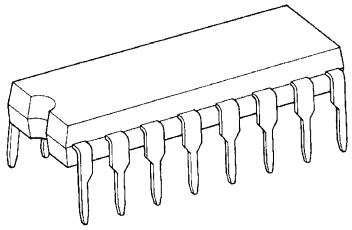
TOSHIBA BIPOLAR DIGITAL IC SILICON MONOLITHIC

TD62930P,TD62930F

THREE−CHANNEL SMALL−SIGNAL IGBT GATE DRIVER

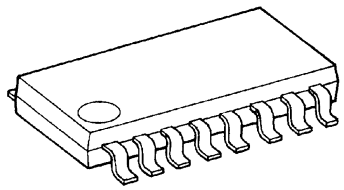
The TD62930P and TD62930F are drivers using 5 V−signal input to output the signals required to drive IGBT gates.
TD62930P / F is the most suitable for low−side drive of a miniature IGBT to use for inverter for the household electric appliances mainly.
The outputs are separated into high−side and low−side outputs. This separation simplifies the IGBT gate on / off timing control.
Two output signals are assigned for one input signal.
The high−side output is high−level for high−level input, and high impedance for low−level input. The low−side output is high impedance for high−level input, and low−level for low−level input.

TD62930P



DIP16-P-300-2.54A

TD62930F



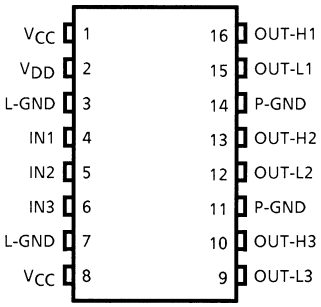
SSOP16-P-225-1.00A

Weight
DIP16−P−300−2.54A : 1.11 g (Typ.)
SSOP16−P−225−1.00A : 0.14 g (Typ.)

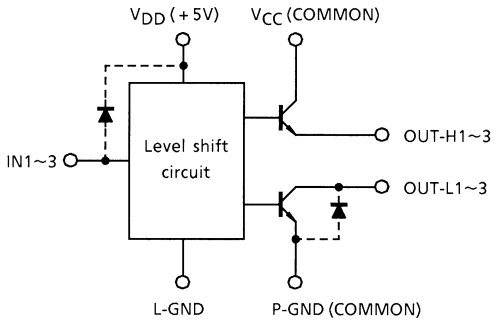
FEATURES

- Power supply voltage (maximum rating)
  High−voltage block power supply voltage V_{CC} = 30 V
  Low−voltage block power supply voltage V_{DD} = 7 V
- Output current (maximum rating)
  High−side peak current I_{OUT} = −0.4 A (max)
  Low−side peak current I_{OUT} = 0.4 A (max)
- Input−output response speed tpHL, tpLH ≤ 1 μs (max)
- Package : DIP16 / SSOP16 (1.00 mm pitch)

PIN ASSIGNMENT (TOP VIEW)



INTERNAL EQUIVALENT CIRCUIT



PIN DESCRIPTION

PIN No.	PIN NAME	FUNCTION
1, 8	V_{CC}	30 V supply pins
2	V_{DD}	5 V supply pin
3, 7	L−GND	Ground pins for 5 V supply
4, 5, 6	IN1~3	Input pins for 5 V output control signals
11, 14	P−GND	Ground pins for 30 V supply
9, 12, 15	OUT−L1~3	Low−side output pins
10, 13, 16	OUT−H1~3	High−side output pins

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	PIN / PACKAGE	SYMBOL	RATING	UNIT
Power Supply Voltage	V_{CC}	V_{CC}	30	V
Power Supply Voltage	V_{DD}	V_{DD}	7	V
Input Voltage	IN1~3	V_{IN}	−0.5~V_{DD} + 0.5	V
Output Voltage	OUT−H1~3	$V_{OUT\ (H)}$	0~20 (Ta = −20~85°C)	V
			0~30 (Ta = −20~70°C)	
	OUT−L1~3	$V_{OUT\ (L)}$	−0.5~20 (Ta = −20~85°C)	V
			−0.5~30 (Ta = −20~70°C)	
High−level Output Peak Current	OUT−H1~3	IOPH (Note 1)	−0.4	A / ch
Low−level Output Peak Current	OUT−L1~3	IOPL (Note 1)	+0.4	A / ch
Operating Frequency	IN1~3	f	25	kHz
Power Dissipation	DIP16	P_{D1} (Note 2)	1.47 (FREE AIR)	W
	SSOP16	P_{D2} (Note 2)	0.78 (ON PCB)	W
Operating Ambient Temperature		T_{opr}	−20~85	°C
Storage Temperature		T_{stg}	−55~150	°C

Note 1: Output pin current
The pulse width of the output pin current at peak is ≤ 1 μs, 300 pps.

