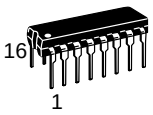
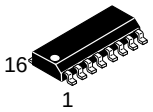
MICROCIRCUIT INTERFACE TRANSCEIVER OF THE SERIAL DATA OF THE STANDARD RS -232

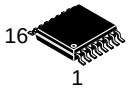
Microcircuits HT3232 is interface transceiver of serial data under RS - 232 standard with single power supply source & bipolar output voltage of transmitter, forming by build-in voltage multiplier on 4 external capacities, 0.1 µF. HT3232 correspond to EIA/TIA-232E, V.28 standard and is purposed for application in modern high efficient calculating systems with the wide range of supply voltage, fast-operating electronic devices with high level of fidelity of information exchange among distant devices**.**



DIP−16 N SUFFIX
HT3232EDNZ

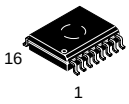


SOP−16 R SUFFIX
HT3232EDRZ



TSSOP−16 S SUFFIX
HT3232EDRSZ

QFN16 Q SUFFIX
HT3232EDRQZ



WSOP16 W SUFFIX
HT3232EDRWZ

Functions and structure:

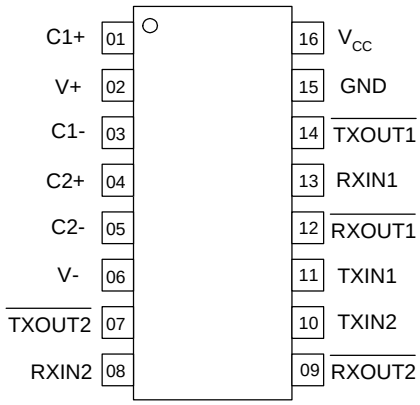
- Microcircuit contains 2 transmitters and 2 receivers of the serial data of the standard RS-232.
- The microcircuit supply voltage range is from 3.0 to 5.5 V.
- Enhanced ESD Specifications:
  —15kV IEC61000-4-2 Air Discharge
  —8kV IEC61000-4-2 Contact Discharge

Truth Table

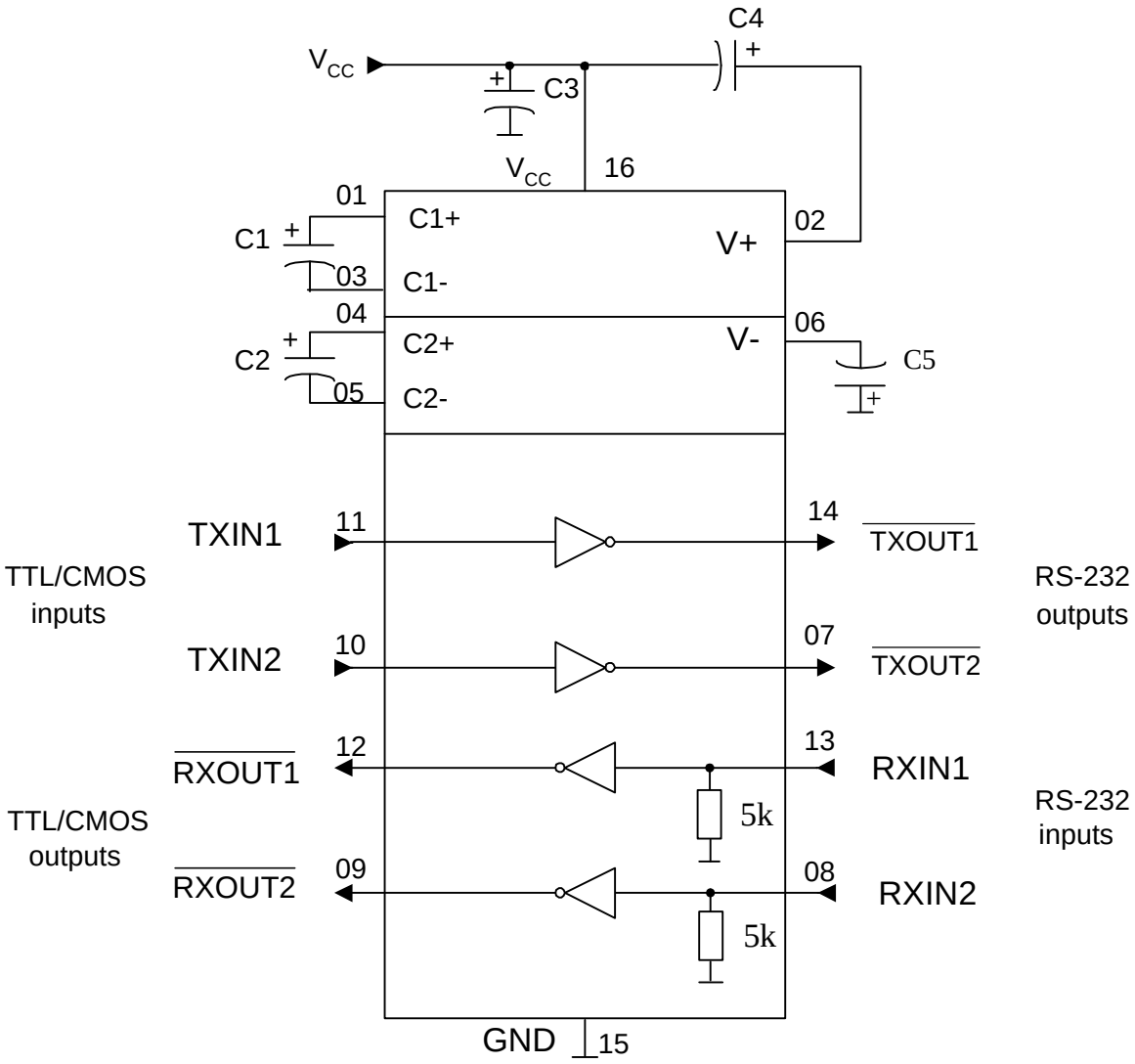
Input	Output
RXIN, TXIN	$\overline{\text{RXOUT}}$, $\overline{\text{TXOUT}}$
H	L
L	H

