



# T58xx Digital Microphone Series

**World's Lowest Power Microphone**

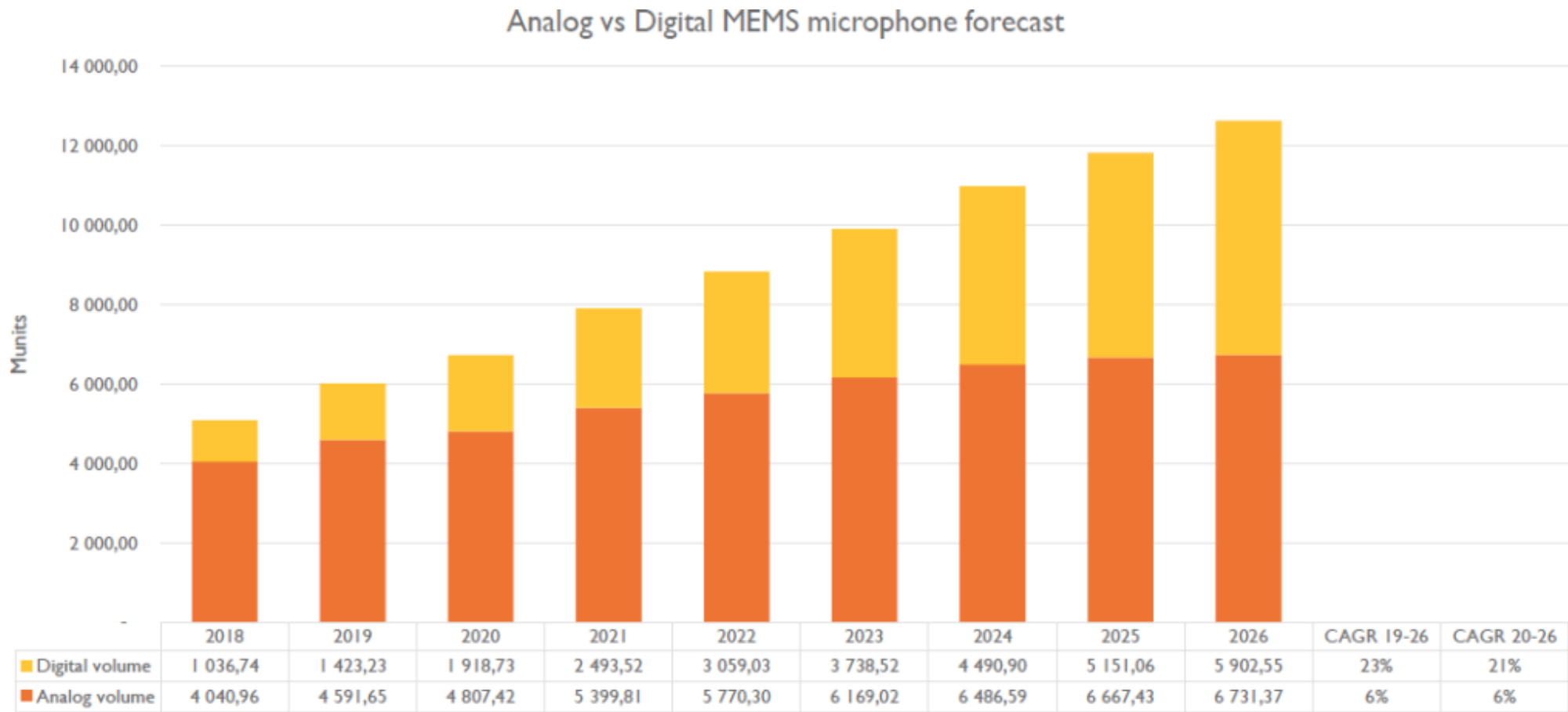
**Ritesh Tyagi**

*Vice President, Product Management*

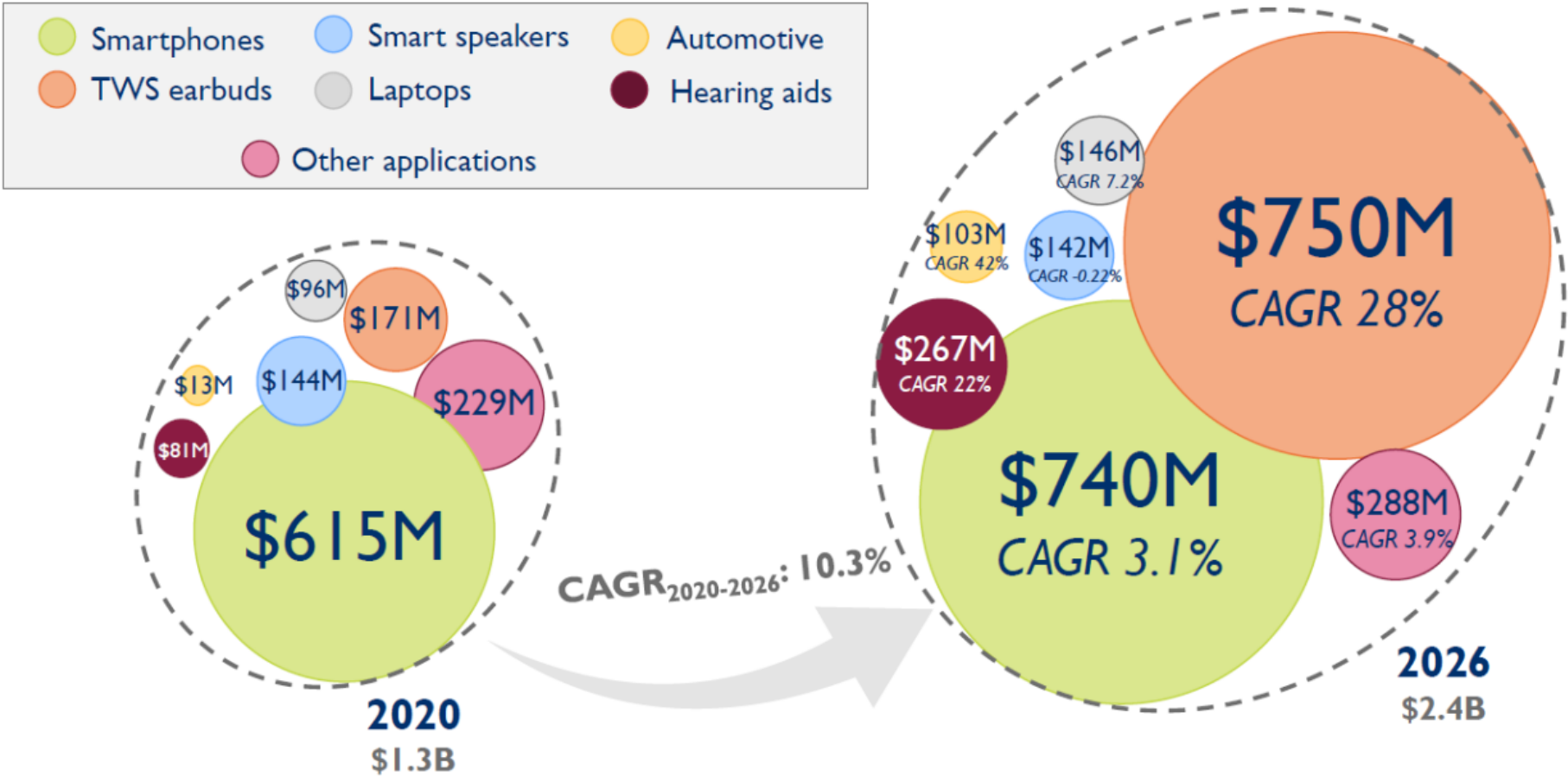
*January 6, 2022*

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Source: Yole 2021



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# **T58xx Series Microphone**

