

ESMT Elite Semiconductor Memory Technology Inc.

Audio/Power Product BU



Company Highlights

- Taiwan-Based IC Design Company
- Established : Jun, 1998
- Public Listed in Taiwan Stock Exchange : March 2002
- Collected Capital : US\$ 88M
- Revenue in 2017 : US\$ ~313M (NTD10,456M)
- Scope : Specialty Memory (BU1), Audio/Power IC (BU2)
- Number of Employees : 421 (70 for BU2)
- Location : Hsinchu Science Park, Taiwan

Rank of TWN Listed IC Design Houses

Rank	Company	Stock ID	2017 Rev (K NTD)	Note
1	MTK	2454	238,216,318	Mobile Phone, TV, DVD
2	Novatek	3034	47,073,692	LCD Driver, LCD SOC
3	Realtek	2379	41,688,021	Network Communications, PC Peripherals
4	GUC	3443	12,160,606	IP
5	Focaltech	3545	10,798,334	Touch Panel control IC, LCD Driver IC
6	ESMT	3006	10,456,519	Specialty DRAM, Audio AMP/Power IC
7	Paradetek	4966	10,348,469	Display Port, High Speed Singal Interface
8	Sitronix	8016	9,431,062	Display Driver IC
9	RAD IC	3592	9,335,190	LCD Driver IC
10	Silergy	6415	8,608,067	Power Management IC

Product

■ Audio

- Audio Amp. – 5V
 - Class AB
 - Class D/K
- Audio Amp. – 12/24V
 - Class D: Analog input
 - Class D: Digital input
 - Class D: PWM input
- USB Audio
- Audio ADC
- Line Driver

■ Power

- Linear Regulator (LDO)
- DC/DC Switching Converter
 - Step-Up / Boost
 - Step-Down / Buck
- LED Driver
 - Back Light
 - Lighting
- Li-Ion Battery Charger
- Power Switch IC

Audio

5V Class D/K Audio Amp - Mono

	AD51652	AD51040/1	AD51653
Class	D	D/AB	K
Channel	1	1	1
Supply	2.5~5.5V	2.5~5.5V	2.8~5.5V
Iquiescent	3mA (5V)	3.1mA (3.6V)	3.5mA (3.6V)
Load (typical)	4Ω	4Ω	4Ω
Output Power (10%)	3.2W (5V, 4Ω)	3.5W (5V, 4Ω)	4.2W (5V, 4Ω)
			2.9W (4.2V, 8Ω)
THD+N	10%	10%	10%
Power Limit (NCN)	X	O	X
PSRR (dB)	-77dB (217Hz)	-70dB (217Hz)	-80dB(217Hz) -75dB(1KHz)
SNR (dB)	102dB (5V/1.8W/4ohm)	98dB (5V/1.8W/4ohm)	95dB (3.6V/1W/8ohm)
Efficiency	93% (5V/1.78W/8ohm)	93% (3.6V/0.8W/8ohm)	78% (3.6V/1W/8ohm) 73% (3.6V/2W/8ohm)
Earphone	X	X	X
Package	MSOP-8 TDFN-8 WCSP	MSOP-8 WLCSP-9L	TSSOP-14 QFN-3x3-20 WLCSP-12
P2P	TPA2010/2011 EMA2011	YDA145 YDA168	NCP2830

- BT Speaker
- Mobile Phone
- Portable Media Device
- Navigator
- Voice Control Module



5V Class D Audio Amp - Stereo

	AD52010	AD52040	AD52080	AD52651C	AD52652	AD52655	AD52656
Channel	2	2	2	2	2	2	2
Supply	5V	5V	5V	5V	5V	5V	5V
Load (typical)	4Ω	4Ω	4Ω	4Ω	4Ω	4Ω	4Ω
Output Power	3W	3.3W	3W	3W	3W	2.5W Power Limit	2.5W Power Limit
THD+N	10%	10%	10%	10%	10%	1%	1%
AGC	X	O	O	X	X	O	O
PSRR (dB)	77	70	70	55	66	55	55
SNR (dB)	98	98	90	96	96	96	96
Efficiency	90%	92%	95%	91%	91%	91%	91%
Earphone	X	X	X	X	O	X	O
P2P / Note	High C/P	NCN D/AB	APA2604C	PAM8603M	PAM8603A/ PAM8007	PAM8603M	PAM8603M

Analog-in Class D Audio Amp

- Super Low EMI/EMC (Spread Spectrum™)
- True Filter-less, 省電感, available for <13PVDD



