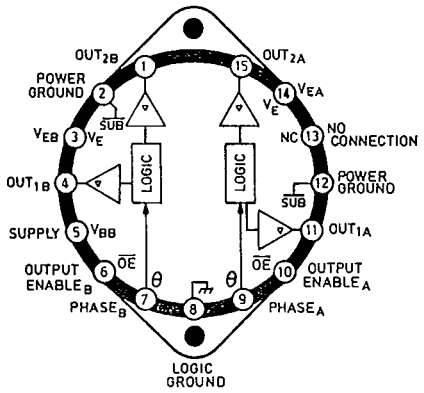
T-52-13-25

2998

MIL-STD-883 COMPLIANT

DUAL FULL-BRIDGE MOTOR DRIVER



Dwg. No. PM-003

ABSOLUTE MAXIMUM RATINGS

Motor Supply Voltage, V_{BB} . . . . . **50 V**
Output Current, I_{OUT} (300 ms) . . . . . **±2.2 A**
(Continuous) . . . . . **±1.8 A**
Sink Driver Emitter Voltage, V_E . . . . . **1.5 V**
Logic Input Voltage Range, V_{IN} . . . . . **-0.3 V to +15 V***
Package Power Dissipation, P_D . . . . . **See Graph**
Operating Temperature Range, T_A . . . . . **-55°C to + 125°C**
Junction Temperature, T_J . . . . . **+150°C†**
Storage Temperature Range, T_S . . . . . **-65°C to + 150°C**

*V_{IN} must not exceed V_{BB}.

†Fault conditions which produce excessive junction temperature will activate device thermal shutdown circuitry. These conditions can be tolerated, but should be avoided.

Output current rating may be restricted to a value determined by system concerns and factors. These include: system duty cycle and timing, ambient temperature, and use of any heatsinking and/or forced cooling. For reliable operation, the specified maximum junction temperature should not be exceeded.

The UDS2998V dual full-bridge driver is designed for bidirectional operation of 2-phase stepper motors, a pair of dc servo motors, 2-phase brushless dc motors, or two solenoids at up to 50 V with continuous output currents to ±1.8 A per bridge or peak (start-up) currents to ±2.2 A. The control inputs are compatible with standard logic families. Except for a common supply voltage and thermal shutdown, the two drivers in a device are completely independent. Static burn-in and 100% high-reliability screening to MIL-STD-883, Class B are standard.

For external PWM control, an OUTPUT ENABLE for each bridge circuit is provided and the sink driver emitters are brought out for connection to external current-sensing resistors. A PHASE input to each bridge determines load-current direction.

Extensive circuit protection is provided on-chip. Output suppression diodes protect the bridges from the transients generated when switching inductive loads. A thermal shutdown circuit disables all of the source drivers if chip temperature rating (package power dissipation) is exceeded. Internal delays provide protection against crossover currents (adjacent source and sink drivers conducting simultaneously) during switching intervals.

The UDS2998V is supplied in a 15-pin, flange-mount MO-097AA style hermetic package for improved power dissipation capabilities. An external heatsink is required for high-current applications. The flange is at ground potential and normally needs no isolation.

FEATURES

- ±1.8 A Output Current
- Output Voltage to 50 V
- Integral Output Suppression Diodes
- Output Current Sensing
- Logic Compatible Inputs
- Internal Thermal Shutdown Circuitry
- Crossover-Current Protected
- Hermetically Sealed Package
- High-Reliability Screening

Always order by complete part number: **UDS2998V883** .

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DUAL FULL-BRIDGE MOTOR DRIVER

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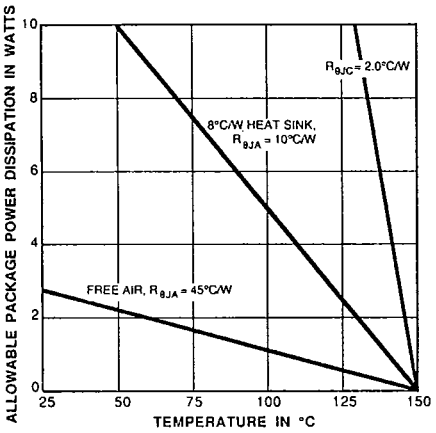
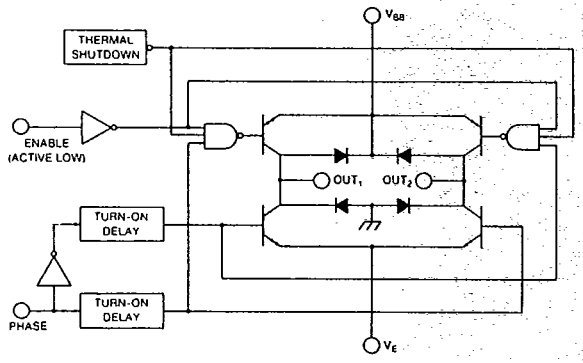


