



# UA8316

Preliminary

**LINEAR INTEGRATED CIRCUIT**

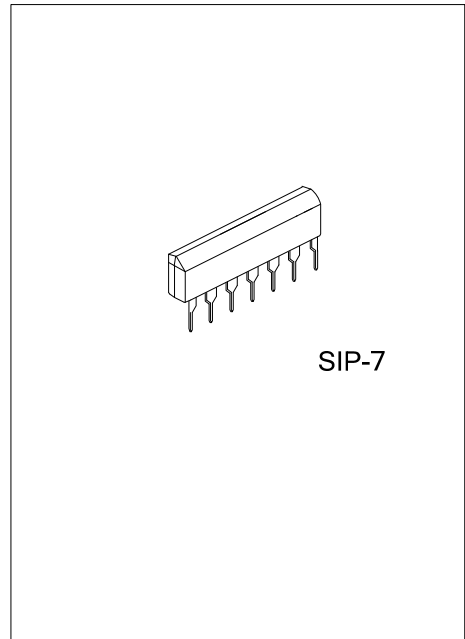
## IGBT GATE DRIVER

### DESCRIPTION

Integrating IGBT gate drive circuits on a single chip, The UTC **UA8316** is a dedicated IC and a high current can directly drive IGBT.

### FEATURES

- \* A high current can directly drive IGBT
- \* Can directly control from a microcontroller  
Source current: -200mA (max), sink current 1A (max)
- \* Protect the IGBT gate at power on via a diode



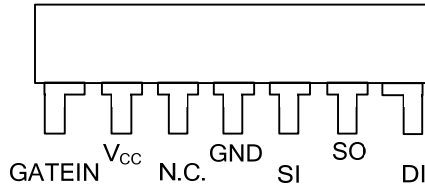
### ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
UA8316L-G07-T	UA8316G-G07-T	SIP-7	Tube

Note: xx: Output Voltage, refer to Marking Information.

<p>UA8316L-G07-T</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Lead Free</li> </ul>	<ul style="list-style-type: none"> <li>(1) T: Tube</li> <li>(2) G07: SIP-7</li> <li>(3) G: Halogen Free, L: Lead Free</li> </ul>
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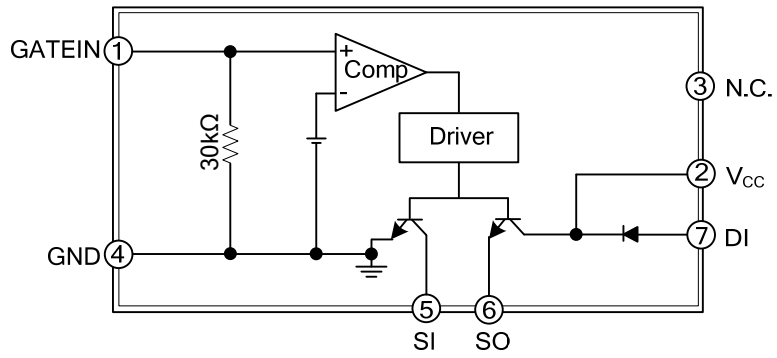
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	GATEIN	Gate Signal Input
2	V <sub>CC</sub>	Power Supply
3	N.C.	Not Connected
4	GND	Ground
5	SI	IGBT Gate Drive (Sink Side)
6	SO	IGBT Gate Drive (Source Side)
7	DI	IGBT Gate Protector Diode

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub>=25°C, Unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Collector Supply Voltage	V <sub>CC</sub>	25	V
Input Voltage	V <sub>IN</sub>	GND-0.3~V <sub>CC</sub> +0.3	V
Power Dissipation (Note 2)	P <sub>D</sub>	925	mW
Operating Temperature	T <sub>OPR</sub>	-20~+85	°C
Storage Temperature	T <sub>STG</sub>	-55~+150	°C

Note: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. When T<sub>A</sub>>25°C, P<sub>D</sub> decreases 7.4mW per degree.

