Integrated Circuits

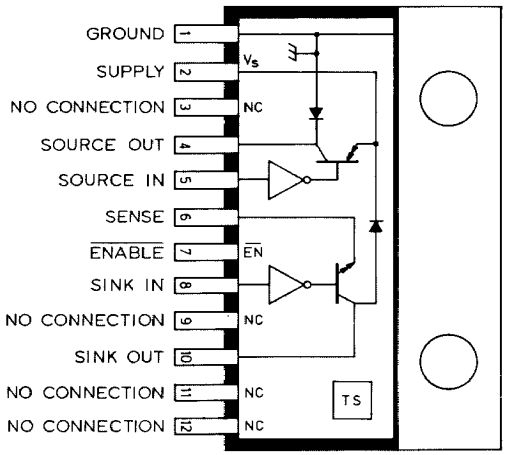
UDN2955W

Data Sheet 29318.8

IECQ MFG. APPROVAL

HIGH-CURRENT HALF-BRIDGE POWER DRIVER

UDN2955W



Dwg. PP-023

The UDN2955W half-bridge power driver combines a high-current, half-bridge power driver with low-level control and protection circuitry. For PWM applications there are provisions for output current sensing and an ENABLE (active low) input. The output can source or sink up to 8 A continuously. This device features a minimum breakdown and sustaining voltage of 50 V. It can be used in pairs for full-bridge operation or in triplets for 3-phase brushless dc motors.

Protection is included which shuts down the device during overtemperature conditions caused by loss of cooling; internal flyback and clamp diodes are included for switching inductive loads. Internal logic lockout and delays prevent potentially destructive crossover currents. The logic inputs are compatible with TTL and 5 V CMOS logic systems.

A similar device, excluding the ENABLE and output current sensing provision, in a 5-lead TO-220 style package, is the UDN2951Z.

The UDN2955W is supplied in a 12-lead power-tab single in-line plastic package. The tab is at ground potential, allowing multiple devices to share a common heat sink.

FEATURES

- ±8 A Continuous Output current
- Output Voltage to 50 V
- Internal Thermal Shutdown
- TTL and 5 V CMOS Compatible Inputs
- Integral Transient-Suppression Diodes

ABSOLUTE MAXIMUM RATINGS at $T_J \leq 150°C$

Supply Voltage, V_S . . . . . **50 V**
Output Current, I_{OUT} . . . . . **±8.0 A**
Input Voltage, V_{IN} . . . . . **7.0 V**
Sense Voltage, V_{SENSE} . . . . . **1.5 V**
Package Power Dissipation, P_D . . . . . **See Graph**
Operating Temperature Range, T_A . . . . . **-20°C to +85°C**
Storage Temperature Range, T_S . . . . . **-55°C to +150°C**

Output current rating may be limited by duty cycle, ambient temperature, and heat sinking. Under any set of conditions, do not exceed the specified output current rating or a junction temperature of +150°C.

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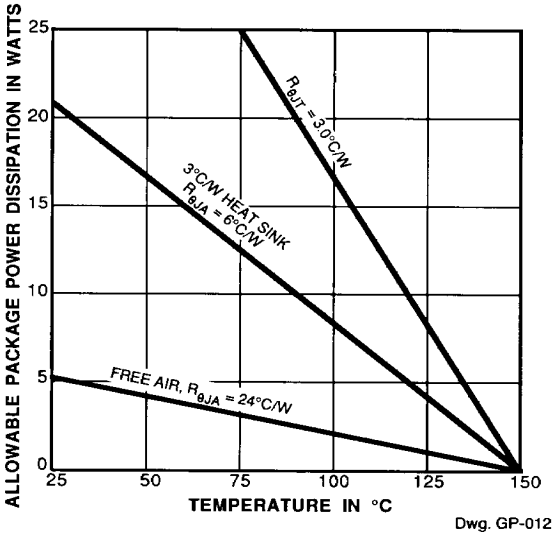
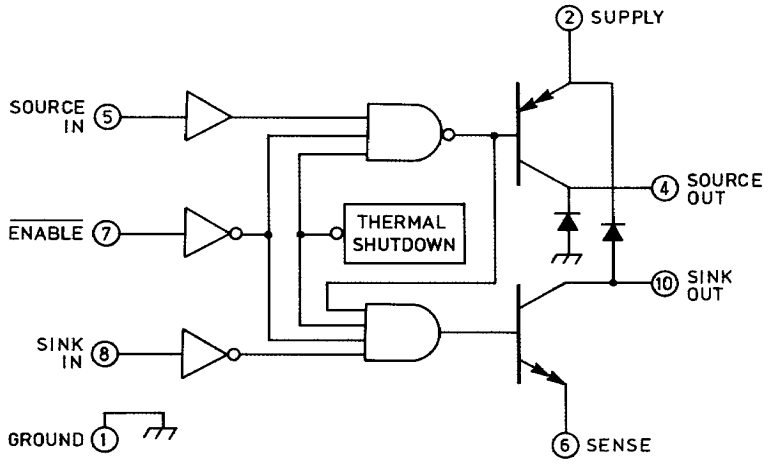
HIGH-CURRENT HALF-BRIDGE POWER DRIVER



