DESCRIPTION

The AG2113 is a high-side and low-side gate driver with a source and sink current capability of 2.5A, making it suitable for driving power MOSFETs or IGBTs. Its logic inputs are compatible with standard CMOS or TTL outputs, functioning with logic levels as low as 3.3V. The output drivers include a high pulse current buffer stage designed to minimize cross-conduction between drivers. This device supports a wide bias supply input range from 10V to 20V. Additionally, the floating channel can drive an N-Channel power MOSFET or IGBT in a high-side configuration, operating at voltages up to 600V.

AG2113 is available in SOP16 and DIP14 packages.

ORDERING INFORMATION

Package Type	Part Number	
SOP16 SPQ: 3,000pcs/Reel	M16	AG2113M16VR
DIP14 SPQ: 25pcs/Tube	P14	AG2113P14VU
Note	V: Halogen free Package R: Tape & Reel U: Tube	
AiT provides all RoHS products		

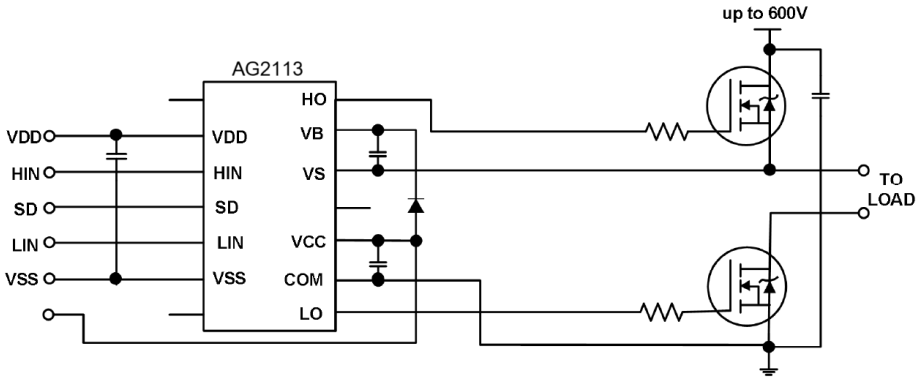
FEATURES

- Fully Operational up to 600 V
- Drives two N-channel MOSFETs or IGBTs in high-side / low-side configuration
- Floating channel designed for bootstrap operation.
- Output source/sink current capability 2.5A
- Gate drive supply ranges from 10V to 20V
- Under-voltage lockout for both channels
- 3.3V logic compatible with CMOS and TTL, CMOS Schmitt-triggered inputs with pull-down; Logic and power ground ±5V offset
- Separate logic supply ranges from 3.3V to 20V
- 18 ns(typ) rise / 13 ns (typ) fall times with 1000 pF load.
- 128 ns (typ) turn-on / 124 ns (typ) turn-off delay times.

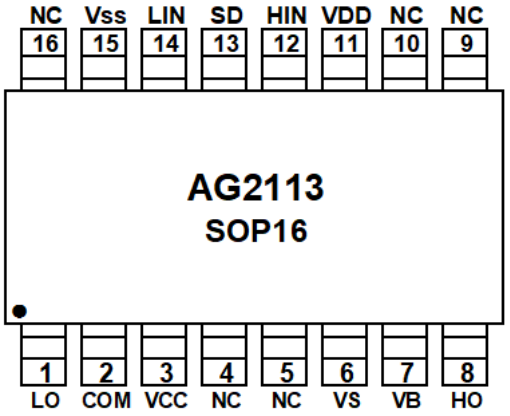
APPLICATION

- Motor Drivers, UPS.
- High-Density Switching Power Supplies for Industrial Infrastructure.
- Full/Half Bridge Converters.
- Two Switch Forward Converter.

TYPICAL APPLICATION

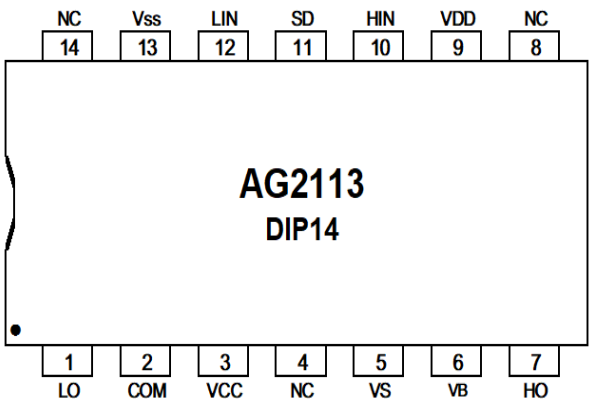


PIN DESCRIPTION



SOP16, M16

Top View



DIP14, P14

Top View

Pin #		Symbol	Function
SOP16	DIP14		
1	1	LO	Low side gate drive output
2	2	COM	Low side return
3	3	V_{CC}	Low side supply
6	5	V_S	High side floating supply return
7	6	V_B	High side floating supply
8	7	HO	High side gate drive output
11	9	V_{DD}	Logic supply
12	10	HIN	Logic input for high side gate driver output (HO), in phase
13	11	SD	Logic input for shutdown
14	12	LIN	Logic input for low side gate driver output (LO), in phase
15	13	V_{SS}	Logic ground
4,5,9,10,16	4, 8,14	NC	Not Connected

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min.	Max.	Units
High side floating supply voltage	V_B	-0.3	620	V
High side floating supply offset voltage	V_S	V_B - 20	V_B + 0.3	
High side floating output voltage	V_{HO}	V_S - 0.3	V_B + 0.3	
Low side fixed supply voltage	V_{CC}	-0.3	20	
Low side output voltage	V_{LO}	-0.3	V_{CC} + 0.3	
Logic supply voltage	V_{DD}	-0.3	V_{CC} + 20	
Logic supply offset voltage	V_{SS}	V_{CC} -20	V_{CC} + 0.3	
Logic input voltage (HIN, LIN, SD)	V_{IN}	V_{SS}-0.3	V_{DD} + 0.3	
Allowable offset supply voltage transient	dV_S/dt	-	50	V/ns
Package Thermal Resistance (DIP14)	-	-	75	°C /W
Package Thermal Resistance (SOP16)		-	100	
Junction Temperature	T_J		150	°C
Storage Temperature	T_S	-55	150	
Lead Temperature (Soldering, 10 seconds)	T_L		300	

Stress beyond above listed “Absolute Maximum Ratings” may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min.	Max.	Units
High side floating supply voltage	V_B	V_S + 10	V_S + 20	V
Low side fixed supply voltage	V_{CC}	10	20	
Logic supply voltage	V_{DD}	V_{SS} + 3	V_{SS} + 20	
Logic supply offset voltage	V_{SS}	-5	5	
Logic input voltage (HIN, LIN, SD)	V_{IN}	V_{SS}	V_{DD}	
Operation temperature	T_A	-40	125	°C

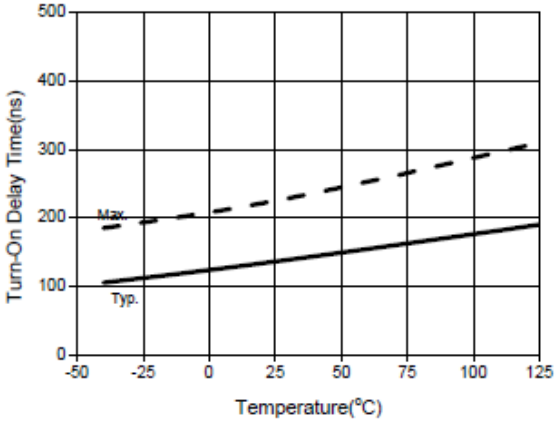
ELECTRICAL CHARACTERISTICS

V_{BIAS} (V_{CC}, V_{BS}, V_{DD}) = 15V, T_A = 25°C, C_L = 1000pF and V_{SS} = COM, unless otherwise specified.

