DESCRIPTION

The AG2113 is a high voltage, high speed power MOSFET and IGBT driver with independent high and low side referenced output channels based on P_SUB P_EPI process. Logic inputs are compatible with standard CMOS or LSTTL output, down to 3V logic. The output drivers feature a high pulse current buffer stage designed for minimum driver cross-conduction. Propagation delays are matched to simplify use in high frequency applications. The floating channel can be used to drive an N-channel power MOSFET or IGBT in the high side configuration which operates up to 600 V.

AG2113 is available in a SOP16 package.

FEATURES

- Floating channel designed for bootstrap
  -Fully operational to +600 V
  -Tolerant to negative transient voltage dV/dt immune
- Gate drive supply range from 10 V to 20 V
- Undervoltage lockout (UVLO) for both channels
- Separate logic supply range from 5 to 20V
  -Logic and power ground ±5V offset
- 3.3 V /5 V/15 V logic compatible
- 2.5A Output Current Capability
- Matched propagation delay for both channels
- Output in phase with inputs

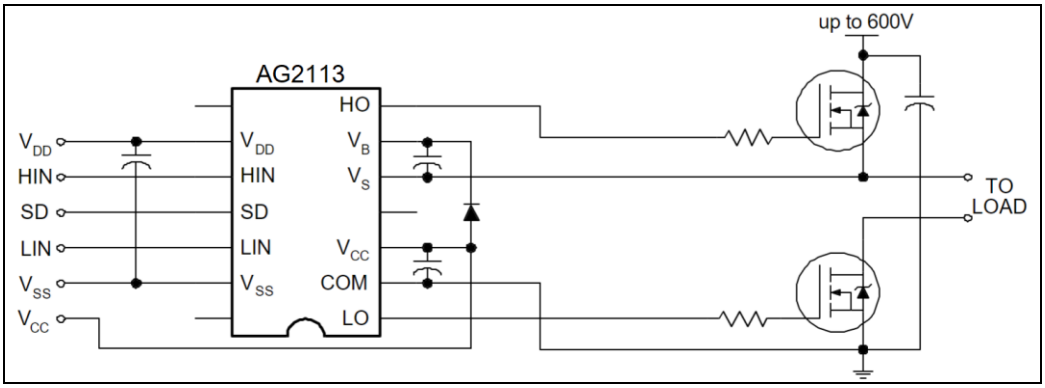
ORDERING INFORMATION

Package Type	Part Number	
SOP16 SPQ: 1,500pcs/Reel	M16	AG2113M16R
		AG2113M16VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

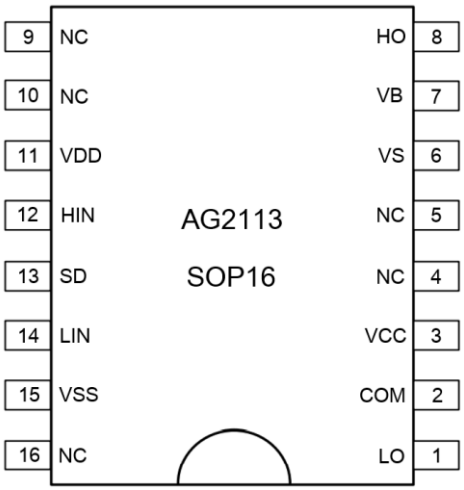
APPLICATION

- DC/DC Converter
- Power MOSFET or IGBT driver
- DC/AC Converter

TYPICAL APPLICATION



PIN DESCRIPTION



SOP16, M16

Top View

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

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min.	Max.	Units
High side floating supply	V_B	-0.3	625	V
High side floating supply return	V_S	V_B - 25	V_B + 0.3	
High side gate drive output	V_{HO}	V_S - 0.3	V_B + 0.3	
Low side supply	V_{CC}	-0.3	25	
Low side gate drive output	V_{LO}	-0.3	V_{CC} + 0.3	
Logic supply	V_{DD}	-0.3	V_{CC} + 0.3	
Logic ground	V_{SS}	V_{CC} -25	V_{CC} + 0.3	
Logic input	V_{IN}	V_{SS}-0.3	V_{DD} + 0.3	
Allowable Offset Supply Voltage Transient	dV_S/dt		50	V/ns
HBM Model	ESD	2.5		kV
Machine Model		200		V
Package Power Dissipation @ T_A ≤25°C (14 Lead DIP)	PD		1.6	W
Package Power Dissipation @ T_A ≤25°C (16 Lead SOW)			1.25	
Thermal Resistance Junction to Ambient (14 Lead DIP)	R_{thJA}		75	°C /W
Thermal Resistance Junction to Ambient (16 Lead SOW)			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

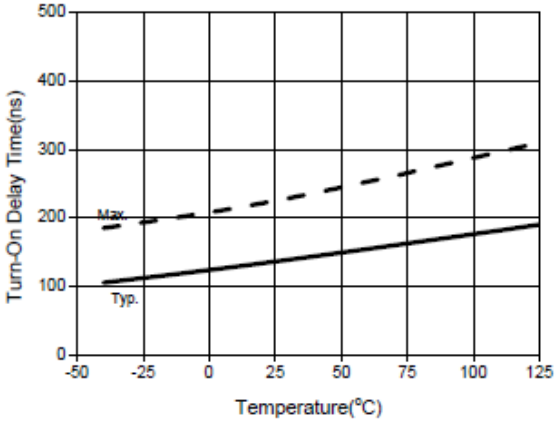
Parameter	Symbol	Min.	Max.	Units
High side floating supply	V_B	V_S + 10	V_S + 20	V
High side floating supply return	V_S	COM - 8	600	
High side gate drive output voltage	V_{HO}	V_S	V_B	
Low side supply	V_{CC}	10	20	
Low side gate drive output voltage	V_{LO}	0	V_{CC}	
Logic supply	V_{DD}	V_{SS}+3	V_{SS}+20	
Logic ground	V_{SS}	-5	5	
Logic input voltage(HIN & LIN & SD)	V_{IN}	0	V_{DD}	
Ambient temperature	T_A	-40	125	°C

