

TOSHIBA CMOS LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TC75W55FU, TC75W55FK**DUAL OPERATIONAL AMPLIFIER**

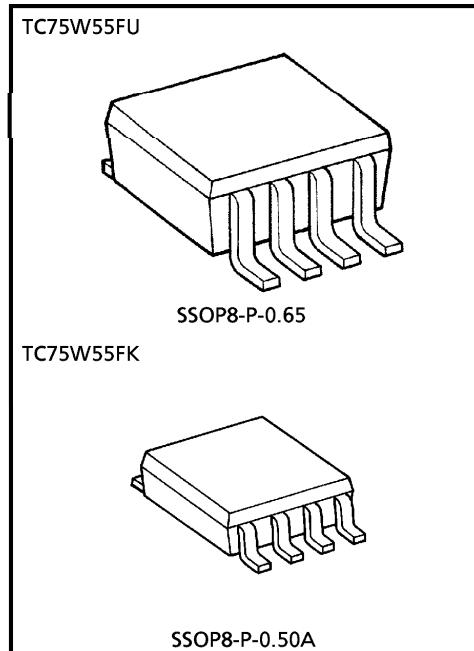
TC75W55 is a CMOS operational amplifier with low supply voltage, low supply current.

FEATURES

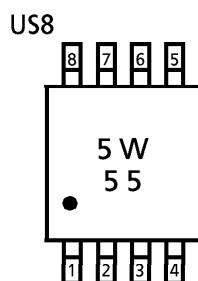
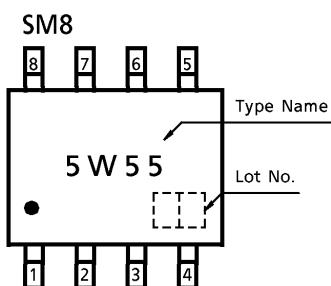
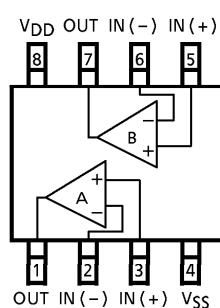
- Low supply voltage : $V_{DD} = \pm 0.9\sim 3.5V$ or $1.8\sim 7V$
- Low supply current : $I_{DD} (V_{DD} = 3V) = 20\mu A$ (Typ.)
- The internally phase compensated operational amplifier.
- Small package

MAXIMUM RATINGS ($T_a = 25^\circ C$)

CHARACTERISTIC	SYMBOL	RATING	N
Supply Voltage	V_{DD}, V_{SS}	7	V
Differential Input Voltage	DV_{IN}	± 7	V
Input Voltage	V_{IN}	$V_{DD}\sim V_{SS}$	V
Power Dissipation	P_D	250 (SM8) 200 (US8)	mW
Operating Temperature	T_{opr}	-40~85	$^\circ C$
Storage Temperature	T_{stg}	-55~125	$^\circ C$



Weight
SSOP8-P-0.65 : 0.021g (Typ.)
SSOP8-P-0.50A : 0.01g (Typ.)

MARKING (TOP VIEW)**PIN CONNECTION (TOP VIEW)**

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ELECTRICAL CHARACTERISTICSDC CHARACTERISTICS (V_{DD} = 3.0V, V_{SS} = GND, Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V _{IO}	1	R _S = 10kΩ	—	2	10	mV
Input Offset Current	I _{IO}	—	—	—	1	—	pA
Input Bias Current	I _I	—	—	—	1	—	pA
Common Mode Input Voltage	CMV _{IN}	2	—	0.0	—	2.1	V
Voltage Gain (Open Loop)	G _V	—	—	60	70	—	dB
Maximum Output Voltage	V _{OH}	3	R _L ≥ 1MΩ	2.9	—	—	V
	V _{OL}	4	R _L ≥ 1MΩ	—	—	0.1	
Common Mode Input Signal Rejection Ratio	CMRR	2	V _{IN} = 0.0~2.1V	60	70	—	dB
Supply Voltage Rejection Ratio	SVRR	1	V _{DD} = 1.8~7.0V	60	70	—	dB
Supply Current	I _{DD}	5	—	—	20	40	μA
Source Current	I _{source}	6	—	10	20	—	μA
Sink Current	I _{sink}	7	—	100	450	—	μA

DC CHARACTERISTICS (V_{DD} = 1.8V, V_{SS} = GND, Ta = 25°C)

