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ISO 9001:2008 Certified

PRODUCT INFORMATION

PART # **5060CE-1** **Revision: 1-2014**

Lead Free RoHS COMPLIANCE

SQUARE PINCUSHION SPEAKER

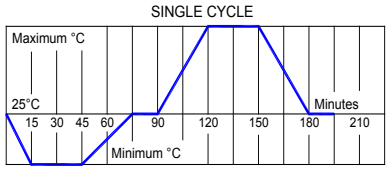
DESCRIPTION: **C**hallenge **E**lectronics **S**peaker; **130.3** mm Long; **S**quare shape; **117.0** mm Wide, **51.1** mm High; **KA= 10 W** maximum power; Impedance **8** Ohm; **S**teel Plated Frame; **P**aper with Foam Edge Cone; **NdFeB** magnet; **140** Hz. (Fo) Resonant Frequency; **T**erminal Lugs Termination; **R**oHS Lead Free Compliant

SPECIFICATIONS

Shape	**Square**		**Impedance**	**8 ± 15%, at: 800 Hz. 1.0 V**				**DC Resistance**	**7.1 Ω**		
Rated Power	**Sine Wave**	**5.0 W**	**Square Wave**	**W**	**Maximum Power**	**Sine Wave**	**10.0 W**	**Square Wave**	**W**		
Effective Frequency Band	**140 Hz. to 10 K Hz.** SPL within 10 dB Average				**Resonant Frequency (Fo)**	**140 Hz. ± 20%, at 1.0 V**					
Sound Pressure Level86	**90 ± 2 dB(A), at: 1.0 W, 1.0 m, Average 100, 500, 800, 1,000 Hz, at 25°C, Baffle board (IEC)**										
Operating Temperature	**-10ºC to + 55ºC**		**Storage Temperature**	**-20ºC to +65ºC**							
Physical Dimensions	**Length**	**130.3 mm**	**Width**	**117.0 mm**	**Height**	**51.1 mm**					
Baffle Opening	**Diameter**	**110.0 mm ø**	**Width**		**Minimum Opening Recessed**	**3.0 mm**					
Mounting	**Length**	**85.0 mm**	**Width**	**85.0 mm**	**Mounting Holes**	**4**	**Holes size**	**4.3 X 7.0 mm ø**			
Distortion	**Less than 7% at 1,000 Hz. at 81 dB**										
Buzz & Rattle	**Not be audible at 6.8 V sine wave between Fo to 5,000 Hz.**										
Polarity	**When a positive DC Current is applied to the voice coil terminal marked + or red, the diaphragm shall move forward**										
Material	**Magnet**	**Rare Earth, NdFeB, 80 mm Ø. 40.0 mm Ø OD mm, ID mm, H 12.0 mm**					**Flux Density**	**± 10% Gauss**			
	Frame	**PINCUSHION Plated Steel**			**Cone Material**	**Paper with Foam Edge**					
	Termination	**Terminal Lugs for wire leads soldering.** (Caution, overheating the terminal may damage connections of voice coil leads)									
	Optional Gasket	**Paper Gasket, ID 110.0 mm Ø**									
Approximate Weight	**440 grams**		**Shielding**	**No**	**Compliance**	**RoHS, Lead Free**					
Options											

RELIABILITY

Maximum Power Test	With program White-Noise source **Maximum Power**, 1 minute on, 2 minutes off, **10 cycles**, per (EIA) *
Thermal Operating Temperature Test	**96 hours** continuous operation **at Rated Power**, at **Maximum Rated Operating Temperature** *
	96 hours continuous operation **at Rated Power**, at **Minimum Rated Operating Temperature** *
Thermal Storage Temperature Test	**96 hours** at **Maximum Rated Storage Temperatures** *
	96 hours at **Minimum Rated Storage Temperatures** *
Thermal Shock Test	**5 cycles** of **Minimum and Maximum Operating Temperature** Each cycle shell be set per diagram below and is three (3) hours long *
Humidity Test	**96 Hours** at +40°C±2°C. 90-95% RH *
Operation Load Test	Must perform normal with program White-Noise source **at Rated Power** for **5 Hours** per (EIA) *
Insulation Test	A minimum of 1 MΩ, measured with 100 Vdc Insulation Resistance Meter, between the Electrical Terminals and the Transducer Case
Vibration Test	15 minutes at 1.5 mm with 10 to 55 Hz. vibration frequency to each of 3 perpendicular directions *
Termination Strength	Maximum of 9.8 N (1.0 Kg) load pull test, applied to each terminal in axial direction for 10 seconds
Drop Test	Dropped naturally from 1 meter height onto the surface of 40 mm wooden board, 3 axes (X,Y,Z) directions, 3 times (9 times total) *
* **Reliability Test Performance**	**Parts should conform to original performance within ±5 dB tested with Rated Power, after 3 hours of recovery period.**
Warranty	For a period of one (1) year from date of shipping under normal operations conditions This warranty does not apply to products damaged through misuse, abuse, improper installation, alteration, rework, or attempt to repair