ELECTRICAL CHARACTERISTICS

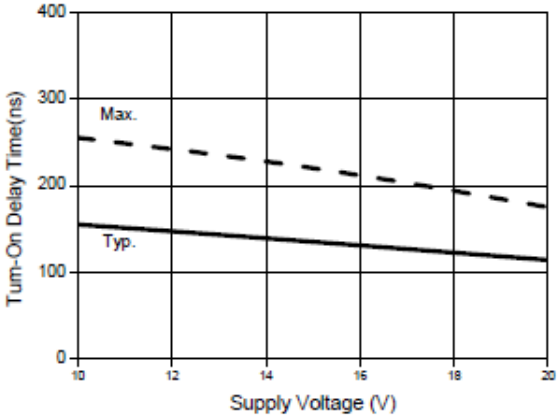
Parameter	Symbol	Conditions	Min	Typ.	Max	Units
Dynamic V_{BIAS} (V_{CC}, V_{BS}) = 15V, C_L = 1000pF, T_A = 25°C, unless otherwise specified.						
Turn-On Propagation Delay	t_{on}		-	135	220	ns
Turn-Off Propagation Delay	t_{off}		-	130	220	
Shutdown Propagation Delay	t_{sd}		-	135	220	
Delay Matching	MT		-	-	30	
Turn-On Rise Time	t_r		-	20	30	
Turn-Off Fall Time	t_f		-	15	25	
Static V_{BIAS} (V_{CC}, V_{BS}, V_{DD}) = 15V, C_L = 1000pF, T_A = 25°C, V_{SS}=COM, unless otherwise specified.						
Logic “1”(IN) Input Voltage	V_{IH}		9.5	-	-	V
Logic “0” (IN) Input Voltage	V_{IL}		-	-	5	
High Level Output Voltage, V_{BIAS} - V_O	V_{OH}		-	-	1.4	
Low Level Output Voltage, V_O	V_{OL}		-	-	0.15	
Quiescent V_{DD} Supply Current	I_{QDD}		-	-	30	μA
Quiescent V_{CC} Supply Current	I_{QCC}		-	120	240	
Quiescent V_B Supply Current	I_{QBS}		-	75	150	
Leakage Current From V_S(600V) to GND	I_{LK}		-	-	10	
Logic “1” Input Bias Current	I_{IN}+		-	20	40	
Logic “0” Input Bias Current	I_{IN}-		-	-	5	
V_{BS} Supply UVLO Threshold	V_{BSU}+		7.5	8.4	9.7	V
	V_{BSU}-		7	8	9.4	
V_{CC} Supply UVLO Threshold	V_{CCU}+		7.5	8.4	9.6	
	V_{CCU}-		7	8	9.4	
Output High Short Circuit Pulsed Current	I_O+		-	2.5	-	A
Output Low Short Circuit Pulsed Current	I_O-		-	2.5	-	

TYPICAL PERFORMANCE CHARACTERISTICS

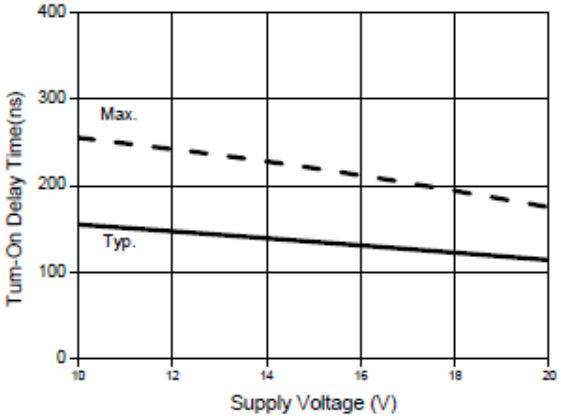
1. Turn-On Delay vs. Temperature



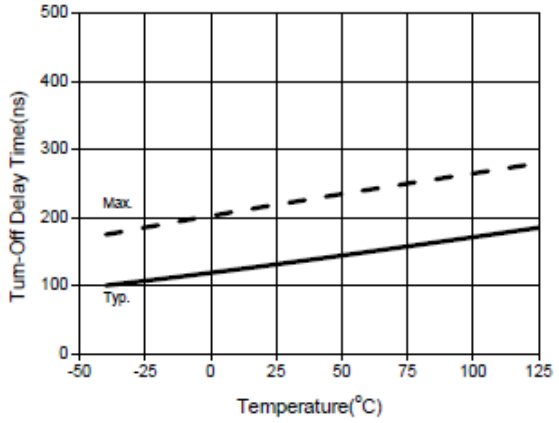
2. Turn-On Delay vs. Supply Voltage



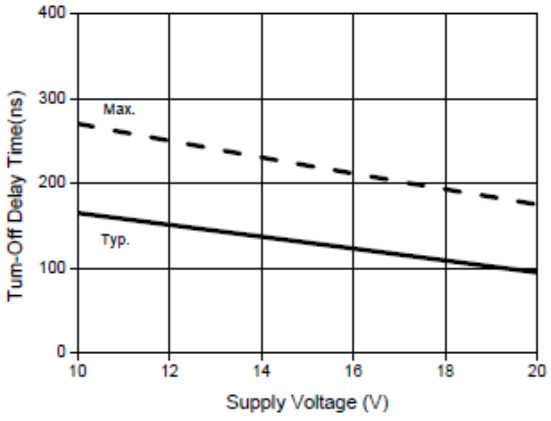
3. Turn-On Delay Time vs. V_{DD} Supply Voltage



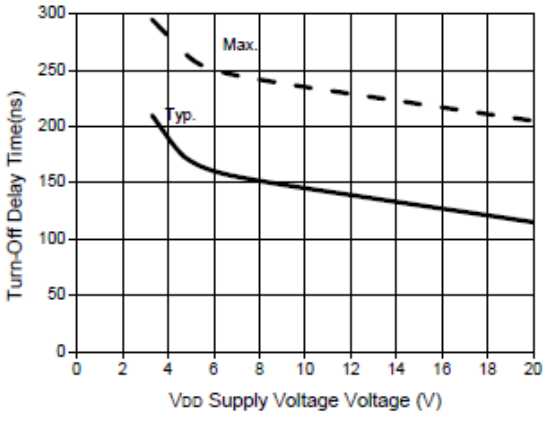
4. Turn-Off Delay Time vs. Temperature



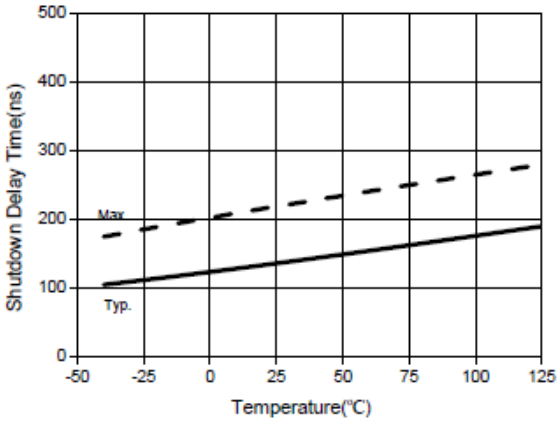
5. Turn-Off Delay Time vs. Supply Voltage



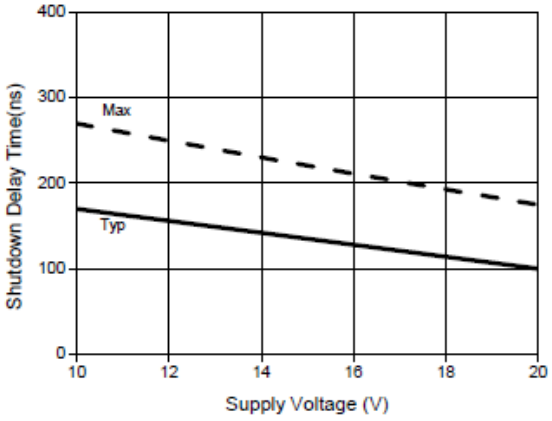
6. Turn-Off Delay Time vs. V_{DD} Supply Voltage



