600V High and Low Side Driver

PRODUCT SUMMARY

- V_{OFFSET} 600 V max.
- I_O+/-   2.5A / 3.5A
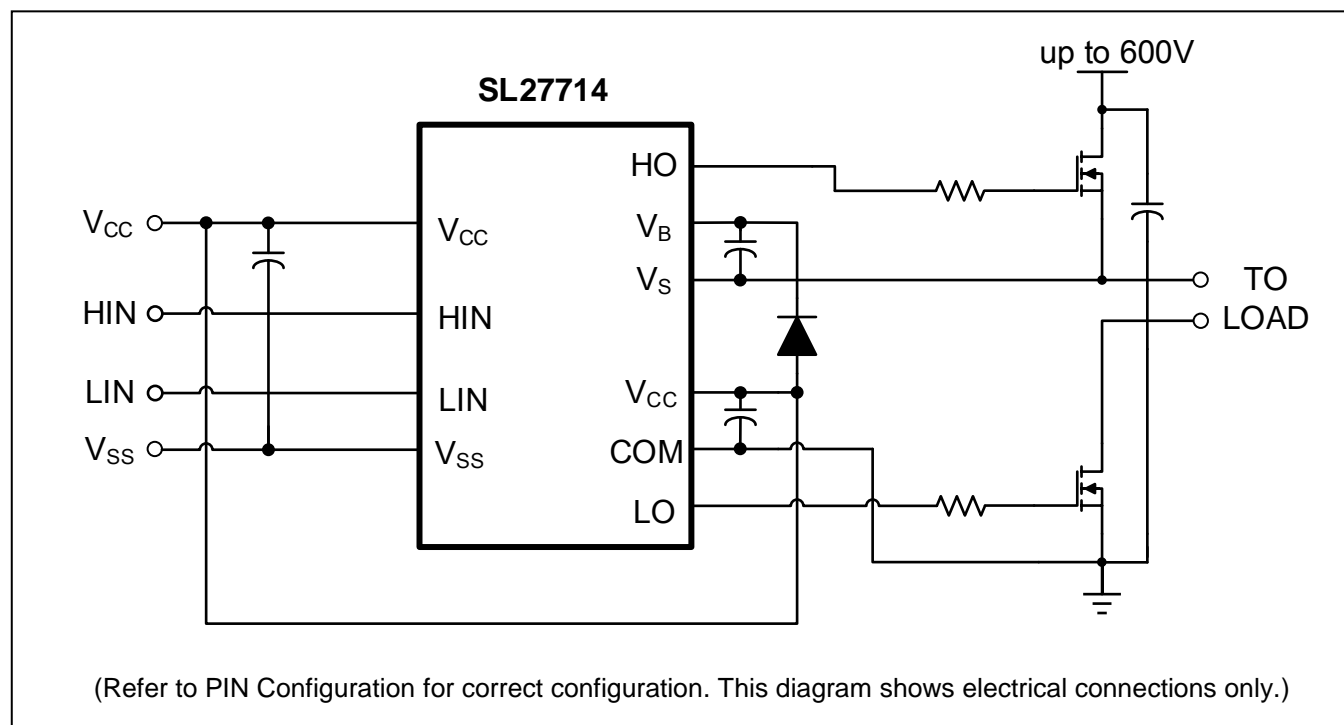- V_{OUT} 10 V - 20 V
- $t_{on/off}$ **(typ.)**   180ns / 200ns

GENERAL DESCRIPTION

The SL27714 is a high voltage, high speed power MOSFET and IGBT drivers with independent high- and low-side referenced output channels. Proprietary HVIC and latch immune CMOS technologies enable ruggedized monolithic construction. The logic input is compatible with standard CMOS or LSTTL output, down to 3.3 V 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.

