DESCRIPTION

The AG2106 is a high voltage, high speed power MOSFET and IGBT driver based on P_SUB P_EPI process. The floating channel driver can be used to drive two N-channel power MOSFET or IGBT in a half-bridge configuration which operates up to 600V. Logic inputs are compatible with standard CMOS or LSTTL output, down to 3.3V 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.

AG2106 is available in a SOP8 and DFN8(2x3) packages.

ORDERING INFORMATION

Package Type	Part Number	
SOP8 SPQ: 4,000pcs/Reel	M8	AG2106M8R
		AG2106M8VR
DFN8(2x3) SPQ: 3,000pcs/Reel	J8	AG2106J8R
		AG2106J8VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

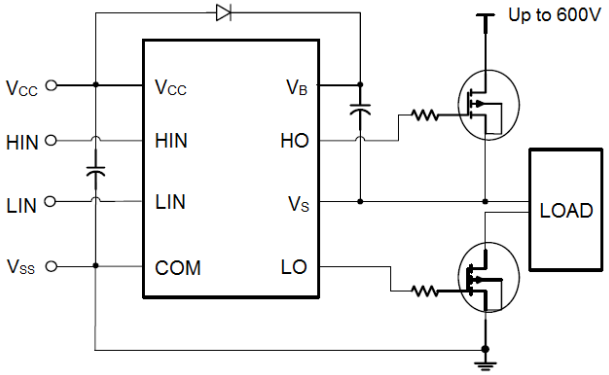
FEATURES

- Fully operational to +600 V
- 3.3V logic compatible
- dV/dt Immunity ±50V/nsec
- Floating channel designed for bootstrap operation
- Gate drive supply range from 10V to 20V
- UVLO for both channels
- Output Source / Sink Current Capability 400mA / 800mA
- Cross Conduction Protection with 180ns Internal Fixed Dead Time
- -5V negative Vs ability
- Matched propagation delay for both channels
- Available in a SOP8 and DFN8(2x3) packages.

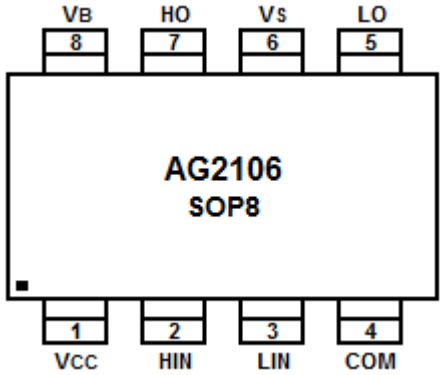
APPLICATION

- Small and medium- power motor driver
- Power MOSFET or IGBT driver
- Lighting ballast
- Half−Bridge Power Converters
- Full-Bridge Power Converters

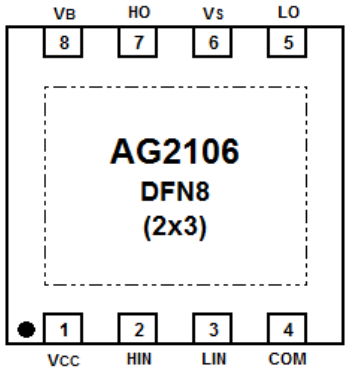
TYPICAL APPLICATION CIRCUIT



PIN DESCRIPTION



Top View



Top View

Pin #	Symbol	Function
1	V_{CC}	Low side and main power supply
2	HIN	Logic input for high side gate driver output (HO)
3	LIN	Logic input for low side gate driver output (LO)
4	COM	Ground
5	LO	Low side gate drive output, in phase with LIN
6	V_S	High side floating supply return or bootstrap return
7	HO	High side gate drive output, in phase with HIN
8	V_B	High side floating supply

ABSOLUTE MAXIMUM RATINGS

V_B, High Side Floating Supply		-0.3V ~ 622V
V_S, High Side Floating Supply Return		V_B -25V ~ V_B +0.3V
V_{HO}, High Side Gate Drive Output		V_S -0.3V ~ V_B +0.3V
V_{CC}, Low Side and Main Power Supply		-0.3V ~ 22V
V_{LO}, Low Side Gate Drive Output		-0.3V ~ V_{CC} +0.3V
V_{IN}, Logic input of HIN and LIN		-0.3V ~ V_{CC} +0.3V
dV_S/dt, Allowable Offset Supply Voltage Transient		50V/ns
ESD, HBM Model		2.5kV
ESD, Machine Model		200V
P_D, Package Power Dissipation @ T_A ≤25°C	SOP8	0.625W
Rth_{JA}, Thermal Resistance Junction to Ambient	SOP8	200℃/W
T_J, Junction Temperature		150℃
T_S, Storage Temperature		-55℃~150℃
T_L, Lead Temperature (Soldering, 10 seconds)		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	-	600	V
High Side Gate Drive Output Voltage	V_{HO}	V_S	V_B	V
Low Side Supply	V_{CC}	10	20	V
Low Side Gate Drive Output Voltage	V_{LO}	0	V_{CC}	V
Logic Input Voltage(HIN &LIN)	V_{IN}	0	V_{CC}	V
Ambient Temperature	T_A	-40	125	℃

ELECTRICAL CHARACTERISTICS

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

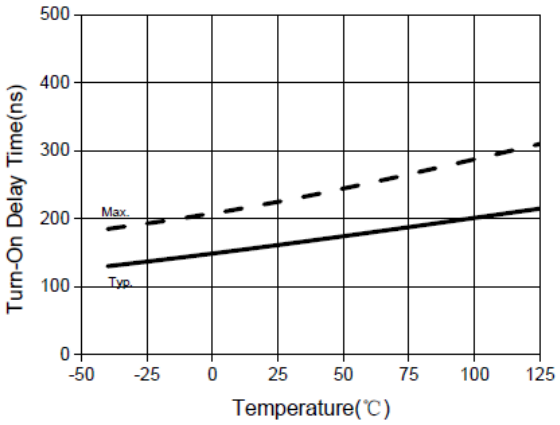
Parameter	Symbol	Conditions	Min	Typ.	Max	Units
Dynamic						
High side turn-on propagation delay	t_{onH}		-	160	220	ns
High side turn-off propagation delay	t_{offH}		-	150	220	
Low side turn-on propagation delay	t_{onL}		-	160	220	
Low side turn-off propagation delay	t_{offL}		-	150	220	
Dead time	DT		-	180	250	
Delay matching	MT		-	20	50	
Turn-On Rise Time	t_r		-	60	120	
Turn-Off Fall Time	t_f		-	50	100	

V_{BIAS} (V_{CC}, V_{BS}) = 15V, T_A = 25°C, unless otherwise specified.