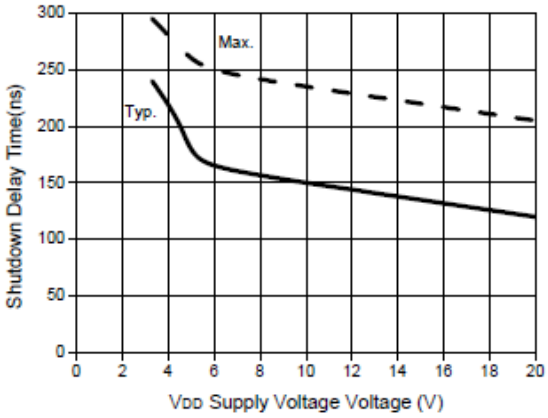
7. Shutdown Delay Time vs. Temperature



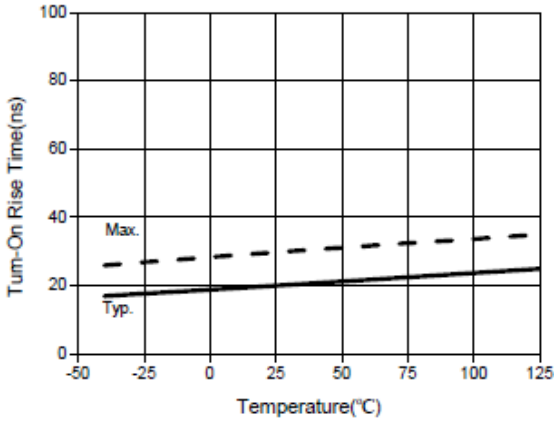
8. Shutdown Delay Time vs. Supply Voltage



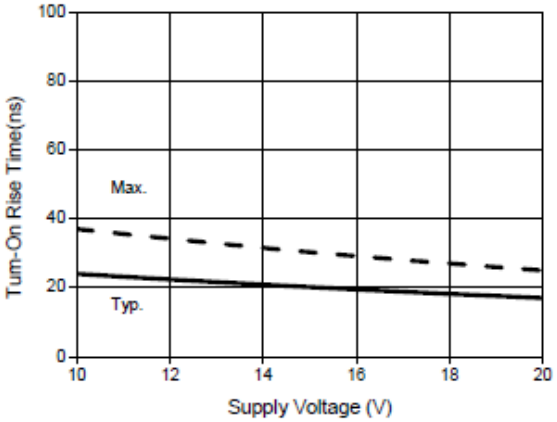
9. Shutdown Delay Time vs. V_{DD} Supply Voltage



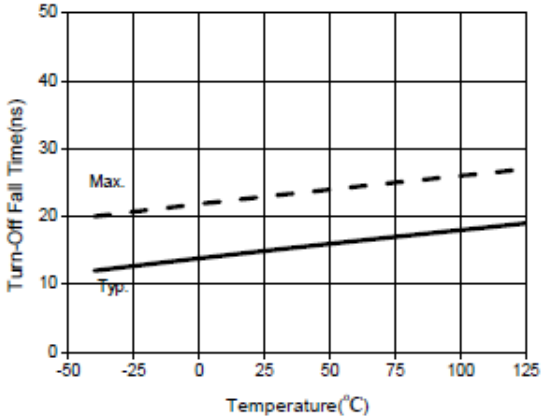
10. Turn-On Rise Time vs. Temperature



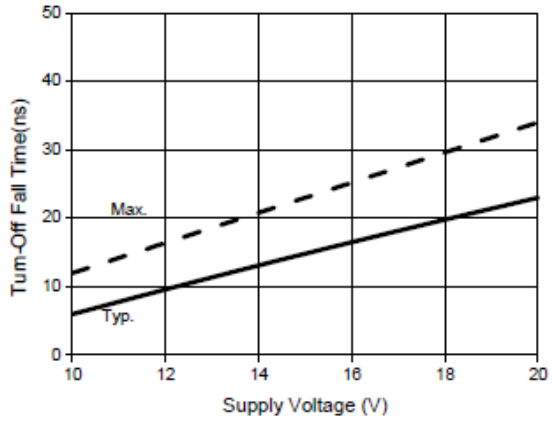
11. Turn-On Rise Time vs. Voltage



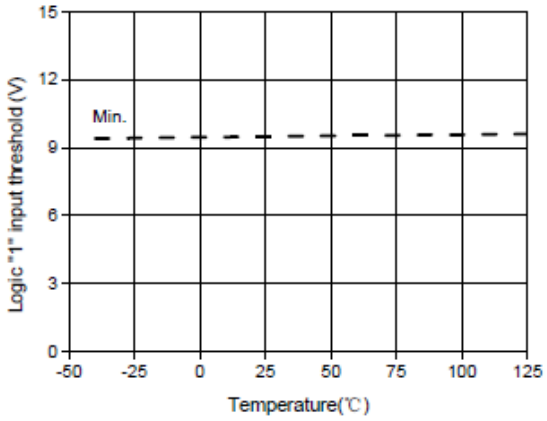
12. Turn-Off Fall Time vs. Temperature



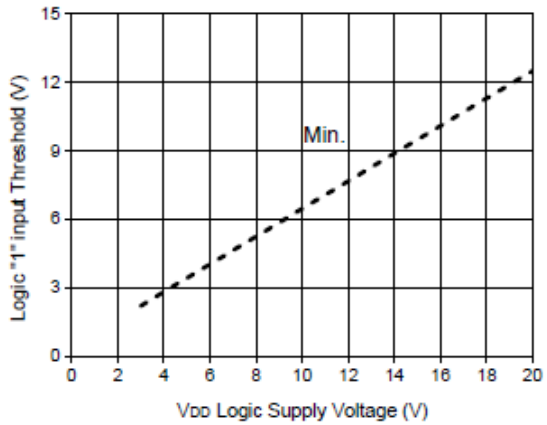
13. Turn-Off Fall Time vs. Voltage



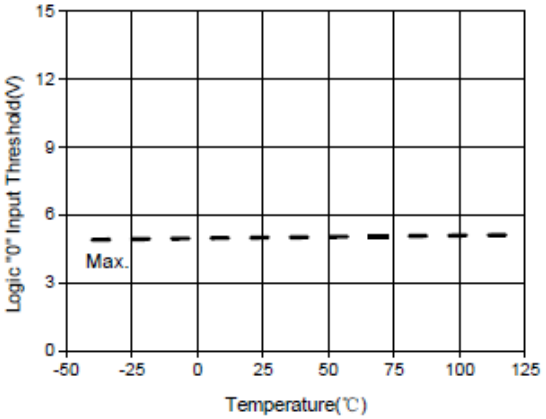
14. Logic "1" Input Voltage vs. Temperature



