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Oct 20th, 2023

PCN # ESW490-54 – Thyristor TO225_TO252_TO251 Package Products Alternative Wafer Location

To our valued customers,

Littelfuse wants to inform you that we have an alternative wafer manufacturing site for our acquired ON Semiconductor Thyristor products TO225/TO252/TO251 Packages. The new in-house wafer factory locates in Wuxi, China. Our target is to build this factory as a world-class facility with automated, error-proof processes to meet the highest quality standards. Below are the detailed changes associated with Littelfuse’s alternative wafer manufacturing site.

Form, fit, function changes: YES
Part number changes: NO
Effective date: Jan 20th, 2024
Replacement products: NO
Last time buy: NO

1.0 Qualification Test Result

All samples passed reliability test standard by Littelfuse.

Elaborate on PN and test items which fail datasheet spec as below

PN	dv/dt			di/dt(c)		
	Littelfuse wafer(after)	Lite-on wafer(before)	datasheet	Littelfuse wafer(after)	Lite-on wafer(before)	datasheet
MAC4DCNT4G MAC4DCMT4G	/			avg.5 A/ms min.4 A/ms @ dv/dt(c)=4.8V/μs	avg.12 A/ms min.9 A/ms @ dv/dt(c)=7.3V/μs	avg.8.4 A/ms min.6 A/ms @ dv/dt(c)=18V/μs
MCR12DSNT4G MCR12DSMT4G	avg.45 V/μs min.37 V/μs @ RGK=100Ω	avg.198 V/μs min.183 V/μs @ RGK=100Ω	avg.10 V/μs min.2 V/μs @ RGK=1KΩ	/		
MCR8DSNT4G MCR8DSMT4G				min.2 A/ms	min.2.9 A/ms	min.3 A/ms
MAC4DSNT4G MAC4DSMT4G	/			/		

1.1 Package TO225 Reliability test result summary

Test Item	Sample P/N	Sample QTY	Littelfuse test Ref#	Contents/Conditions	Duration	Result Summary
ACBV (HTRB)	2N6075AG	77 x 1	TR23-03-000115	At T _J max, Reverse biased at 100%V _{DRM}	1,008hrs	0 failure
	2N6075BG	77 x 1	147885/150808			
H3TRB	2N6075AG	77 x 1	TR23-03-000115	T _A =85°C, RH=85%, Reverse biased at 100V _{DC}	1,008hrs	0 failure
	2N6075BG	77 x 1	147885/150808			
TC	2N6075AG	77 x 1	TR23-03-000115	-55°C & 150°C (air to air), Dwell time 15mins	1,000 cycles	0 failure
	2N6075BG	77 x 1	147885/150808			
UHAST	2N6075AG	77 x 1	TR23-03-000115	T _A =130°C, RH=85%	96hrs	0 failure
	2N6075BG	77 x 1	147885/150808			
IOL	2N6075AG	77 x 1	TR23-03-000115	T _A =25°C, T _J (ΔT _J)>=100°C	15,000 cycles	0 failure
	2N6075BG	77 x 1	147885/150808			

RSH	2N6075AG	30 x 1	TR23-03-000115	260°C	10 secs	0 failure
	2N6075BG	30 x 1	147885/150808			
Solderability	2N6075AG	10 x 1	TR23-03-000115	245°C	10 secs	0 failure
	2N6075BG	10 x 1	147885/150808			
ESD	2N6075AG	30 x 1	TR23-03-000115	HBM 8KV, MM 400V		0 failure
	2N6075BG	30 x 1	147885/150808			