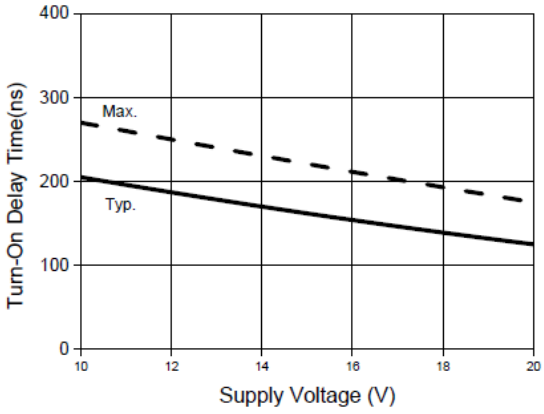
Parameter	Symbol	Conditions	Min	Typ.	Max	Units
Static						
Logic “1”(HIN+LIN) Input Voltage	V_{IH}		2.5	-	-	V
Logic “0” (HIN+LIN) Input Voltage	V_{IL}		-	-	0.8	
High Level Output Voltage, V_{BIAS} - V_O	V_{OH}		-	-	0.3	
Low Level Output Voltage, V_O	V_{OL}		-	-	0.3	
Quiescent V_{CC} Supply Current	I_{QCC}		-	200	300	μA
Quiescent V_B Supply Current	I_{QBS}		-	50	100	
Leakage Current from V_S(600V) to GND	I_{LK}		-	-	10	
Logic “1” Input Bias Current	I_{IN}+		-	6	10	
Logic “0” Input Bias Current	I_{IN}-		-	-	1	
V_{BS} Supply UVLO Threshold	V_{BSU}+		-	8.7	-	V
	V_{BSU}-		-	8	-	
V_{CC} Supply UVLO Threshold	V_{CCU}+		-	8.7	-	
	V_{CCU}-		-	8	-	
Output High Short Circuit Pulsed Current	I_O+		-	400	-	mA
Output Low Short Circuit Pulsed Current	I_O-		-	800	-	

TYPICAL PERFORMANCE CHARACTERISTICS

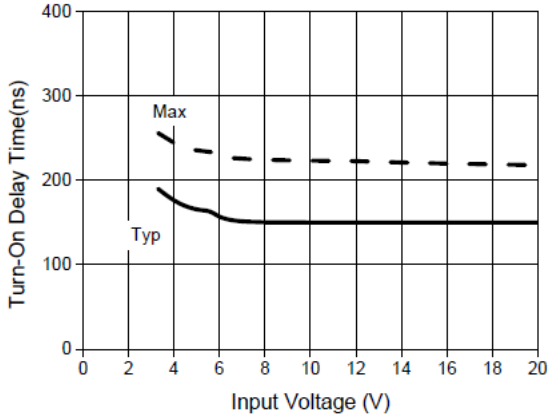
1. Turn-On Delay vs. Temperature



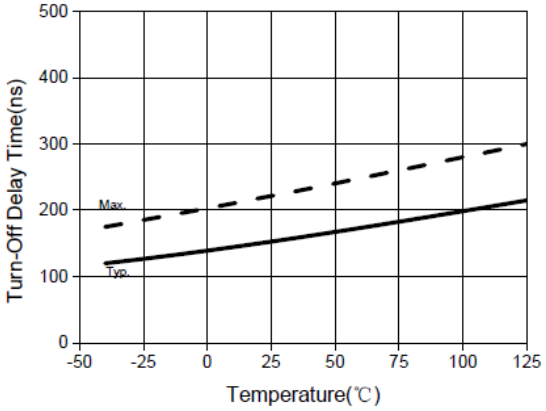
2. Turn-On Delay vs. Supply Voltage



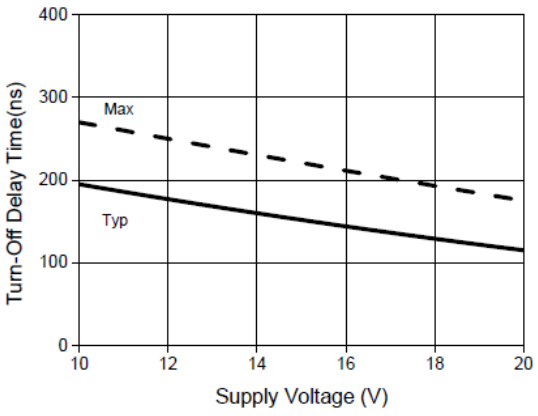
3. Turn-On Delay Time vs. Input Voltage



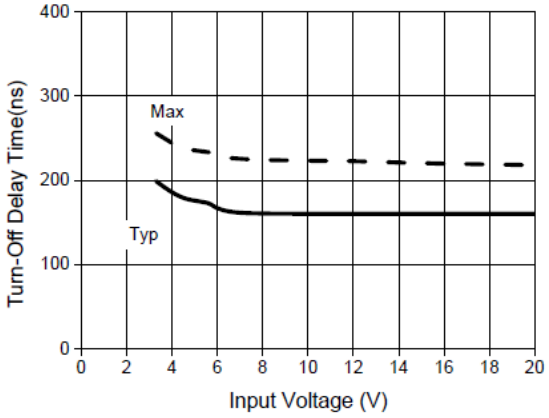
4. Turn-Off Delay Time vs. Temperature



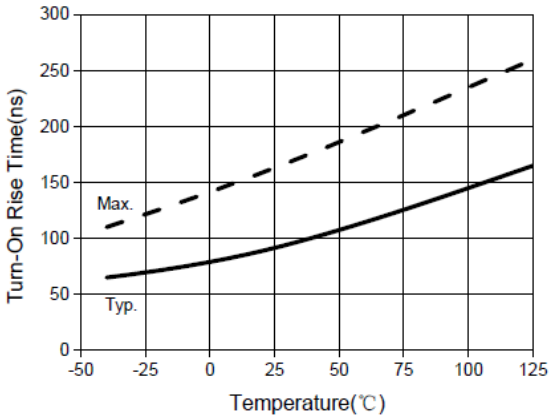
5. Turn-Off Delay Time vs. Supply Voltage