Note 2: When ambient temperature exceeds 25°C
Derate the power dissipation of DIP−type devices at 11.76 mW / 1°C (device only) and
Derate the power dissipation of SMD−type devices at 6.24 mW / 1°C (mounted on the board).

RECOMMENDED OPERATING CONDITIONS
(Unless otherwise specified, Ta = −20 to 70°C)

CHARACTERISTIC		PIN	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Input Voltage	High level	IN1~3	V_{IH}	V_{CC} = 15 V, V_{DD} = 4.5~5.5 V	3.5	—	—	V
	Low level		V_{IL}		—	—	1.0	
Input Current	High level	IN1~3	I_{IH}	V_{CC} = 15 V, V_{DD} = 4.5~5.5 V	—	—	5	mA
	Low level		I_{IL}		—	—	−5	
Input Power Supply Voltage		V_{CC}	V_{CC}		10	15	25	V
		V_{DD}	V_{DD}		4.5	5.0	5.5	
Output Current		OUT−H1~3	IOH (DC)	V_{CC} = 20 V, V_{DD} = 4.5 V	—	—	−0.1	A
			IOH (Peak)		—	—	−0.35	
		OUT−L1~3	IOL (DC)	V_{CC} = 20 V, V_{DD} = 4.5 V	—	—	0.1	
			IOL (Peak)		—	—	0.35	
Operating Temperature			T_{opr}	V_{CC} = 30 V, V_{DD} = 5.5 V	−20	25	70	°C
				V_{CC} = 20 V, V_{DD} = 5.5 V	−20	25	85	

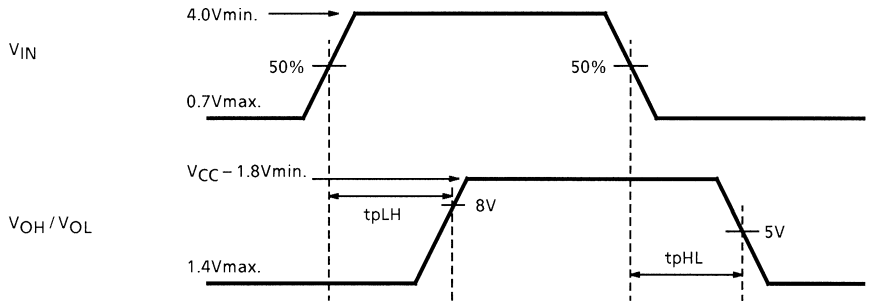
ELECTRICAL CHARACTERISTICS (Unless otherwise specified, Ta = −20 to 70°C)

CHARACTERISTIC		PIN	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Input Current	High level	IN1~3	I_{IH}	V_{CC} = 15 V, V_{IN} = 5 V	0.1	0.2	0.4	mA
	Low level		I_{IL}	V_{CC} = 15 V, V_{IN} = 0 V	—	0	—	
Output Voltage	High level	OUT−H1~3	V_{OH}	V_{CC} = 15 V, V_{IH} = 5 V, R_{LH} = 100 Ω	VCC −4.0	VCC −1.9	VCC −1.0	V
	Low level	OUT−L1~3	V_{OL}	V_{CC} = 15 V, V_{IL} = 0 V, R_{LL} = 100 Ω	0.3	0.5	2.5	
Dissipation Current 1		V_{DD}	I_{DDL}	V_{DD} = 5.5 V, V_{IH} = 0 V, Ta = 25°C	—	1.5	3.0	mA
				V_{DD} = 5.5 V, V_{IH} = 0 V, Ta = −20~85°C	—	—	3.5	
			I_{DDH}	V_{DD} = 5.5 V, V_{IH} = 5 V, Ta = 25°C	—	1.8	3.5	
				V_{DD} = 5.5 V, V_{IH} = 5 V, Ta = −20~85°C	—	—	4.0	
Dissipation Current 2		V_{CC}	I_{CCL}	V_{CC} = 30 V, V_{DD} = 5.5 V, V_{IH} = 0 V, Ta = 25°C	—	10.2	15.0	mA
				V_{CC} = 30 V, V_{DD} = 5.5 V, V_{IH} = 0 V	—	—	18.0	
			I_{CCH}	V_{CC} = 30 V, V_{DD} = 5.5 V, V_{IH} = 5 V, Ta = 25°C	—	7.5	11.0	
				V_{CC} = 30 V, V_{DD} = 5.5 V, V_{IH} = 5 V	—	—	14.0	
Operating Power Supply Voltage		V_{CC}	V_{CCopr}		10	—	30	V