FEATURES

- Floating channel designed for bootstrap operation
- Fully operational to +600 V
- Low V_{CC} operation
- Tolerant to negative transient voltage, dV/dt immune
- Gate drive supply range from 10 V to 20 V
- Undervoltage lockout for both channels
- 3.3 V, and 5 V logic compatible
- CMOS Schmitt-triggered inputs with pull-down
- Matched propagation delay for both channels
- Outputs in phase with inputs
- RoHS compliant
- SOP14 package

TYPICAL APPLICATION CIRCUIT

(Refer to PIN Configuration for correct configuration. This diagram shows electrical connections only.)

SL27714

PIN CONFIGURATION

Package	Pin Configuration (Top View)
SOP14	1 HIN / NC 14 2 LIN / V$_B$ 13 3 VSS / HO 12 4 NC / V$_S$ 11 5 COM / NC 10 6 LO / NC 9 7 VCC / NC 8

PIN DESCRIPTION

No.	Pin	Description
1	HIN	Logic input for high-side gate driver output (HO), in phase
2	LIN	Logic input for low-side gate driver output (LO), in phase
3	VSS	Logic ground
5	COM	Low-side return
6	LO	Low-side gate drive output
7	V$_{CC}$	Low-side and logic fixed supply
11	V$_S$	High-side floating supply return
12	HO	High-side gate drive output
13	V$_B$	High-side floating supply
4,8,9,10,14	NC	No Connection

ORDERING INFORMATION

Industrial Range: -40°C to +125°C

Order Part No.	Package	QTY
SL27714	SOP14, Pb-Free	2500/Reel

FUNCTIONAL BLOCK DIAGRAM

ABSOLUTE MAXIMUM RATINGS

Symbol	Definition		Min.	Max.	Units
V_B	High-side floating absolute voltage		-0.3	625	
V_S	High-side floating supply offset voltage		V_B - 25	V_B + 0.3	
V_{HO}	High-side floating output voltage		V_S - 0.3	V_B + 0.3	
V_{CC}	Low-side and logic fixed supply voltage		-0.3	25	V
V_{LO}	Low-side output voltage		-0.3	V_{CC} + 0.3	
V_{IN}	Logic input voltage (HIN & LIN)		V_{SS}-0.3	V_{SS} + VCC	
V_{SS}	Logic ground		-5	+5	
dV_S/dt	Allowable offset supply voltage transient		---	50	V/ns
P_D	Package power dissipation @ $T_A \leq$ +25°C	SOP14	---	1.0	W
θ_{JA}	Thermal resistance, junction to ambient	SOP14	---	120	°C/W
T_J	Junction temperature		---	150	
T_S	Storage temperature		-55	150	°C
T_L	Lead temperature (soldering, 10 seconds)		---	300	

Note: Absolute maximum ratings indicate sustained limits beyond which damage to the device may occur. All voltage parameters are absolute voltages referenced to COM. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions.

RECOMMENDED OPERATION CONDITIONS

Symbol	Definition	Min	Max	Units
V_B	High-side floating absolute voltage	V_S + 10	V_S + 20	
V_S	High-side floating supply offset voltage		600	
V_{HO}	High-side floating output voltage	V_S	V_B	V
V_{CC}	Low-side and logic fixed supply voltage	10	20	
V_{LO}	Low-side output voltage	0	V_{CC}	
V_{IN}	Logic input voltage (HIN & LIN)	V_{SS}	V_{SS}+V_{CC}	
T_A	Ambient temperature	- 40	125	°C

Note: For proper operation the device should be used within the recommended conditions. The V_S offset rating is tested with all supplies biased at a 15 V differential.

DYNAMIC ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
t_{on}	Turn-on propagation delay	V_S = 0 V	---	180	270	ns
t_{off}	Turn-off propagation delay	V_S = 0V	---	200	300	
t_r	Turn-on rise time		---	10	20	
t_f	Turn-off fall time		---	8	20	
MT	Delay matching, HS & LS turn-on/off		---	0	35	

STATIC ELECTRICAL CHARACTERISTICS

V_{BIAS} (V_{CC}, V_{BS}) = 15 V, VSS=COM and T_A = 25°C unless otherwise specified. The V_{IN}, V_{TH}, and I_{IN} parameters are referenced to VSS/COM and are applicable to the logic input leads: HIN and LIN. The V_O and I_O parameters are referenced to COM and are applicable to the respective output leads: HO and LO.