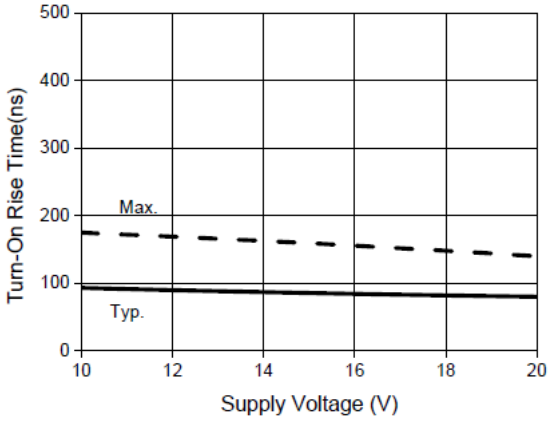
6. Turn-Off Delay Time vs. Input Voltage



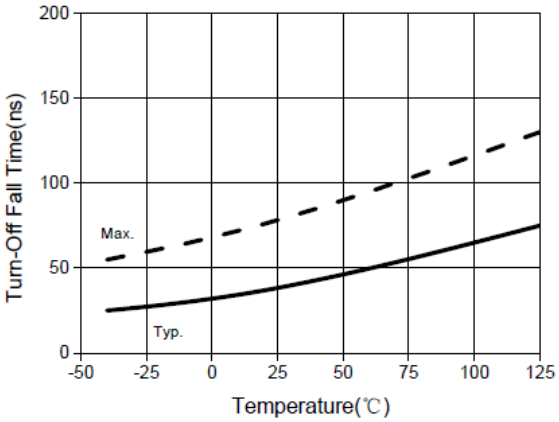
7. Turn-On Rise Time vs. Temperature



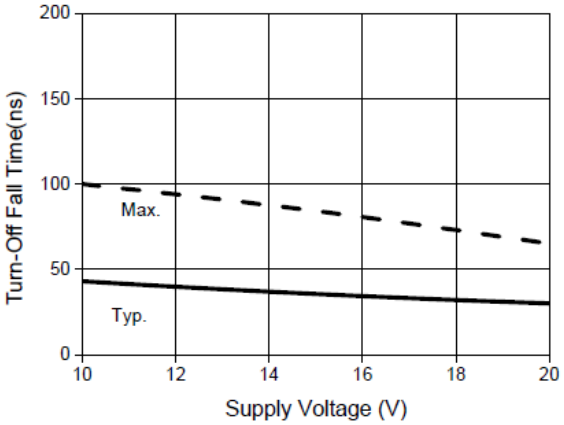
8. Turn-On Rise Time vs. Supply Voltage



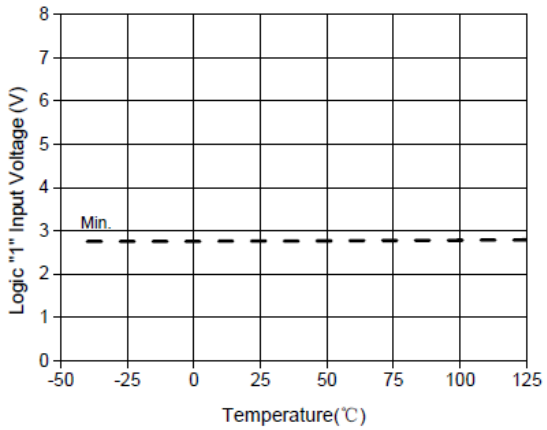
9. Turn-Off Fall Time vs. Temperature



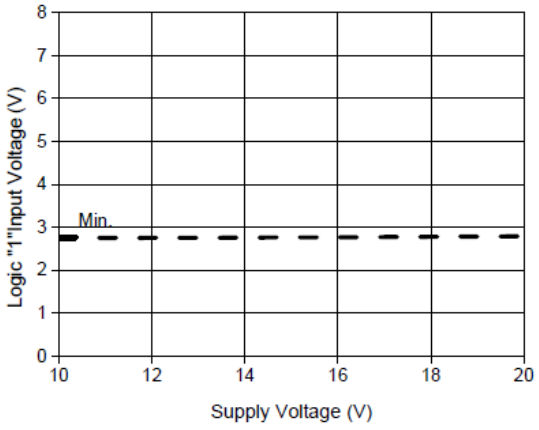
10. Turn-Off Fall Time vs. Supply Voltage



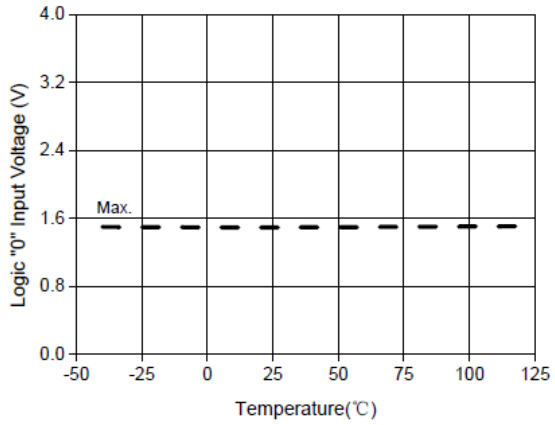
11. Logic "1" Input Voltage vs. Temperature



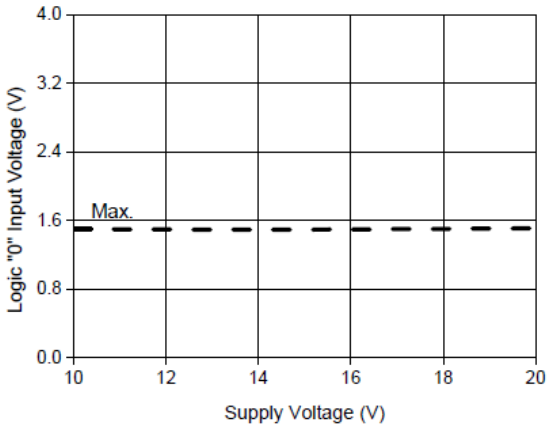
12. Logic "1" Input Voltage vs. Supply Voltage



