600V HIGH- AND LOW-SIDE GATE DRIVER

Features

- High side fully operational to +600V
- Floating channel designed for bootstrap operation
- Output source/sink current capability 2.5A
- Common-Mode dV/dt noise canceling circuit
- Gate drive supply range from 10V to 20V
- Under-voltage lockout for both channels
- 3.3V logic compatible
- Separate logic supply range from 3.3V to 20V
- Logic and power ground ±5V offset
- CMOS Schmitt-triggered inputs with pull-down
- Cycle by cycle edge-triggered shutdown logic
- Outputs in phase with inputs
- Matched propagation delay for both channels

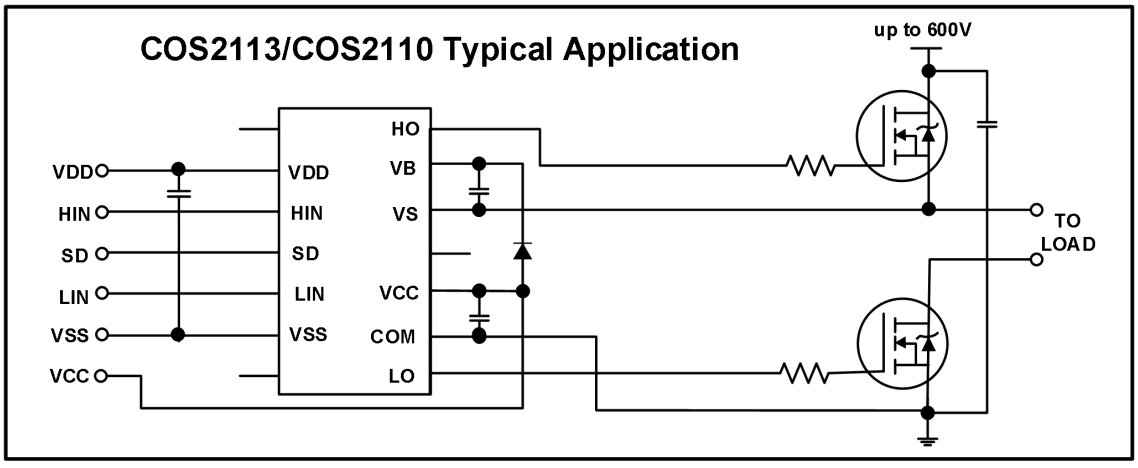
Applications

- Motor Drivers
- Full/Half Bridge Converters
- Two Switch forward Converter

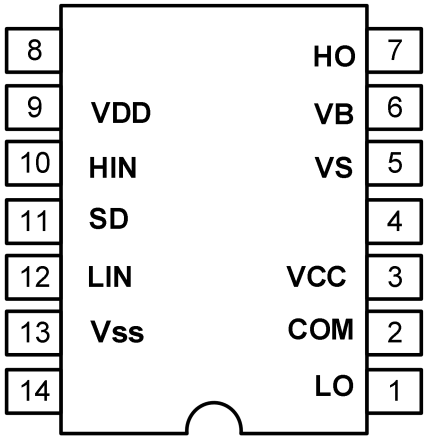
General Description

The COS2113/COS2110 are high voltage and high speed power MOSFET and IGBT drivers with independent high-side and low-side referenced output channels. 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 600V. The Logic inputs of COS2113/COS2110 are compatible with standard CMOS or TTL output, down to 3.3V logic. COS2113/COS2110 are available in Green wide SOP16, and DIP14 Packages.

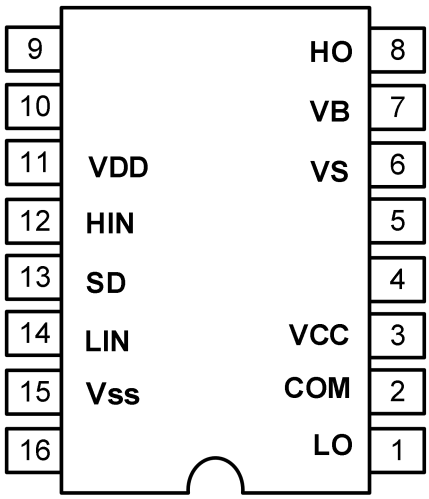
Rev1.0



1. Pin Configuration and Functions



COS2113/COS2110
DIP-14



COS2113/COS2110
SOP-16,Wide Body

Figure 1. Pin Diagram

Pin Description

Name	Pin No. (DIP14)	Pin No. (SOP16)	Description
VDD	9	11	Logic supply
HIN	10	12	Logic input for high-side gate driver output (HO), in phase
SD	11	13	Logic input for shutdown
LIN	12	14	Logic input for low-side gate driver output (LO), in phase
VSS	13	15	Logic ground
VB	6	7	High-side floating supply
HO	7	8	High-side gate drive output
VS	5	6	High-side floating supply return
VCC	3	3	Low-side supply
LO	1	1	Low-side gate drive output
COM	2	2	Low-side return

