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Lead-free Green

DGD0211CWTQ

1.9A HIGH SPEED SINGLE GATE DRIVER

Description

The DIODES™ DGD0211C single high-speed/low-side MOSFET and IGBT driver are capable of driving 1.9A of peak current. The DGD0211C logic inputs are compatible with standard TTL and CMOS levels (down to 3.3V) to interface easily with MCUs. The DGD0211C provides non-inverting and inverting inputs.

Because of fast propagation times of 35ns typical and rise/fall times of 15ns typical, the DGD0211C is well suited for high-speed applications like switch-mode power supplies and PFC circuits.

The DGD0211C is offered in TSOT25 package and the operating temperature extends from -40°C to +125°C.

Features

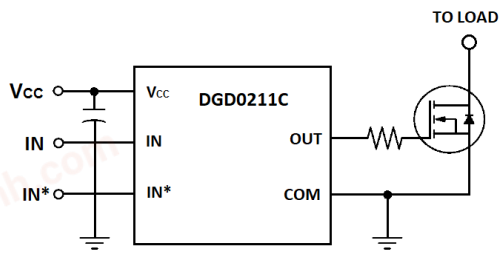
- Efficient Low-Cost Solution for Driving MOSFETs and IGBTs
- Wide Supply Voltage Operating Range: 4.5V to 18V
- 1.9A Source / 1.8A Sink Output Current Capability
- Non-Inverting and Inverting Input Configuration
- Fast Propagation Delay (35ns Typ)
- Fast Rise and Fall Times (15ns Typ)
- Logic Input (IN, IN*) 3.3V Capability
- Extended Temperature Range: -40°C to +125°C
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DGD0211CWTQ is suitable for automotive applications requiring specific change control; this part is AEC-Q100 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

Applications

- DC-DC converters
- Line drivers
- Motor controls
- Switch-mode power supplies

Mechanical Data

- Package: TSOT25
- Package Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.012 grams (Approximate)



Typical Configuration



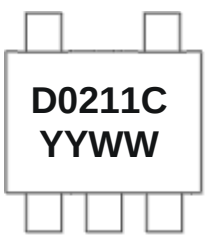
TSOT25

Ordering Information (Note 4)

Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
DGD0211CWTQ-7	D0211C	7	8	3,000

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information

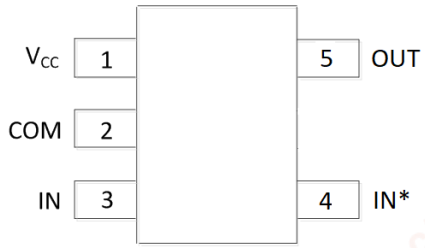


D0211C = Product Type Marking Code
YY = Year (ex: 22 = 2022)
WW = Week (01 to 53)

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Pin Diagrams

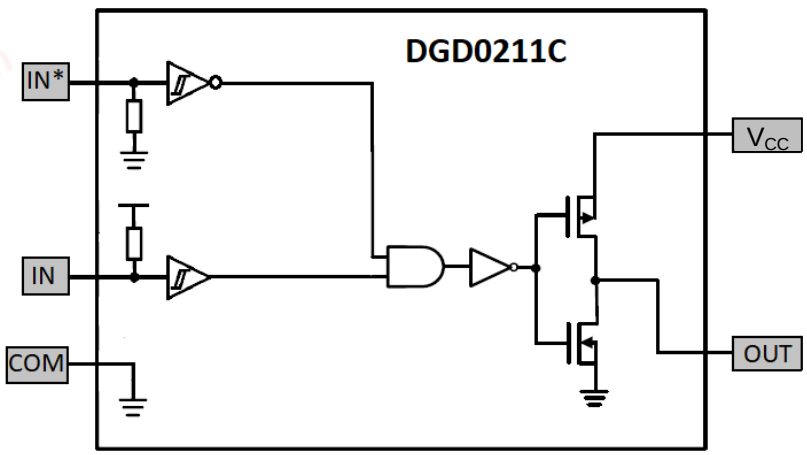


Top View TSOT25

Pin Descriptions

Pin Number	Pin Name	Function
1	V_{CC}	Supply Input
2	COM	Supply Return
3	IN	Non-Inverting Logic Input, see Input/Output Response Table (Connect to Vcc to Enable Output)
4	IN*	Inverting Logic Input, see Input/Output Response Table (Connect to COM to Enable Output)
5	OUT	Gate Drive Output