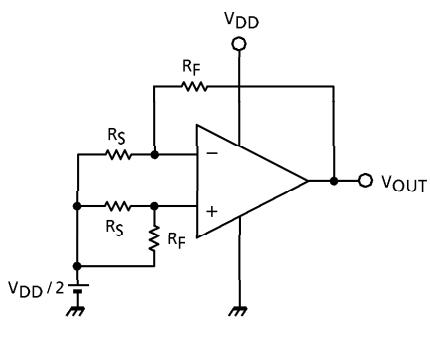
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V _{IO}	1	R _S = 100kΩ	—	2	10	mV
Input Offset Current	I _{IO}	—	—	—	1	—	pA
Input Bias Current	I _I	—	—	—	1	—	pA
Common Mode Input Voltage	CMV _{IN}	2	—	0.0	—	0.9	V
Voltage Gain (Open Loop)	G _V	—	—	60	70	—	dB
Maximum Output Voltage	V _{OH}	3	R _L ≥ 1MΩ	1.7	—	—	V
	V _{OL}	4	R _L ≥ 1MΩ	—	—	0.1	
Supply Current	I _{DD}	5	—	—	16	32	μA
Source Current	I _{source}	6	—	8	16	—	μA
Sink Current	I _{sink}	7	—	100	400	—	μA

AC CHARACTERISTICS (V_{DD} = 3.0V, V_{SS} = GND, Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Slew Rate	SR	—	—	—	0.08	—	V/μs
Unity Gain Cross Frequency	f _T	—	—	—	160	—	kHz

AC CHARACTERISTICS (V_{DD} = 1.8V, V_{SS} = GND, Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Slew Rate	SR	—	—	—	0.06	—	V/μs
Unity Gain Cross Frequency	f _T	—	—	—	140	—	kHz

TEST CIRCUIT**1. SVRR, V_{IO}** **• SVRR**

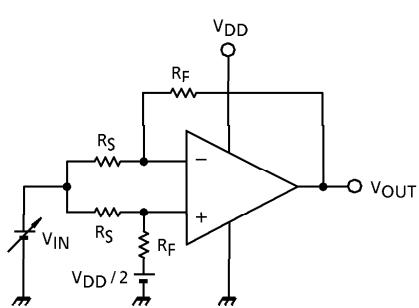
$V_{DD} = 1.8V : V_{DD} = V_{DD1}, V_{OUT} = V_{OUT1}$

$V_{DD} = 7.0V : V_{DD} = V_{DD2}, V_{OUT} = V_{OUT2}$

$$SVRR = 20\log \left(\left| \frac{V_{OUT1} - V_{OUT2}}{V_{DD1} - V_{DD2}} \right| \times \frac{R_S}{R_F + R_S} \right)$$

• V_{IO}

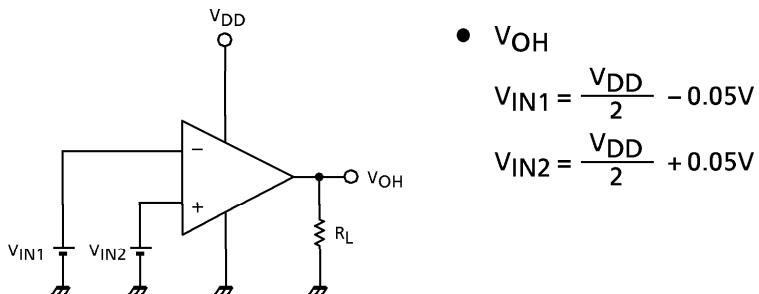
$$V_{IO} = \left(V_{OUT} - \frac{V_{DD}}{2} \right) \times \frac{R_S}{R_F + R_S}$$

2. CMRR, CMV_{IN} **• CMRR**

$V_{IN} = 0.0V : V_{IN} = V_{IN1}, V_{OUT} = V_{OUT1}$

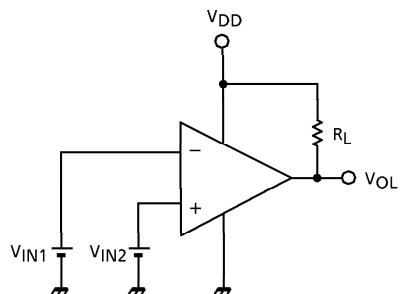
$V_{IN} = 2.1V : V_{IN} = V_{IN2}, V_{OUT} = V_{OUT2}$

$$CMRR = 20\log \left(\left| \frac{V_{OUT1} - V_{OUT2}}{V_{IN1} - V_{IN2}} \right| \times \frac{R_S}{R_F + R_S} \right)$$