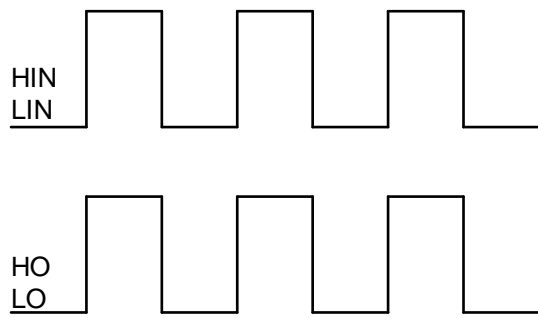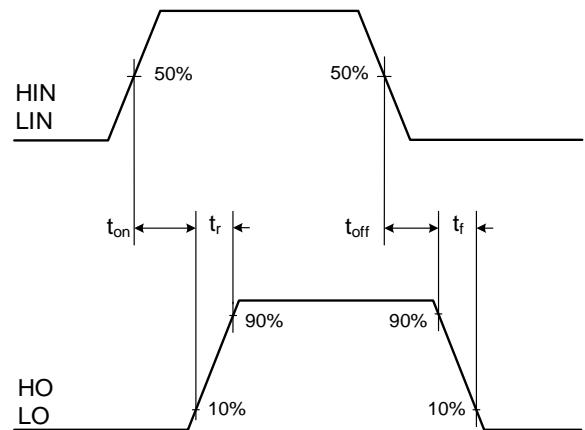| Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
V_{IH}	Logic "1" input voltage	V_{CC} = 10 V to 20V	2.5	---	---	V
V_{IL}	Logic "0" input voltage		---	---	0.8	
V_{OH}	High level output voltage, V_{BIAS} - V_O	I_O = 20 mA	---	---	0.2	
V_{OL}	Low level output voltage, V_O		---	0.02	0.15	
I_{LK}	Offset supply leakage current	V_B = V_S = 600 V	---	---	50	µA
I_{QBS}	Quiescent V_{BS} supply current	V_{IN} = 0 V	30	65	100	
I_{QCC}	Quiescent V_{CC} supply current		200	270	350	
I_{IN+}	Logic "1" input bias current	HIN=LIN = 5V	---	27	35	
I_{IN-}	Logic "0" input bias current	HIN=LIN= 0V	---	---	5	
V_{BSUV+}	V_{BS} supply undervoltage positive going threshold		8.0	8.9	9.8	V
V_{BSUV-}	V_{BS} supply undervoltage negative going threshold		7.4	8.2	9.0	
V_{CCUV+}	V_{CC} supply undervoltage positive going threshold		8.0	8.9	9.8	V
V_{CCUV-}	V_{CC} supply undervoltage negative going threshold		7.4	8.2	9.0	
I_{O+}	Output high short circuit pulsed current	V_O = 0 V, V_{IN} = Logic "1", PW ≤ 10 µs		2.5		A
I_{O-}	Output low short circuit pulsed current	V_O = 15 V, V_{IN} = Logic "0", PW ≤ 10 µs		3.5		

