INTEGRATED CIRCUITS
UNITRODE

L298

Dual Full-Bridge Power Driver

FEATURES

- Operating Supply Voltage up to 46V
- Total Saturation Voltage 3.4V max at 1A
- Overtemperature Protected
- Operates in Switched and L/R Regulation Modes
- 25W Power-Tab Package for Low Installed Cost
- Individual Logic Inputs for Each Driver
- Channel-Enable Logic Inputs for Driver Pairs

DESCRIPTION

The L298 is a power integrated circuit usable for driving resistive and inductive loads. This device contains four push-pull drivers with separate logic inputs. Two enable inputs are provided for power down and chopping. Each driver is capable of driving loads up to 2A continuously.

Logic inputs to the L298 have high input thresholds (1.85V) and hysteresis to provide trouble-free operation in noisy environments normally associated with motors and inductors. The L298 input currents and thresholds allow the device to be driven by TTL and CMOS systems without buffering or level shifting.

The emitters of the low-side power drivers are separately available for current sensing. Feedback from the emitters can be used to control load current in a switching mode, or can be used to detect load faults.

Separate logic and load supply lines are provided to reduce total IC power consumption. Power consumption is reduced further when the enable inputs are low. This makes the L298 ideal for systems that require low standby current, such as portable or battery-operated equipment.

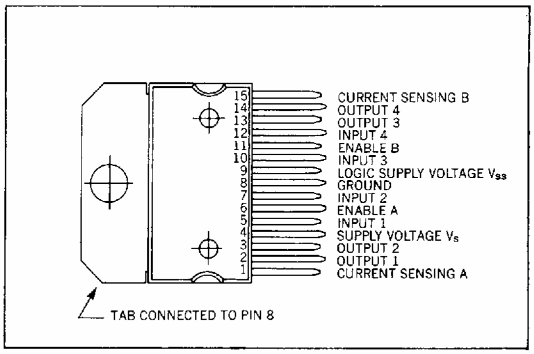
ABSOLUTE MAXIMUM RATINGS

Power Supply, V_s 50V
Logic Supply Voltage, V_{SS} 7V
Input and Inhibit Voltage, V_i, $V_{inhibit}$ .... −0.3V to +7V
Peak Output Current (each channel), I_o
Non-Repetitive (t = 100μs) 3A
Repetitive (80% on - 20% off; t_{ON} = 10ms) 2.5A
DC Operation 2A
Sensing Voltage, V_{sens} .... −1V to +2.3V
Total Power Dissipation (T_{case} = 75°C), P_{tot} 25W
Storage and Junction Temperature, T_{stg}, T_j .... −40°C to +150°C

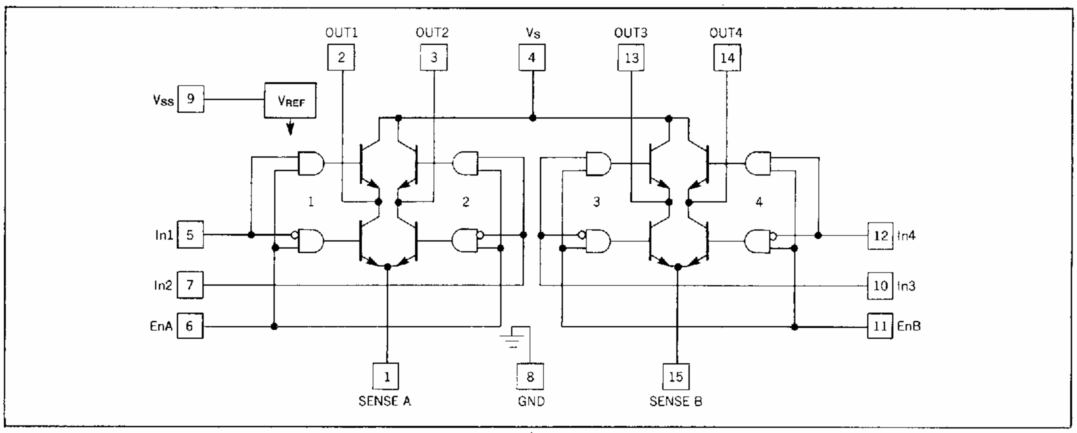
THERMAL DATA

Thermal Resistance Junction-Case, $R_{th\ j\text{-}case}$ .... 3°C/W max.
Thermal Resistance Junction-Ambient, $R_{th\ j\text{-}amb}$ .... 35°C/W max.

