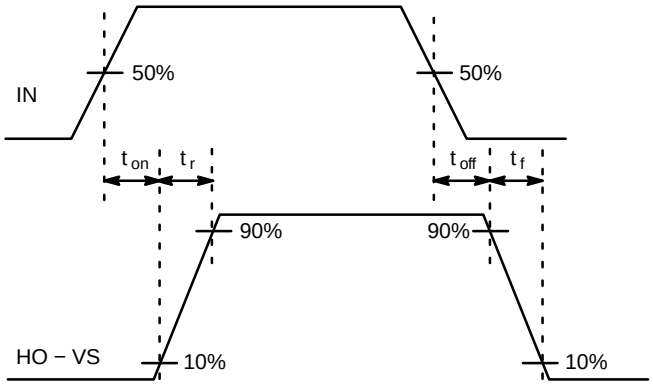
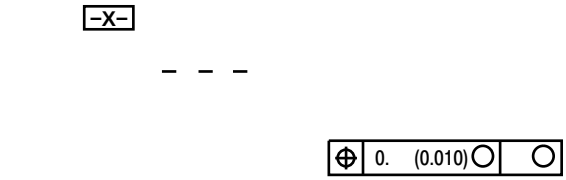


Figure 23. Switching Time Waveform Definitions



C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
H	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0	8	0	8
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244

0. (0.010) 1 0 1 1 0 0 1 . 0 0 0 0 . 1 1 0 1 1 . 1 0 . 0 0 0 1 . 1 1 0 0 1 1 0 ( ) 0 1 . 1 1 0 0 1 1 . 1 1 . 1 0 0 . 0 0 0 . 1 1 . 1 0 0 . 0 0 0 1 1 . 1 0 0 0 1 0 0 0 0 .)

onsemi, , and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba “**onsemi**” or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**’s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent−Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided “as−is” and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi**