

Quality Grade Difference: MLCC

	TY Quality Grade 3	TY Quality Grade 2		TY Quality Grade 1
	S: General Application L: Medical GHTF A/B	B: Telecom and Industrial M: Medical GHTF C	C: Automotive Body Info JIS ver/AEC-Q200 ver	A: Automotive Powertrain and Safety
Parts code	MSASE31LSB7475KTNA01 MLASE31LSB7475KTNA01 EMK316 B7475KL-T	MBASE31LAB7475KTNA18 MMASE31LAB7475KTNA18 EMK316AB7475KL8T	MCASE31LAB7475KTNA01 EMK316AB7475KLHT	MAASE31LAB7475KTNA01 EMF316AB7475KLHT
AEC-Q200 Test Method	N/A		Qualified	
PPAP	N/A	Available upon request	Level 1~3 Series Certification*	Level 1~5 Item Certification*
ISO9001 series	Certified			
IATF16949	N/A		Produced at IATF16949 authenticated factories (NON APQP)	IATF16949 confirmed (APQP)
Plants	All Taiyo Yuden Plants			
Design for safety margin based on rated voltage	×1 ~1.5	×2 ~3.5		
Inspection process inline	Electric performance	+ Confirm durability on safety margin (×2~3.5)		+CSR and HALT
Temperature range	-55 to 85°C (or 105/125°C)	-55 to 125°C (or 85 / 105)		-55 to 125°C(150°C)
Median Life @ Use70%RV 70°C	60years	328years		512years
Fail in Time @ AEC-Q200 operating life	Max 2500	225~450		Max 225
Process control	Meeting Spec/Standard	Full Control of manufacturing process from start to end		
Process Line	Standard	Automotive Line and Designated Operator		

* Note: AEC-Q200 is used as the specification of the stress test which is included in PPAP document for automotive grade.

MLCC Spec Difference

	Conditions	TY Quality Grade 3	TY Quality Grade 2			TY Quality Grade 1
		S:General Application L:Medical GHTF A/B	B:Telecom and Industrial/ M:Medical GHTF C	C:Automotive Body Info JIS ver	C:Automotive Body Info AEC-Q200 ver	A:Automotive Powertrain and Safety
Parts code		MSASE31LSB7475KTNA01 MLASE31LSB7475KTNA01 EMK316 B7475KL-T	MBASE31LAB7475KTNA18 MMASE31LAB7475KTNA18 EMK316AB7475KL8T	MCASE31LAB7475KTNA1J EMK316AB7475KLHT	MCASE31LAB7475KTNA01 EMK316AB7475KLHT	MAASE31LAB7475KTNA01 EMF316AB7475KLHT
Operating life	Atmosphere	125°C Dry			AEC-Q200 qualified	125°C Dry
	Electric stress	RV×1.5			AEC-Q200 qualified	RV×1
	Duration	1000hours			AEC-Q200 qualified	1000hours
Biased Humidity	Atmosphere	40°C 95%RH	60°C 95%RH		AEC-Q200 qualified	85°C 85%RH
	Electric stress	RV			AEC-Q200 qualified	RV
	Duration	500 hours			AEC-Q200 qualified	1000 hours
Heat Cycle	Atmosphere	-55°C to 125°C			AEC-Q200 qualified	-55°C to 125°C
	Duration	5cycle	50cycle		AEC-Q200 qualified	1000cycle
Board Flex		1mm			AEC-Q200 qualified	2mm
Shear stress		0402(EIA) and larger: 5N 30秒 0201(EIA) and smaller: 2N 10秒			AEC-Q200 qualified	17.7 N 60sec 0402(EIA) and smaller: Individual Spec
Mechanical shock		N/A			AEC-Q200 qualified	1500g 0.5,sec
Beam Lord		N/A			AEC-Q200 qualified	Individual Spec

Note: (i)The term “AEC-Q200 qualified” as used in this presentation shall mean that the products have been tested according to AEC-Q200 and have passed the tests. The scope of performance warranty for the products shall be only rated value, and shape and dimensions described in our product specification sheet.

(ii) RV : Rated Voltage (定格電圧) Ex) “RV×1.5” means 1.5 times of rated voltage

(iii) Only one version from JIS version or AEC-Q200 version can be chosen as automotive grade standard type.

(iv) The specification vale of Automotive Powertrain and Safety on this chart is our normal value based on AEC-Q200 test condition. Please contact us for more detail.

