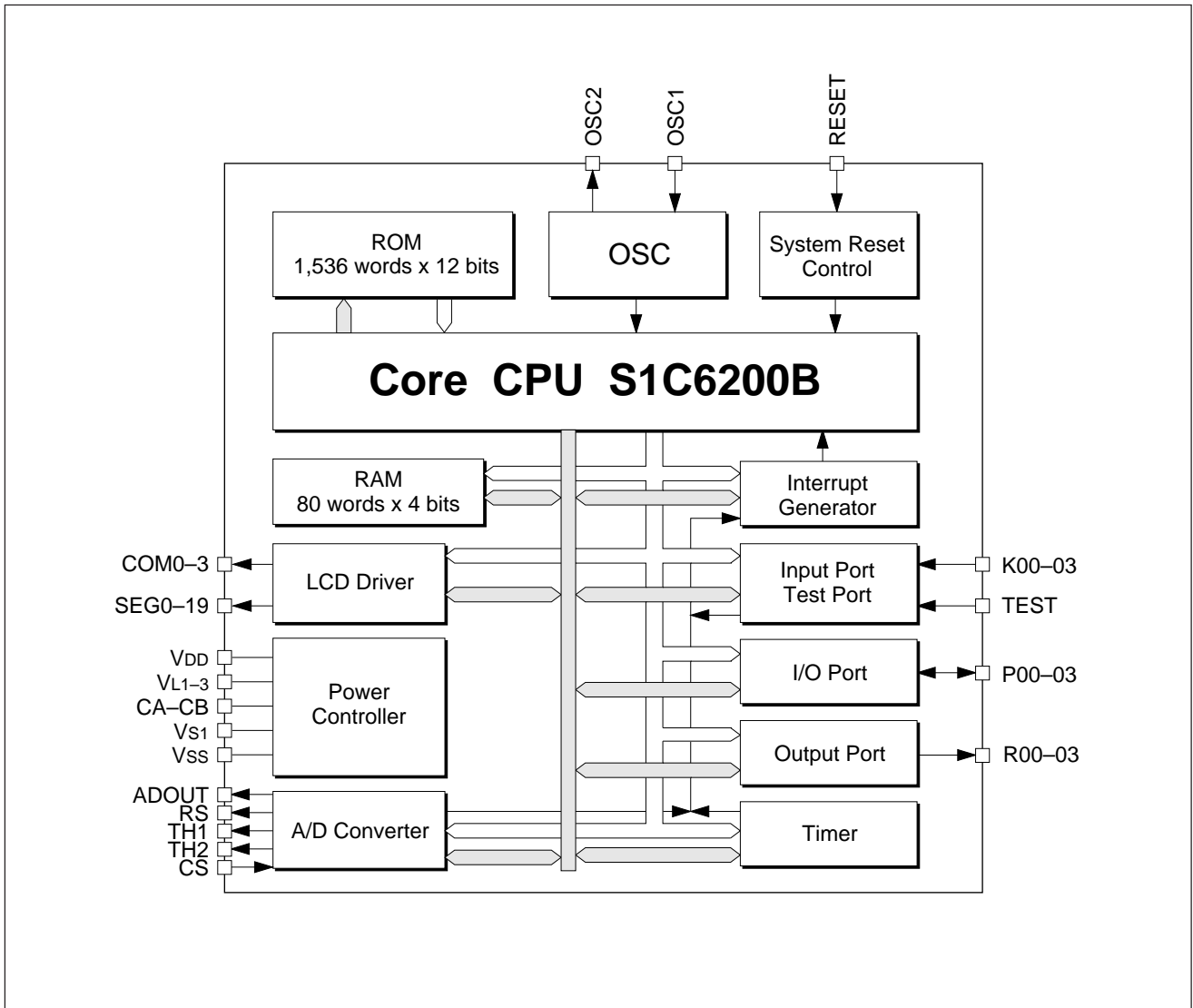
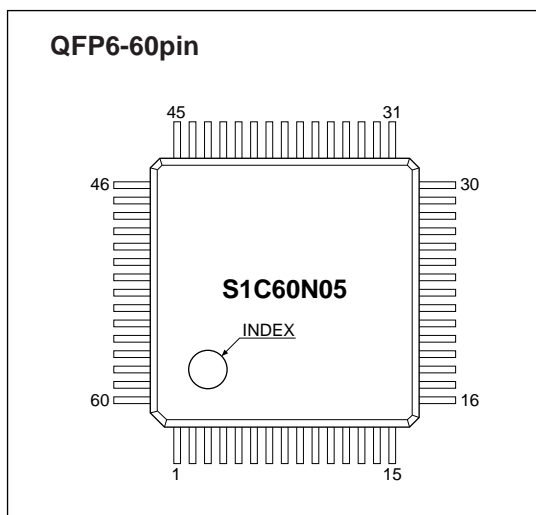


S1C60N05

■ BLOCK DIAGRAM



■ PIN CONFIGURATION



Pin No.	Pin name	Pin No.	Pin name	Pin No.	Pin name	Pin No.	Pin name
1	N.C.	16	N.C.	31	TEST	46	VL3
2	N.C.	17	ADOUT	32	RESET	47	VL2
3	K00	18	SEG0	33	SEG12	48	VL1
4	K01	19	SEG1	34	SEG13	49	CA
5	K02	20	SEG2	35	SEG14	50	CB
6	K03	21	SEG3	36	SEG15	51	Vss
7	R00	22	SEG4	37	SEG16	52	VDD
8	R01	23	SEG5	38	SEG17	53	OSC1
9	R02	24	SEG6	39	SEG18	54	OSC2
10	R03	25	SEG7	40	SEG19	55	Vs1
11	RS	26	SEG8	41	COM0	56	P00
12	TH1	27	SEG9	42	COM1	57	P01
13	TH2	28	SEG10	43	COM2	58	P02
14	CS	29	SEG11	44	COM3	59	P03
15	N.C.	30	N.C.	45	N.C.	60	N.C.

