

Description

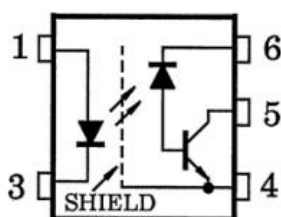
The CHEUK YUI mini flat coupler CYTLP109 is a small outline coupler, suitable for surface mount assembly. The CYTLP109 consists of a high-output-power infrared LED optically coupled to a high-speed photodiode-transistor chip.

The CYTLP109 is housed in the SO6 package and guarantees a creepage distance of ≥ 5.0 mm, a clearance of ≥ 5.0 mm and an insulation thickness of ≥ 0.4 mm. Therefore, the CYTLP109 meets the reinforced insulation class requirements of international safety standards.

Features

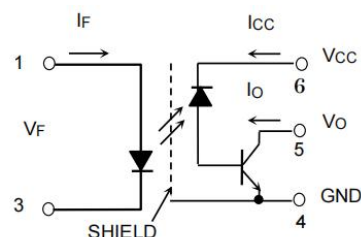
- TTL-compatible
- Switching speed: $t_{pHL} = 0.8 \mu s$, $t_{pLH} = 0.8 \mu s$ (max) @ $R_L = 1.9 k\Omega$
- Isolation voltage: 3750Vrms (min.)
- UL approved (NO.:E497745)

Pin Configurations(top view)



- 1.ANODE
- 3.CATHODE
- 4.EMITTER (GND)
- 5.COLLECTOR (OUTPUT)
- 6.VCC

Schematic



Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit
Input	Forward Current	I_F	20	mA
	Forward current derating	$\Delta I_F / ^\circ C$	-0.36	mA / $^\circ C$
	Pulse forward current (Note 1)	I_{FP}	40	mA
	Peak transient forward current (Note2)	I_{FPT}	1	A
	Reverse Voltage	V_R	5	V
	Power dissipation (Note 3)	P_D	40	mW
Output	Output Current	I_O	8	mA
	Output Current Derating ($T_a \geq 95 ^\circ C$)	$\Delta I_O / ^\circ C$	-0.3	mA / $^\circ C$
	Peak Output Current	I_{OP}	16	mA
	Supply Voltage	V_{CC}	-0.5~30	V
	Output Voltage	V_O	-0.5~20	V
	Output power dissipation (Note 4)	P_O	100	mW
Isolation Voltage (Note 5)		Viso	3750 (AC, 1min., R.H. $\leq 60\%$)	Vrms
Operating Temperature		T_{opr}	-55~+110	$^\circ C$
Storage Temperature		T_{stg}	-55~+125	$^\circ C$
Soldering Temperature		T_{sol}	260 (10s)	$^\circ C$

Note 1: 50 % duty cycle, 1 ms pulse width. Derate 0.72 mA / $^\circ C$ above 95 $^\circ C$.

Note 2: Pulse width $\leq 1 \mu s$, 300 pps.

Note 3: Derate 0.72 mW / $^\circ C$ above 95 $^\circ C$.

Note 4: Derate 1.8 mW / °C above 95 °C.

Note 5: Device considered a two-terminal device: Pins 1 and 3 shorted together, and pins 4, 5 and 6 shorted together.

Electro-optical Characteristics (Ta=25°C)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage	V_F	$I_F = 16\text{mA}$	1.2	1.4	1.6	V
	Forward voltage temperature coefficient	$\Delta V_F / ^\circ\text{C}$	$I_F = 16\text{mA}$		-1.6		mV/°C
	Reverse Current	I_R	$V_R = 3\text{V}$			10	μA
	Capacitance between terminals	C_T	$V = 0, f = 1\text{MHz}$		60		pF
Output	High level output current	$I_{OH(1)}$	$I_F = 0\text{mA}, V_{CC} = V_O = 5.5\text{V}$		3	500	nA
		$I_{OH(2)}$	$I_F = 0\text{mA}, V_{CC} = 30\text{V}, V_O = 20\text{V}$			5	μA
		I_{OH}	$I_F = 0\text{mA}, V_{CC} = 30\text{V}, V_O = 20\text{V}, T_a = 100^\circ\text{C}$			50	
	High level supply current	I_{CCH}	$I_F = 0\text{mA}, V_{CC} = 30\text{V}$		0.01	1	μA
	Low level supply current	I_{CCL}	$I_F = 16\text{mA}, V_O = \text{Open}, V_{CC} = 15\text{V}$			200	μA
	Current transfer ratio	CTR	$I_F = 16\text{mA}, V_{CC} = 4.5\text{V}, V_O = 0.4\text{V}$	20			%
	Low level output voltage	V_{OL}	$I_F = 16\text{mA}, V_{CC} = 4.5\text{V}, I_O = 24\text{mA}$			0.4	V

