



DESCRIPTION

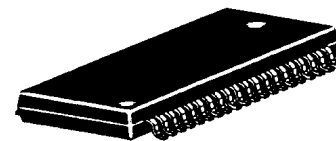
The M65857FP is a Surround Processor IC for AV Amplifier ,Mini-component stereo and Car audio built-in QSurround™5.1.

The QSurround™5.1 system generates 5.1ch from 2ch input and produce 3D sound.

(Note) QSurround™5.1 is a trademark of QSound Labs, Inc., and is used under license from QSound Labs, Inc.

FEATURES

- Built-in QSurround™5.1 system
- 6 Output (5.1ch) available
- Built-in SRAM for digital delay
- Digital delay
 - Delay time; 20,30,40,50msec
 - Frequency response; 3KHz/7KHz
- Built-in 3wire MCU interface
- Bypass mode



36P2R-A

0.8mm pitch 450mil SSOP
(8.4mm×15.0mm×2.0mm)

APPLICATIONS

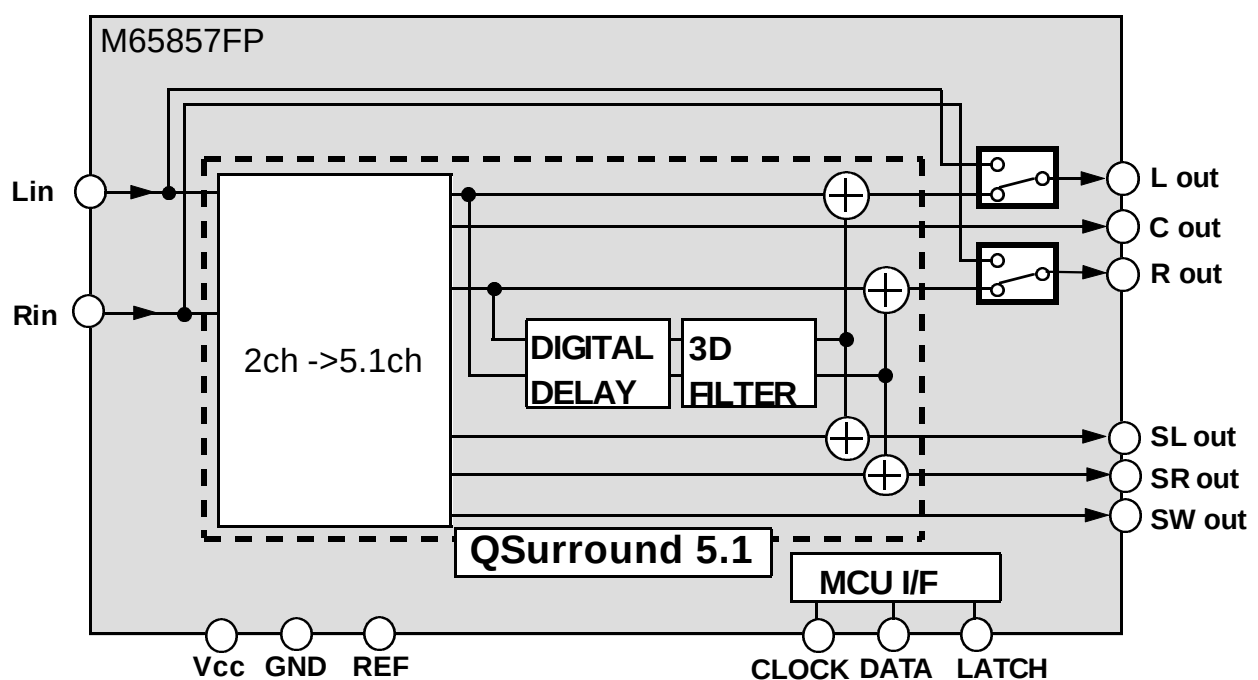
AV Amplifier,Mini-component stereo,Car Audio

RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range ----- Vcc=4.5 to 5.5V