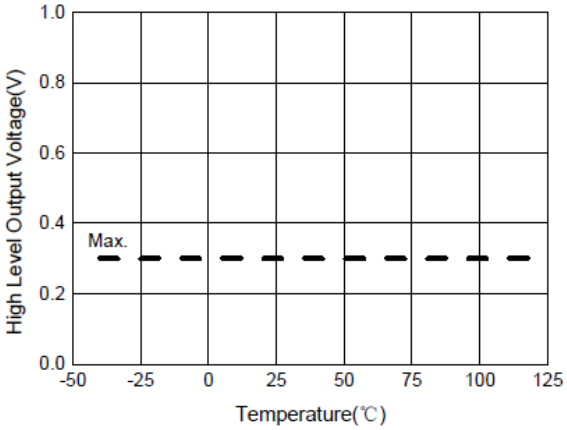
13. Logic "0" Input Voltage vs. Temperature



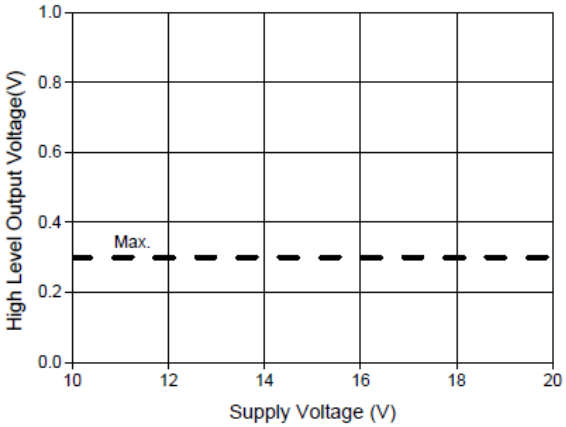
14. Logic "0" Input Voltage vs. Supply Voltage



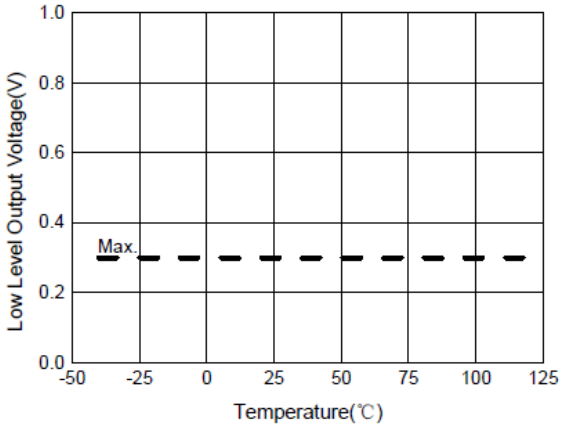
15. High Level Output vs. Temperature



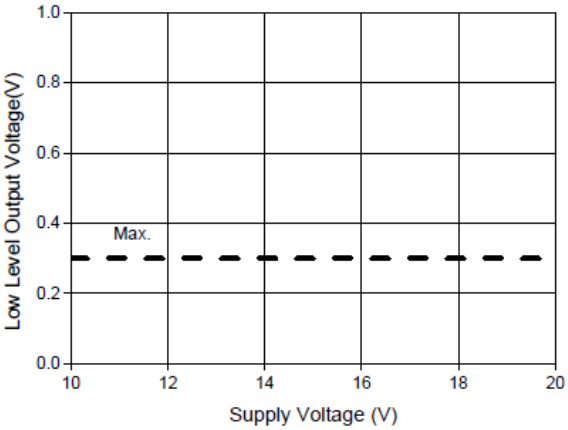
16. High Level Output vs. Supply Voltage



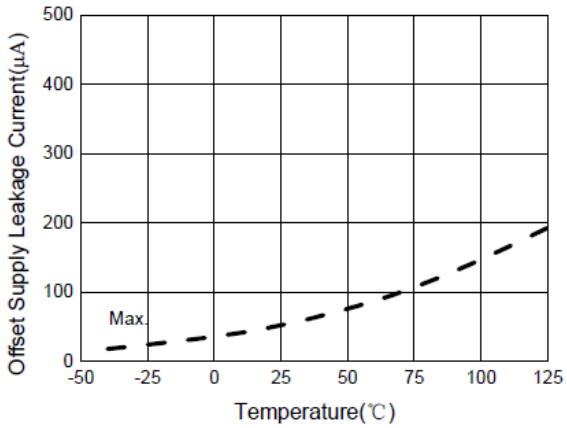
17. Low Level Output vs. Temperature



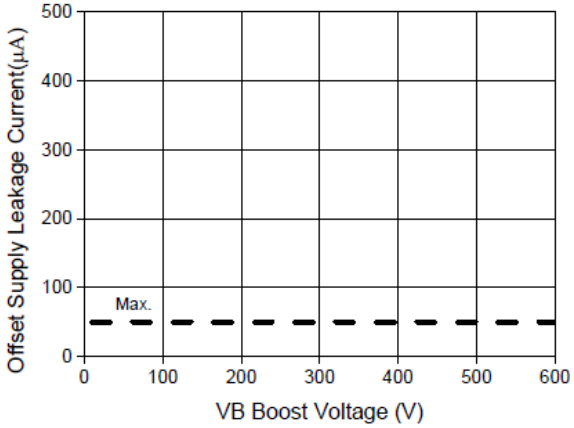
18. Low Level Output vs. Supply Voltage



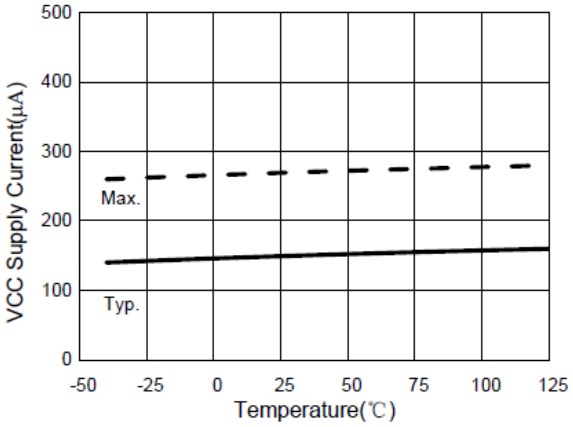
19. Offset Supply Current vs. Temperature



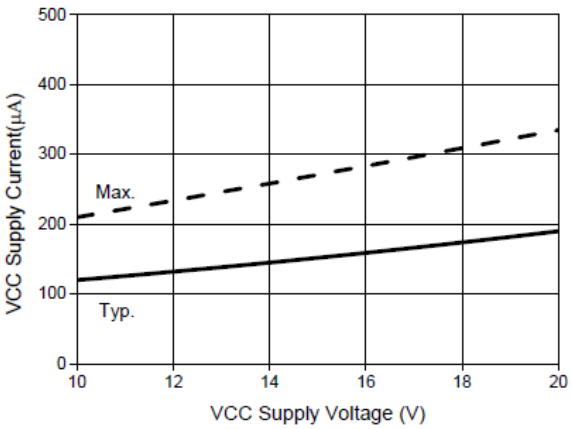
20. Offset Supply Current vs. Boost Voltage



