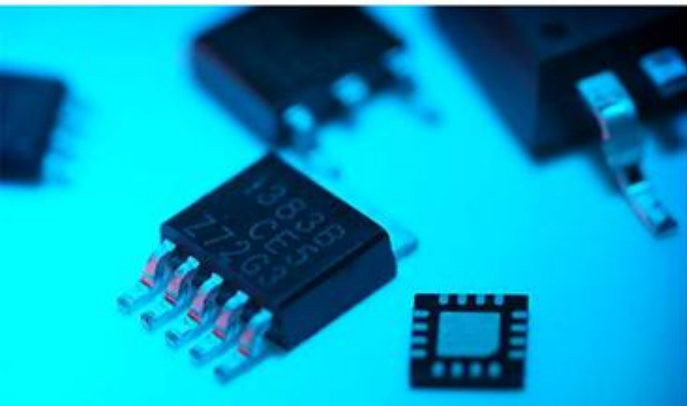




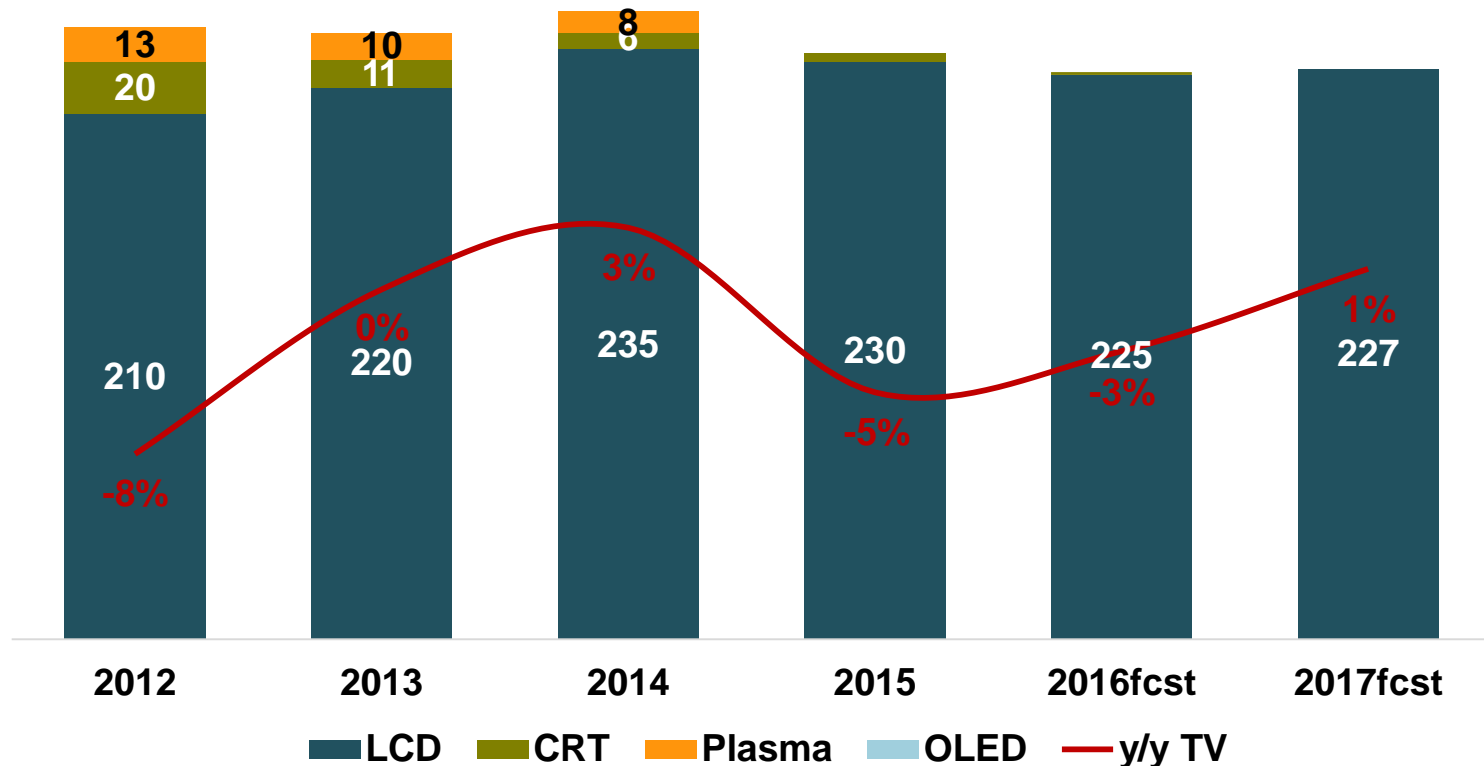
AIC Solutions for TV



Agenda

- Market Status & Trend
- Market Forecast
- Supply Chain (Core chip, IDH, Key player)
- New Product Feature
- Application Power Block
- Power Solutions
- Product Roadmap
- Promotion Strategy

