

ZINITIX Touch

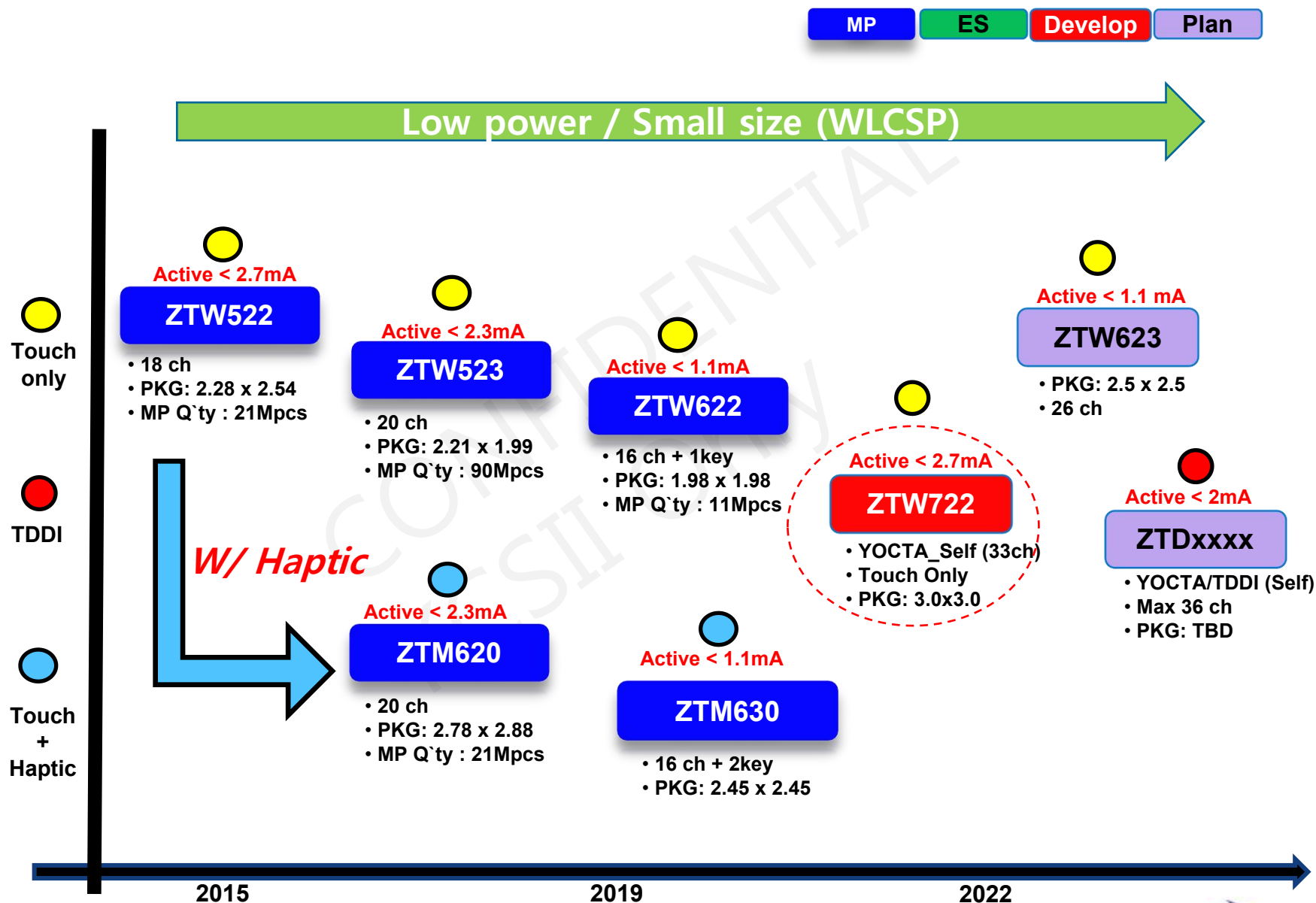
- Touch Solution
- Digital wheel Solution