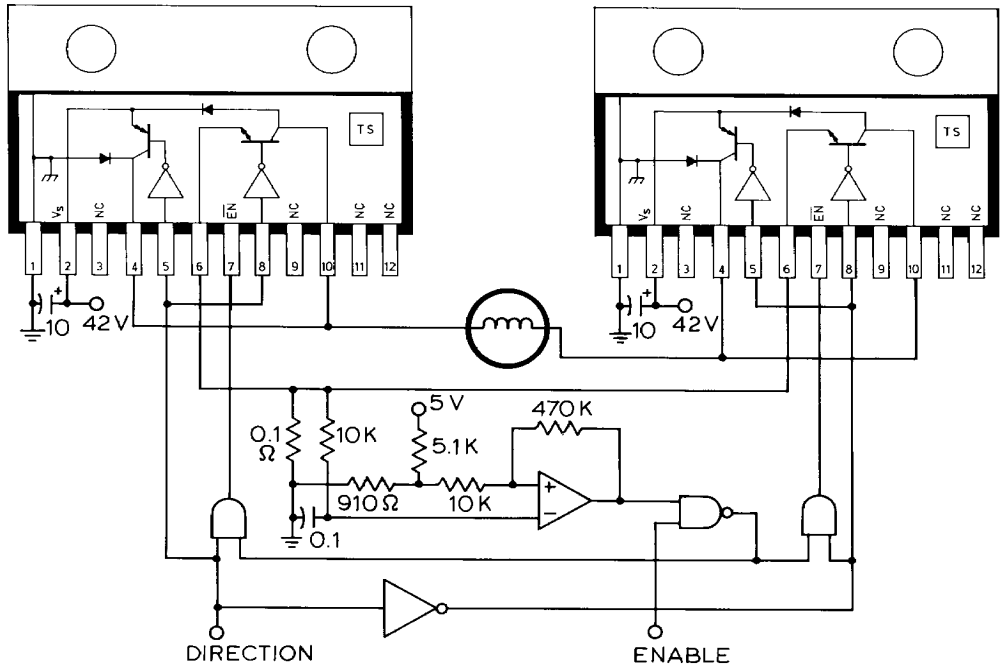
Dwg. GP-012

FUNCTIONAL BLOCK DIAGRAM



Dwg. FP-009

TYPICAL APPLICATION



The printed wiring board should utilize a heavy ground plane. For optimum performance, the driver should be soldered directly into the board. The power supply (V_S) should be decoupled with an electrolytic capacitor (≥ 10 μF) as close as possible to pin 2.

Dwg. EP-019

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ELECTRICAL CHARACTERISTICS at T_A = +25°C, $T_J \leq$ 150°C, V_S = 50 V.

