Half-Bridge Bipolar Switch

FEATURES

- Source or Sink 4.0A
- Supply Voltage to 35V
- High-Current Output Diodes
- Tri-State Operation
- TTL and CMOS Input Compatibility
- Thermal Shutdown Protection
- 300kHz Operation
- Low-Cost TO-220 Package

DESCRIPTION

This device is a monolithic integrated circuit designed to provide high-current switching with low saturation voltages when activated by low-level logic signals. Source and sink switches may be independently activated without regard to timing as a built-in interlock will keep the sink off if the source is on.

This driver has the high current capability to drive large capacitive loads with fast rise and fall times; but with high-speed internal flyback diodes, it is also ideal for inductive loads. Two UC2950s can be used together to form a full bridge, bipolar motor driver compatible with high frequency chopper current control.

TRUTH TABLE

Source Drive Pin 2	Sink Drive Pin 5	Output Pin 4
Low	Low	Low
Low	High	Off
High	Low	High
High	High	High

Note: With no load, output voltage will be HIGH in the OFF state.

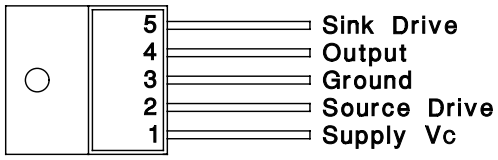
ABSOLUTE MAXIMUM RATINGS (Note 1)

Supply Voltage Range, V_C . . . . . 8V to 35V
Output Voltage Range, V_O . . . . . –3.0V to V_C+3V
Input Voltage Range, V_{IN} . . . . . –0.3V to +7.0V
Peak Output Current (100 ms, 10% DC) . . . . . ± 4.0A
Continuous Output Current . . . . . ± 2.0A
Power Dissipation with Heat Sink 15W
Power Dissipation in Free Air 2W
Operating Temperature Range, T_A . . . . . –20°C to +100°C
Storage Temperature Range, T_S . . . . . –55°C to +125°C

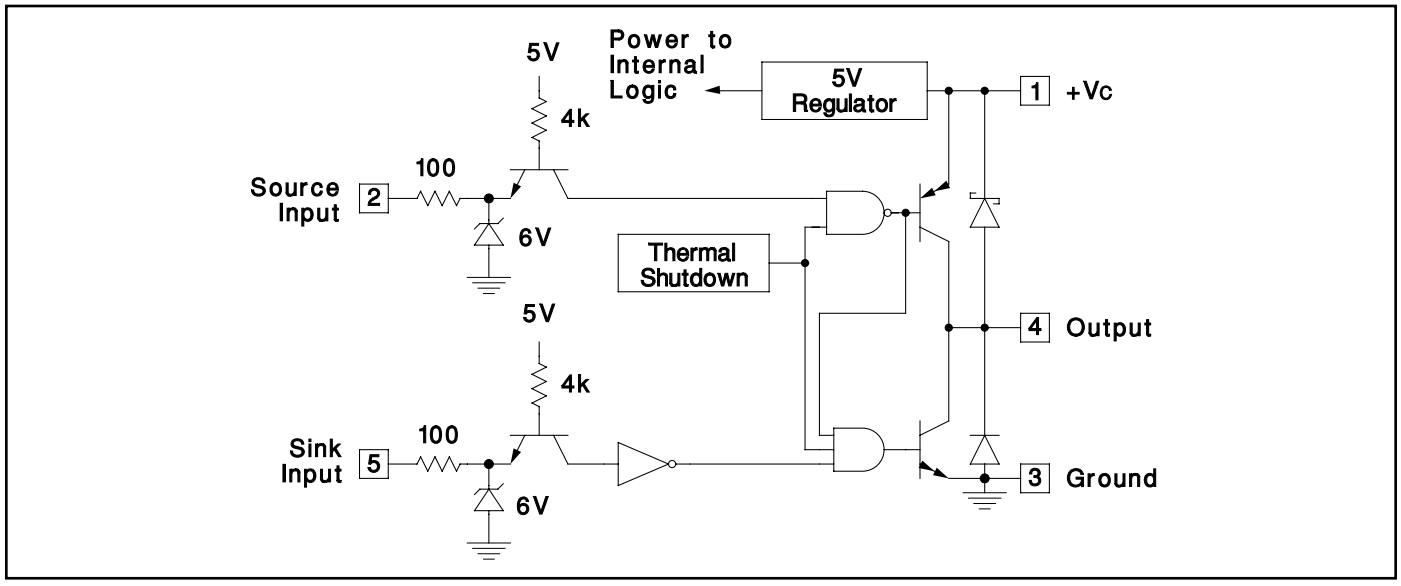
Note 1: Consult Packaging section of databook for thermal limitations and considerations of package.

