Hybrid Driver
Monolithic IC MM1285

Outline

This IC collects various driver functions used in pagers and other portable communication devices in a single chip. Recently there have been requests for more compact pagers and portable telephones, and at the same time new functions and features are being added, leading to a strong demand for miniaturized and hybrid components. This IC meets these needs through adoption of a miniature package.

The speaker driver incorporates functions for varying audio volume through data, a feature which can be used in novel applications.

Features

1. Configuration: Speaker driver,vibration motor driver, two LED drivers
2. The speaker driver is capable of varying the audio volume in four steps via parallel data
3. Power can be supplied by a single dry-cell battery
4. Low 0.1µA consumption current in standby mode
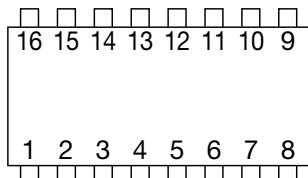
## Package

TSOP-16A (MM1285XV)

Absolute Maximum Ratings
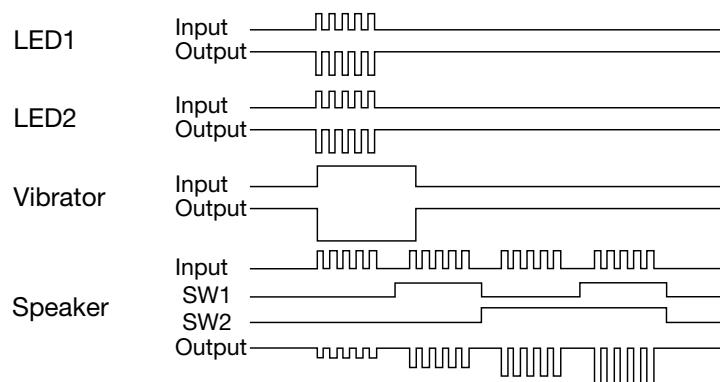
Item		Symbol	Ratings	Units
Storage temperature		T_{STG}	–40~+125	℃
Operating temperature		T_{OPR}	–10~+50	℃
Power supply voltage		V_{CC} max.	–0.3~+6	V
Operating power supply voltage		Vccop	+1.0~+1.7	V
Voltage applied to output pin	OUT1~4		–0.3~+15	V
	OUT5		–0.3~+5	V
Voltage applied to input pin			–0.3~+5	V
Allowable loss		Pd	300	mW

Pin Assignment
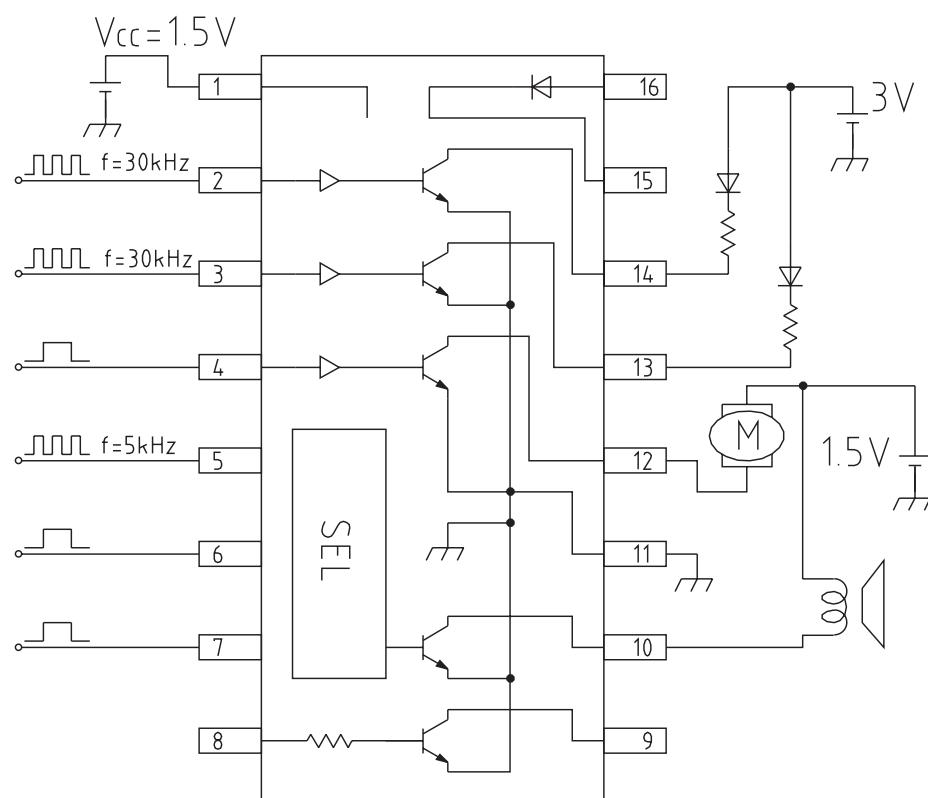
1	Vcc	9	O5
2	I1	10	O4
3	I2	11	GND
4	I3	12	O3
5	I4	13	O2
6	S1	14	O1
7	S2	15	KATHODE
8	I5	16	ANODE