CONFIDENTIAL
KCSII Only

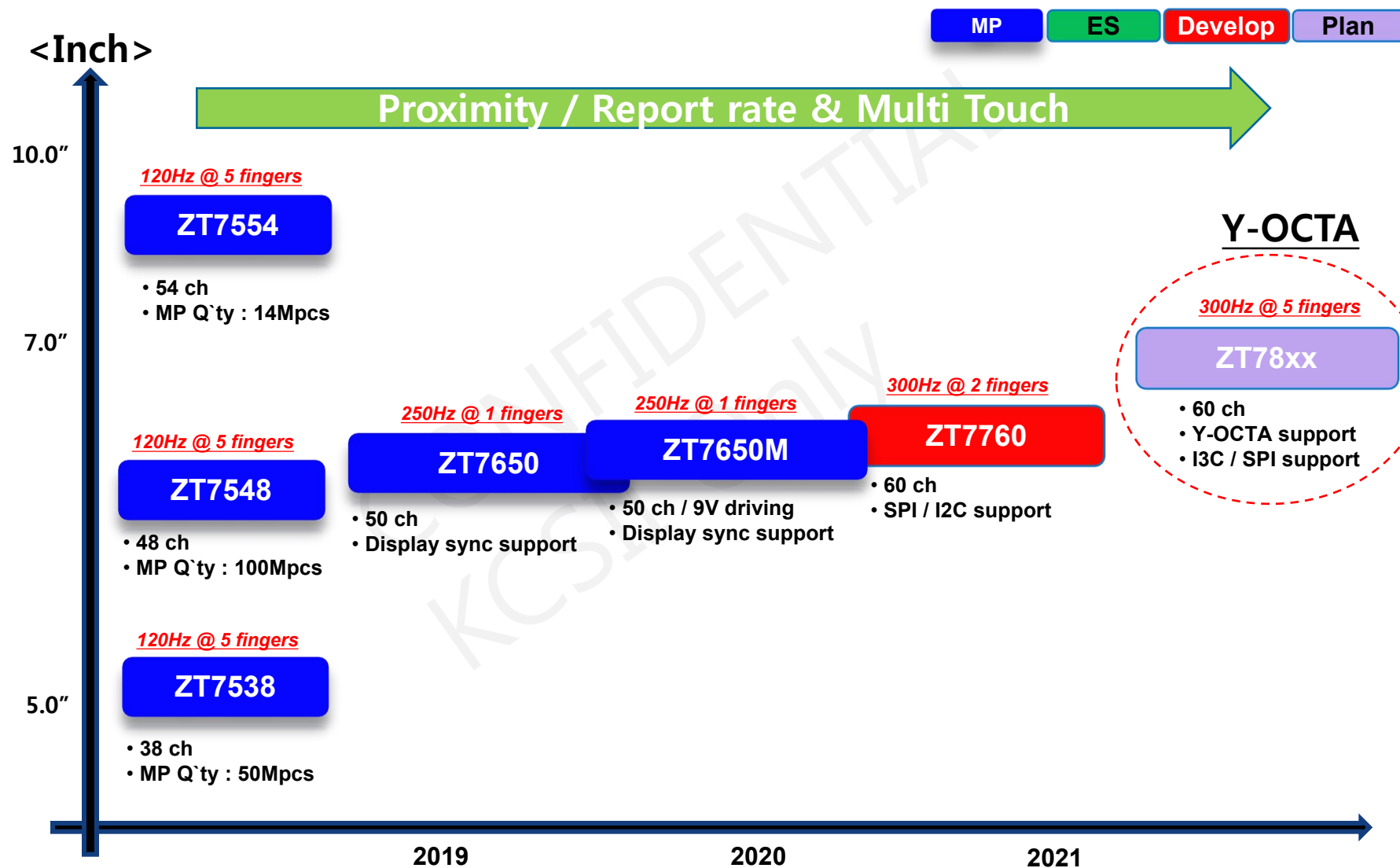


April, 2021

1-1. Touch Roadmap For Wearable



1-1. Touch Roadmap For Mobile



