SGM4915
Dual 145mW Headphone Amplifier with Active Low Shutdown Mode

GENERAL DESCRIPTION

The SGM4915 is a dual audio power amplifier with active low shutdown mode. It is designed to maximize audio performance in portable applications. The audio power amplifier is designed for the portable application that needs low-component count and can operate from a single 2.5V to 5.5V power supply. Under the condition of using a 5.0V power supply to drive a 16Ω speaker, it can deliver a continuous average power of 145mW per channel, and the distortion (THD) is less than 0.1%.

The SGM4915 provides an active-low, micro-power consumption shutdown mode which is controlled externally and an internal thermal shutdown protection.

The SGM4915 is applied to low power portable systems. Bootstrap capacitors or snubber networks are not needed.

The SGM4915 provides an externally controlled gain (with resistors), as well as an externally controlled turn-on time (with the bypass capacitor) for maximum flexibility.

The SGM4915 is available in a Green TDFN-2×2-8L package. It operates over an ambient temperature range of -40℃ to +85℃.

FEATURES

- **Supply Voltage Range: 2.5V to 5.5V**
- **Active Low Shutdown Mode**
- **145mW into 16Ω Load from 5V Power Supply at THD+N = 0.1% (Typical, per Channel)**
- **82mW into 32Ω Load from 5V Power Supply at THD+N = 0.1% (Typical, per Channel)**
- **Unity Gain Stable**
- **Shutdown Current: 0.02μA (TYP)**
- **Shutdown Pin is Compatible with 1.8V Logic**
- **Pop/Click Reduction Circuitry**
- **-40℃ to +85℃ Operating Temperature Range**
- **Available in a Green TDFN-2×2-8L Package**

APPLICATIONS

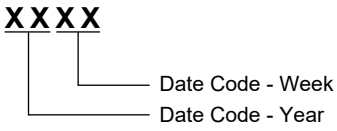
Mobile Phone
Portable Systems
Headphone Amplifier
Notebook Computers
Microphone Preamplifier
PDAs
GPS

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM4915	TDFN-2×2-8L	-40℃ to +85℃	SGM4915YDE8G/TR	4915 XXXX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XXXX = Date Code.



Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage 6V
Input Voltage ..... -0.3V to (V_{CC}) + 0.3V
Junction Temperature ..... +150℃
Storage Temperature Range ..... -65℃ to +150℃
Lead Temperature (Soldering, 10s) ..... +260℃
ESD Susceptibility
HBM 2000V
MM 200V

RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range ..... 2.5V to 5.5V
Operating Temperature Range ..... -40℃ to +85℃

OVERSTRESS CAUTION

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

ESD SENSITIVITY CAUTION

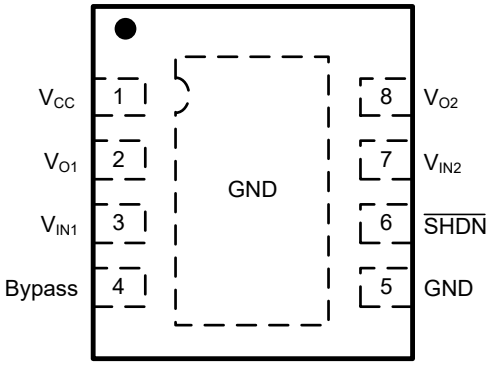
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because even small parametric changes could cause the device not to meet the published specifications.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

PIN CONFIGURATION

(TOP VIEW)



TDFN-2×2-8L

PIN DESCRIPTIONS

PIN	NAME	DESCRIPTION
1	C1P	Positive Terminal for Flying Capacitor. Connect a 1μFcapacitor to C1N.
2	PGND	Power Ground. Connect to SGND.
3	C1N	Negative Terminal for Flying Capacitor. Connect a 1μF capacitor to C1P.
4	PV_{SS}	Charge-Pump Output. Connect to SV_{SS} and bypass with a 1μF ceramic capacitor to PGND.
5	$\overline{SHDN}$	Active-Low Shutdown Input.
6	INL	Input for Left-Channel.
7	SGND	Signal Ground. Connect to PGND.
8	INR	Input for Right-Channel.
9	SV_{SS}	Amplifier Negative Supply. Connect to PV_{SS}.
10	OUTR	Output for Right-Channel.
11	OUTL	Output for Left-Channel.
12	V_{DD}	Positive Power-Supply Input. Bypass with a 1μF capacitor to SGND.
Exposed Pad	—	Exposed Pad. Can be connected to GND or left floating.