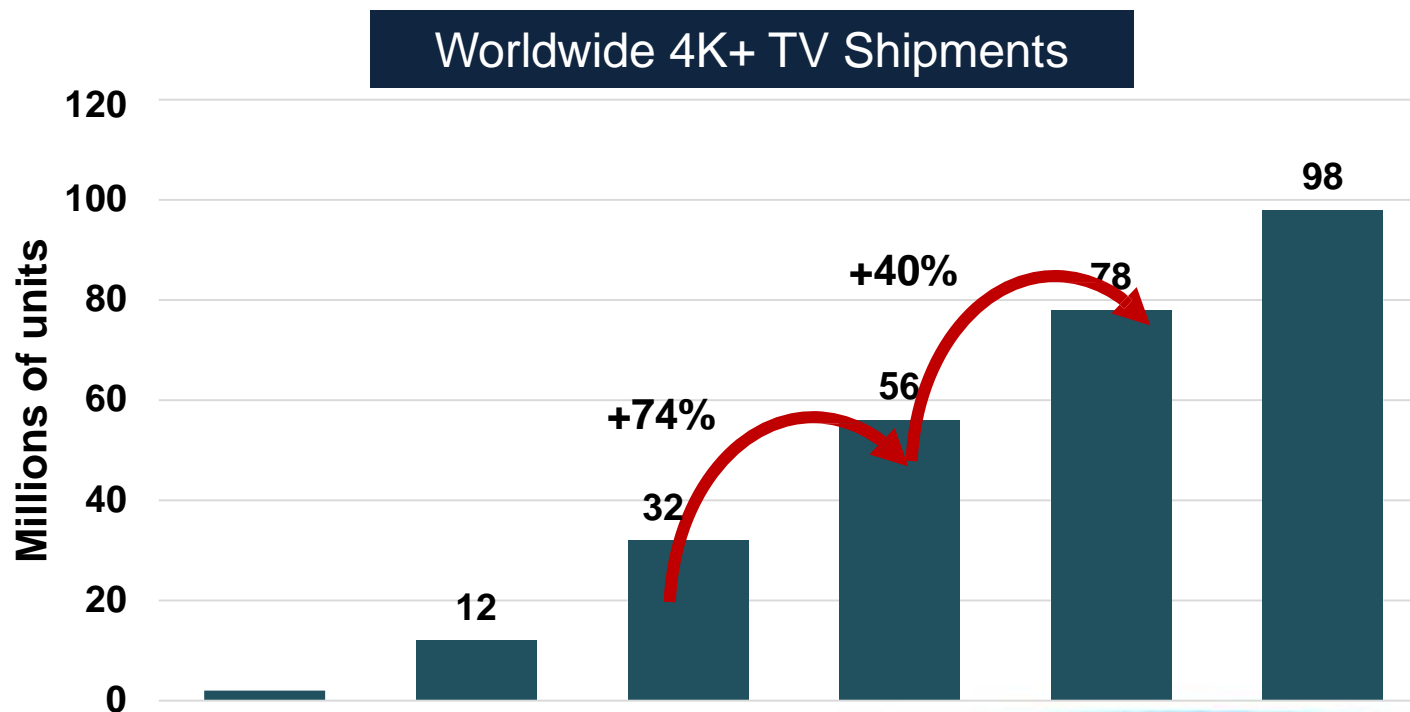
Global TV Volumes Leveling Off



Source: IEK, 2017/01

4K TV 連續三年跳躍式成長

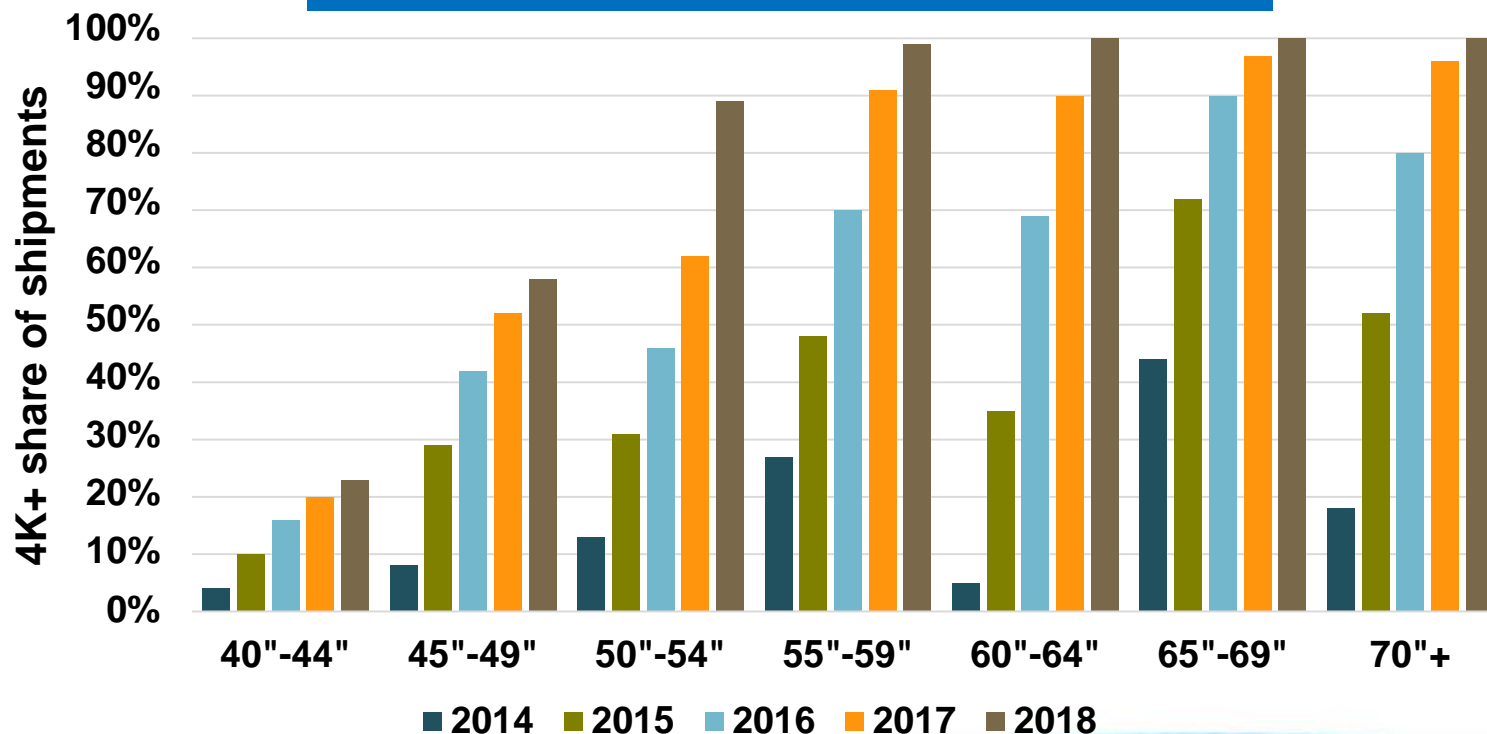
- The transition from 1080P to 4K+ at sizes greater than 50" will proceed very quickly
- Display industry already looking beyond to 8K



4K Mix Increasing Quickly

- In 2016, 55"+ shipments already 73%
- 50"+ nearly 100% 4K by 2018

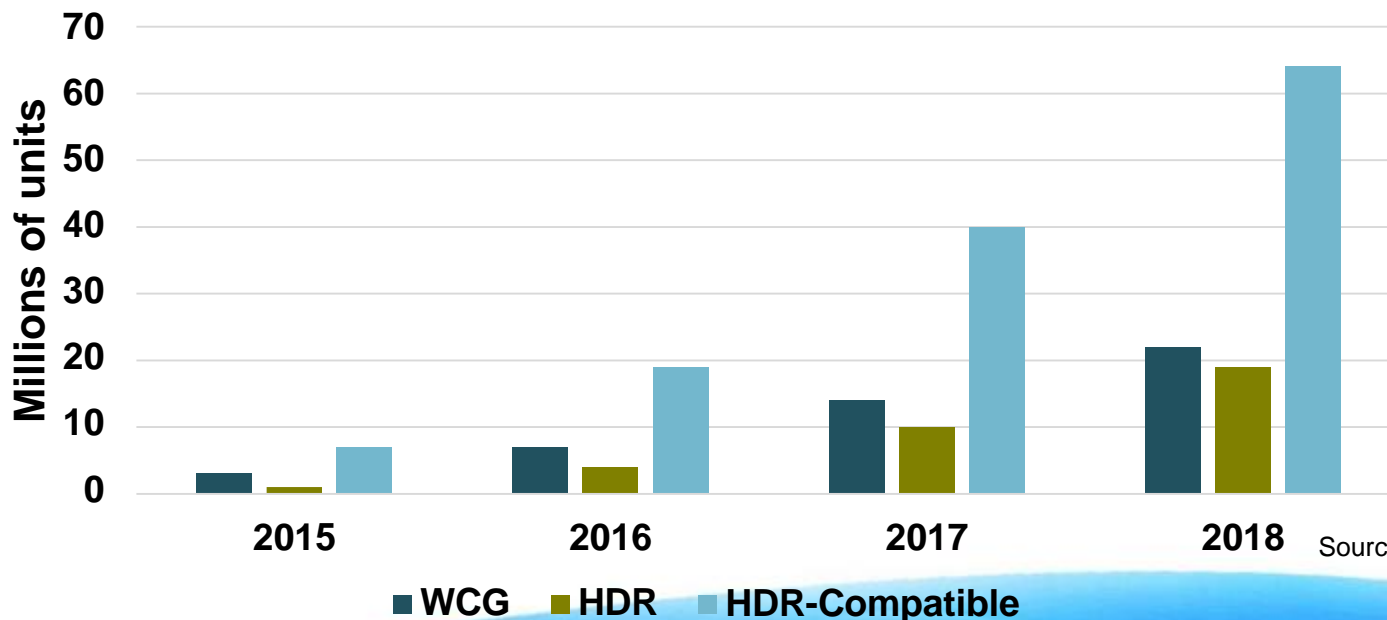
Worldwide 4K+ mix by size category



HDR and WCG Enhance 4K

- Forecasting 10M HDR TV , HDR compatible nearly 100% 4K TV by 2018
- WCG TV total 14M units in 2017 , all types of WCG can achieve 90%+ DCI P3

Worldwide WCG and HDR 4K+ TV Shipments



Source: CES.tech, 2017/01

美國TV市場強者恆強

TCL憑藉垂直整合與Amazon結盟異軍突起

Q1-Q3 Shipments	2015	2016	Y/Y
Samsung	7,182,792	7,987,933	11%
Vizio	5,356,338	5,404,749	1%
LGE	2,742,131	3,020,475	10%
Sony	1,379,498	1,401,085	2%
Hisense	906,880	858,010	-5%
TCL	846,420	1,540,230	82%
Sharp	581,000	307,760	-47%
RCA	520,765	302,200	-42%
Haier	300,050	112,880	-62%
Hitachi	149,258	159,636	7%
Grand Total	28,242,082	28,629,595	1%

Source: IHS, 2017/01

Global LCD TV Shipments Grew 1.6% Annually in 2016

- Hisense and TCL made gains by expanding into overseas markets