Functional Block Diagrams



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Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Low-Side Fixed Supply Voltage	V_{CC}	-0.3 to +22	V
Output Voltage (OUT)	V_{OUT}	-0.3 to V_{CC}+0.3	V
Logic Input Voltage (IN, IN*)	V_{IN}	-0.3 to V_{CC}+0.3	V

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor (Note 5)	P_D	0.54	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	188	°C/W
Operating Temperature	T_J	+150	°C
Lead Temperature (Soldering, 10s)	T_L	+300	
Storage Temperature Range	T_{STG}	-55 to +150	

Note: 5. When mounted on a standard JEDEC 2-layer FR-4 board.

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_B	4.5	18	V
Output Voltage (OUT)	V_S	0	V_{CC}	V
Logic Input Voltage (IN, IN*)	V_{IN}	0	5	V
Ambient Temperature	T_A	-40	+125	°C

DC Electrical Characteristics (V_{BIAS} (V_{CC}, V_{BS}) = 12V, @T_A = +25°C, unless otherwise specified.) (Note 6)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Logic “1” Input Voltage	V_{IH}	2.4	1.6	—	V	—
Logic “0” Input Voltage	V_{IL}	—	1.3	0.8	V	—
Logic “1” Input Bias Current	I_{IN+}	—	—	5	µA	V_{IN} = 3V, V_{IN*} = 0V
Logic “0” Input Bias Current	I_{IN-}	—	—	2	µA	V_{IN} = 0V, V_{IN*} = 3V
High Level Output Voltage, V_{BIAS} - V_O	V_{OH}	—	25	—	mV	—
Low Level Output Voltage	V_{OL}	—	25	—	mV	—
Quiescent V_{CC} Supply Current	I_{CCQ}	—	50	100	µA	V_{IN} = 0V or 3V
Output High Short Circuit Pulsed Current	I_{O+}	—	1.9	—	A	—
Output Low Short Circuit Pulsed Current	I_{O-}	—	1.8	—	A	—
Output Reverse Current Withstand	I_{RVS}	—	250	—	mA	—

Note: 6. The V_{IN} and I_{IN} parameters are applicable to the logic input pin: IN and IN*. The V_O and I_O parameters are applicable to the output pin: OUT.

AC Electrical Characteristics (V_{CC} = 12V, @T_A = +25°C, unless otherwise specified.)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Turn-On Rise Time	t_r	—	15	25	ns	C_L = 1000pF
Turn-Off Fall Time	t_f	—	15	25	ns	C_L = 1000pF
Turn-On Propagation Delay	t_{ON}	—	35	50	ns	—
Turn-Off Propagation Delay	t_{OFF}	—	35	55	ns	—