	AD52580(B)	AD52060	AD52050B
Channel	2 / 1	2 / 1	2
Supply	8~26V	8~26V	8~14.4V
Output Power	5~20W*2 10~40W*1	5~20W*2 10~40W*1	15W*2
True Filter-less Save 4 inductors	X	O	O
SNR (dB)	98	103	100
PSRR (dB)	62	70	70
Efficiency	87%	93%	92%
Pin-to-Pin	TPA3110	TPA3110	TPA3136
Pin Assignment			

■ For Audio Application

	AD51062	AD52058	AD52068	AD52090	AD53060
Channel	1	2 / 1	2 / 1	2 / 1	2 / 2.1 / 4
Supply	8~26V	4.5~14.4V	4.5~26V	4.5~26V	4.5~20V
Output Power	10~40W*1	3~15W*2 6~30W*1	3~20W*2 6~40W*1	3~30W*2 6~60W*1	25W*2 15W*2+25W 15W*4
True Filter-less <13PVDD	○	○	○	○	○
SNR (dB)	103	103	103	103	103
PSRR (dB)	70	70	70	70	70
Efficiency	88%	93%	93%	96%	88%
Pin-to-Pin	TPA3111	TPA3136/3110	TPA3110	TPA3110	

Battery Charged		AD52066B	AD52067
Channel		2 / 1	2 / 1
Supply		2.9~12V	2.9~12V
Built-in Step-up Converter		up to 14V	up to 14V
Output Power @12V boosted from 8.4V (2 cell battery)	Stereo		13W/CH, 4Ω, 1% 15W/CH, 4Ω, 10%
	Mono		19W/CH, 4Ω, 10%
Output Power @8V boosted from 3.7V (1 cell battery)	Stereo	6W/CH, 4Ω, 1% 7W/CH, 4Ω, 10%	6W/CH, 4Ω, 1% 7.5W/CH, 4Ω, 10%
	Mono	7W/CH, 4Ω, 1% 8.7W/CH, 4Ω, 10%	8.7W/CH, 4Ω, 10%

Digital-in D Amp: With EQ (with DRC)

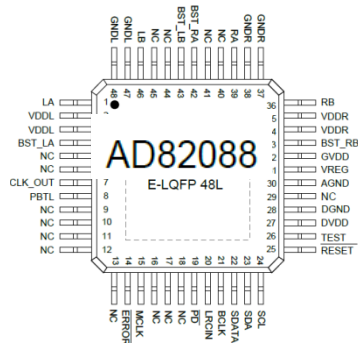
For TV Application

ESMT	TI P2P	Note
AD82584D/AD82586C AD87588/AD87586	TAS5707/5711	5~20Wx2, 20 EQ, 2 DRC, 48pin/24pin; + Headphone
AD82072/AD87072	X	5~25Wx2, 20 EQ, 2+post DRC, 3D Surround, + Headphone
AD82088/AD87088	TAS5707/5711	5~20Wx2, 30 EQ, 3 DRC; + Headphone
AD82080B	X	5~25Wx2, 44 EQ, 3 DRC, 3D Surround, I2S output

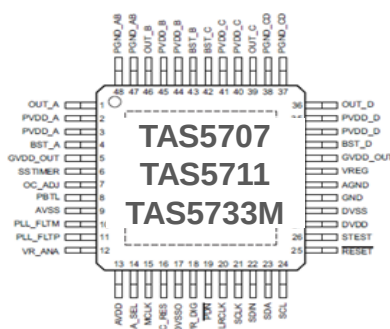
For Audio Application

AD82589/AD87589	X	3~20Wx2, 24 EQ, 2 DRC, support LV(5V), Closed Loop; + Headphone
AD82584F	TAS5707/5711	5~25Wx2, 30 EQ, 3+post DRC, I2S out, 8KHz~192KHz, 3D, 4.5~26V
AD85020	X	5~20Wx2, 36 EQ, 3+post DRC, I2S out, Closed Loop, 4.5~26V