 - China's Hisense and TCL took the third and fourth spot in the annual ranking by increasing their shipments 3.9% and 0.8% respectively, reaching 13.3 million and 13.2 million units.
 - Both brands relied on overseas markets to boost their shipments due to the gradual saturation of the domestic market. Competition in China will become more intense as Internet brands offer high-specification products at reduced prices to take market shares away from local second- and third-tier brands. With survival at stake, major domestic brands will grow even larger and push smaller competitors out of the market.

Table: Global Ranking of Branded LCD TV Vendors by Shipments, 2015~2016

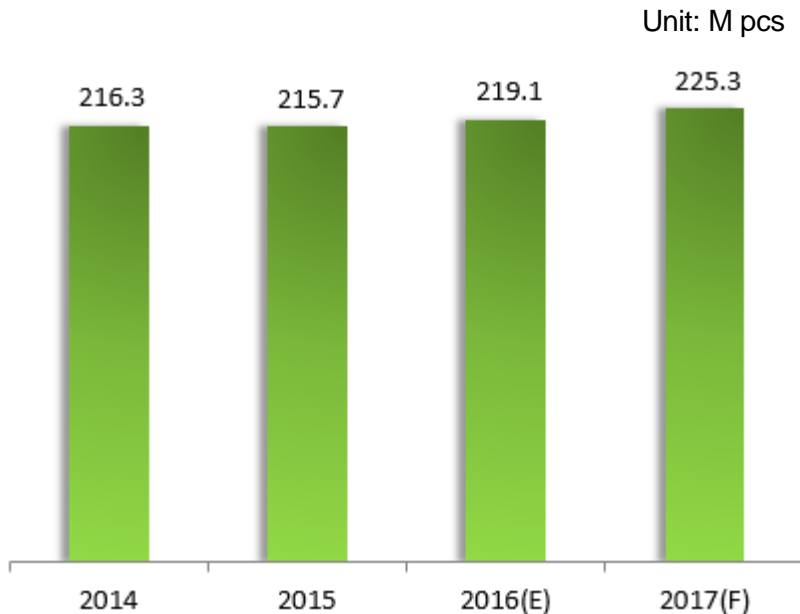
Company	2015		2016		YoY
	Rank	Shipments	Rank	Shipments	
Samsung	1	47.9	1	47.9	0.0%
LGE	2	29.4	2	28.2	-4.1%
Hisense	4	12.8	3	13.3	3.9%
TCL	3	13.1	4	13.2	0.8%
Sony	5	12.1	5	11.7	-3.7%
Others	100.4		105		4.5%
Shipment Total (in Million Units)	215.7		219.2		1.6%

Source: WitsView, Feb., 2017

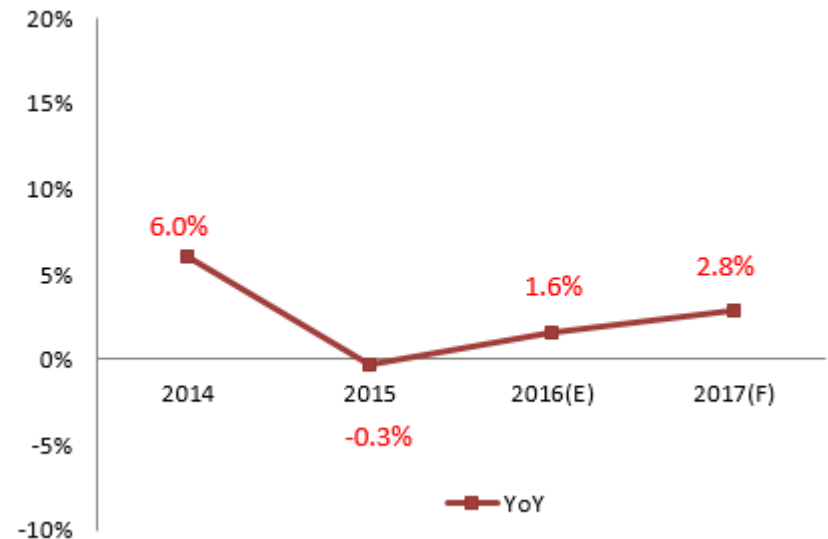
2017's TV Brand Shipment Rose 2.8% YoY

- WitsView's forecast WW LCD TV shipment in 2017 will total about 225.3 M units. Its annual growth will be 2.8%.