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SPEAKER PARAMETERS

Name	Value	Unit	Comments
Electrical Parameters (Calculated)			
Re	7.1	Ohms	Electrical Voice-Coil DC Resistance
Le	0.1	mH	Frequency independent part of Voice-Coil Inductance
L2	0.1	mH	Para-Inductance of Voice-Coil
R2	2.1	Ohms	Electrical Resistance due to eddy current losses
Cmes	422`	µF	Electrical Capacitance representing moving mass
Lces	3.0	mH	Electrical Inductance representing driver compliance
Res	26.1	Ohms	Resistance due to Mechanical losses
Fs	142.6	Hz.	Driver Resonant Frequency
Mechanical Parameters (using Laser)			
Mms	2.51	grams	Mechanical mass of Driver Diaphragm assembly including Air-Load and Voice-Coil
Mmd (Sd)	2.06	grams	Mechanical mass of Voice-Coil and Diaphragm without Air-Load
rms	0.23	kg/s	Mechanical Resistance of total Driver losses
Cms	0.50	mm/N	Mechanical Compliance of Driver Suspension
Kms	2.02	N/mm	Mechanical Stiffness of Driver Suspension
Bl	2.44	N/A	Force factor (Bl product)
Lambda s	0.06		Suspension creep factor
Loss factors			
Qtp	2.11		Total Q-factor considering all losses
Qms	9.87		Mechanical Q-factor of Driver in free air considering Rms only
Qes	2.69		Electrical Q-factor of Driver in free air considering Re only
Qts	2.11		Total Q-factor considering Re and Rms only
Vas	5.27	l	Equivalent air volume of Suspension
n0	0.55	%	Reference efficiency (2 Pi-radiation using Re)
Lm	89.6	dB	Characteristic Sound Pressure Level (SPL at 1m for 1W @ Re)
Lnom	90.1	dB	Nominal sensitivity (SPL at 1m for 1W @ Zn)
rmse Z	1.30	%	Root-Mean-Square fitting error of Driver Impedance Z(f)
rmse Hx	3.39	%	Root-Mean-Square fitting error of transfer function Hx (f)
Series Resistor	0.00	Ohms	Resistance of Series Resistor
Sd	86.59	cm	Diaphragm area
HINT:			Increase averaging to improve laser signal
U pp	0.75	A	Peak to Peak value of Voltage at terminals
U ac	0.06	A rms	AC part of Voltage Signal
U head	56.9	dB	Digital headroom of Voltage Signal
U SNR+D	40.2	dB	Ratio of Signal to Noise + Distortion in Voltage Signal
FU noise	2,975	Hz.	Frequency of Noise + maximum Distortion in Voltage Signal
I pp	0.10	V	Peak to Peak value of Current at terminals
I ac	0.01	V rms	AC part of Current Signal
I head	40.8	dB	Digital headroom of Current Signal
I SNR+D	36.5	dB	Ratio of Signal to Noise + Distortion in Current Signal
FI noise	141	Hz.	Frequency of Noise + maximum Distortion in Current Signal
X pp	0.12	mm	Peak to Peak value of Displacement at terminals
X ac	0.02	mm rms	AC part of Displacement Signal
X head	64.4	dB	Digital headroom of Displacement Signal
X SNR+D	23.3	dB	Ratio of Signal to Noise + Distortion in Displacement Signal
FX noise	292	Hz.	Frequency of Noise + maximum Distortion in Displacement Signal