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Timing Waveforms

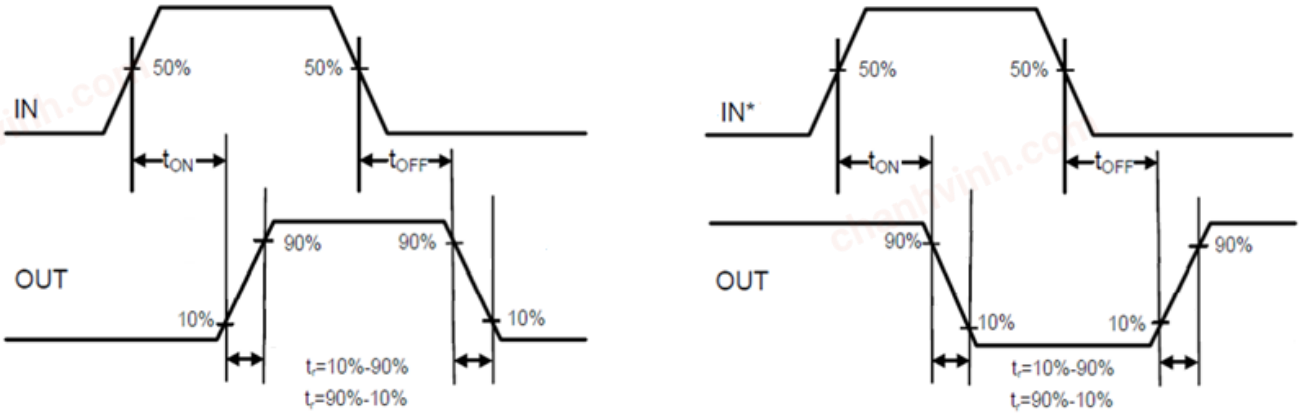


Figure 1. Switching Time Waveform Definitions

Input/Output Response Table

IN	IN*	OUT
0	0	0
0	1	0
1	0	1
1	1	0

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Typical Performance Characteristics (V_{CC} = 12V, @T_A = +25°C, unless otherwise specified.)

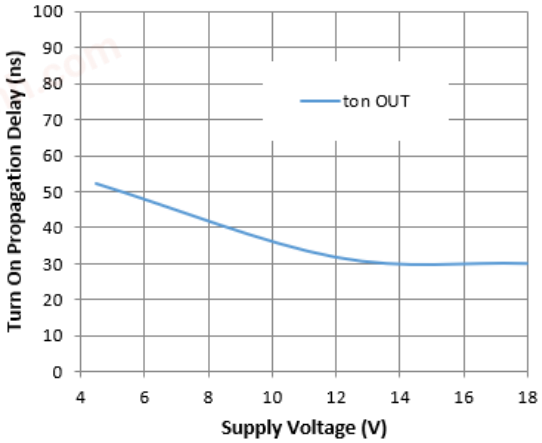


Figure 2. Turn-on Propagation Delay vs. Supply Voltage

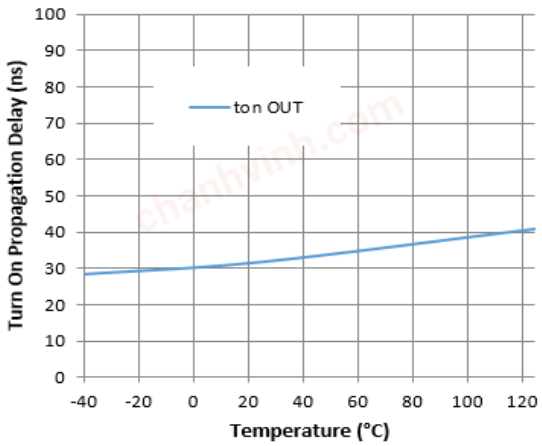


Figure 3. Turn-on Propagation Delay vs. Temperature

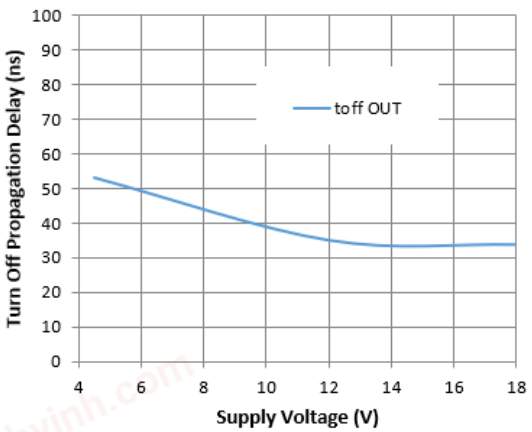


Figure 4. Turn-off Propagation Delay vs. Supply Voltage

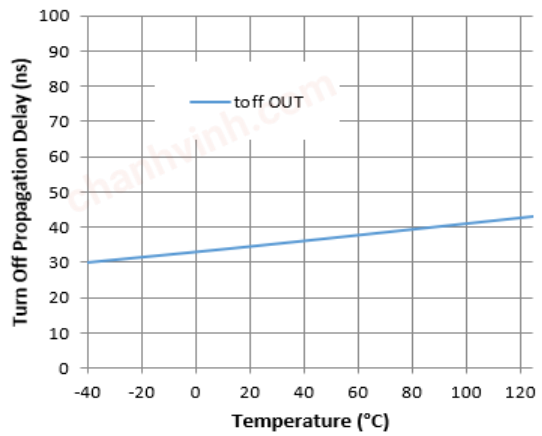


Figure 5. Turn-off Propagation Delay vs. Temperature

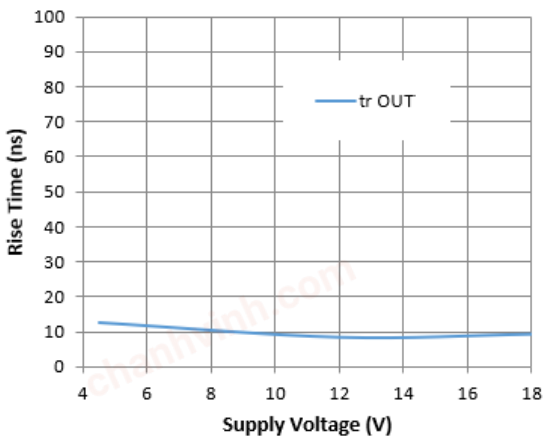


Figure 6. Rise Time vs. Supply Voltage

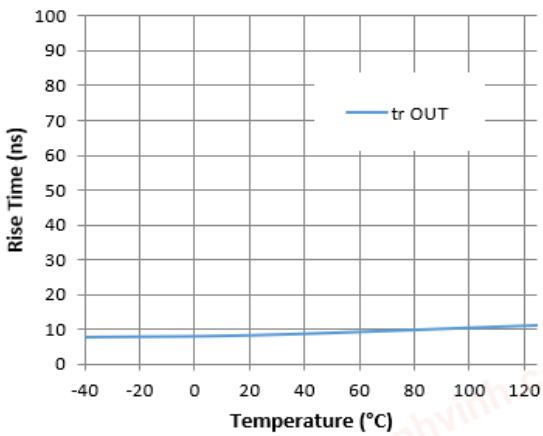


Figure 7. Rise Time vs. Temperature

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Typical Performance Characteristics (continued)