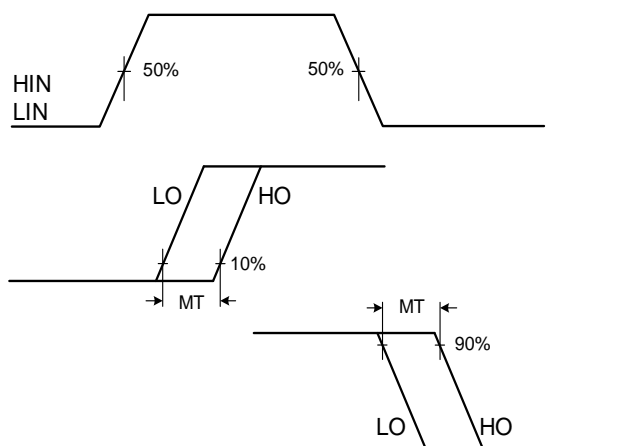Figure 1. Input/Output Timing Diagram

Figure 2. Switching Time Waveform

Figure 3. Delay Matching Waveform

TYPICAL PERFORMANCE CHARACTERISTICS

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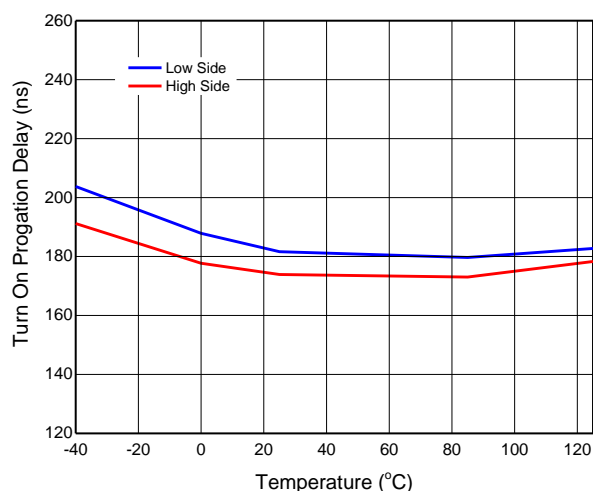
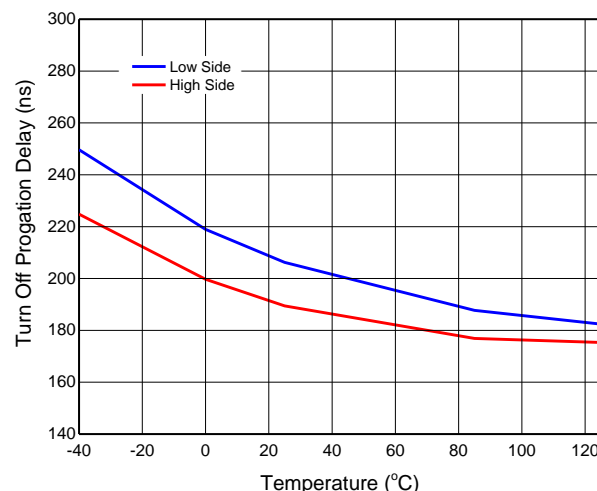

