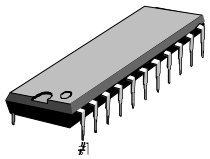
KS58550 UNIVERSAL 10 MEMORY DIALER

INTRODUCTION

The KS58550 is 10 memory Tone/pulse switchable dialer with 32 digit redial memory.
The Flash time is selectable on the keyboard.
Also, Hands-Free and Hold function are controlled on the keyboard. The KS58550 can fulfill all the standards of each country.

22-DIP-400



FEATURES

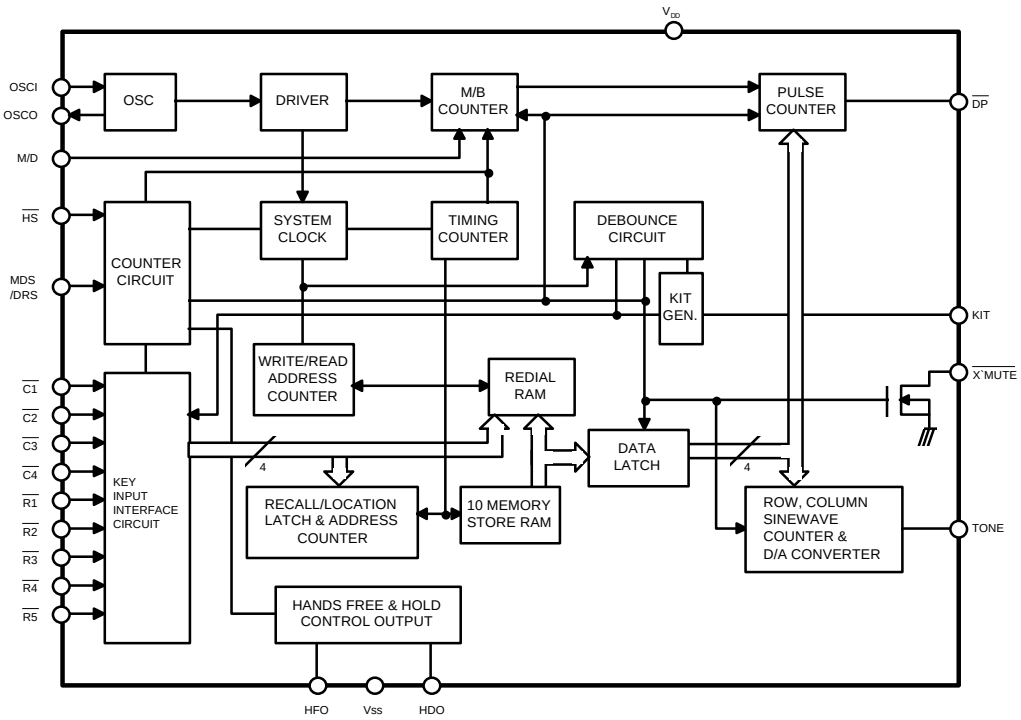
- Flash Time selectable on the keyboard (92, 312, 608 mS)
- Hands-Free and Hold function
- Key in Tone function (1.75KHz)
- Tone/Pulse switchable
- Pulse rate selectable
- Make/Break ratio selectable
- Single tone enable for test
- Uses 3.579545MHz Color burst Crystal or ceramic resonator
- Tone (T/ *) key function (Pulse → Tone)
- Redial function (Pulse: 32 digit, Tone : 31 digit)
- Two touch repertory memory (Pulse : 16 digit, Tone : 15 digit)
- Pin compatible with KS58006, KS58555B

ORDERING INFORMATION

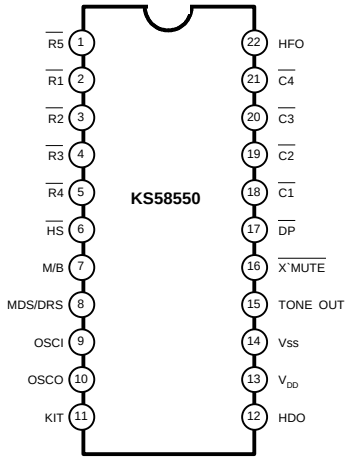
Device	Package	Function					
		HFD	HOLD	KIT	FLASH TIME	MAKE/BREAK	PPS
KS58550	22-DIP-400	O	O	O	Selectable	Selectable	Selectable