Isolation Characteristics (Ta=25°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Capacitance(input to output)	C_S	$V_S = 0, f = 1\text{MHz}$	-	0.8	-	pF
Isolation resistance	R_S	$V_S = 500\text{V}, R.H. \leq 60\%$	10^{12}	10^{14}	-	Ω
Isolation voltage	BV_S	AC, 1 minute	3750	-	-	Vrms

Switching Characteristics (Ta=25°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Propagation delay time (H → L)	t_{pHL}	$I_F = 0 \rightarrow 16\text{mA}, R_L = 1.9\text{k}\Omega$			0.8	μs
Propagation delay time (L → H)	t_{pLH}	$I_F = 16 \rightarrow 0\text{mA}, R_L = 1.9\text{k}\Omega$			0.5	
Common mode transient immunity at high output level	CM_H	$I_F = 0\text{mA}, V_{CM} = 400\text{V}_{p-p}, R_L = 4.1\text{k}\Omega$	5000			V/μs
Common mode transient Immunity at low output level	CM_L	$I_F = 16\text{mA}, V_{CM} = 400\text{V}_{p-p}, R_L = 4.1\text{k}\Omega$	5000			

Note: CM_L is the maximum rate of fall of the common mode voltage that can be sustained with the output voltage in the logic low state ($V_O < 0.8\text{V}$). CM_H is the maximum rate of rise of the common mode voltage that can be sustained with the output voltage in the logic high state ($V_O > 2.0\text{V}$)