N.C. : No Connection

PIN DESCRIPTION

Pin name	Pin No.	In/Out	Function
VDD	52	(I)	Power source (+) terminal
VSS	51	(I)	Power source (-) terminal
VS1	55	O	Oscillation and internal logic system regulated voltage output terminal
VL1	48	O	LCD system regulated voltage output terminal
VL2	47	O	LCD system booster output terminal
VL3	46	O	LCD system booster output terminal
CA, CB	49, 50	-	Booster capacitor connecting terminal
OSC1	53	I	Crystal or CR oscillation input terminal
OSC2	54	O	Crystal or CR oscillation output terminal
K00-K03	3-6	I	Input terminal
P00-P03	56-59	I/O	I/O terminal
R00-R03	7-10	O	Output terminal
SEG0-19	18-29 33-40	O	LCD segment output terminal (convertible to DC output terminal by mask option)
COM0-3	41-44	O	LCD common output terminal
CS	14	I	A/D converter CR oscillation input terminal
RS	11	O	A/D converter CR oscillation output terminal
TH1, TH2	12, 13	O	A/D converter CR oscillation output terminal
ADOUT	17	O	A/D converter oscillation frequency output terminal
RESET	32	I	Initial setting input terminal
TEST	31	I	Test input terminal

OPTION LIST

1. DEVICE TYPE AND LCD VOLTAGE

1. EOC6005 (Normal Type <S1C60N05>) LCD 3 V

2. EOC6005 (Normal Type <S1C60N05>) LCD 4.5 V

3. EOC60L05 (Low Power Type <S1C60L05>) LCD 3 V

4. EOC60L05 (Low Power Type <S1C60L05>) LCD 4.5 V

2. MULTIPLE KEY ENTRY RESET

• COMBINATION 1. Not Use

2. Use K00, K01

3. Use K00, K01, K02

4. Use K00, K01, K02, K03

3. INTERRUPT NOISE REJECTOR

• K00-K03 1. Use 2. Not Use

4. INPUT PORT PULL DOWN RESISTOR

• K00 1. With Resistor 2. Gate Direct

• K01 1. With Resistor 2. Gate Direct

• K02 1. With Resistor 2. Gate Direct

• K03 1. With Resistor 2. Gate Direct

5. R00 SPECIFICATION

• OUTPUT TYPE 1. DC Output

2. Buzzer Inverted Output (Control bit is R00)

3. Buzzer Inverted Output (Control bit is R01)

4. FOUT Output

• FOUT OUTPUT SPACIFICATION

F1 1. 256[Hz] 2. 512[Hz]

3. 1,024[Hz] 4. 2,048[Hz]

5. 4,096[Hz]

F2 1. 1,512[Hz] 2. 1,024[Hz]

3. 2,048[Hz] 4. 4,096[Hz]

5. 8,192[Hz]

S1C60N05

F3	<input type="checkbox"/> 1. 1,024[Hz]	F4	<input type="checkbox"/> 1. 2,048[Hz]
	<input type="checkbox"/> 2. 2,048[Hz]		<input type="checkbox"/> 2. 4,096[Hz]
	<input type="checkbox"/> 3. 4,096[Hz]		<input type="checkbox"/> 3. 8,192[Hz]
	<input type="checkbox"/> 4. 8,192[Hz]		<input type="checkbox"/> 4. 16,384[Hz]
	<input type="checkbox"/> 5. 16,384[Hz]		<input type="checkbox"/> 5. 32,768[Hz]
• OUTPUT SPECIFICATION	<input type="checkbox"/> 1. Complementary	<input type="checkbox"/> 2. Pch-OpenDrain	
6. R01 SPECIFICATION			
• OUTPUT TYPE	<input type="checkbox"/> 1. DC Output	<input type="checkbox"/> 2. Buzzer Output	
• OUTPUT SPECIFICATION	<input type="checkbox"/> 1. Complementary	<input type="checkbox"/> 2. Pch-OpenDrain	
7. OUTPUT SPECIFICATION (R02, R03)			
• R02	<input type="checkbox"/> 1. Complementary	<input type="checkbox"/> 2. Pch-OpenDrain	
• R03	<input type="checkbox"/> 1. Complementary	<input type="checkbox"/> 2. Pch-OpenDrain	
8. I/O PORT SPECIFICATION			
• P00	<input type="checkbox"/> 1. Complementary	<input type="checkbox"/> 2. Pch-OpenDrain	
• P01	<input type="checkbox"/> 1. Complementary	<input type="checkbox"/> 2. Pch-OpenDrain	
• P02	<input type="checkbox"/> 1. Complementary	<input type="checkbox"/> 2. Pch-OpenDrain	
• P03	<input type="checkbox"/> 1. Complementary	<input type="checkbox"/> 2. Pch-OpenDrain	
9. LCD COMMON DUTY AND BIAS			
	<input type="checkbox"/> 1. 1/4 Duty 1/3 Bias		
	<input type="checkbox"/> 2. 1/3 Duty 1/3 Bias		
	<input type="checkbox"/> 3. 1/2 Duty 1/3 Bias		
	<input type="checkbox"/> 4. 1/4 Duty 1/2 Bias		
	<input type="checkbox"/> 5. 1/3 Duty 1/2 Bias		
	<input type="checkbox"/> 6. 1/2 Duty 1/2 Bias		
10. OSC1 SYSTEM CLOCK			
	<input type="checkbox"/> 1. Crystal		
	<input type="checkbox"/> 2. CR		

