PC
ON CIRCUITS INC.

SM5610

IC for Quartz Crystal Oscillating Module

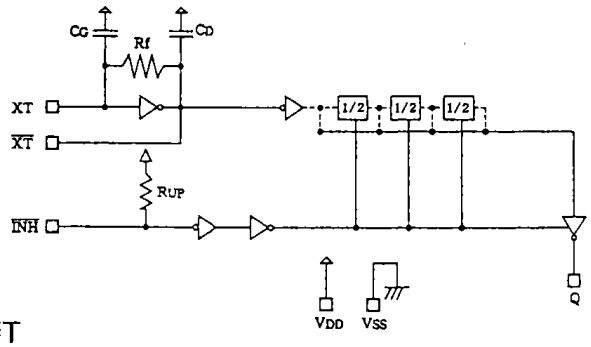
RVIEW

610 series are C-MOS ICs for quartz crystal oscillating module. Each IC has a high
y oscillating circuit and dividers with low current consumption.
many kinds of type, capacitor for oscillation on chip or not, output frequency: f0
ntal), f0/2, f0/4, or f0/8, and I/O level TTL or CMOS (Refer to the SERIES TABLE.

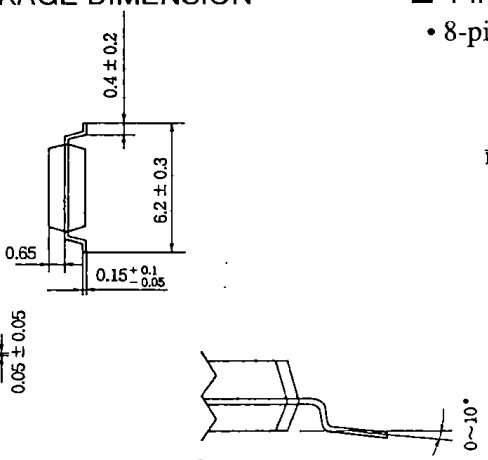
TURES

erating voltage (4V - 6V)
lt-in feed back resistance of oscillation circuit
tate function
v current consumption
p form, 8-pin SOP
lybdenum gate C-MOS
fundamental wave use

■ BLOCK DIAGRAM

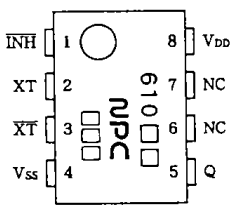


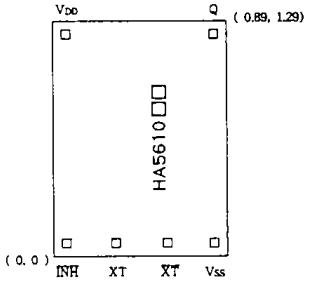
KAGE DIMENSION



■ PIN OUT

• 8-pin SOP (TOP VIEW)





CHIP SIZE: 0.89 × 1.29mm
CHIP THICKNESS: 400 ±30 µm

COORDINATES

UNIT: µm

■ PIN DESCRIPTION

quency	Output duty level	Output current
	TTL	16mA
2	TTL	16mA
4	TTL	16mA
8	TTL	16mA
	CMOS	4mA
2	CMOS	4mA
4	CMOS	4mA
8	CMOS	4mA
	CMOS	16mA
2	CMOS	16mA
4	CMOS	16mA
8	CMOS	16mA

SOP package is named SM5610 ☐ ☐ S.

MUM RATING (Vss=0V)

MBOL	CONDITIONS	UNIT
V_{DD}	-0.5 to +7.0	V
V_{IN}	-0.5 to V_{DD}+0.5	V
V_{OUT}	-0.5 to V_{DD}+0.5	V
T_{STG1}	-65 to +150 (chip)	°C
T_{STG2}	-40 to +125 (SOP)	
OUT	N, K series 25	mA
	H series 10	
P_W	200	mW
T_{SLD}	255	°C
SLD	10	S

ote: * mark is useful at SOP package

TERISTICS

(V_{SS}=0V, Ta=-40 to 85°C, unless otherwise noted)

	CONDITIONS			LIMITS			UNIT
				MIN	TYP	MAX	
	SM5610K, N	Q pin, Fig. 1	V_{DD}=4.5V. I_{OH}=16.0mA	3.9	4.2		V
			V_{DD}=4.0V. I_{OH}=14.4mA	3.4	3.7		
	SM5610H		V_{DD}=4.5V. I_{OL}=4.0mA	3.9	4.2		
			V_{DD}=4.0V. I_{OL}=3.6mA	3.4	3.7		
	SM5610K, N	Q pin, Fig. 1	V_{DD}=4.5V. I_{OH}=16.0mA		0.3	0.4	V
			V_{DD}=4.0V. I_{OH}=14.4mA		0.3	0.4	
	SM5610H		V_{DD}=4.5V. I_{OL}=4.0mA		0.3	0.5	
			V_{DD}=4.0V. I_{OL}=3.6mA		0.3	0.5	
	Q pin, Fig. 1, $\overline{INH}$="L", V_{DD}=6.0V		V_{OH}=V_{DD}			10	µA
			V_{OL}=Vss			10	
	$\overline{INH}$ pin		V_{DD}=5±0.5V	2.0			V
			V_{DD}=5±1.0V	2.2			
	$\overline{INH}$ pin		V_{DD}=5±1.0V			0.8	V
	Load circuit 1 (SM5610N, H) Load circuit 2 (SM5610K), Fig. 2, $\overline{INH}$=OPEN, CL=15pF		V_{DD}=5V, Ta=25°C		15	20	mA
			V_{DD}=5.5V			30	
			V_{DD}=6.0V			35	
	Load circuit 1 (SM5610N, H) Load circuit 2 (SM5610K), Fig. 2, $\overline{INH}$=OPEN, CL=50pF		V_{DD}=5V, Ta=25°C		21	26	
			V_{DD}=5.5V			36	
			V_{DD}=6.0V			41	
	Fig. 3			50		250	kΩ
	Fig. 4		V_{DD}=5±0.5V	1.0		5.0	MΩ
			V_{DD}=5±1.0V	0.9		5.5	
	Design value			19	27	35	pF
				19	27	35	

CTERISTICS

V_{SS} = 0V, Ta= -40 to +85°C unless otherwise noted.