## **Best $\mu$ W/SNR in the Industry**

# T58xx: Scalable Digital Microphone Series

**T5828**  
(Soundwire,  
AAD)



**T5837**  
(PDM, w/o  
AAD)



**T5838**  
(PDM, AAD)

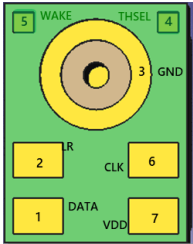
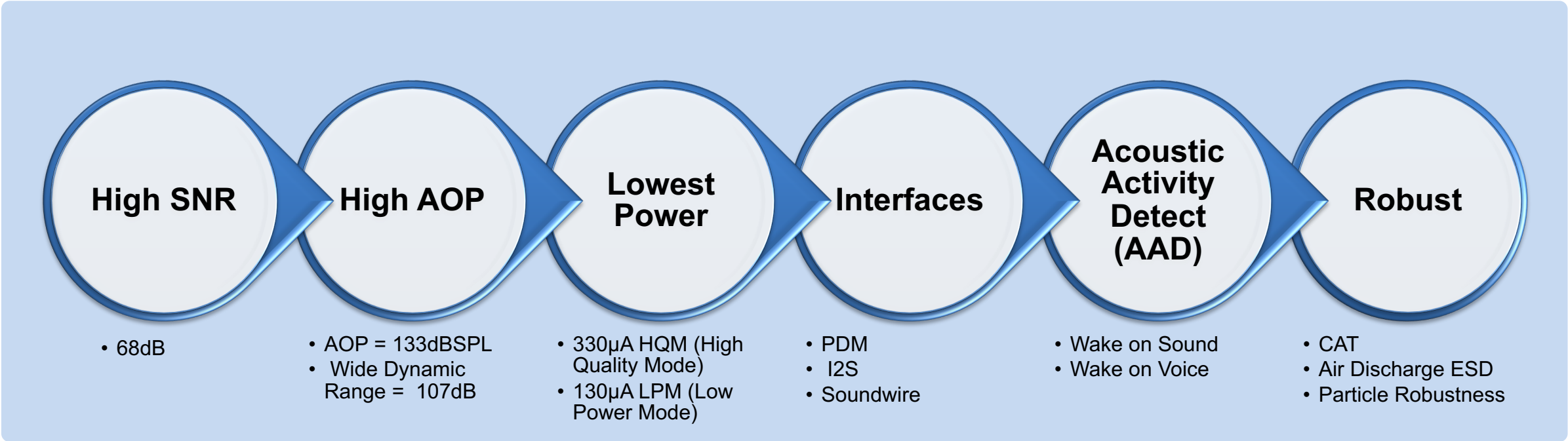