■ ELECTRICAL CHARACTERISTICS

● Absolute Maximum Ratings

(V_{DD}=0V)

Rating	Symbol	Value	Unit
Power voltage	V _{SS}	-5.0 to 0.5	V
Input voltage (1)	V _I	V _{SS} - 0.3 to 0.5	V
Input voltage (2)	V _I OSC	V _{SS} - 0.3 to 0.5	V
Operating temperature	T _{opr}	-20 to 70	°C
Storage temperature	T _{stg}	-65 to 150	°C
Soldering temperature / Time	T _{sol}	260°C, 10sec (lead section)	-
Allowable dissipation *1	P _D	250	mW

*1: In case of plastic package (QFP6-60pin).

● Recommended Operating Conditions

S1C60N05

(T_a=-20 to 70°C)

Condition	Symbol	Remark	Min.	Typ.	Max.	Unit
Power voltage	V _{SS}	V _{DD} =0V	-3.5	-3.0	-1.8	V
Oscillation frequency	f _{osc1}	Crystal oscillation		32.768		kHz
	f _{osc2}	CR oscillation, R=420kΩ		65	80	kHz
Booster capacitor	C ₁		0.1			μF
Capacitor between V _{DD} and V _{S1}	C ₂		0.1			μF

S1C60L05

(Ta=-20 to 70°C)

Condition	Symbol	Remark	Min.	Typ.	Max.	Unit
Power voltage	VSS	VDD=0V *1	-2.0	-1.5	-1.2	V
Oscillation frequency	fosc1	Crystal oscillation		32.768		kHz
	fosc2	CR oscillation, R=420kΩ		65	80	kHz
Booster capacitor	C1		0.1			μF
Capacitor between VDD and VS1	C2		0.1			μF

*1: When there is no software control during CR oscillation or crystal oscillation.

● DC Characteristics

S1C60N05

(Unless otherwise specified: VDD=0V, VSS=-3.0V, fosc=32.768kHz, Ta=25°C, VS1/VL1-VL3 are internal voltage, C1=C2=0.1μF)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
High level input voltage (1)	VIH1		0.2•VSS		0	V
High level input voltage (2)	VIH2		0.15•VSS		0	V
Low level input voltage (1)	VIL1		VSS		0.8•VSS	V
Low level input voltage (2)	VIL2		VSS		0.85•VSS	V
High level input current (1)	IiH1	VIH1=0V, No pull down resistor	0		0.5	μA
High level input current (2)	IiH2	VIH2=0V, With pull down resistor	10		40	μA
High level input current (3)	IiH3	VIH3=0V, With pull down resistor	30		100	μA
Low level input current	IiL	VIL=VSS	-0.5		0	μA
High level output current (1)	IOH1	VOH1=0.1•VSS			-1.0	mA
High level output current (2)	IOH2	VOH2=0.1•VSS (built-in protection resistance)			-1.0	mA
High level output current (3)	IOH3	VOH3=-1.0V			-1.0	mA
Low level output current (1)	IOL1	VOL1=0.9•VSS	3.0			mA
Low level output current (2)	IOL2	VOL2=0.9•VSS (built-in protection resistance)	3.0			mA
Low level output current (3)	IOL3	VOL3=-2.0V	3.0			mA
Common output current	IOH4	VOH4=-0.05V			-3	μA
	IOL4	VOL4=VL3+0.05V	3			μA
Segment output current (during LCD output)	IOH5	VOH5=-0.05V			-3	μA
	IOL5	VOL5=VL3+0.05V	3			μA
Segment output current (during DC output)	IOH6	VOH6=0.1•VSS			-300	μA
	IOL6	VOL6=0.9•VSS	300			μA

S1C60L05

(Unless otherwise specified: VDD=0V, VSS=-1.5V, fosc=32.768kHz, Ta=25°C, VS1/VL1-VL3 are internal voltage, C1=C2=0.1μF)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
High level input voltage (1)	VIH1		0.2•VSS		0	V
High level input voltage (2)	VIH2		0.15•VSS		0	V
Low level input voltage (1)	VIL1		VSS		0.8•VSS	V
Low level input voltage (2)	VIL2		VSS		0.85•VSS	V
High level input current (1)	IiH1	VIH1=0V, No pull down resistor	0		0.5	μA
High level input current (2)	IiH2	VIH2=0V, With pull down resistor	5.0		20	μA
High level input current (3)	IiH3	VIH3=0V, With pull down resistor	9.0		100	μA
Low level input current	IiL	VIL=VSS	-0.5		0	μA
High level output current (1)	IOH1	VOH1=0.1•VSS			-200	μA
High level output current (2)	IOH2	VOH2=0.1•VSS (built-in protection resistance)			-200	μA
High level output current (3)	IOH3	VOH3=-0.5V			-200	μA
Low level output current (1)	IOL1	VOL1=0.9•VSS	700			μA
Low level output current (2)	IOL2	VOL2=0.9•VSS (built-in protection resistance)	700			μA
Low level output current (3)	IOL3	VOL3=-1.0V	700			μA
Common output current	IOH4	VOH4=-0.05V			-3	μA
	IOL4	VOL4=VL3+0.05V	3			μA
Segment output current (during LCD output)	IOH5	VOH5=-0.05V			-3	μA
	IOL5	VOL5=VL3+0.05V	3			μA
Segment output current (during DC output)	IOH6	VOH6=0.1•VSS			-100	μA
	IOL6	VOL6=0.9•VSS	130			μA