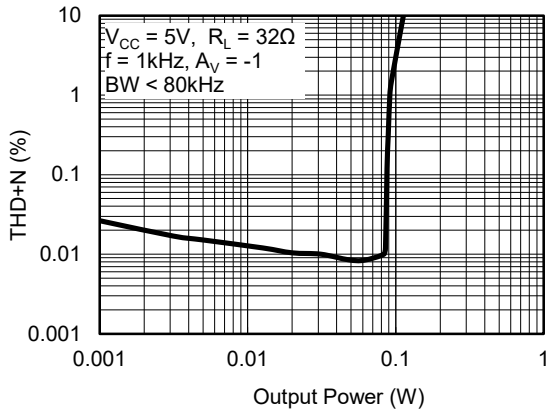
ELECTRICAL CHARACTERISTICS

(T_A = +25℃, unless otherwise noted.)

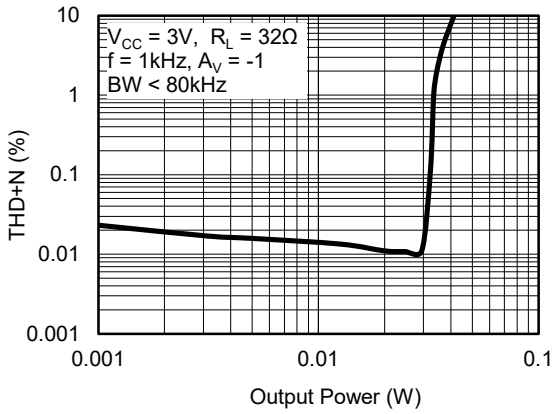
PARAMETER	SYMBOL	CONDITIONS			MIN	TYP	MAX	UNITS
					2.5		5.5	V
Shutdown Current	I_{SD}	V_{IN} = 0V, V_{SHDN} = GND, V_{CC} = 5.0V				0.02	4	μA
		V_{IN} = 0V, V_{SHDN} = GND, V_{CC} = 3.3V				0.02		
		V_{IN} = 0V, V_{SHDN} = GND, V_{CC} = 2.6V				0.02		
Output Offset Voltage	V_{OS}	V_{IN} = 0V, V_{SHDN} = V_{CC} = 5.0V			-50	2.5	50	mV
		V_{IN} = 0V, V_{SHDN} = V_{CC} = 3.3V				2.5		
		V_{IN} = 0V, V_{SHDN} = V_{CC} = 2.6V				2.5		
Quiescent Power Supply Current	I_Q	V_{IN} = 0V, V_{SHDN} = V_{CC}	V_{CC} = 5.0V, No Load			1.65	2.8	mA
			V_{CC} = 3.3V, No Load			1.50		
			V_{CC} = 2.6V, No Load			1.40		
Shutdown Voltage Input High	V_{SDIH}				1.2			V
Shutdown Voltage Input Low	V_{SDIL}						0.4	V
Output Power (per Channel)	P_O	f = 1kHz THD+N = 0.1%	V_{CC} = 5.0V	R_L = 16Ω		145		mW
				R_L = 32Ω		85		
			V_{CC} = 3.6V	R_L = 16Ω		78		
				R_L = 32Ω		44		
			V_{CC} = 3.0V	R_L = 16Ω		54		
				R_L = 32Ω		31		
			V_{CC} = 2.6V	R_L = 16Ω		40		
				R_L = 32Ω		23		
Total Harmonic Distortion + Noise	THD+N	P_O = 78mW, V_{CC} = 5.0V, R_L = 32Ω, f = 20Hz to 20kHz				0.1		%
Crosstalk	X_{talk}	R_L = 32Ω, P_O = 70mW, V_{CC} = 5V, f = 1kHz				-85		dB
Power Supply Rejection Ratio	PSRR	f = 217Hz, C_B = 1μF, R_L = 32Ω V_{RIPPLE} = 200mVp-p, Input Grounded with 10Ω	V_{CC} = 5.0V			-67		dB
			V_{CC} = 3.6V			-67		
			V_{CC} = 3.0V			-65		
			V_{CC} = 2.6V			-64		
		f = 1kHz, C_B = 1μF, R_L = 32Ω V_{RIPPLE} = 200mVp-p, Input Grounded with 10Ω	V_{CC} = 5.0V			-75		
			V_{CC} = 3.6V			-75		
			V_{CC} = 3.0V			-74		
			V_{CC} = 2.6V			-65		