OL	CONDITIONS			LIMITS			UNIT
				MIN	TYP	MAX	
	Load circuit 2, Fig. 2	C_L=15pF	V_{DD}=5±0.5V		1.5	3.0	ns

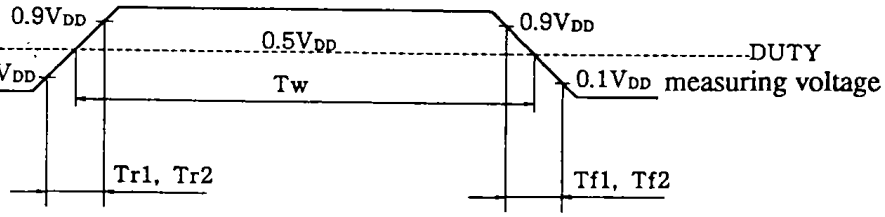
V_{SS} = 0V, Ta= -40 to +85°C unless otherwise noted.

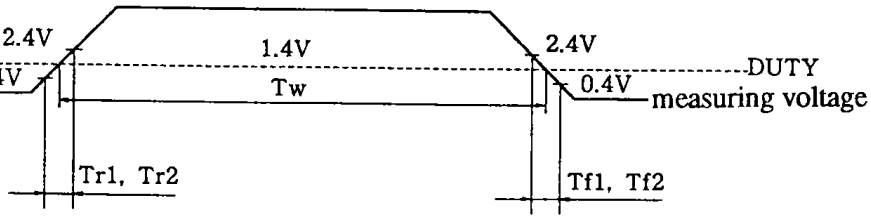
SYMBOL	CONDITIONS			LIMITS MIN	LIMITS TYP	LIMITS MAX	UNIT
T_{r1}	Load circuit 1, Fig. 2 0.1V_{DD} to 0.9V_{DD}	C_L=15pF	V_{DD}=5±0.5V		5.0	10	ns
			V_{DD}=5±1.0V			12	
T_{r2}		C_L=50pF	V_{DD}=5±0.5V		13	26	
			V_{DD}=5±1.0V			30	
T_{f1}	Load circuit 1, Fig. 2 0.9V_{DD} to 0.1V_{DD}	C_L=15pF	V_{DD}=5±0.5V		5.0	10	ns
			V_{DD}=5±1.0V			12	
T_{f2}		C_L=50pF	V_{DD}=5±0.5V		13	26	
			V_{DD}=5±1.0V			30	
DUTY	Load circuit 1, Fig. 2, C_L=15pF, Ta=25°C, V_{DD}=5.0V			45		55	%
T_{PLZ}	Fig. 2, Ta=25°C, V_{DD}=5±1.0V, Load C_L≤50pF					100	ns
T_{PZL}						100	
f_{MAX}	Load circuit 1, Fig. 2, V_{DD}=5±1.0V			30			MHz

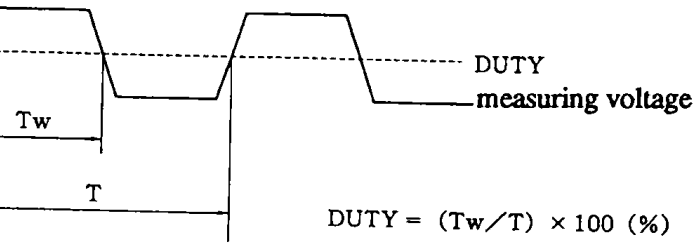
V_{SS} = 0V, Ta= -40 to +85°C unless otherwise noted.

SYMBOL	CONDITIONS			LIMITS MIN	LIMITS TYP	LIMITS MAX	UNIT
T_{r1}	Load circuit 1, Fig. 2 0.1V_{DD} to 0.9V_{DD}	C_L=15pF	V_{DD}=5±0.5V		1.5	3.0	ns
			V_{DD}=5±1.0V			3.5	
T_{r2}		C_L=50pF	V_{DD}=5±0.5V		3.0	6.0	
			V_{DD}=5±1.0V			7.0	
T_{f1}	Load circuit 1, Fig. 2 0.9V_{DD} to 0.1V_{DD}	C_L=15pF	V_{DD}=5±0.5V		1.5	3.0	ns
			V_{DD}=5±1.0V			3.5	
T_{f2}		C_L=50pF	V_{DD}=5±0.5V		3.0	6.0	
			V_{DD}=5±1.0V			7.0	
DUTY	Load circuit 1, Fig. 2, C_L=50pF, Ta=25°C, V_{DD}=5.0V			45		55	%
T_{PLZ}	Fig. 2, Ta=25°C, V_{DD}=5±1.0V, Load C_L≤50pF					100	ns
T_{PZL}						100	
f_{MAX}	Load circuit 1, Fig. 2, C_L=50pF, V_{DD}=5±1.0V			30			MHz

SWITCHING TIME







t terminal
Q
$f_o/2$; $f_o/4$ or $f_o/8$)
dance

l frequency