S1C60N05

● Analog Circuit Characteristics and Current Consumption

S1C60N05 (Normal Operating Mode)

(Unless otherwise specified: $V_{DD}=0V$, $V_{SS}=-3.0V$, $f_{osc}=32.768kHz$, $T_a=25^\circ C$, $C_G=25pF$, $V_{S1}/V_{L1}-V_{L3}$ are internal voltage, $C_1=C_2=0.1\mu F$
<During A/D conversion: $R_S=49.8k\Omega$, $T_H=50k\Omega$, $C_{AD}=2,200pF$ >)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Internal voltage	V_{L1}	Connect $1M\Omega$ load resistor between V_{DD} and V_{L1} (without panel load)	$1/2 \cdot V_{L2}$ -0.1		$1/2 \cdot V_{L2}$ $\times 0.9$	V
	V_{L2}	Connect $1M\Omega$ load resistor between V_{DD} and V_{L2} (without panel load)		V_{SS}		V
	V_{L3}	Connect $1M\Omega$ load resistor between V_{DD} and V_{L3} (without panel load)	$3/2 \cdot V_{L2}$ -0.1		$3/2 \cdot V_{L2}$ $\times 0.9$	V
Power current consumption	I_{OP}	During HALT	Without panel load	0.8	1.4	μA
		During execution		1.5	5.0	μA
		During A/D conversion (HALT)		30	40	μA

S1C60N05 (Heavy Load Protection Mode)

(Unless otherwise specified: $V_{DD}=0V$, $V_{SS}=-3.0V$, $f_{osc}=32.768kHz$, $T_a=25^\circ C$, $C_G=25pF$, $V_{S1}/V_{L1}-V_{L3}$ are internal voltage, $C_1=C_2=0.1\mu F$
<During A/D conversion: $R_S=49.8k\Omega$, $T_H=50k\Omega$, $C_{AD}=2,200pF$ >)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Internal voltage	V_{L1}	Connect $1M\Omega$ load resistor between V_{DD} and V_{L1} (without panel load)	$1/2 \cdot V_{L2}$ -0.1		$1/2 \cdot V_{L2}$ $\times 0.85$	V
	V_{L2}	Connect $1M\Omega$ load resistor between V_{DD} and V_{L2} (without panel load)		V_{SS}		V
	V_{L3}	Connect $1M\Omega$ load resistor between V_{DD} and V_{L3} (without panel load)	$3/2 \cdot V_{L2}$ -0.1		$3/2 \cdot V_{L2}$ $\times 0.85$	V
Power current consumption	I_{OP}	During HALT	Without panel load	2.0	5.5	μA
		During execution		5.5	10.0	μA
		During A/D conversion (HALT)		31	41.5	μA

S1C60L05 (Normal Operating Mode)

(Unless otherwise specified: $V_{DD}=0V$, $V_{SS}=-1.5V$, $f_{osc}=32.768kHz$, $T_a=25^\circ C$, $C_G=25pF$, $V_{S1}/V_{L1}-V_{L3}$ are internal voltage, $C_1=C_2=0.1\mu F$
<During A/D conversion: $R_S=49.8k\Omega$, $T_H=50k\Omega$, $C_{AD}=2,200pF$ >)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Internal voltage	V_{L1}	Connect $1M\Omega$ load resistor between V_{DD} and V_{L1} (without panel load)		V_{SS}		V
	V_{L2}	Connect $1M\Omega$ load resistor between V_{DD} and V_{L2} (without panel load)	$2 \cdot V_{L1}$ -0.1		$2 \cdot V_{L1}$ $\times 0.9$	V
	V_{L3}	Connect $1M\Omega$ load resistor between V_{DD} and V_{L3} (without panel load)	$3 \cdot V_{L1}$ -0.1		$3 \cdot V_{L1}$ $\times 0.9$	V
Power current consumption	I_{OP}	During HALT	Without panel load	0.8	1.4	μA
		During execution		1.5	5.0	μA
		During A/D conversion (HALT)		30	40	μA

S1C60L05 (Heavy Load Protection Mode)

(Unless otherwise specified: $V_{DD}=0V$, $V_{SS}=-1.5V$, $f_{osc}=32.768kHz$, $T_a=25^\circ C$, $C_G=25pF$, $V_{S1}/V_{L1}-V_{L3}$ are internal voltage, $C_1=C_2=0.1\mu F$
<During A/D conversion: $R_S=49.8k\Omega$, $T_H=50k\Omega$, $C_{AD}=2,200pF$ >)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Internal voltage	V_{L1}	Connect $1M\Omega$ load resistor between V_{DD} and V_{L1} (without panel load)		V_{SS}		V
	V_{L2}	Connect $1M\Omega$ load resistor between V_{DD} and V_{L2} (without panel load)	$2 \cdot V_{L1}$ -0.1		$2 \cdot V_{L1}$ $\times 0.85$	V
	V_{L3}	Connect $1M\Omega$ load resistor between V_{DD} and V_{L3} (without panel load)	$3 \cdot V_{L1}$ -0.1		$3 \cdot V_{L1}$ $\times 0.85$	V
Power current consumption	I_{OP}	During HALT	Without panel load	2.0	5.5	μA
		During execution		5.5	10.0	μA
		During A/D conversion (HALT)		31	41.5	μA

