

WBC2718DB26TJ0

Bottom port digital silicon Microphone

Descriptions

WBC2718DB26TJ0 is a Silicon Microphone with digital output and bottom inlet for sound input. It consists of a MEMS sensor and an encoder IC. It converts sensor analog output signal into 1-bit digital PDM data. The digital output format eliminates AC coupling capacitor, reduces RF noise coupling and eases PCB layout requirement.

WBC2718DB26TJ0 is a cost-effective alternative to traditional electret condenser microphone (ECM). Provided on tap-and-reel, it is ideally suited for high volume applications. And it can be processed directly to customer's PCB using standard automatic pick-and-place equipment and surface mounted via standard solder reflow equipment.

WBC2718DB26TJ0 can be used to implement the array microphones. Speech quality can be significantly improved by combining two microphones.

The WBC2718DB26TJ0 is manufactured in a compact 2.75mm*1.85mm*0.90mm, 5-pin package.

Features

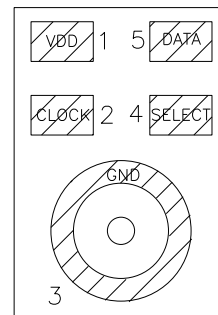
- PDM Output
- High SNR
- Multiple performance modes
- Ultra-Stable Performance
- Standard SMD Reflow
- RoHS/Halogen free compliant
- Omnidirectional

Applications

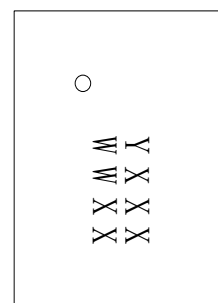
- Smart phones ● ANC-TWS/Headset
- Portable communication device
- Notebook and desktop
- Digital still cameras
- Portable music recorders



Product appearance



Pin configuration (Bottom view)



Marking (Top view)

Y = Year code
WW = Week code
X X X = Batch code

Order information

Device	Package(mm)	Shipping
WBC2718DB26TJ0-5/TR	2.75*1.85*0.90	5000/Reel&Tape

Absolute Maximum Ratings

Parameter	Maximum Ratings	Unit
Power supply voltage	6.5	V
Operation temperature range	-40~85	°C
Storage temperature range	-40~125	°C

Stresses exceeding these “Absolute Maximum Ratings” could cause permanent damage to the microphone. These are stress rating only. Functional operation at these or any other conditions beyond those indicated under “Absolute and Electrical Characteristics” is not implied. Exposure beyond those indicated under “Acoustic and Electrical Characteristics” for extended periods may affect microphone reliability.

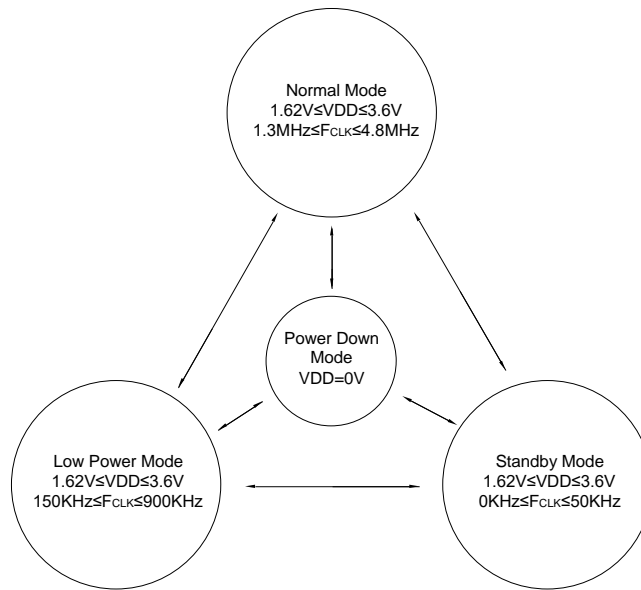
Acoustic & Electrical Specifications

Test conditions: 23 ±2°C, 55±20% R.H., VDD=1.8V, Fclock=2.048MHz, Duty Cycle=50%, SELECT pin grounded, no load, unless otherwise indicated.

