

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.

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) $\pm 4.0A$
 Continuous Output Current $\pm 2.0A$
 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

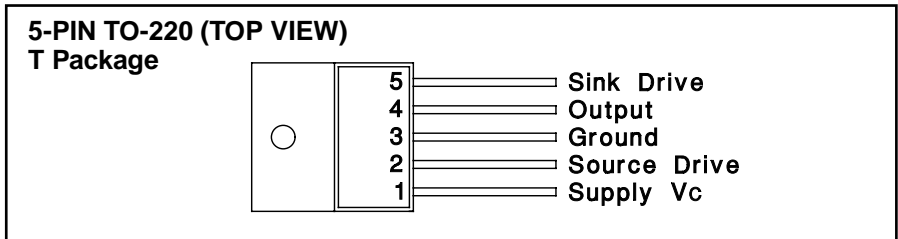
Note 1: Consult Packaging section of databook for thermal limitations and considerations of package.

TRUTH TABLE

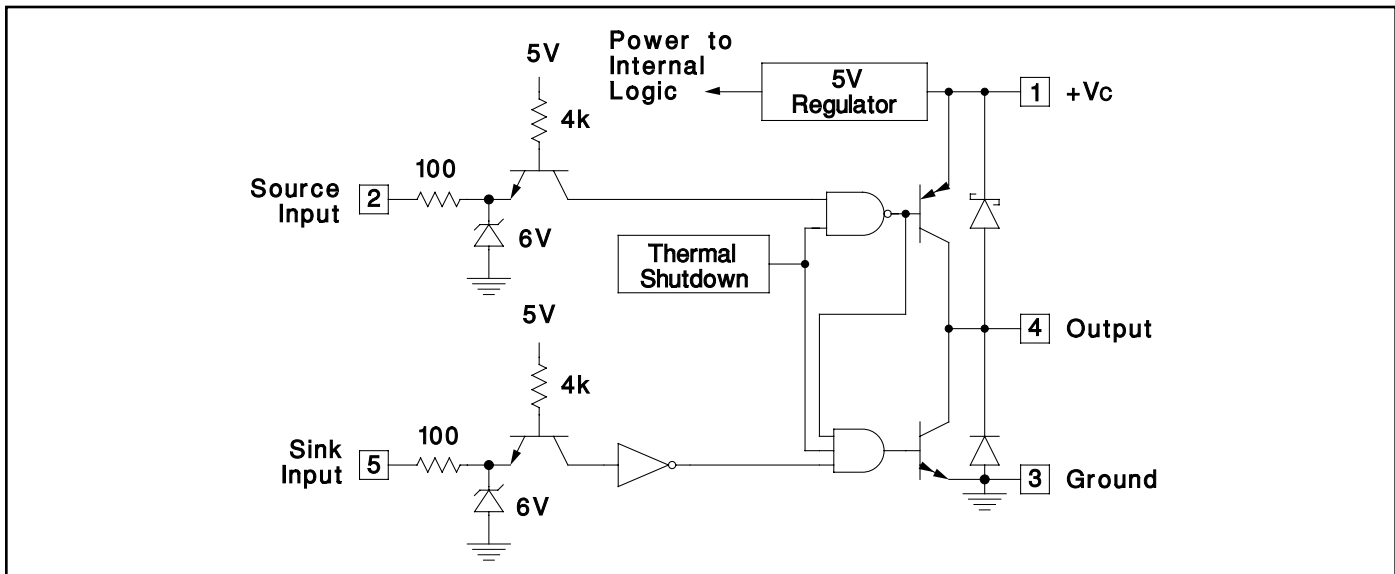
Source Drive Pin 2	Sink Drive Pin 5	Output Pin 4
Low	Low	Low
Low	High	Off
High	Low	High
High	High	High