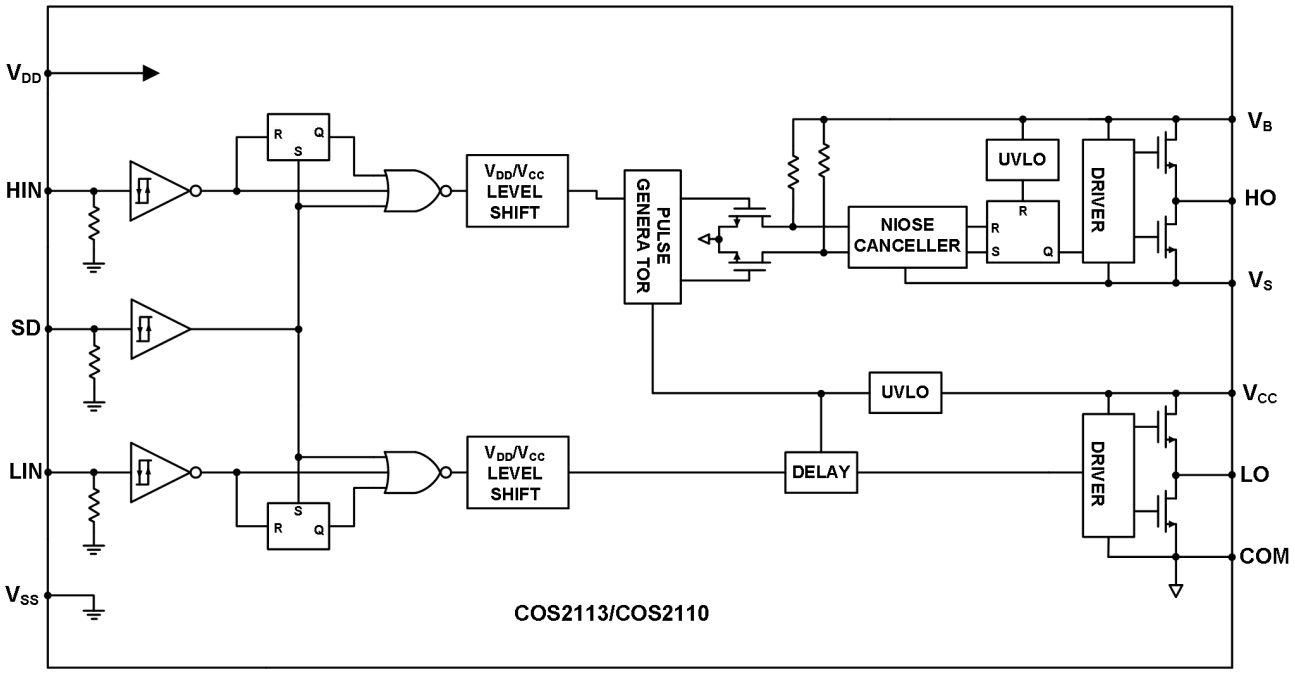


Figure 2. Functional Block Diagram

2. Product Specification

2.1 Absolute Maximum Ratings (1)

Parameter	Symbol	Min	Max	Unit
High-side floating supply voltage	VB	-0.3	620	V
High-side floating supply offset voltage	VS	VB - 20	VB +0.3	V
High-side floating output voltage	VHO	VS - 0.3	VB + 0.3	V
Low-side fixed supply voltage	VCC	-0.3	20	V
Low-side output voltage	VLO	-0.3	VCC + 0.3	V
Logic supply voltage	VDD	-0.3	VSS +20	V
Logic supply offset voltage	VSS	VCC-20	VSS +0.3	V
Logic input voltage (HIN, LIN, SD)	VIN	VSS-0.3	VDD +0.3	V
Allowable offset supply voltage transient	dVs/dt	-	50	V/ns
Junction temperature	T_J	-	150	°C
Storage temperature	T_S	- 55	150	°C
Lead temperature (soldering, 10 seconds)	T_L	-	300	°C

(1) Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

2.2 Thermal Data

Parameter	Rating	Unit
Package Thermal Resistance	100 (WSOP16) 75 (DIP14)	°C/W

2.3 Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
High-side floating supply voltage	VB	VS+10	VS+20	V
Low-side fixed supply voltage	VCC	10	20	
Logic supply voltage	VDD	VSS+3	VSS+20	
Logic supply offset voltage	VSS	-5	5	
Logic input voltage (HIN, LIN, SD)	VIN	VSS	VDD	
Operation temperature	T_A	-40	125	°C

2.4 Electrical Characteristics

VBIAS (VCC, VBS, VDD) = 15 V, T_A = 25 °C , C_L =1000pF and VSS = COM, unless otherwise specified.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
INPUT						
Input signal high threshold	V_{IH}		2.5	-		V
Input signal low threshold	V_{IL}			-	0.8	V
Logic “1” input bias current	I_{IN+}	V_{IN} = 5V		10	20	μA
Logic “0” input bias current	I_{IN-}	V_{IN} = 0 V		-	2.0	μA
OUTPUT						
High level output voltage, V_{BIAS}- V_O	V_{OH}	I_O=20mA		-	1.4	V
Low level output voltage	V_{OL}			-	0.15	V
Output high short circuit pulsed current	I_{O+}	V_O =0 V, V_{IN} = VDD PW≤ 10 μs	2.0	2.5	-	A
Output low short circuit pulsed current	I_{O-}	V_O =15 V, V_{IN} = 0 PW≤ 10 μs	2.0	2.5	-	A

POWER SUPPLY						
Quiescent VBS supply current	I_{QBS}	VIN = 0 V or VDD	-	45	100	μA
Quiescent VCC supply current	I_{QCC}		-	500	700	μA
Quiescent VDD supply current	I_{QDD}		-	-	150	μA
Offset supply leakage current	I_{LK}	VB=VS=600V	-	-	50	μA
VCC and VBS supply under voltage positive going threshold	V_{BSUV+} V_{CCUV+}		7.5	8.6	9.7	V
VCC and VBS supply under voltage negative going threshold	V_{BSUV-} V_{CCUV-}		7.0	8.1	9.2	V
VCC and VBS supply under-voltage lockout hysteresis	V_{BSHY} V_{CCHY}		-	0.5	-	V
SWITCHING CHARACTERISTICS						
Turn-on Rise Time	t_R	C_L =1000pF, See Figure 5, 6, 7, 8	-	18	30	ns
Turn-off Fall Time	t_F		-	13	20	ns
Turn-On Propagation Delay	t_{on}		-	128	150	ns
Turn-Off Propagation Delay	t_{off}		-	124	150	ns
Shutdown Propagation Delay	t_{sd}		-	120	150	ns
Delay matching, turn-on/off	MT		-	10	-	ns

3. Application Information

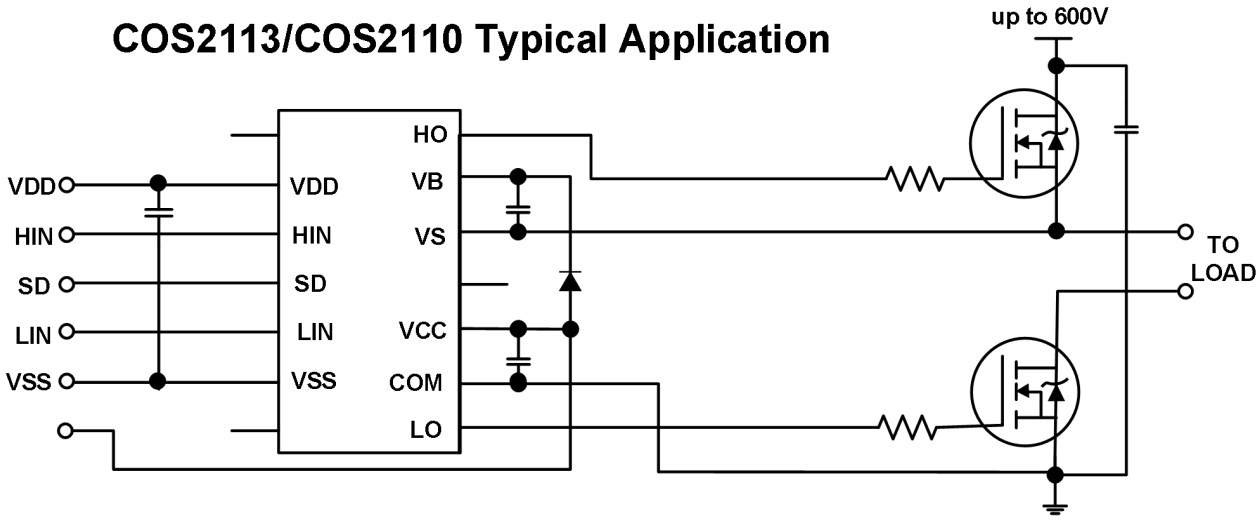


Figure 3.Typical Application

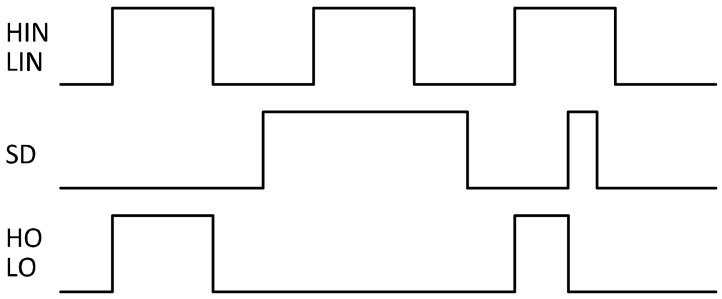


Figure 4. Input/Output Timing Diagram

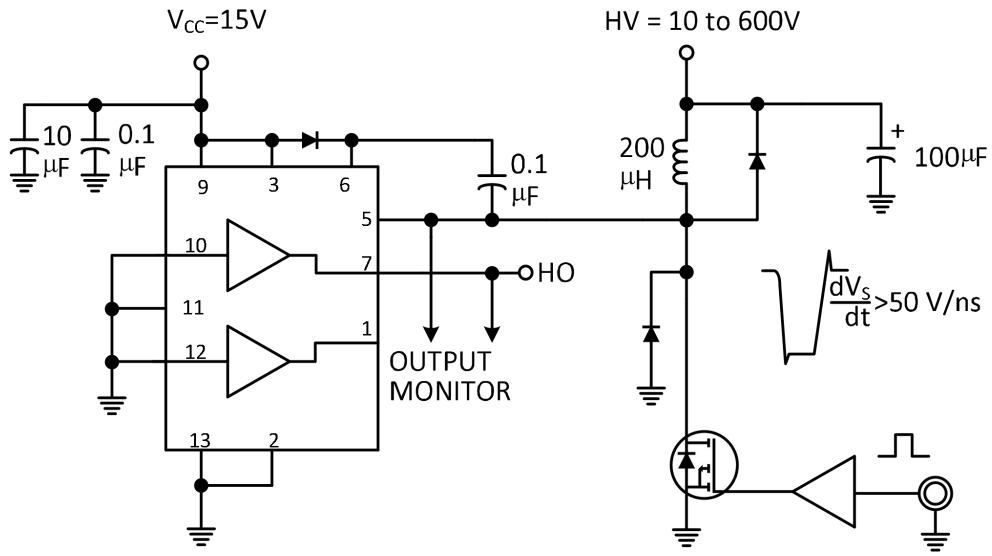


Figure 5. Floating Supply Voltage Transient Test Circuit

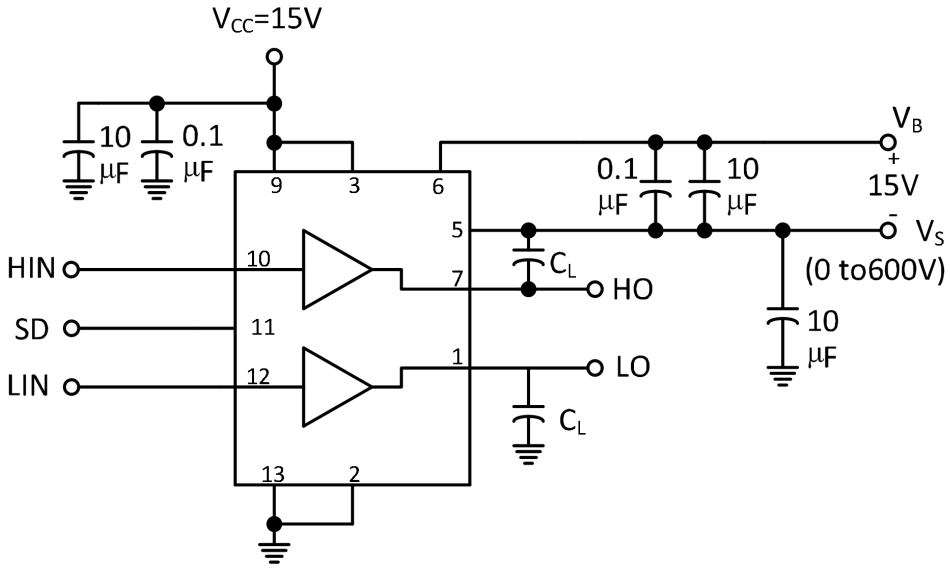


Figure 6. Switching Time Test Circuit

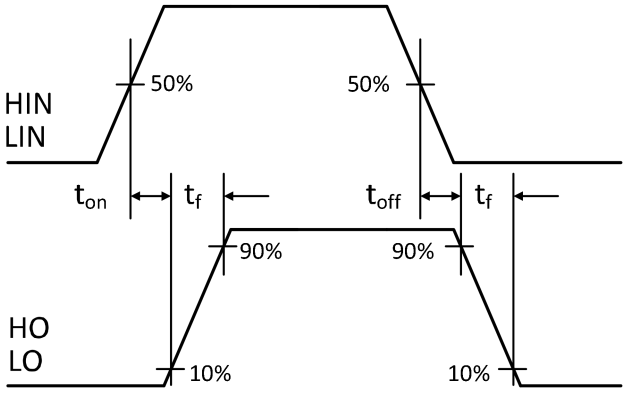


Figure 7. Switching Time Waveform Definition

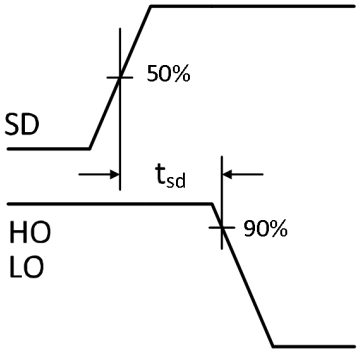