Fig. 1: Switching Time Test Circuit and Waveform

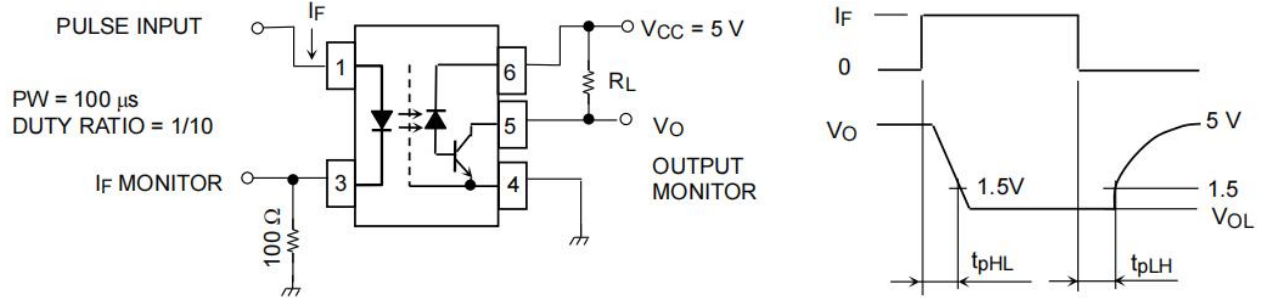
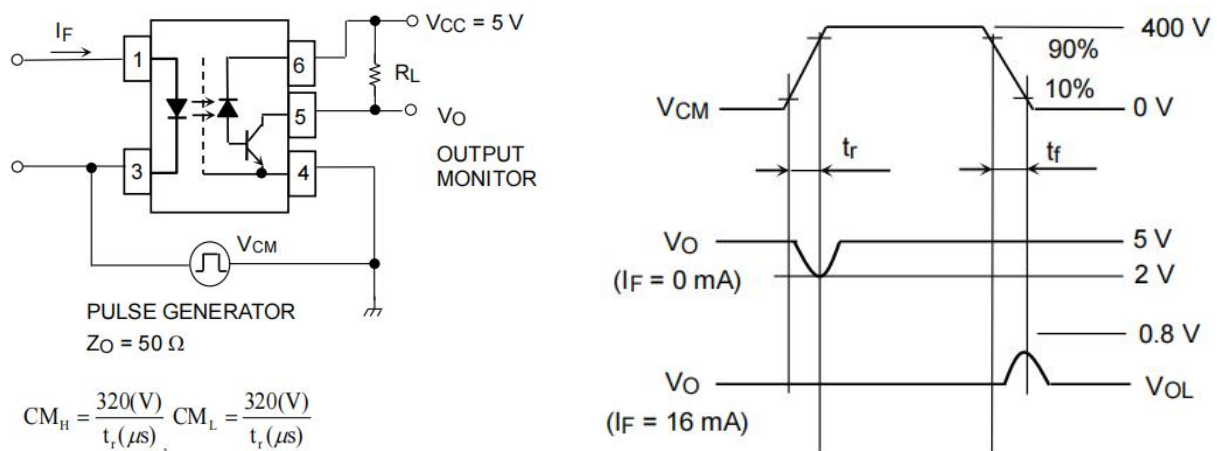
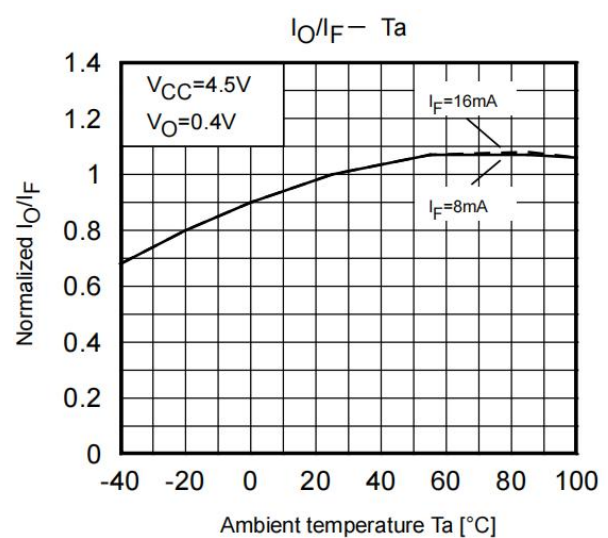