TYPICAL PERFORMANCE CHARACTERISTICS

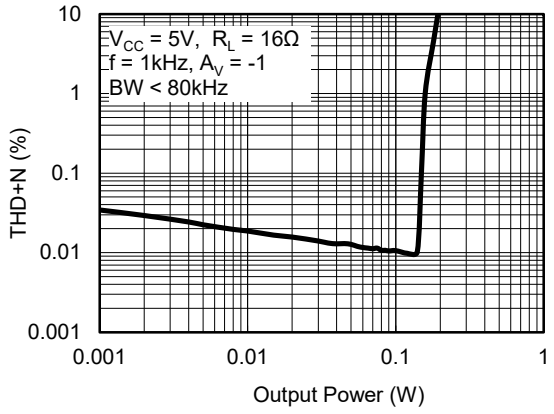
THD+N vs. Output Power per Channel



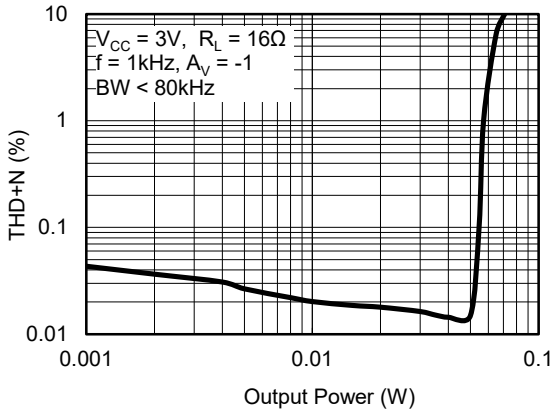
THD+N vs. Output Power per Channel



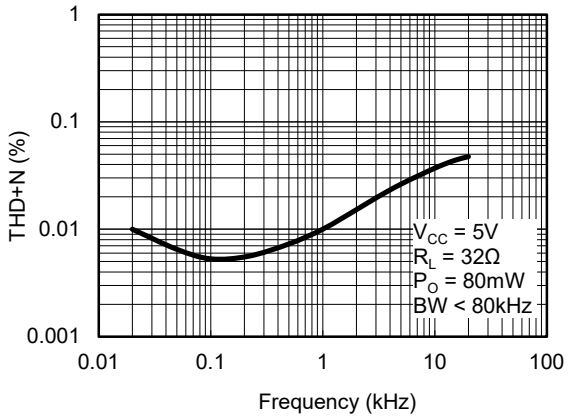
THD+N vs. Output Power per Channel



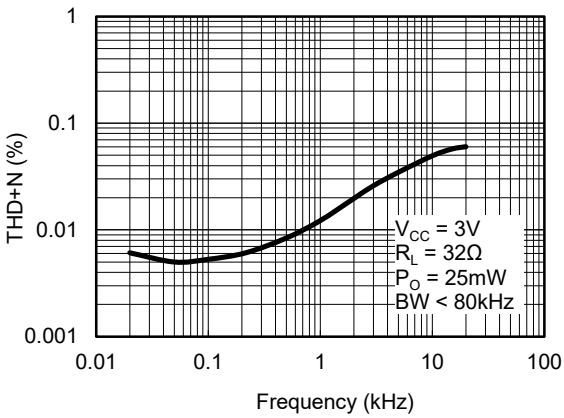
THD+N vs. Output Power per Channel