**T5848**  
(I2S, AAD)

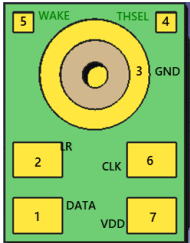




# T58xx: Value Proposition



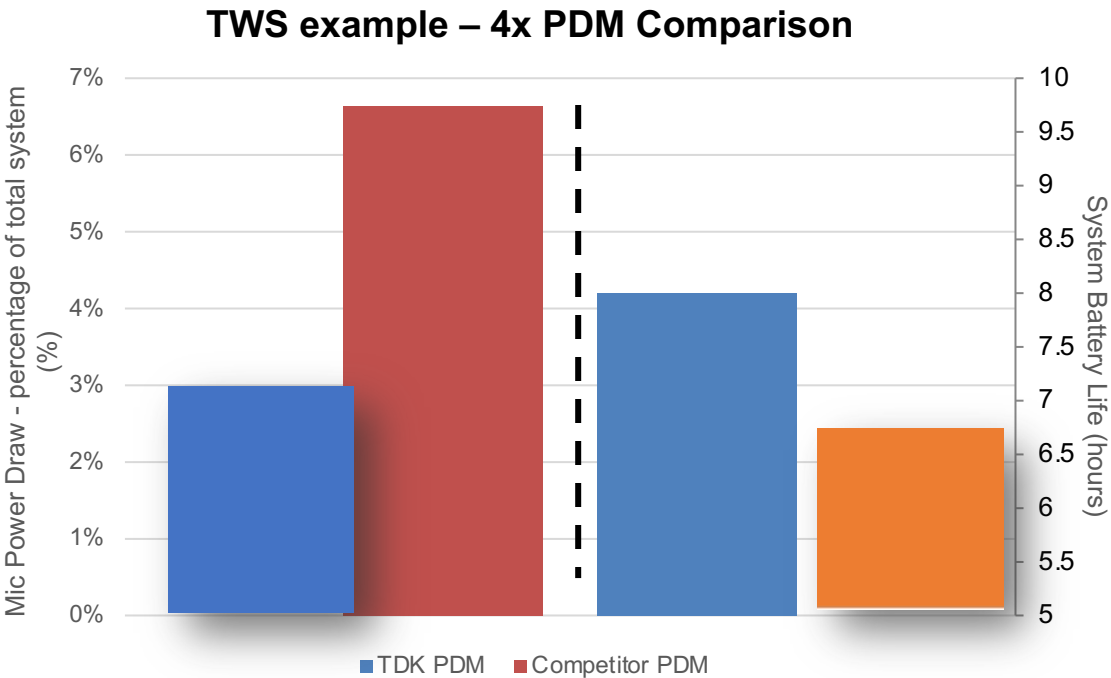
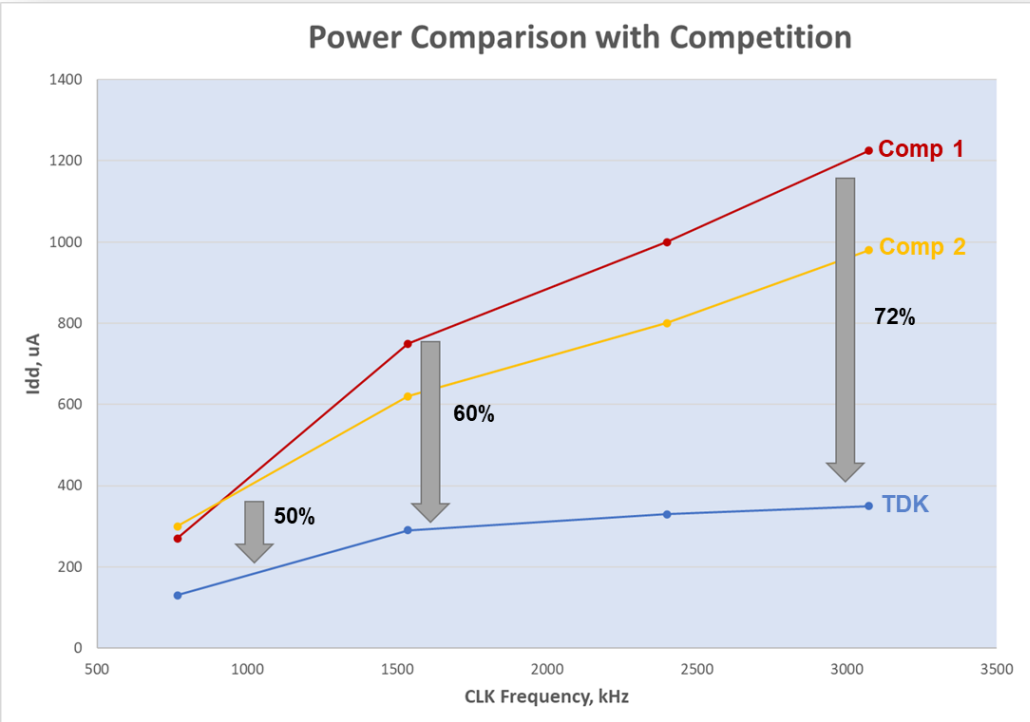
**T5838 PDM**  
(AAD pins not connected)



**T5838 PDM + AAD**  
(AAD pins connected)

3.5mm x 2.65mm x 0.98mm

# T58xx Series: Lowest Power Digital Microphone



# T58xx: 68dB SNR

High SNR for :