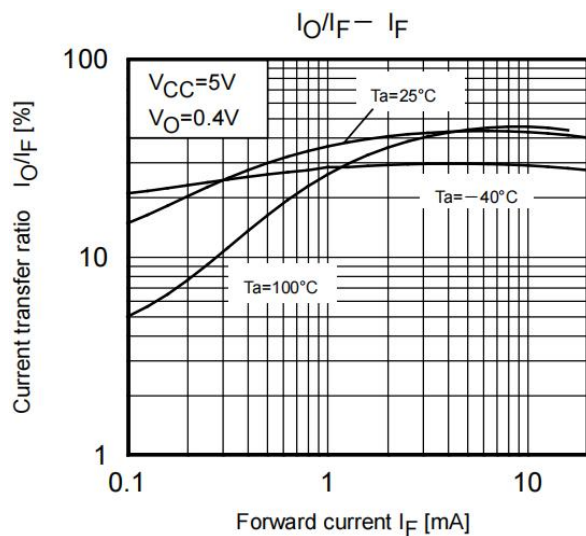
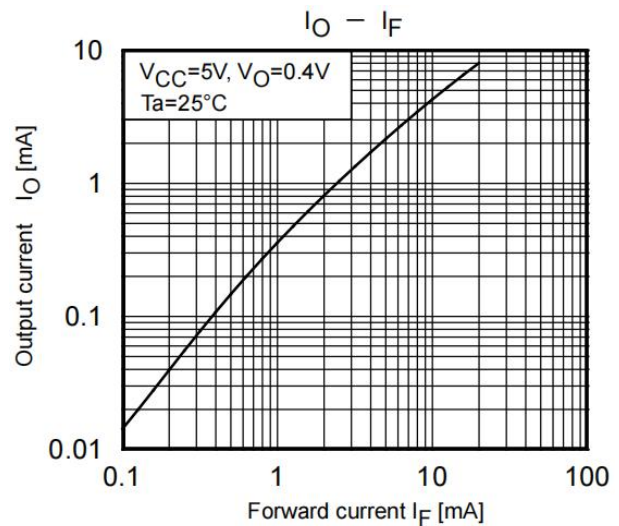
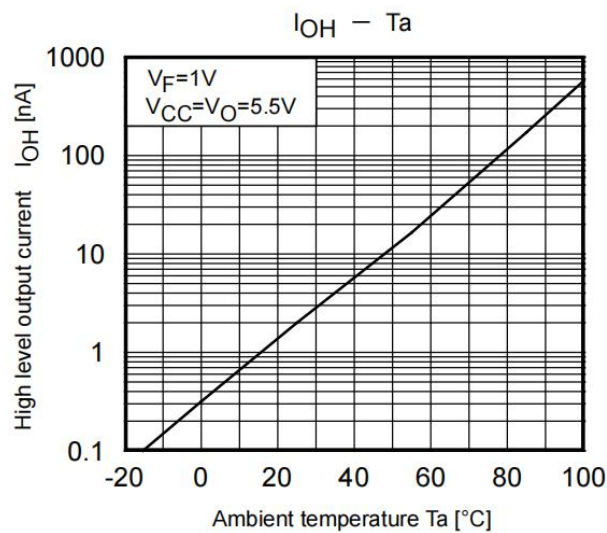
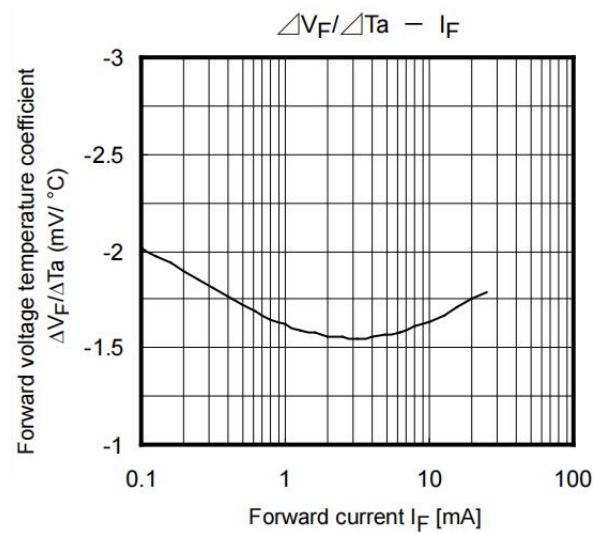
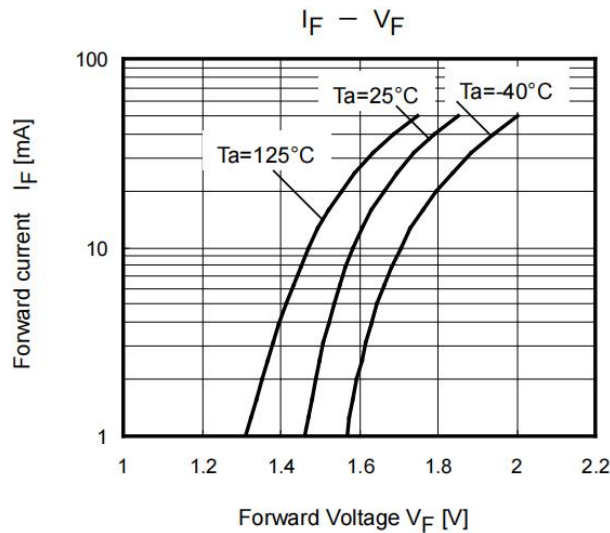