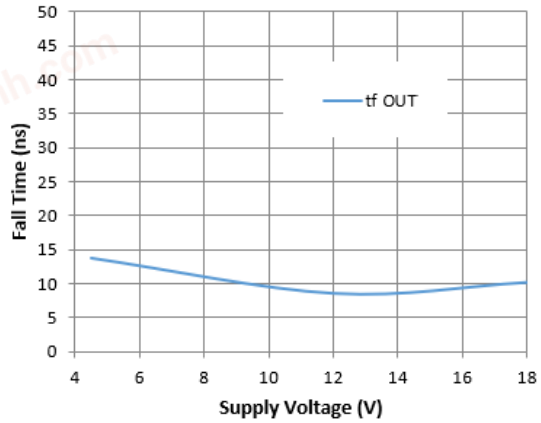


Figure 8. Fall Time vs. Supply Voltage

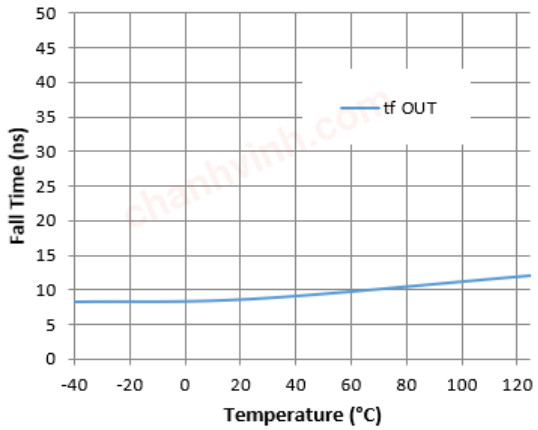


Figure 9. Fall Time vs. Temperature

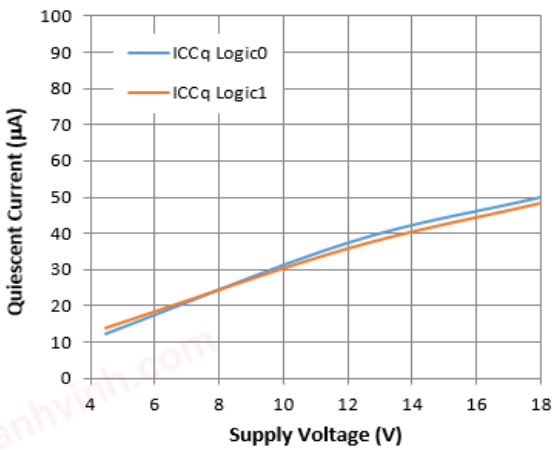


Figure 10. Quiescent Current vs. Supply Voltage

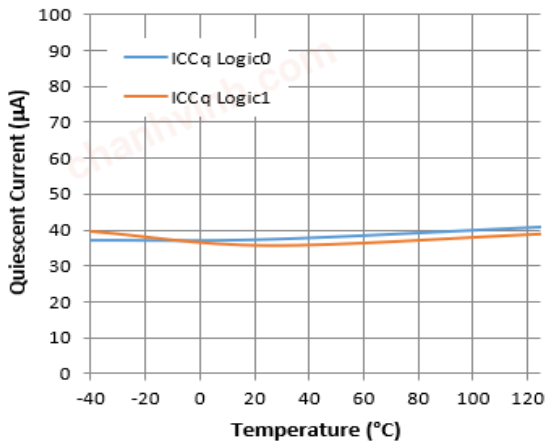


Figure 11. Quiescent Current vs. Temperature

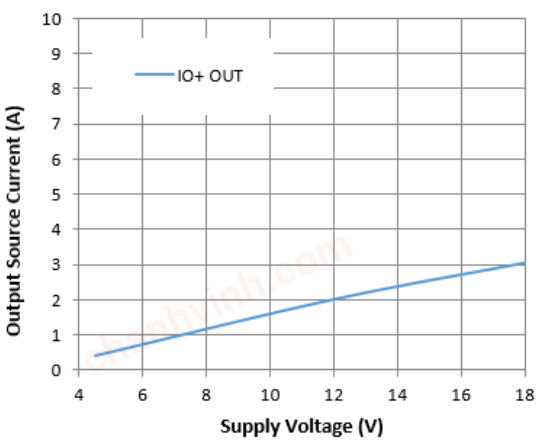


Figure 12. Output Source Current vs. Supply Voltage

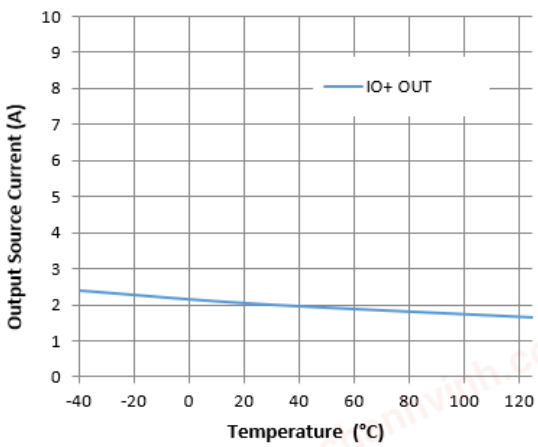


Figure 13. Output Source Current vs. Temperature

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Typical Performance Characteristics (continued)

