	☑ Ψ _____ _____
	☑ Ψ

G ↔

ˇ ầ ˩ ⊢ ᴰ ˆ ˜ ầ PZT ˇ

ـ ـخي TWS ầ ầ شه ˇ ˚ˆ Â

MEMS(Micro-Electro-Mechanical Systems ŭ̌)

ھج˘ ὢ D ھج ˘ Ӟ pixcel ˘

Â خي ˆ ˜ ṗ ˘ ھى γ˘ خي

˘ Â

r ı Ţ : ʿ 3d خي خي

MEMS D ھج˘ p ʒ MEMS ˇ CMOS ˘ chiplet Â

mems ˇ ASIC ˘

Â ˘ ˘ ṿ ǐ ˘ ╟

ṗ ᴹ r ʒ Chiplet ˘ 2.5d ˇ 3d ˘ N

Â

ṿ ʿI D ھج˘ Ũ˘ شھ ʿ ᴴ˘ Ũ

ʿ ھج Â ˘ ˘ ǐ شھ

⌠ 2.5d 3d ˘ pcb sip ʒ Â خي

╟ شھ ˘ pcb sip ᴴ

γ Â

Ạ Chiplet˘ Intel Ӟ خي Ạ ᴴ ˘ ч

ὢ ᴸ Â

ʜ ȁ D ھج ⇔ Ţ MEMS :

AR ˘ MEMS هج ˚˚ شه

Â

Q3ˊ ч ˛ Ӈ Mems هج ˛

ˊ ч pixcel ف˘ ɢ ˘ ӊ

ɢ mems هج˘ wire bonding ӊ ʒ˘ 1024

ɢ˘ ˘ ˘ ч ˘ ↓˘

˘ Â

Q4ˊ Mems هج ╟ ˚ D هج˛

ˊ D ˘ mems هج ˘ Ӟ ˛

Â r ˘ ˊ ɢ D هج˘ D

هج r ˘ خيmems هج ⌠

ʒ = Â

Q5ˊ ⌊ r ˘ ╟mems هج

tws شه˛

ˊ ˘ ╟ ˛ ˘ ˛ mems هج

˘ ΐ ˘ ˜ ˘ 50˛

شه Â ᾤ ʒ˘ ɢ هج Â

Ạ ⅄ ʒ˘ ɢ Ḃ ʒ Â Ạ

mems speaker Â

Q6ˊ mems هج Δ ˘ ˘

Ӈ ˛

ˊ ╟ ↨ ˘ D Ψ ˚ ˘ ɦ =

˘ خي T ˘ ɦ ˘ ASIC ˘

2 ɢ˘ D ˛ ╟ 1 ɢ Â

Q7ˊ ╟Mems D هج ˛

ʿ ᾠ ˘ cis’ ˘ mems speaker’ ⊢ ’ ’ ╠ ħ

Â

Q8ʿ ɢ ᴅ هج ⸗

ʿ Amr˘ tmr˘ gmr˘ ˢ ˘ Ӈ

Â ᴅ هج˘ ᴅ هج ᒣ Ḃ ˘ Asp ˠ

ʒ Â ˘ Â

Q9ʿ ╠**mems** هج ⸗

⇔ Ţ Ţ ˘ 12 ˘ 1

Â ╠ pixcel˘ ᒣ ɢ pixcelخي120-140 ӊ Â ‰pixcel

↓ هج 1024 ɢ˘ ˘ ƀ ч 9 10

ᒣ ˝Ḥ Â

Q10ʿ ↓ شه ⅄ ⸗

ʿ Audiopixel Ӈ Ạ˘ 1024 ɢ 1024 ɢ ⸗

˘ ˘ ˘ ˘ 1024 ᒣ ˝Ḥ

ᒣ ˝Ḥ ⸗ ˘ ᒣ ˝Ḥ ⸗ ˘ ˊ Â

Q11ʿ ╠ **Mems** هج ħ شه ⸗

ʿ ╠ شه ᴅ هج˘ mems

هج ↓ ˘ ɢ ᒣ ˝Ḥ mems هج ʒ˘

هى ˠ˘ Ḃ ˘ Ạ ˘ Ạ

Â ɢ ı˘ Â ╠ ŋ ᾠ xMemsخي

˘ uSound خيstm Â Bosch З ʹ ɢ ʒ˘

هج^ ᾠ˜ ˜ ȁ tws ȁ ȁ ψ ⌠ MEMS

هج Â

Q12ʿ Mems هج ˘ ╠**Mems** هج شه

ˆ mems هج ˘ ˇ ↓

هج ASIC pa ˘ mems ↓ هج

AR VR

AR VR

mems speaker

mems mems

ar vr mems

Q17 **mems**

oppo

2

Q22ʿ ╠mems ھج ٭ ٭

ʿ خي π ı Ţ˘ ╠ خي Ạ ˘

ڭ ڭ ڭ ڭ ڭ ڭ ڭ ڭ ڭ ڭ

Â