Product/Process Change Notification

Initiation Date	14 Jan 2021	**Notification No.**	20210110
Implementation Date	22 Mar 2021	**Initiator's Name**	Reynald Sabug
Beginning Date Code of Implemented Change			WW 12 '21

CHANGE DESCRIPTION:

Knowles Electronics is making new version of TEC parts:

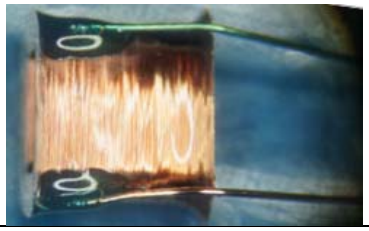
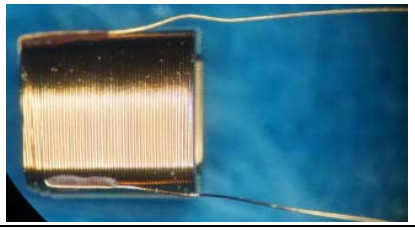
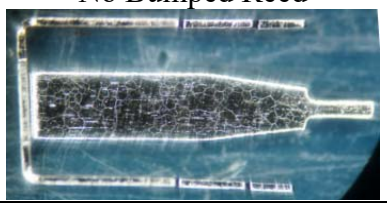
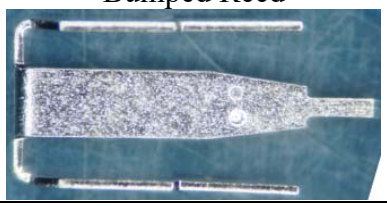
a) Change the current "no bumped Reed" to a "bumped Reed"
b) Change from a "wet wound" Coil to a Thermo-bond coil.

This will be an alternate component to the current TEC Coil design to increase capacity and assure adequate parts supply.

Note: There are no significant changes in the product fit, acoustic performance & reliability. There is no change to the external appearance of the receiver.

Please continue to work with your local Knowles Sales Manager if you have any questions, concerns or require samples for evaluations related to this product change notification.

Changes are shown below:

CURRENT	PROPOSED
Wet Wound Coil 	Thermo-bond Coil 
No Bumped Reed 	Bumped Reed 

MODELS AFFECTED:

Active PNs

DTEC-31116-000	HODTEC-31268-000	RVA-90080-N11
DTEC-32711-000	HODTEC-31323-000	RVA-90080-N12
DTEC-33152-000	HODTEC-31515-000	RVA-90080-N13
DTECLP-60726-000	HODTEC-32024-000	RVA-90080-N14
FTEC-30114-I04	HODTEC-32410-000	RVA-90080-N15
GV-32830-000	HODVTEC-31516-000	RVA-90080-N16
GV-61807-000	HODVTEC-31618-000	RVA-90080-N17
GWP-HPTUBE1SIEL	HODVTEC-32838-000	RVA-90080-N18
GWP-HPTUBE1SIER	HODVTEC-61242-000	RVA-90080-N19
GWP-HPTUBE2SIEL	HODVTEC-61553-000	RVA-90080-N20
GWP-HPTUBE2SIER	HODVTEC-62072-P189	TC-61233-000
GWP-HPTUBE3SIEL	RVA-90080-N01	TC-61235-000
GWP-HPTUBE3SIER	RVA-90080-N05	TC-61793-000
GWP-HPTUBE4SIEL	RVA-90080-N06	TEC-30611-000
GWP-HPTUBE4SIER	RVA-90080-N07	
HODTEC-31230-000	RVA-90080-N08	

SUPPORT INFORMATION:

The following qualification testing has been performed and showed no significant change in performance. The HODTEC-31733-000 receiver was used as the test model.

Group Identification:

Control (Current): Wet wound coil
Trial (New): Thermo-bond coil, Bumped reed

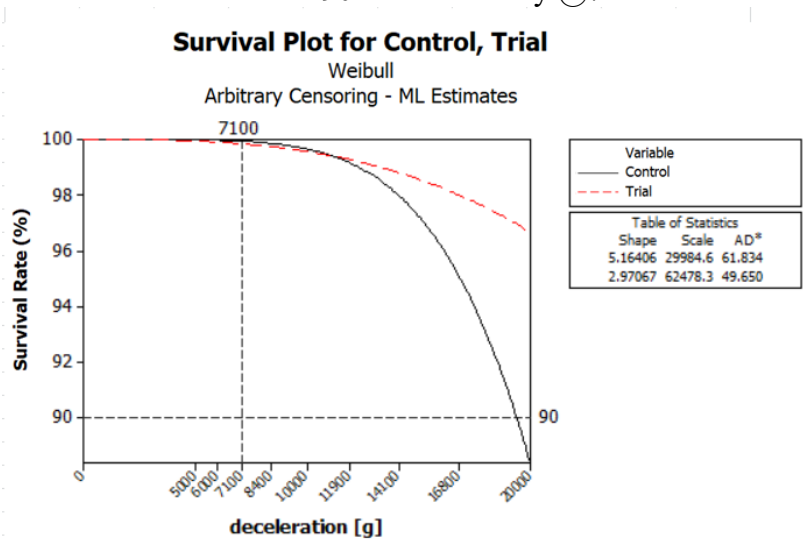
Knowles Qualification Plan Number: R-P-20082

The following Electro-acoustic and Reliability tests have been performed for HODTEC-31733-000.