Figure 4. Turn On Delay vs. Temperature
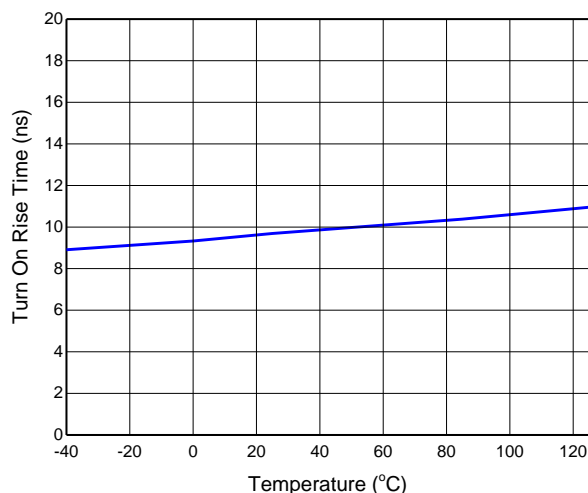

Figure 5. Turn Off Delay vs. Temperature

Figure 6. Turn On Rise Time vs. Temperature

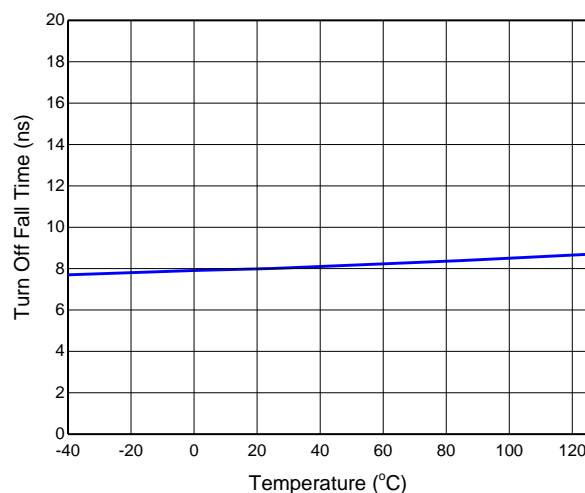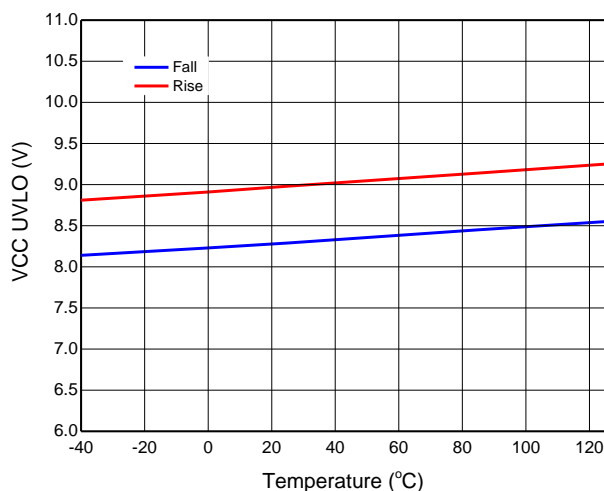Figure 7. Turn Off Fall Time vs. Temperature
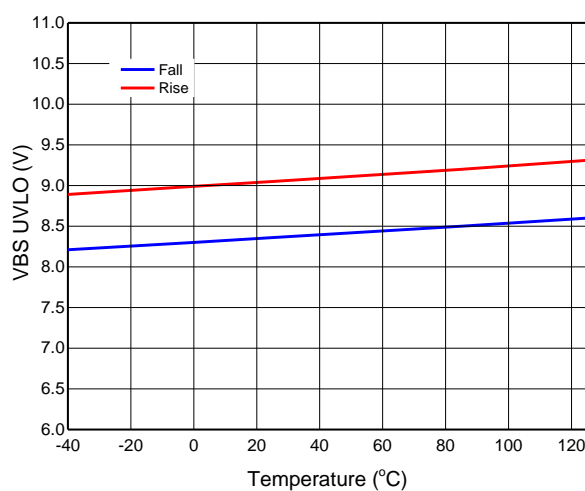

Figure 8. VCC UVLO Threshold vs. Temperature
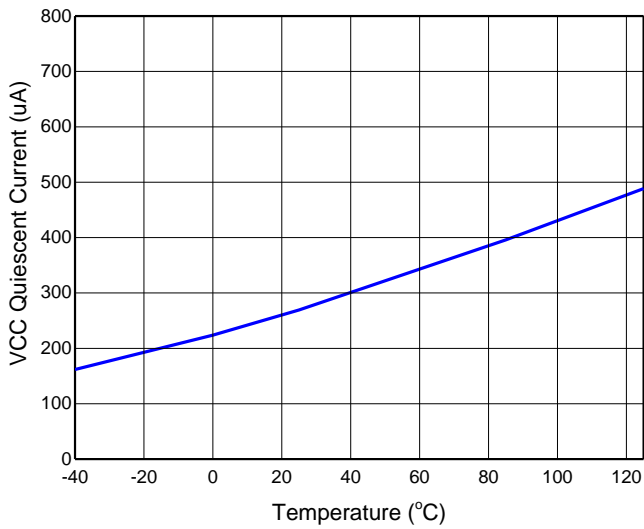