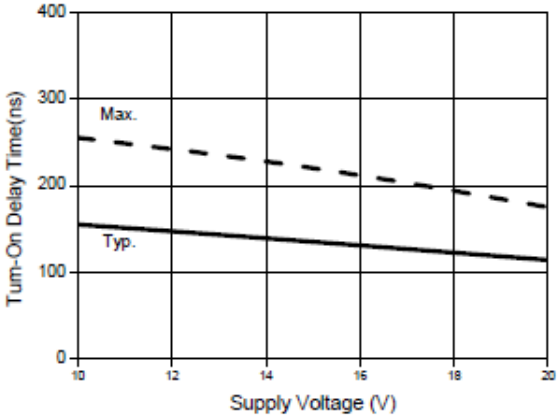
Parameter	Symbol	Conditions	Min	Typ.	Max	Units
INPUT						
Input signal high threshold	V_{IH}	-	2.5	-	-	V
Input signal low threshold	V_{IL}	-	-	-	0.8	
Logic "1" input bias current	I_{IN}+	V_{IN} = 5V	-	10	20	µA
Logic "0" input bias current	I_{IN}-	V_{IN} = 0V	-	-	2.0	
OUTPUT						
High Level Output Voltage, V_{BIAS} - V_O	V_{OH}	I_O = 20 mA	-	-	1.4	V
Low Level Output Voltage	V_{OL}		-	-	0.15	
Output High Short Circuit Pulsed Current	I_O+	V_O=0V, V_{IN}=VDD, PW ≤ 10 µS	2.0	2.5	-	A
Output Low Short Circuit Pulsed Current	I_O-	V_O = 15V, V_{IN} = 0, PW ≤ 10 µS	2.0	2.5	-	
POWER SUPPLY						
Quiescent V_{BS} Supply Current	I_{QBS}	V_{IN} = 0 or V_{DD}	-	45	100	µA
Quiescent V_{CC} Supply Current	I_{QCC}		-	500	700	
Quiescent V_{DD} Supply Current	I_{QDD}		-	-	150	
Offset Supply Leakage Current	I_{LK}	V_B = V_S = 600V	-	-	50	
V_{CC} and V_{BS} Supply under voltage positive going threshold	V_{BSUV}+ V_{CCUV}+	-	7.5	8.6	9.7	V
V_{CC} and V_{BS} Supply under voltage negative going threshold	V_{BSUV}- V_{CCUV}-	-	7.0	8.1	9.2	
V_{CC} and V_{BS} Supply under voltage lockout hysteresis	V_{BSHY} V_{CCHY}	-	-	0.5	-	
SWITCHING CHARACTERISTICA						
Turn-On Rise Time	t_R	C_L = 1000pF, See Function Timing Diagram Fig.2.3.4.5	-	18	30	ns
Turn-Off Fall TIME	t_F		-	13	20	
Turn-On Propagation Delay	t_{on}		-	128	150	
Turn-Off Propagation Delay	t_{off}		-	124	150	
Shutdown Propagation Delay	t_{sd}		-	120	150	
Delay matching, turn-on/off	MT		-	10	-	

TYPICAL PERFORMANCE CHARACTERISTICS

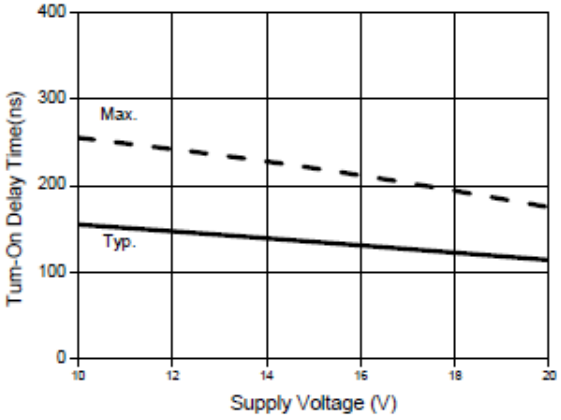
1. Turn-On Delay vs. Temperature



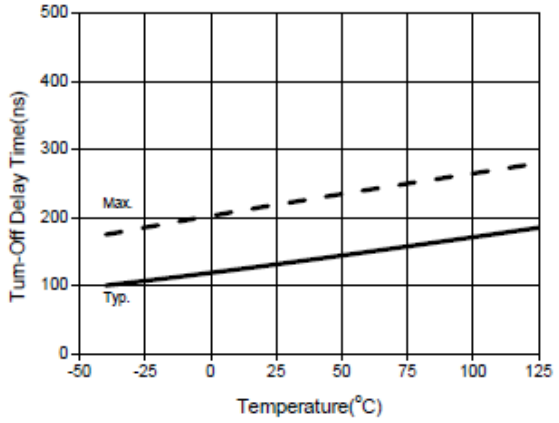
2. Turn-On Delay vs. Supply Voltage



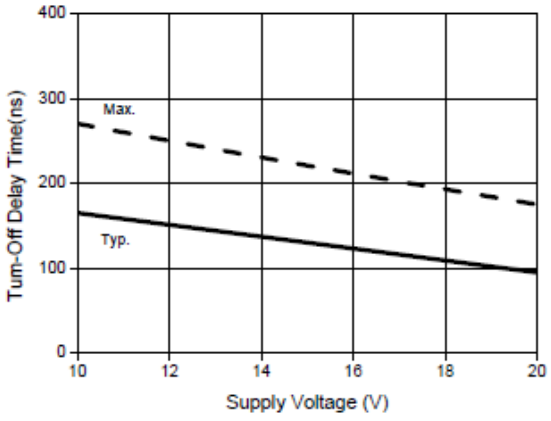
3. Turn-On Delay Time vs. V_{DD} Supply Voltage



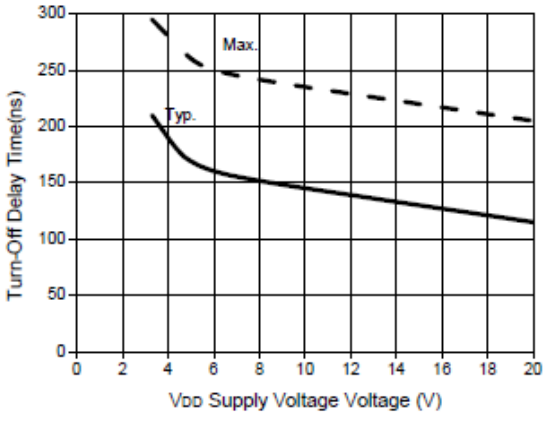
4. Turn-Off Delay Time vs. Temperature



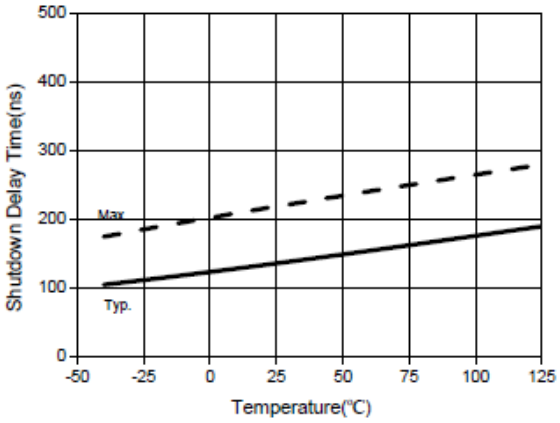
5. Turn-Off Delay Time vs. Supply Voltage



