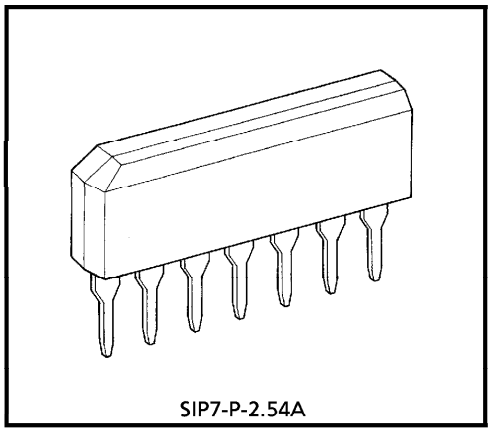
TENTATIVE TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8316AS

IGBT GATE DRIVER

TA8316AS is a dedicated IC integrating IGBT gate drive circuits on a single chip.
A high current directly drives IGBT.

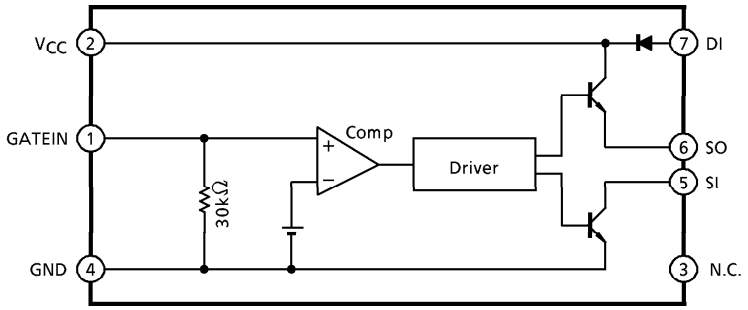


Weight : 0.72g (Typ.)

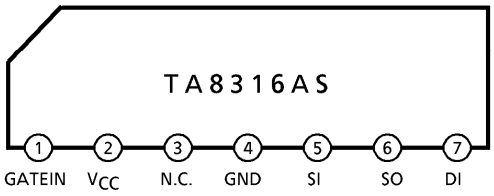
FEATURES

- Can directly control from a microcontroller
- Can directly drive the IGBT gate using a high current. Source current : −200mA (max), sink current 1A (max)
- Incorporates a diode to protect the IGBT gate at power on.

BLOCK DIAGRAM



PIN CONNECTION



PIN FUNCTIONS

PIN No.	PIN NAME	FUNCTION
1	GATEIN	Gate Signal Input Pin
2	V_{CC}	System Power Supply
3	N.C.	Not Connected
4	GND	GND
5	SI	IGBT Gate Drive Pin 1 (Sink Side)
6	SO	IGBT Gate Drive Pin 2 (Source Side)
7	DI	IGBT Gate Protector Diode Pin

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector Supply Voltage	V_{CC}	25	V
Input Voltage	V_{in}	GND – 0.3~V_{CC} + 0.3	V
Operating Temperature	T_{opr}	– 20~85	°C
Storage Temperature	T_{stg}	– 55~150	°C
Power Dissipation *	P_D	925	mW

* When Ta > 25°C, P_D decreases 7.4mW per degree.