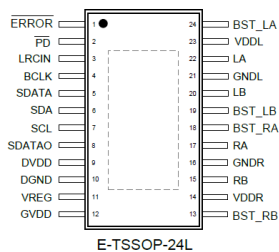
TI P2P



24Pin

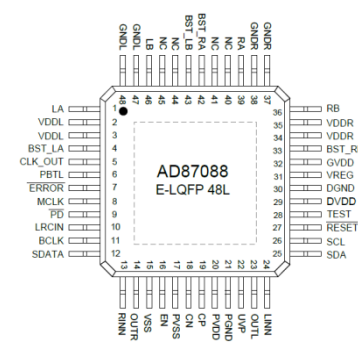


AD82088

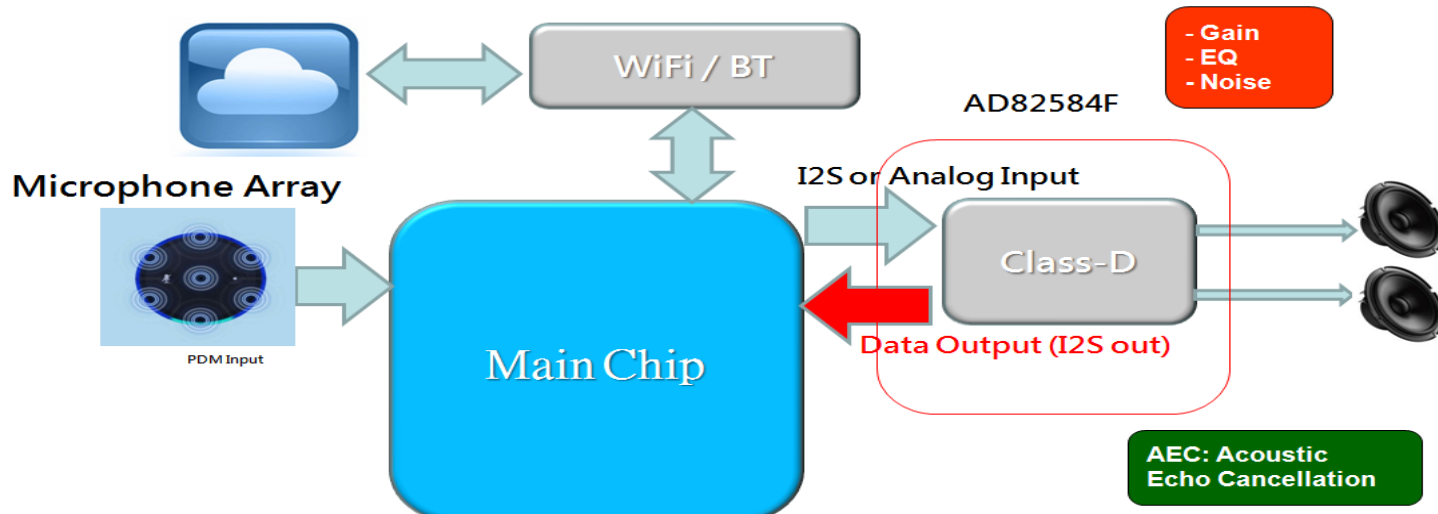
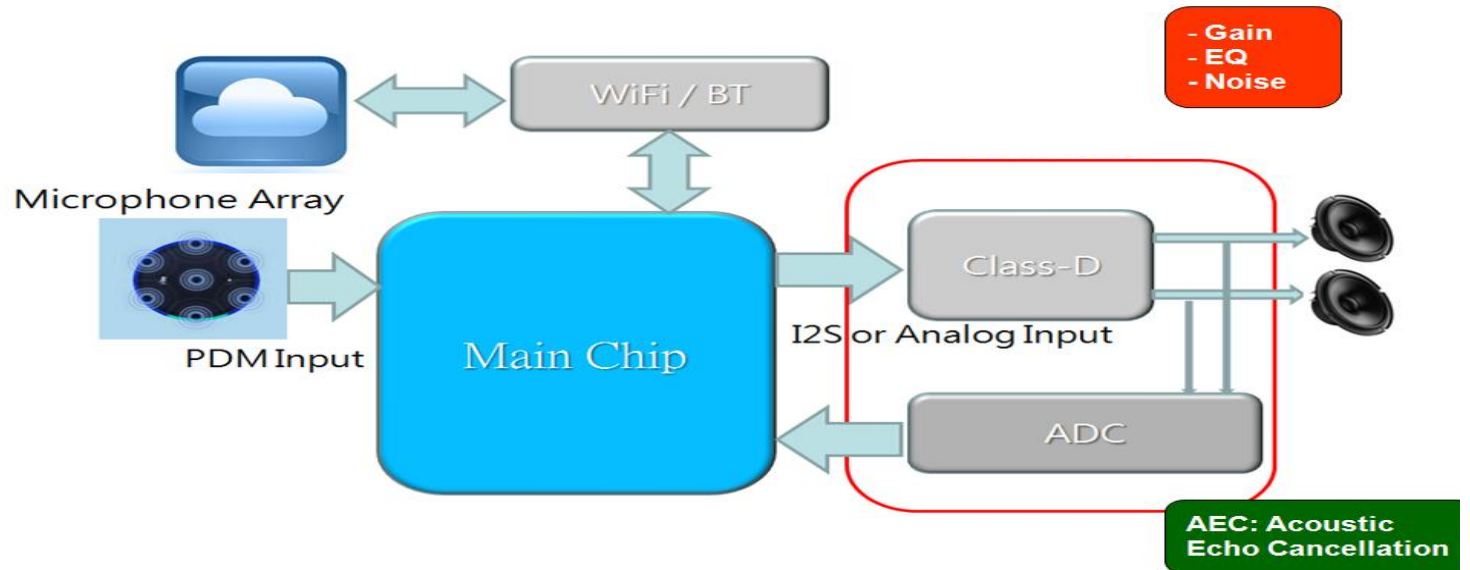