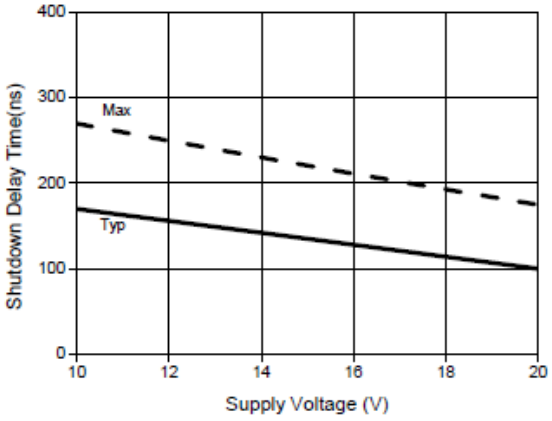
6. Turn-Off Delay Time vs. V_{DD} Supply Voltage



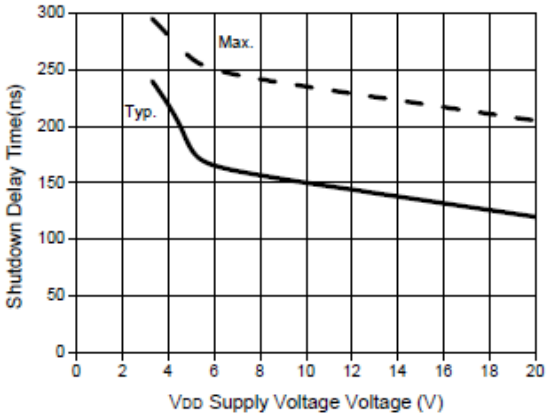
7. Shutdown Delay Time vs. Temperature



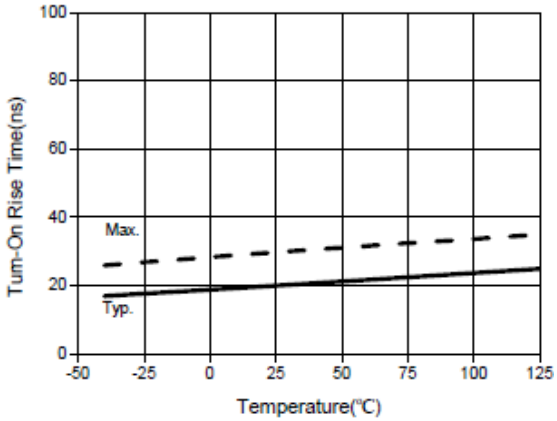
8. Shutdown Delay Time vs. Supply Voltage



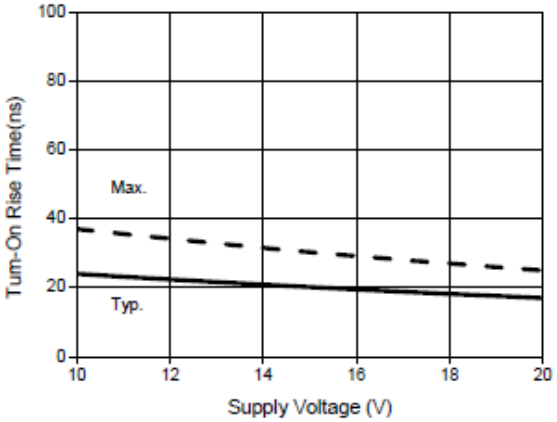
9. Shutdown Delay Time vs. V_{DD} Supply Voltage



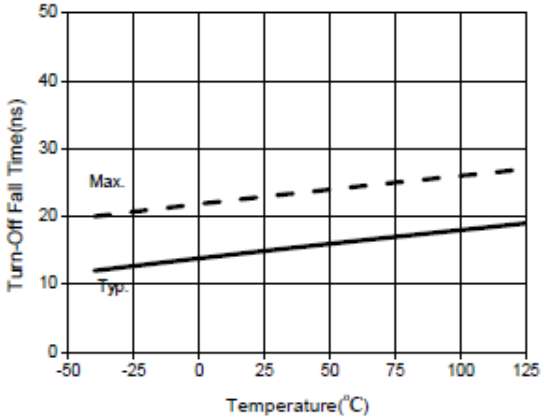
10. Turn-On Rise Time vs. Temperature



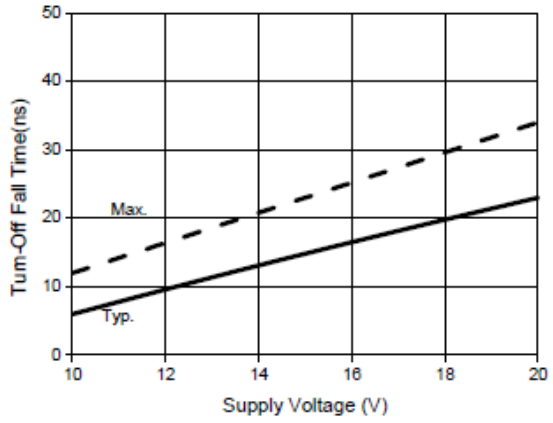
11. Turn-On Rise Time vs. Voltage



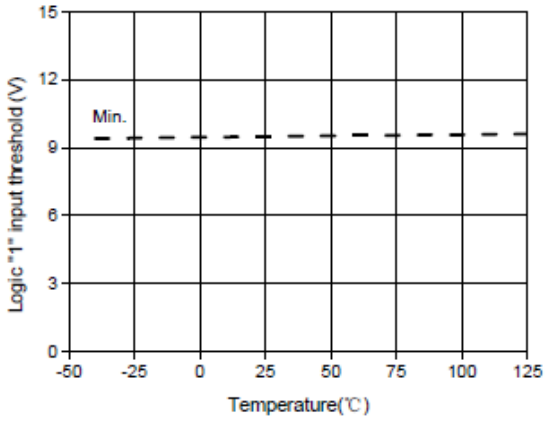
12. Turn-Off Fall Time vs. Temperature



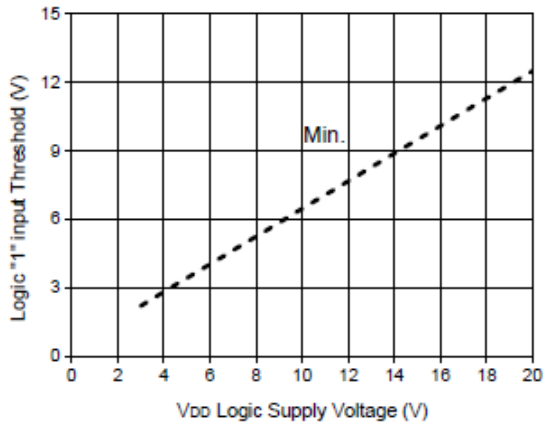
13. Turn-Off Fall Time vs. Voltage



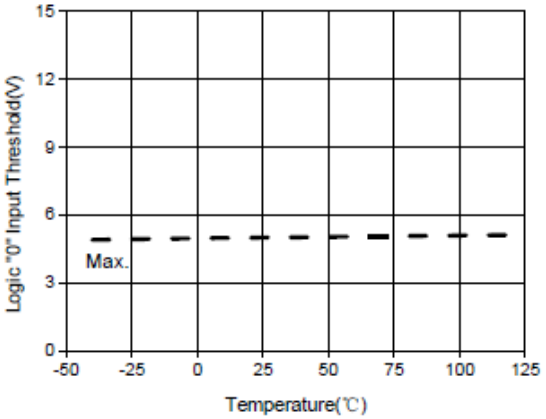
14. Logic "1" Input Voltage vs. Temperature