THD+N vs. Frequency

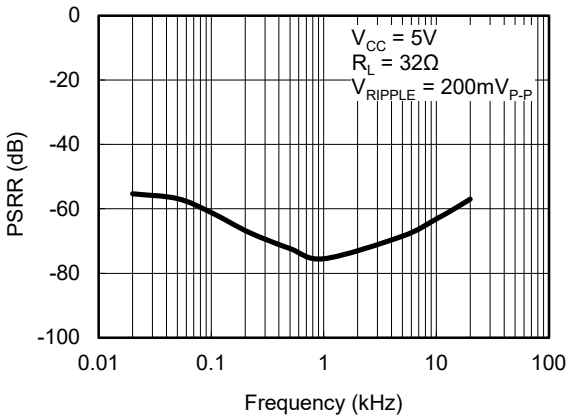


THD+N vs. Frequency

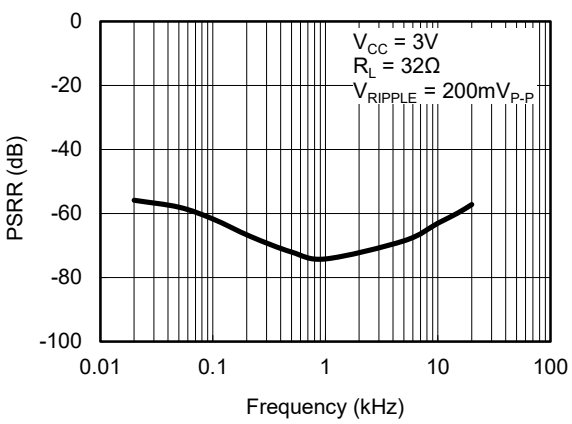


TYPICAL PERFORMANCE CHARACTERISTICS (continued)

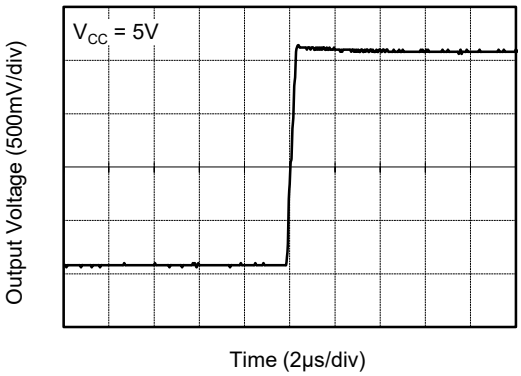
Power-Supply Rejection Ratio vs. Frequency



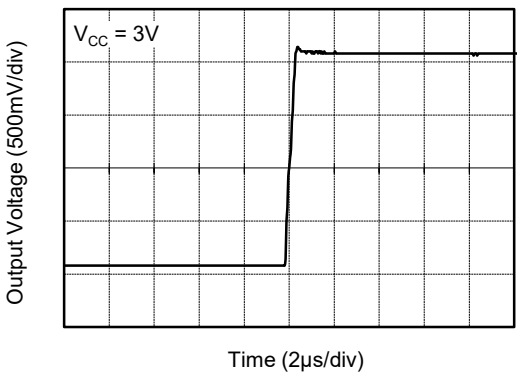
Power-Supply Rejection Ratio vs. Frequency