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

CONNECTION DIAGRAM



SIMPLIFIED SCHEMATIC



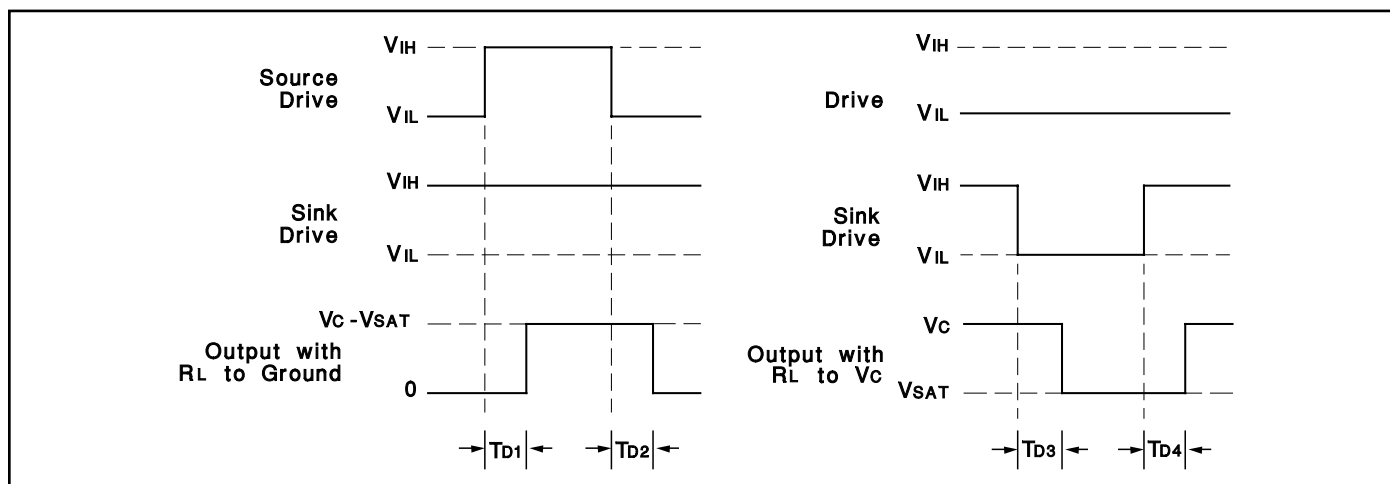
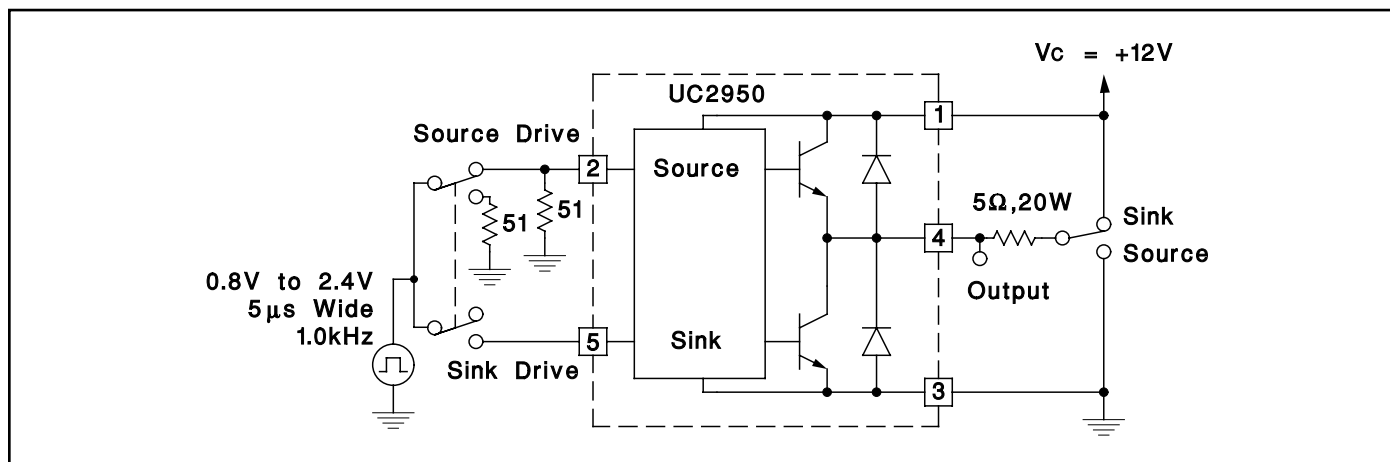
ELECTRICAL CHARACTERISTICS: Unless otherwise stated, $V_C = 35V$, $T_A = -20^{\circ}C$ to $+100^{\circ}C$, $V_{IL} = 0.8V$, $V_{IH} = 2.4V$ for either input, $T_A = T_J$.

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. $V_C = 12V$, $R_L = 5\Omega$, $T_A = 25^{\circ}C$. 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 Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
UC2950T	ACTIVE	TO-220	KC	5	50	RoHS & Green	Call TI SN	N / A for Pkg Type	-20 to 100	UC2950T	Samples
UC2950TG3	ACTIVE	TO-220	KC	5	50	RoHS & Green	SN	N / A for Pkg Type	-20 to 100	UC2950T	Samples

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices 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.