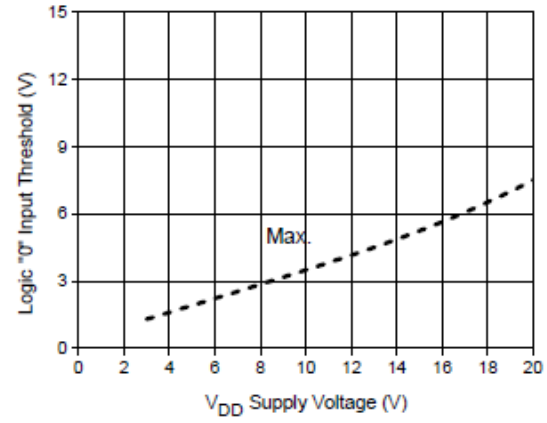
15. Logic "1" Input Voltage vs. Voltage



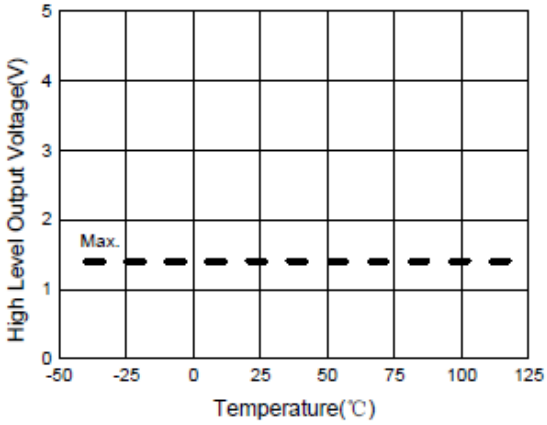
16. Logic "0" Input Voltage vs. Temperature



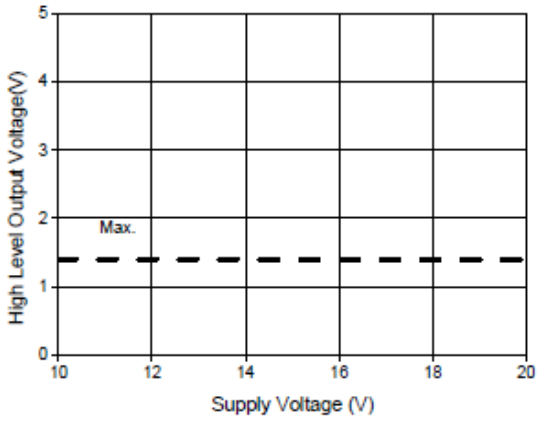
17. Logic "0" Input Voltage vs. Voltage



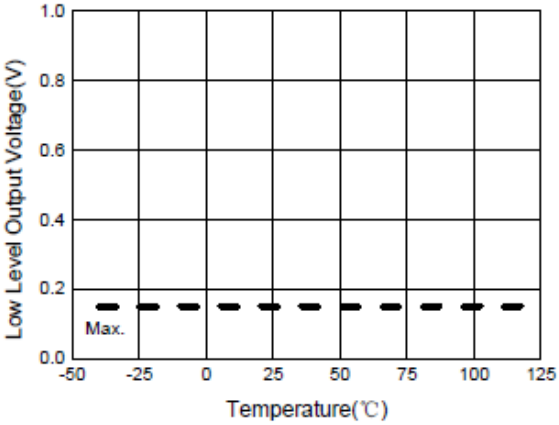
18. High Level Output vs. Temperature



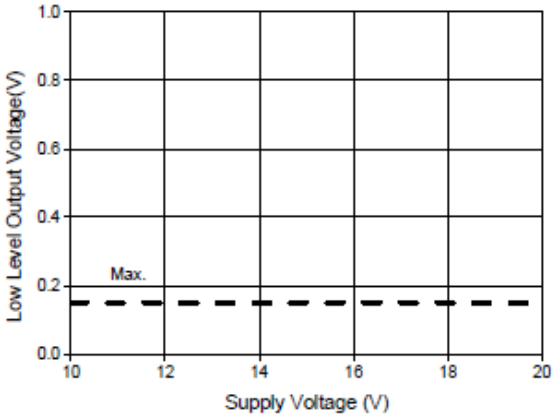
19. High Level Output vs. Voltage



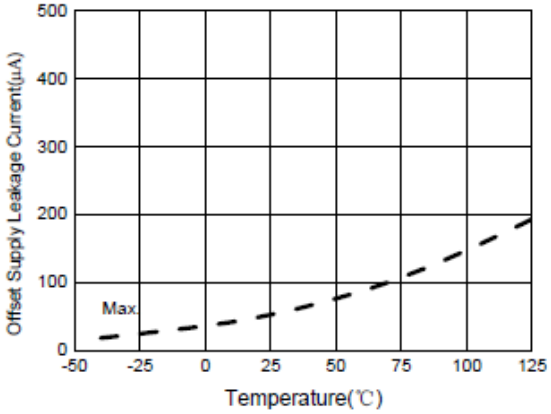
20. Low Level Output vs. Temperature



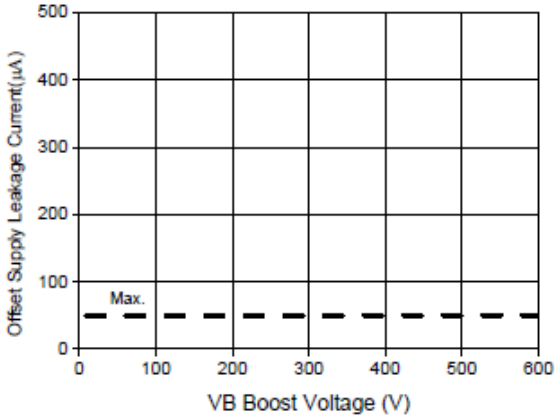
21. Low Level Output vs. Voltage



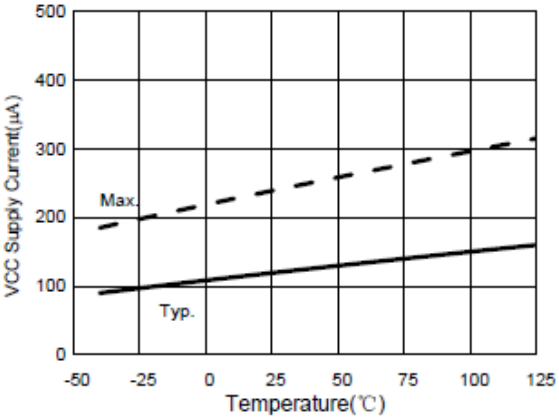
22. Offset Supply Current vs. Temperature