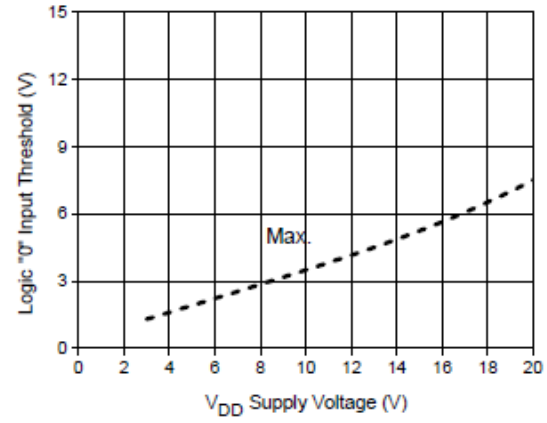
15. Logic "1" Input Voltage vs. Voltage



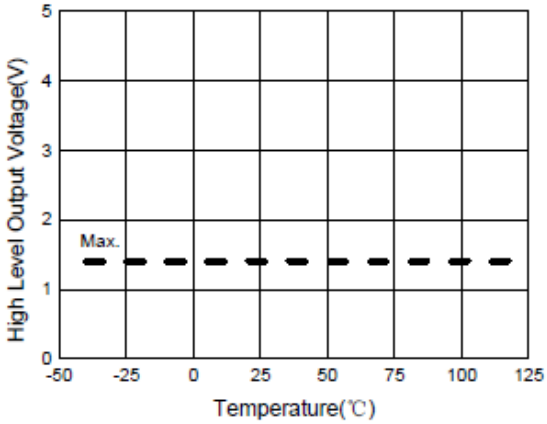
16. Logic "0" Input Voltage vs. Temperature



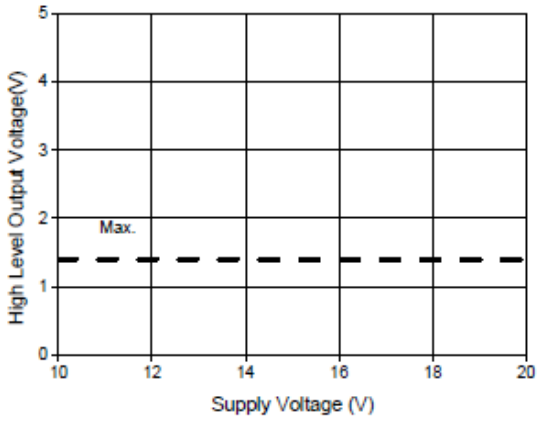
17. Logic "0" Input Voltage vs. Voltage



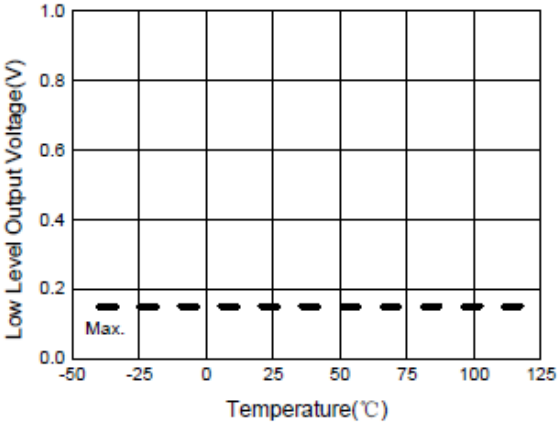
18. High Level Output vs. Temperature



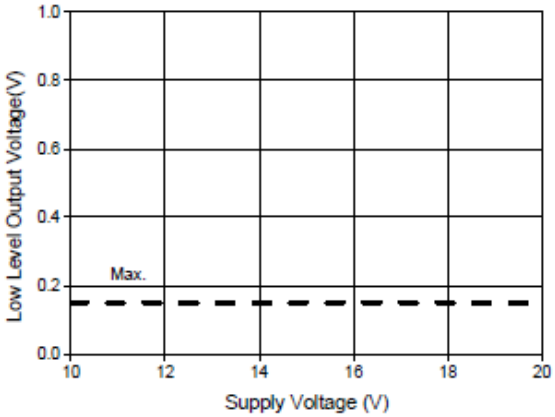
19. High Level Output vs. Voltage



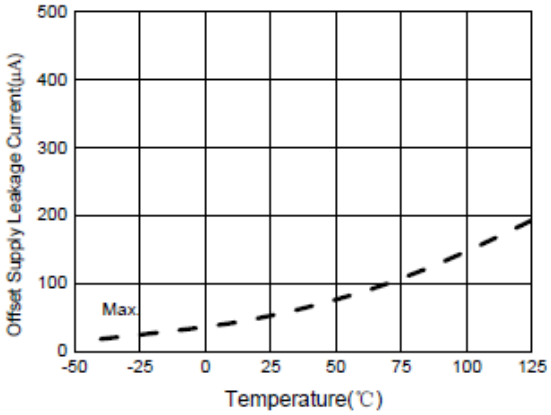
20. Low Level Output vs. Temperature



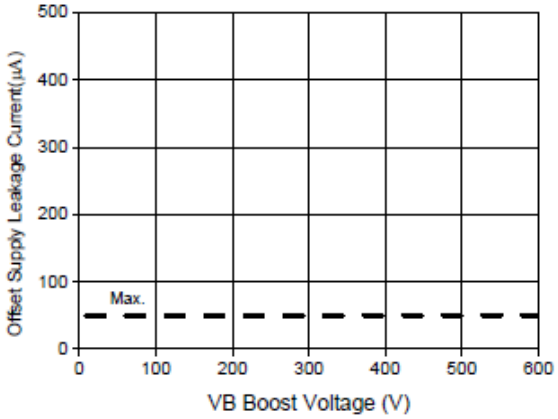
21. Low Level Output vs. Voltage



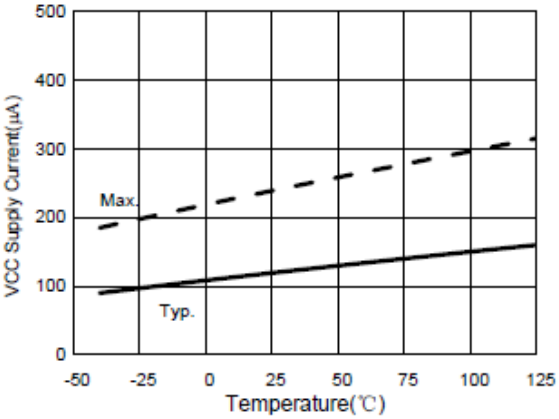
22. Offset Supply Current vs. Temperature