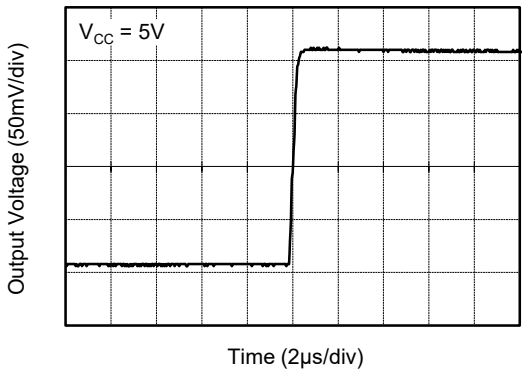
Large Signal Step Response



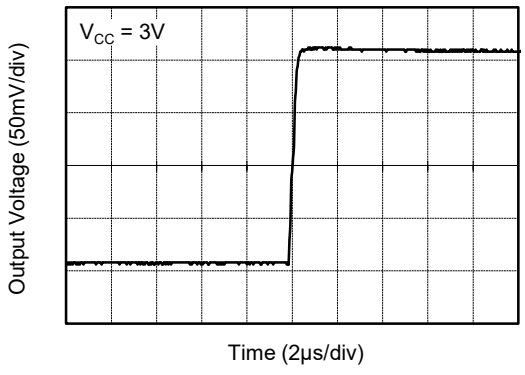
Large Signal Step Response



Small Signal Step Response

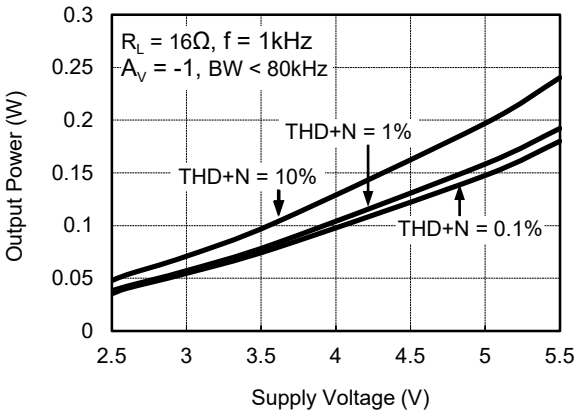


Small Signal Step Response

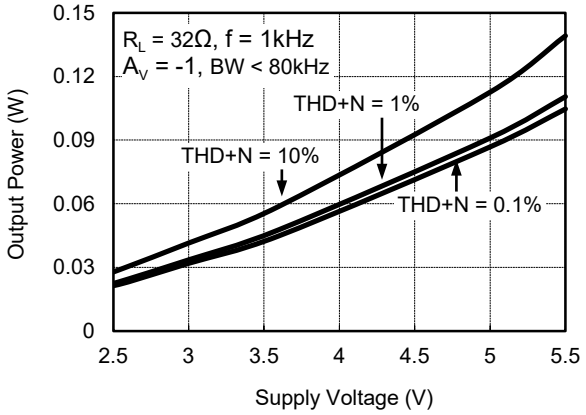


TYPICAL PERFORMANCE CHARACTERISTICS (continued)

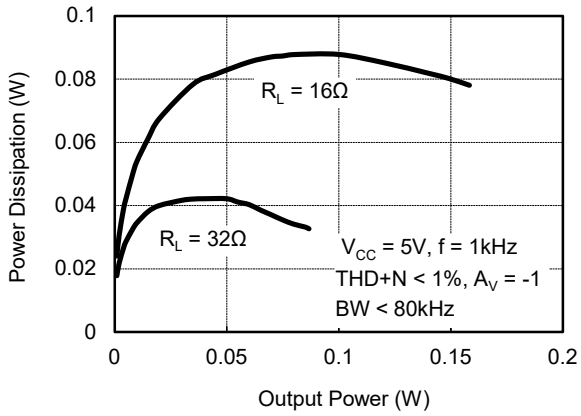
Output Power vs. Supply Voltage



Output Power vs. Supply Voltage



Power Dissipation vs. Output Power per channel



REVISION HISTORY

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

MAY 2011 – REV.A to REV.A.1

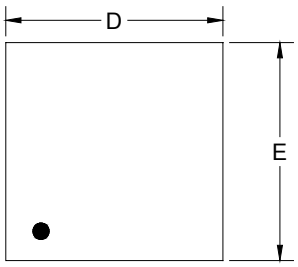
Updated package name	All

Changes from Original (MARCH 2010) to REV.A

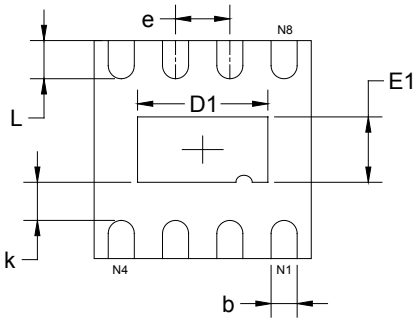
Changed from product preview to production data	All