Note –
L – low voltage level;
H – high voltage level

Pinning



Functional diagram



C1 – capacitor 0.1 µF ± 10 % for U_{CC} = 3.3 V ± 10% (0.047 µF ± 10 % for U_{CC} = 5.0 V ± 10%)

C2, C4, C5– capacitors 0.1 µF ± 10 % for U_{CC} = 3.3 V ± 10% (0.33 µF ± 10 % for U_{CC} = 5.0 V ± 10%)

C3 – capacitor 0.1 µF ± 10 %

Pin description table

Pin number	Pin description	Symbol
01	Positive terminal of the voltage multiplier charge-pump capacitor	C1+
02	Positive voltage multiplier output	V+
03	Negative terminal of the voltage multiplier charge-pump capacitor	C1-
04	Positive terminal of the voltage multiplier charge-pump capacitor	C2+
05	Negative terminal of the voltage multiplier charge-pump capacitor	C2-
06	Negative voltage multiplier output	V-
07	Transmitter output (RS-232 levels)	$\overline{\text{TXOUT2}}$
08	Receiver input (RS-232 levels)	RXIN2
09	Receiver output (TTL/CMOS levels)	$\overline{\text{RXOUT2}}$
10	Transmitter input (TTL/CMOS levels)	TXIN2
11	Transmitter input (TTL/CMOS levels)	TXIN1
12	Receiver output (TTL/CMOS levels)	$\overline{\text{RXOUT1}}$
13	Receiver input (RS-232 levels)	RXIN1
14	Transmitter output (RS-232 levels)	$\overline{\text{TXOUT1}}$
15	Common pin	GND
16	Supply voltage	V

Maximum Ratings & Recommended Operating Conditions

Parameter, unit	**Symbol**	**Recommended operating conditions**		**Maximum rate**	
		min	**max**	**min**	**max**
Supply voltage, V	U_{CC}	3.0	5.5	-0.3	6.0
Voltage applied to transmitter output, V	U	–	–	-13.2	13.2
Multiplier positive output voltage, V	U+	5.0	–	-0.3	7.0
Multiplier negative output voltage, V	U-	-5.0	–	-7.0	0.3
Receiver input voltage, V	U	-25	25	-25	25
Receiver output voltage, V	U	–	–	-0.3	Ucc+0.3
Transmitter low level input voltage, V	U	0	0.8	-0.3	–
Transmitter high level input voltage, V	U_{IH}	2.0 (Ucc=3.3 V)	Ucc	–	6
		2.4 (Ucc=5.0 V)			
Multiplier outputs voltages difference, V	$U_+ + U_-$	–	–	–	13
Receiver low level threshold input voltage,V	U_{ITL}	0.6 (Ucc=3.3 V)	–	–	–
		0.8 (Ucc=5.0 V)			
Receiver high level threshold input voltage,V	U_{ITH}	–	2.4	–	–