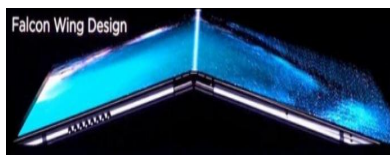
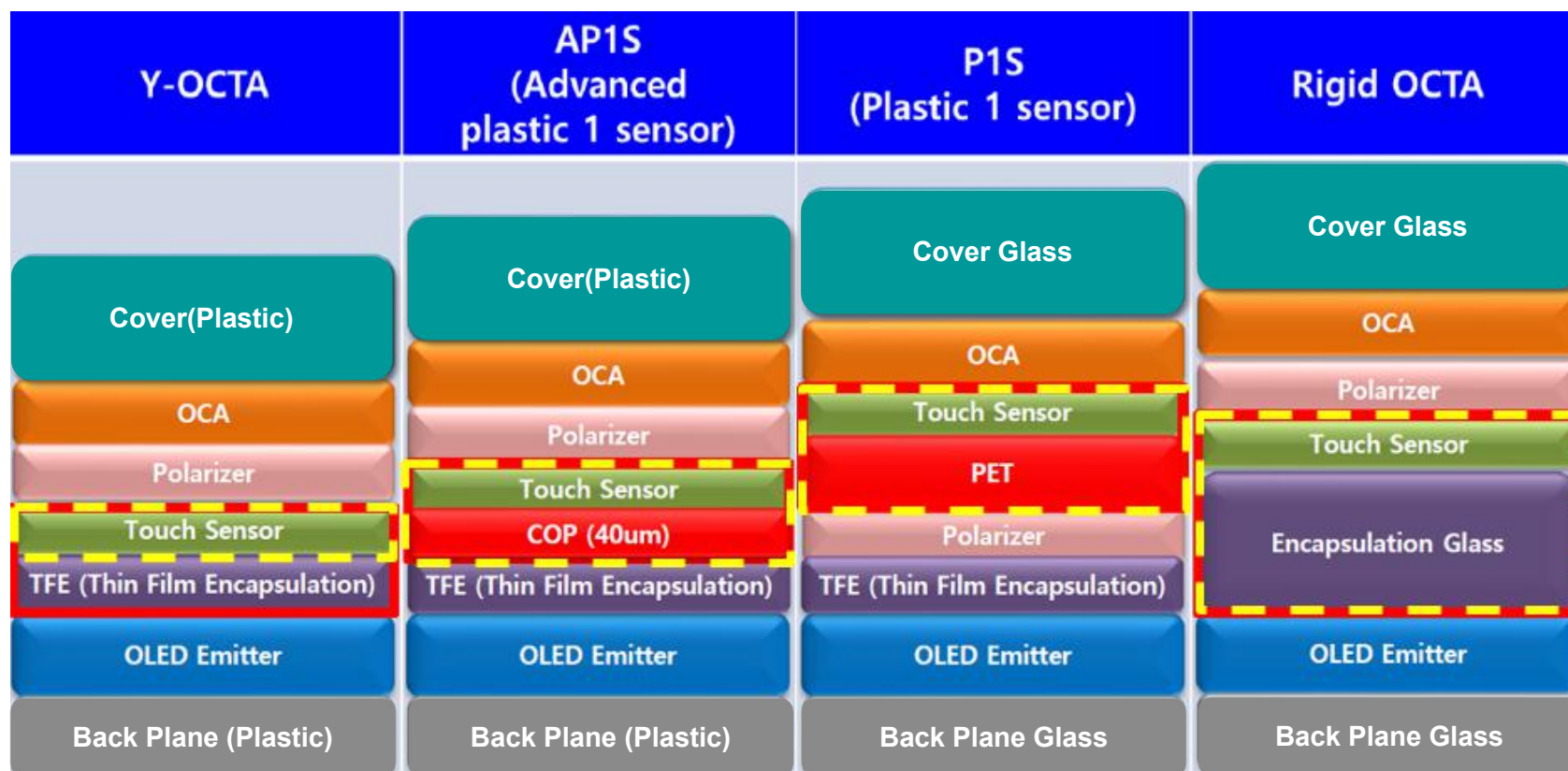
1-2. Comparison Wearable Touch IC