* HFD : Hands-Free Dialing Function
* HOLD : Hold for Melody
* KIT : Key In Tone

BLOCK DIAGRAM



PIN CONFIGURATION



ARRANGEMENT OF KEY BOARD

1	**2**	**3**	**ST**
4	**5**	**6**	**R/L**
7	**8**	**9**	**RD/P**
T/∗	**0**	**#**	**F3**
HFI	**HDI**	**F1**	**F2**

- RD/P: Redial/Pause
- ST : Store
- R/L : Recall/Location
- F1 : Flash Time (92ms)
- F2 : FlashTime (312ms)
- F3 : Flash Time (608ms)
- HFI : Hands Free Dialing Key Input
- HDI : Hold Key Input
- T/∗ : Pulse → Tone Mode
- # : RD/P Function in Pulse Mode
  Data in Tone Mode

SELECTION FUNCTION

PIN	CONNECTION	FUNCTION
MDS/DRS	V_{DD}	PULSE MODE/20 PPS
	OPEN	PULSE MODE/10 PPS
	V_{SS}	TONE MODE
MAKE/BREAK	V_{DD}	1 : 2 (M : B)
	V_{SS}	2 : 3 (M : B)

PIN DESCRIPTION

Pin No	Symbol	I/O	Description
1	$\overline{R5}$	I	Row Key Input
2	$\overline{R1}$		
3	$\overline{R2}$		
4	$\overline{R3}$		
5	$\overline{R4}$		
6	$\overline{HS}$	I	Hook Switch
7	M/B	I	Make/Break Select
8	MDS/DRS	I	Mode & Dial Pulse Ratio Select Pin
9	OSCI	I	Oscillator Input
10	OSCO	O	Oscillator Output
11	KIT	O	Key - In -Tone Output
12	HDO	O	Hold Function Control Output
13	V_{DD}	S	(+) Power
14	V_{SS}	S	(-) Power
15	TONE	O	Tone Output
16	$\overline{X'MUTE}$	O	Xmute Output (N - Channel Open Drain)
17	$\overline{DP}$	O	Dial Pulse Output (CMOS Inverter Output)
18	$\overline{C1}$	I	Column Key Input
19	$\overline{C2}$		
20	$\overline{C3}$		
21	$\overline{C4}$		
22	HFO	O	Hands-Free Control Output

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Supply Voltage	V_{DD}	- 0.3 ~ 7.0	V
Input Voltage	V_I	- 0.2 ~ V_{DD} + 0.3	V
Output Voltage	V_O	- 0.3 ~ V_{DD} + 0.3	V
Power Dissipation	P_D	500	mW
Operating Temperature	T_{OPR}	- 20 ~ + 70	°C
Storage Temperature	T_{STG}	- 55 ~ + 150	°C