W/W TV Shipment Forecast



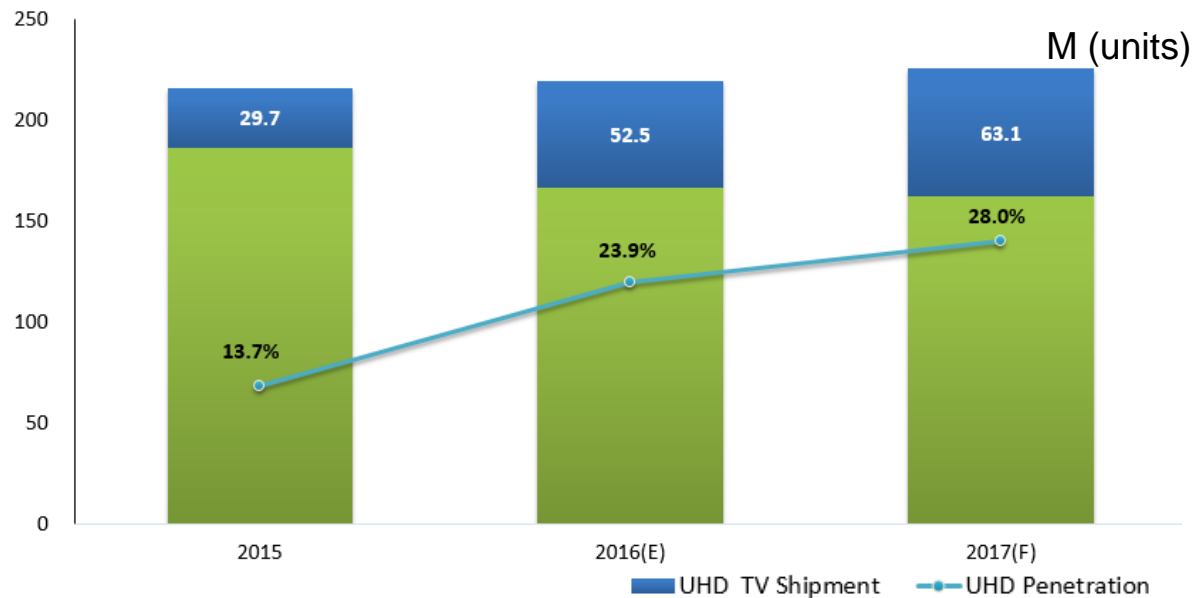
W/W TV Shipment YoY%



Source: WitsView, 2016/11

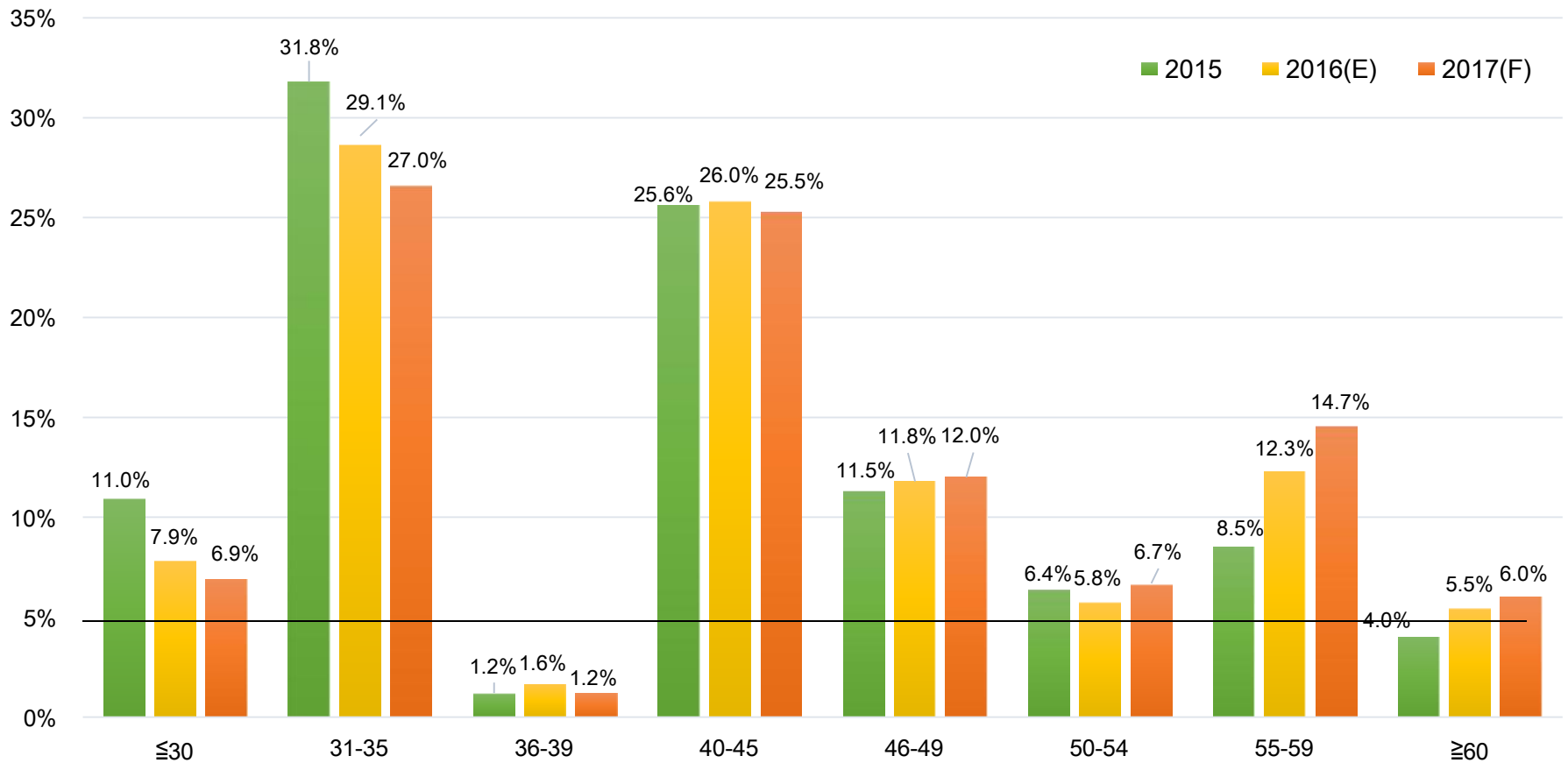
UHD TV Penetration to Grow to 28% in 2017

- The trends of TV size enlargement and rising resolution are more and more obvious. This year Korean brands' UHD penetration rates saw a considerable growth versus last year.
- Chinese brands' UHD TV average penetration in China's domestic market were all above 30%, and some brands' even surpassed 40%. The average exporting penetration rate didn't reach 20%.






