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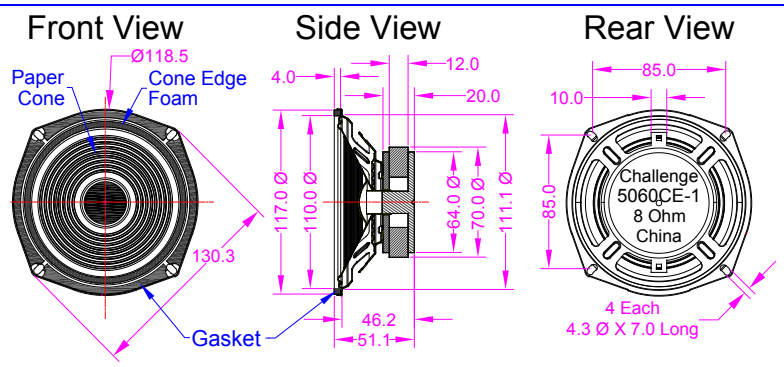
P pp		**mV**	**Peak to Peak value of Microphone Signal**
P ac		**mV rms**	**AC part of Microphone Signal**
P head		**dB**	**Digital headroom of Microphone Signal**
P sum level		**dB**	**Sum level of Microphone Signal**
FP mean level		**dB**	**Mean level of Microphone Displacement Signal**
F sample	**12,000**	**Hz.**	**Sample Frequency**
N stim	**32,768**	**number of samples**	**Stimulus Length**
cal x laser	**-0.103766**		**Laser calibration factor**

DIMENSIONS
Units in: mm; Tolerance: ± 0.5 mm unless specified otherwise

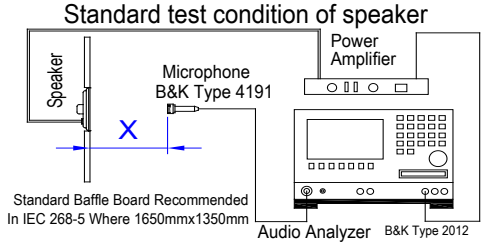


SPL vs. FREQUENCY RESPONSE

IMPEDANCE vs. FREQUENCY

MAGNITUDE OF TRANSFER FUNCTION

TEST PROCESS



Test Condition

STANDARD
Temperature: 15 ~ 35ºC
Relative humidity: 45% ~ 85%
Atmospheric pressure: 860 mbar to 1060 mbar

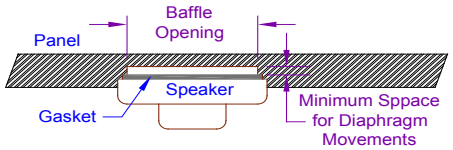
JUDGEMENT
Temperature : 20±3ºC
Relative humidity: 60% ~ 70%
Atmospheric pressure: 860mbar to 1060 mbar

Standard Test Fixture

Zero Level:	-dB
Mode:	TSR
potentiometer Range:	50 dB
Sweep Time:	0.5 sec

Input Power:
1.0 W
Microphone Distance:
X = 1.0 m

MOUNTING PRECAUTION



In order to keep speaker working normally, there allow enough free space for diaphragm movements, Minimum distance required is marked in page # 1under Baffle Opening

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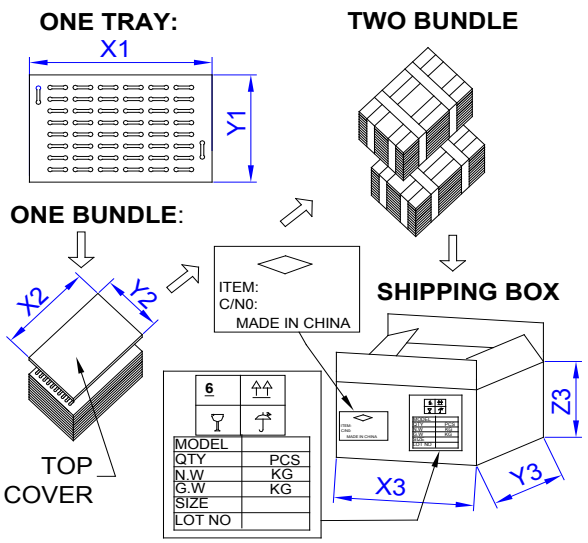
PACKAGING



MARKING	TRAY		
Bundle	Dimensions	X1	cm
Part Number		Y1	cm
Other PN if required		Z1	cm
Quantity	Quantity		0
Lot and/or Date Code	BUNDLE		
Bundle Number	Dimensions	X2	cm
Shipping Box		Y2	cm
Part Number		Z2	cm
Other PN (if required)	Quantity		0
Quantity	**SHIPPING BOX**		
Lot and/or Date Code	Dimensions	**X3**	**44 cm**
PO Number		**Y3**	**27 cm**
Net Weight		**Z3**	**32 cm**
Gross Weight	Number of Bundles		**0**
Box Number of Boxes	Quantity		**40**
Made in China	Approximate Weight		**18.9 Kg.**

Revision	Description	By	Date
1-2014	Modified the Specification Format and added Speaker Parameters	Ely Zofan	5/27/2014