■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C, Unless otherwise specified, V<sub>CC</sub>=20V)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>SUPPLY VOLTAGE BLOCK</b>						
Operating Supply Voltage Range	V <sub>CC</sub>		7		24	V
Current Consumption 1	I <sub>CC1</sub>	V <sub>CC</sub> =20V, GATEIN="H", No Load	0.7	1.25	1.9	mA
Current Consumption 2	I <sub>CC2</sub>	V <sub>CC</sub> =20V, GATEIN="L", No Load	4.2	6.25	8.8	mA
<b>GATEIN PIN</b>						
Input Dynamic Range	V <sub>IN</sub> GATEIN		0		V <sub>CC</sub> -2.2	V
Threshold Voltage 1	V <sub>TH</sub> GATE1	GATE Signal L→H		2.63	3	V
Threshold Voltage 2	V <sub>TH</sub> GATE2	GATE Signal H→L	1.5	2.27		V
Input Current	I <sub>IN</sub> GATE	V <sub>IN</sub> =5V	125	167	249	μA
Input Frequency (Reference)	F <sub>IN</sub> GATE	When Load C=5600pF, R=10kΩ Connected			50	KHz
<b>SI PIN</b>						
"L" Level Output Voltage 1	V <sub>OL</sub> SI1	VGATEIN=0V, I <sub>OL</sub> =30mA			0.7	V
"L" Level Output Voltage 2	V <sub>OL</sub> SI2	VGATEIN=0V, I <sub>OL</sub> =1A			2	V
"L" Level Output Voltage 3	V <sub>OL</sub> SI3	V <sub>CC</sub> =7V, VGATEIN=0V, I <sub>OL</sub> =30mA			1	V
"L" Level Output Voltage 4 (Output Voltage At Low Supply Voltage)	V <sub>OL</sub> SI4	2V≤V <sub>CC</sub> <7V, VGATEIN=0V, No Load			1	V
"L" Level Output Voltage 5 (Output Voltage At Low Supply Voltage)	V <sub>OL</sub> SI5	2V≤V <sub>CC</sub> <7V, VGATEIN=0V, I <sub>OL</sub> =30mA			2	V
Off Leakage Current	I <sub>OFF</sub> SI	VGATEIN=6V, V <sub>IN</sub> =20V	-1		1	μA
<b>SO PIN</b>						
"H" Level Output Voltage 1	V <sub>OH</sub> SO1	VGATEIN=6V, I <sub>OH</sub> =-30mA	V <sub>CC</sub> -2			V
"H" Level Output Voltage 2	V <sub>OH</sub> SO2	VGATEIN=6V, I <sub>OH</sub> =-200mA	V <sub>CC</sub> -5			V
Off Leakage Current	I <sub>OFF</sub> SO	VGATEIN=0V, V <sub>IN</sub> =0V	-1		1	μA
<b>DI PIN</b>						
Input Clamp Voltage 1	V <sub>F</sub> DI1	I <sub>IN</sub> =500mA			V <sub>CC</sub> +1.5	V
Input Clamp Voltage 2	V <sub>F</sub> DI2	V <sub>CC</sub> =0V, I <sub>IN</sub> =300mA			V <sub>CC</sub> +1.0	V

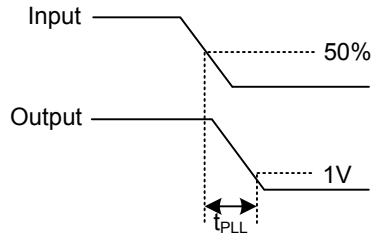
■ AC CHARACTERISTICS (V<sub>CC</sub>=20V, T<sub>A</sub>=25°C, Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay Time 1	t <sub>PLL</sub>	See Test Circuit Diagram			2	μs
Propagation Delay Time 2	t <sub>PHH</sub>	See Test Circuit Diagram			2	μs
Output Fall Time	t <sub>F</sub>	See Test Circuit			0.5	μs

■ AC CHARACTERISTICS TEST CONDITIONS

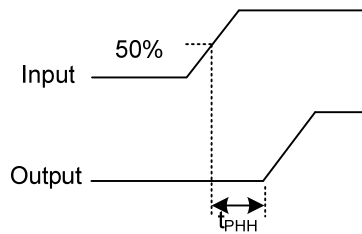
A. Propagation delay time 1 ( $t_{PLL}$ )