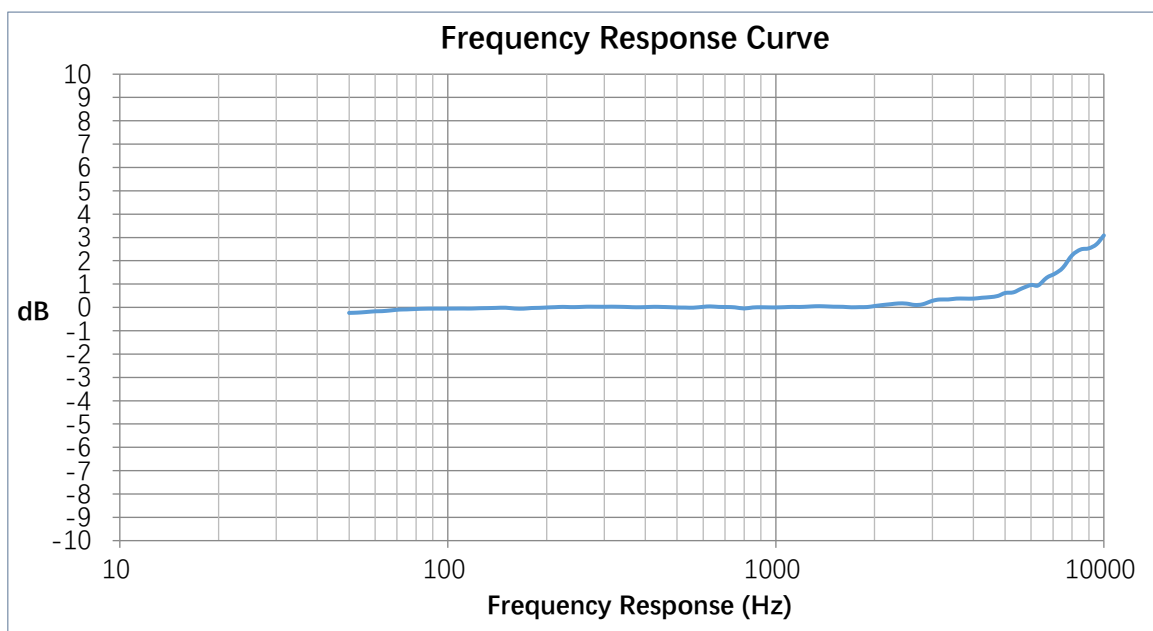
Parameter		Symbol	Conditions	Min	Typ	Max	Units
Supply Voltage		V _{DD}		1.6	-	3.6	V
Supply Current		I _{DD}	Normal operation, Fclk(1MHz~4.8MHz)	-	770	-	uA
		I _{low_power}	Low power mode, Fclk(350kHz~800KHz)	-	340	-	uA
		I _{sleep}	Sleep mode, Fclk(<250KHz)	-	6	50	uA
Clock Frequency Range	Sleep mode			0	-	50	KHz
	Low power mode			150	-	900	KHz
	Standard Performance Mode			1.3	-	4.8	MHz
Sensitivity		Sense	94dB SPL @1KHz	-27	-26	-25	dBFS
Signal to Noise Ratio		SNR	Normal mode 94dB SPL @1KHz, A-weighted	-	62	-	dB(A)
			Low power mode 94dB SPL @1KHz, A-weighted	-	61	-	dB(A)
Total Harmonic Distortion		THD	94dB SPL @1KHz, S=Typ	-	0.15	0.5	%
Acoustic Overload Point		AOP	10%THD @1KHz	-	120	-	dB SPL
Power Supply Rejection		PSR+N	100 mVpp square wave @ 217Hz, A-weighted	-	-90	-	dBFS(A)
Power Supply Rejection Ratio		PSRR	200 mVpp sinewave @ 1 kHz	-	60	-	dBv/FS
DC Output		ZOUT	DC fullscale=±100	-	50	-	%FS
Directivity				Omnidirectional			
Data Format				1/2 Cycle 1 bit PDM			
Logic Input High		V _{Ih}		0.65x V _{DD}	-	V _{DD} +0.3	V
Logic Input Low		V _{Il}		-0.3	-	0.35x V _{DD}	V
Logic Output High		V _{Oh}		V _{DD} - 0.45	-	-	V
Logic Output Low		V _{Ol}		-	-	0.45	V
Output Load		CLOAD		-	-	140	pF
Short Circuit Output Current			94dB SPL @1KHz	1		20	mA
Clock Duty Cycle				40		60	%
Clock Rise/Fall Time		T _{EDGE}		-	-	15	ns