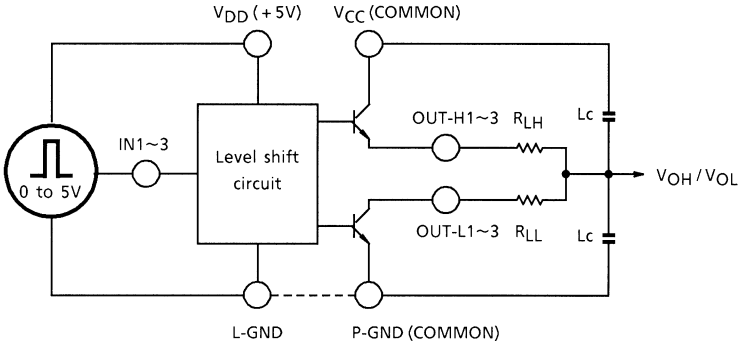
SWITCHING CHARACTERISTICS (Unless otherwise specified, Ta = −20~70°C)

CHARACTERISTIC		PIN	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Output Propagation Delay Time	High level	OUT−H1~3	tPLH	V_{DD} = 5.0 V, V_{CC} = 15 V, R_{LH} = R_{LL} = 100 Ω, V_{IN} = 0.7 to 4 V	—	0.25	1.00	μs
	Low level	OUT−L1~3	tPHL	V_{DD} = 5.0 V, V_{CC} = 15 V, R_{LH} = R_{LL} = 100 Ω, V_{IN} = 4 to 0.7 V	—	0.25	1.00	

SWITCHING WAVEFORM



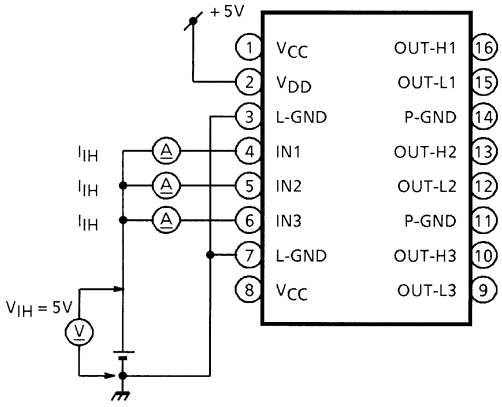
PROPAGATION DELAY TIME TEST CIRCUIT



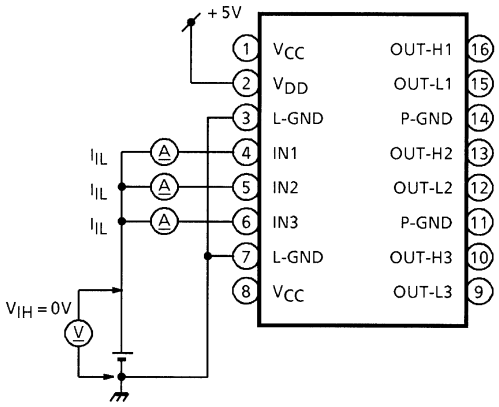
Toshiba recommends connecting load resistors as in the above diagram, utilizing the independence of the high−level and low−level sides of this IC.