ELECTRICAL CHARACTERISTICS (Ta = 25°C, Unless otherwise specified, V_{CC} = 20V)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage Block							
Operating Supply Voltage Range	V_{CC}	—	—	7	—	24	V
Current Consumption 1	I_{CC1}	—	V_{CC} = 20V, GATEIN = "H", No Load	0.7	1.25	1.9	mA
Current Consumption 2	I_{CC2}	—	V_{CC} = 20V, GATEIN = "L", No Load	4.2	6.25	8.8	mA
(GATEIN Pin)							
Input Dynamic Range	V_{in} GATEIN	—	—	0	—	V_{CC} – 2.2	V
Threshold Voltage 1	V_{th} GATE1	—	GATE Signal L→H	—	2.63	3	V
Threshold Voltage 2	V_{th} GATE2	—	GATE Signal H→L	1.5	2.27	—	V
Input Current	I_{in} GATE	—	V_{in} = 5V	125	167	249	μA
Input Frequency (Reference)	f_{in} GATE	—	When Load C = 5600pF, R = 10kΩ Connected	—	—	50	kHz
(SI Pin)							
"L" Level Output Voltage 1	V_{OL} SI1	—	VGATEIN = 0V, I_{OL} = 30mA	—	—	0.7	V
"L" Level Output Voltage 2	V_{OL} SI2	—	VGATEIN = 0V, I_{OL} = 1A	—	—	2	V
"L" Level Output Voltage 3	V_{OL} SI3	—	V_{CC} = 7V, VGATEIN = 0V, I_{OL} = 30mA	—	—	1	V
"L" Level Output Voltage 4 (Output Voltage At Low Supply Voltage)	V_{OL} SI4	—	2V ≦ V_{CC} < 7V, VGATEIN = 0V, No Load	—	—	1	V
"L" Level Output Voltage 5 (Output Voltage At Low Supply Voltage)	V_{OL} SI5	—	2V ≦ V_{CC} < 7V, VGATEIN = 0V, I_{OL} = 30mA	—	—	2	V
Off Leakage Current	Ioff SI	—	VGATEIN = 6V, V_{in} = 20V	– 1	—	1	μA
(SO Pin)							
"H" Level Output Voltage 1	V_{OH} SO1	—	VGATEIN = 6V, I_{OH} = – 30mA	V_{CC} – 2	—	—	V
"H" Level Output Voltage 2	V_{OH} SO2	—	VGATEIN = 6V, I_{OH} = – 200mA	V_{CC} – 5	—	—	V
Off Leakage Current	Ioff SO	—	VGATEIN = 0V, V_{in} = 0V	– 1	—	1	μA
(DI Pin)							
Input Clamp Voltage 1	V_F DI1	—	I_{in} = 500mA	—	—	V_{CC} + 1.5	V
Input Clamp Voltage 2	V_F DI2	—	V_{CC} = 0V, I_{in} = 300mA	—	—	V_{CC} + 1.0	V

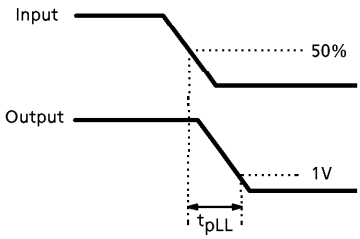
AC CHARACTERISTICS (Ta = 25°C, Unless otherwise specified, V_{CC} = 20V)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Propagation Delay Time 1	t_{PLL}	—	See test circuit diagram	—	—	2	μs
Propagation Delay Time 2	t_{PHH}	—	See test circuit diagram	—	—	2	μs
Output Fall Time	t_f	—	See test circuit	—	—	0.5	μs

AC CHARACTERISTICS TEST CONDITIONS

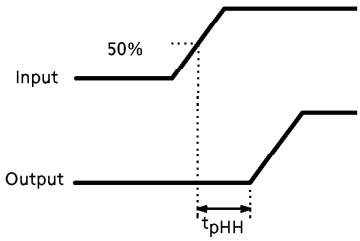
① Propagation delay time 1 (t_{pLL})

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



② Propagation delay time 2 (t_{pHH})

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



③ Output fall time (t_f)

Output fall time from 90% to 10%

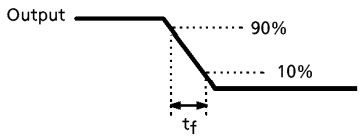
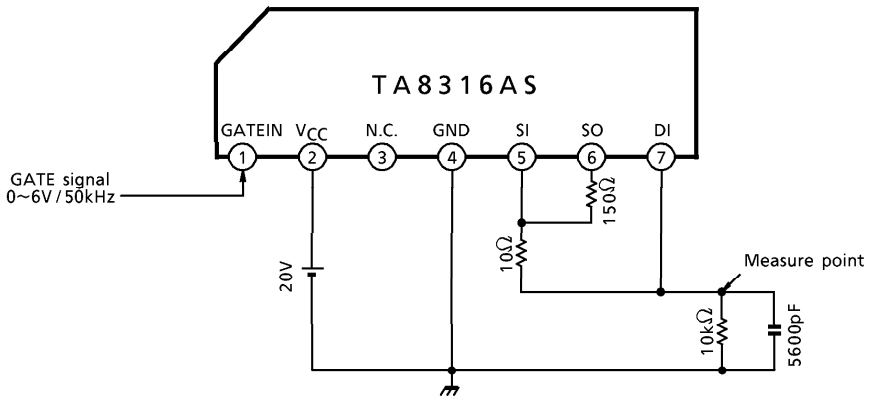
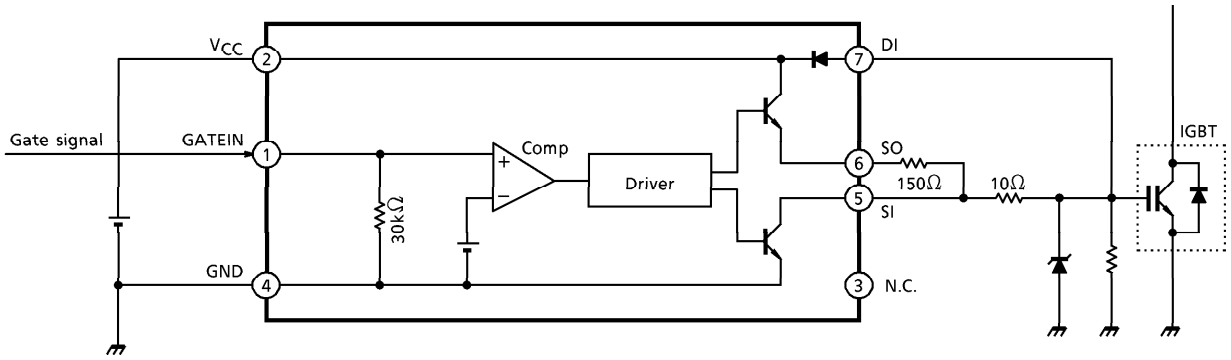