CONNECTION DIAGRAM

5-PIN TO-220 (TOP VIEW)
T Package



SIMPLIFIED SCHEMATIC



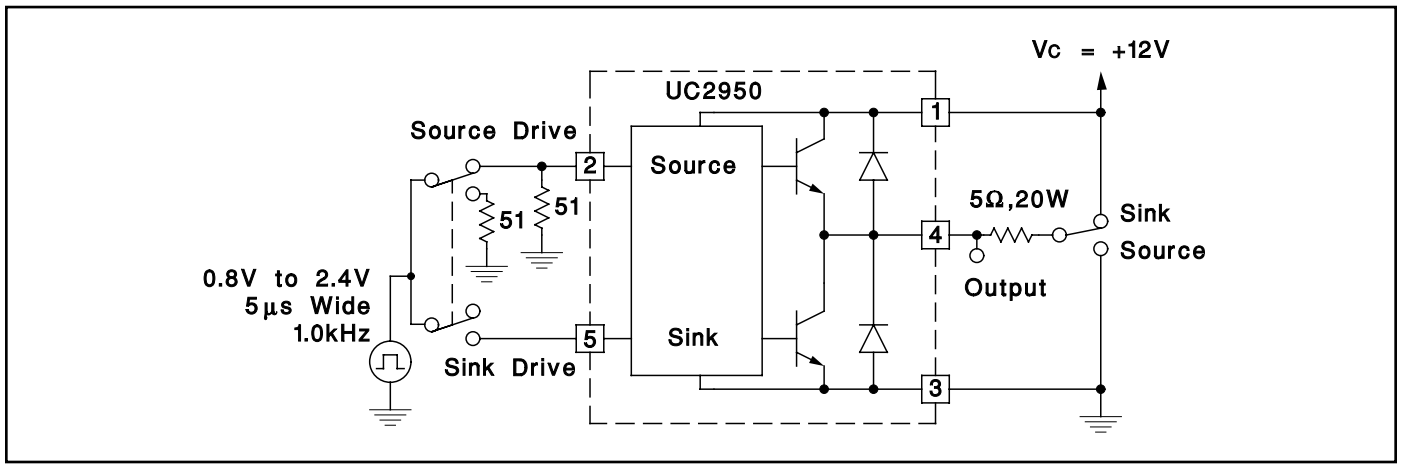
ELECTRICAL CHARACTERISTICS: Unless otherwise stated, V_C = 35V, T_A = -20°C to +100°C, V_{IL} = 0.8V, V_{IH} = 2.4V for either input, $T_A = T_J$.

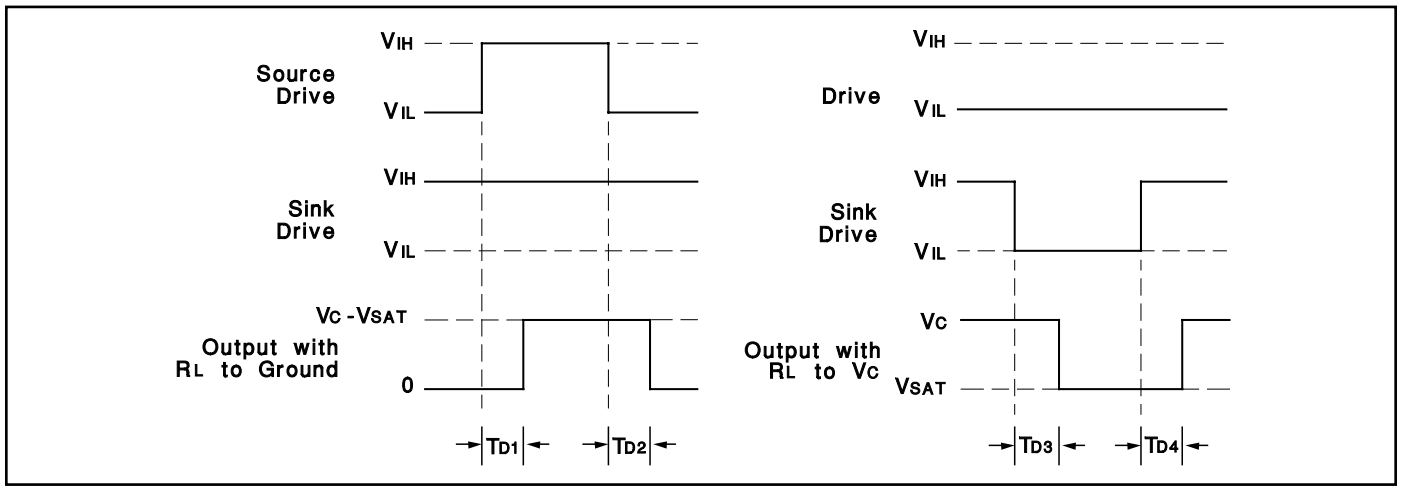
PARAMETERS	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Output Leakage to V_C	Output Off		20	500	µA
Output Leakage to Ground	Output Off		–200	–500	µA
Output Sink Saturation	V_{OL}, I_L = 2.0A		1.2	2.0	V
Output Source Saturation	(V_C-V_{OL}), I_L = –2.0A		1.2	2.0	V
Sink Diode Forward Voltage	I_D = –2.0A		1.4	2.0	V
Source Diode Forward Voltage	I_D = 2.0A		1.4	2.0	V
Input Current	Either Input, V_I = 5V		20	100	µA
	Either Input, V_I = 0V		–1.0	–1.6	mA
Supply Current	Output High		20	36	mA
	Output Low		10	20	mA