TEST CIRCUIT

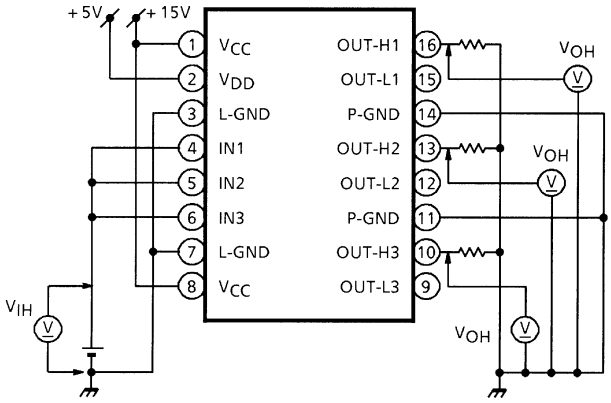
(1) I_{IH}



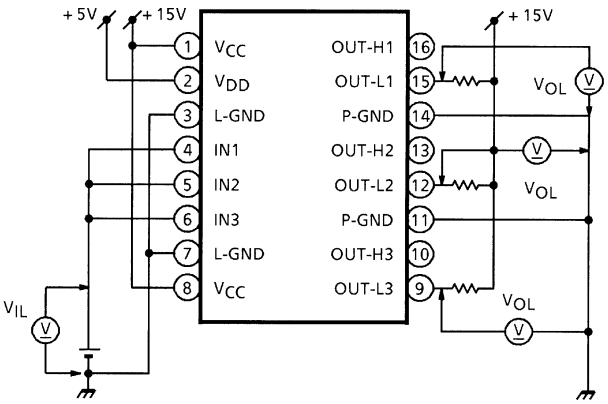
(2) I_{IL}



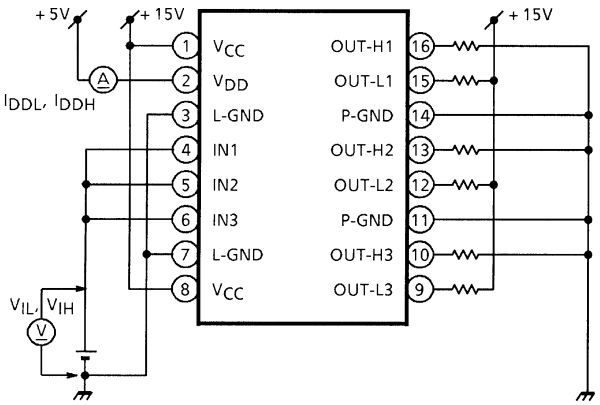
(3) V_{IH}, V_{OH}



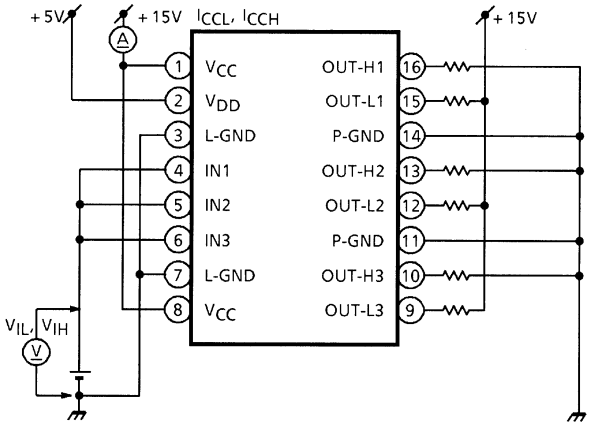
(4) V_{IL}, V_{OL}



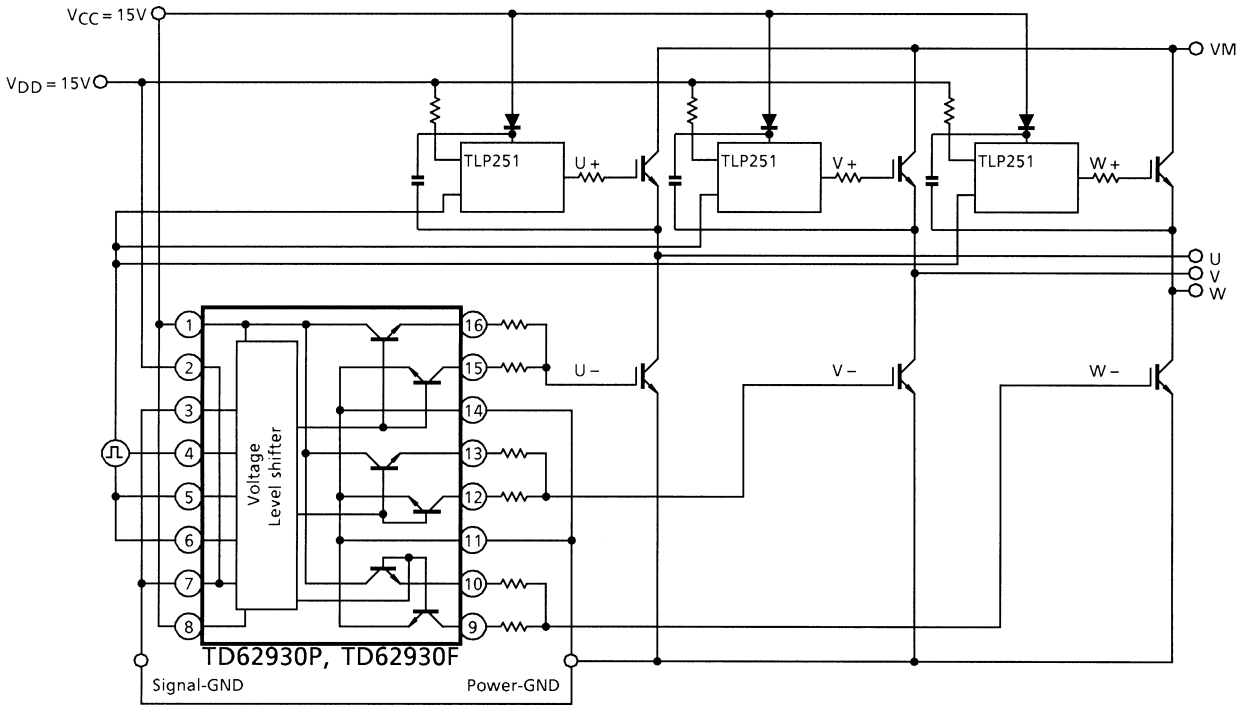
(5) I_{DDL}, I_{DDH}



(6) I_{CCL}, I_{CCH}



APPLICATION CIRCUIT

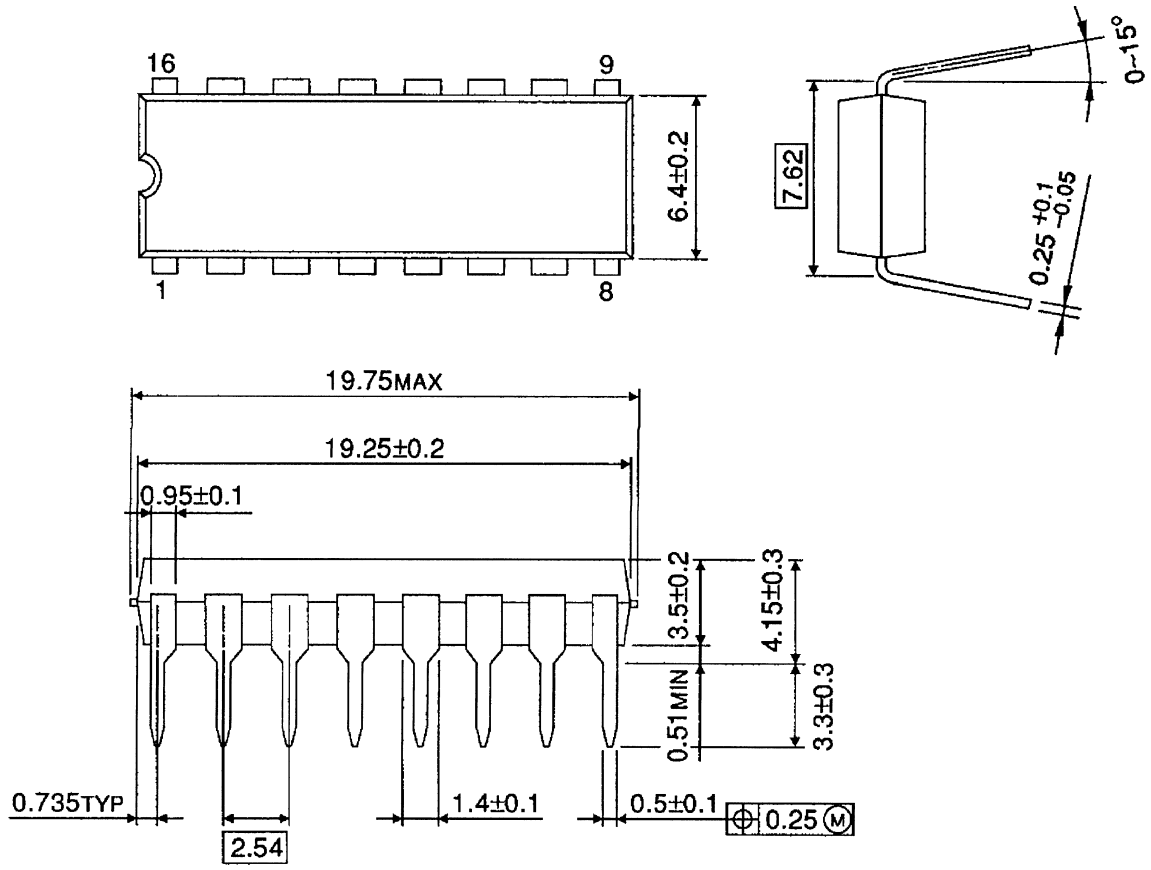