S1C60N05 (CR, Normal Operating Mode)

(Unless otherwise specified: $V_{DD}=0V$, $V_{SS}=-3.0V$, $f_{osc}=65kHz$, $T_a=25^{\circ}C$, $C_G=25pF$, $V_{S1}/V_{L1}-V_{L3}$ are internal voltage, $C_1=C_2=0.1\mu F$
Recommended external resistance for CR oscillation= $420k\Omega$ <During A/D conversion: $R_S=49.8k\Omega$, $T_H=50k\Omega$, $C_{AD}=2,200pF$ >)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Internal voltage	VL1	Connect 1M Ω load resistor between V _{DD} and VL1 (without panel load)	1/2•VL2 -0.1		1/2•VL2 ×0.9	V
	VL2	Connect 1M Ω load resistor between V _{DD} and VL2 (without panel load)		V _{SS}		V
	VL3	Connect 1M Ω load resistor between V _{DD} and VL3 (without panel load)	3/2•VL2 -0.1		3/2•VL2 ×0.9	V
Power current consumption	IOP	During HALT	Without panel load	8.0	15.0	μA
		During execution		15.0	20.0	μA
		During A/D conversion (HALT)		37	52.5	μA

S1C60N05 (CR, Heavy Load Protection Mode)

(Unless otherwise specified: $V_{DD}=0V$, $V_{SS}=-3.0V$, $f_{osc}=65kHz$, $T_a=25^{\circ}C$, $C_G=25pF$, $V_{S1}/V_{L1}-V_{L3}$ are internal voltage, $C_1=C_2=0.1\mu F$
Recommended external resistance for CR oscillation= $420k\Omega$ <During A/D conversion: $R_S=49.8k\Omega$, $T_H=50k\Omega$, $C_{AD}=2,200pF$ >)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Internal voltage	VL1	Connect 1M Ω load resistor between V _{DD} and VL1 (without panel load)	1/2•VL2 -0.1		1/2•VL2 ×0.85	V
	VL2	Connect 1M Ω load resistor between V _{DD} and VL2 (without panel load)		V _{SS}		V
	VL3	Connect 1M Ω load resistor between V _{DD} and VL3 (without panel load)	3/2•VL2 -0.1		3/2•VL2 ×0.85	V
Power current consumption	IOP	During HALT	Without panel load	16.0	30.0	μA
		During execution		30.0	40.0	μA
		During A/D conversion (HALT)		45	57.5	μA

S1C60L05 (CR, Normal Operating Mode)

(Unless otherwise specified: $V_{DD}=0V$, $V_{SS}=-1.5V$, $f_{osc}=65kHz$, $T_a=25^{\circ}C$, $C_G=25pF$, $V_{S1}/V_{L1}-V_{L3}$ are internal voltage, $C_1=C_2=0.1\mu F$
Recommended external resistance for CR oscillation= $420k\Omega$ <During A/D conversion: $R_S=49.8k\Omega$, $T_H=50k\Omega$, $C_{AD}=2,200pF$ >)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Internal voltage	VL1	Connect 1M Ω load resistor between V _{DD} and VL1 (without panel load)		V _{SS}		V
	VL2	Connect 1M Ω load resistor between V _{DD} and VL2 (without panel load)	2•VL1 -0.1		2•VL1 ×0.9	V
	VL3	Connect 1M Ω load resistor between V _{DD} and VL3 (without panel load)	3•VL1 -0.1		3•VL1 ×0.9	V
Power current consumption	IOP	During HALT	Without panel load	8.0	15.0	μA
		During execution		15.0	20.0	μA
		During A/D conversion (HALT)		37	52.5	μA

S1C60L05 (CR, Heavy Load Protection Mode)

(Unless otherwise specified: $V_{DD}=0V$, $V_{SS}=-1.5V$, $f_{osc}=65kHz$, $T_a=25^{\circ}C$, $C_G=25pF$, $V_{S1}/V_{L1}-V_{L3}$ are internal voltage, $C_1=C_2=0.1\mu F$
Recommended external resistance for CR oscillation= $420k\Omega$ <During A/D conversion: $R_S=49.8k\Omega$, $T_H=50k\Omega$, $C_{AD}=2,200pF$ >)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Internal voltage	VL1	Connect 1M Ω load resistor between V _{DD} and VL1 (without panel load)		V _{SS}		V
	VL2	Connect 1M Ω load resistor between V _{DD} and VL2 (without panel load)	2•VL1 -0.1		2•VL1 ×0.85	V
	VL3	Connect 1M Ω load resistor between V _{DD} and VL3 (without panel load)	3•VL1 -0.1		3•VL1 ×0.85	V
Power current consumption	IOP	During HALT	Without panel load	16.0	30.0	μA
		During execution		30.0	40.0	μA
		During A/D conversion (HALT)		45	57.5	μA

S1C60N05

● Oscillation Characteristics

Oscillation characteristics will vary according to different conditions (elements used, board pattern). Use the following characteristics as reference values.