Source: WitsView, 2016/11

With TV Sizes' Uptrend, in 2017, ≥ 50 " LCD TV Share Might Reach Nearly 27%

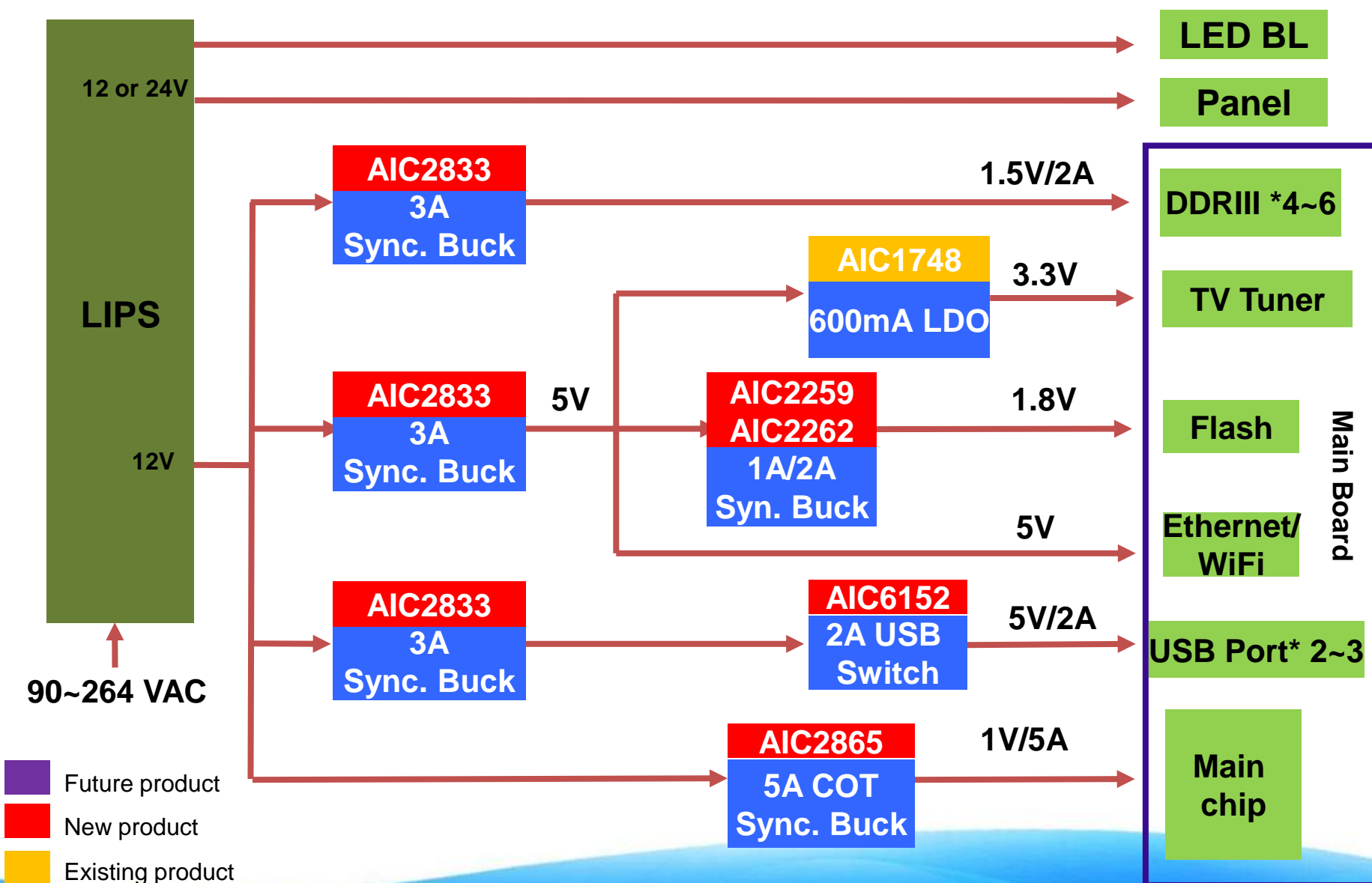


Source: WitsView, 2016/11

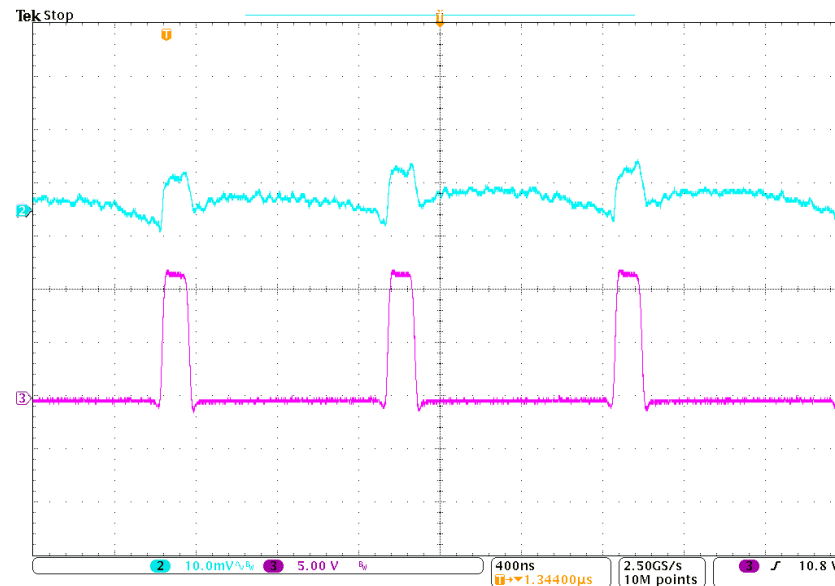
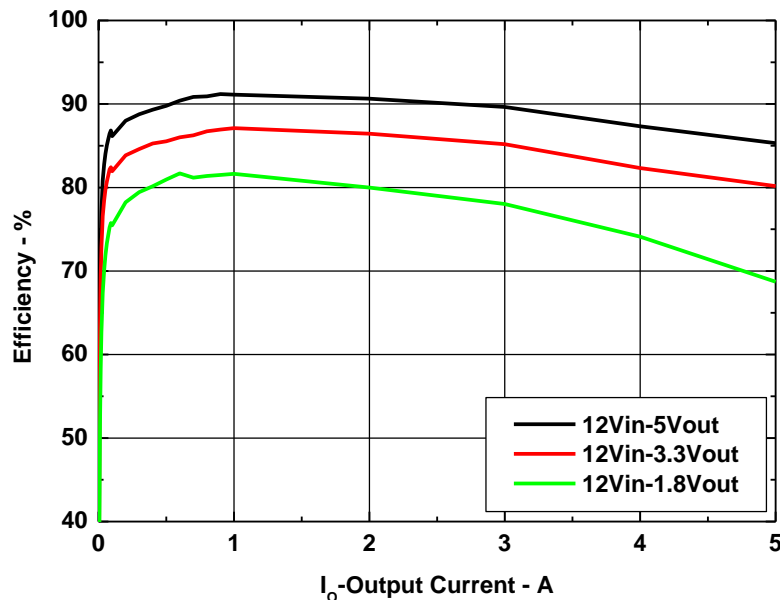
Supply Chain

Region	Key Customers	Core Chip Vendors
Oversea	    	 +  
China	    	 + 
Taiwan		 +  

Full HDTV Power Block

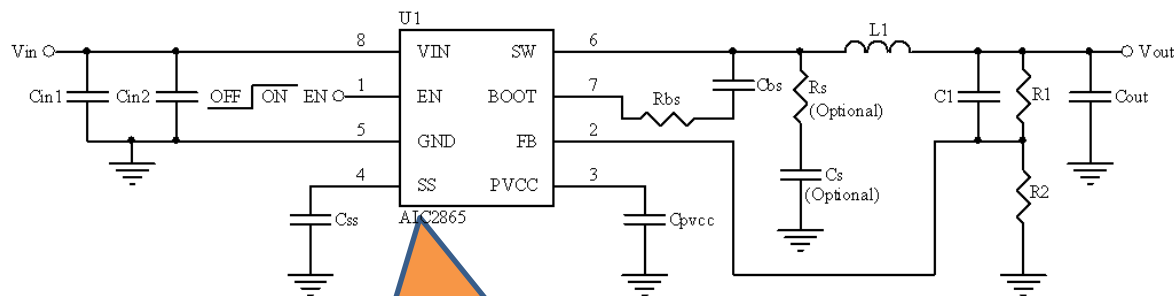


5A 16V 700kHz COT Synchronous Step-Down Converter

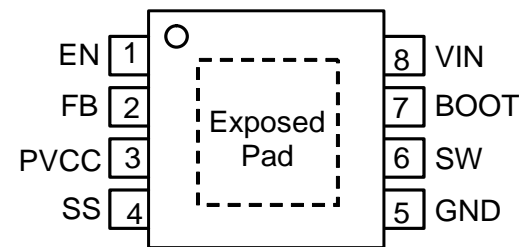


$V_{OUT}=1.05V$, $I_{OUT}=5A$ Ripple at $V_{IN}=12V$

Application Circuit



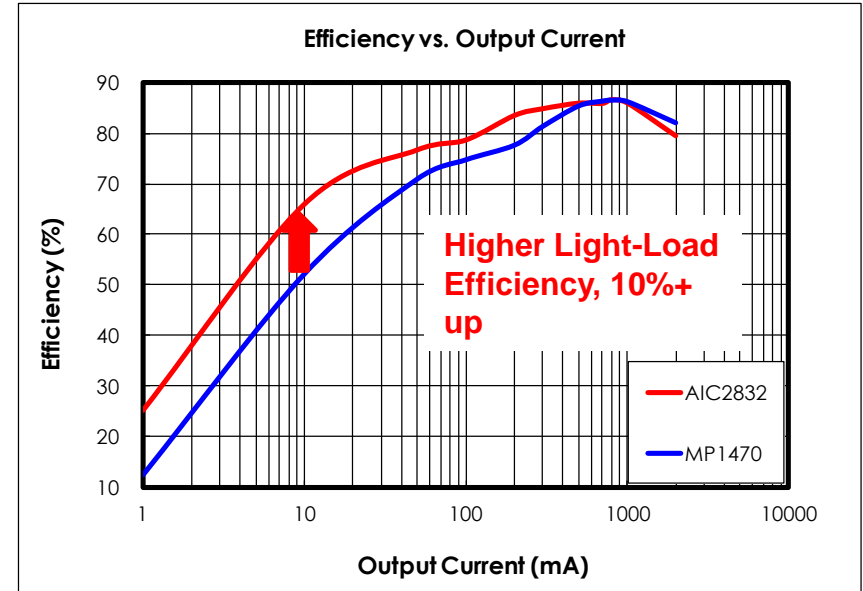
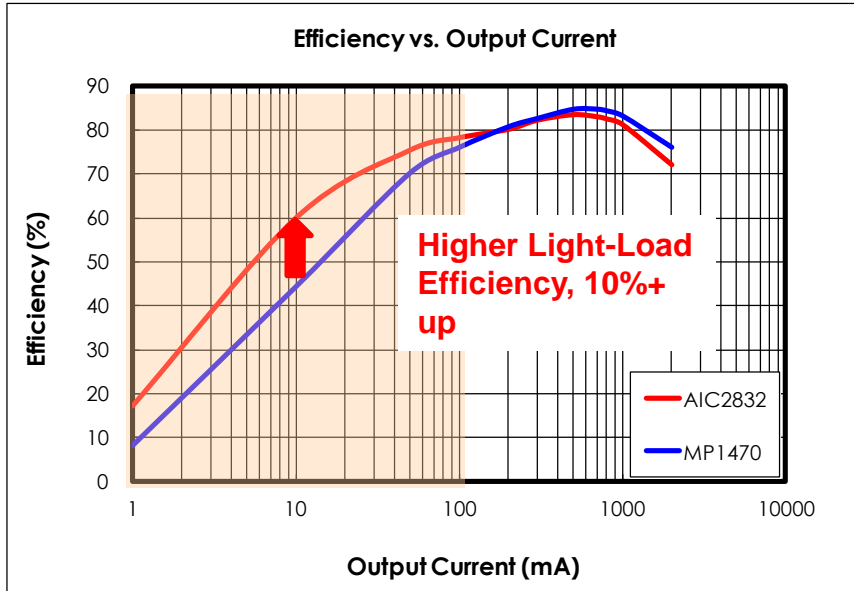
Package