Characteristic	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max.	Units
Functional Supply Range	V_S		10	—	50	V
Output Leakage Current	I_{CEX}	$SINK_{OUT}$ = 50 V, $SOURCE_{IN}$ = 0.8 V, $SINK_{IN}$ = 2.0V	—	<1.0	50	µA
		$SOURCE_{OUT}$ = 0 V, $SOURCE_{IN}$ = 0.8 V, $SINK_{IN}$ = 2.0 V	—	<–1.0	–50	µA
Output Sustaining Voltage	$V_{CE(sus)}$	I_{OUT} = ±8.0 A, L = 10 mH	50	—	—	V
Output Saturation Voltage	$V_{CE(SAT)}$	$SINK_{OUT}$ = 5.0 A	—	—	1.5	V
		$SINK_{OUT}$ = 8.0 A	—	—	2.0	V
		$SOURCE_{OUT}$ = –5.0 A	—	—	2.0	V
		$SOURCE_{OUT}$ = –8.0 A	—	—	2.5	V
Input Voltage	Logic 1	$SOURCE_{IN}$ or $SINK_{IN}$	2.0	—	—	V
	Logic 0	$SOURCE_{IN}$ or $SINK_{IN}$	—	—	0.8	V
Input Current	Logic 1	$SOURCE_{IN}$ or $SINK_{IN}$ = 2.0 V	—	3.0	10	µA
	Logic 0	$SOURCE_{IN}$ or $SINK_{IN}$ = 0.8 V	—	–1.0	–10	µA
Propagation Delay	t_{PHL}	Sink Driver (includes Turn-On Delay)	—	2.5	—	µs
		Source Driver	—	2.5	—	µs
	t_{PLH}	Sink Driver	—	0.2	—	µs
		Source Driver (includes Turn-On Delay)	—	2.5	—	µs
Supply Current	$I_{S(ON)}$	$SOURCE_{IN}$ = 2.0 V	—	10	15	mA
		$SOURCE_{IN}$ = $SINK_{IN}$ = 0.8 V	—	20	25	mA
	$I_{S(OFF)}$	$SOURCE_{IN}$ = 0.8 V, $SINK_{IN}$ = 2.0 V	—	8.0	10	mA
Flyback Diode Forward Voltage	V_F	I_F = 8.0 A	—	—	2.8	V
Clamp Diode Forward Voltage	V_F	I_F = 8.0 A	—	—	2.1	V
Diode Leakage Current	I_R	Each diode, V_R = 50 V	–	<1.0	50	µA
Thermal Shutdown	T_J		—	165	—	°C

NOTES: Typical Data is given for circuit design information only.
Negative current is defined as coming out of (sourcing) the specified device terminal.

TRUTH TABLE

Inputs			Outputs	
ENABLE	SOURCE	SINK	SOURCE	SINK
Low	Low	Low	OFF	ON
	Low	High	OFF	OFF
	High	X	ON	OFF
High	X	X	OFF	OFF

X = Irrelevant

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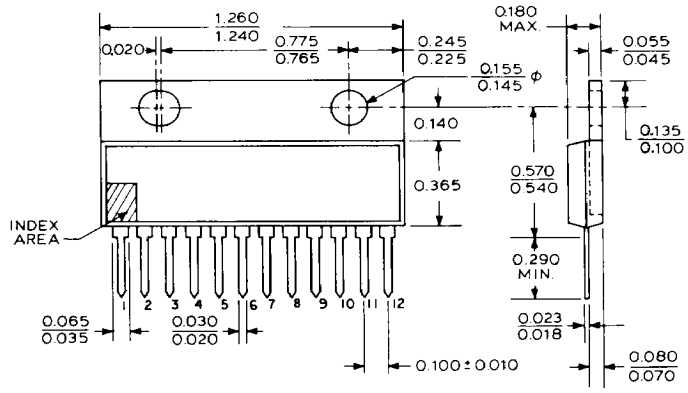
HIGH-CURRENT HALF-BRIDGE POWER DRIVER

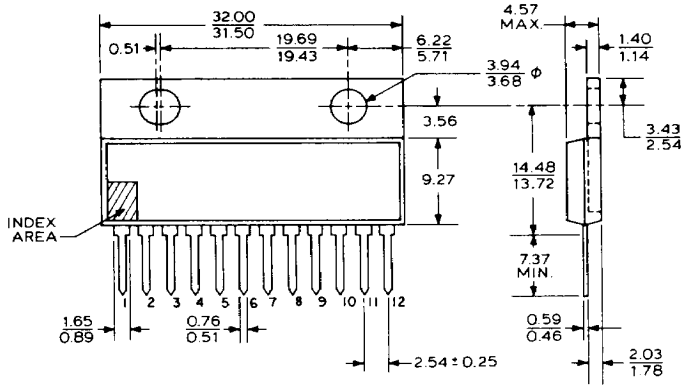
PLASTIC SINGLE IN-LINE POWER TAB

DIMENSIONS IN INCHES



Dwg. No. A-13.652 IN

DIMENSIONS IN MILLIMETERS
(BASED ON 1" = 25.40 mm)



Dwg. No. A-13.652 MM

In the construction of the components described, the full intent of the specification will be met. The Sprague Electric Company, however, reserves the right to make, from time to time, such departures from the detail specifications as may be required to permit improvements in the design of its products. Components made under military approvals will be in accordance with the approval requirements.

The information included herein is believed to be accurate and reliable. However, the Sprague Electric Company assumes no responsibility for its use; nor for any infringements of patents or other rights of third parties which may result from its use.

1. Lead spacing tolerance is non-cumulative.
2. Exact body and lead configuration at vendor's option within limits shown.
3. Lead gauge plane is 0.030 in. (0.76 mm) max. below seating plane.

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