ELECTRO-ACOUSTIC CPK RESULTS:

Note: Sensitivity is measured as dB relative to 20 µPa.		Average	Std. Dev	Cpk
RELSENS @200 Hz	New	-0.67	0.10	8.53
	Current	-0.77	0.10	2.45
SENSITIVITY @500 Hz	New	114.28	0.10	1.85
	Current	114.37	0.10	4.34
PKREL1 Amp @ 810 - 1010 Hz	New	8.45	0.22	4.74
	Current	8.27	0.12	1.78
PKREL2 Amp @ 1895 - 2305 Hz	New	4.43	0.16	3.28
	Current	4.31	0.11	7.39
PKREL3 Amp @ 3060 - 3740 Hz	New	-1.16	0.26	3.55
	Current	-1.35	0.38	1.96
PKREL4 Amp @ 4030 - 4530 Hz	New	-6.85	0.26	3.52
	Current	-7.10	0.22	1.51
PKREL5 Amp @ 5050 - 6170 Hz	New	-13.94	0.34	1.38
	Current	-14.14	0.34	2.51
THD-1 1/3rd PK @ 0.296 Vrms	New	1.29	0.51	3.67
	Current	1.11	0.24	5.68
THD-2 1/2rd PK @ 0.296 Vrms	New	1.70	0.70	2.06
	Current	1.60	0.54	1.93
THD-3 1/3rd PK @ 0.590 Vrms	New	2.80	0.91	2.81
	Current	3.06	0.61	2.5
THD-4 1/2rd PK @ 0.590 Vrms	New	3.51	1.23	1.56
	Current	3.55	1.04	1.28
IMPEDANCE-1 @ 500 Hz	New	169.48	1.91	5.00
	Current	170.17	2.32	2.99
IMPEDANCE-2 @ 1000 Hz500Hz	New	182.26	2.44	1.71
	Current	181.93	2.22	3.84

Test	Acceptance Criteria	Model Tested	Sample Size	Result
Acoustical Characteristics	Performance to be comparable to current product	HODTEC-31733-000	control = 194pcs trial = 324pcs	PASSED
HALT Condition A: 63°C / 95% RH, 1008 hours total exposure, biased.	Units shall compare favourably to historical data from similar model and shall change ≤ 3.0dB change in sensitivity at the adjust frequency; ≤5% distortion changes at the nominal drive; ≤10% distortion changes at the high drive.	HODTEC-31733-000	control = 30 trial = 30	PASSED
	<u>Average Change of Sensitivity (dB) @ 500Hz</u> Current = -0.0729 dB New = -0.6882 dB			
Environment 3 Condition A: 63°C / 95% RH, 1008 hours total exposure, unbiased.	Units shall compare favourably to historical data from similar model and shall change ≤ 3.0dB change in sensitivity at the adjust frequency; ≤5% distortion changes at the nominal drive; ≤10% distortion changes at the high drive.	HODTEC-31733-000	control = 30 trial = 30	PASSED
	<u>Average Change of Sensitivity (dB) @ 500Hz</u> Current = 0.0742 dB New = 0.0276 dB			
Powered Salt Fog Test 4 Weeks exposure to 35°C salt fog chamber with salt deposition 20~50g/sq.m/24 hours. Units powered with 0.289Vrms@1kHz	No open/short after test.	HODTEC-31733-000	control = 20 trial = 20	PASSED
	Current = No failures observed after the test New = No failures observed after the test			

Test	Acceptance Criteria	Model Tested	Sample Size	Result
Mechanical Shock Shock at progressively higher heights until failure. "Failure" means that a unit changes >3dB from initial, THD at nominal drive at 1/3 resonance > 10% or THD at nominal drive at 1/2 resonance > 20%.	90% Survivability @7.1kG	HODTEC-31733-000	control = 60 trial = 60	PASSED
	Current = above 90% survivability @7.1kG New = above 90% survivability @7.1kG 			
Solder / De-solder Cycling Temp for Pb.-Free: 750°F (400°C) 5 Cycles of 2 sec. / pad	≤ 1dB in sensitivity at the adjust frequency and distortion shall meet specification for all units tested	HODTEC-31733-000	control = 20 trial = 20	PASSED
	<u>Average Change of Sensitivity (dB) @ 500Hz</u> Current = -0.0082 dB New = 0.02775 dB			
Composite Temperature Humidity Cyclic Test Test 2b (10 cycles of 24 hrs each) 25°C / 80-100% RH for 3 h 65°C / 90-100% RH for 5 h -10°C / 0% RH for 5 h	Sensitivity changes at the adjustment frequency< 1.5 dB	HODTEC-31733-000	control = 20 trial = 20	PASSED
	<u>Average Change of Sensitivity (dB) @ 500Hz</u> Current = 0.1010 dB New = 0.0100 dB			
Thermal Shock	≤3 dB change from initial adjust frequency value	HODTEC-31733-000	control = 20 trial = 20	PASSED

5 cycles: -40°C to +63°C, 15 minute soaks, <30 sec. transition	Average Change of Sensitivity (dB) @ 500Hz Current = -0.0999 dB New = -0.1271 dB			
Aggressive Sweat Cond 4 -10 Day exposure to sweat vapour in 38°C oven, 1.8PH±.2.	No visual signs of corrosion, Sensitivity to change < 4 dB	HODTEC-31733-000	control = 20 trial = 20	PASSED
	Average Change of Sensitivity (dB) @ 500Hz Current = -0.0670 dB New = -0.0710 dB			
Test	**Acceptance Criteria**	**Model Tested**	**Sample Size**	**Result**
Sine Vibration Test 10Hz-55Hz w/ const amp of 3.5mm, 55Hz-5000Hz w/ const acc of 30G, 11 mins/axis, Sweep 1 oct/min,	Sensitivity to change < 1 dB	HODTEC-31733-000	control = 20 trial = 20	PASSED
	Average Change of Sensitivity (dB) @ 500Hz Current = -0.10225 dB New = -0.07665 dB			

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