ELECTRICAL CHARACTERISTICS

(V_{DD} = 3.5V, V_{SS} = 0V, Ta = 25°C, f_{osc} = 3.579545 MHz)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Operating voltage	V_{DD}	-		2.0	-	6.0	V
Memory Retention Voltage	V_{MR}	-		1.0	-	-	
Memory Retention Current	I_{MR}	$\overline{HS}$ = V_{DD} = 1.0V		-	0.05	0.1	uA
Operating Current	$I_{DD(PULSE)}$	All Output Unloaded	Pulse Mode	-	0.1	0.3	mA
	$I_{DD(TONE)}$		Tone Mode	-	0.4	0.7	
Standby Current	I_{SB}		$\overline{HS}$ = V_{SS}	-	10	50	μA
Output Sink Current ($\overline{DP}$, X'MUTE)	$I_{O(SINK)1}$	V_{OL} = 0.4V		1.7	5.0	-	mA
	$I_{O(SINK)2}$	V_{OL} = 0.4V, V_{DD} = 2.5V		0.5	1.5	-	mA
Output Current	I_{OH}	V_{OH} = 3.0V		1.8	5.2	-	mA
	I_{OL}	V_{OL} = 0.4V		1.7	5.1	-	mA
Input Voltage	V_{IH}	$\overline{R1}$ ~ $\overline{R5}$, M/B, $\overline{HS}$		0.8V_{DD}	-	V_{DD}	V
	V_{IL}	$\overline{C1}$ ~ $\overline{C4}$, MDS/RDS, $\overline{HS}$		V_{SS}	-	0.2V_{DD}	V
Input Current	V_{I1}	$\overline{R1}$ ~ $\overline{R5}$, V_{IN} = V_{SS}		-	-	50	μA
	V_{I2}	$\overline{R1}$ ~ $\overline{R5}$, V_{IN} = V_{SS} V_{DD} = 2.5V		-	-	30	μA
Column to Row Tone Ratio	dBcr	Tone Mode		1	2	3	dB
Row Tone Output	$V_{OH(TONE)}$	R_L = 5.0 Kohm		-18	-	-16	dBV
	$V_{OL(TONE)}$	V_{DD} = 2.5V, R_L = 5.0Kohm		-18	-	-16	
Tone Distortion	THD	-		-	-	4	%
Valid Key Entry Time	t_{KD}	-		-	23.0	-	mS
Pause Time	t_{PA}	"P" Key Depress		-	3.52	-	Sec
Pulse Interdigit	t_{PIDP1}	MDS/DRS = V_{DD} (20 PPS)		-	585	-	mS
Pause Time	t_{PIDP2}	MDS/DRS = OPEN (10 PPS)		-	805	-	
Tone Interdigit Pause Time	t_{TIDP}	MDS/DRS = V_{SS}		-	92	-	
Tone Duration	t_{TD}	-		-	92	-	
Key In Tone Duration	t_{KIT}	-		-	27	-	
Key In Tone Frequency	f_{KIT}	-		-	1.75	-	
Make/Break Time	$t_{M/B}$	MDS/DRS = OPEN (10PPS)	M/B = V_{DD}	-	34.33/68.66	-	KHz
			M/B = V_{SS}	-	41.19/61.79	-	mS
		MDS/DRS = V_{DD} (20PPS)	M/B = V_{DD}	-	17.16/34.33	-	
			M/B = V_{SS}	-	20.59/30.89	-	

ELECTRICAL CHARACTERISTICS

(V_{DD} =3.5V, V_{SS} = 0V, Ta = 25°C, f_{OSC} =3.579545 MHz)

Characteristic	Symbol	Test conditions	Min	Typ	Max	Unit
Pulse to Tone Auto Pause Time	t_{PTPA}	-	-	3.52	-	Sec
Pre - digit Pause Time	t_{PDPA}	MDS/DRS = V_{DD}, M/B = V_{DD}	-	20	-	mS
		MDS/DRS = OPEN, M/B = V_{DD}	-	34	-	
		MDS/DRS = V_{DD}, M/B = V_{DD}	-	14	-	
		MDS/DRS = OPEN, M/B = V_{DD}	-	24	-	
Pulse to X'MUTE Overlap Time	t_{PMO}	-	-	1.2	-	mS
Flash Time	t_{FL}	F1 Key Depress	-	92	-	mS
		F2 Key Depress	-	312	-	
		F3 Key Depress	-	608	-	

APPLICATION INFORMATION KEY DESCRIPTION

- **1, 2, 3, 4, 5, 6, 7, 8, 9, 0**
  These are Tone/Pulse dialing signal keys in normal mode.

- **T/∗**
  Pulse Mode : Pulse to Tone Switching Key
  Tone Mode : Data Key

- **#**
  Pulse Mode : This Key will operate as a redial key if it is pressed first after off - hook.
  Otherwise, it will be allowed as a pause key.
  Tone Mode : Data key

- **ST: Store**
  If the ST key is allowed when the dialer is set to the corresponding condition,
  pressing the ST key will change the dialer into the ST mode.
  The ST mode is released after the memory transfer operation is executed.
  The dialing sequence will be interrupted when the key is activated.

- **R/L**
  This key will be allowed location selection in store mode and will he allowed recall function in normal mode.

- **F: Flash (i = 1, 2, 3)**
  If the Flash key is pressed,
  $\overline{DP}$ and $\overline{X'MUTE}$ will be forced to low during the t_{FL} (Fash Time)

F1	92mS	Flash Time Selectable on the Keyboard
F2	312mS	
F3	608mS	

• **RD/P KEY**
If press this key first after off - hook, it will operate as a redial key, otherwise it will operate as a pause key.

• **HFI**
Hands-Free dialing input.
Hands-Free dialing output is controlled on the keyboard (HFI)

• **HDI**
Hold function input.
Hold function is controlled on the keyboard (HDI).
The output will control the melody enable.