+ Headphone =
(2Vrms Line Driver)

+HP



AI Speaker AES

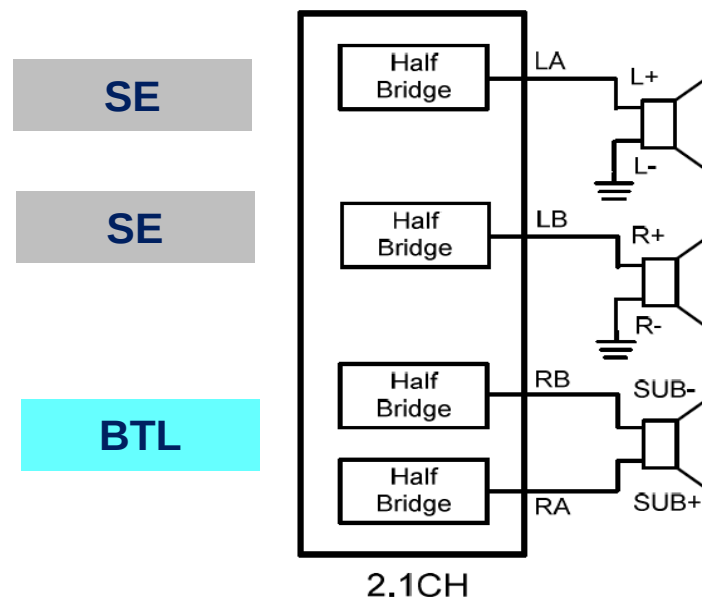
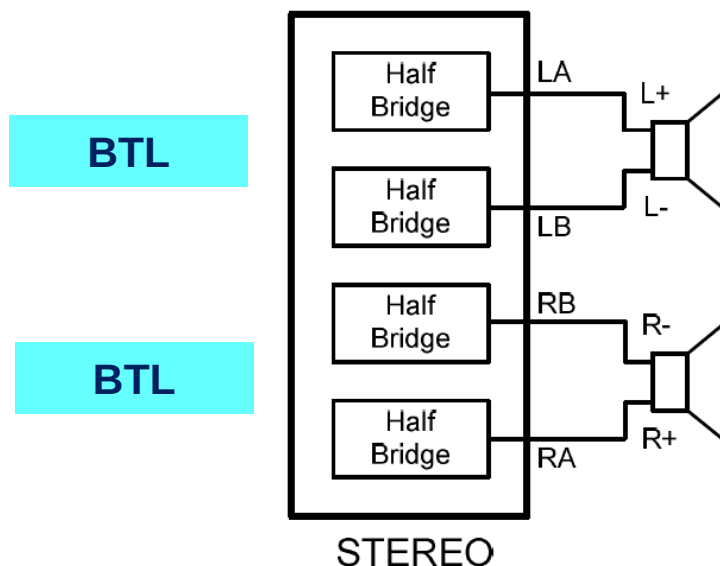


Digital-in D Amp: 2.1 Channel

ESMT	TI	Note
AD83584D	5711	10Wx2 + 20W, 2SE + 1 BTL (2BTL)
AD83586B	X	20Wx2 + 40W, 2BTL + 1PBTL (4BTL)

TPA5711/AD83584D
in 2.0 model (20W*2)