SWITCHING CHARACTERISTICS: See Test Circuit. V_C = 12V, R_L = 5Ω, T_A = 25°C. Guaranteed by design, not 100% tested in production.

PARAMETERS	MIN	TYP	MAX	UNITS
Source Turn-On Delay, t_{D1}		300	500	ns
Source Turn-Off Delay, t_{D2}		1.0	2.0	µs
Sink Turn-On Delay, t_{D3}		200	400	ns
Sink Turn-Off Delay, t_{D4}		100	300	ns
Cross-Conduction Current Spike When Source and Sink are Activated Together		0.6	1.0	µs

SWITCHING TEST CIRCUIT





PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package | Pins	Package qty | Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
UC2950T	Active	Production	TO-220 (KC) | 5	50 | TUBE	Yes	SN	N/A for Pkg Type	-20 to 100	UC2950T
UC2950T.A	Active	Production	TO-220 (KC) | 5	50 | TUBE	Yes	SN	N/A for Pkg Type	-20 to 100	UC2950T
UC2950TG3	Active	Production	TO-220 (KC) | 5	50 | TUBE	Yes	SN	N/A for Pkg Type	-20 to 100	UC2950T

(1) **Status:** For more details on status, see our product life cycle.

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

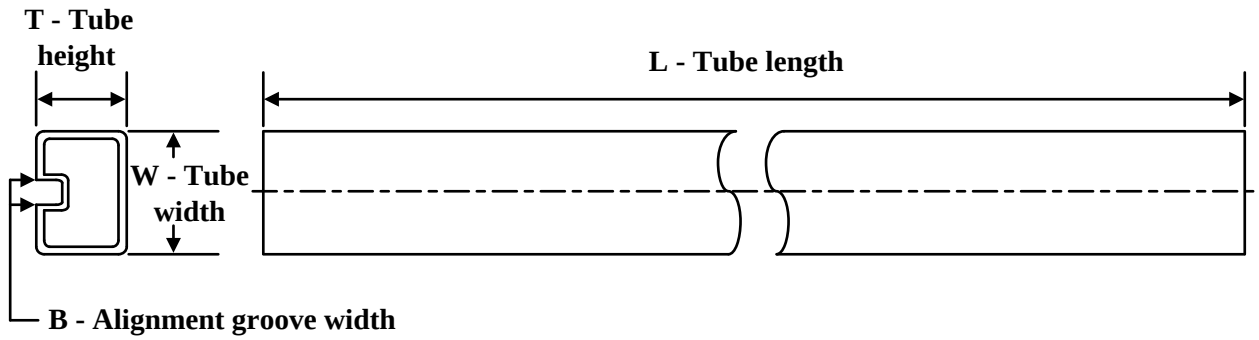
(4) **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