S1C60N05

(Unless otherwise specified: $V_{DD}=0V$, $V_{SS}=-3.0V$, Crystal: Q13MC146, $C_G=25pF$, $C_D=$ built-in, $T_a=25^{\circ}C$)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Oscillation start voltage	Vsta	$t_{sta} \leq 5sec$ (V_{SS})	-1.8			V
Oscillation stop voltage	Vstp	$t_{stp} \leq 10sec$ (V_{SS})	-1.8			V
Built-in capacitance (drain)	C_D	Including the parasitic capacity inside the IC		20		pF
Frequency/voltage deviation	$\partial f/\partial V$	$V_{SS}=-1.8$ to $-3.5V$			5	ppm
Frequency/IC deviation	$\partial f/\partial IC$		-10		10	ppm
Frequency adjustment range	$\partial f/\partial C_G$	$C_G=5$ to $25pF$	40			ppm
Harmonic oscillation start voltage	Vhho	$C_G=5pF$ (V_{SS})			-3.6	V
Allowable leak resistance	Rleak	Between OSC1 and V_{DD} , and between V_{SS} and OSC1	200			$M\Omega$

S1C60L05

(Unless otherwise specified: $V_{DD}=0V$, $V_{SS}=-1.5V$, Crystal: Q13MC146, $C_G=25pF$, $C_D=$ built-in, $T_a=25^{\circ}C$)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Oscillation start voltage	Vsta	$t_{sta} \leq 5sec$ (V_{SS})	-1.2			V
Oscillation stop voltage	Vstp	$t_{stp} \leq 10sec$ (V_{SS})	-1.2			V
Built-in capacitance (drain)	C_D	Including the parasitic capacity inside the IC		20		pF
Frequency/voltage deviation	$\partial f/\partial V$	$V_{SS}=-1.2$ to $-2.0V$ (-0.9) *1			5	ppm
Frequency/IC deviation	$\partial f/\partial IC$		-10		10	ppm
Frequency adjustment range	$\partial f/\partial C_G$	$C_G=5$ to $25pF$	40			ppm
Harmonic oscillation start voltage	Vhho	$C_G=5pF$ (V_{SS})			-2.0	V
Allowable leak resistance	Rleak	Between OSC1 and V_{DD} , and between V_{SS} and OSC1	200			$M\Omega$

*1: Items enclosed in parentheses () are those used when operating at heavy load protection mode.

S1C60N05 (CR)

(Unless otherwise specified: $V_{DD}=0V$, $V_{SS}=-3.0V$, $R_{CR}=480k\Omega$, $T_a=25^{\circ}C$)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Oscillation frequency dispersion	fosc		-20	65kHz	20	%
Oscillation start voltage	Vsta		-1.8			V
Oscillation start time	tsta	$V_{SS}=-1.8$ to $-3.5V$		3		mS
Oscillation stop voltage	Vstp		-1.8			V

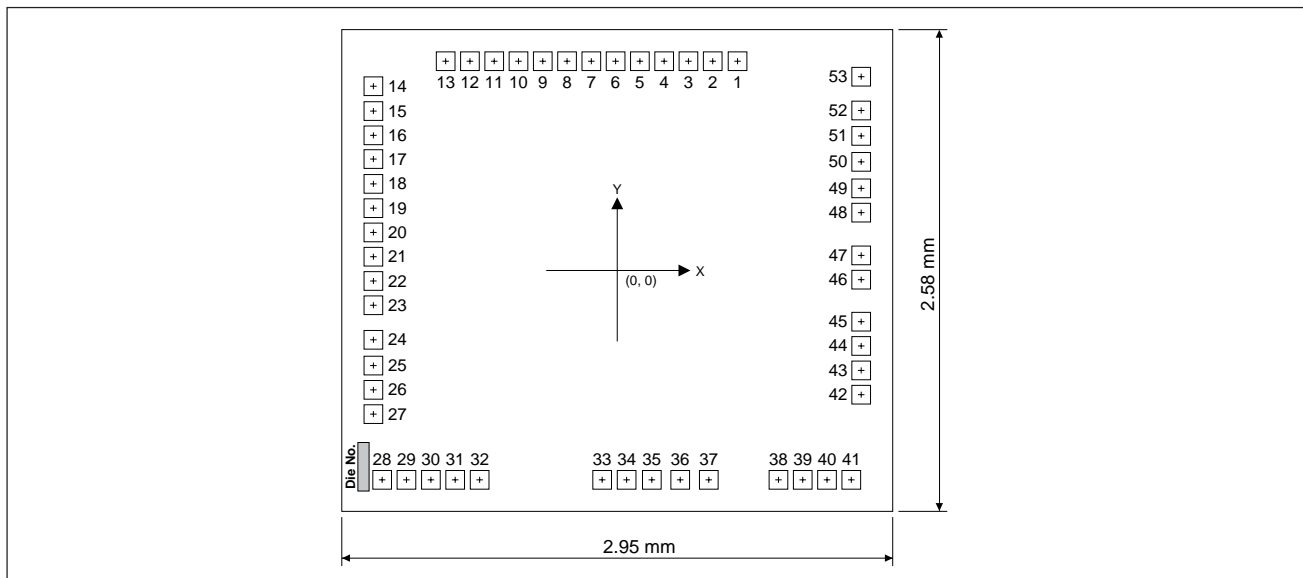
S1C60L05 (CR)

(Unless otherwise specified: $V_{DD}=0V$, $V_{SS}=-1.5V$, $R_{CR}=480k\Omega$, $T_a=25^{\circ}C$)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Oscillation frequency dispersion	fosc		-20	65kHz	20	%
Oscillation start voltage	Vsta		-1.2			V
Oscillation start time	tsta	$V_{SS}=-1.2$ to $-2.0V$		3		mS
Oscillation stop voltage	Vstp		-1.2			V