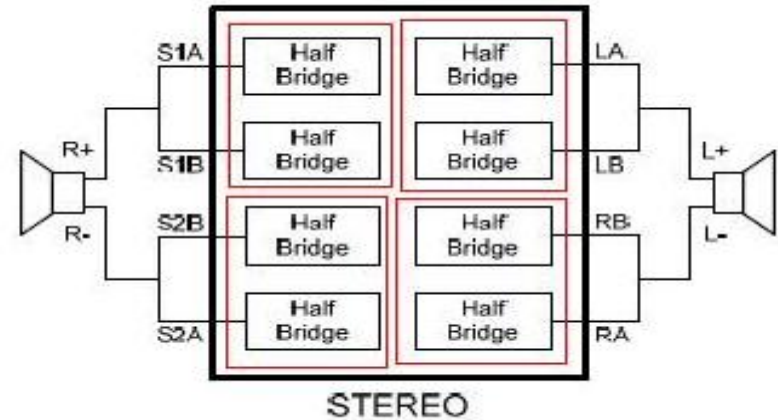
TPA5711/AD83584D
in 2.1 model (10W*2+20W)



AD83586B – 4 BTL

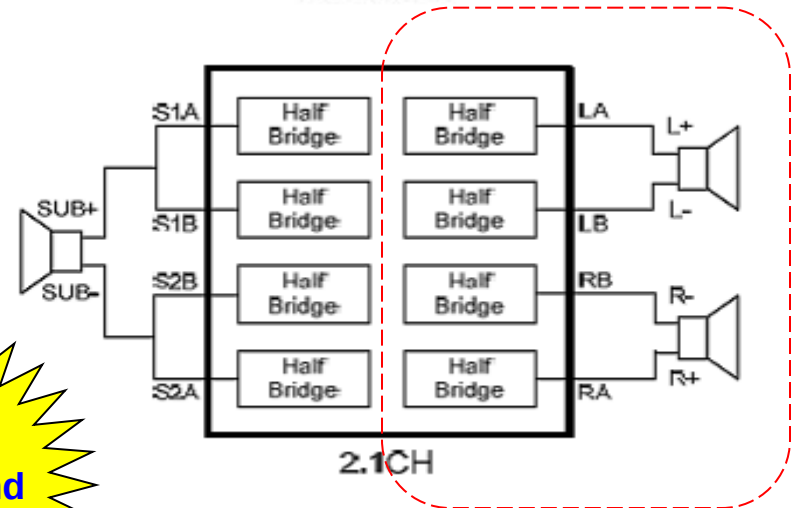
- 2.0CH Mode: 40W x 2CH

supports 8, 6, 4Ω (BTL mode)
vs. TI 5711's 8Ω only



- 2.1CH Mode: 20W x 2CH + 40W

L/R output are both BTL
vs. TI L/R **SE** only



- Mono Mode: 80W



AD83586B Application



Sound Bar



Bluetooth 

P-127J High Power Bazooka Bluetooth Speaker with NFC

- High Power Output: 2 x 40W RMS (80W Total Power)
- Bluetooth Wireless Function with NFC
- Mic/Guitar Input for guitar and vocal practice
- Bass & Treble Effect
- Echo Effect
- Aux In Function
- Shoulder Strap
- AC Adaptor or Rechargeable Battery Operated
- Dimension: 620(W) x 255(D) x 250(H) mm