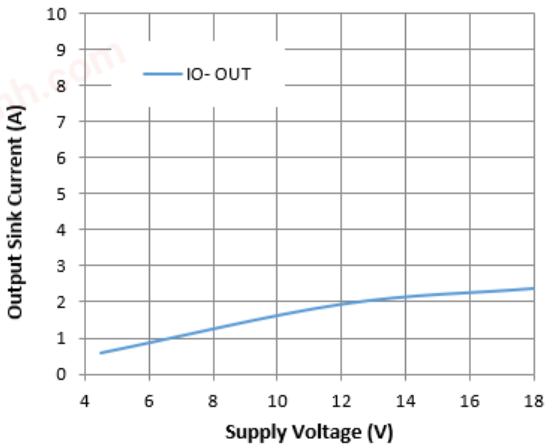


Figure 14. Output Sink Current vs. Supply Voltage

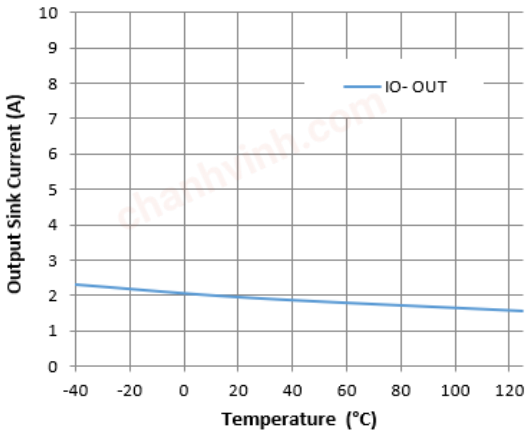


Figure 15. Output Sink Current vs. Temperature

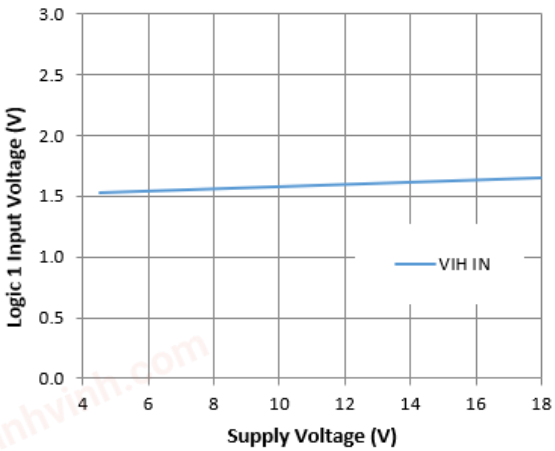


Figure 16. Logic 1 Input Voltage vs. Supply Voltage

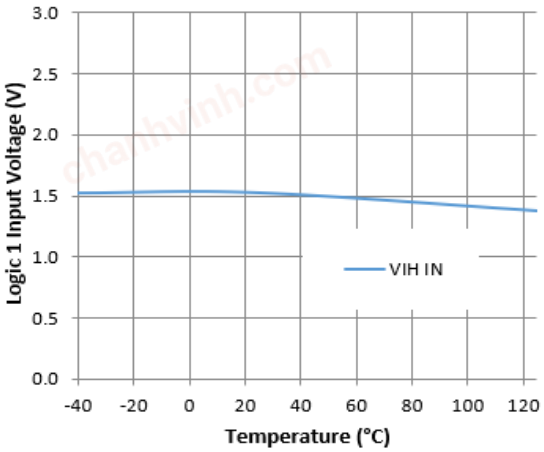


Figure 17. Logic 1 Input Voltage vs. Temperature

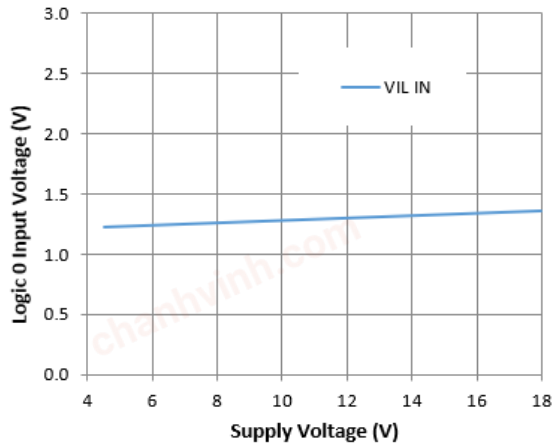


Figure 18. Logic 0 Input Voltage vs. Supply Voltage

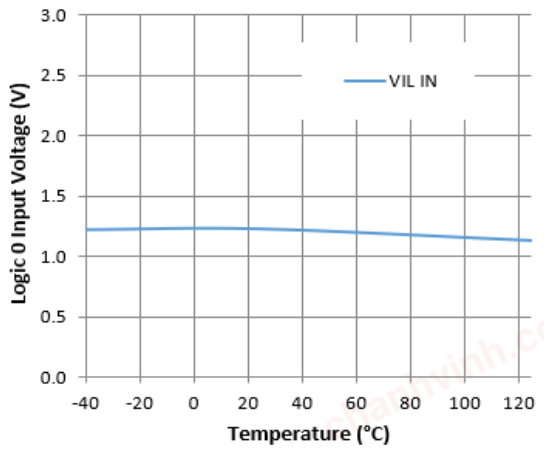


Figure 19. Logic 0 Input Voltage vs. Temperature