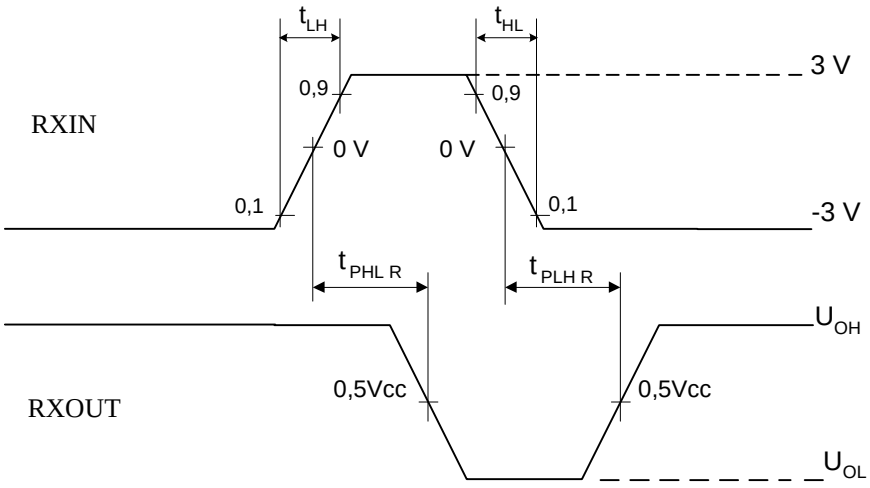
Electric parameters

Parameter, unit	Symbol	Norm		Mode	T_A, °C
		Min	Max		
Supply current, µA	I_{CC1}	–	1.0	Ucc = 3.3 V; 5.0 V; U_{IL} = 0 V	25±10
			1.4		-40; 85
Receiver					
Low level output voltage, V	U_{OLR}	–	0.3	U_{CC} =3.3V ±10%; U_{ITH} = 2.4V; I = 1.6 mA	25±10
			0.4		-40; 85
			0.3	U_{CC} =5.0V ±10%; U_{ITH} = 2.4V; I = 1.6 mA	25±10
			0.4		-40; 85
High level output voltage, V	U_{OHR1}	2.5	-	U_{CC} =3.3V ±10%; U_{ITL} = 0.6 V; I = -1.0 mA	25±10
		2.4			-40; 85
	U_{OHR2}	4.0		U_{CC} =5.0V ±10%; U_{ITL} = 0.8 V; I = -1.0 mA	25±10
		3.9			-40; 85
Receiver hysteresis, V	Uh	0.2	1.0	U = 3.3 V ± 10%; 5.0 V ± 10%	25±10
Input resistance, kOhm	R	3	7	-	25±10
OFF-ON switching propagation delay, ns	t_{PHLR}, t	–	1500	U_{CC} = 5.0V ±10 %; C_L = 150 pF; U_{IL} = 0 V; U_{IH} = 3.0 V; t = t ≤ 10 ns	
Propagation delays difference, ns	t_{SKD}	–	600		
Transmitter					
Low level output voltage, V	U_{OLT1}	-	-5.07	U_{CC}=3.3V ±10%; U_{IH} = 2.0V; R = 3 kOhm	25±10
			-5.0		-40; 85
	U_{OLT2}	-	-5.07	U_{CC}=5.0V ±10%; U_{IH} = 2.4V; R = 3 kOhm	25±10
			-5.0		-40; 85
High level output voltage, V	U_{OHT}	5.07	–	U_{CC}=3.3V ±10%; U_{IL} = 0.8V; R = kOhm	25±10
		5.0			-40; 85
		5.07	–	U_{CC}=5.0V ±10%; U_{IL} = 0.8V; R = kOhm	25±10
		5.0			-40; 85
Transmitter hysteresis, V	Uh	0.1	1.0	U = 3.3 V ± 10%; 5.0 V ± 10%	25±10
Low level input leakage current, µA	I_{ILL}	–	-0.5	Ucc = 5.5 V; U_{IL} = 0V	25±10
			-1.0		-40; 85
High level input leakage current, µA	I_{ILH}	–	0.5	Ucc = 5.5 V; U_{IH} = 5.5V	25±10
			1.0		-40; 85
Output resistance , Ohm	R_O	350	–	U_{CC} = U_{V+}*= U_V*- = 0 V; U = ±2 V	25±10
		300			-40; 85