Divide		ZTW523	ZTW622	ZTM630	ZTW722	
Status		MP Now	MP Now	MP Now	4Q / 21'	
Sensor type		Rigid/Flexible	Rigid/AP1S YOCTA(2layer)	Rigid/AP1S YOCTA(2layer)	YOCTA(1 layer) Self Only	YOCTA(1 layer) Mutual
Channel		10 x 10	8 x 8 + 1key	8 x 8 + 2key	33ch	10x10
Reporting rate		120Hz	120Hz	120Hz	120Hz	120Hz
Host interface		I2C	I2C	I2C	I2C	I2C
Power consumption (GFF)	Active	1.95mA @ 100Hz 1.75mA @ 50Hz	1.1mA @ 100Hz 0.7mA @ 50Hz	1.1mA @ 100Hz 0.7mA @ 50Hz	TBD	2.7mA @ 100Hz 0.7mA @ 50Hz
	Idle	35uA @ 30Hz	19uA @ 20Hz	19uA @ 20Hz		60uA @ 20Hz
	W-Key	X	15uA @ 10Hz	15uA @ 10Hz		X
	Sleep	< 10uA	< 7uA	< 7uA		< 7uA
	Deep	X	< 0.1uA	X		X
Features			- HW DSP Engine - Wakeup-key	- HW DSP Engine - Wakeup-key - Display Sync - Haptic Integrated	- HW DSP Engine - Large Cp(Cb) Compensation - Display Sync - Cm 0.9uF/Cp 200pF	
Package		30-Ball WLCSP (2.28*2.54*0.47T)	25-Ball WLCSP (1.9 7*1.97* 0.47T)	WLCSP (2.5*2.5*0.47T)	Target WLCSP (3.0*3.0*0.47T)	

1-2. Comparison Mobile Touch IC

Divide	ZT7650/M	ZT7760	ZT78xx
Status	MP Now	3Q / 21'	4Q / 22'
Sensor Type	Rigid	Rigid	FMLOC
Channel	34 x 16	20 x 40	20 x 44
Node size	$\leq 4.5 \times 4.5$ (6.7")	$\leq 4.0 \times 4.0$ (6.x")	$\leq 4.0 \times 4.0$ (7.x")
Package	60pin-QFN (6 x 6 x 0.45 T)	BGA (6 x 6 x 0.47T)	BGA
Reporting Rate	240Hz @ 1-finger 180Hz @ 5-finger	300Hz @ 1-finger 240Hz @ 5-finger	360Hz @ 1-finger 300Hz @ 5-finger
Active Stylus	Not support	Not support	USI / HPP
TX Driving Voltage	6V	6V	12V
Host Interface	I2C	I2C/SPI	I2C/SPI
Features	HW DSP Engine		- HW DSP Engine - Large Cp(Cb) Compensation - Display Sync - Display Noise Cancellation