Time from input of "L" level to GATEIN pin until output reaches 1V



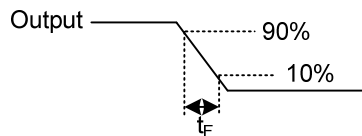
B. Propagation delay time 2 ( $t_{PHH}$ )

Time from input of "H" level to GATEIN pin until output starts to rise

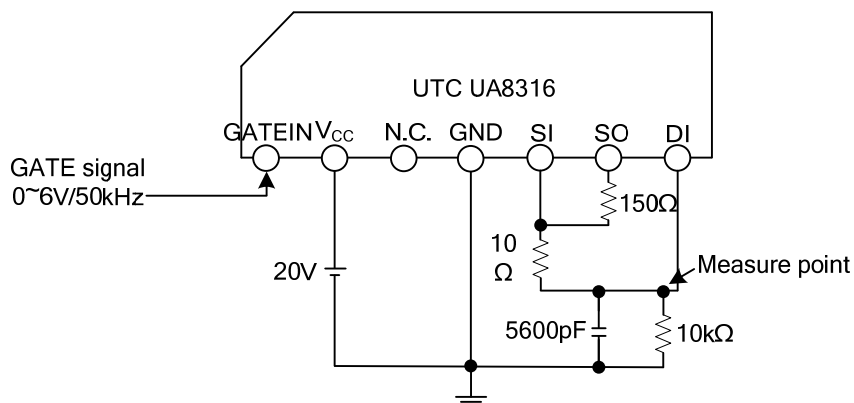


C. Output fall time ( $t_F$ )

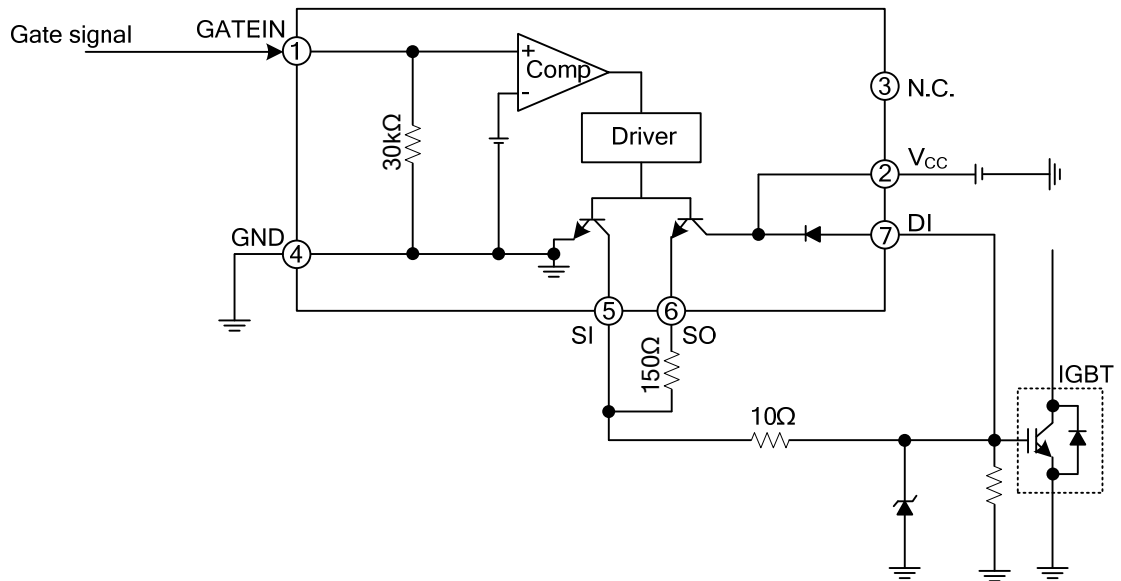
Output fall time from 90% to 10%



■ TEST CIRCUIT



■ TYPICAL APPLICATION CIRCUIT



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