1. 100% tested.
2. I_{DD} varies with CLOAD according to: $\Delta I_{DD} = 0.5 * V_{DD} * \Delta C_{LOAD} * F_{CLOCK}$.
3. Maximum specifications are measured at maximum VDD. Typical specifications are measured at standard test Conditions .
4. Valid microphones states are: Power Down Mode (mic off), Low Power Mode (mic clock speed), Sleep Mode (low current, DATA = high-Z, fast startup), and Normal Mode (normal operation).
5. Time from FCLOCK < 250 kHz to ISLEEP specification is met when transitioning from Normal Mode to Sleep Mode.
6. Time from FCLOCK \geq 1 MHz to all applicable specifications are met when transitioning from Sleep Mode to Normal Mode.

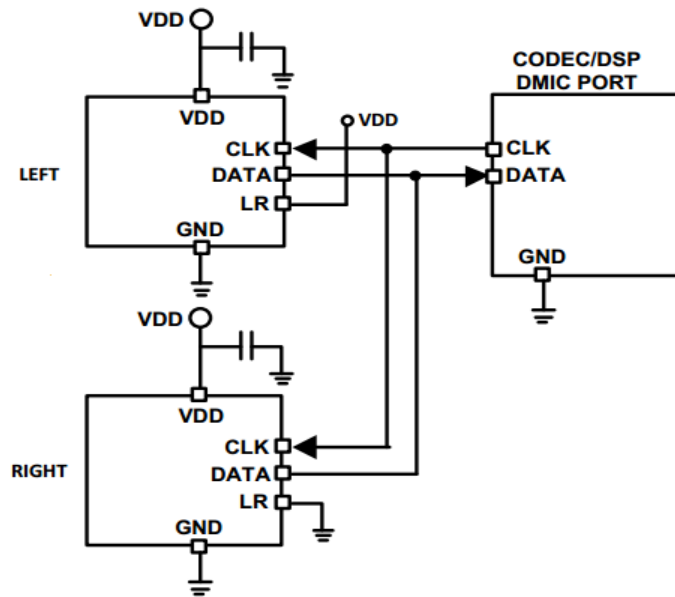
Microphone State Diagram



Frequency Response Curve



Application Informations

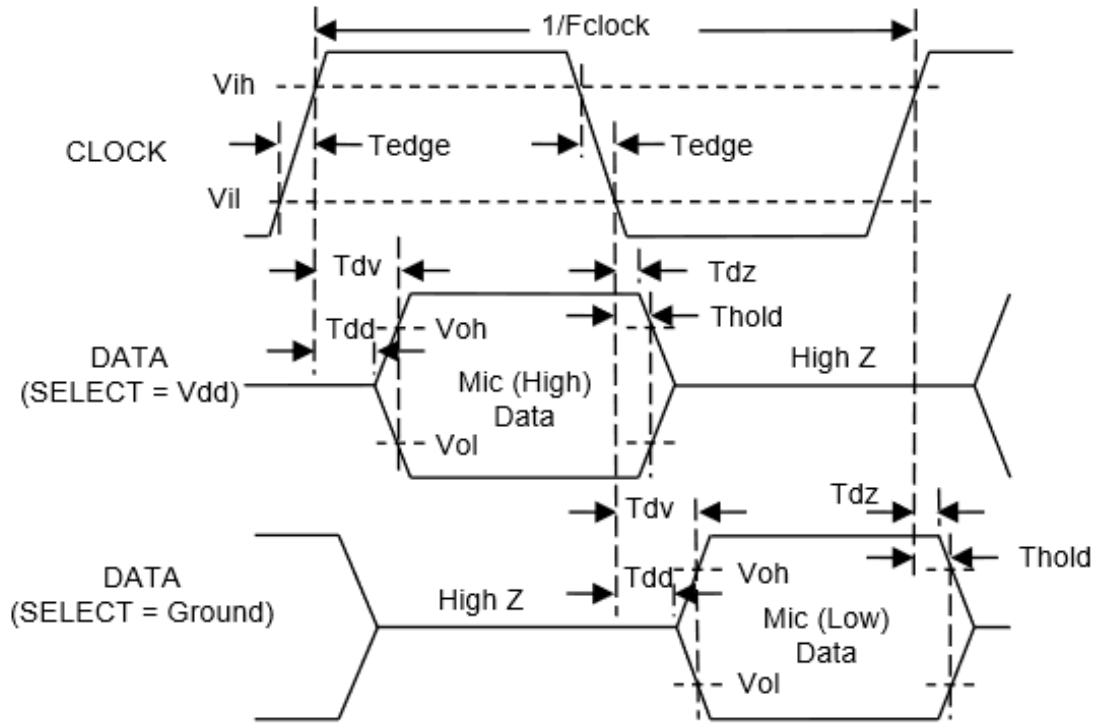


Microphone	SELECT	Asserts DATA On	Latch DATA On
Mic (High)	V _{DD}	Rising Clock Edge	Falling Clock Edge
Mic (Low)	GND	Falling Clock Edge	Rising Clock Edge

Note:

- All GND pins must be connected to ground.
- Capacitors(100nF) near the microphone are must and the capacitors should not contain Class 2 dielectrics.