KEYBOARD AND SWITCHES OPERATION

• **SYMBOL DEFINITION**

D_P = PULSE DATA : 0,1,2,3,4,5,6,7,8,9
D_t = TONE DATA : 0,1,2,3,4,5,6,7,8,9,∗,#
D_g = STORE DATA : 0,1,2,3,4,5,6,7,8,9, ∗,#
D_n = INDIRECT MEMORY LOCATION : 0,1,2,3,4,5,6,7,8,9
REC = RECALL
LOC = LOCATION
ZiZiZi = Conversation Mode
OFF = OFF-HOOK
ON = ON-HOOK

= INPUT LEVEL LOW TO HIGH

= INPUT LEVEL HIGH TO LOW

• **OPERATION MANUAL**

- NORMAL DIALING IN PULSE MODE
  OFF-HOOK : D_P, - , D_P, : ZiZiZi : ON-HOOK
- NORMAL DIALING IN TONE MODE
  OFF-HOOK : D_t, - , D_t, : ZiZiZi : ON-HOOK
- NORMAL DIALING FROM PULSE TO TONE VIA T/∗ KEY
  OFF-HOOK : D_p, - , D_p, T/∗, D_t, : ZiZiZi : ON-HOOK
- NORMAL DIALING FROM PULSE TO TONE VIA MDS/DRS SWITCH
  OFF-HOOK : D_p, - , D_p, MDS/DRS, ↴ ,D_t, - , D_t, : ZiZiZi : ON-HOOK
- REDIAL

  OFF-HOOK : RD/P : ZiZiZi : ON-HOOK

  (if the dialing digit exceeds 32 digits, the redialing operation will be inhibited)
- REPERTORY DIALING FOR ONE MEMORY
  OFF-HOOK : $R/_L$, Dm, : ZiZiZi : ON-HOOK

- REPERTORY DIALING FOR CASCADED MEMORY
  OFF-HOOK : R/L, Dm, : ZiZiZi : ON-HOOK (The cascade 32 digits dialing are available)
- NORMAL DIALING AFTER REDIALING
  OFF-HOOK : RD/P, Dn, ----, Dn, : ZiZiZi : ON-HOOK
- NORMAL DIALING AFTER REPERTORY DIALING
  OFF-HOOK : R/L, Dm, Dn ----. Dn, : ZiZiZi : ON-HOOK
- REPERTORY DIALING AFTER NORMAL DIALING
  OFF-HOOK : Dn, ----, Dn, $R/_L$, Dm, : ZiZiZi : ON-HOOK
- REPERTORY DIALING AFTER REDIALING
  OFF-HOOK : RD/P, $R/_L$, Dm, : ZiZiZi : ON-HOOK
- STORE FOR ONE MEMORY
  OFF-HOOK / ON, ST, Dn, ----, Dn, R/L, Dm, : ON-HOOK
- STORE FOR CASCADE MEMORY
  OFF-HOOK / ON, ST, Dn,-, Dn, R/L, Dm, ST, Dn, -, Dn, R/L, Dm : ON-HOOK
- HANDS FREE DIAL
  ON-HOOK : HFl, D1**,** D2,-, Dn, HFl, RD
- HOLD FUNCTION
  Melody output enable/disable function.

TRUTH TABLE OF HANDS FREE INPUT & HOLD FUNCTION

NO	CURRENT STATE			INPUT	NEXT STATE		
	HOOK STATE	HFO	HDO		HFO	HDO	DIALING
1	ON/OFF HOOK	L	L	HFI KEY IN	H	L	YES
2	ON HOOK	H	L	HFI KEY IN	L	L	NO
3	OFF HOOK	H	L	HFI KEY IN	L	L	YES
4	ON HOOK	X	X	OFF HOOK	L	L	YES
5	OFF HOOK	X	H	ON HOOK	P	P	MELODY ON
6	OFF HOOK	L	L	ON HOOK	L	L	NO
7	OFF HOOK	H	L	ON HOOK	H	L	YES
8	ON HOOK	L	X	HDI KEY IN	L	P	NO
9	ON HOOK	H	L	HDI KEY IN	H	H	MELODY ON
10	ON HOOK	H	H	HDI KEY IN	H	L	YES
11	OFF HOOK	X	L	HDI KEY IN	P	H	MELODY ON
12	OFF HOOK	X	H	HDI KEY IN	P	L	YES
13	ON/OFF HOOK	X	H	HDI KEY IN	P	H	MELODY ON

