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NTE7226 Integrated Circuit High Voltage, High Speed MOSFET/IGBT Driver w/High and Low Side Outputs 14-Lead DIP Type Package

Description:

The NTE7226 is a high voltage, high speed power MOSFET and IGBT driver with independent high and low side referenced output channels in a 14-Lead DIP type package. HVIC and latch immune CMOS technologies enable ruggedized monolithic construction. Logic inputs are compatible with standard CMOS or LSTTL output, down to 3.3V logic. The output drivers feature a high pulse current buffer stage designed for minimum driver cross-conduction. Propagation delays are matched to simplify use in high frequency applications. The floating channel can be used to drive an N-Channel power MOSFET or IGBT in the high side configuration which operates up to 500 volts.

Features:

- Floating Channel Designed for Bootstrap Operation
 Fully Operational to +500V
 Tolerant to Negative Transient Voltage
 dV/dt Immune
- Gate Drive Supply Range from 10V to 20V
- Undervoltage Lockout for Both Channels
- 3.3V Logic Compatible
 Separate Logic Supply Range from 3.3V to 20V
 Logic an Power Ground $\pm 5V$ Offset
- CMOS Schmitt-Triggered Inputs with Pull-Down
- Cycle by Cycle Edge-Triggered Shutdown Logic
- Matched Propagation Delay for Both Channels
- Outputs in Phase with Inputs

Absolute Maximum Ratings: (Note 1)

High Side Floating Supply Voltage, V_B	-0.3 to 525V
High Side Floating Supply Offset Voltage, V_S	$V_B - 25$ to $V_B + 0.3V$
High Side Floating Output Voltage, V_{HO}	$V_S - 0.3$ to $V_B + 0.3V$
Low Side Fixed Supply Voltage, V_{CC}	-0.3 to +25V
Low Side Output Voltage, V_{LO}	-0.3 to $V_{CC} + 0.3V$
Logic Supply Voltage, V_{DD}	-0.3 to $V_{SS} + 25V$
Logic Supply Offset Voltage, V_{SS}	$V_{CC} - 25$ to $V_{CC} + 0.3V$
Logic Input Voltage (HIN, LIN, & SD), V_{IN}	$V_{SS} - 0.3$ to $V_{DD} + 0.3V$
Maximum Allowable Offset Supply Voltage Transient, dV_S/dt	50V/ns
Package Power Dissipation ($T_A \leq +25^\circ C$), P_D	1.6W

Note 1. Absolute Maximum Ratings indicate sustained limits beyond which damage to the device may occur. All voltage parameters are absolute voltages referenced to COM. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions.

Absolute Maximum Ratings (Cont'd): (Note 1)

Operating Junction Temperature, T_J	+150°C
Storage Temperature Range, T_{stg}	-55° to +150°C
Thermal Resistance, Junction-to-Ambient, R_{thJA}	75°C/W
Lead Temperature (During Soldering, 10sec), T_L	+300°C

Note 1. Absolute Maximum Ratings indicate sustained limits beyond which damage to the device may occur. All voltage parameters are absolute voltages referenced to COM. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions.

Recommended Operating Conditions: (Note 2)

Parameter	Symbol	Min	Max	Unit
High Side Floating Supply Absolute Voltage	V_B	$V_S + 10$	$V_S + 20$	V
High Side Floating Supply Offset Voltage	V_S	Note 3	500	V
High Side Floating Output Voltage	V_{HO}	V_S	V_B	V
Low Side Fixed Supply Voltage	V_{CC}	10	20	V
Low Side Output Voltage	V_{LO}	0	V_{CC}	V
Logic Supply Voltage	V_{DD}	$V_{SS} + 3$	$V_{SS} + 20$	V
Logic Supply Offset Voltage	V_{SS}	-5 (Note 4)	5	V
Logic Input Voltage (HIN, LIN, & SD)	V_{IN}	V_{SS}	V_{DD}	V
Ambient Temperature	T_A	-40	+125	°C

Note 2. For proper operation, the device should be used within the recommended conditions. The V_S and V_{SS} offset ratings are tested with all supplies biased at 15V differential.

Note 3. Logic operational for V_S of -4V to +500V. Logic state held for V_S of -4V to $-V_{BS}$.