CONNECTION DIAGRAM



BLOCK DIAGRAM



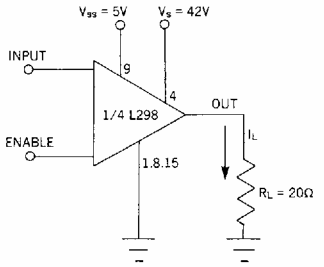
ELECTRICAL CHARACTERISTICS (for each channel, V_s = 42V, V_{ss} = 5V, T_j = 25°C) $T_A=T_J$

PARAMETERS	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Supply Voltage (Pin 4), V_s	Operating Condition	V_{IH}+2.5		46	V
Logic Supply Voltage (Pin 9), V_{ss}		4.5		7	V
Quiescent Supply Current (Pin 4), I_s (Per Channnel)	$V_{inh.}$ = H, V_i = L		3	7	mA
	I_L = 0, V_i = H		15	20	
	$V_{inh.}$ = L			1	
Quiescent Current from V_{ss} (Pin 9), I_{ss} (Per Channnel)	$V_{inh.}$ = H, V_i = L		5	10	mA
	I_L = 0, V_i = H		1.5	3	
	$V_{inh.}$ = L		1	1.5	
Input Low Voltage (Pins 5, 7, 10, 12), $V_{i\ L}$		-0.3		1.5	V
Input High Voltage (Pins 5, 7, 10, 12), $V_{i\ H}$		2.3		V_{ss}	
Low Voltage Input Current (Pins 5, 7, 10, 12), $I_{i\ L}$	V_i = L			-10	μA
High Voltage Input Current (Pins 5, 7, 10, 12), $I_{i\ H}$	V_i = H		30	100	
Inhibit Low Voltage (Pins 6, 11), $V_{inh.\ L}$		-0.3		1.5	V
Inhibit High Voltage (Pins 6, 11), $V_{inh.\ H}$		2.3		7	
Low Voltage Inhibit Current (Pins 6, 11), $I_{inh.\ L}$	$V_{inh.}$ = L			-10	μA
High Voltage Inhibit Current (Pins 6, 11), $I_{inh.\ H}$	$V_{inh.}$ = H ≤ V_{ss} -0.6V		30	100	
Source Saturation Voltage, $V_{CE\ sat(H)}$	I_L = 1A		1.2	1.8	V
	I_L = 2A		1.8	2.8	
Sink Saturation Voltage, $V_{CE\ sat(L)}$	I_L = 1A		1.2	1.8	V
	I_L = 2A		1.7	2.6	
Total Drop, $V_{CE\ sat}$	I_L = 1A			3.4	V
	I_L = 2A			5.2	
Sensing Voltage (Pins 1, 15), V_{sens}		-1[1]		2	V
Source Current Turn-Off Delay, $T_1(V_i)$	0.5 V_i to 0.9 I_L [2]		1.7		μs
Source Current Fall Time, $T_2(V_i)$	0.9 I_L to 0.1 I_L [2]		0.2		μs
Source Current Turn-On Delay, $T_3(V_i)$	0.5 V_i to 0.1 I_L [2]		2.5		μs
Source Current Rise Time, $T_4(V_i)$	0.1 I_L to 0.9 I_L [2]		0.35		μs
Sink Current Turn-Off Delay, $T_5(V_i)$	0.5 V_i to 0.9 I_L [3]		0.7		μs
Sink Current Fall Time, $T_6(V_i)$	0.9 I_L to 0.1 I_L [3]		0.2		μs
Sink Current Turn-On Delay, $T_7(V_i)$	0.5 V_i to 0.1 I_L [3]		1.5		μs
Sink Current Rise Time, $T_8(V_i)$	0.1 I_L to 0.9 I_L [3]		0.2		μs
Commutation Frequency, f_c	I_L = 2A		25	40	KHz

1) Sensing voltage can be -1V for t ≤ 50μS; in steady state V_{sens} min ≥ -0.5V.
2) See figure 1a.
3) See figure 2a.

SWITCHING CHARACTERISTICS

Figure 1. Switching times test circuits.



NOTE: For INPUT chopper, set EN = H.

Figure 1a. Source Current Delay Times vs. Input or Enable Chopper.

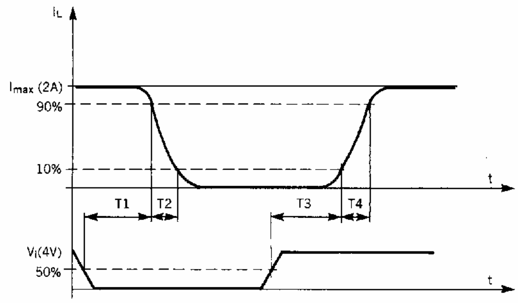
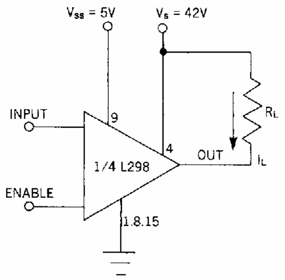
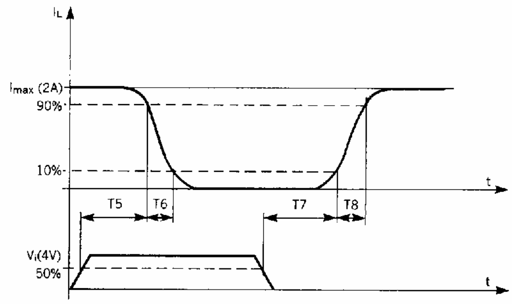


Figure 2. Switching Times Test Circuits.