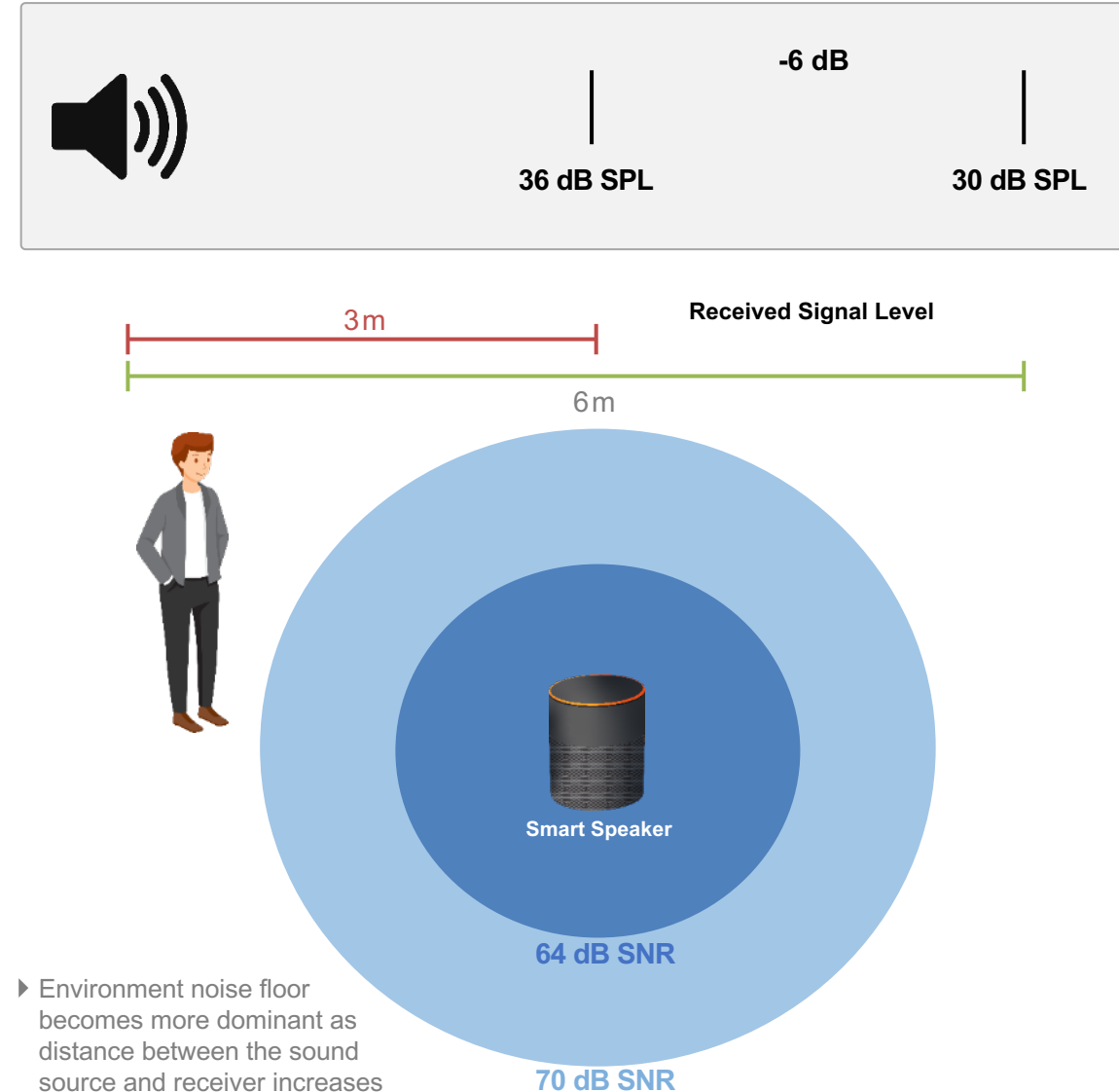
best performance  
and  
voice capture

Essential for:

far field applications and  
effectively increases the  
radius of  
speech intelligibility