DIAGRAM OF AC CHARACTERISTICS TEST CIRCUIT

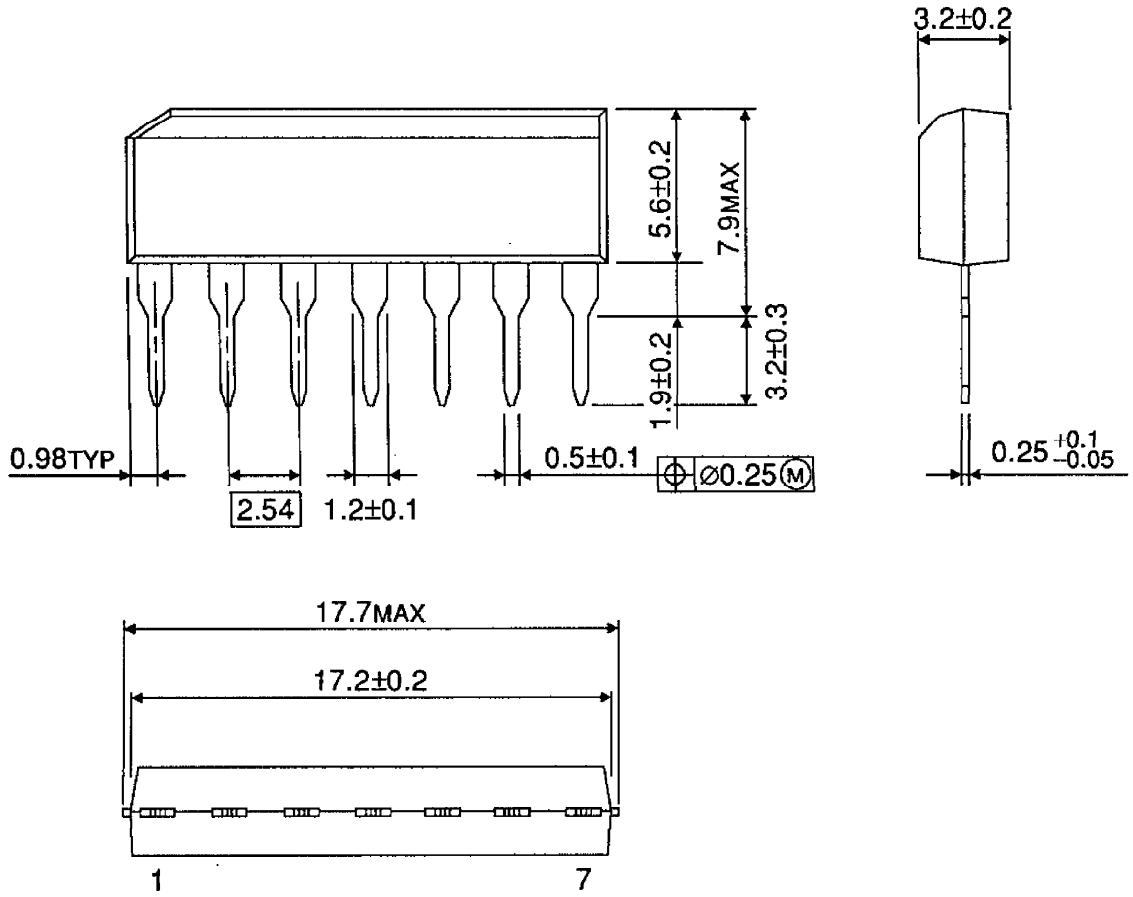


APPLICATION CIRCUIT



PACKAGE DIMENSIONS

SIP7-P-2.54A Unit : mm



Weight : 0.72g (Typ.)

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