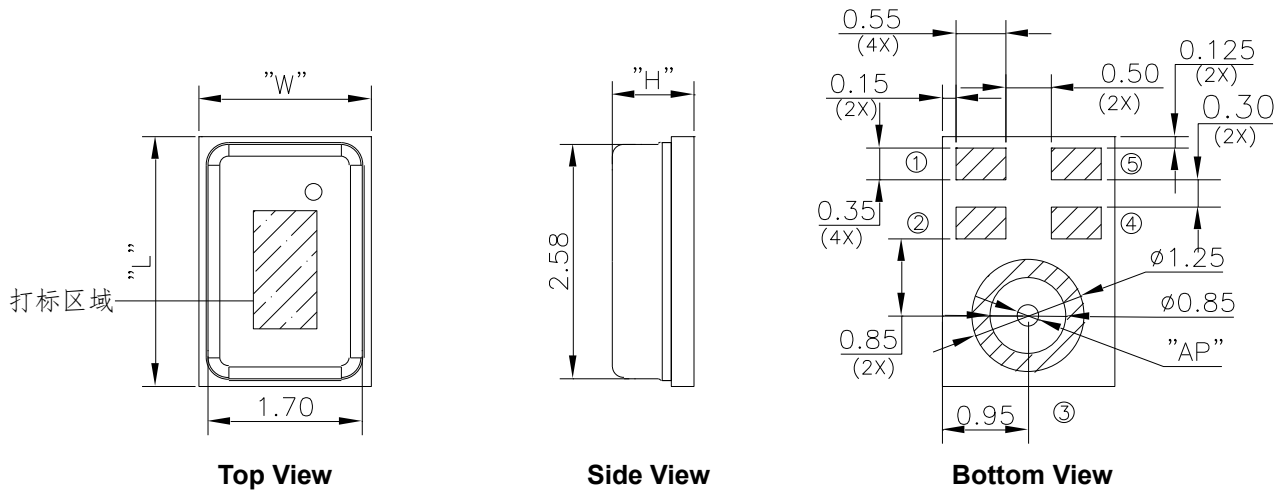
Clock Timing Diagram



Timing Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Clock duty cycle		40	50	60	%	
Operation Voltage	V_{DD}	1.62		3.6	V	
Input Logic Low Level	V_{IL}	-0.3		$0.35 \times V_{DD}$	V	
Input Logic High Level	V_{IH}	$0.65 \times V_{DD}$		$V_{DD} + 0.3$	V	
Output Logic Low Level	V_{OL}			0.45	V	
Output Logic High Level	V_{OH}	$V_{DD} - 0.45$			V	
Clock rise time	t_{CR}			6	ns	35%~65%
Clock fall time	t_{CF}			6	ns	65%~35%
Delay time for data valid	t_{DV}	40		100	ns	Delay time from clock edge(0.50 x VDD) to data valid(< V_{OL} or > V_{OH})
Delay time for data driven	t_{DD}	25		50	ns	Delay time from clock edge (50% VDD) to data driven.