• CMV_{IN} **3. V_{OH}** **• V_{OH}**

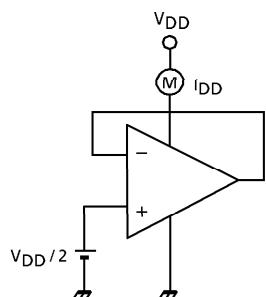
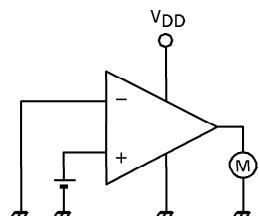
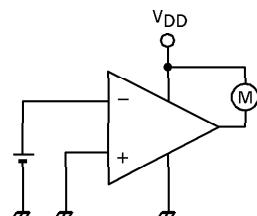
$$V_{IN1} = \frac{V_{DD}}{2} - 0.05V$$

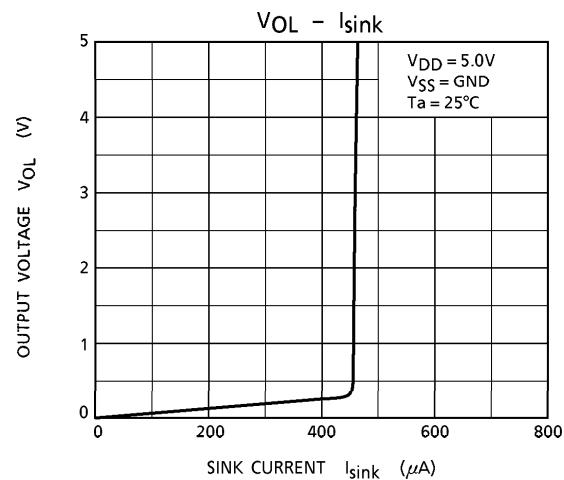
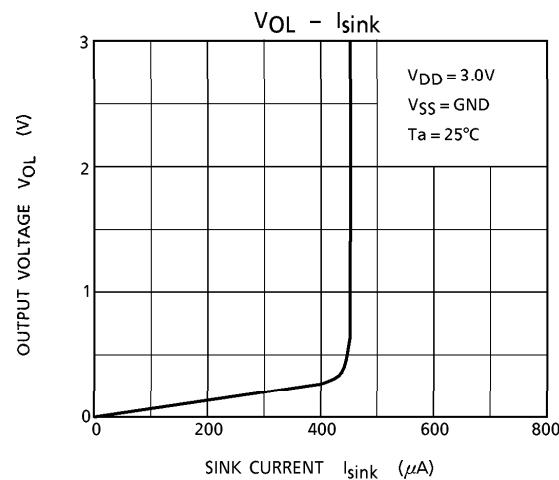
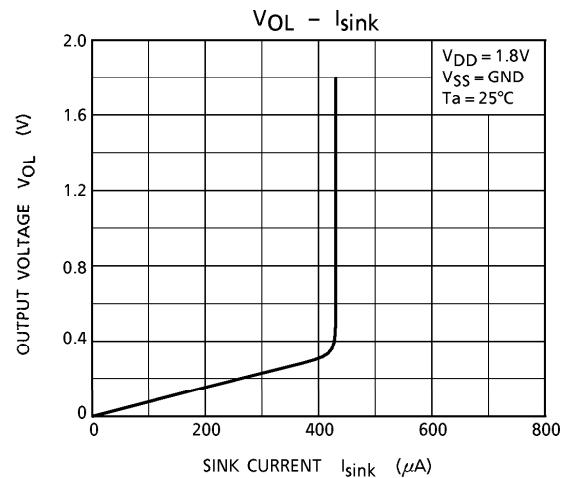
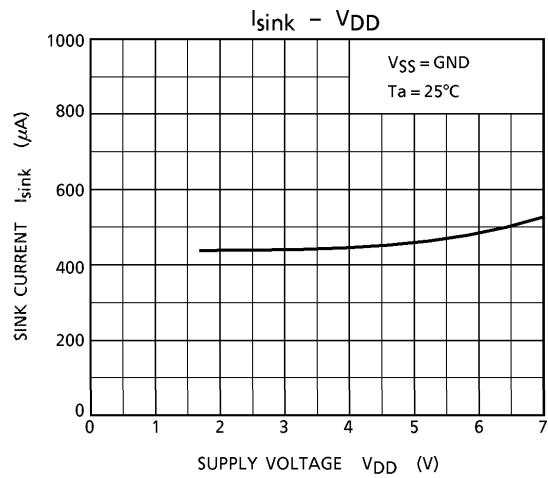
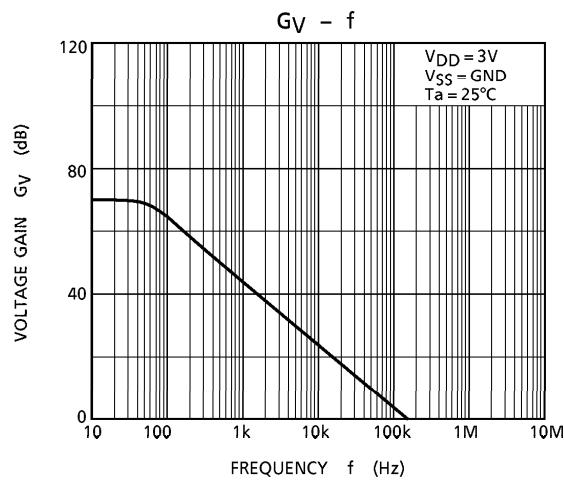
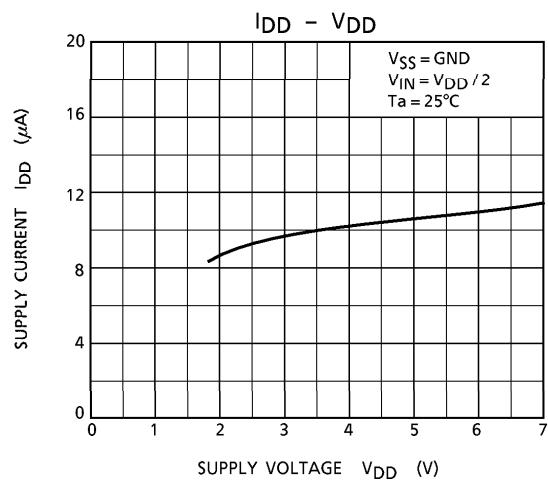
$$V_{IN2} = \frac{V_{DD}}{2} + 0.05V$$