1-3. ZINITIX Touch Solution- OLED Structure



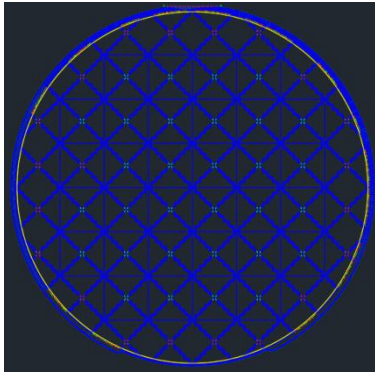
≡ Thickness Reduction 25%



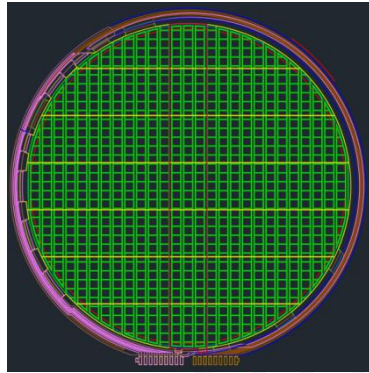
1-3. TSP Structure

Mutual Pattern

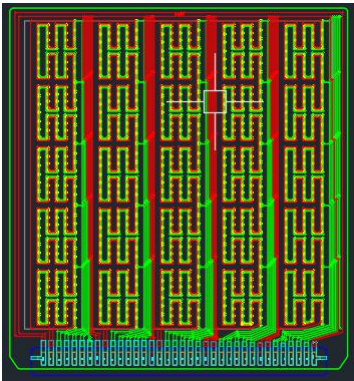
1.39" OCTA



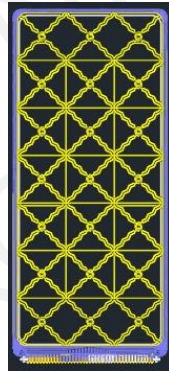
1.39" GFF



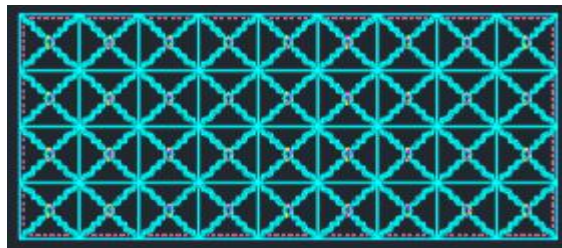
1.3" GF1



1.1" OCTA(Diamond)

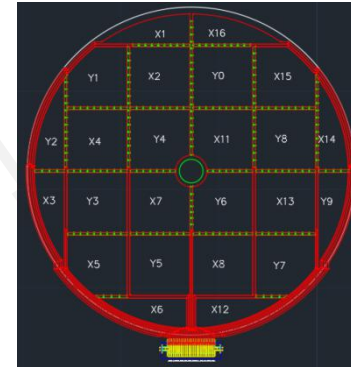


1.53" AP1S Flexible

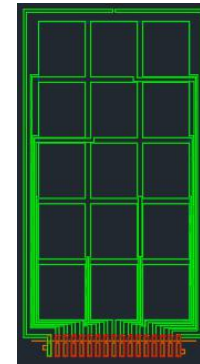


Self Pattern

1.3" GF Self



0.96" GF Self



1-4. Performance

Function	Support	Hybrid Type	YOCTA(2layer)
Gesture wake up	support	YES	YES
Gesture event	slide + click	YES	YES
Palm Sleep(> 1/2 area)	support	YES	YES
Finger	2	YES	YES
SNR(Φ 5mm)	>40dB	>40dB	>40dB
Report Rate	80HZ	>80Hz	>80Hz
Point Sensitivity	$\leq \Phi$ 5mm	YES	YES
Accuracy(Φ 7mm)	Edge area <1.5mm	YES	YES
	Center area <1mm	YES	YES
Precision(Φ 7mm)	Edge area <0.50mm	YES	YES
	Center area <0.40mm	YES	YES
Jitter (Φ 7mm)	Edge area <0.50mm	YES	YES
	Center area <0.40mm	YES	YES
Move Sensitivity	$\leq \Phi$ 5mm	$\leq \Phi$ 4mm	$\leq \Phi$ 4mm
Linearity (Φ 7mm)	Edge area <1.5mm	YES	YES
	Center area <1mm	YES	YES
Sweat hand operation	support	YES	YES
Wet hand operation	support	YES	YES
Running water	support(no ghost)	YES	YES
Cp Loading		20pF	120pF