Delay time for data high Z	t_{HZ}	5		20	ns	Delay time from clock edge(50% VDD) to data

Mechanical Specification



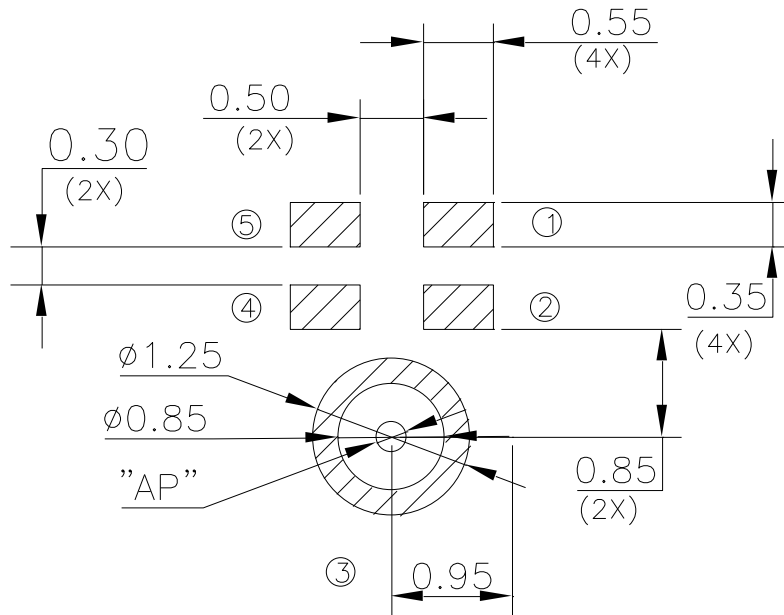
Item	Dimension	Tolerance
Length(L)	2.75	±0.10
Width(W)	1.85	±0.10
Height(H)	0.90	±0.10
Acoustic Port (AP)	Ø0.25	±0.05

Pin#	Pin Name	Description
1	VDD	Power Supply
2	CLOCK	Clock input
3	GND	GND
4	SELECT	Lo/Hi (L/R) Select This pin is internally pulled low but should not be left floating
5	DATA	PDM Output

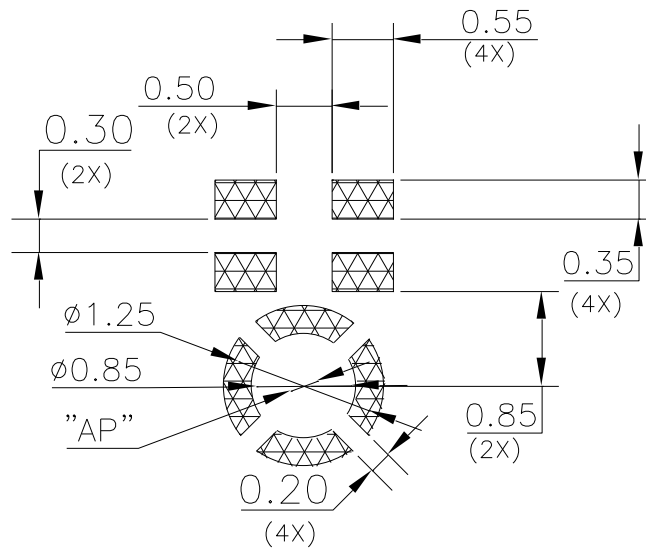
Notes:

- Dimensions are in millimeters unless otherwise specified.
- Tolerance is ±0.10mm unless otherwise specified.
- Pick Area only extends to 0.25 mm of any edge or hole unless otherwise specified.
- Suggestion to use the same date code microphone in one array microphone module.