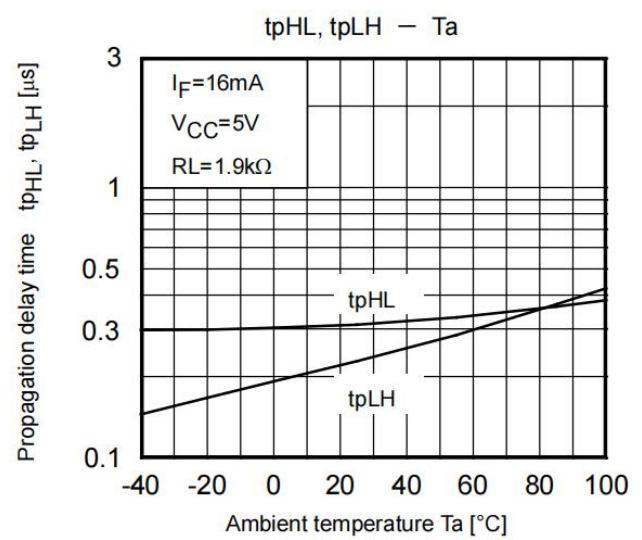
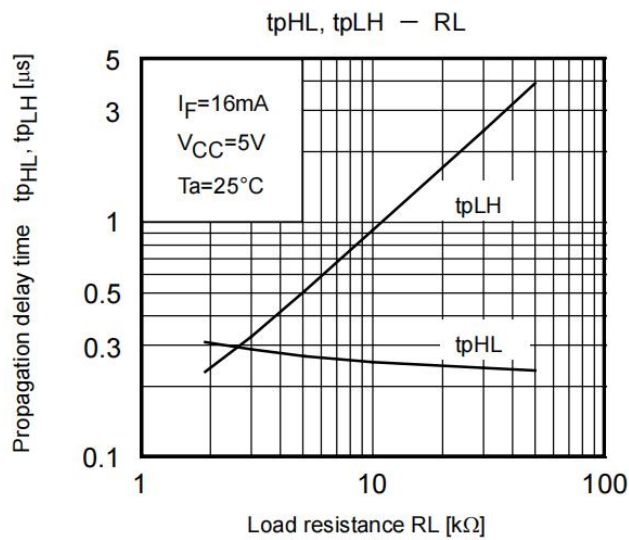
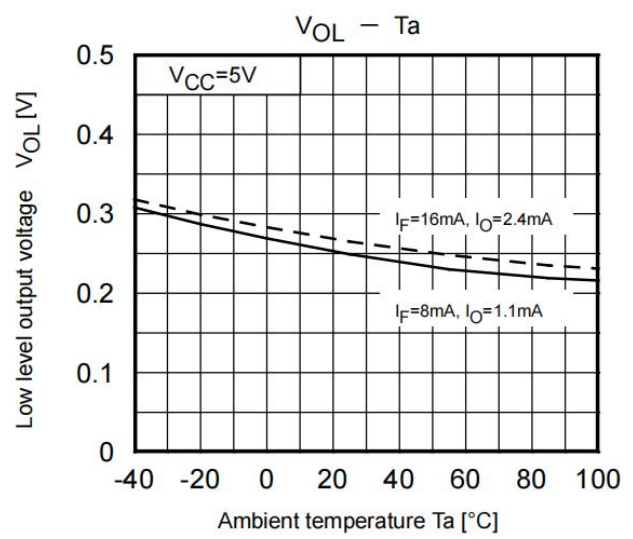
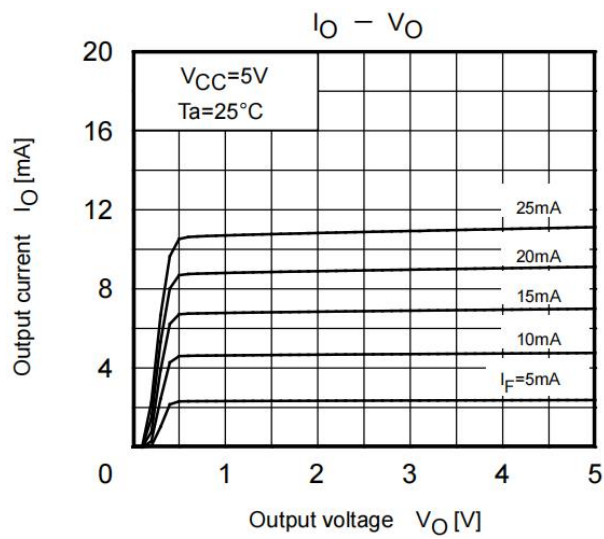