Rated supply voltage ----- Vcc=5.0V

SYSTEM CONFIGURATION

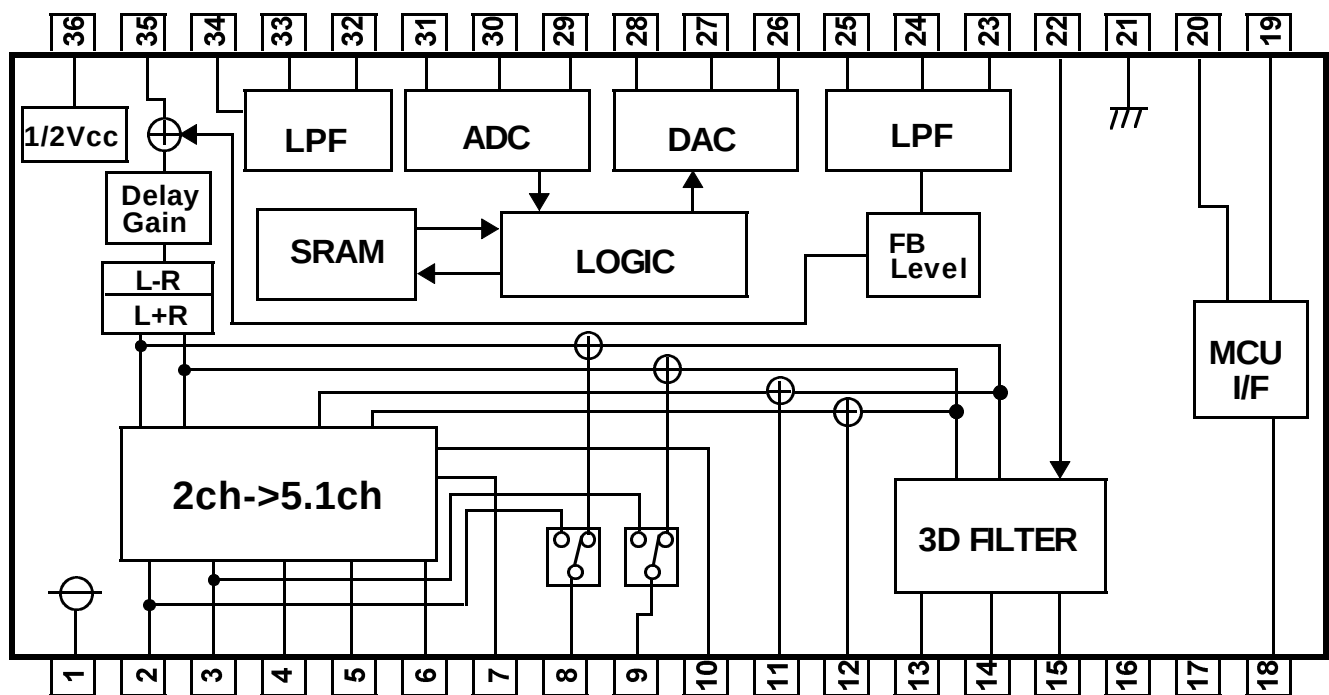


PIN CONFIGURATION (TOP VIEW)

Vcc	1	36	REF
LIN	2	35	DELAYIN
RIN	3	34	LPFI1
SWLPF	4	33	LPFI2
CBPF2	5	32	LPFI3
CBPF1	6	31	ADC1
SWOUT	7	30	ADC2
LOUT	8	29	ADC3
ROUT	9	28	DAC3
COUT	10	27	DAC2
SLOUT	11	26	DAC1
SROUT	12	25	LPFO1
3DR	13	24	LPFO2
3DFIL	14	23	LPFO3
3DL	15	22	3DIN
TEST1	16	21	GND
TEST2	17	20	LATCH
DATA	18	19	CLOCK