Example Land Pattern

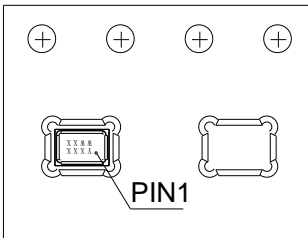
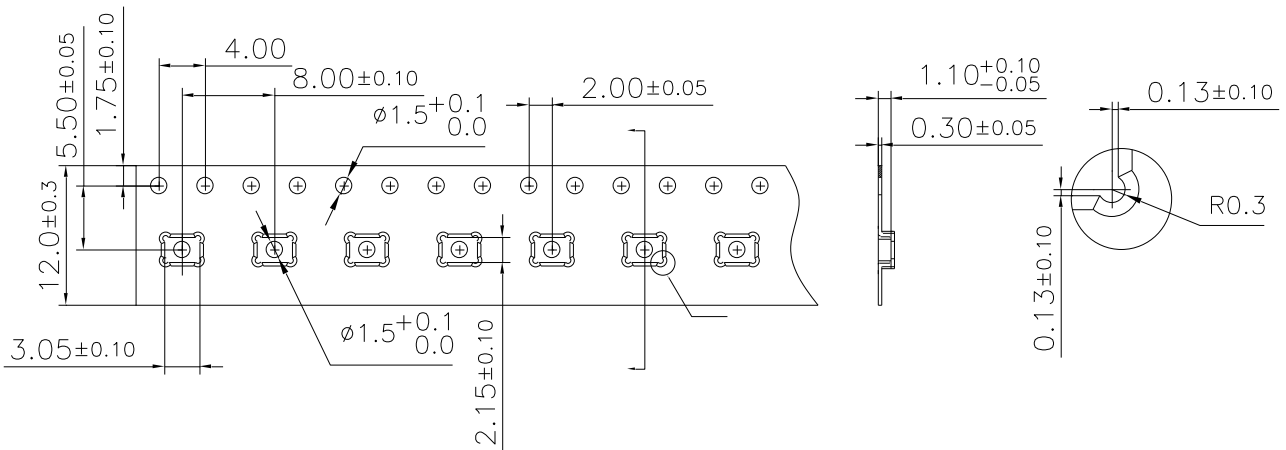


Example Solder Stencil Pattern



Notes: Dimensions are in millimeters unless otherwise specified.
Further optimizations based on application should be performed.