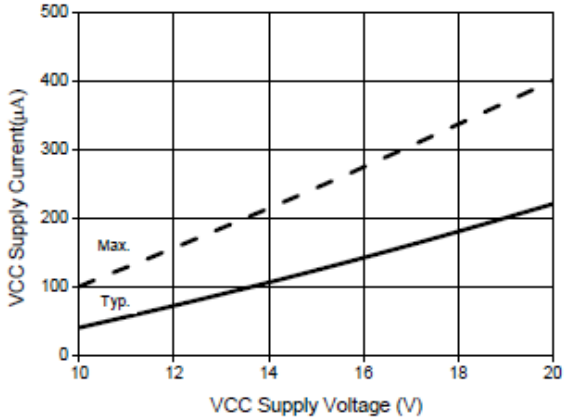
23. Offset Supply Current vs. Voltage



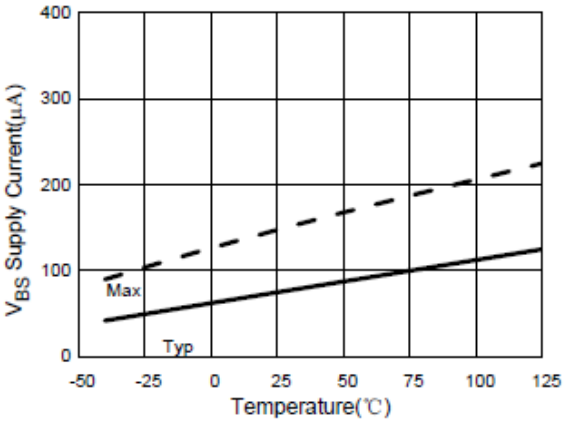
24. V_{CC} Supply Current vs. Temperature



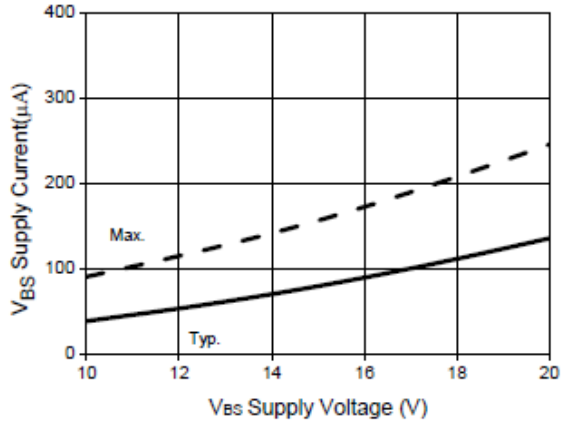
25. V_{CC} Supply Current vs. Voltage



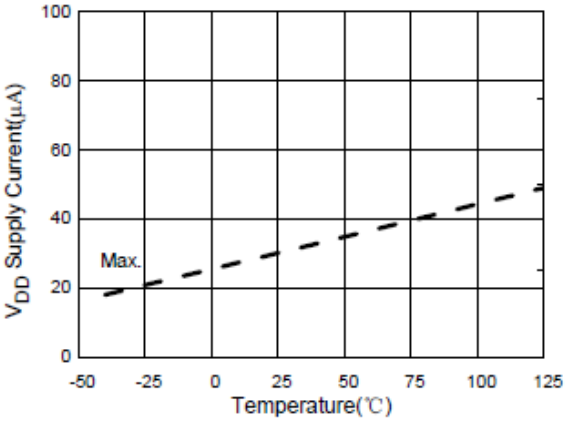
26. V_{BS} Supply Current vs. Temperature



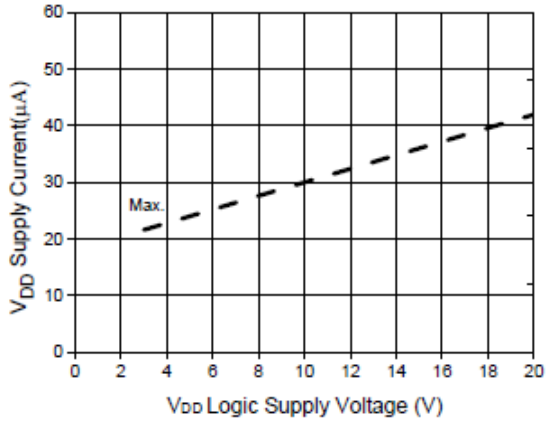
27. V_{BS} Supply Current vs. Voltage



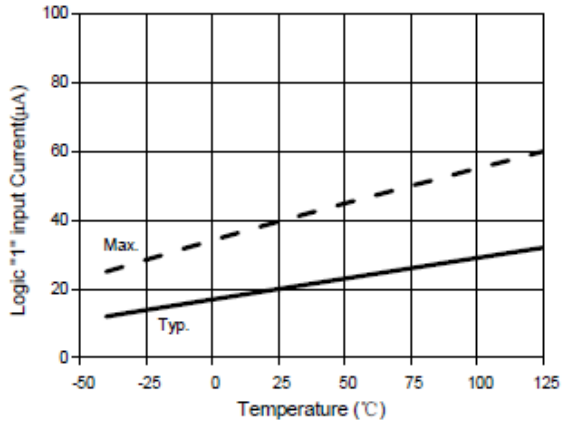
28. V_{DD} Supply Current vs. Temperature



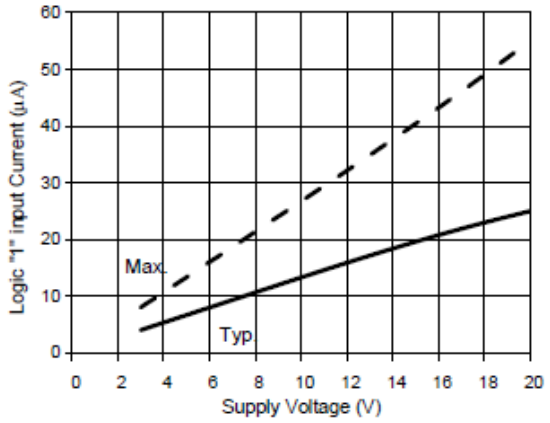
29. V_{DD} Supply Current vs. Voltage



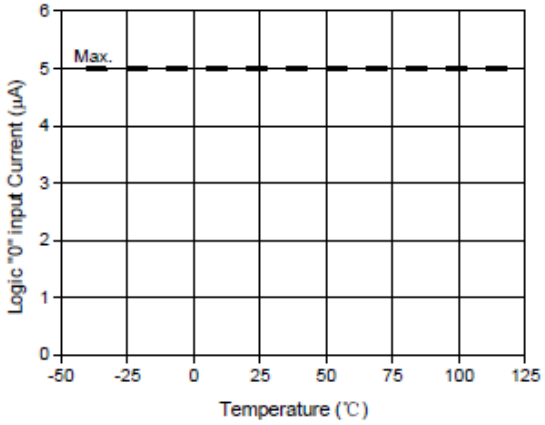
30. Logic "1" Input Current vs. Temperature



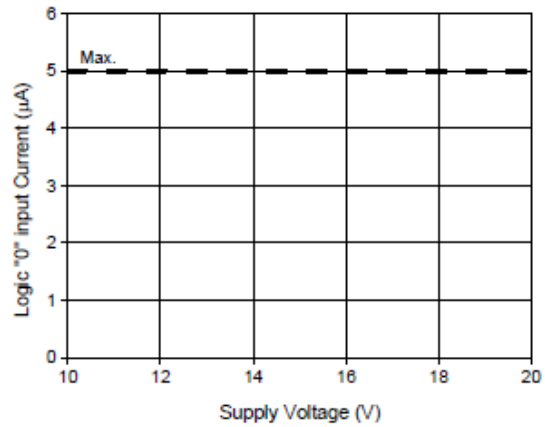
31. Logic "1" Input Current vs. Voltage



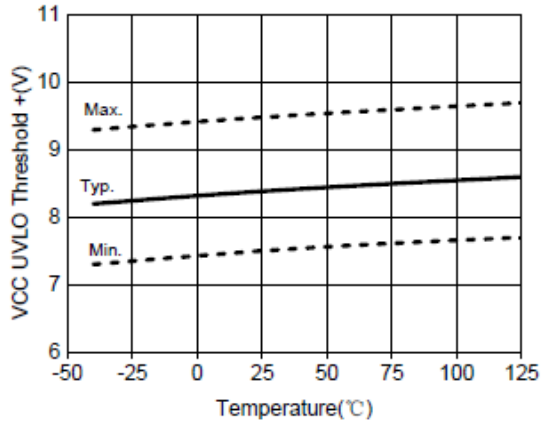
32. Logic "0" Input Current vs. Temperature