cocoon
PORTABLE

DENON
PROFESSIONAL

marantz
PROFESSIONAL



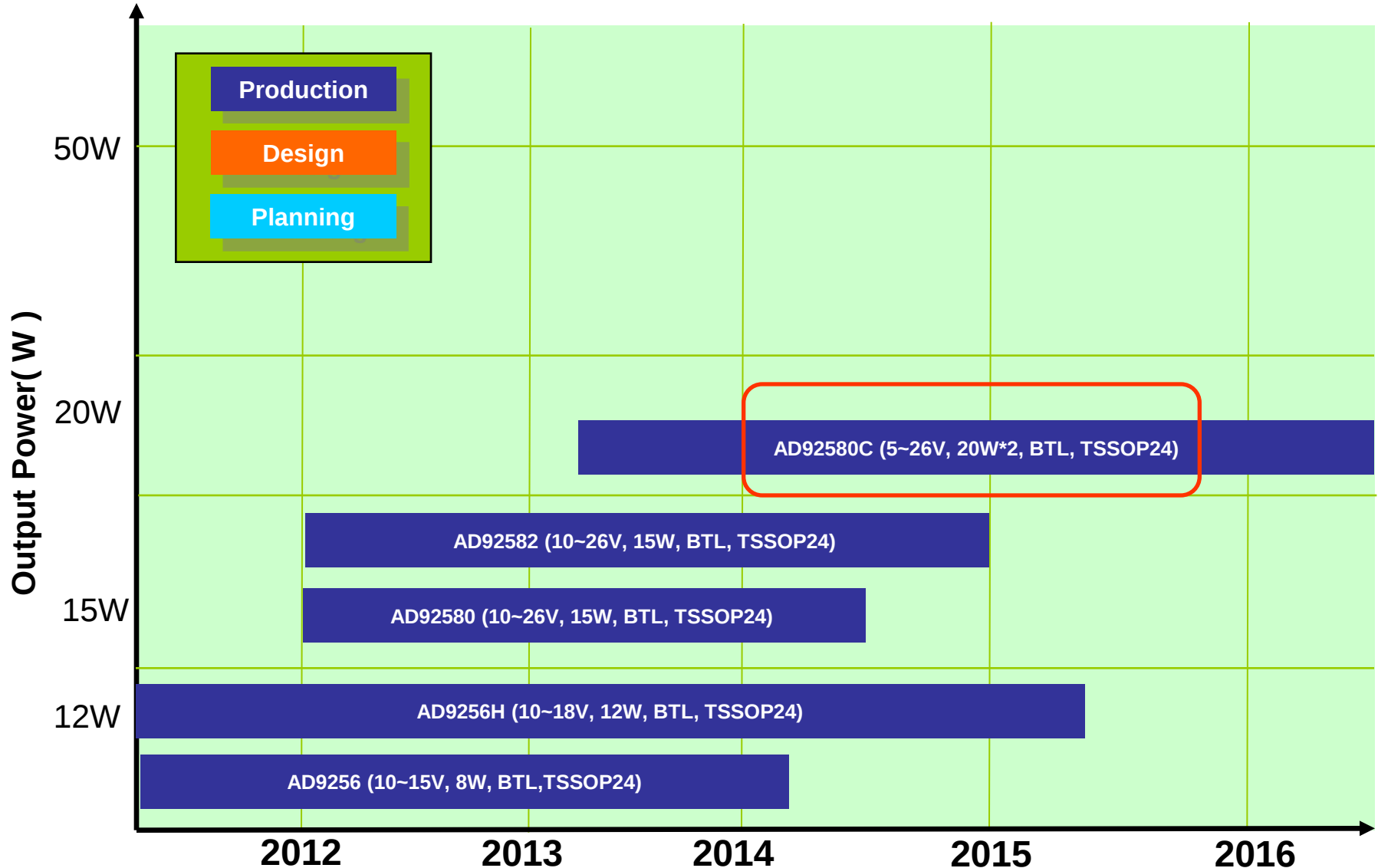
USB Audio

Product	CH	VDD (V)	Load	Power (W)	Recording	Package	Features
AD62550	2	5	4	2	X	LQFP-32	D Amp, I2S in/out
AD62555	2	5	4	2	X	TSSOP-24	D Amp
AD62553	2	5	4	2.6	O	LQFP-64	D Amp, I2S in/out Mic/Line in Headphone
AD62556	2	5	na	na	O	LQFP-48	Mic/Line in Headphone
AD62557	2	5	4	2.6	O	LQFP-48	D Amp, I2S in/out Mic/Line in

Line Driver

Product	Operation Voltage (V)	Max Output	Feature	Package	Pin to Pin
AD22650	3.0~5.5V	3Vrms	Popless	TSSOP-14	TI DRV602/603
AD22654	3.0~5.5V	3Vrms	Popless	MSOP-10	
AD22653(B)	3.0~3.6V	2Vrms	Popless/Mute	TSSOP-14	TI DRV632
AD22655	3.0~3.6V	2Vrms	Popless/Mute Programmable Gain	TSSOP-14	TI TPA6139
AD22657B	3.0~3.6V	2Vrms	Popless/Mute	MSOP-10	