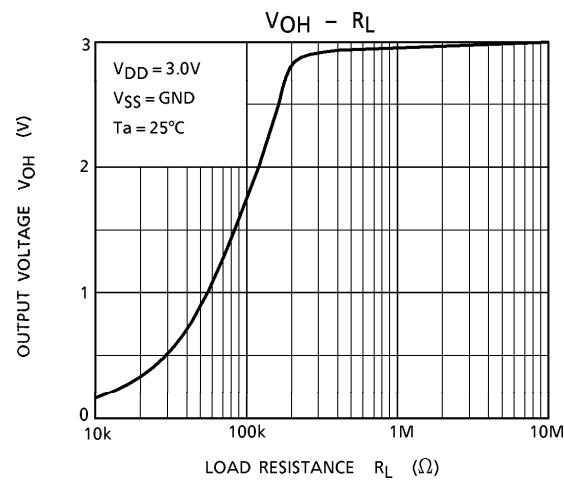
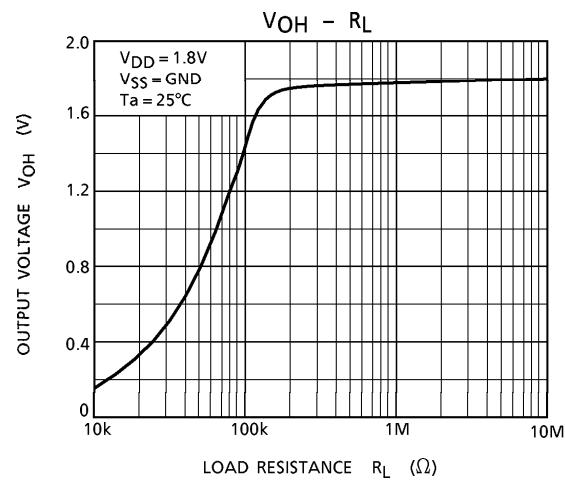
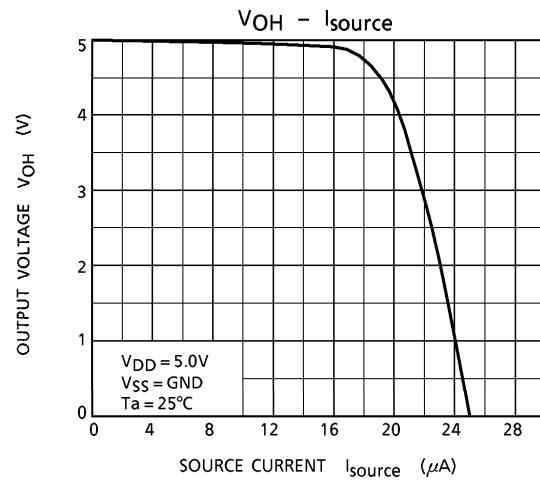
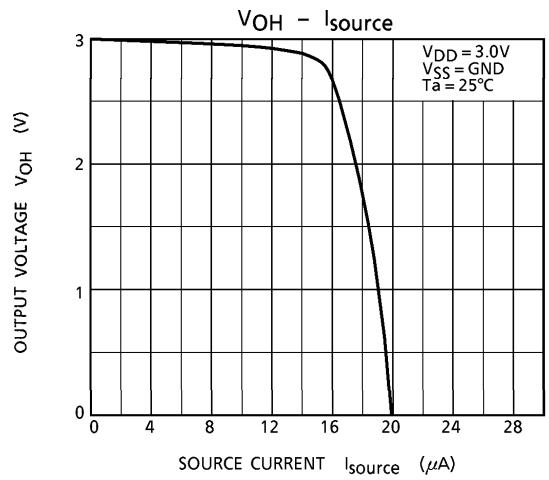
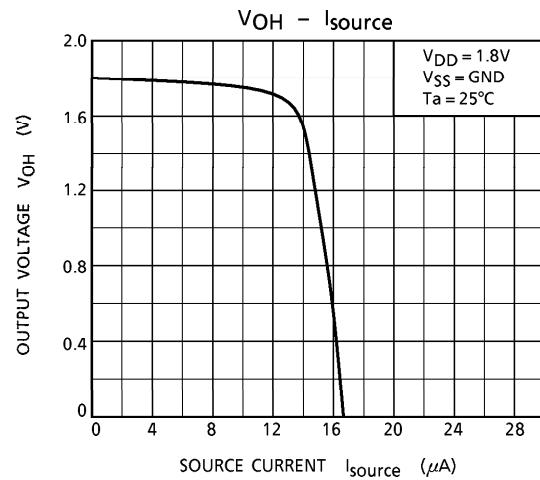
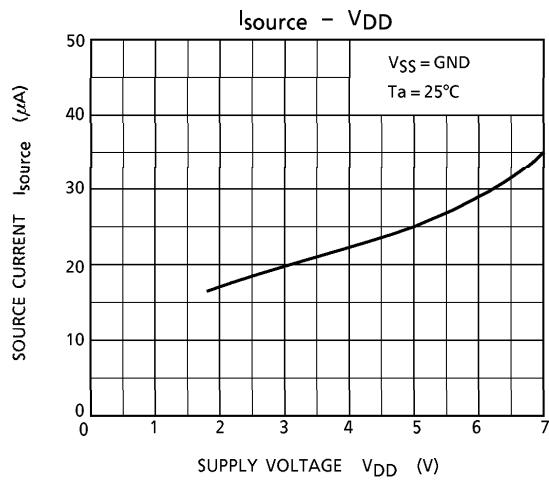
4. V_{OL}  $\bullet V_{OL}$