Outline 36P2R

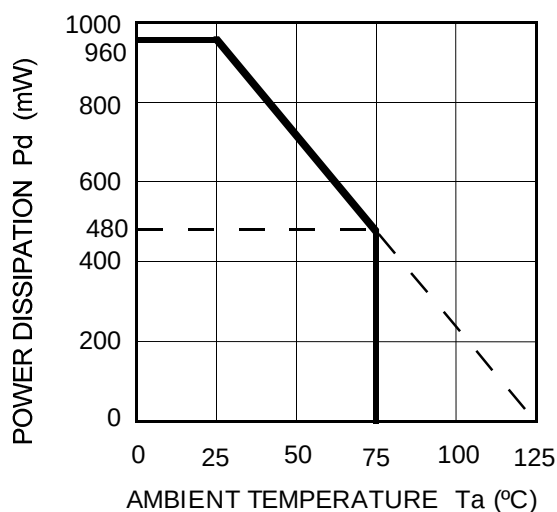
BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Ta=25°C,unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
Vcc	Supply Voltage		6	V
VI	Input Voltage		-0.3 to Vcc+0.3	V
Pd	Power Dissipation		960	mW
Kθ	Thermal Derating	Ta≥25°C	9.6	mW/°C
Topr	Operating Temperature		-20 to +75	°C
Tstg	Storage Temperature		-40 to +125	°C

THERMAL DERATING (MAXIMUM RATING)



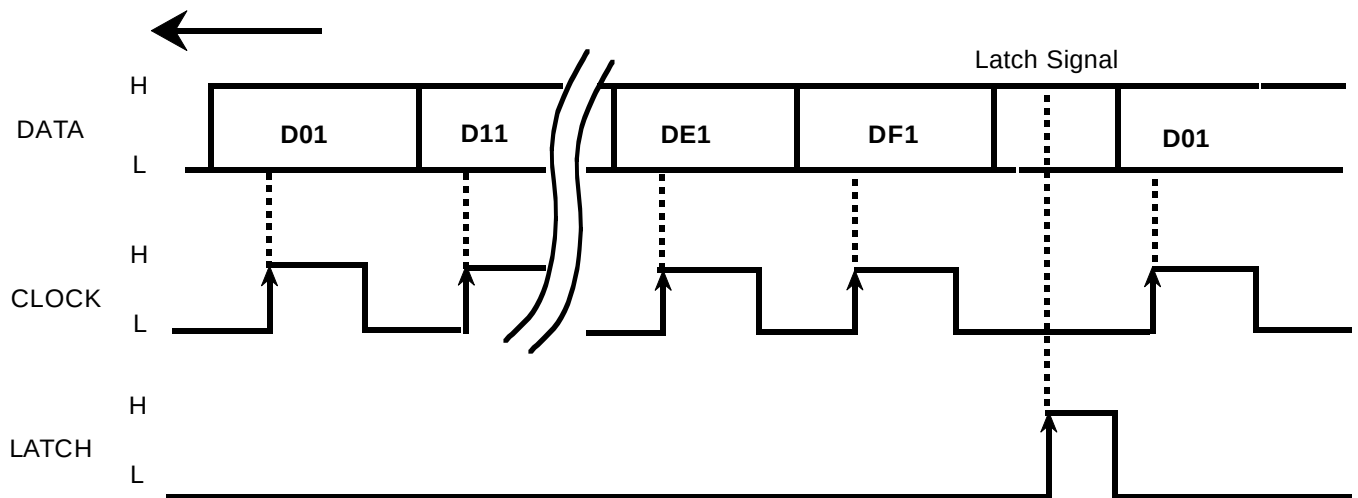
RECOMMENDED OPERATING CONDITION (Ta=25°C,unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
VCC	Supply voltage		4.5	5.0	5.5	V
VIH	Logic"H"level input voltage		Vcc×0.7	—	VCC	V
VIL	Logic"L"level input voltage		GND	—	Vcc×0.3	V