1-5. Major MP Model List 1



Galaxy Watch
(1.3"/1.2" Flexible AMOLED)



Galaxy Active



(1.106" Rigid AMOLED)



Galaxy Active2



(1.4"/1.2" Flexible AMOLED)



Galaxy Watch3
(1.36"/1.3", Flexible AMOLED)



Samsung Gear Fit2/Pro
(1.54" Flexible AMOLED)



Galaxy Fit
(0.95" Rigid AMOLED)



Galaxy Fit2
(1.1" Rigid AMOLED)



SamSung Gear VR2
Touch Controller



SK JOON2
(1.3" GFF)



VOICE CADDIE T7 For Golf
(1.3" GFF)

1-5. Major MP Model List 2



Huawei Watch GT
(1.39" GFF)



Honor Magic Watch
(1.19" GFF)



Huawei Watch GT2
46mm/42mm
(1.39" GFF/1.19" OCTA)



Honor Magic Watch2
(1.39" GFF)



Huawei Kids Watch 4X
(1.41" Oncell AMOLED)



Huawei Watch GT2e
(1.39" GFF)



Huawei Watch GT2 Pro
(1.39" Oncell AMOLED)



Honor Watch GS Pro
(1.39" Oncell AMOLED)



Honor Band 6
(1.47" Oncell AMOLED)



Honor Band 4/5, Huawei Band 3/4 Pro
(0.95" Oncell AMOLED)



Huawei Band B6
(1.53" Flexible AP1S)



Huawei Watch Fit
(1.64" Oncell AMOLED)



Honor Watch ES
(1.64" Oncell AMOLED)

1-5. Major MP Model List 3



Xiaomi Mi Band 4
(0.95" OnCell AMOLED)

OPPO Band, KEEP B2
(1.1" OnCell AMOLED)

BBK/XTC Y3/Z3/Z2/Z5/Z6DF
(0.95"/1.41"/1.6" ON-CELL AMOLED)



VIVO Watch
(1.39"/1.19" OLED+GFF/OnCell)

Ticwatch pro3
(1.39" AMOLED+GF)

BBK/XTC Z1/Z1S/Q1/Q2/Y06
(1.3" GF1/OCTL)



MiTu3
(1.41" OLED)

Readboy A6/A6E
(1.54"GF/ 1.40"GF)

APPScomm L28/38U
(1.02" GF)

APPScomm L42A/A+
(1.3/1.4" GF)

APPScomm/P03/P02
(AMOLED 1.30"/1.22"GF)
Hybrid Smart Watch

APPScomm/ZETIME
(1.22"/1.05" GF)

World Wide 1st use
Hour hand/Minute Hand

Digital wheel Solution (ZTM620)

1-1. Key specification comparison (Touch controller + Haptic driver)

IC	ZTW523	ZTM620		
Channel	20ch	16ch	Operating Voltage	2.7V~3.6V
Power consumption	Active: 1.9mA Idle: below 40uA Sleep: below 1uA	Same as ZTW523 DW: 2.7mA(Active)	Start up time	0.2ms
Design	Cycle, Rectangle, Curved		Braking time	> 10ms
Package	2.28x2.54(30ball)	2.78x2.88(36ball)	Input	I2C/PWM
PCB Footprint size		Touch  ZTW523 + Haptic driver  ZM917 =  ZTM620 Touch + Haptic driver ≡ Reduction 5%		

1-2. ZTM620 key features

❖ Function

1) Wearable device solution

- Digital wheel function
- Cycle touch solution
- Low power consumption
- Display noise cancellation