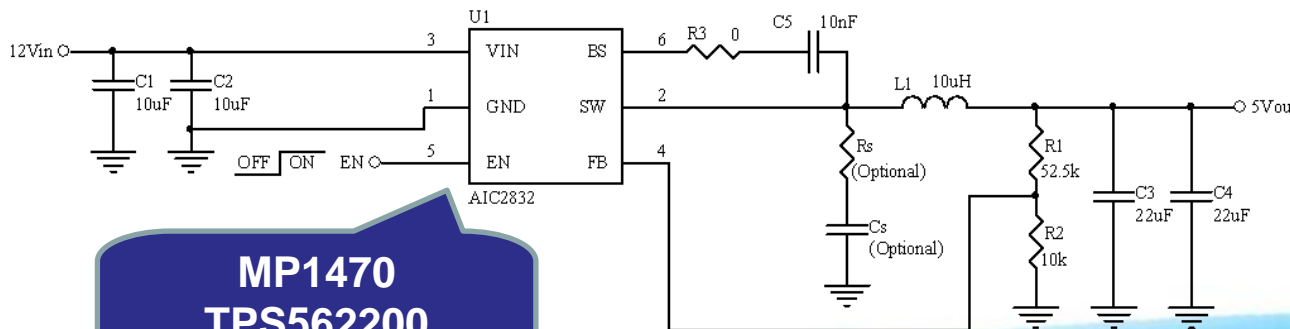
SOP-8 exposed pad

TPS54528 Compatible

2A 16V 490kHz PWM/PSM Synchronous Step-Down Converter

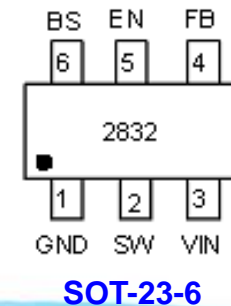


Application Circuit

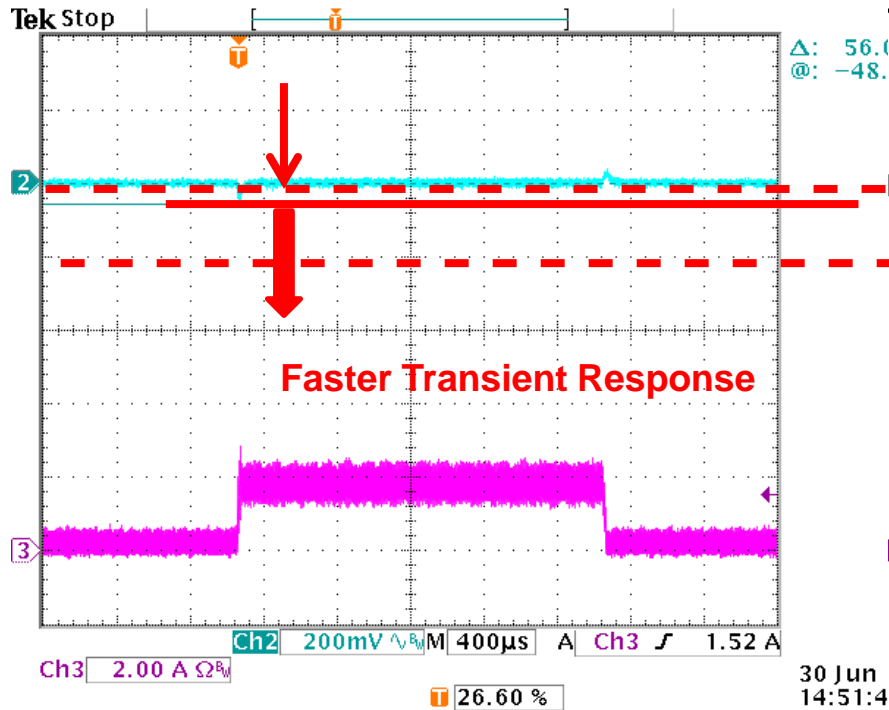


**MP1470
TPS562200
Compatible**

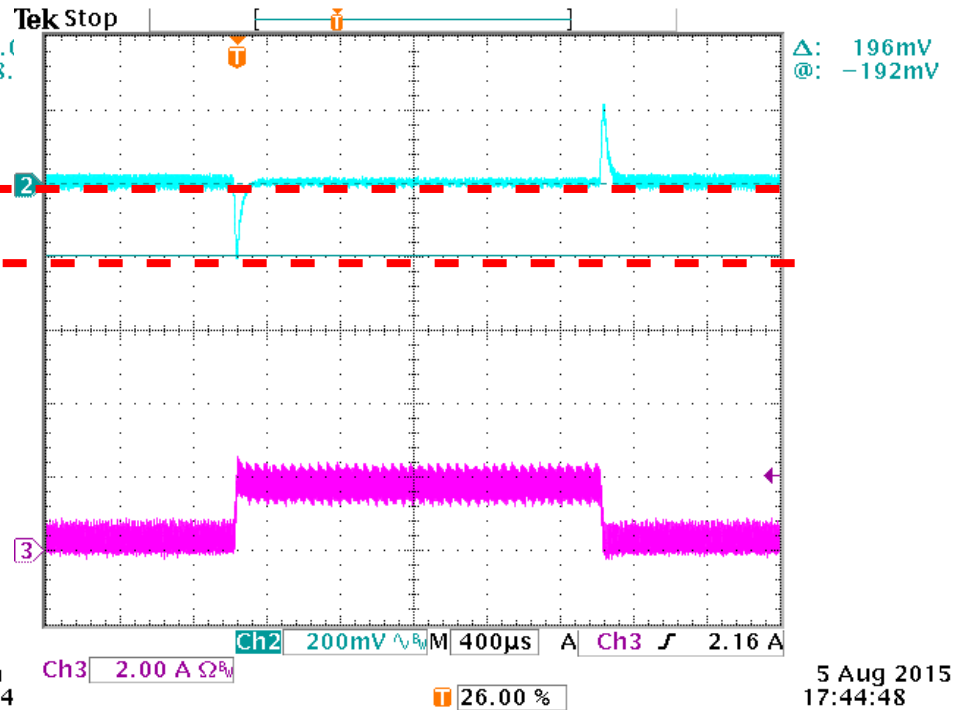
Package



2A 16V 490kHz PWM/PSM Synchronous Step-Down Converter



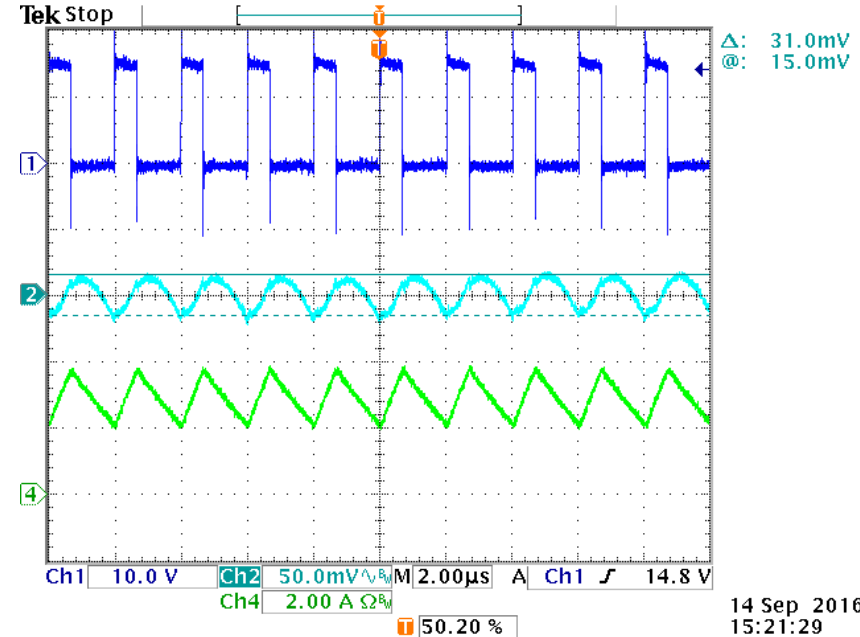
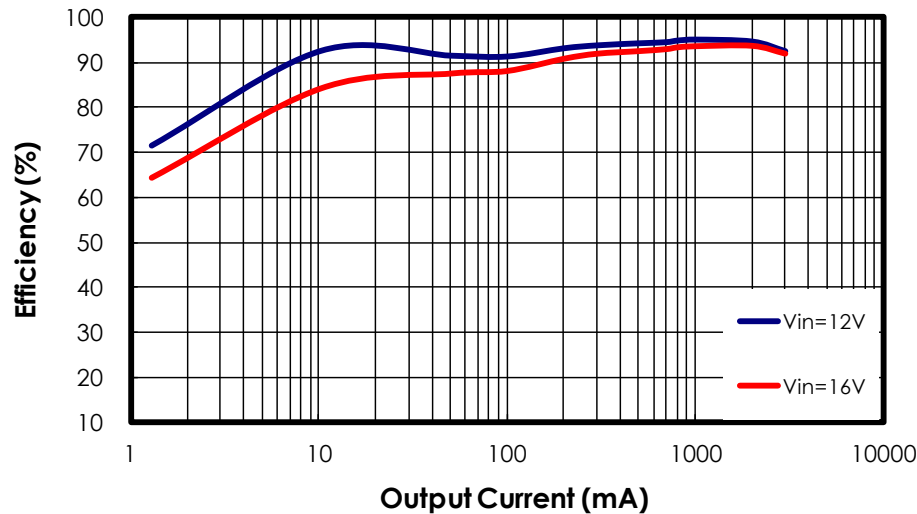
AIC2832 $V_{IN}=12V$, $V_{OUT}=1.05V$, $I_O=0.2 \sim 1.8A$,
drop=59mV
 CH2: Output Voltage, CH3: Inductor Current



MP1470 $V_{IN}=12V$, $V_{OUT}=1.05V$, $I_O=0.2 \sim 1.8A$,
drop=196mV
 CH2: Output Voltage, CH3: Inductor Current

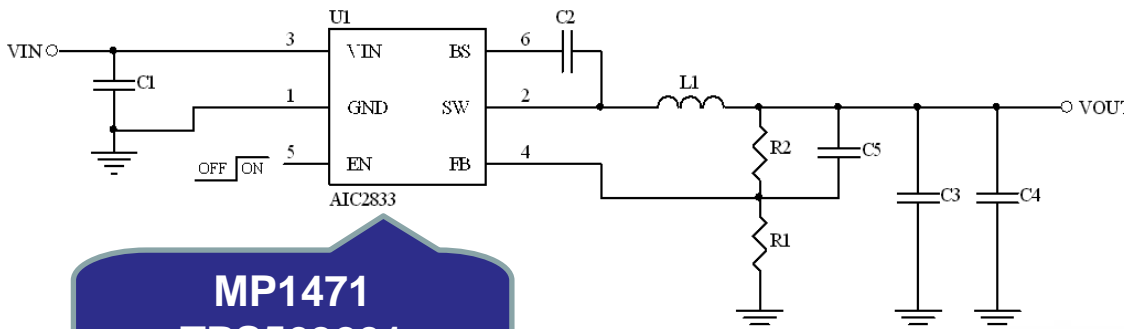
3A 16V 490kHz PWM/PSM Synchronous Step-Down Converter