**Digital:**

- $T5837/38 = 68 \text{ dB SNR}$





# T5828/38/48: Acoustic Activity Detect

## AAD to Conserve Power

- Wake on Sound and Voice via simple interrupt
- Native always-on sensing feature to conserve power

## Flexible Configuration

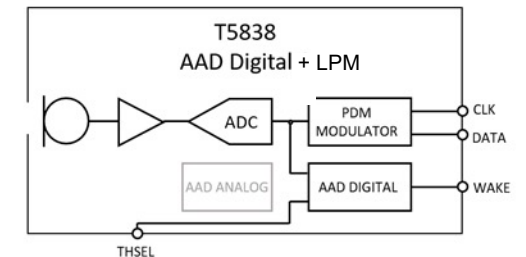
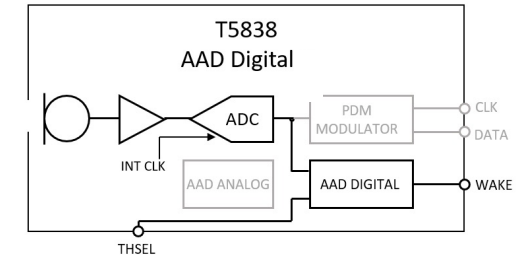
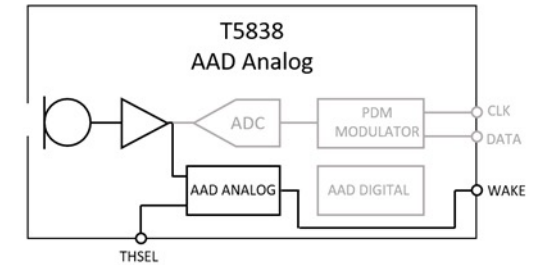
- Three modes of activity detect
- Dynamic configuration via digital I/O
  - Allow customers to set thresholds and filter settings



Wake on Sound



Wake on Voice



# T58xx: Designed for Multiple Applications

## Smartphones



## Low Power True Wireless Stereo / Headsets



## Low Power Voice Activated Devices



TV Remote





Robotics



Smart Speaker



Security



Wearables



Tablets



Gaming Consoles



Automotive

# T5837/38 Summary

Ultra-Low Power, High SNR, Multi-Mode PDM Microphone

In Production



## Specifications

SPEC	HIGH QUALITY MODE	LOW-POWER MODE	ULTRASONIC MODE
Sensitivity	-37/41 dB FS $\pm$ 1 dB	-21/26 dB FS $\pm$ 1 dB	-37/41 dB FS $\pm$ 1 dB
SNR	68 dBA	65 dBA	68 dBA
Current	330 $\mu$ A	130 $\mu$ A	400 $\mu$ A
AOP	133 dB SPL	119 dB SPL	133 dB SPL
Clock	2.0 – 3.7 MHz	400 – 800 kHz	4.2 – 4.8 MHz
L.F. Rolloff	30 Hz		
Package	3.5 $\times$ 2.65 $\times$ 0.98 mm, Bottom Port		

► Datasheet: **Contact your sales representative for datasheet**

## Applications

- Smartphones
- Smart Speakers
- Headsets
- Voice-Enabled TV Remotes
- Smart TV / Set Top Box
- Wearables

## Solution Benefits

- Industry leading low power consumption in high quality mode and low power mode, 50 – 70% lower than competitors
- High SNR and AOP in all operational modes
- Acoustic Activity Detect w/ programmable thresholds & filters with power consumption as low as 20  $\mu$ A (only on T5838)
- Available with -37dBFS sensitivity in HQM (T5837 version)