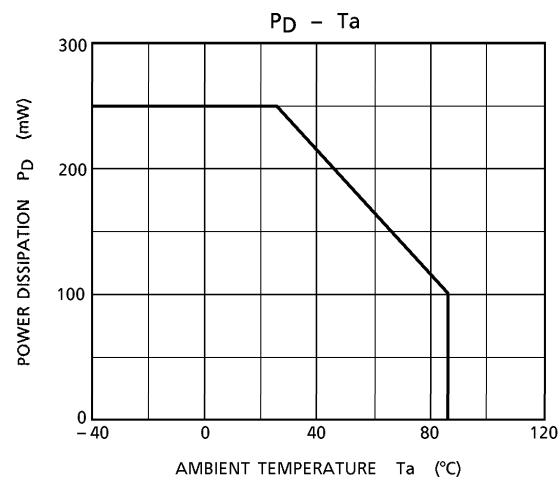
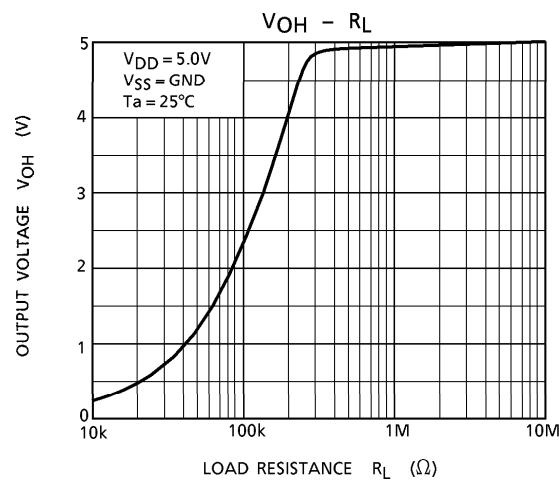
$$V_{IN1} = \frac{V_{DD}}{2} + 0.05V$$