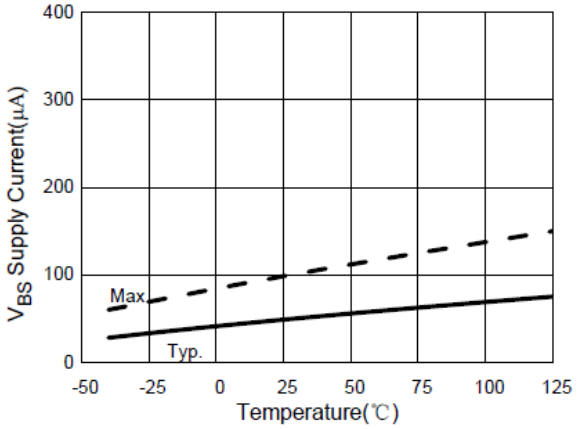
21. V_{CC} Supply Current vs. Temperature



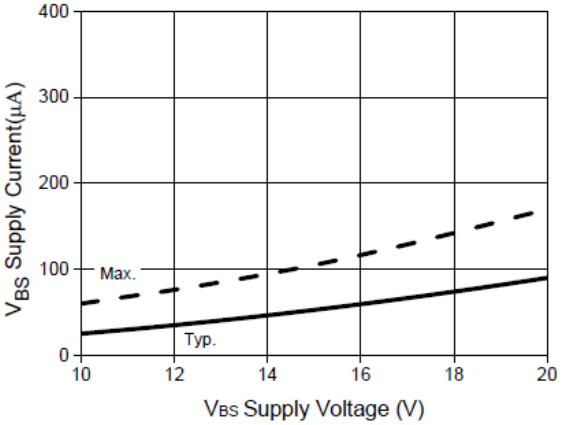
22. V_{CC} Supply Current vs. Supply Voltage



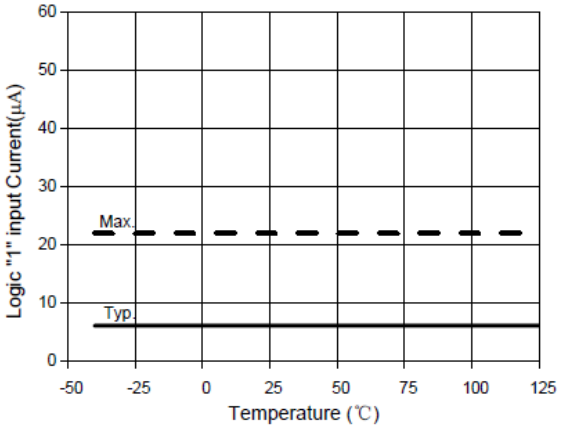
23. V_{BS} Supply Current vs. Temperature



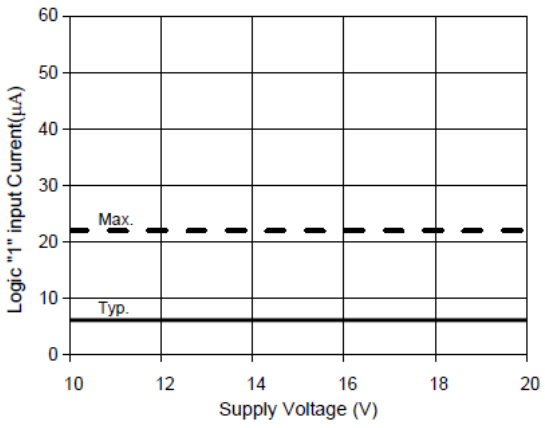
24. V_{BS} Supply Current vs. Supply Voltage



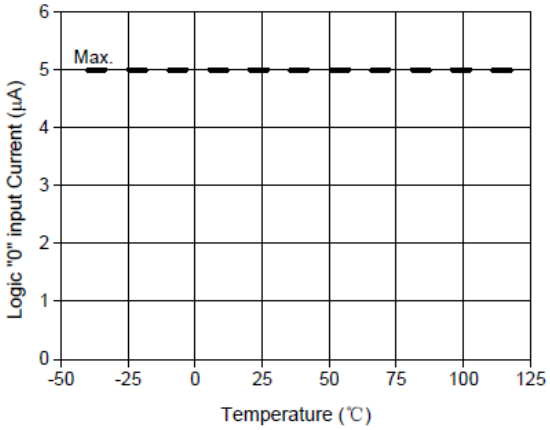
25. Logic "1" Input Current vs. Temperature



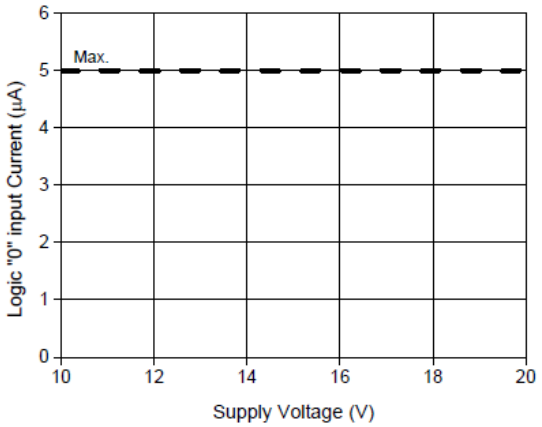
26. Logic "1" Input Current vs. Supply Voltage



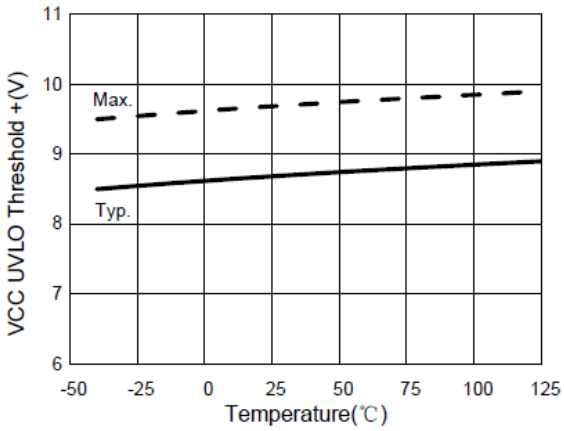
27. Logic "0" Input Current vs. Temperature