* Comment : X : Don't Care
P : Previous State

TONE GENERATOR

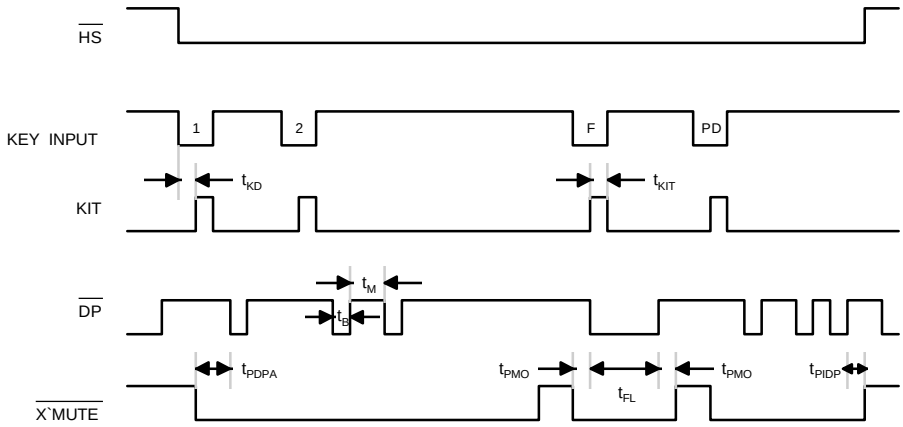
The device will be designed 15 Level, 30 Segment.
The COLUMN TONE is Pre-emphasized 2 dB than the ROW TONE.
In order to generate a single tone, push the same COLUMN or ROW keys more than 2 Keys at the same time.

TONE FREQUENCY

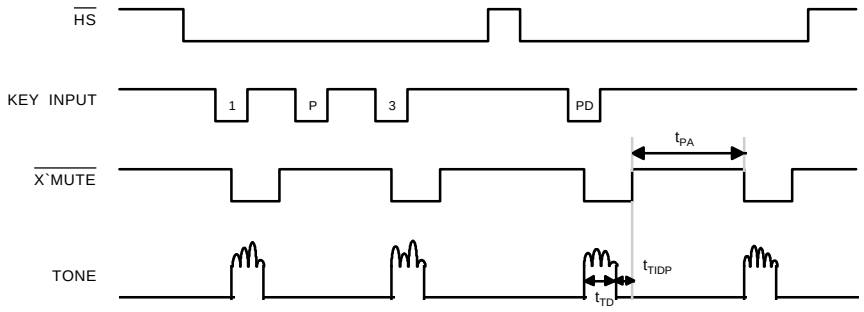
INPUT	SPECIFIED	ACTUAL	%ERROR
ROW1	697	699.1	+ 0.31
ROW2	770	766.2	- 0.49
ROW3	852	845.4	- 0.54
ROW4	941	948.0	+ 0.74
COLUMN1	1209	1215.9	+ 0.57
COLUMN2	1336	1331.7	- 0.33
COLUMN3	1477	1471.9	- 0.35