$$V_{IN2} = \frac{V_{DD}}{2} - 0.05V$$

5. I_{DD} 6. I_{source} 7. I_{sink} 

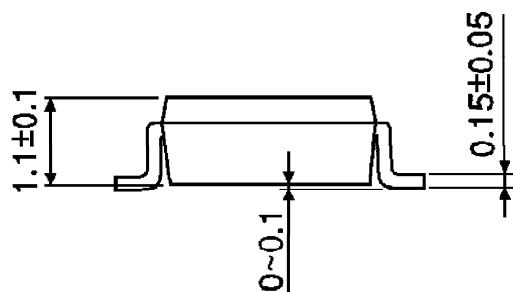
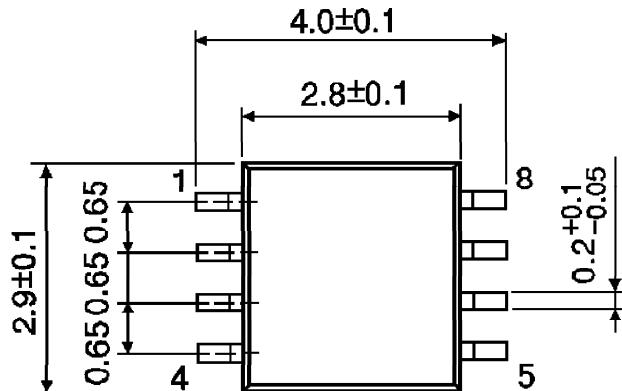






OUTLINE DRAWING
SSOP8-P-0.65

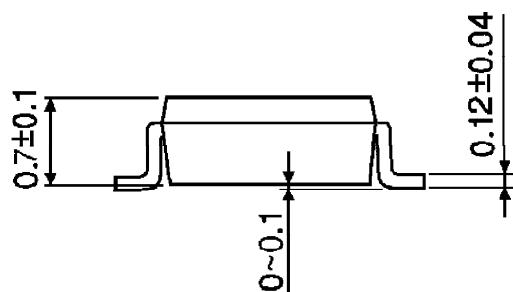
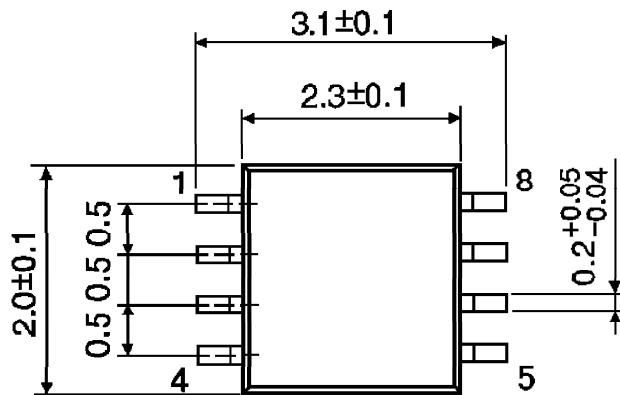
Unit : mm



Weight : 0.021g (Typ.)

OUTLINE DRAWING
SSOP8-P-0.50A

Unit : mm



Weight : 0.01g (Typ.)