Packaging & Marking Detail

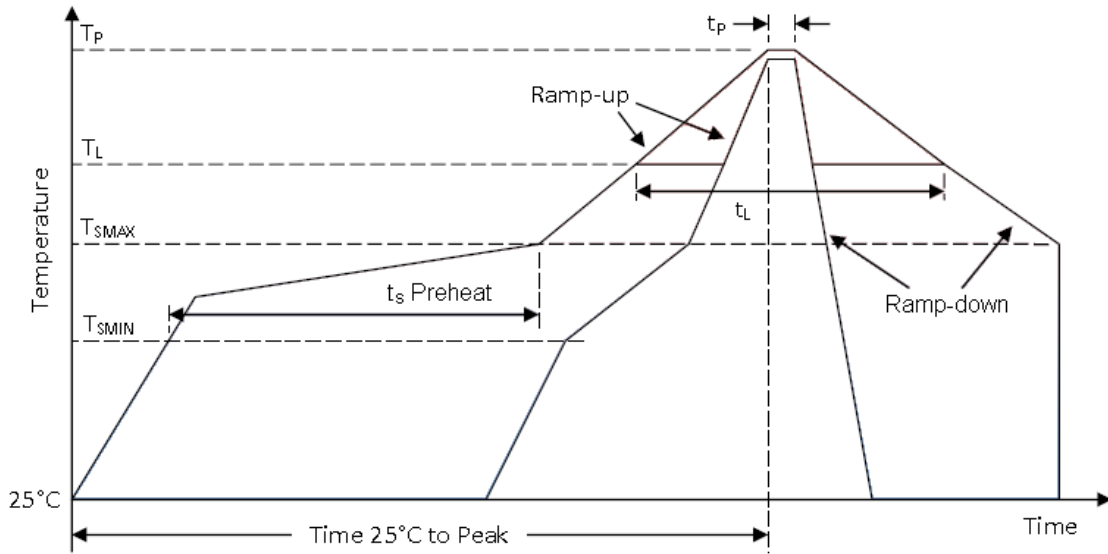


Model Number	Reel Diameter	Quantity Per Reel
WBC2718DB26TJ0	13"	5,000

Notes:

- Dimensions are in millimeters unless otherwise specified.
- Vacuum pickup only in the pick area indicated in Mechanical Specifications.
- Tape & reel per EIA-481.
- Labels applied directly to reel and external package.

Referenced Reflow Profile



Profile Feature	Pb-Free
Average Ramp-up rate (T_{SMAX} to T_P)	3°C/second max.
Preheat <ul style="list-style-type: none"> • Temperature Min (T_{SMIN}) • Temperature Max (T_{SMAX}) • Time (T_{SMIN} to T_{SMAX}) (t_s) 	150°C 200°C 60-180 seconds
Time maintained above: <ul style="list-style-type: none"> • Temperature (T_L) • Time (t_L) 	217°C 60-150 seconds
Peak Temperature (T_P)	260°C
Time within 5°C of actual Peak Temperature (t_p)	20-40 seconds
Ramp-down rate (T_P to T_{SMAX})	6°C/second max
Time 25°C to Peak Temperature	8 minutes max

Note:

All temperatures refer to topside of the package, measured on the package body surface.

Additional Notes

- (A) Maximum of 3 reflow cycles is recommended.
- (B) In order to minimize device damage:
- Do not board wash or clean after the reflow process.
 - Do not brush board with or without solvents after the reflow process.
 - Do not directly expose to ultrasonic processing, welding, or cleaning.
 - Do not insert any object in port hole of device at any time.
 - Do not apply over 30 psi of air pressure into the port hole.
 - Do not pull a vacuum over port hole of the microphone.
 - Do not apply a vacuum when repacking into sealed bags at a rate faster than 0.5 atm/sec.

Materials Statement

Meets the requirements of the European RoHS and Halogen-Free.

Reliability Specifications

Test	Description
Thermal Shock	100 cycles air-to-air thermal shock from -40°C to +125°C with 15 minute soaks. (IEC 68-2-4)
High Temperature Storage	1000 hours at +105°C environment. (IEC 68-2-2 Test Ba)
Low Temperature Storage	1000 hours at -40°C environment. (IEC 68-2-2 Test Aa)
High Temperature Bias	1000 hours at +105°C under bias. (IEC 68-2-2 Test Ba)
Low Temperature Bias	1000 hours at -40°C under bias. (IEC 68-2-2 Test Aa)
Temperature / Humidity Bias	1000 hours at +85°C /85% R.H. under bias. (JESD22-A101A-B)
Vibration	4 cycles of 20 to 2,000 Hz sinusoidal sweep with 20g peak acceleration lasting 12 minutes in X, Y, and Z directions. (Mil-Std-883E, method 2007.2 A)
ESD-HBM	3 discharges of ±3.5kV direct contact to I/O pins. (ESD STM5.2)
ESD-LID/GND	3 discharges of ±8 kV direct contact to lid while unit is grounded. (IEC 61000-4-2)
ESD-MM	3 discharges of ±200V direct contact to I/O pins. (ESD STM5.2)
Reflow	5 reflow cycles with peak temperature of +260°C.
Mechanical Shock	3 pulses of 10000g in the X, Y, and Z direction. (IEC 68-2-27, Test Ea)
Drop Test	To be no interference in operation after dropped to marble or 1.0cm steel plate 18 times from 1.5 meter height.

Note:

After reliability tests are performed, the sensitivity of the microphones shall not deviate more than 3 dB from its initial value. (The measurement to be done after 2 hours of conditioning at 20±2 °C, R.H 60%~70%)