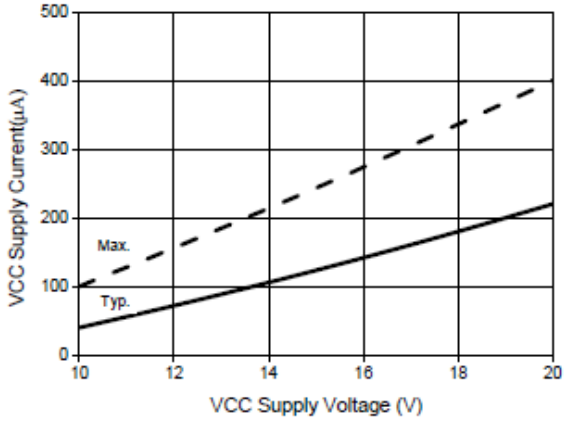
23. Offset Supply Current vs. Voltage



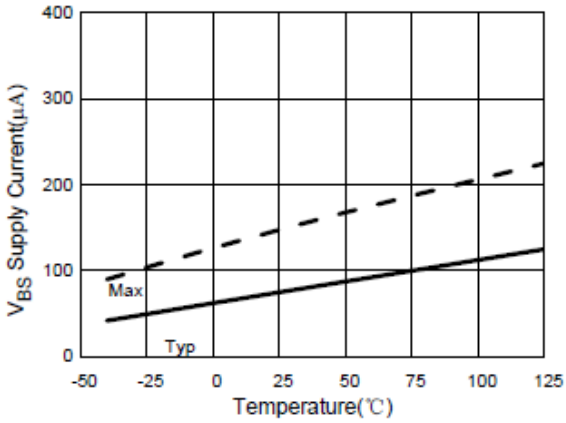
24. V_{CC} Supply Current vs. Temperature



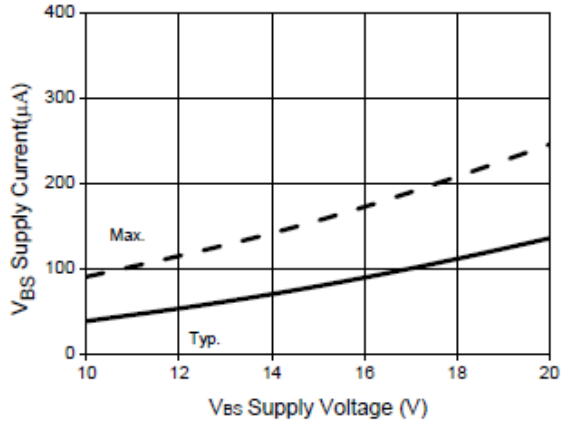
25. V_{CC} Supply Current vs. Voltage



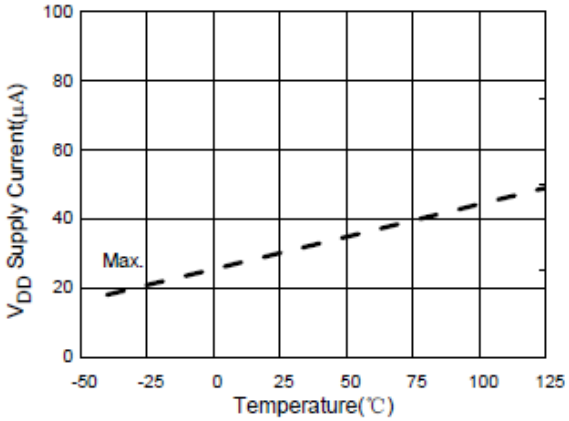
26. V_{BS} Supply Current vs. Temperature



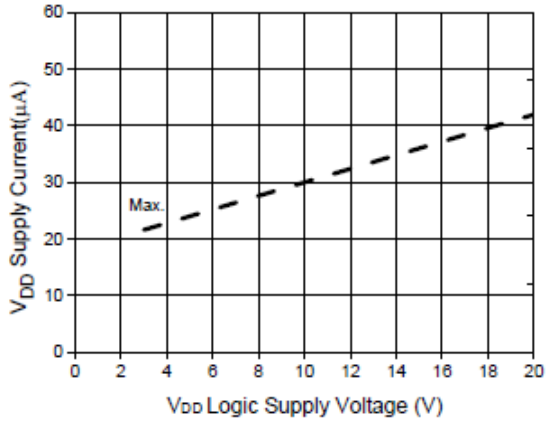
27. V_{BS} Supply Current vs. Voltage



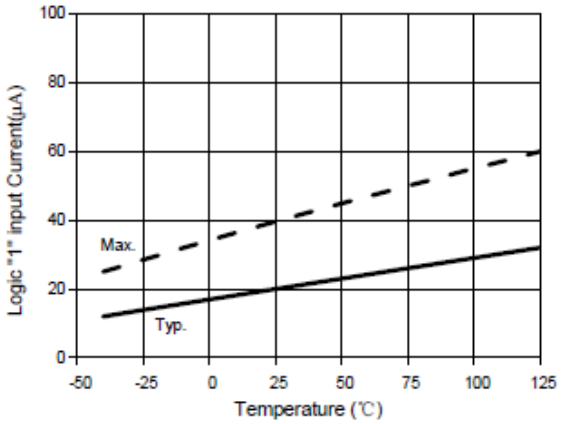
28. V_{DD} Supply Current vs. Temperature



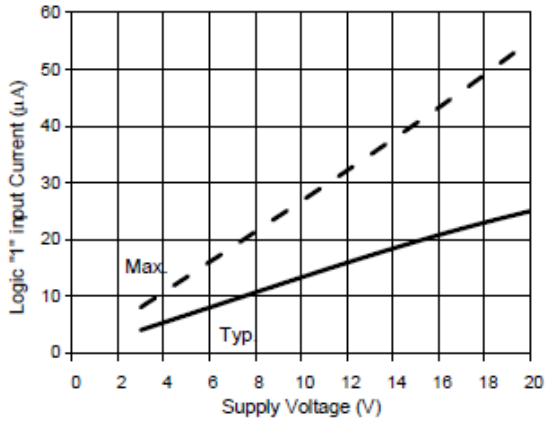
29. V_{DD} Supply Current vs. Voltage



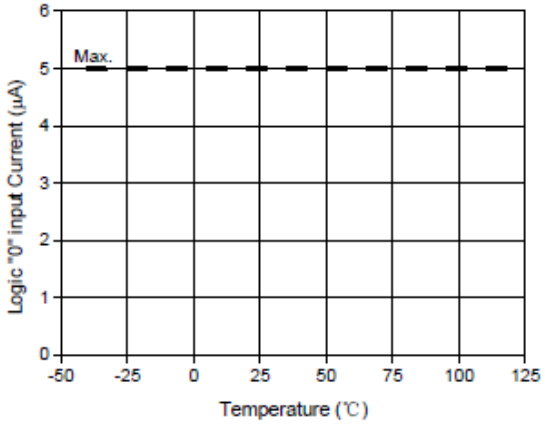
30. Logic "1" Input Current vs. Temperature