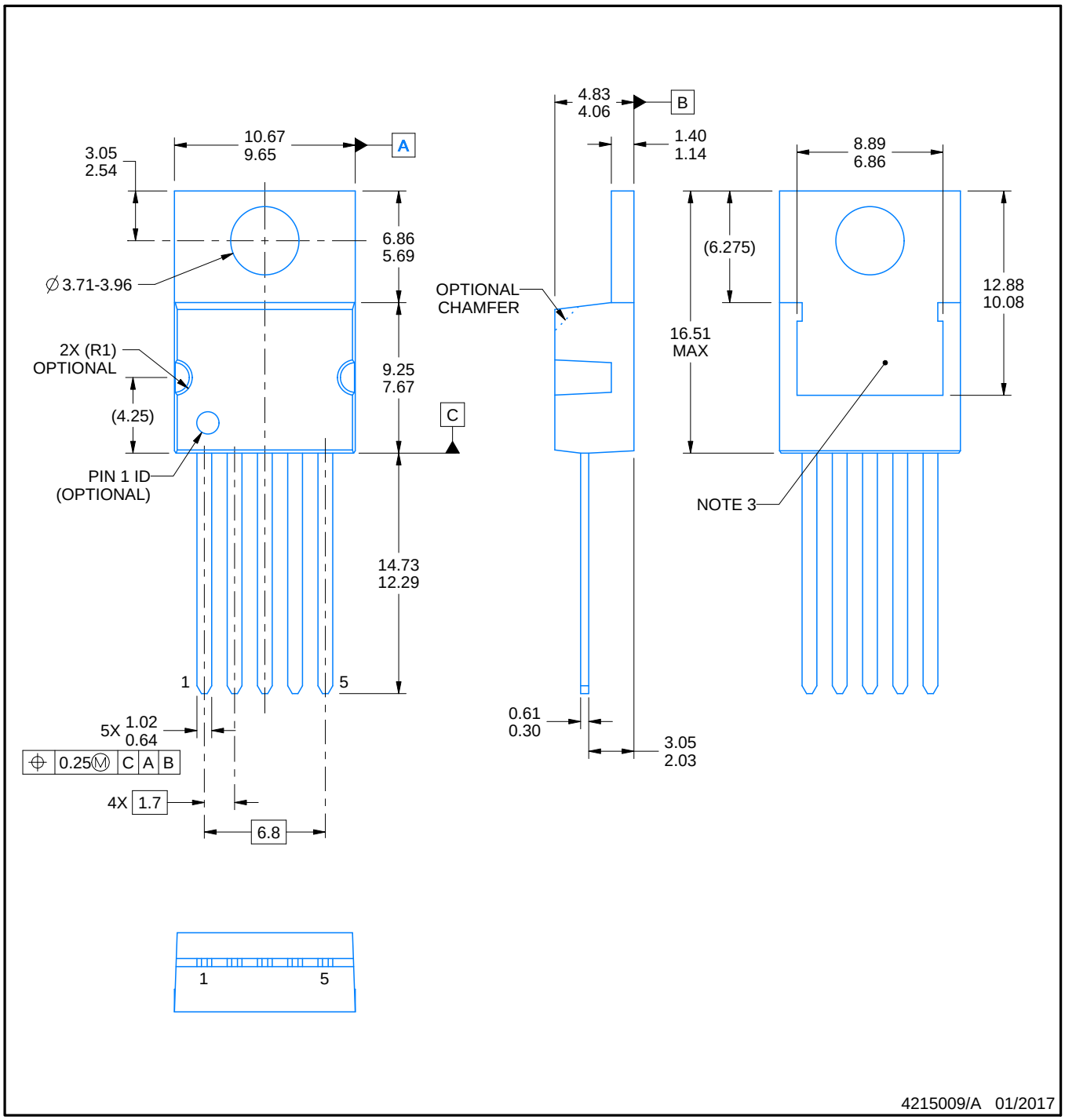
TUBE



*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
UC2950T	KC	TO-220	5	50	546	31	11930	3.17
UC2950T.A	KC	TO-220	5	50	546	31	11930	3.17
UC2950TG3	KC	TO-220	5	50	546	31	11930	3.17

TO-220



NOTES:

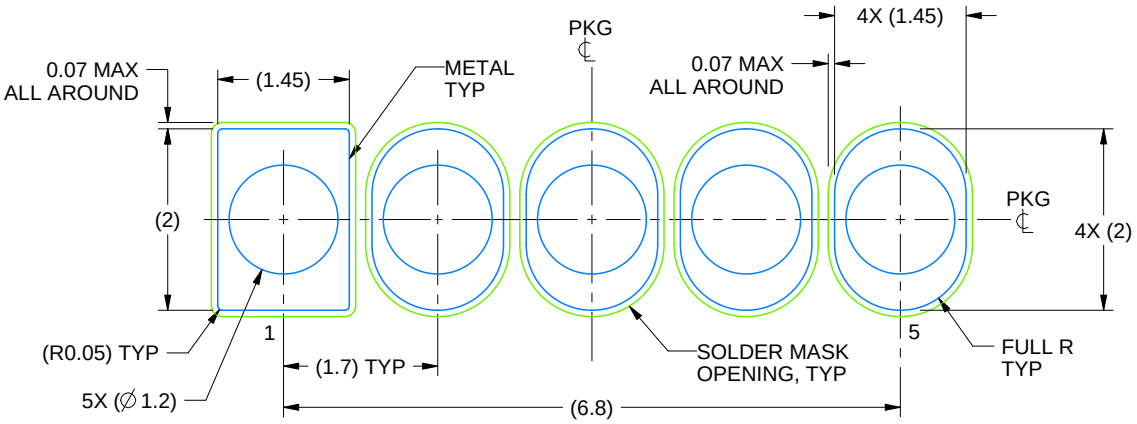
1. All controlling linear dimensions are in inches. Dimensions in brackets are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Shape may vary per different assembly sites.

EXAMPLE BOARD LAYOUT

KC0005A

TO-220 - 16.51 mm max height

TO-220



LAND PATTERN
NON-SOLDER MASK DEFINED
SCALE:12X

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