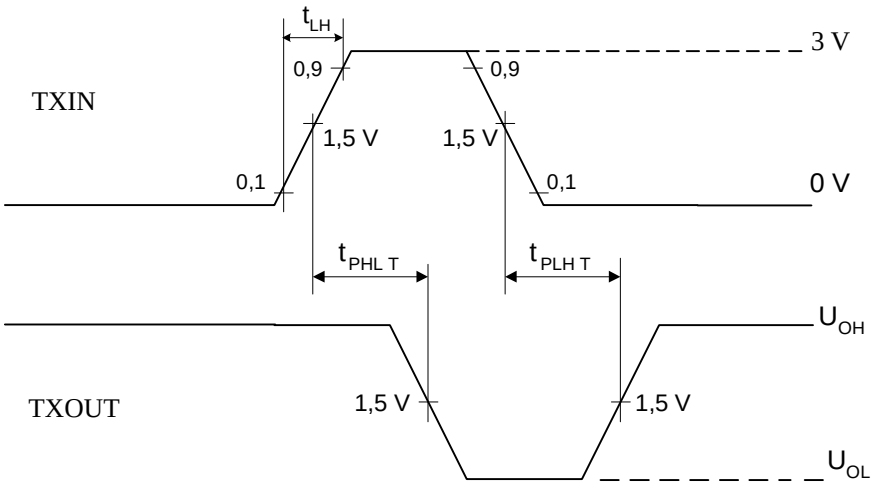
Electric parameters

Parameter, unit	Symbol	Norm		Mode	T_A, °C
		Min	Max		
Transmitter					
Short circuit current, mA	I_{OS}	–	53	Ucc = 3.6 V	25±10
			60		-40; 85
			-53	Ucc = 3.6 V	25±10
			-60		-40; 85
			53	Ucc = 5.5 V	25±10
			60		-40; 85
			-53	Ucc = 5.5 V	25±10
			-60		-40; 85
Low level output current for OFF-state, µA	I_{OZLT}	–	-10	U_{CC} = 0V; U_O= -12 V; transmitter output is disabled	25±10
			-25		-40; 85
High level output current for OFF-state, µA	I_{OZHT}	–	10	U_{CC} = 0V; U_O = 12 V; transmitter output is disabled	25±10
			25		-40; 85
Maximum Data Rate, Kbit/s	ST	140	–	R_L = 3 kOhm; C_L = 1000 pF	25±10
		120			-40÷85
Transition-Region Slew Rate, V/µs	SR	6	30	U_{CC} = 3.3 V; R_L = (3-7) kOhm; U_{OT} is from +3 to -3 V or from -3 to +3 V; C_L = (150-1000) pF	25±10
		4	30	U_{CC} = 3.3 V; R_L = (3-7) kOhm; U_{OT} is from +3 to -3 V or from -3 to +3 V; C_L = (150-2500) pF	
Propagation delays difference, ns	t_{SKEW}	–	600	U_{CC} = 5.0V ±10 %; U_{IL} = 0 V; U_{IH} = 3.0 V; $t_{LH} = t_{HL} \leq 10$ ns; R =3 kOhm; C =1000 pF	