Figure 9. VBS UVLO Threshold vs. Temperature
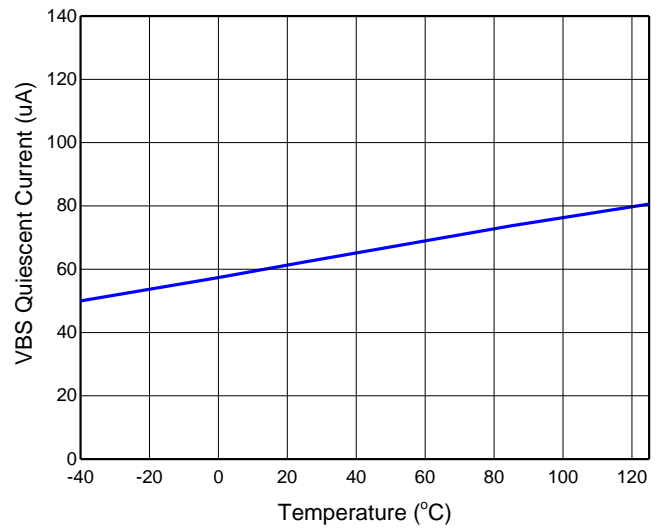
Figure 10. VCC Quiescent Current vs. Temperature

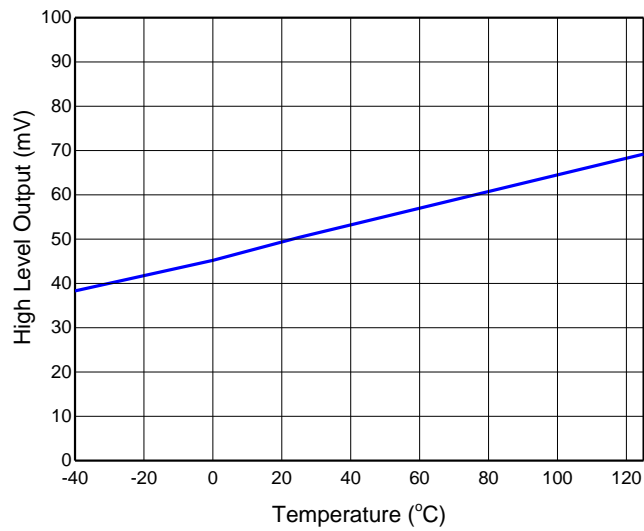Figure 11. VBS Quiescent Current vs. Temperature
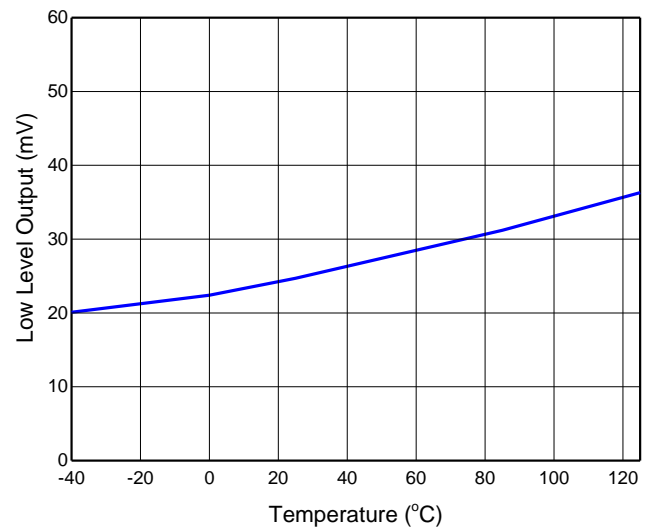