PRECAUTIONS for USING

This IC does not integrate protection circuits such as overcurrent and overvoltage protectors.
Thus, if excess current or voltage is applied to the IC, the IC may be damaged. Please design the IC so that excess current or voltage will not be applied to the IC.
Utmost care is necessary in the design of the output line, V_{CC} and GND (L−GND, P−GND) line since IC may be destroyed due to short−circuit between outputs, air contamination fault, or fault by improper grounding.

PACKAGE DIMENSIONS

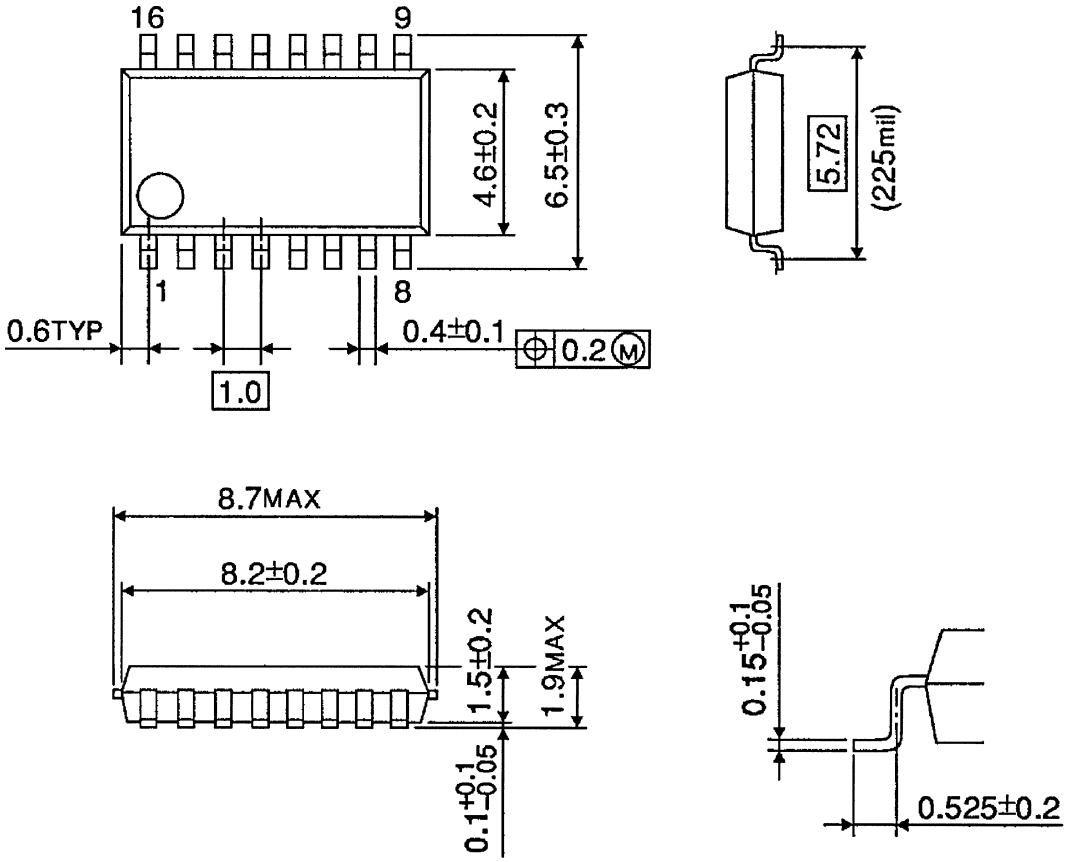
DIP16−P−300−2.54A Unit: mm



Weight: 1.11 g (Typ.)

PACKAGE DIMENSIONS

SSOP16−P−225−1.00A Unit: mm



Weight: 0.14 g (Typ.)

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000707EBA

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