2) Touch controls Haptic motor without AP wake-up

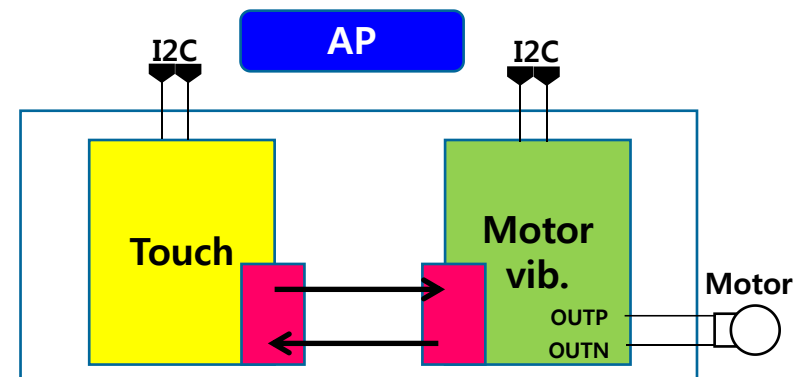
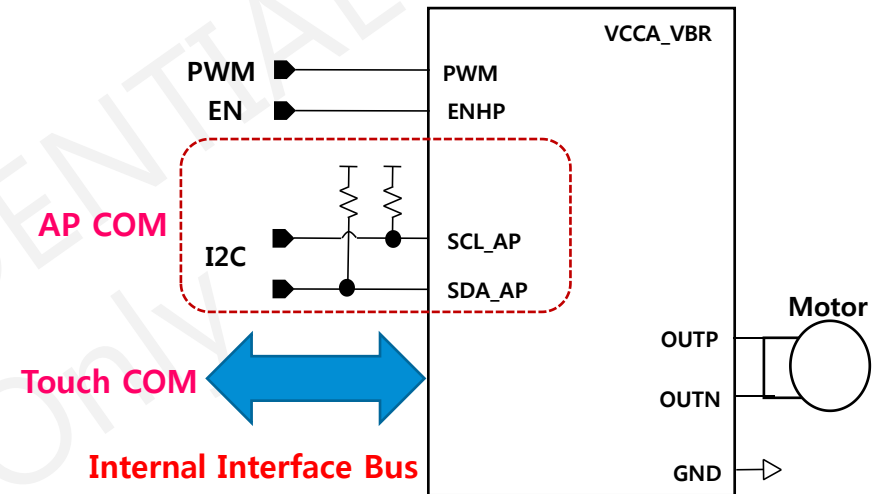
- latency time minimize (0.2ms)

3) Haptic motor driving : I2C / PWM

4) How to Haptic motor enable

- H/W EN or Software EN (AP)
- Software EN (Touch)

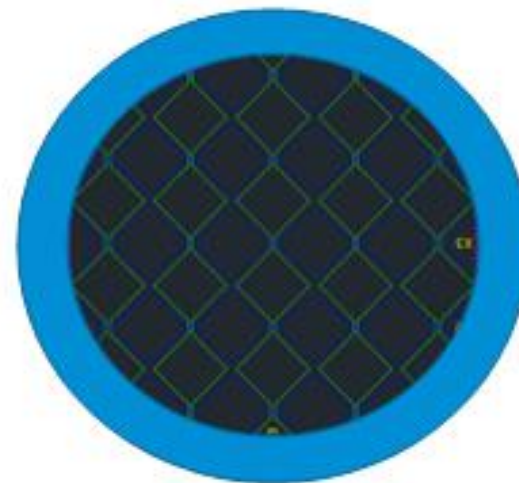
❖ Functional block diagram



1-3. Galaxy watch active2 (LTE / Bluetooth)

❖ Feature

- Size : 40mm (10.9T)
- Display : 1.2" (360x360 AMOLED)
- Battery : 247mAh
- Size : 44mm (10.9T)
- Display : 1.4" (360x360 AMOLED)
- Battery : 340mAh



< Galaxy Watch >

**Digital
wheel**



< Galaxy watch Active 2 >

➤ Digital wheel

- ✓ No pattern in bezel
- ✓ Touch Hover
- ✓ One chip (Touch+Haptic)
- ✓ High SNR
- ✓ Hybrid (Self+Mutual)