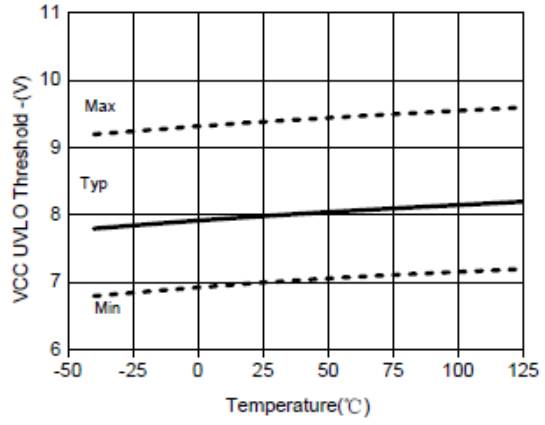
33. Logic "0" Input Current vs. Voltage



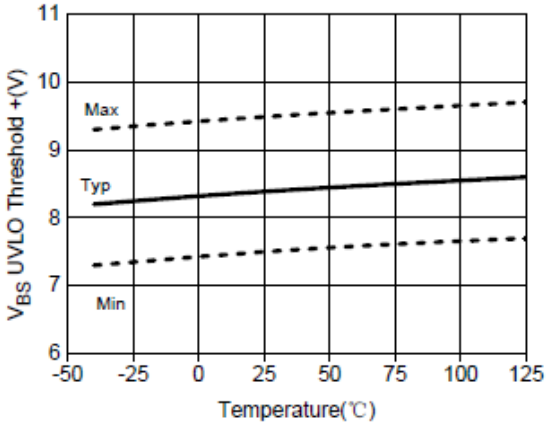
34. V_{CC} Under voltage (+) vs. Temperature



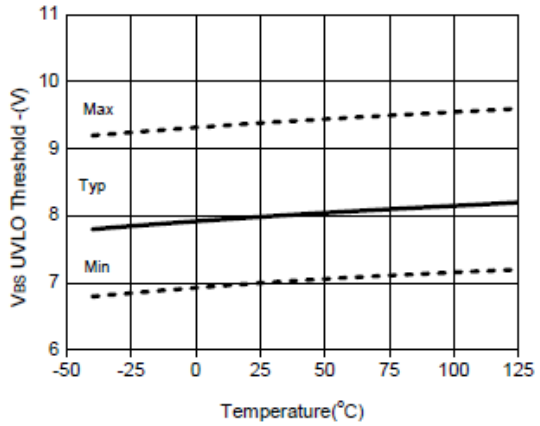
35. V_{CC} Under voltage (-) vs. Temperature



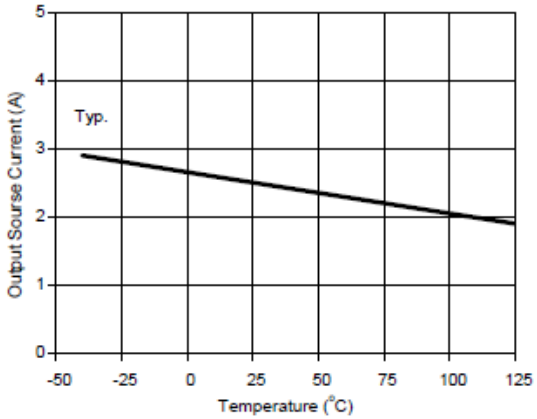
36. V_{BS} Under voltage (+) vs. Temperature



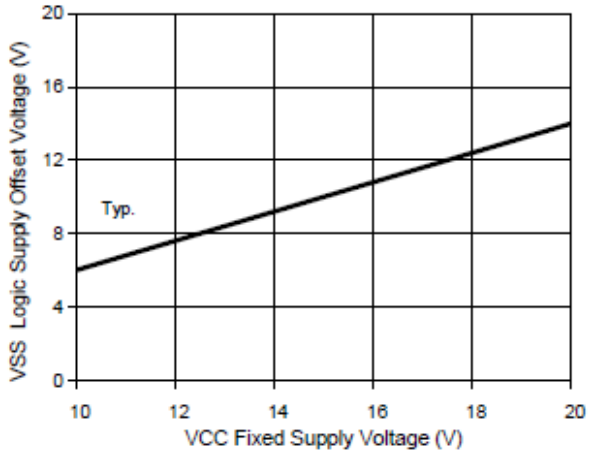
37. V_{BS} Under voltage (-) vs. Temperature



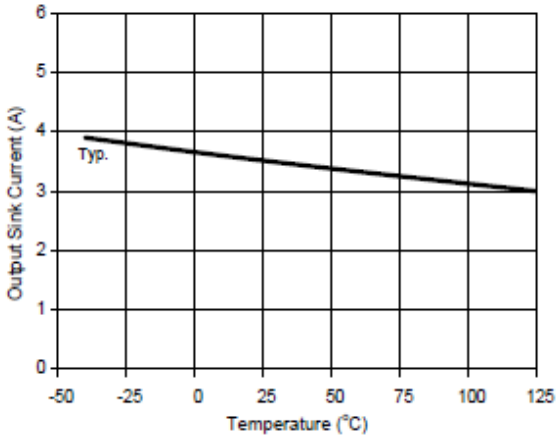
38. Output Source Current vs. Temperature



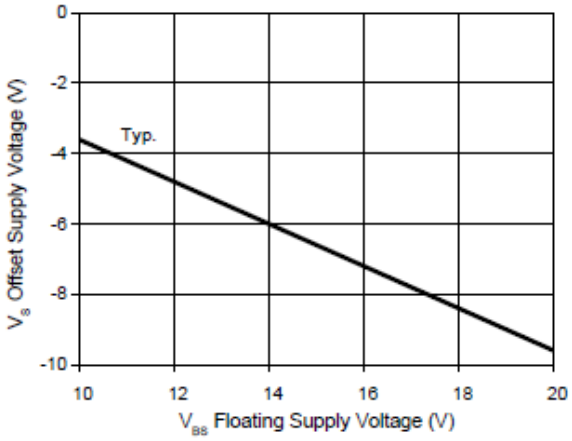
39. Maximum V_{SS} Positive Offset vs. V_{CC} Supply Voltage