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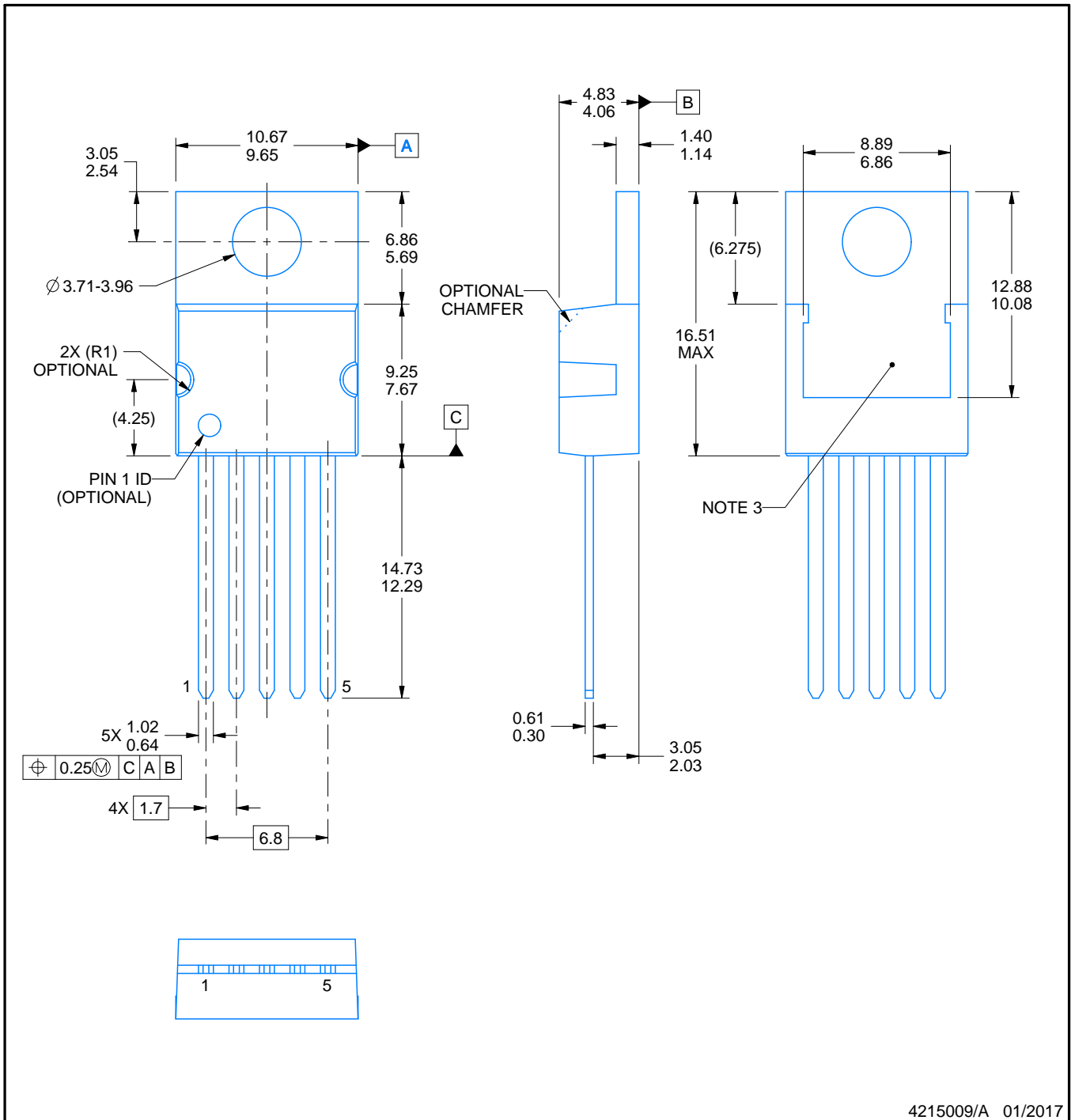
KC0005A



PACKAGE OUTLINE

TO-220 - 16.51 mm max height

TO-220



NOTES:

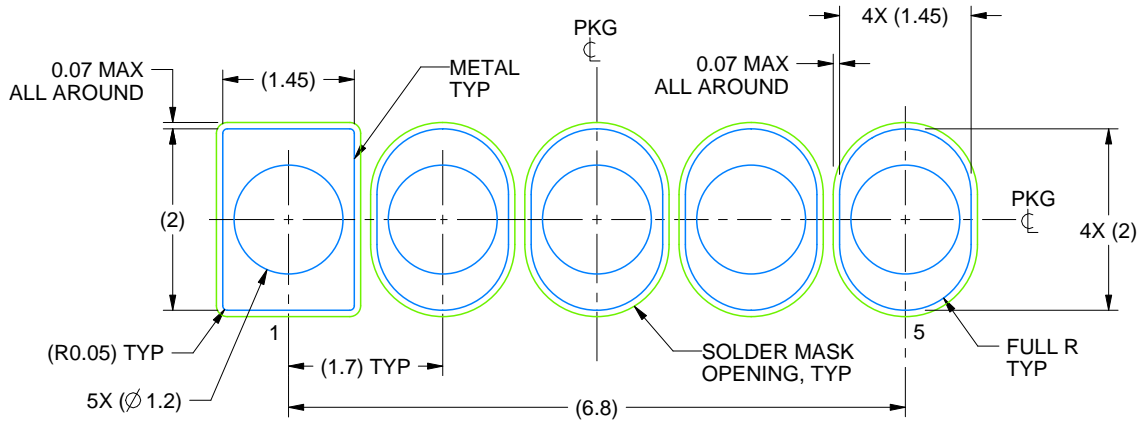
1. All controlling linear dimensions are in inches. Dimensions in brackets are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Shape may vary per different assembly sites.

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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