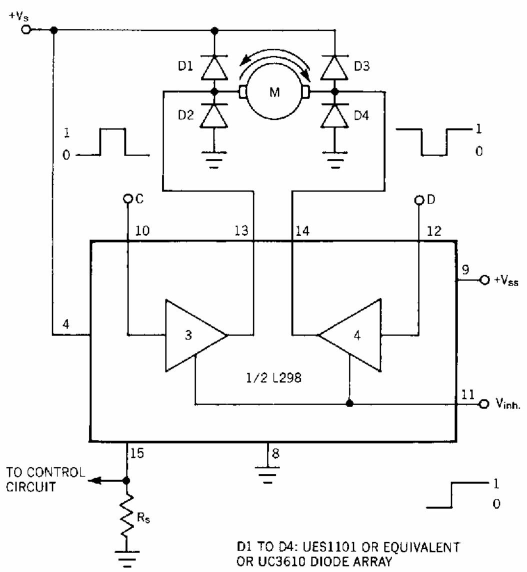
NOTE: For INPUT chopper, set EN = H.

Figure 2a. Sink Current Delay Times vs. Input or Enable Chopper.



APPLICATIONS

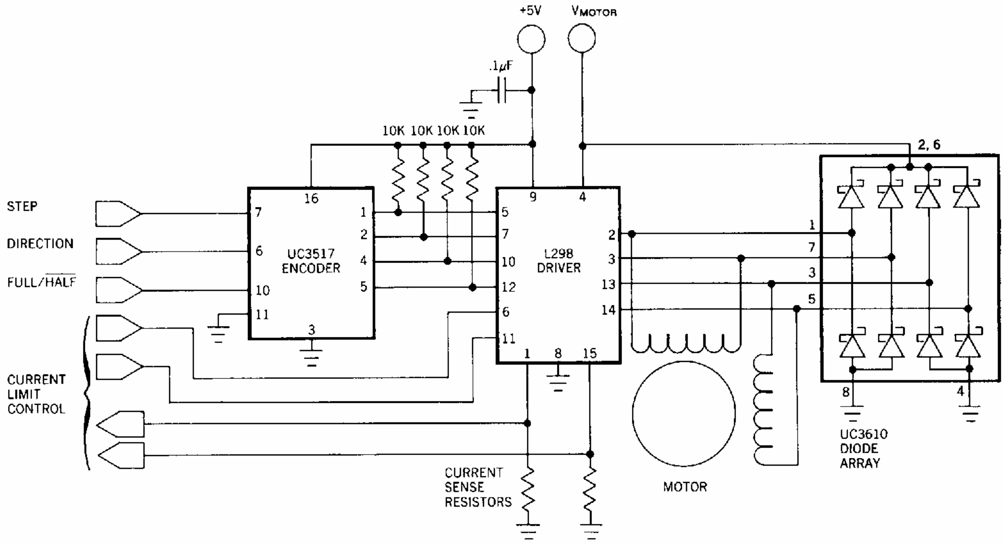
Figure 3. Bi-Directional DC Motor Control.



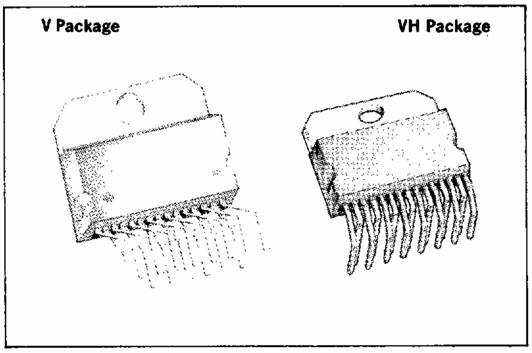
	INPUTS	FUNCTION
$V_{inh.}$ = H	C = H; D = L	Turn right
	C = L; D = H	Turn left
	C = D	Fast motor stop
$V_{inh.}$ = L	C = X; D = C	Free running motor stop

L = Low
H = High
X = Don't Care

Figure 4. Bipolar Step Motor Driver.



STANDARD PACKAGES



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