PWM Class D Roadmap



Power IC

AEC-Q100 Line Card

AEC Products	LDO		HV DCDC					
P/N	EMP8130	EMP8045	EML3192	EML3190	EML3193(B)	EML3191(B)	EML3420/1	EML3290
Vin	1.7V~5.5V	3.0V~32V	4.5V~36V	4.5V~36V	4.5V~36V	4.5V~36V	4.5V~40V	4.5V~36V
Freq(MHZ)	-	-	0.42	0.42	1.5(2)	1.5	2.1	2
Iout (A)	0.3	0.15	3	5	3	5	6	3
Feature	Ultra High PSRR Small Package	HV, Low Iq, Vo_1.5%	Non-Sync. PSM/PWM Power Good*	Non-Sync. PSM/PWM Power Good*	Non-Sync. PSM/PWM Adj. Freq. (OVP)	Non-Sync. PSM/PWM Adj. Freq. (OVP)	Non-Sync. PSM/PWM Adj. Freq. (OVP)	Sync. PSM/PWM Adj. Freq. (OVP)
Package	DFN1x1	E-SOP-8	E-SOP-8	E-SOP-8	E-SOP-8	E-SOP-8	E-SOP-8	E-SOP-8
AEC-Q100 Grade	1	1	2	2	2	2	1	1

20180Q3 20180Q3

LDO Line Card

	Standard LDO		Very Low Drop LDO	Ultra Low-I _q LDO	Ultra High-PSRR LDO	High Current LDO				HV LDO	
Product	EMP8736	EMP8021	EMP8965 EMP8966	EMP8150	EMP8130	EMP8110	EMP8166	EMP8160 A	EMP8170	EMP804X (B) series	EMP8045 series
V _{in}	2.2V~5.5V	2.2V~5.5V	2.5V~5.5V	1.2V~5.5V	1.7V~5.5V	2.5V~6.5V	1V~5.5V	1V~5.5V	1V~5.5V	3.0V~40V 3.0V~20V	3.0V~32V
I _{out}	300mA	600mA	600mA	250mA	300mA	1.5A	1A	2A	3A	150mA	150mA
Feature	ADJ		Very Low Drop ADJ	I _q =1uA, High PSRR Small Package	Ultra High PSRR Small Package	High Current Power Good	High Current Low	High Current Low	High Current Low	HV, Low I _q , Vo_1%(B)	AECQ100 HV, Low I _q , Vo_1.5%
Package	SOT-23-5 SC70-5	SOT23-5 SC70-5 SOT89-3	SOT23-5 SOT23-6	SOT23-5 DFN1X1	SOT23-5 SC70-5 SC82-4 DFN1x1 SOT23-3 TDFN2X2-6	SOT223 TO-252 SOP8-E	SOT23-5 SOP8-E	SOP8-E	SOP8-E	SOT23-3 SOT23-5 SOT89-3	E-SOP-8

Buck Converter Line Card (5V)

	5V					
Product	EML341X series	EML3380/3 EML302X	EML3210	EML3320	EML3321	EML3322
Vin	2.5V~5.5V	2.5V~5.5V	2.5V~5.5V	2.7V~5.5V	2.7V~5.5V	2.7V~5.5V
Iout (A)	1.2 1.5 2.0	1.0	1.0/1.0	2	3.0	2.0/2.0
Control	Sync. PWM	Sync. PWM PSM	Sync. PWM PSM	Sync. PWM PSM	Sync. PWM PSM	Sync. PWM PSM
Package	TDFN-3x3-6 TDFN-3x3-8 SOP-8-E	SOT-23-5 TDFN-2x2-6	TDFN-10	SOT-23-5 SOT-23-6	TDFN-2x2-8	TDFN-3x3-10

P2P RT8010
P2P AP3417C
P2P SY8088

Buck Converter Line Card (HV)

	High Voltage				
Product	EML3230	EML319X series	EML3290	EML3420 EML3421	EML3350
Vin	4.5V~23V	4.5V~36V	4.5V~40V	4.5V~40V	4.5V~60V
Iout (A)	3.0	3.0 5.0	3	6A	1.5A
Control	Sync. PWM	Non-Sync. PSM PWM Power Good* Adj. Freq. OVP	Sync. PSM PWM Adj. Freq. OVP	Non-Sync. 2.1MHz Iq=180uA	Non-Sync. 1.5MHz
Package	SOP-8-E	SOP-8-E	SOP-8-E	SOP-8-E	SOP-8-E

