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## NTE7071 Integrated Circuit Dual, Full-Bridge Driver

**Description:**

The NTE7071 is a high voltage, high current, dual, full-bridge driver in a 15-Lead Staggered SIP type package designed to accept standard TTL logic levels and drive inductive loads such as relays, solenoids, DC, and stepping motors. Two enable inputs are provided to enable or disable the device independently of the input signals. The emitters of the lower transistors of each bridge are connected together and the corresponding external terminal can be used for the connection of an external sensing resistor. An additional supply input is provided so that the logic works at a lower voltage.

**Features:**

- Operating Supply Voltage up to 46V
- Total DC Current up to 4A
- Low Saturation Voltage
- Overtemperature Protection
- Logical “0” Input Voltage up to 1.5V (High Noise Immunity)

**Absolute Maximum Ratings:**

Power Supply, $V_S$ .....	50V
Logical Supply Voltage, $V_{SS}$ .....	7V
Input and Enable Voltage, $V_I, V_{en}$ .....	-0.3 to +7.0V
Peak Output Current (Each Channel), $I_O$	
Non-Repetitive ( $t = 100\mu s$ ) .....	3A
Repetitive (80% ON; 20% OFF, $t_{on} = 10ms$ ) .....	2.5A
DC Operation .....	2A
Sensing Voltage, $V_{sens}$ .....	-1 to +2.3V
Total Power Dissipation ( $T_C = +75^\circ C$ ), $P_{tot}$ .....	25W
Operating Junction Temperature Range, $T_J$ .....	-40° to +150°C
Storage Temperature Range, $T_{stg}$ .....	-40° to +150°C
Thermal Resistance, Junction-to-Case, $R_{thJC}$ .....	3°C/W
Thermal Resistance, Junction-to-Ambient, $R_{thJA}$ .....	35°C/W

**Electrical Characteristics:** ( $V_S = 42V$ ,  $V_{SS} = 5V$ ,  $T_J = +25^\circ C$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Supply Voltage (Pin4)	$V_S$	Operative Condition	$V_{IH}+2.5$	-	46	V	
Logic Supply Voltage (Pin9)	$V_{SS}$		4.5	5.0	7.0	V	
Quiescent Supply Current (Pin4)	$I_S$	$V_{en} = H, I_L = 0$	$V_i = L$	-	13	22	mA
			$V_i = H$	-	50	70	mA
		$V_{en} = L, V_i = X$	-	-	4	mA	
Quiescent Current from $V_{SS}$ (Pin9)	$I_{SS}$	$V_{en} = H, I_L = 0$	$V_i = L$	-	24	36	mA
			$V_i = H$	-	7	12	mA
		$V_{en} = L, V_i = X$	-	-	6	mA	
Input Low Voltage (Pin5, Pin7, Pin10, Pin12)	$V_{iL}$		-0.3	-	1.5	V	
Input High Voltage (Pin5, Pin7, Pin10, Pin12)	$V_{iH}$		2.3	-	$V_{SS}$	V	
Low Voltage Input Current (Pin5, Pin7, Pin10, Pin12)	$I_{iL}$	$V_i = L$	-	-	-10	$\mu A$	
High Voltage Input Current (Pin5, Pin7, Pin10, Pin12)	$I_{iH}$	$V_i = H \leq V_{SS} - 0.6V$	-	30	100	$\mu A$	
Enable Low Voltage (Pin6, Pin11)	$V_{en} = L$		-0.3	-	1.5	V	
Enable High Voltage (Pin6, Pin11)	$V_{en} = H$		2.3	-	$V_{SS}$	V	
Low Voltage Enable Current (Pin6, Pin11)	$I_{en} = L$	$V_{en} = L$	-	-	-10	$\mu A$	
High Voltage Enable Current (Pin6, Pin11)	$I_{en} = H$	$V_{en} = H \leq V_{SS} - 0.6V$	-	30	100	$\mu A$	
Source Saturation Voltage	$V_{CE(sat)} (H)$	$I_L = 1A$	-	1.35	1.70	V	
		$I_L = 2A$	-	2.0	2.7	V	
Sink Saturation Voltage	$V_{CE(sat)} (L)$	$I_L = 1A$ , Note 3	-	1.2	1.6	V	
		$I_L = 2A$ , Note 3	-	1.7	2.3	V	
Total Drop	$V_{CE(sat)}$	$I_L = 1A$ , Note 3	-	-	3.2	V	
		$I_L = 2A$ , Note 3	-	-	4.9	V	
Sensing Voltage (Pin1, Pin15)	$V_{sens}$	Note 1	-1	-	2	V	
Source Current Turn-Off Delay	$T_1 (V_i)$	$0.5 V_i$ to $0.9 I_L$ , Note 2	-	1.5	-	$\mu s$	
Fall Time	$T_2 (V_i)$	$0.9 I_L$ to $0.1 I_L$ , Note 2	-	0.2	-	$\mu s$	
Turn-On Delay	$T_3 (V_i)$	$0.5 V_i$ to $0.1 I_L$ , Note 2	-	2	-	$\mu s$	
Rise Time	$T_4 (V_i)$	$0.1 I_L$ to $0.9 I_L$ , Note 2	-	0.7	-	$\mu s$	
Sink Current Turn-Off Delay	$T_5 (V_i)$	$0.5 V_i$ to $0.9 I_L$ , Note 2	-	0.7	-	$\mu s$	
Fall Time	$T_6 (V_i)$	$0.9 I_L$ to $0.1 I_L$ , Note 2	-	0.25	-	$\mu s$	
Turn-On Delay	$T_7 (V_i)$	$0.5 V_i$ to $0.9 I_L$ , Note 2	-	1.6	-	$\mu s$	
Rise Time	$T_8 (V_i)$	$0.1 I_L$ to $0.9 I_L$ , Note 2	-	0.2	-	$\mu s$	