Note 4. When $V_{DD} < 5V$, the minimum V_{SS} offset is limited to $-V_{DD}$.

Electrical Characteristics: (V_{BIAS} (V_{CC} , V_{BS} , V_{DD}) = 15V, V_{SS} = COM, T_A = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Dynamic Characteristics ($C_L = 1000pF$)						
Turn-On Propagation Delay	t_{on}	$V_S = 0V$	-	120	150	ns
Turn-Off Propagation Delay	t_{off}	$V_S = 500V$	-	94	125	ns
Shutdown Propagation Delay	t_{sd}	$V_S = 500V$	-	110	140	ns
Turn-On Rise Time	t_r		-	25	35	ns
Turn-Off Fall Time	t_f		-	17	25	ns
Delay Matching, HS & LS Turn-On/Off	MT		-	-	10	ns
Static Characteristics (Note 5)						
Logic "1" Input Voltage	V_{IH}		9.5	-	-	V
Logic "0" Input Voltage	V_{IL}		-	-	6.0	V
High Level Output Voltage, $V_{BIAS} - V_O$	V_{OH}	$I_O = 0A$	-	-	1.2	V
Low Level Output Voltage, V_O	V_{OL}	$I_O = 0A$	-	-	0.1	V
Offset Supply Leakage Current	I_{LK}	$V_B = V_S = 500V$	-	-	50	μA
Quiescent V_{BS} Supply Current	I_{QBS}	$V_{IN} = 0V$ or V_{DD}	-	125	230	μA
Quiescent V_{CC} Supply Current	I_{QCC}	$V_{IN} = 0V$ or V_{DD}	-	180	340	μA
Quiescent V_{DD} Supply Current	I_{QDD}	$V_{IN} = 0V$ or V_{DD}	-	15	30	μA

Note 5. The V_{IN} , V_{TH} , and I_{IN} parameters are referenced for V_{SS} and are applicable to all three logic input leads: HIN, LIN and SD. The V_O and I_O parameters re referenced to COM and are applicable to the respective output leads: HO or LO.

Electrical Characteristics (Cont'd): (V_{BIAS} (V_{CC} , V_{BS} , V_{DD}) = 15V, V_{SS} = COM, T_A = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics (Cont'd) (Note 5)						
Logic "1" Input Bias Current	I_{IN+}	$V_{IN} = V_{DD}$	-	20	40	μA
Logic "0" Input Bias Current	I_{IN-}	$V_{IN} = 0V$	-	-	1.0	μA
V_{BS} Supply Undervoltage Positive Going Threshold	V_{BSUV+}		7.5	8.6	9.7	V
V_{BS} Supply Undervoltage Negative Going Threshold	V_{BSUV-}		7.0	8.2	9.4	V
V_{CC} Supply Undervoltage Positive Going Threshold	V_{CCUV+}		7.4	8.5	9.6	V
V_{CC} Supply Undervoltage Negative Going Threshold	V_{CCUV-}		7.0	8.2	9.4	V
Output High Short Circuit Pulsed Current	I_{O+}	$V_O = 0V$, $V_{IN} = V_{DD}$, $PW \leq 10\mu s$	2.0	2.5	-	A
Output Low Short Circuit Pulsed Current	I_{O-}	$V_O = 15V$, $V_{IN} = V_{DD}$, $PW \leq 10\mu s$	2.0	2.5	-	A

Note 5. The V_{IN} , V_{TH} , and I_{IN} parameters are referenced for V_{SS} and are applicable to all three logic input leads: HIN, LIN and SD. The V_O and I_O parameters re referenced to COM and are applicable to the respective output leads: HO or LO.

Pin Definitions:

Symbol	Description
V_{DD}	Logic Supply
HIN	Logic Input for High Side Gate Driver Output (HO), In Phase
SD	Logic Input for Shutdown
LIN	Logic Input for Low Side gate Driver Output (LO), In Phase
V_{SS}	Logic Ground
V_B	High Side Floating Supply
HO	High Side Gate Drive Output
V_S	High Side Floating Supply Return
V_{CC}	Low Side Supply
LO	Low Side Gate Drive Output
COM	Low Side Return