ELECTRICAL CHARACTERISTICS (Ta=25°C,unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
Icc	Circuit Current	No Signal	—	30	50	mA
GV	Voltage Gain	Vi=200mVrms, f=1KHz Bypass, L/Rch	-3	0	3	dB
THD	Total Harmonic Distortion	Vi=200mVrms, f=1KHz Bypass, L/Rch	—	0.006	0.06	%
Vimax	Maximum Input Voltage	THD=1%, f=1KHz Bypass, L/Rch	1.0	1.4	—	Vrms
Vomax	Maximum Output Voltage	THD=1%, f=1KHz Bypass, L/Rch	1.0	1.4	—	Vrms
Vno	Output Noise Voltage	Rg=0,JIS-A Bypass, L/Rch	—	4	10	μVrms
CS	Channel Separation	Vi=200mVrms, f=1KHz Bypass, L/Rch	—	-80	-65	dB
GV-D	Digital Delay Voltage Gain	Vi=200mVrms, f=1KHz 34pin input, 23pin output Td=40ms	-3	0	3	dB
THD-D	Digital Delay Total Harmonic Distortion	Vi=200mVrms, f=1KHz 34pin input, 23pin output Td=40ms	—	0.6	1.8	%
Vomax-D	Digital Delay Maximum Output Voltage	THD=10%, f=1KHz 34pin input, 23pin output Td=40ms	0.7	1.0	—	Vrms
Vno-D	Digital Delay Output Noise Voltage	Rg=0,JIS-A 23pin output Td=40ms	—	50	300	μVrms

DATA and CLOCK



The DATA is read by rising edge of CLOCK signal, and DATA is loaded by rising edge of LATCH signal.

DATA CONTROL SPECIFICATION

Chip address

D0	D1	D2	D3	D4	D5	D6	D7	D8	D9	DA	DB	DC	DD	DE	DF
Mode	Input Mode	Center ON/OFF	Rear effect	Surround effect	Delaytime		Delay LPF	Delay ON/OFF	Delay gain		Delay feed back			1	0

SETTING CODE

(1) Mode (Bypass/QSurround™5.1)

MODE	D0
By pass	0
QSurround™5.1	1

(2) INPUT

INPUT	D1
Mono	0
Stereo	1

(3) CENTER

INPUT	D2
OFF	0
ON	1

(4) Surround output

Surround output	D3
OFF	0
ON	1

(5) Surround effect

Surround effect	D4
Narrow	0
Wide	1

(6) Delay time

Delay time (msec)	D5	D6
20	0	0
30	1	0
40	0	1
50	1	1

(7) Delay LPF

Cut-off frequency

Cut-off frequency	D7
f _c =3KHz	0
7KHz	1

(9) Delay gain

Delay gain	D9	DA
Gain 1 Low	0	0
2	1	0
3	0	1
4 High	1	1

(10) Delay feed back gain

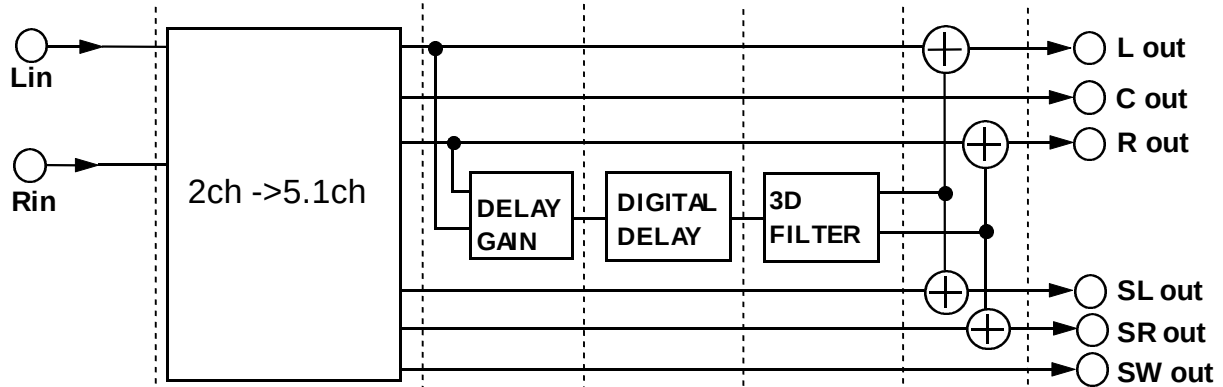
Feedback gain	DB	DC	DD
- 3dB	0	0	0
- 6dB	1	0	0
- 9dB	0	1	0
- 12dB	1	1	0
-∞	1	1	1