Figure 8. Shutdown Waveform Definition

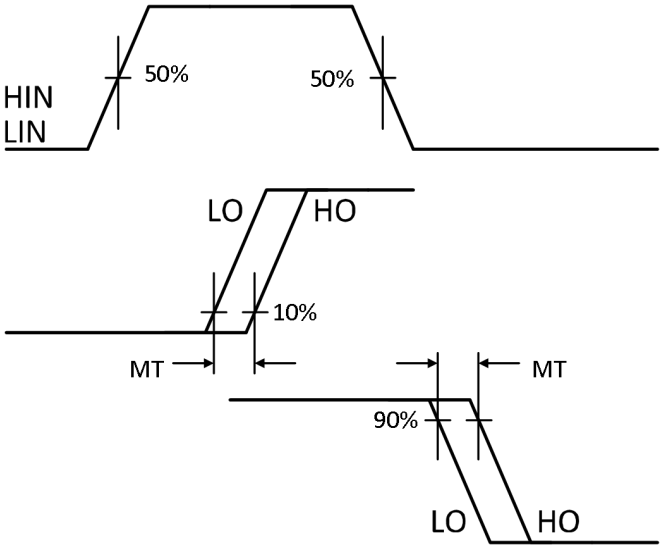


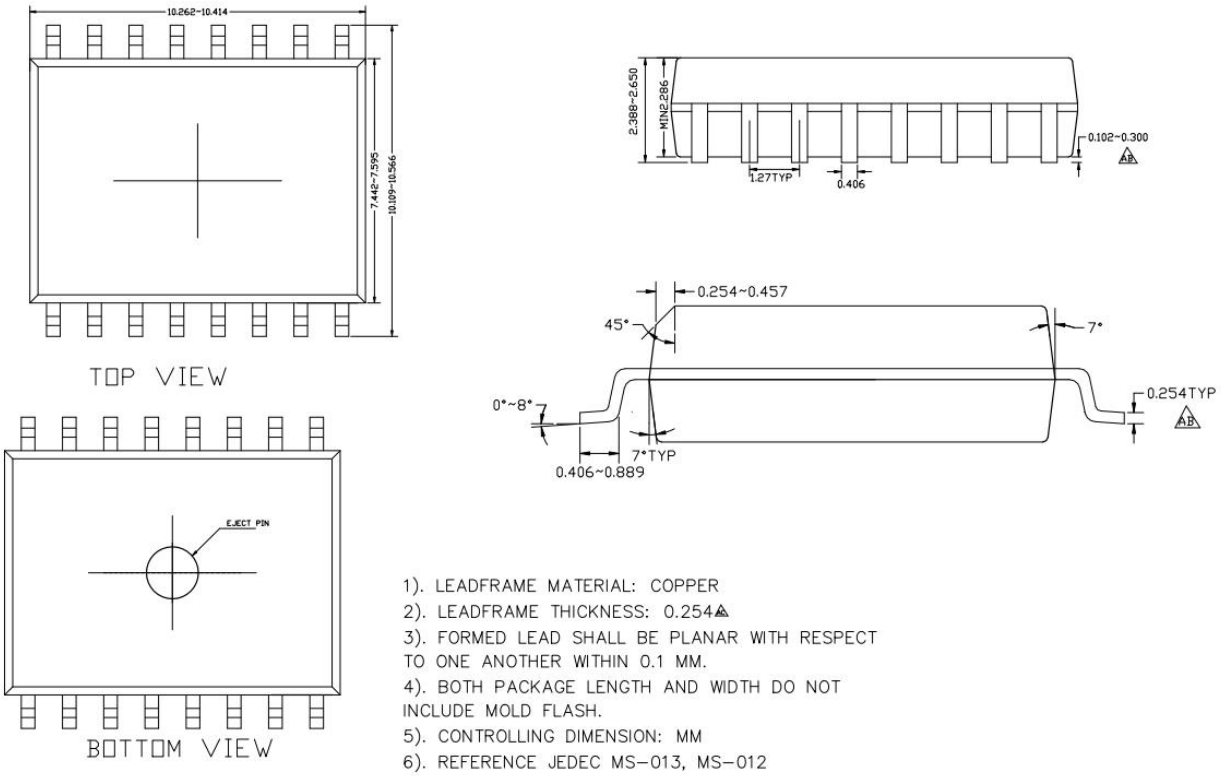
Figure 9. Delay Waveform Definition

4. Ordering Information

Model	Order Number	Package	Package Option	Marking Information
COS2113 COS2110	COS2113STRPBF	WSOP-16	Tape and Reel, 1000	COS2113
	COS2113PBF	DIP-14	Tube 25	COS2113

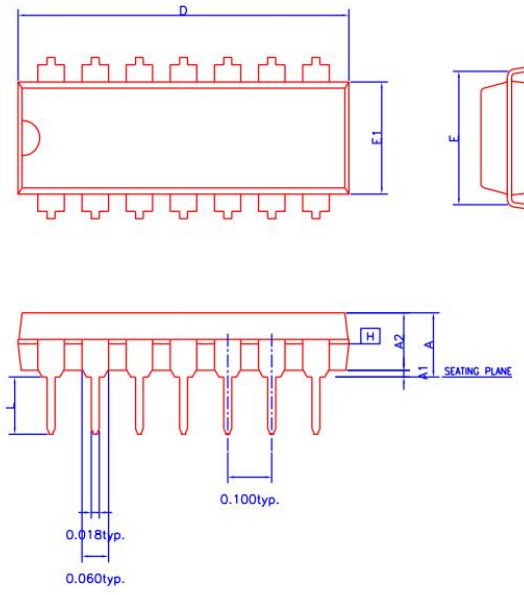
5. Package Information

5.1 WSOP16 (Package Outline Dimensions)



1). LEADFRAME MATERIAL: COPPER
2). LEADFRAME THICKNESS: 0.254
3). FORMED LEAD SHALL BE PLANAR WITH RESPECT TO ONE ANOTHER WITHIN 0.1 MM.
4). BOTH PACKAGE LENGTH AND WIDTH DO NOT INCLUDE MOLD FLASH.
5). CONTROLLING DIMENSION: MM
6). REFERENCE JEDEC MS-013, MS-012
7). THE SIZE LABEL OF THE LENGTH AND WIDTH IN THE DRAWING BELONG TO THE BOTTOM SIZE OF THE PACKAGE.

5.2 DIP14 (Package Outline Dimensions)



SYMBOLS	MIN.	NOR.	MAX.
A	–	–	0.210
A1	0.015	–	–
A2	0.125	0.130	0.135
D	0.735	0.750	0.775
E		0.300 BSC.	
E1	0.245	0.250	0.255
L	0.115	0.130	0.150
e_B	0.335	0.355	0.375
θ°	0	7	15

UNIT : INCH