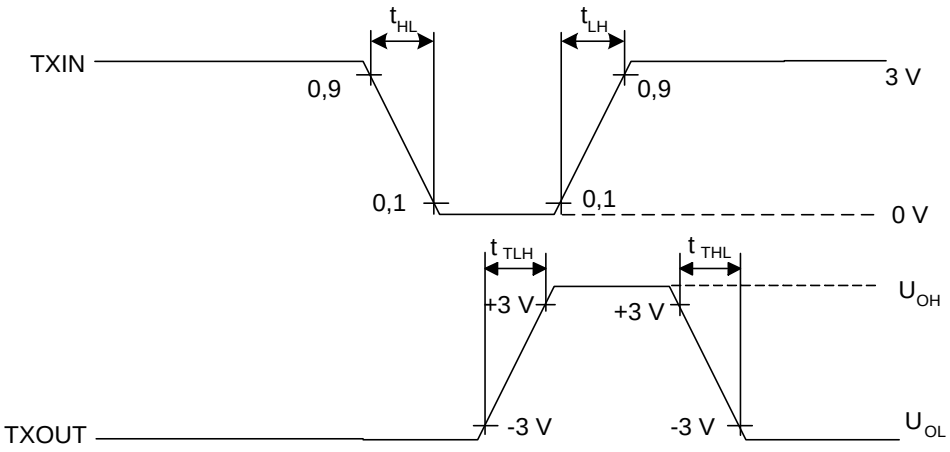
* U_{V+}, U_{V-} - voltages applied to pins 02 , 06.
Note – Electric parameters is indicated for C1=0.047 µF, C2-C4 = 0.33 µF & U_{CC} = 5.0 V±10 % (or C1-C4 = 0.1 µF & U = 3.3 V±10 %)



Receiver output & input signals time diagram



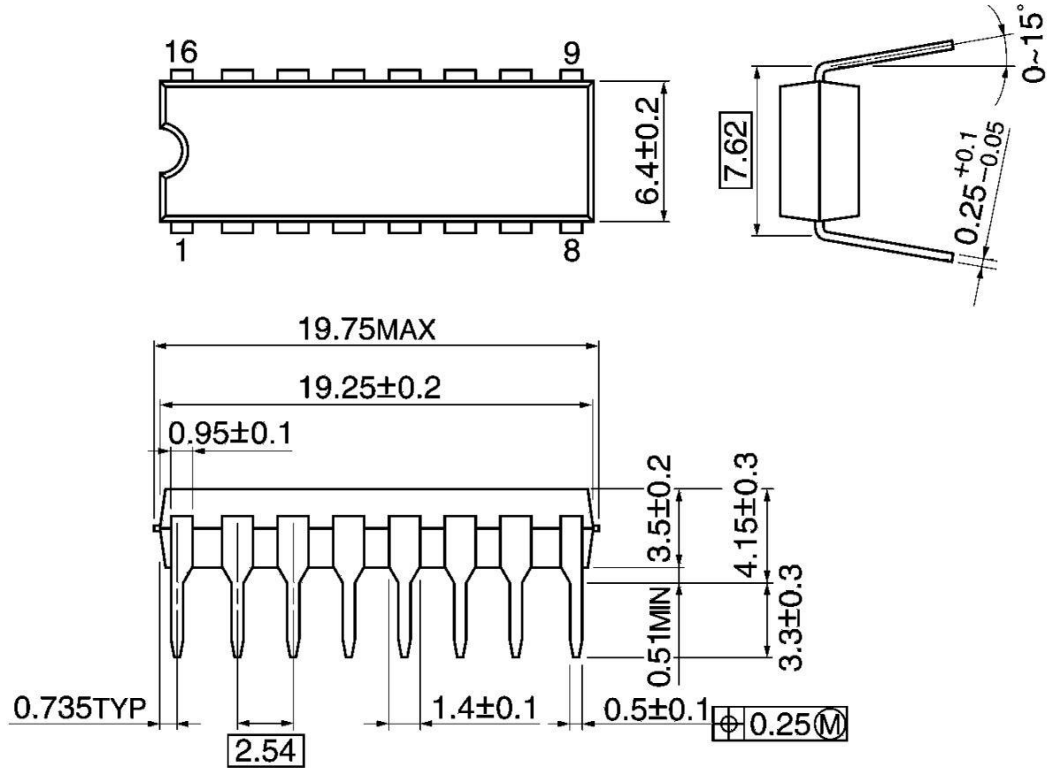
Transmitter output & input signals time diagram