Fig. 2: Common Mode Transient Immunity Test Circuit and Waveform

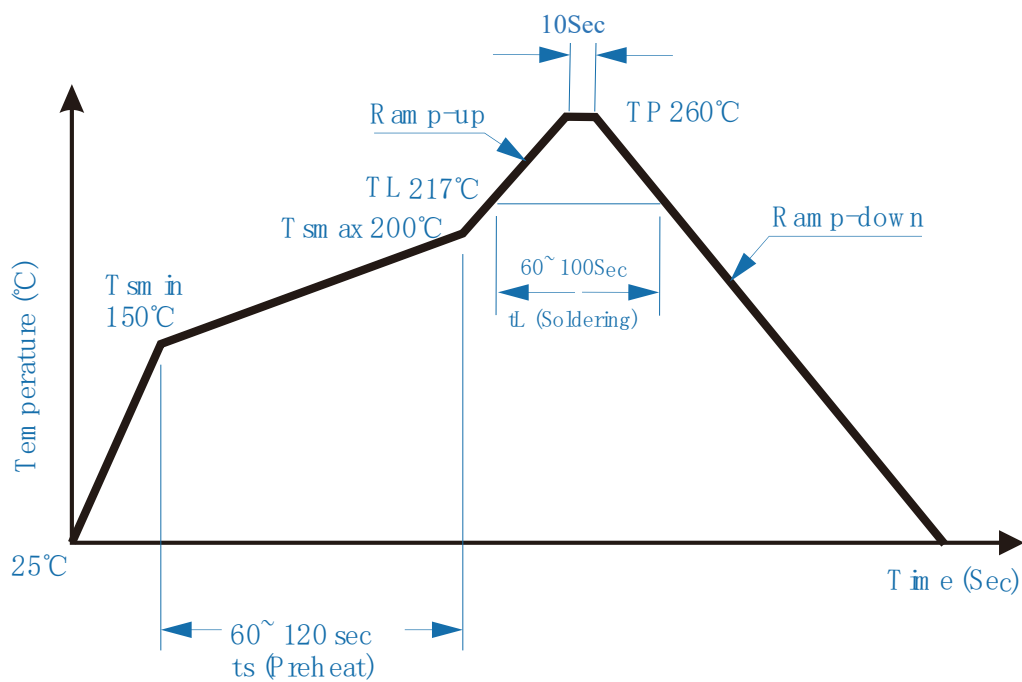


Characteristic curve

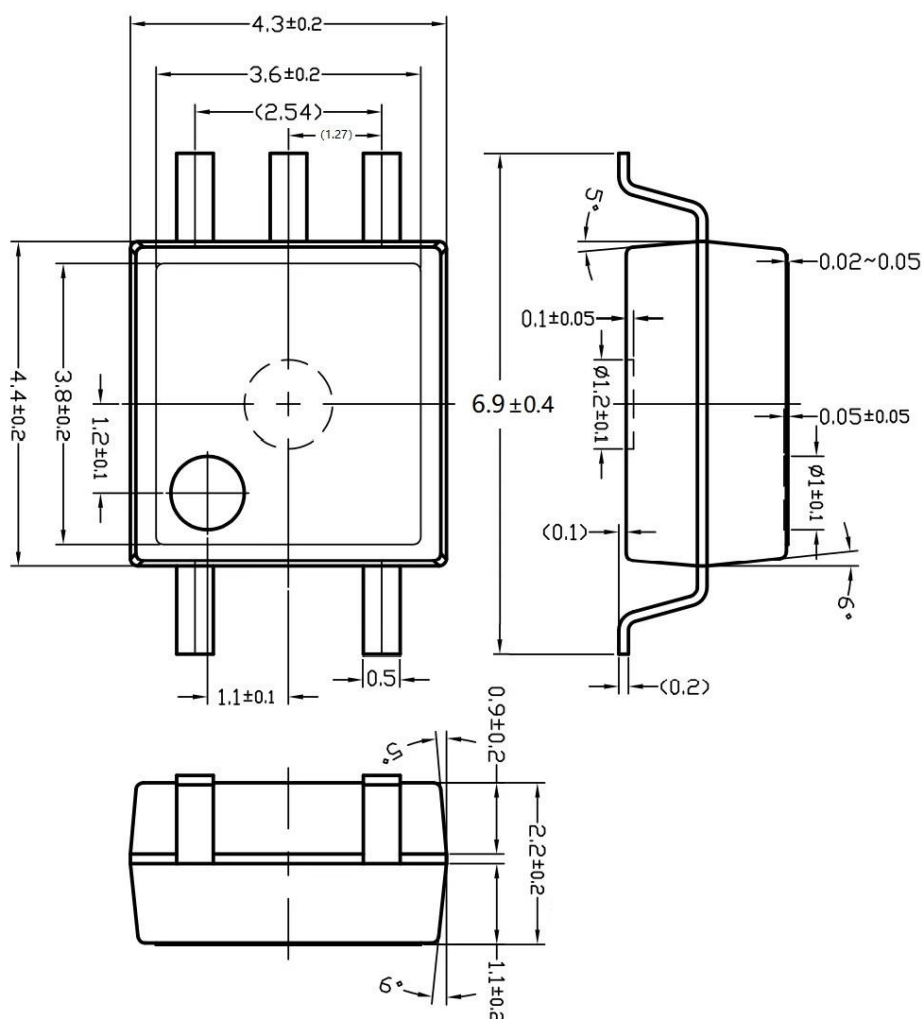




Solder Reflow Profile



Outline Dimension



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