Quality Grade Difference: Wire-Wound Inductor (ex. □□X□ structure)

	TY Quality Grade 3	TY Quality Grade 2		TY Quality Grade 1
	S: General Application L: Medical GHTF A/B	B: Telecom , Industrial M: Medical GHTF C	C: Automotive Body Info	A: Automotive Powertrain and Safety
Parts code	LSXND6060YEL100MMG LLXND6060YEL100MMG NRS6045T100MMGK	LBXND6060YEL100MMG LMXND6060YEL100MMGNRS604 5T100MMGK8	LCXHF6060YEL100MMR LCXND6060YEL100MMG NRM6045T100MMRSV NRS6045T100MMGKV	LAXHG6060YEL100MMR NRT6045T100MMRS
AEC-Q200 Test Method	N/A		Qualified	
PPAP	N/A	Available upon request	Level 1~3 Series Certification*	Level 1~5 Item Certification*
ISO9001 series	Certified			
IATF16949	N/A		Produced at IATF16949 authenticated factories (NON APQP)	IATF16949 confirmed (APQP)
Plant	TAIYO YUDEN (PHILIPPINES), INC.			
Inspection process inline	Electric performance	Tight sorting criteria		Part Average Testing
Temperature range	-25 to 125°C(120) (Including self-heating)	-40 to 125°C (Including self-heating)		-40 to 150°C (Including self-heating)
Median Life@ Tmax.* (including self heating)	> 76 years (125°C)			> 10 years (150°C)
Fail in Time @ AEC-Q200 operating life*	Max 2,500	Max 100		Max 20
Process Capability STD	Cpk > 1.33	Cpk > 1.67		
Process control	Meeting Spec/Standard	Control tightening of manufacturing process for key parameters from start to end		Full Control of manufacturing process from start to end
Process Line	Standard	Automotive Line and Designated Operator		

* Note: AEC-Q200 is used as the specification of the stress test which is included in PPAP document for automotive grade.

* The values differ depending on the product.

Inductor Spec Difference: Wire-Wound Inductor (1/4)

Conditions	TY Quality Grade 3		TY Quality Grade 2		TY Quality Grade 1
	General Application Medical Devices GHTF Class A,B		Telecom、Industrial Medical Devices GHTF Class C	Automotive Body Info JIS/EIA version	Automotive Powertrain and Safety
First 2 letter of parts code	LS / LL	LB / LM	LC	LA	
Operating temperature range ※Including self-heating					
Wire-wound Ferrite Power Inductors □□XN/□□XP/□□XH/□□DN/□□YPseries	-25~120℃*1 -25℃~125℃	-40~125℃		-40~150℃ -55~150℃*5	
Wire-wound Ferrite Power Inductors □□RN series Resin base type	-40~125℃			-	
Wire-wound Ferrite (Power) Inductors □□QB/□□QC/□□QE /□□QN/□□QPA/□□QM*2 series	-40~105℃		-		
Wire-wound Metal Power Inductors □□EN/□□EP/□□EU series	-40~125℃			-	
Damp heat life test					
Wire-wound Ferrite Power Inductors □□XN/□□XP/□□XH/□□DN/□□YPseries	60℃ 90~95%RH/ 500hours	60℃ 90~95%RH/1000hours 85℃ 85%RH/1000hours*3		85℃ 85%RH/ 1000hours	
Wire-wound Ferrite Power Inductors □□RN series Resin base type	60℃ 90~95%RH/500hours			-	
Wire-wound Ferrite (Power) Inductors □□QB/□□QC/□□QE /□□QN/□□QPA/□□QM*2 series	60℃ 90~95%RH/1000hours		-		
Wire-wound Metal Power Inductors □□EN/□□EP/□□EU*4 series	60℃90~95%/500hours 85℃85%/500hours*4	85℃85%/1000hours		-	
Loading at high temperature life test @Rated current					
Wire-wound Ferrite Power Inductors □□XN/□□XP/□□XH/□□DN/□□Ypseries	85℃/500hours	85℃/1000hours (Δ40℃) or 105℃/1000hours (Δ20℃)*3		125℃/1000hours (Δ25℃)*3,*5	
Wire-wound Ferrite Power Inductors □□RN series Resin base type	85℃/500hours			-	
Wire-wound Ferrite (Power) Inductors □□QB/□□QC/□□QE /□□QN*6/□□QPA*6/□□QM*2 series	85℃/1000hours - *2*6		-		
Wire-wound Metal Power Inductors □□EN/□□EP/□□EU series	- 85℃/500hours*4	85℃/1000hours(Δ40℃) or 105℃/1000hours(Δ20℃)		-	

*1 □□XH size≤3□ *2 signal *3 □□XH *4 □□EU *5 □□YP

Inductor Spec Difference: Wire-Wound Inductor (2/4)