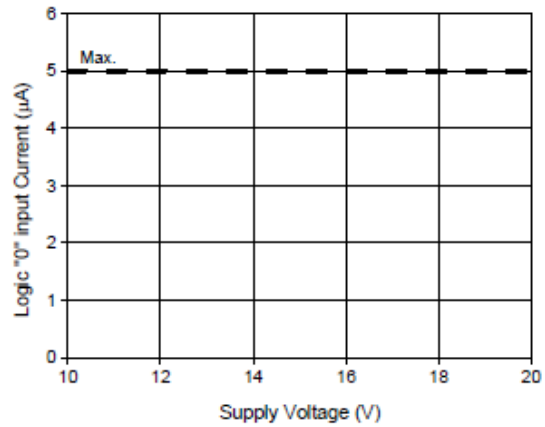
31. Logic "1" Input Current vs. Voltage



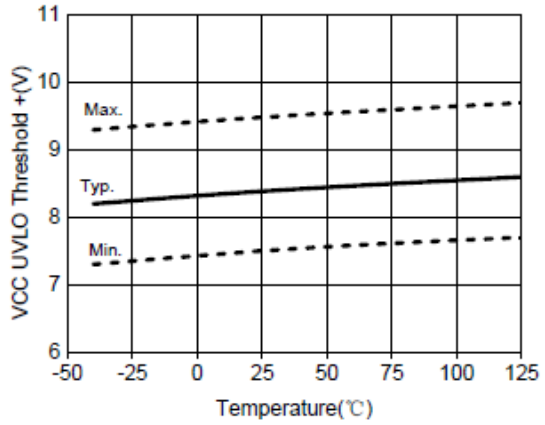
32. Logic "0" Input Current vs. Temperature



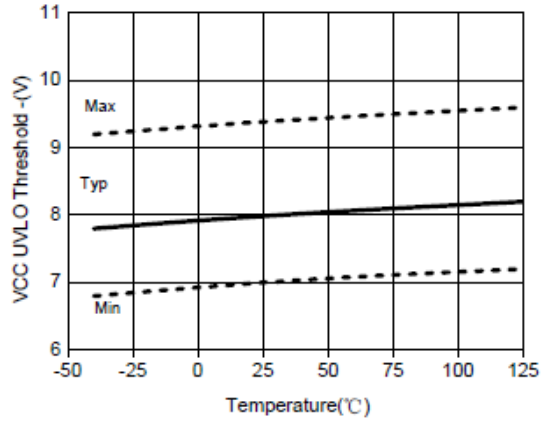
33. Logic "0" Input Current vs. Voltage



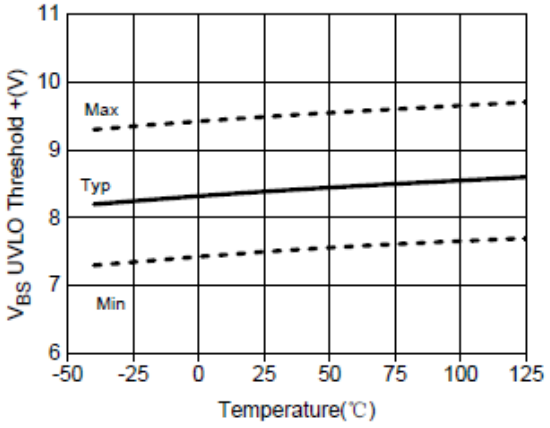
34. V_{CC} Under voltage (+) vs. Temperature



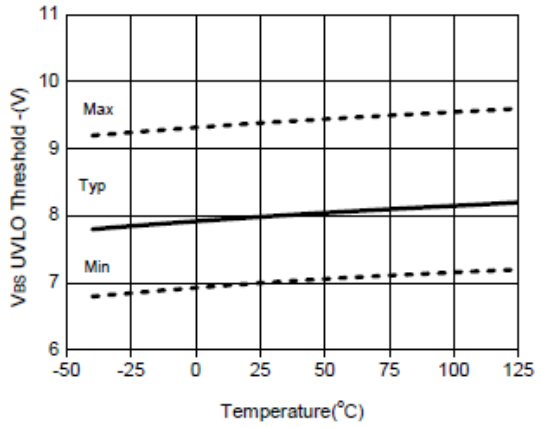
35. V_{CC} Under voltage (-) vs. Temperature



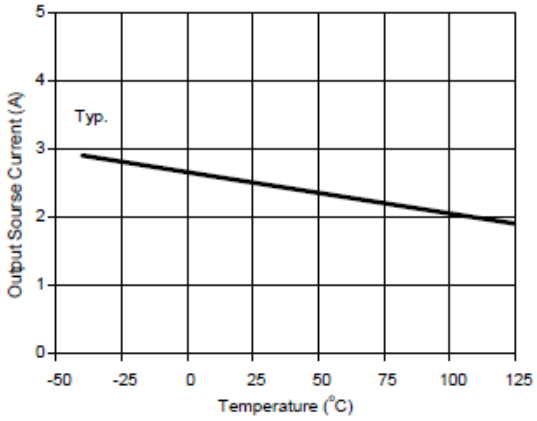
36. V_{BS} Under voltage (+) vs. Temperature



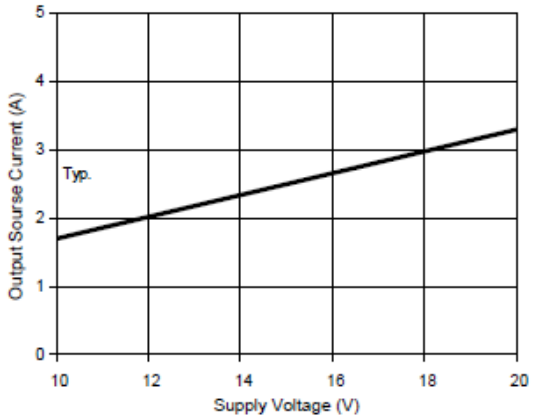
37. V_{BS} Under voltage (-) vs. Temperature



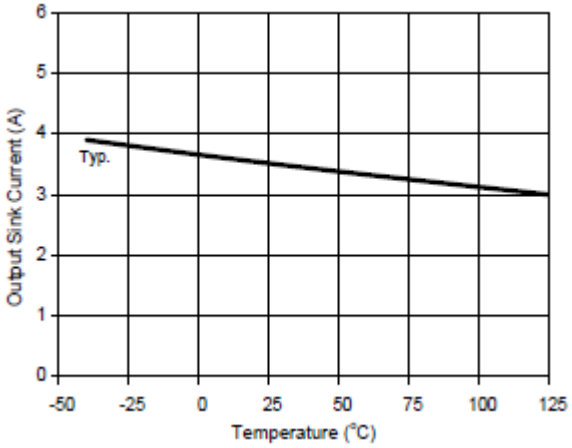
38. Output Source Current vs. Temperature