Efficiency vs. Output Current



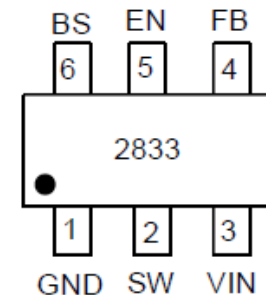
14 Sep 2016
15:21:29

Application Circuit



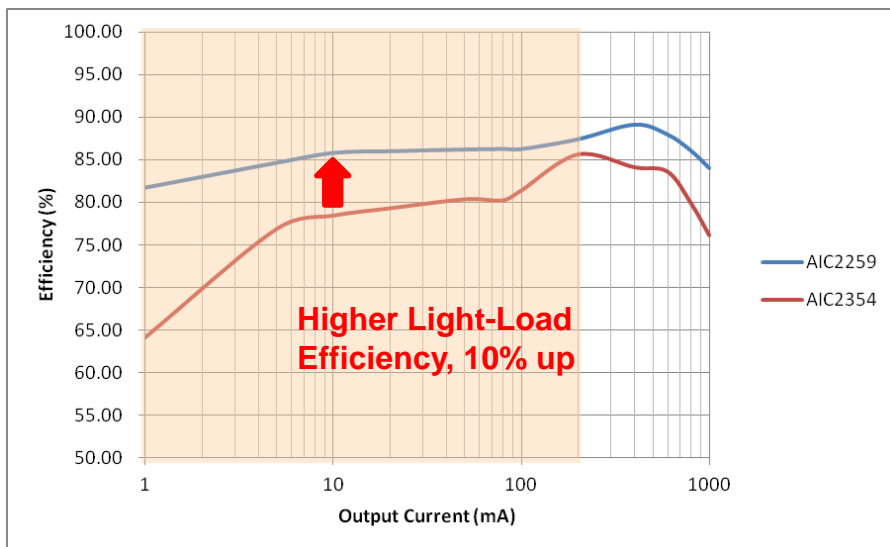
**MP1471
TPS563201
Compatible**

Package

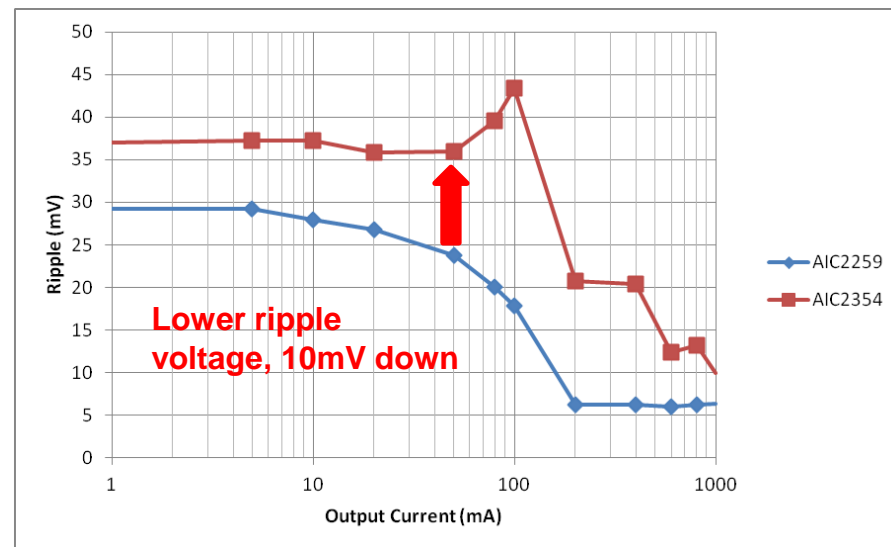


SOT-23-6

1A, 1.5MHz AOT Synchronous Step-Down DC/DC Converter

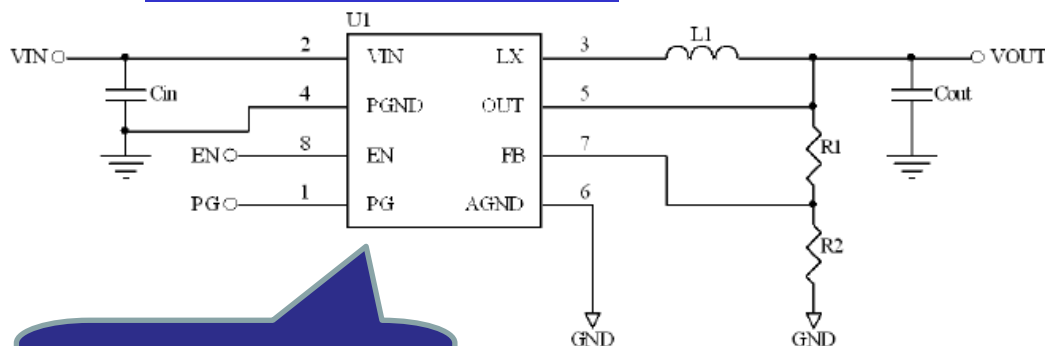


$V_{OUT}=1.0V$ Efficiency at $V_{IN}=5V$

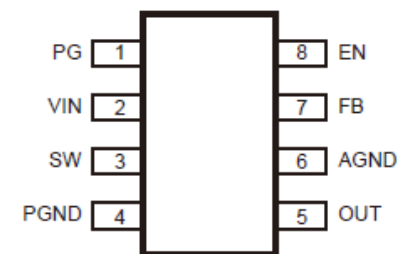


$V_{OUT}=1.0V$ Ripple at $V_{IN}=5V$

Application Circuit



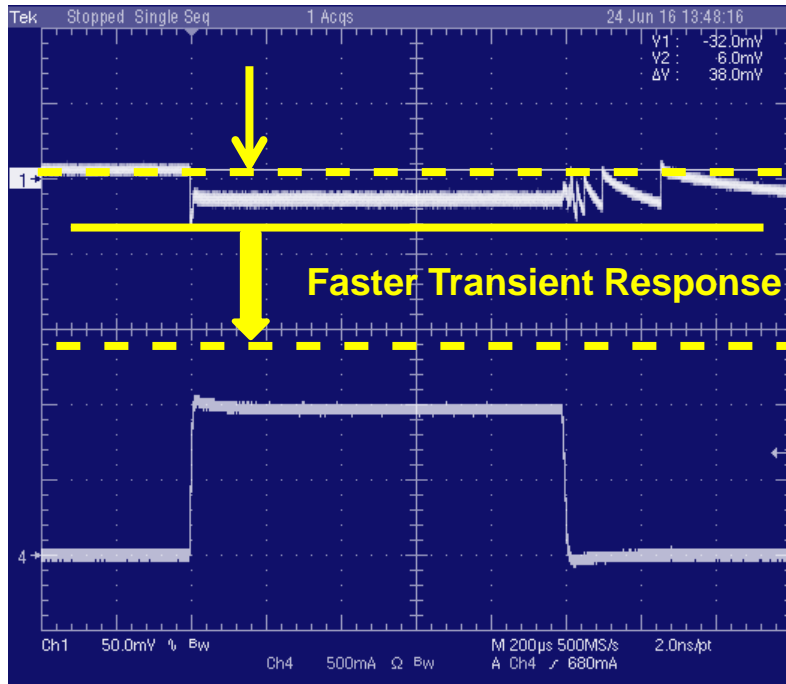
Package



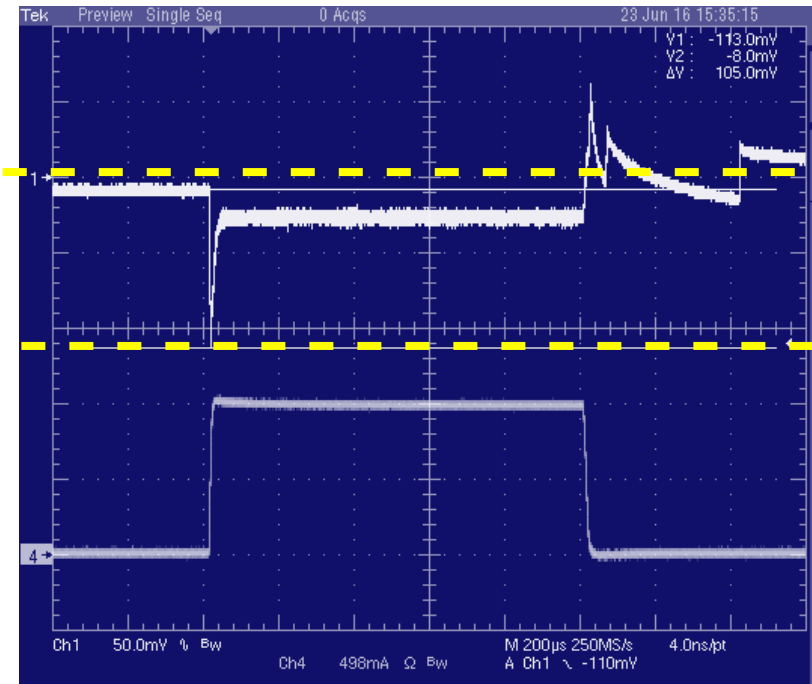
SOT-23-8

MP2159
Compatible

1A, 1.5MHz AOT Synchronous Step-Down DC/DC Converter

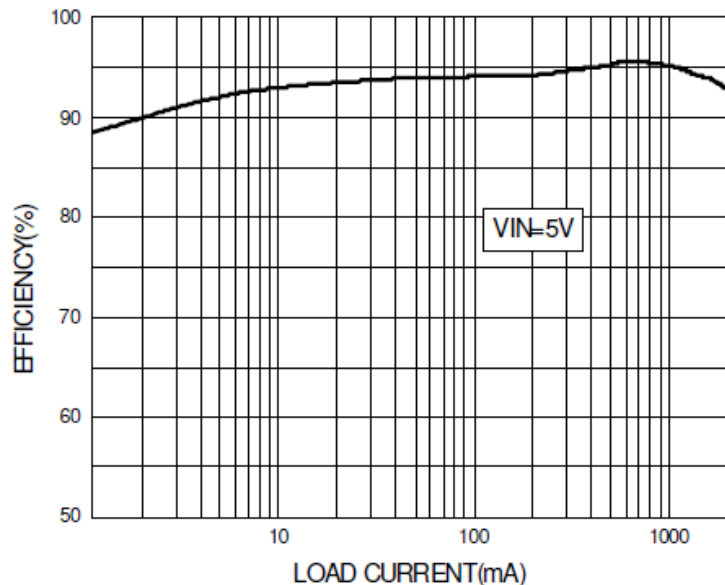


AIC2259 $V_{IN}=5V$, $V_{OUT}=1.0V$, $I_O=0 \sim 1A$,
drop=38mV
 (CH1: Output Voltage, CH4: Output Current)



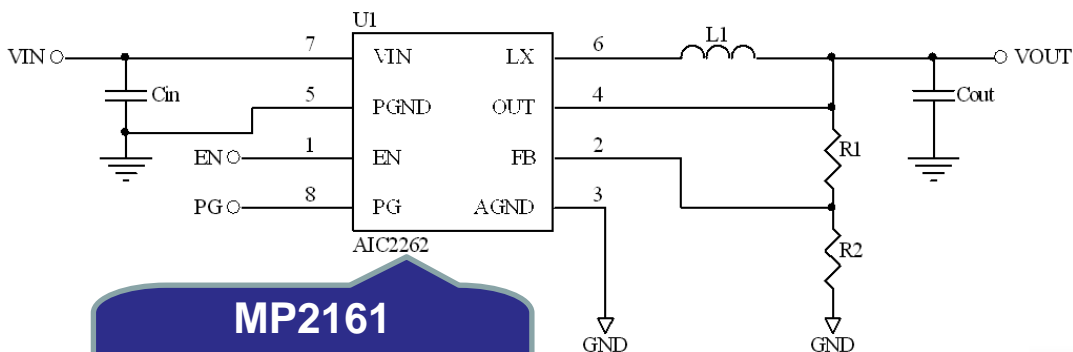
AIC2354 $V_{IN}=5V$, $V_{OUT}=1.0V$, $I_O=0 \sim 1A$,
drop=105mV
 (CH1: Output Voltage, CH4: Output Current)