Transmitter output & input signals time diagram

Package Dimensions

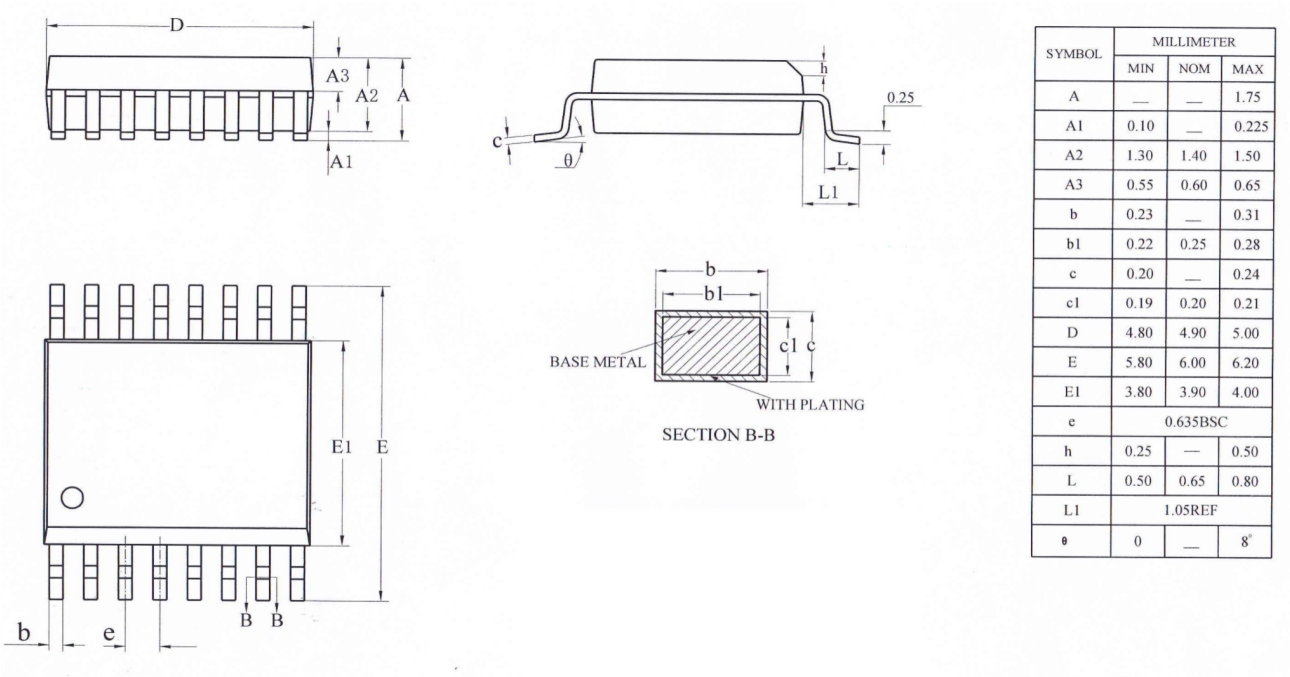
DIP16-P-300-2.54A Unit: mm



Weight: 1.11 g (Typ.)