PACKAGE OUTLINE DIMENSIONS

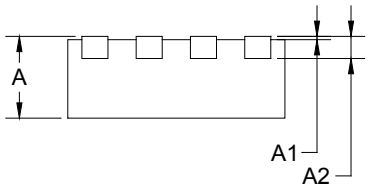
TDFN-2×2-8L



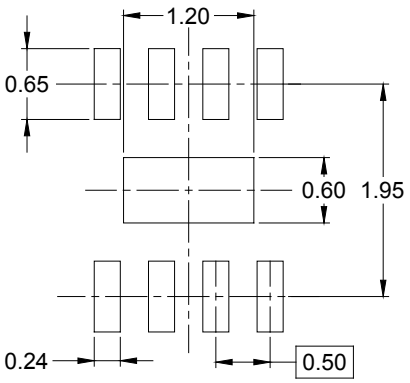
TOP VIEW



BOTTOM VIEW



SIDE VIEW

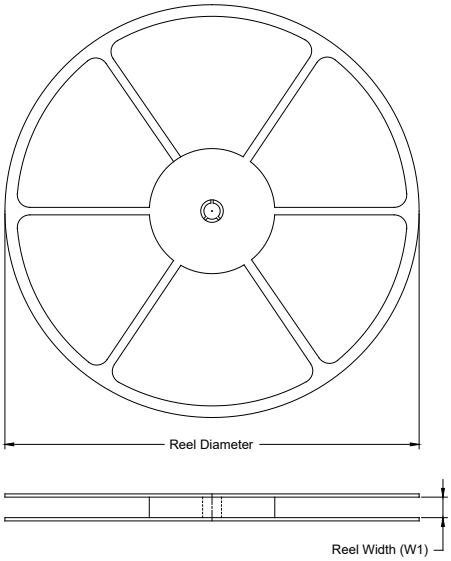


RECOMMENDED LAND PATTERN (Unit: mm)

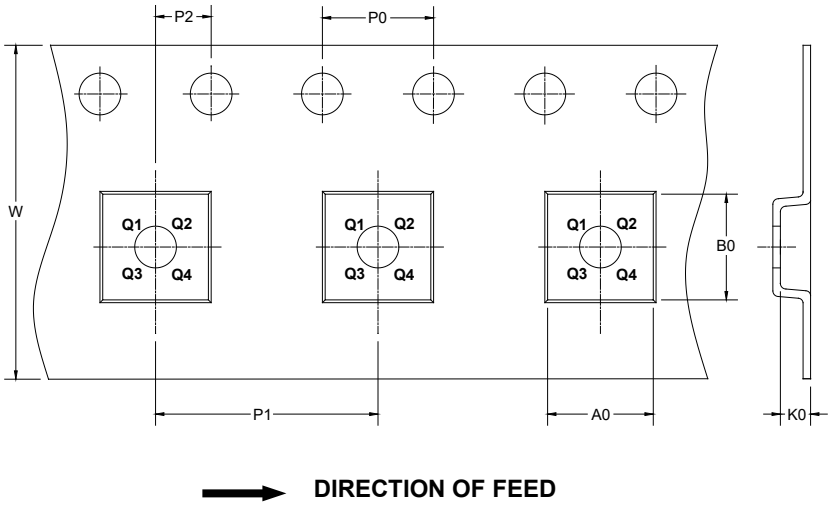
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203 REF		0.008 REF	
D	1.900	2.100	0.075	0.083
D1	1.100	1.300	0.043	0.051
E	1.900	2.100	0.075	0.083
E1	0.500	0.700	0.020	0.028
k	0.200 MIN		0.008 MIN	
b	0.180	0.300	0.007	0.012
e	0.500 TYP		0.020 TYP	
L	0.250	0.450	0.010	0.018

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



DIRECTION OF FEED

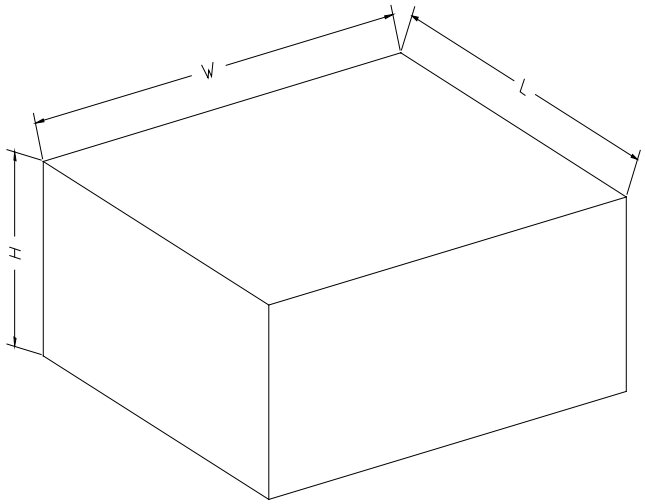
NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
TDFN-2×2-8L	7″	9.5	2.30	2.30	1.10	4.0	4.0	2.0	8.0	Q1

DD0001

CARTON BOX DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
7″ (Option)	368	227	224	8
7″	442	410	224	18

DD0002