(8) Delay effect

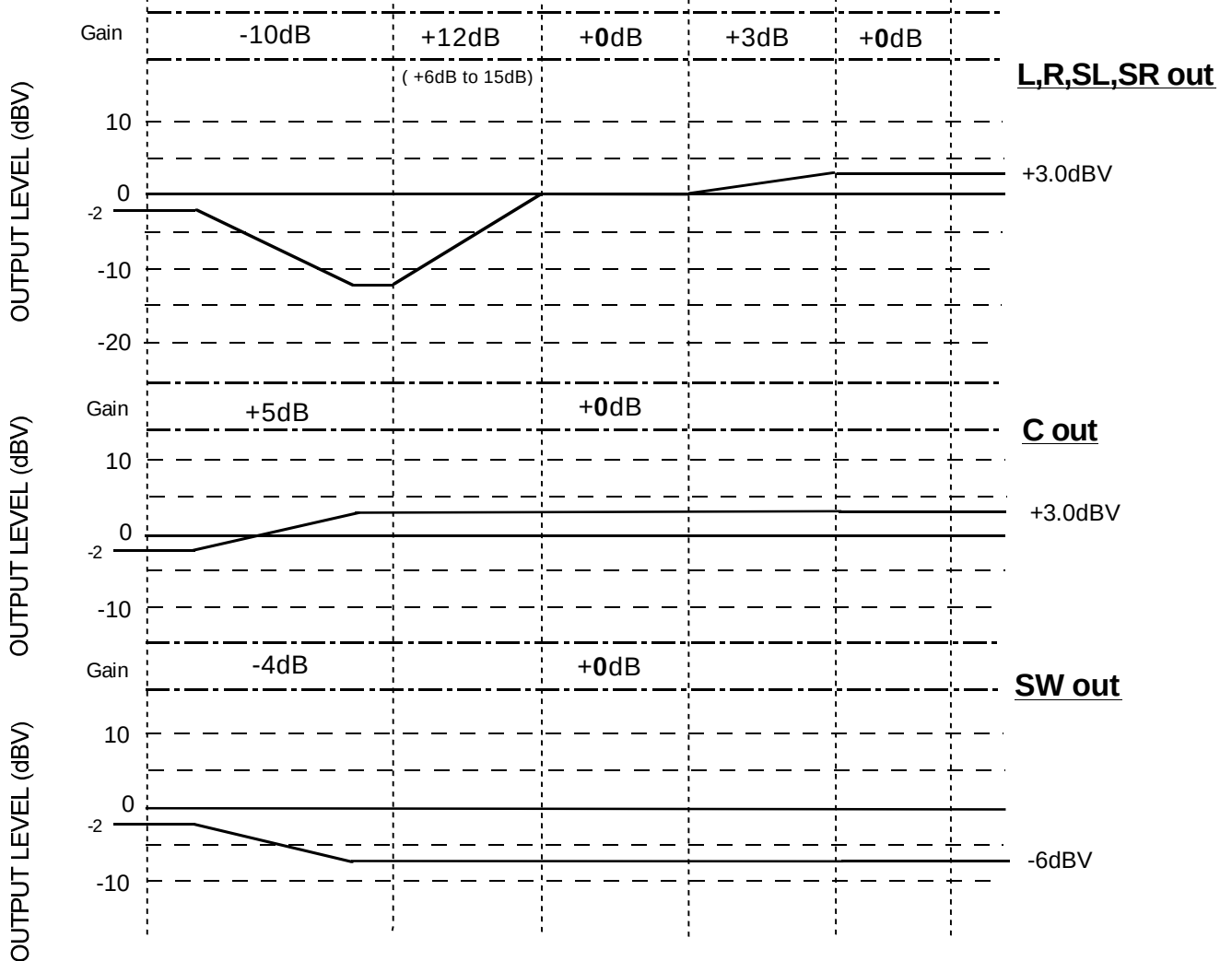
Delay effect	D8
OFF	0
ON	1

Level Diagram

QSurround™5.1 MODE



INPUT
L,R IN



Application circuit