Package Dimensions

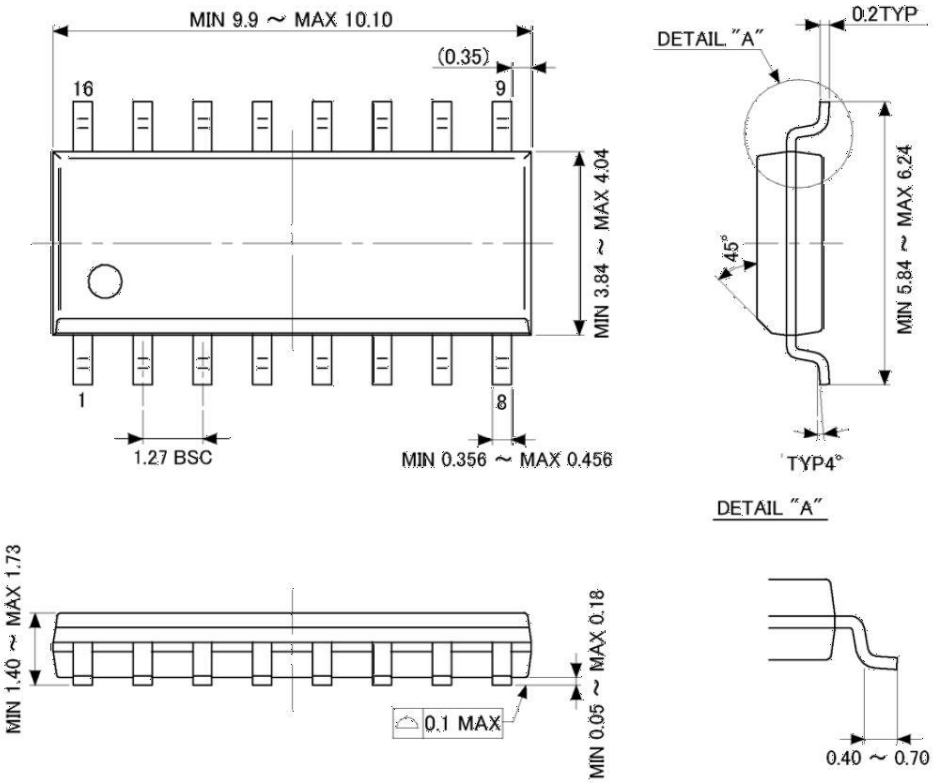
TSSOP16



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.75
A1	0.10	—	0.225
A2	1.30	1.40	1.50
A3	0.55	0.60	0.65
b	0.23	—	0.31
b1	0.22	0.25	0.28
c	0.20	—	0.24
c1	0.19	0.20	0.21
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	0.635BSC		
h	0.25	—	0.50
L	0.50	0.65	0.80
L1	1.05REF		
θ	0	—	8°

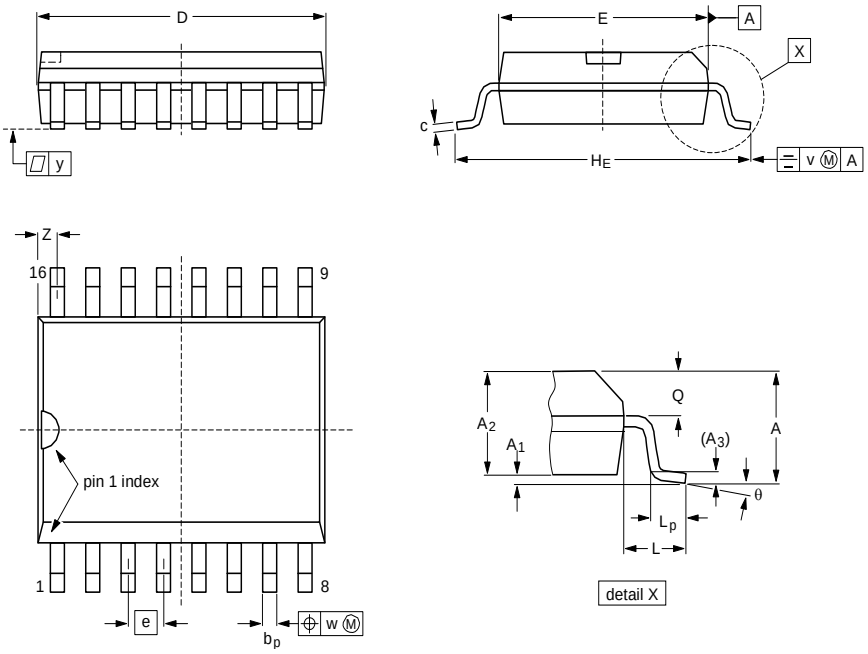
Weight: 0.07 g (Typ.)

P-SOP16-0410-1.27-002 Unit: mm



Weight: 0.15 g (Typ.)

WSOP16: plastic small outline package; 16 leads; body width 7.5 mm



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	D (1)	E (1)	e	H_E	L	L_p	Q	v	w	y	Z (1)	θ
mm	2.65	0.30 0.10	2.45 2.25	0.25	0.49 0.36	0.32 0.23	10.5 10.1	7.6 7.4	1.27	10.65 10.00	1.4	1.1 0.4	1.1 1.0	0.25	0.25	0.1	0.9 0.4	8^o 0^o
inches	0.10	0.012 0.004	0.096 0.089	0.01	0.019 0.014	0.013 0.009	0.41 0.40	0.30 0.29	0.050	0.419 0.394	0.055	0.043 0.016	0.043 0.039	0.01	0.01	0.004	0.035 0.016	

Note

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.