P2P MP2482
P2P MP1584
P2P MP4462

P2P TPS54540

Boost Converter Line Card

	5V			
Product	EMH7600 Series	EMH7070	EMH7080B	EMH7090
V _{in}	0.9V~5.5V	2.6V~5.5V	2.9V~12V	2.9V~12V
Current Limit (A)	1	2.5	5.0	6.0
Control	Sync./PFM	Async PWM	Async PWM	Async PWM
Package	MSOP-8 SOT-23-5 TDFN-2x2-6	SOT-23-6	SOP-8-E TDFN-3X3-8	SOP-8-E

Battery Charger Line Card

	Linear Charger			Switching Charger
Product	EMC5754 EMC5755	EMC5040 EMC5042	EMC5050 EMC5051	EMC5090
AMR (V)	6	13.5 15	7	6.5
Vbat (V)	4.2/4.35 ± 1%	4.2/8.4 ± 1%	4.2/4.35 + 1%	4.2/4.35 + 1%
Iout (A)	1.0 1.2	1.2	1.5 2.0	2.5
Features	TR	TR Temp Sense OVP	TR Temp Sense Timer	Temp Sense Timer OVP
Package	SOT-23-5 SOP-8-E TDFN-3x3-6	TDFN-3x3-10 SOP-8-E	TDFN-3x3-10 TDFN-4x4-16	TDFN-4x4-16 TSSOP-16
P2P ISL6292				P2P LTC4001

DC/DC LED Driver Line Card (Back Light)

	LED Driver (Back Light)						Laser Diode Driver
Product	EMD3001	EMD2050	EMD2055	EMD2095	EMD2081	EMD2240	EMD2160/1
Topology	Charge Pump	Boost	Boost	Boost	Boost	Step-Down	Linear
Vin	2.7V~4.5V	2.5V~5.5V	2.5V~5.5V	2.5V~5.5V	5.2~30V	6~60V	3~5.5V
OVP (V)	-----	15	36	31	36.5	*	-----
Max Iout/Ch.	100mA	*	*	*	*	1A	300mA/150mA
Dimm	PWM	PWM	PWM	PWM	PWM	PWM	-----
Features		3S13P	10s3p	8s3p	10S4P	*	
Package	SOT-23-6 TDFN-2x2-6	SOT-23-6	SOT-23-6 TDFN-2x2-8	SOT-23-6	MSOP-10	SOT-23-5	SOT23-5

AC/DC LED Driver Line Card (Lighting)

		Linear LED Driver (Lighting)						PWM LED	RGB DRIVER
Product ID		EMD25010	EMD2155	EMD2530/1	EMD2181	EMD2182	EMD2183	EMD2230	EMD2540
Topology		Linear	Linear	Linear	Linear	Linear	Linear	Buck Controller	Linear
Input Voltage (Vac)		90~130 200~240	90~130 200~240	90~130 200~240	90~130 200~240	90~130 200~240	90~130 200~240	90~240	2.2~5.5
110V & 220V auto switch		X	X	X	X	X	X	0	X
Segment		1	3	2/3	1	1	1	1	3
Max Power (W)		8/12	15	15	10/25	10/25	10/25	10~50	X
Min Iout (mA)		5	40	5	10	10	10	5	-
Max Iout Peak (mA)		200/External MOS	100	120	60/External MOS	60/External MOS	60/External MOS	External MOS	300/EACH
Dimming	Triac	X	0	0	X	X	X	X	X
	PWM	X	0	0	X	0	X	X	0/EACH
	E-Dimming	X	X	X	0	X	0	X	X
PCR		X	0	0	0	0	0	0	X
Support External MOS		0	X	X	0	0	0	0	X
Protection	OVP (V)	X	400	X	450	450	450	0	X
	OTP (°C)	160	150	150	150	150	150	X	150
	UVLO	X	0	0	0	0	0	0	X
Package		SOP-8	SOP-8-E	SOP-8-EE- /TSSOP-16L	SOP-8-E	SOP-8-E	SOP-8-E	SOT23-6	TSSOP-14

Power Switch IC

	5V		
Product	EMS6030 Series	EMS6040 Series	EMS6050 Series
Vin	2.5~5.5	2.5~5.5	2.5~5.5
Iout (A)	2/2.5	3.0	3/3.4
Feature	OC Flag,& EN	OC Flag,& EN	OC Flag,& EN
Package	SOT23-5	MSOP8	SOT23-5

Conclusion

- An ISO 9000 certified public IC design company
- A rising PMIC/audio supplier out of a memory company
 - Extensive experience in volume production
- Products are well proven on the market
 - Products are thoroughly tested by tier one system makers
 - FAE support
 - Emphasize on device reliability