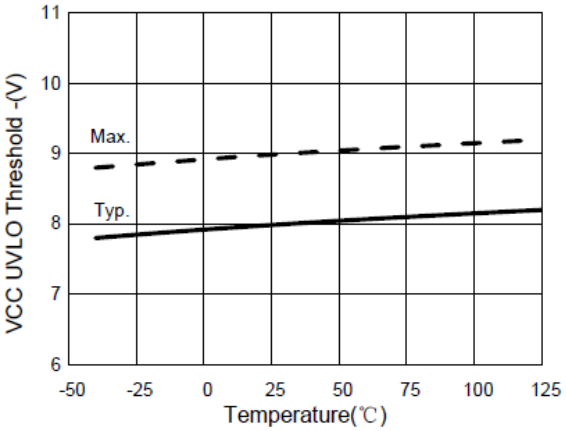
28. Logic "0" Input Current vs. Supply Voltage



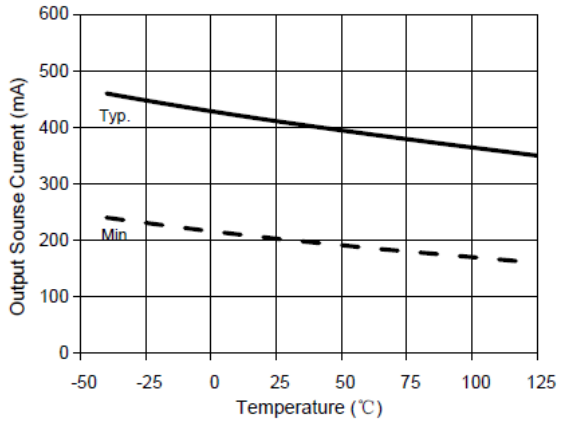
29. V_{CC} Under voltage Threshold(+) vs. Temperature



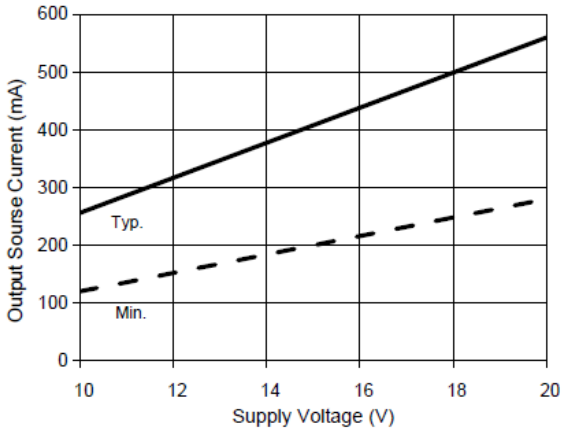
30. V_{CC} Under voltage Threshold(-) vs. Temperature



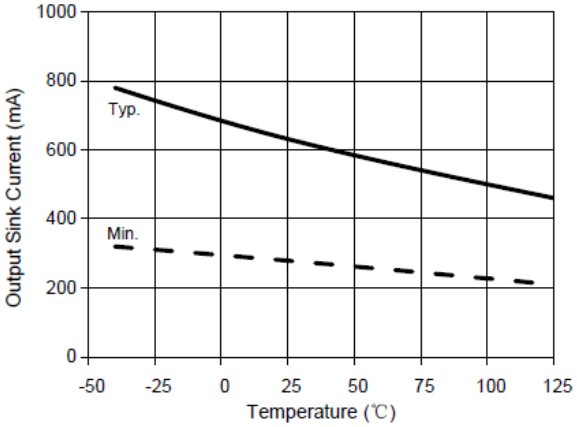
31. Output Source Current vs. Temperature



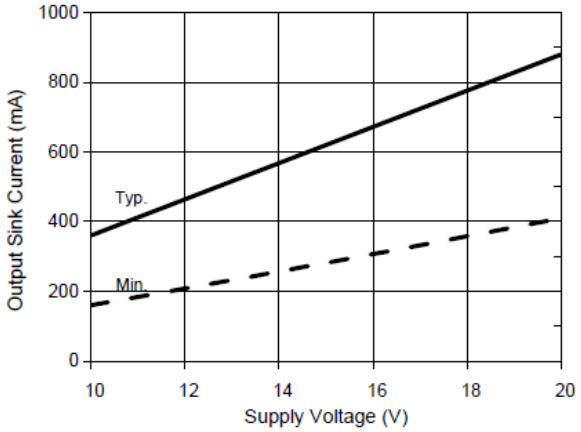
32. Output Source Current vs. Supply Voltage