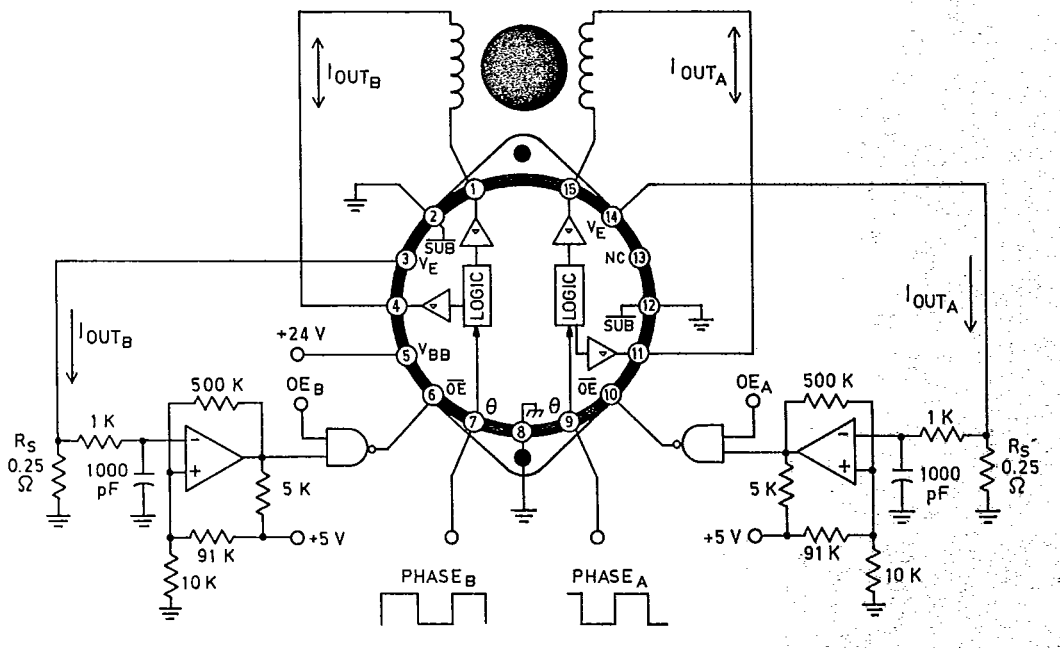
Dwg. GM-001

FUNCTIONAL BLOCK DIAGRAM
(ONE OF TWO DRIVERS)



Dwg. No. W-107A

TYPICAL APPLICATION
2-PHASE BIPOLAR STEPPER MOTOR DRIVE
(Chopper Mode)



Dwg. EM-001

2998
DUAL FULL-BRIDGE MOTOR DRIVER

T-52-13-25

ELECTRICAL CHACTERISTICS at T_A = -55°C to +125°C, V_{BB} = 50 V (unless otherwise noted).