Figure 12. High Level Output vs. Temperature

Figure 13. Low Level Output vs. Temperature

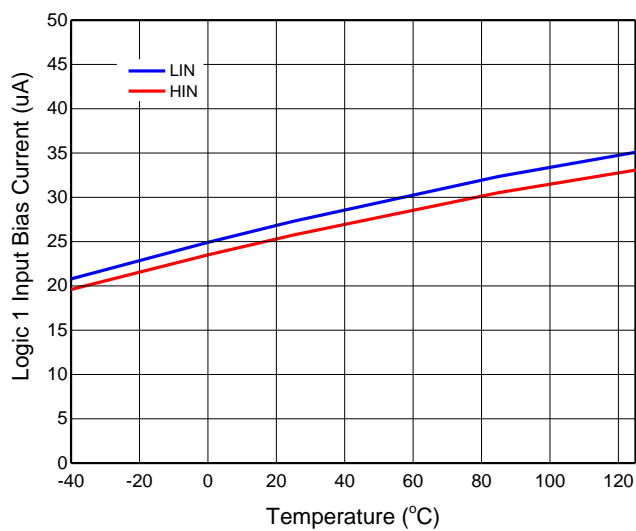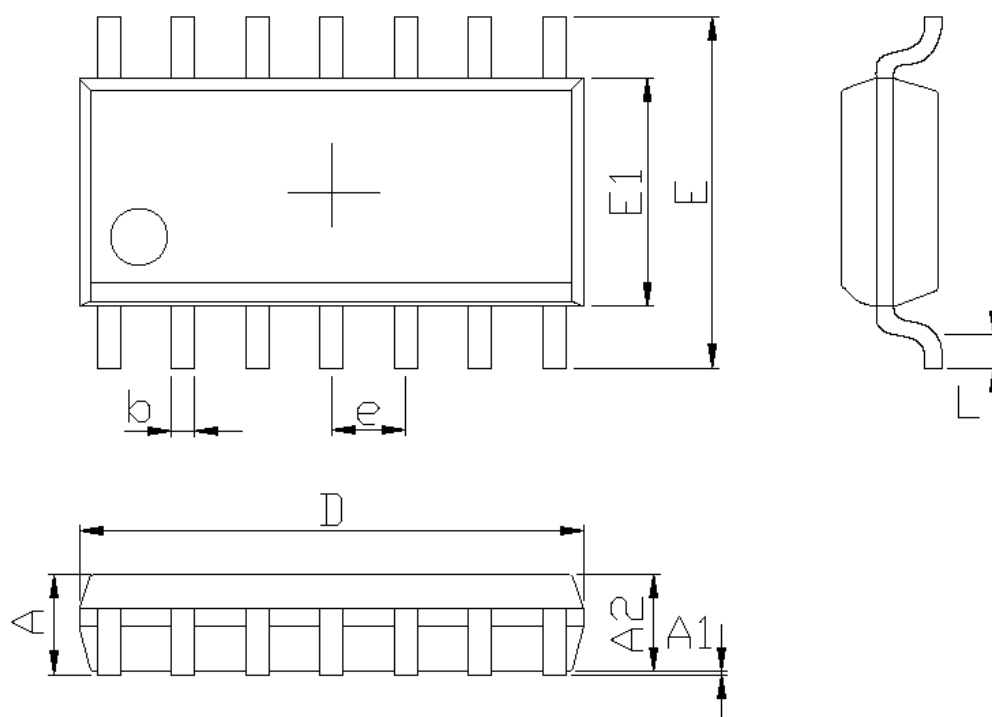
Figure 14. Logic "1" Input Bias Current vs. Temperature

PACKAGE CASE OUTLINES

Dimension	MIN	NOM	MAX
A	-	-	1.75
A1	0.05	-	0.20
A2	1.25	1.40	1.55
D	8.55	8.65	8.75
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27 BSC		
b	0.40 BSC		
L	0.40	-	0.70
Unit : mm			

Figure 15. SOP14 Outline Dimensions

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Gate Drivers *category:*

Click to view products by SLKORMICRO *manufacturer:*

Other Similar products are found below :

00053P0231 56956 57.404.7355.5 LT4936 57.904.0755.0 5882900001 00600P0005 5951900000 0131700000 00-2240 LTP70N06 LVP640 5J0-1000LG-SIL LY2-US-AC240 LY3-UA-DC24 00576P0020 LZNQ2-US-DC12 LZP40N10 0207100000 0207400000 60100564 60249-1-CUT-TAPE 0134220000 6035 60713816 M15730061 61161-90 61278-0020 6131-204-23149P 6131-205-17149P 6131-209-15149P 6131-218-17149P 6131-220-21149P 6131-260-2358P 6131-265-11149P CS1HCPU63 6150300002 6150-5001 CSK-38-60006 CSK-38-60008 621A 622-4053LF 6273 M37730026 M40N08MA-H M55155/29XH06 64-807 65003 65-1930-6 M82310002