Conditions	TY Quality Grade 3	TY Quality Grade 2		TY Quality Grade 1
	General Application Medical Devices GHTF Class A,B	Telecom , Industrial Medical Devices GHTF Class C	Automotive Body Info JIS/EIA version	Automotive Powertrain and Safety
First 2 letter of parts code	LS / LL	LB / LM	LC	LA
Loading under damp heat life test @Rated current				
Wire-wound Ferrite Power Inductors □□XN/□□XP/□□XH/□□DN/□□Ypseries	60°C 90~95%RH/ 500hours	60°C 90~95%RH/1000hours - *3		No definition
Wire-wound Ferrite Power Inductors □□RN series Resin base type	60°C 90~95%RH/500hours			-
Wire-wound Ferrite (Power) Inductors □□QB/□□QC/□□QE /□□QN/□□QPA/□□QM*2 series	60°C 90~95%RH/1000hours		-	
Wire-wound Metal Power Inductors □□EN/□□EP/□□EU*4 series	60°C 90~95%RH/500hours *except 4 - *4		No definition -	
Low temperature life test				
Wire-wound Ferrite Power Inductors □□XN/□□XP/□□XH/□□DN/□□Ypseries	-40°C/500hours	-40°C/1000hours		No definition
Wire-wound Ferrite Power Inductors □□RN series Resin base type	-40°C/500hours			-
Wire-wound Ferrite (Power) Inductors □□QB/□□QC/□□QE /□□QN/□□QPA/□□QM*2 series	-40°C/1000hours		-	
Wire-wound Metal Power Inductors □□EN/□□EP/□□EU*4 series	-40°C/500hours -*4		No definition -	
Temperature Cycling				
Wire-wound Ferrite Power Inductors □□XN/□□XP/□□XH/□□DN/□□Ypseries	-40°C to 85°C/100cycle	-40°C to 85°C/1000cycle -40°C to 105°C/1000cycle*3		-55°C to 150°C*5 -40 to 125°C*3 /1000cycle
Wire-wound Ferrite Power Inductors □□RN series Resin base type	-40°C to 85°C/100cycle			-
Wire-wound Ferrite (Power) Inductors □□QB/□□QC/□□QE /□□QN/□□QPA/□□QM*2 series	-40°C to 85°C/100cycle		-	
Wire-wound Metal Power Inductors □□EN/□□EP/□□EU*4 series	-40°C to 85°C/100cycle	-40°C to 125°C/1000cycle		-

*2 signal Line *3 □□XH *4 □□EU *5 □□YP

Inductor Spec Difference: Wire-Wound Inductor (3/4)

Conditions	TY Quality Grade 3	TY Quality Grade 2		TY Quality Grade 1
	General Application Medical Devices GHTF Class A,B	Telecom、Industrial Medical Devices GHTF Class C	Automotive Body Info JIS/EIA version	Automotive Powertrain and Safety
First 2 letter of parts code	LS / LL	LB / LM	LC	LA
Resistance to soldering heat				
Wire-wound Ferrite Power Inductors □□XN/□□XP/□□XH/□□DN/□□YPseries	260°C_5sec_2times		250°C_30sec 3times	
Wire-wound Ferrite Power Inductors □□RN series Resin base type	260°C_5sec_2times		-	
Wire-wound Ferrite (Power) Inductors □□QB/□□QC/□□QE /□□QN/□□QPA/□□QM*2 series	260°C_5sec_3times		-	
Wire-wound Metal Power Inductors □□EN/□□EP/□□EU series	260°C_5sec_2times		-	
Resistance to flexure of substrate				
Wire-wound Ferrite Power Inductors □□XN/□□XP/□□XH/□□DN/□□Ypseries	1.0mm-Board _2mm	1.6mm-Board _2mm		
Wire-wound Ferrite Power Inductors □□RN series Resin base type	1.0mm-Board _2mm		-	
Wire-wound Ferrite (Power) Inductors □□QB/□□QC/□□QE /□□QN/□□QPA/□□QM*2 series	1.0mm-Board _2mm		-	
Wire-wound Metal Power Inductors □□EN/□□EP/□□EU series	1.0mm-Board _2mm	1.6mm-Board _2mm		-
Adhesion of terminal electrode				
Wire-wound Ferrite Power Inductors □□XN/□□XP/□□XH/□□DN/□□Ypseries	10N_5sec		17.7N_60sec	
Wire-wound Ferrite Power Inductors □□RN series Resin base type	10N_5sec		-	
Wire-wound Ferrite (Power) Inductors □□QB/□□QC/□□QE /□□QN/□□QPA/□□QM*2 series	10N_5sec		-	
Wire-wound Metal Power Inductors □□EN/□□EP/□□EU series	10N_5sec	17.7N_60sec		-

*2 signal Line

Inductor Spec Difference: Wire-Wound Inductor (4/4)