Characteristic	Symbol	Test Conditions	Limits Min.	Typ.	Max.	Units
Supply Voltage Range	V_{BB}	Operating	10	—	50	V
Supply Current	I_{BB}	V_{ENABLE} (A & B) = 0.8 V, No Load	—	25	50	mA
		V_{ENABLE} (A & B) = 2.0 V, No Load	—	—	45	mA
Thermal Shutdown Temp.	T_J		—	175	—	°C
Thermal Shutdown Hysteresis	ΔT_J		—	25	—	°C
Output Drivers						
Output Leakage Current	I_{CEX}	$V_{OUT} = V_{BB}$, V_{ENABLE} = 2.0 V, Note 3	—	<5.0	50	µA
		V_{OUT} = 0 V, V_{ENABLE} = 2.0 V, Note 3	—	<-5 0	-50	µA
Output Saturation Voltage (T_A = -55°C to + 25°C)	$V_{CE(SAT)}$	Source Driver, I_{OUT} = -1.0 A	—	1.7	2.0	V
		Sink Driver, I_{OUT} = +1.0 A	—	1.2	1.5	V
		Source Driver, I_{OUT} = -1.8 A	—	2.0	2.4	V
		Sink Driver, I_{OUT} = +1.8 A	—	1.7	2.1	V
Output Saturation Voltage (T_A = +125°C)	$V_{CE(SAT)}$	Source Driver, I_{OUT} = -1.0 A	—	—	1.8	V
		Sink Driver, I_{OUT} = +1.0 A	—	—	1.3	V
		Source Driver, I_{OUT} = -1.8 A	—	—	2.2	V
		Sink Driver, I_{OUT} = +1.8 A	—	—	1.9	V
Output Sustaining Voltage	$V_{CE(sus)}$	I_{OUT} = ±1.8 A, L = 3.0 mH, T_A = +25°C, Note 3	50	—	—	V
Source Driver Rise Time	t_r	I_{OUT} = -1.8 A, Resistive Load, Note 3	—	500	—	ns
Source Driver Fall Time	t_f	I_{OUT} = -1.8 A, Resistive Load, Note 3	—	750	—	ns
Clamp Diode Leakage Current	I_R	V_R = 50 V	—	<5.0	50	µA
Clamp Diode Forward Voltage	V_F	I_F = 1.8 A, T_A = -55°C to +25°C	—	1.5	1.9	V
		I_F = 1.8 A, T_A = +125°C	—	—	2.1	V
Control Logic						
Logic Input Voltage	$V_{IN(1)}$	V_{PHASE} or V_{ENABLE}	2.0	—	—	V
	$V_{IN(0)}$	V_{PHASE} or V_{ENABLE}	—	—	0.8	V
Input Current	$I_{IN(1)}$	V_{PHASE} or V_{ENABLE} = 2.0 V	—	<1.0	10	µA
	$I_{IN(0)}$	V_{PHASE} or V_{ENABLE} = 0.8 V	—	-5.0	-25	µA
Propagation Delay Time	t_{pd}	I_{OUT} = ±1.8 A, Note 3, 50% V_{PHASE} to 90% I_{OUT}	—	4.0	8.0	µs
Deadtime	t_d	I_{OUT} = ±1.8 A	—	2.5	—	µs

NOTES: 1. Typical Data is for design information only and is at T_A = +25°C.
2. Each driver is tested separately.
3. Test is performed with V_{PHASE} = 0.8 V and then repeated for V_{PHASE} = 2.4 V.
4. Negative current is defined as coming out of (sourcing) the specified device pin.

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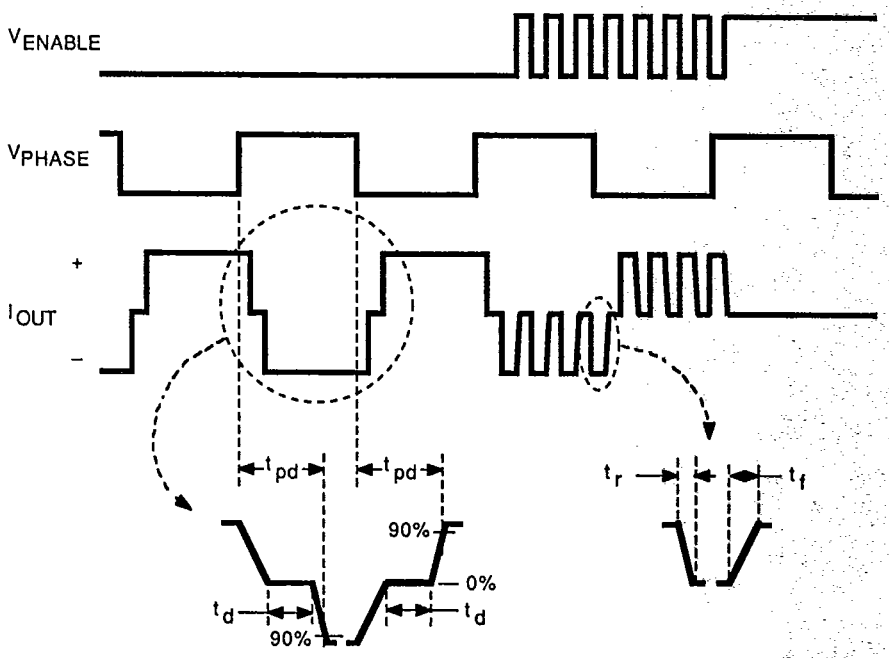
TIMING DEFINITIONS



Dwg. WM-001

TRUTH TABLE

ENABLE INPUT	PHASE INPUT	OUTPUT 1	OUTPUT 2
Low	High	High	Low
Low	Low	Low	High
High	High	Open	Low
High	Low	Low	Open