■ PAD LAYOUT

● Diagram of Pad Layout



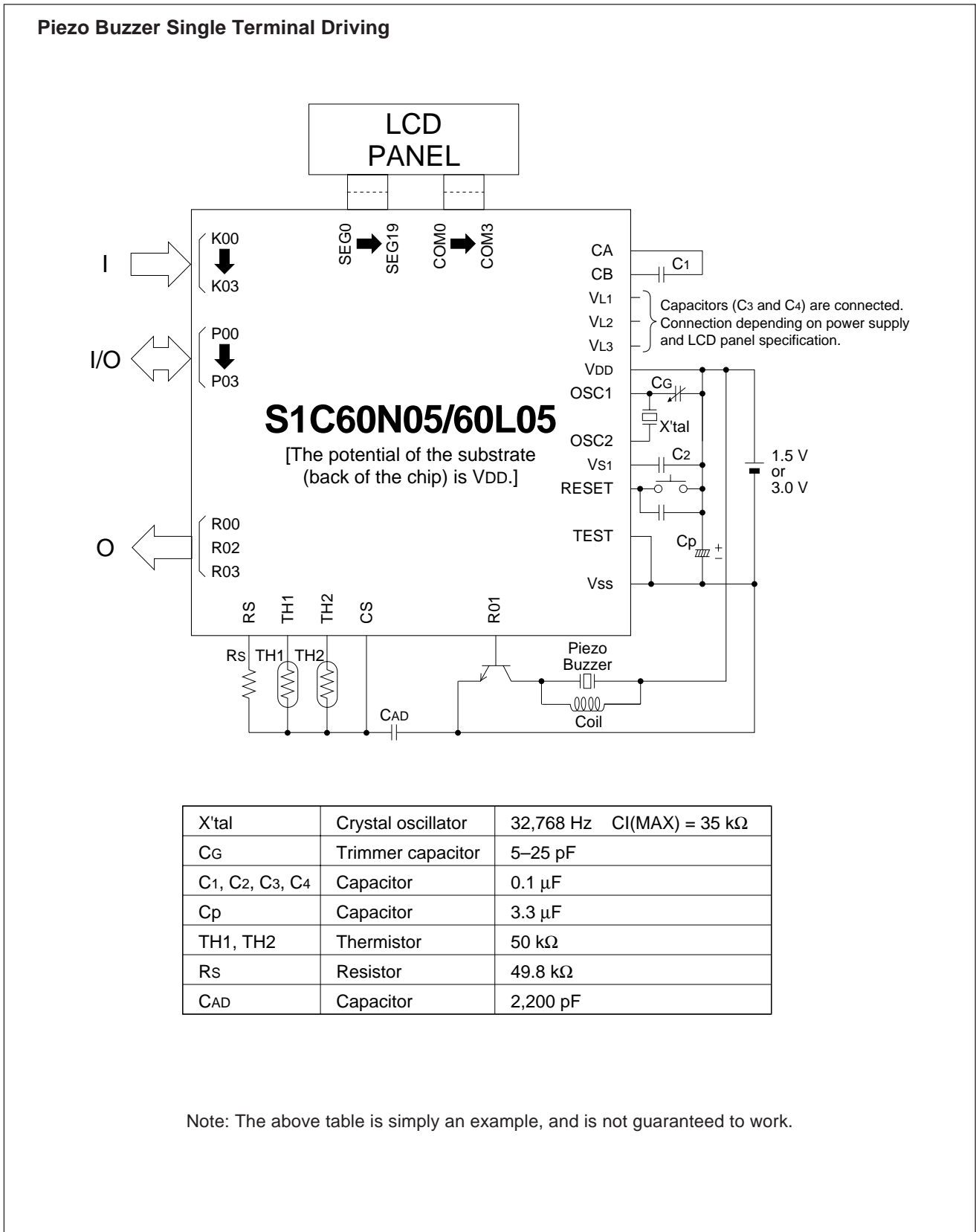
● Pad Coordinates

Pad No.	Pad name	X	Y	Pad No.	Pad name	X	Y
1	ADOUT	644	1,121	28	VL3	-1,259	-1,121
2	SEG0	511	1,121	29	VL2	-1,129	-1,121
3	SEG1	381	1,121	30	VL1	-998	-1,121
4	SEG2	251	1,121	31	CA	-868	-1,121
5	SEG3	121	1,121	32	CB	-737	-1,121
6	SEG4	-9	1,121	33	Vss	-81	-1,121
7	SEG5	-139	1,121	34	Vbd	50	-1,121
8	SEG6	-269	1,121	35	OSC1	185	-1,121
9	SEG7	-399	1,121	36	OSC2	337	-1,121
10	SEG8	-529	1,121	37	Vs1	490	-1,121
11	SEG9	-659	1,121	38	P00	863	-1,121
12	SEG10	-789	1,121	39	P01	993	-1,121
13	SEG11	-919	1,121	40	P02	1,123	-1,121
14	TEST	-1,306	987	41	P03	1,253	-1,121
15	RESET	-1,306	854	42	K00	1,306	-665
16	SEG12	-1,306	724	43	K01	1,306	-535
17	SEG13	-1,306	597	44	K02	1,306	-404
18	SEG14	-1,306	464	45	K03	1,306	-274
19	SEG15	-1,306	334	46	R00	1,306	-49
20	SEG16	-1,306	204	47	R01	1,306	81
21	SEG17	-1,306	74	48	R02	1,306	310
22	SEG18	-1,306	-56	49	R03	1,306	440
23	SEG19	-1,306	-186	50	RS	1,306	582
24	COM0	-1,306	-371	51	TH1	1,306	721
25	COM1	-1,306	-509	52	TH2	1,306	857
26	COM2	-1,306	-639	53	CS	1,306	1,038
27	COM3	-1,306	-769				