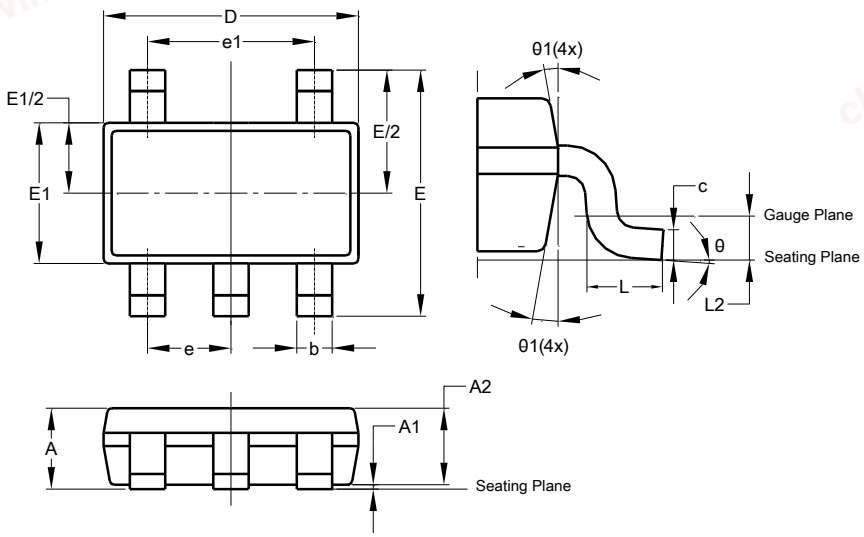
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Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

TSOT25

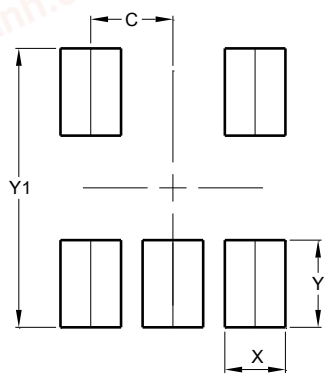


TSOT25			
Dim	**Min**	**Max**	**Typ**
A	-	1.00	-
A1	0.01	0.10	-
A2	0.84	0.90	-
b	0.30	0.45	-
c	0.12	0.20	-
D	-	-	2.90
E	-	-	2.80
E1	-	-	1.60
e	0.95 BSC		
e1	1.90 BSC		
L	0.30	0.50	
L2	0.25 BSC		
θ	0°	8°	4°
θ1	4°	12°	-
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

TSOT25



Dimensions	Value (in mm)
C	0.950
X	0.700
Y	1.000
Y1	3.199

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