2A 1.5MHz AOT Synchronous Step-Down Converter

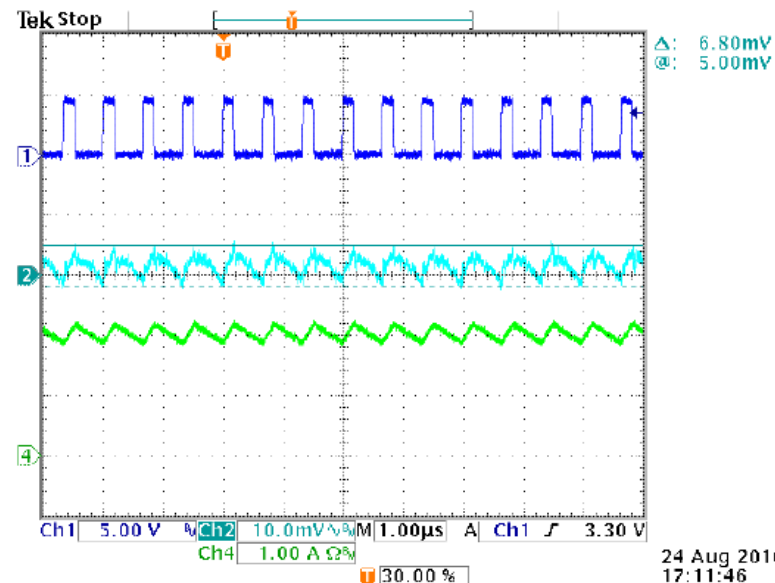


$V_{OUT}=3.3V, V_{IN}=5V$

Application Circuit

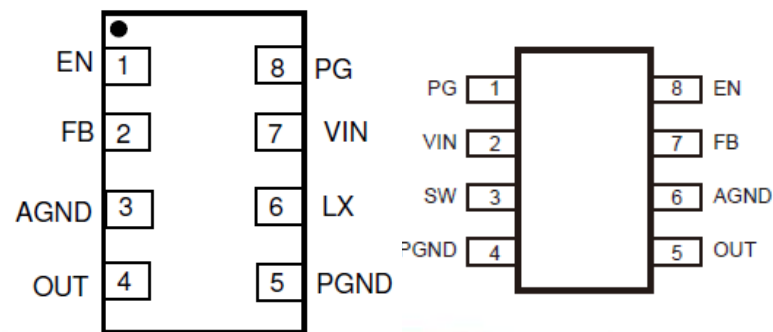


**MP2161
MP2162
Compatible**



$V_{OUT}=1.2V, I_{OUT}=2A$ Ripple at $V_{IN}=5V$

Package



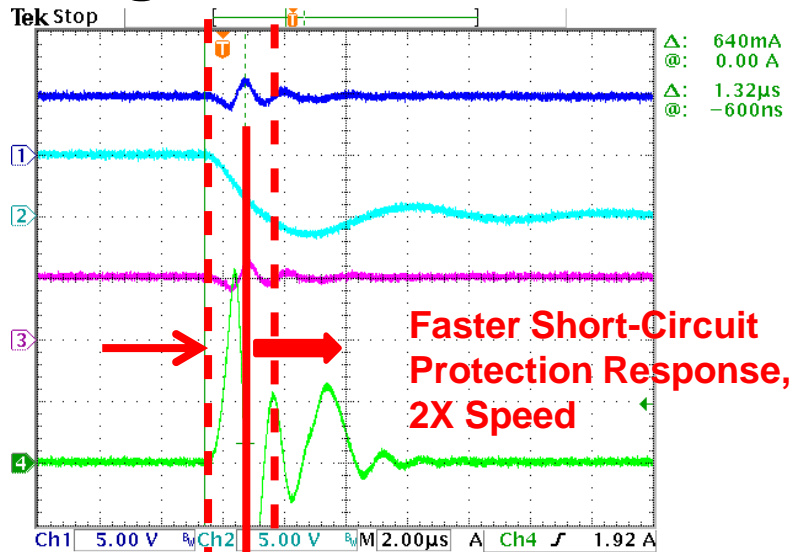
8-pin DFN 2mm x 1.5mm

SOT-23-8

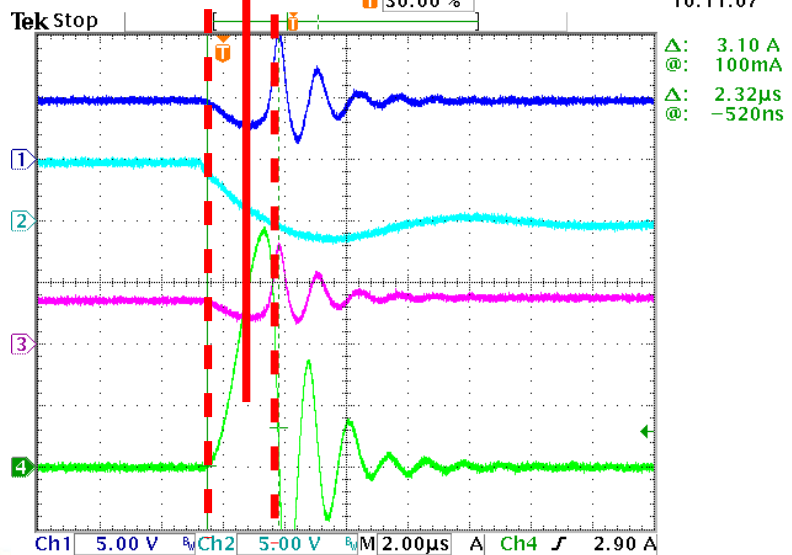
AIC22xx Product Series

Part Number	AIC2385	AIC2253	AIC2256	AIC2258	AIC2259	AIC2262
Input Voltage	2.5V~6V	2.5V~6V	2.5V~6V	2.5V~6V	2.5V~6V	2.5V~6V
Output Current	1.5A	1A	1A	1A	1A	2A
Switching Frequency	1.5MHz	1.5MHz	3MHz	1.5MHz	1.5MHz	1.5MHz
Quiescent Current	65uA	8uA	17uA	17uA	17uA	17uA
Control Mode	Current Mode PWM	AOT	AOT	AOT	AOT	AOT
Package	Wire-bond SOT23-5	Wire-bond TSOT23-8	Wire-bond TSOT23-8	Flip-chip TSOT23-8	Wire-bond TSOT23-8	Flip-chip TSOT23-8 DFN8
Remark	P2P TLV62565	P2P MP2158 MP2159	P2P MP2158 MP2159	P2P MP2158 MP2159	P2P MP2158 MP2159	P2P MP2161 MP2162

Single Channel USB Switch with Adjustable Current Limit



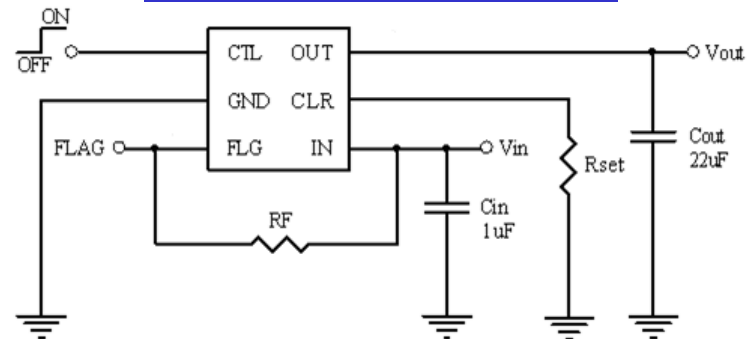
7 Jun 2016 10:11:07



24 May 2016 15:37:01

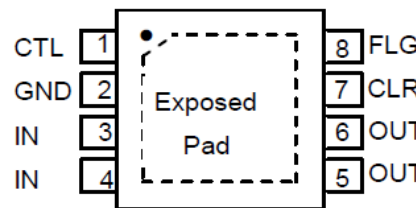
AIC6156 $V_{IN}=5V$, $I_{CL}=0.5A$, **Res. Time=1.32 μ s**
 (CH1: Input Voltage, CH2: Output Voltage, CH3: FLG, CH4: Input Current)

Application Circuit

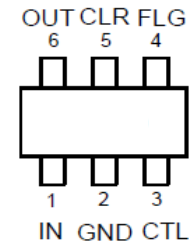


TPS2554 $V_{IN}=5V$, $I_{CL}=0.5A$, **Res. Time=2.32 μ s**
 (CH1: Input Voltage, CH2: Output Voltage, CH3: FLG, CH4: Input Current)

Package



SOP-8 EP



SOT-23-6

USB Power Switch at 3A

	AIC	TI	Rohm	On-Semi
Part Number	AIC6156	TPS2554 TPS2555	BD82024 BD82025	NCP383
Short Circuit Response Time(uS)	1.3	1.5	5	2
Continuous Load Current (A)	0.5~3 (Adj.)	0.5~2.5 (Adj.)	2.5 (Adj.)	0.5~2.1 (Adj.)
MOS R-DS-ON (mohm)	60	73	90	45
Supply current (μA)	85	90	95	99
Input Voltage Range (V)	3.5~5.5	4.5~5.5	2.8~5.5	2.7~5.5
Current Limit Threshold (mA)	3060/ 3600/ 4140 1700/ 2000/ 2300 425/ 500/ 575	2550/ 2840 / 3100 2150/ 2430/ 2650 420/ 480/ 530 185/ 230/ 265	2100/2500/3300	2580/2800/3010 900/1000/1100 500/600/700
Current Limit Accuracy (%)	±15	±12	±15	±8
High Side Switch	NMOS	NMOS	NMOS	NMOS
Flag Delay Time (mS)	9	8.5	12	7
Output discharge	Yes	Yes	Yes	No
Package	SOP-8/SOT23-6	VSON	SOP8	UDFN10

USB Power Switch at 2A

	AIC	TI	Rohm	On-Semi
Part Number	AIC6152	TPS2553	BD2222G BD2242G BD2243G	NCP380 NCV380
Short Circuit Response Time(uS)	1.3	2	5	2
Continuous Load Current (A)	0.5~2 (Adj.)	0.75~1.7 (Adj.)	0.2~1.7 (Adj.)	0.5~2.1 (Adj.)
MOS R-DS-ON (mohm)	60	85	89	70
Supply current (μA)	85	100	120	90
Input Voltage Range (V)	3.5~5.5	2.5~6.5	2.8~5.5	2.5~5.5
Current Limit Threshold (mA)	1700/ 2000/ 2300 425/ 500/ 575	1610/ 1700 / 1800 1215/ 1295/ 1375 490/ 520/ 550 100/ 130/ 150	1566/1696/1826 911/1028/1145 112/212/313	2100/2250/2500 1000/1150/1300 500/580/650
Current Limit Accuracy (%)	±15	±6	±8	±12
High Side Switch	NMOS	NMOS	NMOS	PMOS
Flag Delay Time (mS)	9	8	7	8
Output discharge	Yes	No	BD2242/43	No
Package	SOT23-6	SOT23-6	SSOP6	TSOP-6

ULDO Linear Regulators

AIC11xx/12xx/17xx Series

Output Current		≤150mA	≤300mA	≤600mA	≤1A	≤2A
Single Channel	Vin up to 12V	AIC1730	AIC1731 AIC1734	AIC1733 AIC1735		
	Vin up to 9V	AIC1742	Low Noise 25uVrms			
	Vin up to 7V	AIC1701 AIC1746	AIC1702 AIC1747	AIC1748	AIC1190	AIC1221
		Ultra Low Iq 3uA				
		PSRR 65dB@1kHz				
Dual Channel	Vin up to 7V		AIC1952	AIC1953		

Highlights

- **Focused Products**

- AIC2865 – 5A HVB in SOP8-EP, HLL η , pin-compatible with TPS54528
- AIC2832 – 2A HVB in SOT23-6, HLL η , pin-compatible with MP1470/TPS56220x
- AIC2833 – 3A HVB in SOT23-6, HLL η , pin-compatible with MP1471/TPS56320x
- AIC2259 – 1A LVB in SOT23-8, HLL η , AOT, pin-comp. with MP2159
- AIC2256 – 1A LVB in SOT23-8, HLL η , AOT, 3MHz Frequency, pin-comp. with MP2159
- AIC2253 – 1A LVB in SOT23-8, HLL η , AOT, 8uA Low Iq, pin-comp. with MP2159
- AIC2262 – 2A LVB in SOT23-8/DFN8, HLL η , AOT, pin-comp. with MP2161
- AIC6156/52/51 – 3A/2A/1A UPS in SOP8-EP and SOT23-6, 1.3uS Fast SCP, $\pm 7\sim 15\%$ current accuracy

- **Advanced Technology**

- AOT (Adaptive On-Time Control) –
 - **Higher** light-load eff., **Smaller** ripple V., **Faster** transient
- Low Iq – Power-saving, extending battery life, 30uA -> 3uA -> 0.3uA (Q2 '17)
- Fast Short-Circuit Response Time – 1.3uS

Mastering the POWER