TIMING DIAGRAM

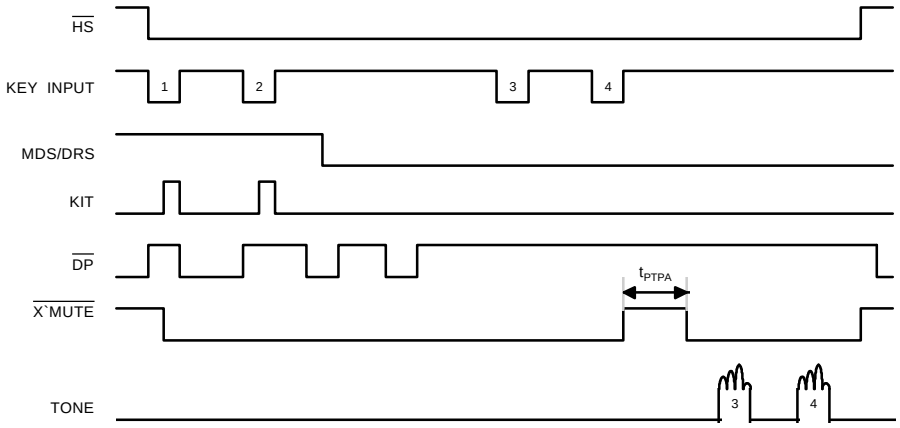
1) PULSE MODE



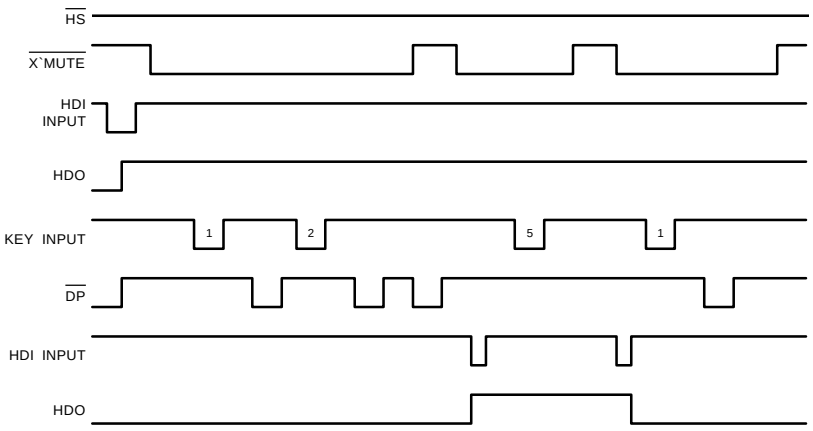
2) TONE MODE



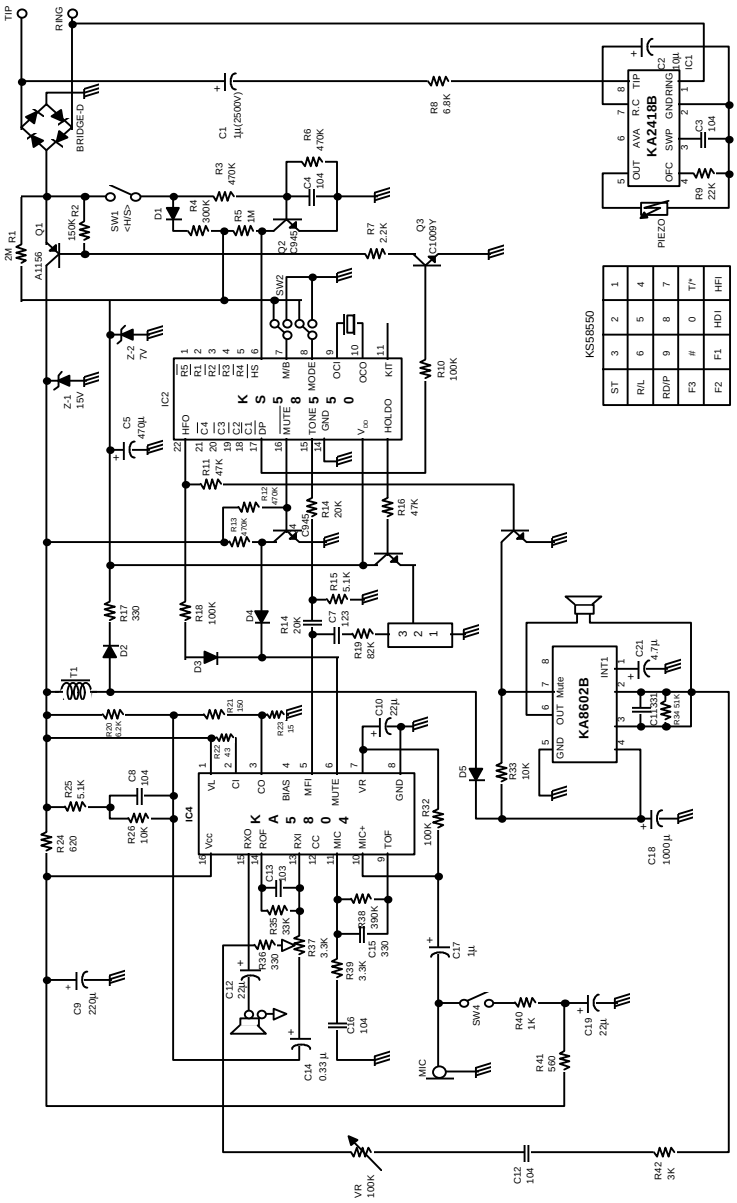
3) PULSE TO TONE DIALING