Conditions	TY Quality Grade 3	TY Quality Grade 2		TY Quality Grade 1
	General Application Medical Devices GHTF Class A,B	Telecom、Industrial Medical Devices GHTF Class C	Automotive Body Info JIS/EIA version	Automotive Powertrain and Safety
First 2 letter of parts code	LS / LL	LB / LM	LC	LA
Mechanical shock				
Wire-wound Ferrite Power Inductors □□XN/□□XP/□□XH/□□DN/□□YPseries	No definition			100G 6msec
Wire-wound Ferrite Power Inductors □□RN series Resin base type	No definition			-
Wire-wound Ferrite (Power) Inductors □□QB/□□QC/□□QE /□□QN/□□QPA/□□QM*2 series	No definition		-	
Wire-wound Metal Power Inductors □□EN/□□EP/□□EU series	No definition			-
Resistance to vibration X/Y/Z direction				
Wire-wound Ferrite Power Inductors □□XN/□□XP/□□XH/□□DN/□□YPseries	10~55~10Hz/1min cycle (each 2 hours)			10~2K~10Hz/ 20min cycle (each 4 hours)
Wire-wound Ferrite Power Inductors □□RN series Resin base type	10~55~10Hz/1min cycle (each 2 hours)			-
Wire-wound Ferrite (Power) Inductors □□QB/□□QC/□□QE /□□QN/□□QPA/□□QM*2 series	10~55~10Hz/1min cycle (each 2 hours)		-	
Wire-wound Metal Power Inductors □□EN/□□EP/□□EU series	10~55~10Hz/1min cycle (each 2 hours)			-
(Reference) Derating				
Wire-wound Ferrite Power Inductors □□XN/□□XP/□□XH/□□DN/□□YPseries	No description	description		
Wire-wound Ferrite Power Inductors □□RN series Resin base type	No description	description		-
Wire-wound Ferrite (Power) Inductors □□QB/□□QC/□□QE /□□QN/□□QPA/□□QM*2 series	No description	description	-	
Wire-wound Metal Power Inductors □□EN/□□EP/□□EU series	No description	description		-

Quality Grade Difference: Multilayer Metal Power Inductor

	TY Quality Grade 3	TY Quality Grade 2		TY Quality Grade 1
	S: General Application L: Medical GTHF A/B	B: Telecom and Industrial M: Medical GHTF C	C: Automotive Body Info	A: Automotive Powertrain and Safety
Parts code	LSCN/LLCN series MC series	LBCN/LMCN series MC_8 series	LCCN series MC_V series	—
AEC-Q200 Test Method	N/A		Qualified	
PPAP	N/A	Available upon request	Level 1~3* Series Certification	Level 1~5* Item Certification
ISO9001 series	Certified			
IATF16949	N/A		IATF16949 confirmed (APQP)	
Plant	WAKAYAMA TAIYO YUDEN CO., LTD. TAIYO YUDEN (PHILIPPINES), INC.			
Design for safety margin based on rated voltage	×2.8	×3.3		× 4
Inspection process inline	Electric performance			+Impulse test
Temperature range (Including self-heating)	-40 to 125℃	-40 to 125℃/150℃		-55 to 150℃
Median Life @ 125℃(including self heating)	> 50 years	> 290 years		> 580 years
Fail in Time @ AEC-Q200 operating life	Max 2,500	225~450		Max 225
Process Capability STD.	Cpk > 1.33	Cpk> 1.67		
Process control	Meeting Spec/Standard	Full Control of manufacturing process from start to end		
Process Line	Standard	Automotive Line and Designated Operator		

* Note: AEC-Q200 is used as the specification of the stress test which is included in PPAP document for automotive grade.

Inductor Spec Difference: Multilayer Metal Power Inductor

	TY Quality Grade 3	TY Quality Grade 2		TY Quality Grade 1
	S:General Application L:Medical GHTF A/B	B:Telecom and Industrial M:Medical GHTF C	C:Automotive Body Info JIS/EIA version	A:Automotive Powertrain and Safety
Parts code	LSCN/LLCN series	LBCN/LMCN series	LCCN series	—
Operating temperature range ※Including self-heating	-40~125℃	-40~125℃/150℃		-40~125℃ -55~150℃
Damp heat life test	60℃ 90~95%RH 500hours	60℃ 90~95%RH 1000hours		85℃ 85%RH 1000hours
Loading at high temperature life test @Rated current	85℃ 500hours	85℃/110℃ 1000hours		85℃/110℃ 1000hours
Temperature Cycling	-40℃ to 85℃ 100cycle	-40℃ to 125℃/150℃ 1000cycle		-40 to 125℃ -55℃ to 150℃ 1000cycle
Resistance to soldering heat	260℃_5sec 3times			260℃_30sec 3times
Resistance to deflection	Board thickness_0.8mm Displacement_2mm			Board thickness_1.6mm Displacement_2mm
Adhesion of terminal electrode	10N_5sec			17.7N_60sec
Mechanical shock	No definition			100G 6msec
Resistance to vibration X/Y/Z direction	10~55~10Hz/1min cycle (each 2 hours)			10~2000~10Hz/ 20min cycle (each 4 hours)
(Reference) Derating	No description	Description		