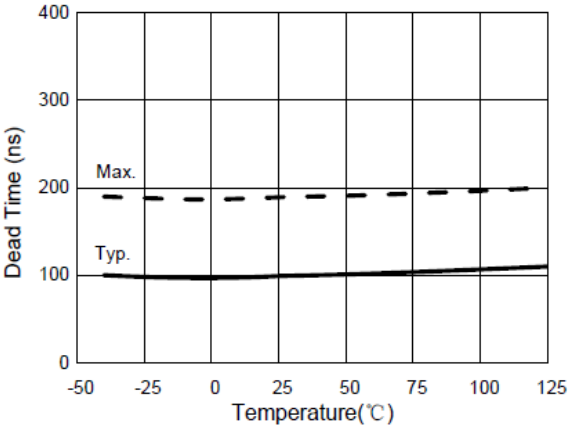
33. Output Sink Current vs. Temperature



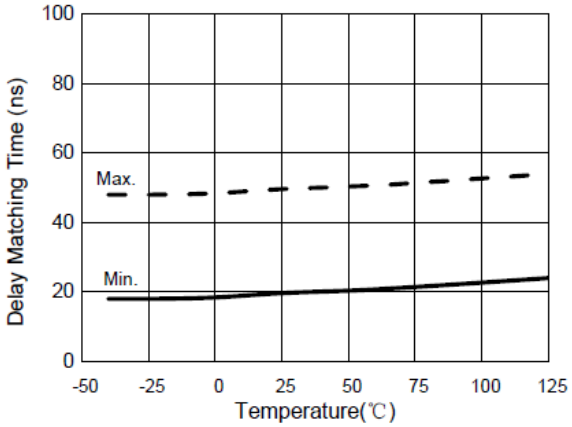
34. Output Sink Current vs. Voltage



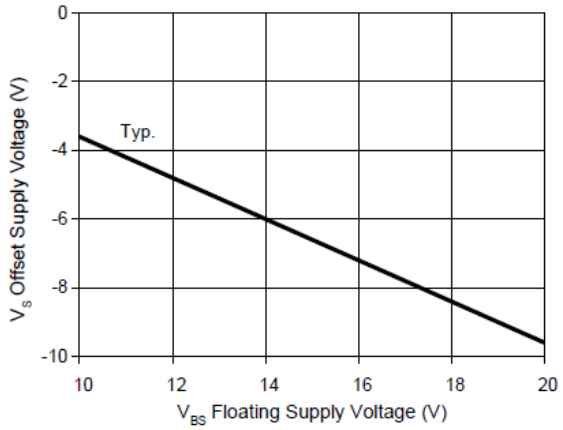
35. Dead Time vs. Temperature



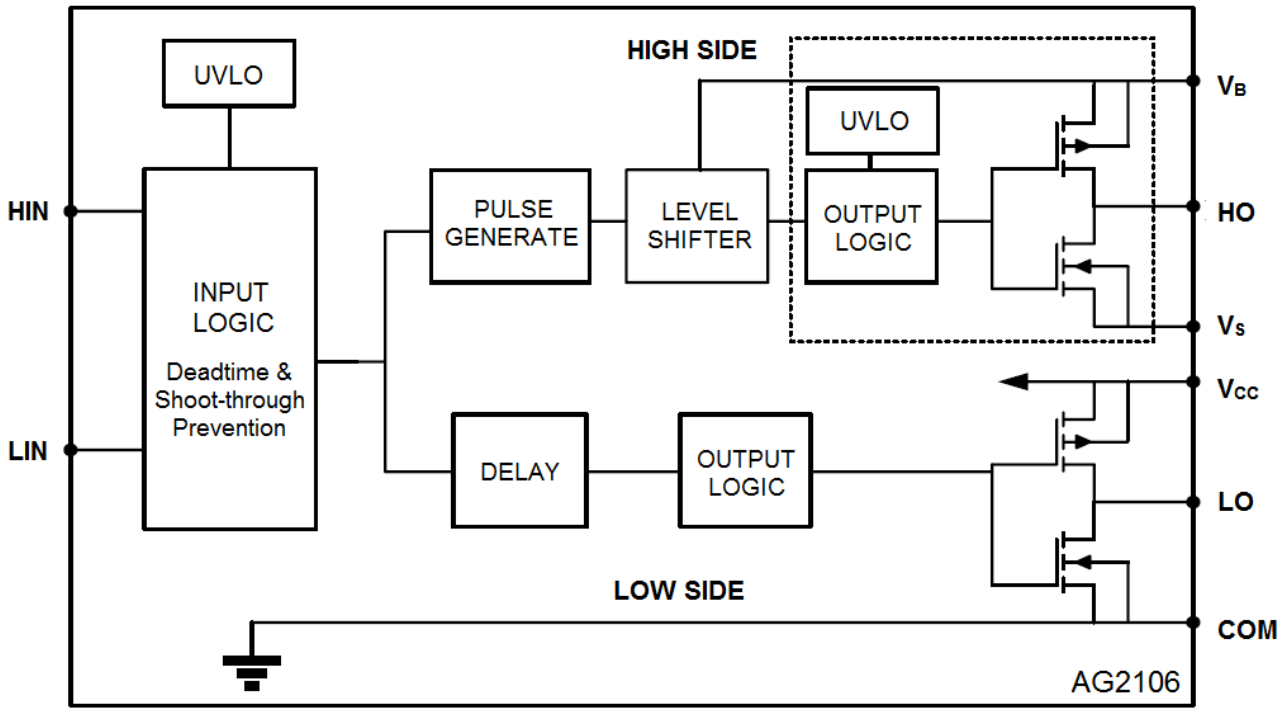
36. High Side & Low Side Delay Matching Time vs. Temperature