I/O Timing Chart

Application Circuits

Electrical Characteristics (Except where noted otherwise, Ta=25℃, Vcc=1.5V)

Item	Measurement conditions	Min.	Typ.	Max.	Units
Standby current	All input pins=0V	–	–	0.1	µA
Consumption current A (O1 pin ON)	I1=H, another pin=L	1.4	2.2	2.9	mA
Consumption current B (O2 pin ON)	I2=H, another pin=L	1.4	2.2	2.9	mA
Consumption current C (O3 pin ON)	I3=H, another pin=L	7.0	11.0	14.5	mA
Consumption current D (O4 pin ON)	I4=H, S1=H, S2=H, another pin=L	7.0	11.0	14.5	mA
Consumption current E (O4 pin ON)	I4=H, S1=H, S2=H, another pin=L	3.5	5.5	8.0	mA
Consumption current F (O4 pin ON)	I4=H, S1=H, S2=H, another pin=L	1.1	1.6	2.2	mA
Consumption current G (O4 pin ON)	I4=H, S1=H, S2=H, another pin=L	0.45	0.70	0.95	mA
Input threshold	All input pins	0.40	0.65	0.85	V
Input resistance value	2·3·4·5·6·7 PIN		⋆220k		Ω
Input resistance value	I5pin (8PIN) only		⋆10k		Ω
Input current	2·3·4·5·6·7 PIN, V$_{IN}$=3V	8.3	11	16	µA
Input current	I5pin (8PIN) only, V$_{IN}$=3V	170	230	330	µA
Output resistance (O1 pin)	I$_O$=20mA		5	10	Ω
Output resistance (O2 pin)	I$_O$=20mA		5	10	Ω
Output resistance (O3 pin)	I$_O$=180mA		1	1.5	Ω
Output resistance A (O4 pin)	I$_O$=100mA, S1=H, S2=H		1	1.5	Ω
Output resistance B (O4 pin)	I$_O$=50mA, S1=L, S2=H	7	10	13	Ω
Output resistance C (O4 pin)	I$_O$=5mA, S1=H, S2=L	38.5	55	71.5	Ω
Output resistance D (O4 pin)	I$_O$=1mA, S1=L, S2=L	154	220	280	Ω
Output current (O5 pin)	V (I5) =1.5V, V (O5) =0.5V	2	10	–	mA
O5 pin acquisition current	V (I5) =0V, V (O5) =5V	–	–	0.1	µA
O5 pin voltage	V(I5)=0.85V, pulled up to 2V by 1MΩ	–	–	0.05	V
ON transport delay time A	I1=L→H		⋆0.3		µS
OFF transport delay time A	I1=H→L		⋆0.9		µS
ON transport delay time B	I2=L→H		⋆0.3		µS
OFF transport delay time B	I2=H→L		⋆0.9		µS
ON transport delay time C	I3=L→H		⋆0.3		µS
OFF transport delay time C	I3=H→L		⋆1.4		µS
ON transport delay time D	I4=L→H, S1=H, S2=H		⋆0.5		µS
OFF transport delay time D	I4=H→L, S1=H, S2=H		⋆1.0		µS
Diode forward voltage	IF=3mA	0.65	0.70	0.75	V
Diode reverse leakage voltage	VR=5.5V			10	µA

Notes. 1: Asterisks (⋆) indicate design values.

2: Voltages applied to input pins are to be H=1V, L=0V.