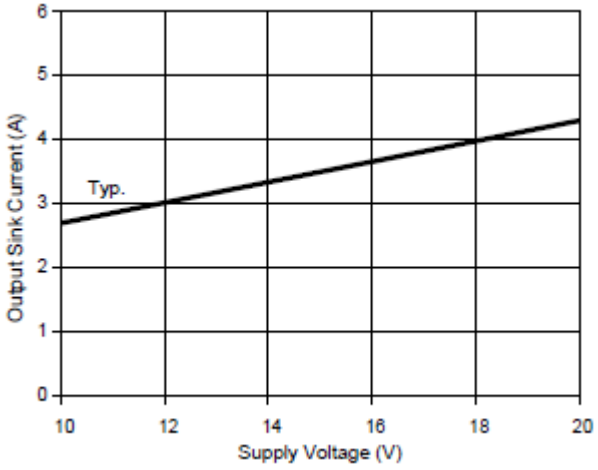
39. Output Source Current vs. Voltage



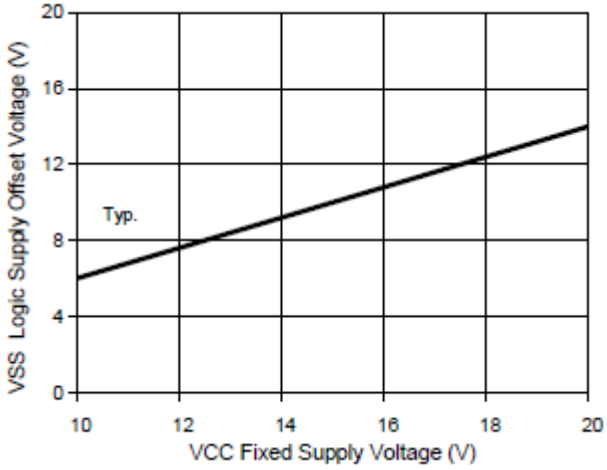
40. Output Sink Current vs. Temperature



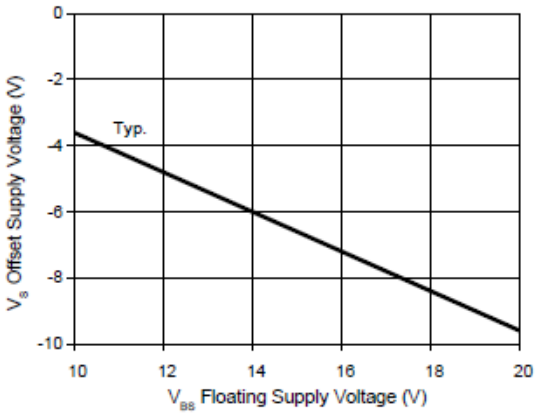
41. Output Sink Current vs. Voltage



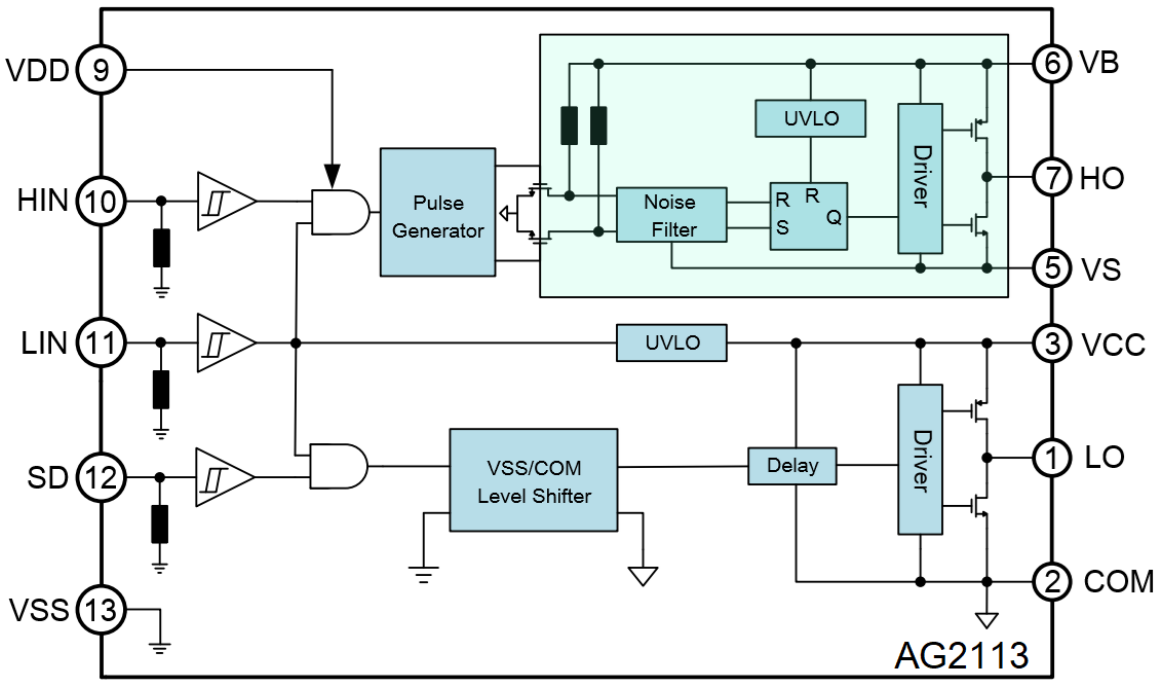
42. Maximum V_{SS} Positive Offset vs. V_{CC} Supply Voltage



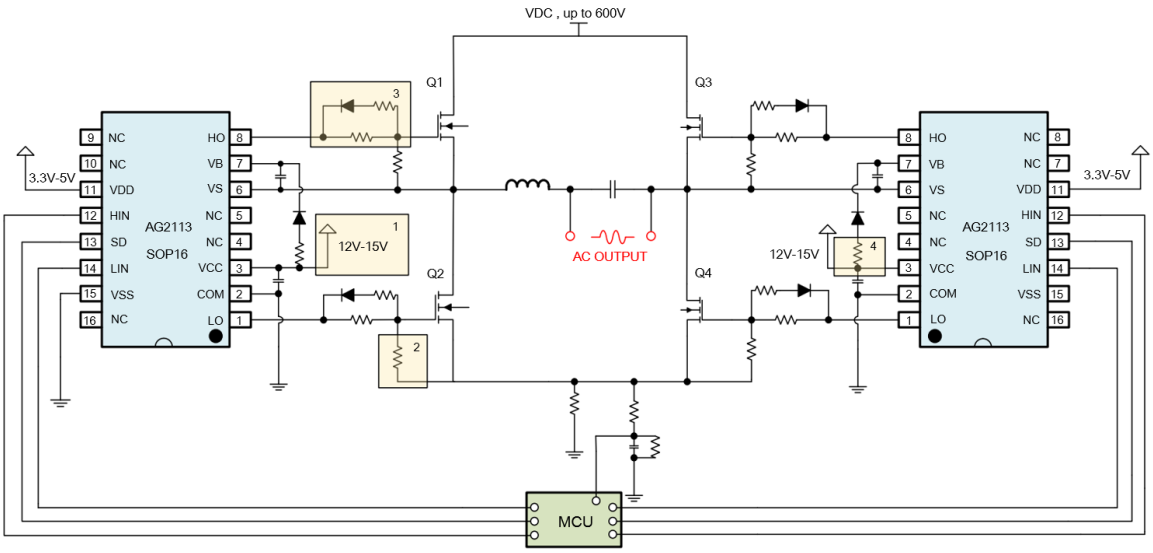
43. Maximum V_{SS} Positive Offset vs. V_{CC} Supply Voltage