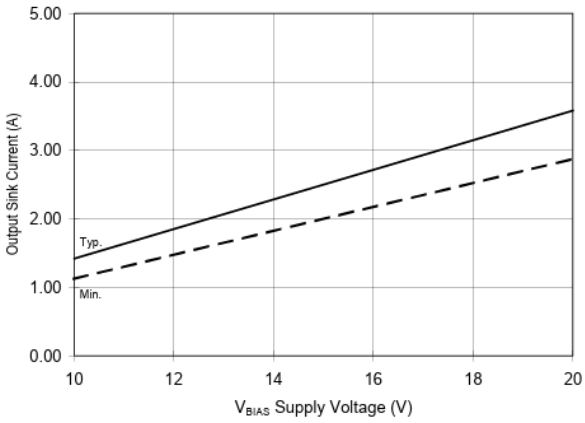
40. Output Sink Current vs. Temperature



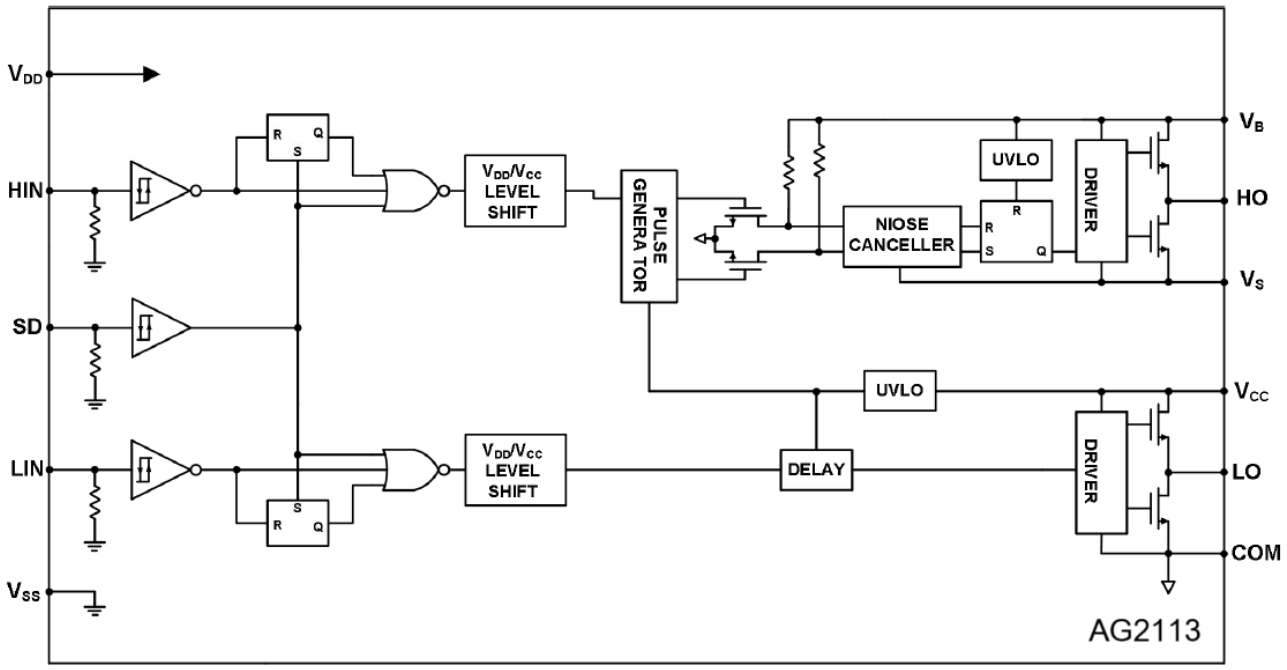
41. Maximum V_{SS} Positive Offset vs. V_{CC} Supply Voltage