Note 1. Sensing voltage can be  $-1V$  for  $t \leq 50\mu s$ ; in steady state  $V_{sensmin} \geq -0.5V$ .

Note 2. The load must be a pure resistor.

Note 3. Pin1 and Pin15 connected to GND.

**Electrical Characteristics (Cont'd):** ( $V_S = 42V$ ,  $V_{SS} = 5V$ ,  $T_J = +25^\circ C$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Commutation Frequency	$f_c (V_I)$	$I_L = 2A$	-	25	40	kHz
Source Current						
Turn-Off Delay	$T_1 (V_{en})$	$0.5 V_{en}$ to $0.9 I_L$ , Note 2	-	3	-	$\mu s$
Fall Time	$T_2 (V_{en})$	$0.9 I_L$ to $0.1 I_L$ , Note 2	-	1	-	$\mu s$
Turn-On Delay	$T_3 (V_{en})$	$0.5 V_{en}$ to $0.1 I_L$ , Note 2	-	0.3	-	$\mu s$
Rise Time	$T_4 (V_{en})$	$0.1 I_L$ to $0.9 I_L$ , Note 2	-	0.4	-	$\mu s$
Sink Current						
Turn-Off Delay	$T_5 (V_{en})$	$0.5 V_{en}$ to $0.9 I_L$ , Note 2	-	2.2	-	$\mu s$
Fall Time	$T_6 (V_{en})$	$0.9 I_L$ to $0.1 I_L$ , Note 2	-	0.35	-	$\mu s$
Turn-On Delay	$T_7 (V_{en})$	$0.5 V_{en}$ to $0.1 I_L$ , Note 2	-	0.25	-	$\mu s$
Rise Time	$T_8 (V_{en})$	$0.1 I_L$ to $0.9 I_L$ , Note 2	-	0.1	-	$\mu s$
Commutation Frequency	$f_c (V_{en})$	$I_L = 2A$	-	1	-	kHz

Note 1. Sensing voltage can be  $-1V$  for  $t \leq 50\mu s$ ; in steady state  $V_{sens\ min} \geq -0.5V$ .

Note 2. The load must be a pure resistor.

Note 3. Pin1 and Pin15 connected to GND.