BLOCK DIAGRAM



TYPICAL APPLICATION CIRCUIT



1. V_{CC} supply voltage, for IGBTs, should be 15V, for MOSFETs, should be 12V-15V.
2. Pull down resistor between Gate and Source of power device, the value is 10k ohms.
3. Driver circuit, turn on and turn off channel should be independently, the resistors value according to power device.
4. The resistor between V_{CC} and bootstrap diode, to avoid V_{BS} dv/dt.

Function Timing Diagram

Fig.1 Input & Output

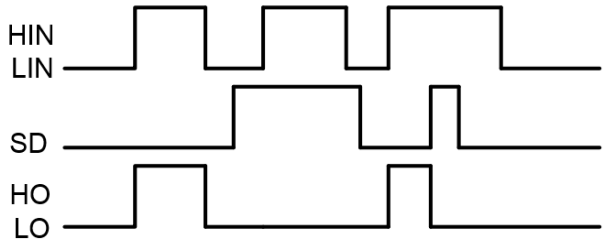


Fig.2 SD Delay Time

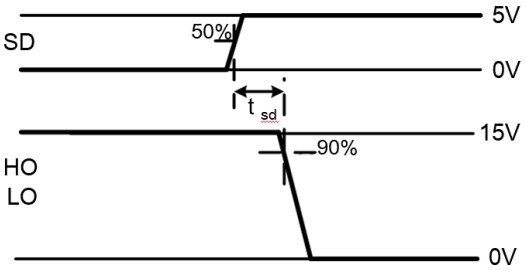
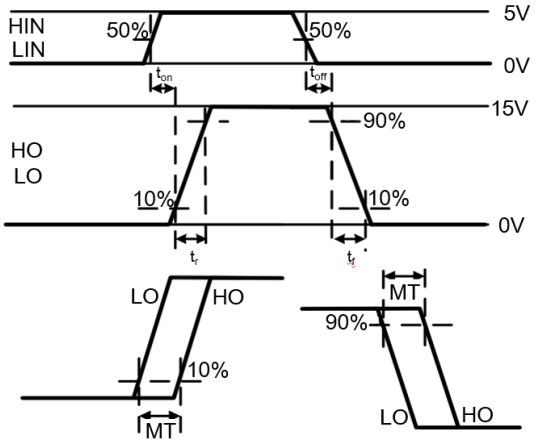
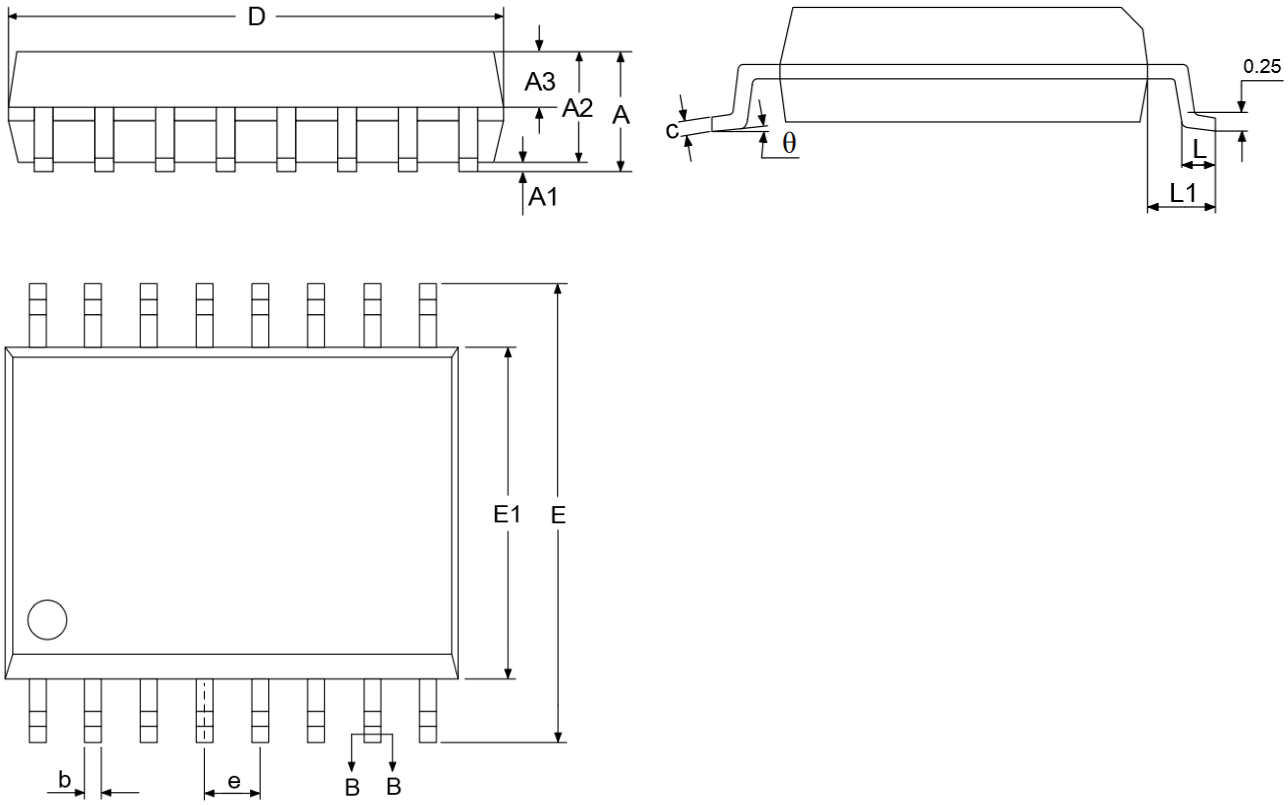


Fig.3 Turn on and Turn off Delay



PACKAGE INFORMATION

Dimension in SOP16 (Unit: mm)



Symbol	Min.	Max.
A	-	2.65
A1	0.10	0.30
A2	2.25	2.35
A3	0.97	1.07
b	0.35	0.44
b1	0.34	0.39
c	0.25	0.31
c1	0.24	0.26
D	10.10	10.50
E	10.26	10.60
E1	7.30	7.70
e	1.27 BSC	
L	0.55	0.85
L1	1.4 BSC	
θ	0°	8°

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