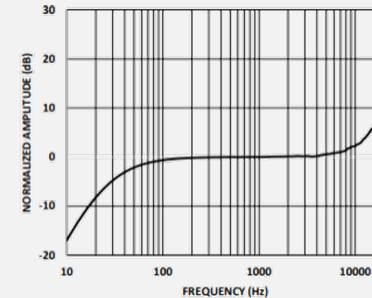


Fig 4. Typical Audio Frequency Response, High Quality Mode

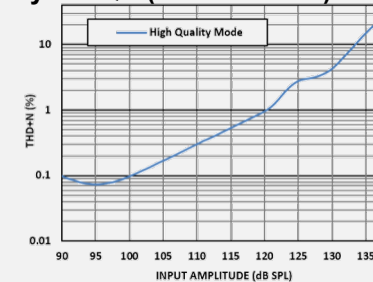
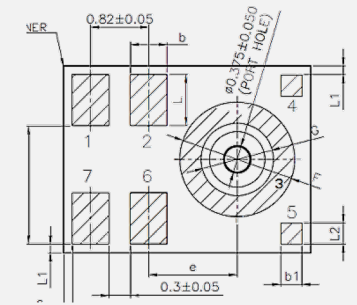


Fig 5. THD + N High Quality Mode



Bottom View



# T5828

Ultra-Low Power, High SNR, Multi-Mode SoundWire Microphone

In Production



## Specifications

SPEC	HIGH QUALITY MODE	LOW POWER LISTEN MODE
Sensitivity	-41 dB FS $\pm$ 1 dB	-26 dB FS $\pm$ 1 dB
SNR	68 dBA	65 dBA
Current	330 $\mu$ A	130 $\mu$ A
AOP	133 dB SPL	119 dB SPL
Microphone Data Rate	2.4 Mbps or 3.072 Mbps	0.6 Mbps or 0.768 Mbps
SoundWire Bus Clock Frequency	Integer Multiple of Microphone data rate up to 9.6 MHz or 12.288 MHz	
L.F. Rolloff	35Hz	
Package	3.5 $\times$ 2.65 $\times$ 0.98 mm, Bottom Port	

► Datasheet: **Contact your sales representative for datasheet**

## Applications

- Smartphones
- Smart Speakers
- Headsets
- Voice-Enabled TV Remotes
- Smart TV / Set Top Box
- Wearables

## Solution Benefits

- Second generation SoundWire microphone with industry leading low power consumption in high quality mode and low power mode
- High SNR and AOP in all operational modes
- Multiple sub-modes for greater configurability: High AOP, Ultrasonic, Ultra Low Power, Acoustic Activity Detect
- Acoustic Activity Detect w/ programmable thresholds & filters with power consumption as low as 20  $\mu$ A

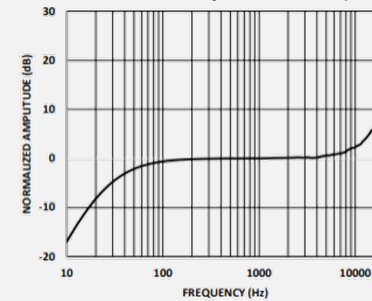


Fig 4. Typical Audio Frequency Response, High Quality Mode

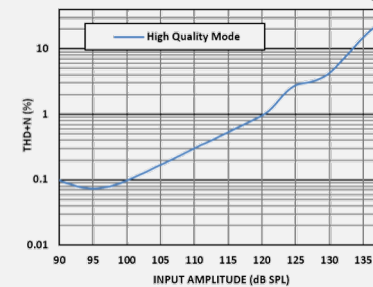
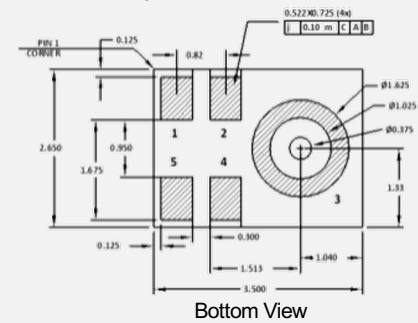


Fig 5. THD + N High Quality Mode







## Get Early Access

- Go to <https://invensense.tdk.com/smartsound/> for more info
- Sample are available
- Evaluation board with Flex PCB is available
- Data sheet is available
- Characterization data is available



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**Questions?**