42. Output Source Current vs. Voltage



BLOCK DIAGRAM



TYPICAL APPLICATION CIRCUIT

Fig.1 Input & Output Timing Diagram

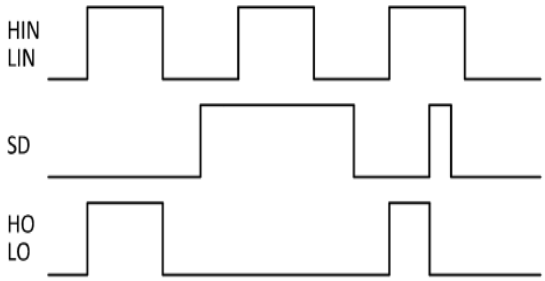


Fig.2 Floating Supply Voltage Transient Test Circuit

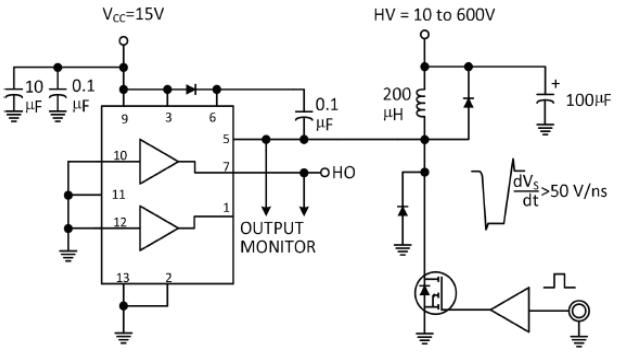


Fig.3 Switching Time Test Circuit

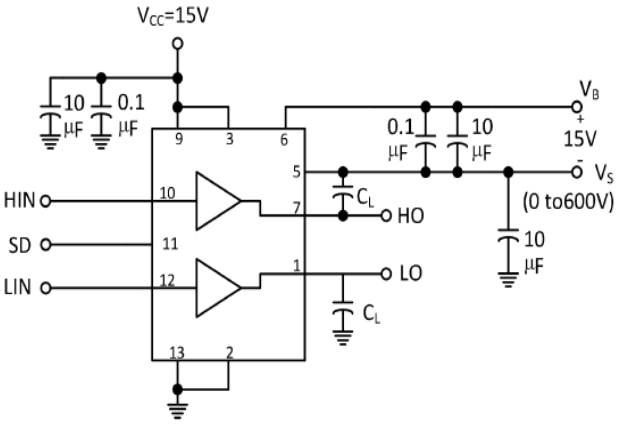


Fig.4 Switching Time Waveform Definition

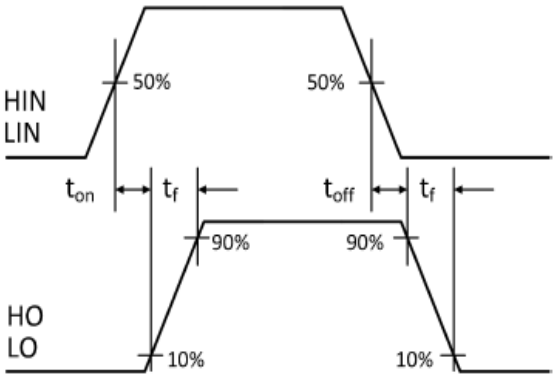


Fig.5 Shutdown Waveform Definition

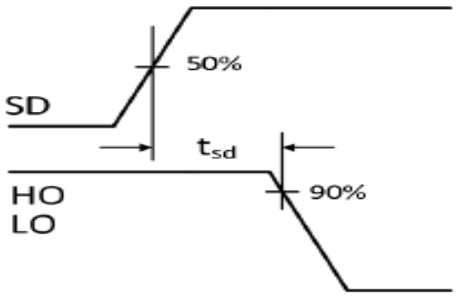
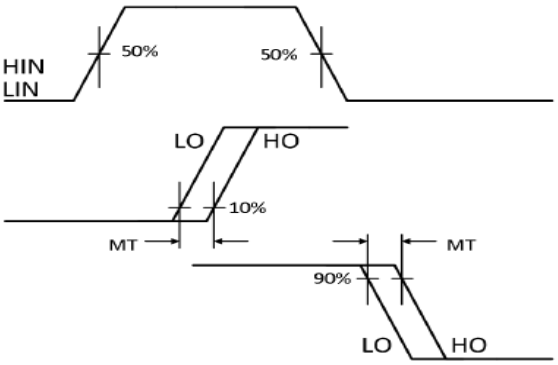
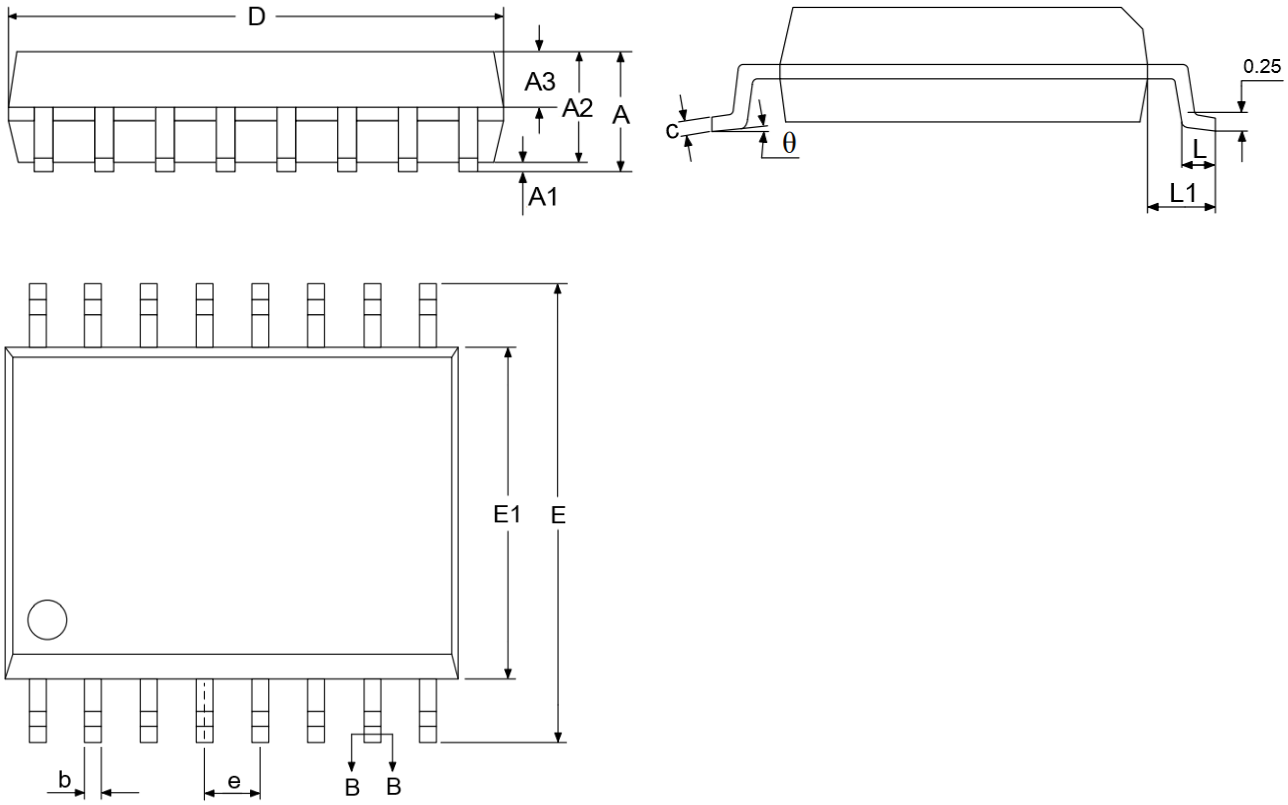


Fig.6 Delay Waveform Definition



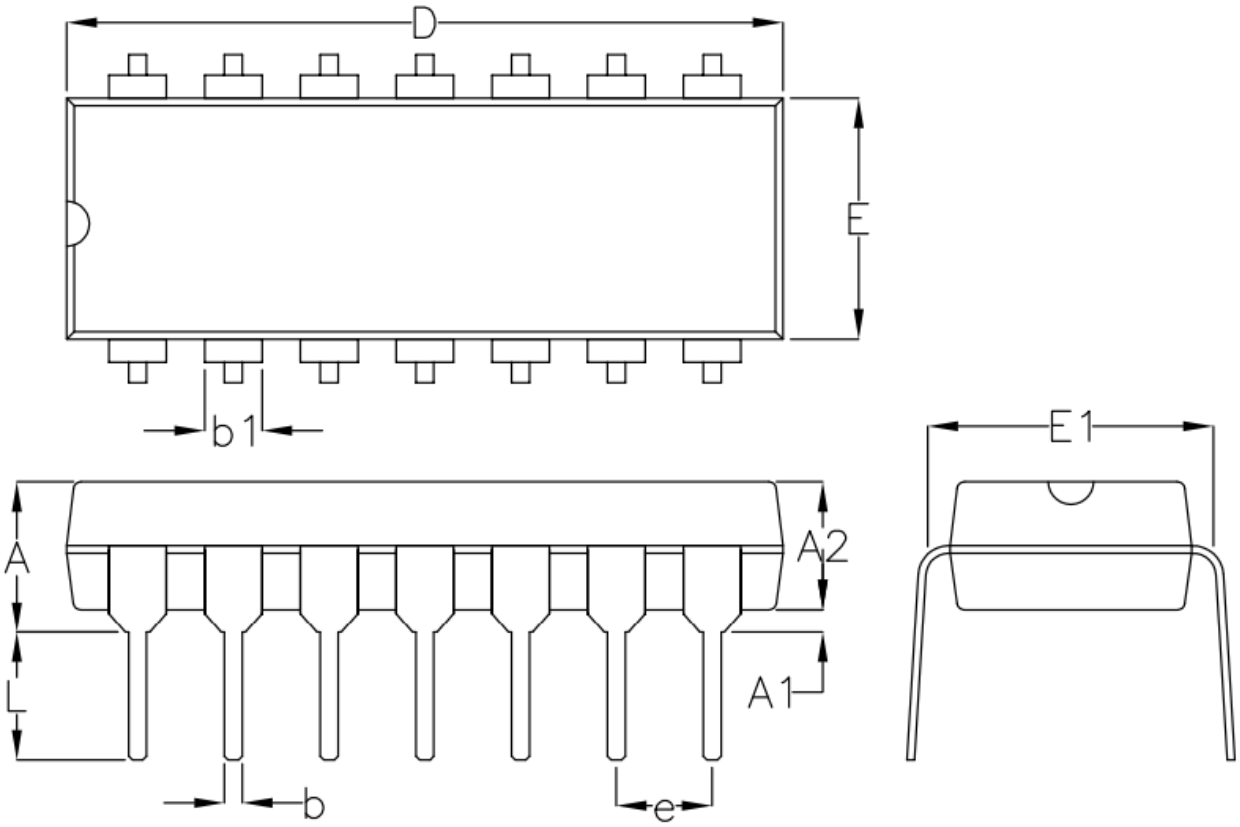
PACKAGE INFORMATION

Dimension in SOP16 (Unit: mm)



Symbol	MILLIMETER	
	Min.	Max.
A	-	2.650
A1	0.100	0.300
A2	2.250	2.350
A3	0.970	1.070
b	0.350	0.440
b1	0.340	0.390
c	0.250	0.310
c1	0.240	0.260
D	10.100	10.500
E	10.260	10.600
E1	7.300	7.700
e	1.27 BSC	
L	0.550	0.850
L1	1.4 BSC	
θ	0°	8°

Dimension in DIP14 (Unit: mm)



Symbol	MILLIMETER	
	Min.	Max.
A	3.700	5.330
A1	0.381	0.710
A2	3.200	3.600
b	0.360	0.560
b1	1.143	1.778
D	18.190	19.700
E	6.200	6.600
E1	7.620	8.255
e	2.540	
L	2.920	3.800

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