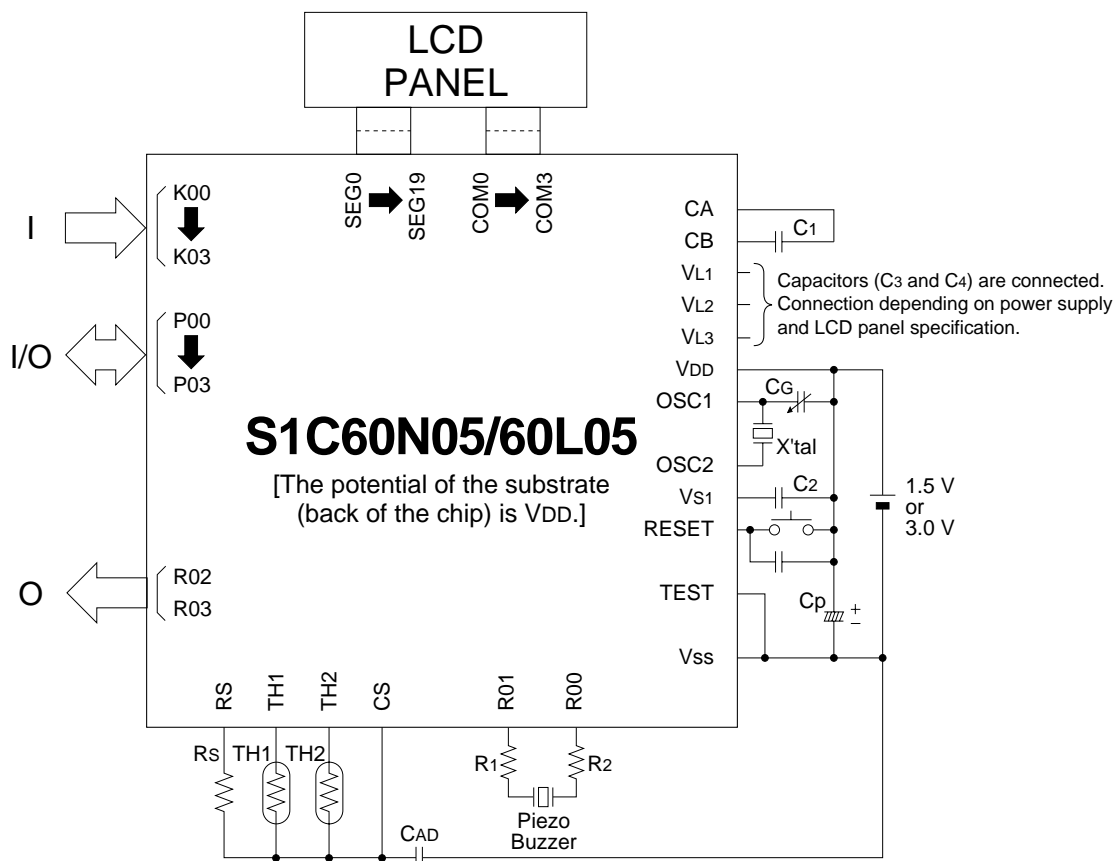
(Unit: μm)

S1C60N05

■ BASIC EXTERNAL CONNECTION DIAGRAM



Piezo Buzzer Direct Driving



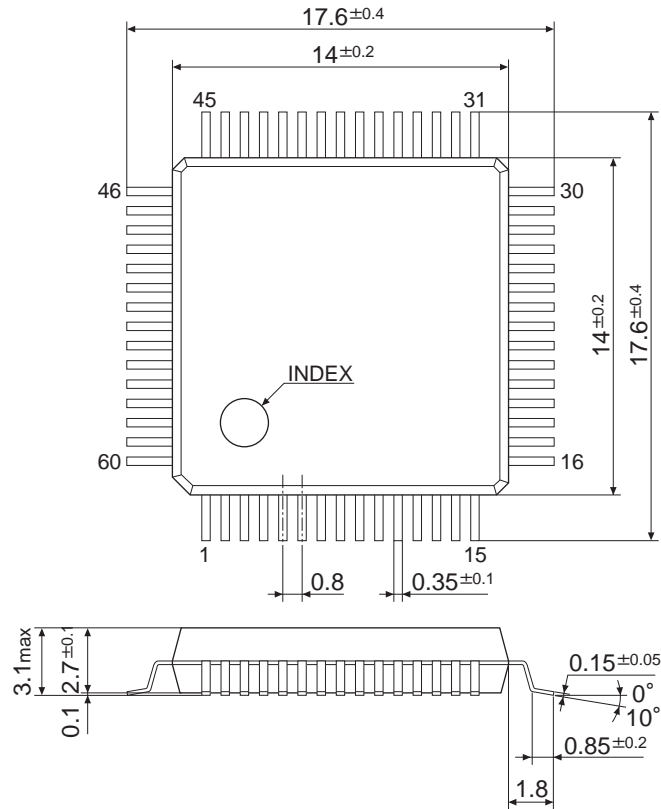
X'tal	Crystal oscillator	32,768 Hz	CI(MAX) = 35 kΩ
CG	Trimmer capacitor	5–25 pF	
C1, C2, C3, C4	Capacitor	0.1 μF	
Cp	Capacitor	3.3 μF	
TH1, TH2	Thermistor	50 kΩ	
Rs	Resistor	49.8 kΩ	
R1, R2	Resistor	100 Ω	
CAD	Capacitor	2,200 pF	

Note: The above table is simply an example, and is not guaranteed to work.

S1C60N05

■PACKAGE

Plastic QFP6-60pin



(Unit: mm)

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