37. Maximum V_S Negative Offset
vs. V_{BS} Floating Supply Voltage

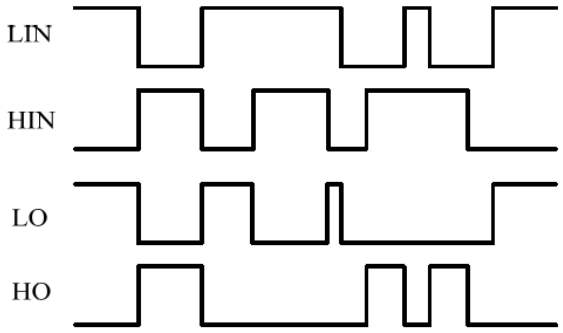


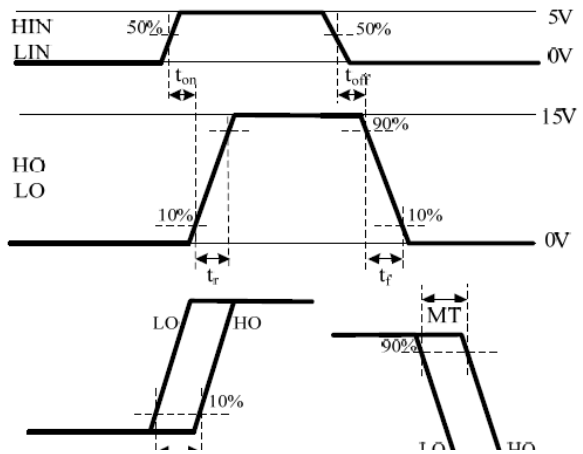
BLOCK DIAGRAM

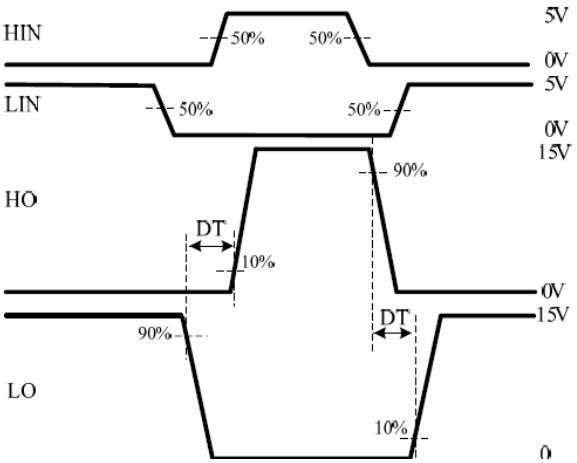


DETAILED INFORMATION

Logic Function & Timing Spec

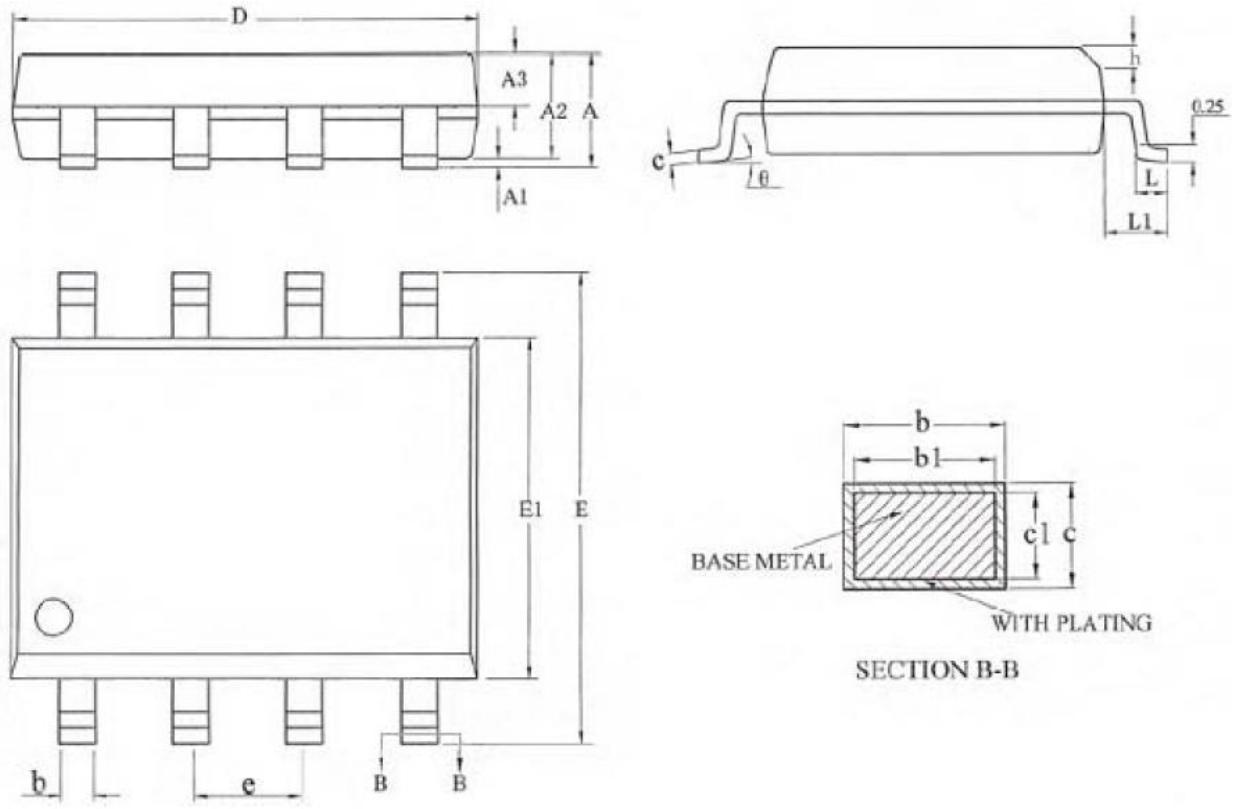






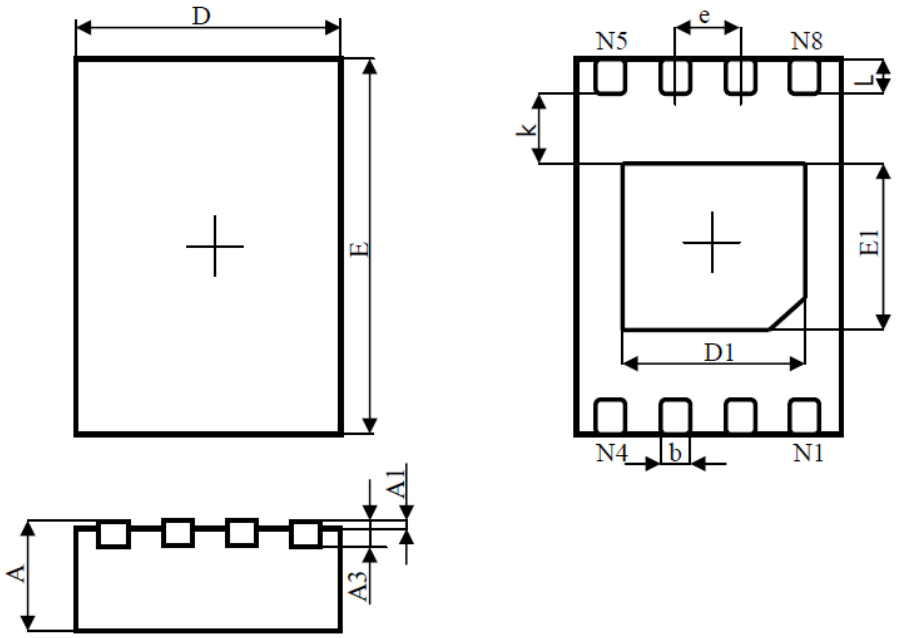
PACKAGE INFORMATION

Dimension in SOP8 (Unit: mm)



Symbol	Min.	Max.
A	-	1.75
A1	0.10	0.225
A2	1.30	1.50
A3	0.60	0.70
b	0.39	0.48
b1	0.38	0.43
c	0.21	0.26
c1	0.19	0.21
D	4.70	5.10
E	5.80	6.20
E1	3.70	4.10
e	1.27 BSC	
h	0.25	0.50
L	0.50	0.80
L1	1.05 BSC	
θ	0°	8°

Dimension in DFN8 (Unit: mm)



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.700/0.800	0.800/0.900	0.028/0.031	0.031/0.035
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	1.924	2.076	0.076	0.082
E	2.924	3.076	0.115	0.121
D1	1.400	1.600	0.055	0.063
E1	1.400	1.600	0.055	0.063
k	0.200MIN.		0.008MIN.	
b	0.200	0.300	0.008	0.012
e	0.500TYP.		0.020TYP.	
L	0.224	0.376	0.009	0.015

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