4) HANDS-FREE DIALING & HOLD FUNCTION

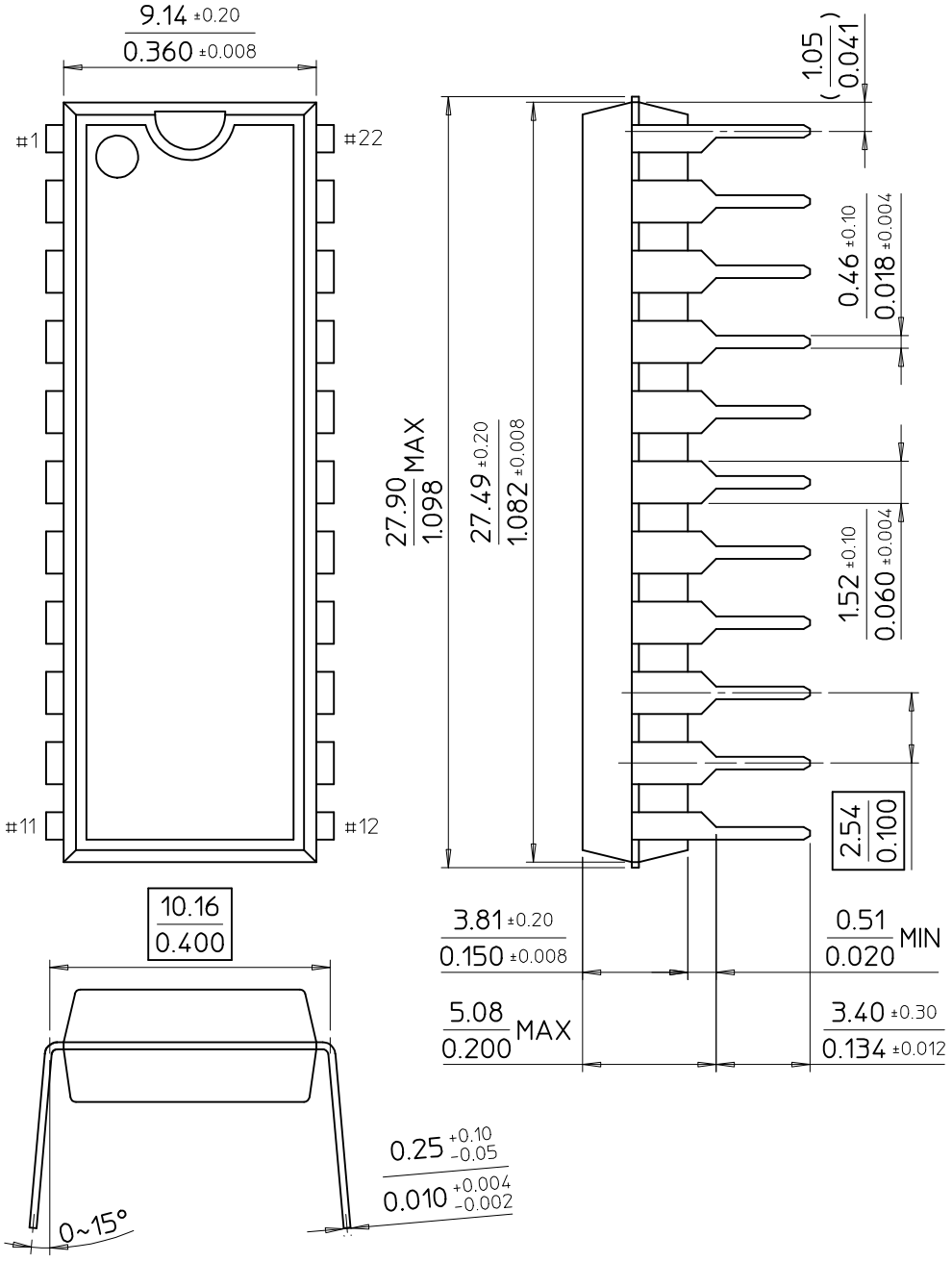


APPLICATION CIRCUIT



22-DIP-400

Dimensions in Milimeters/inches



SAMSUNG ELECTRONICS CO.,LTD.