1.2 Package TO252 Reliability test result summary

Test Item	Sample P/N	Sample QTY	Littelfuse test Ref#	Contents/Conditions	Duration	Result Summary
ACBV (HTRB)	MCR12DSNT4G	77 x 2	TR23-03-000115/146879/150808	At T _J max, Reverse biased at 100%V _{DRM}	1,008hrs	0 failure
	MAC4DSNT4G	77 x 2	TR23-06-002333			
	MCR12DCNT4G	77 x 1	149002/146878			
Pre-conditioning	MCR12DSNT4G	77 x 8	TR23-03-000115/146879/150808	24hrs 125°C bake, 168hrs 85°C/85% humidity storage, 3 x IR reflow		0 failure
	MAC4DSNT4G	77 x 8	TR23-06-002333			
	MCR12DCNT4G	77 x 4	149002/146878			
H3TRB	MCR12DSNT4G	77 x 2	TR23-03-000115/146879/150808	T _A =85°C, RH=85%, Reverse biased at 100V _{DC}	1,008hrs	0 failure
	MAC4DSNT4G	77 x 2	TR23-06-002333			
	MCR12DCNT4G	77 x 1	149002/146878			
TC	MCR12DSNT4G	77 x 2	TR23-03-000115/146879/150808	-55°C&150°C (air to air), Dwell time 15mins	1,000 cycles	0 failure
	MAC4DSNT4G	77 x 2	TR23-06-002333			
	MCR12DCNT4G	77 x 1	149002/146878			
UHASt	MCR12DSNT4G	77 x 2	TR23-03-000115/146879/150808	T _A =130°C, RH=85%	96hrs	0 failure
	MAC4DSNT4G	77 x 2	TR23-06-002333			
	MCR12DCNT4G	77 x 1	149002/146878			
IOL	MCR12DSNT4G	77 x 2	TR23-03-000115/146879/150808	T _A =25°C, T _J (ΔT _J =100°C)	15,000 cycles	0 failure
	MAC4DSNT4G	77 x 2	TR23-06-002333			
	MCR12DCNT4G	77 x 1	149002/146878			
RSH	MCR12DSNT4G	30 x 2	TR23-03-000115/146879/150808	260°C	10 secs	0 failure
	MAC4DSNT4G	30 x 2	TR23-06-002333			
	MCR12DCNT4G	30 x 1	149002/146878			
Solderability	MCR12DSNT4G	10 x 2	TR23-03-000115/146879/150808	245°C	10 secs	0 failure
	MAC4DSNT4G	10 x 2	TR23-06-002333			
	MCR12DCNT4G	10 x 1	149002/146878			
ESD	MCR12DSNT4G	30 x 2	TR23-03-000115/146879/150808	HBM 8KV, MM 400V		0 failure
	MAC4DSNT4G	30 x 2	TR23-06-002333			
	MCR12DCNT4G	30 x 1	149002/146878			

1.3 Package TO251 Reliability test result summary

Test Item	Sample P/N	Sample QTY	Littelfuse test Ref#	Contents/Conditions	Duration	Result Summary
ACBV (HTRB)	MAC4DCN-1G	77 x 1	155534/146879	At T _J max, Reverse biased at 100%V _{DRM}	1,008hrs	0 failure
H3TRB	MAC4DCN-1G	77 x 1	155534/146879	T _A =85°C, RH=85%, Reverse biased at 160V _{DC}	1,008hrs	0 failure
TC	MAC4DCN-1G	77 x 1	155534/146879	-55°C&150°C (air to air), Dwell time 15mins	1,000 cycles	0 failure
UHAST	MAC4DCN-1G	77 x 1	155534/146879	T _A =130°C, RH=85%	96hrs	0 failure
IOL	MAC4DCN-1G	77 x 1	155534/146879	T _A =25°C, T _J (ΔT _J =100°C)	15,000 cycles	0 failure
RSH	MAC4DCN-1G	30 x 1	155534/146879	260°C	10 secs	0 failure
Solderability	MAC4DCN-1G	10 x 1	155534/146879	245°C	10 secs	0 failure
ESD	MAC4DCN-1G	30 x 1	155534/146879	HBM 8KV, MM 400V		0 failure

1.4 Parametric Test

Test Item	Sample P/N	Sample Qty	Littelfuse test Ref#	Contents/Conditions	Result Summary
Electrical Parameters	2N6075AG	10 x 1	142045	IGT/VGT/IH/VT/IDRM/IRRM	Meet datasheet spec
	2N6075BG	10 x 1	162199		
	MAC4DHMT4G	10 x 1	154361		
	MAC4DLMT4G	10 x 1	156226/154361		
	MCR12DCNT4G	10 x 1	151834		
	MCR12DSMT4G	10 x 1	157982		
	MCR12DSNT4G	10 x 1	157982		
	MAC4DSMT4G	10 x 1	154360		
	MAC4DSNT4G	10 x 1	154360		
	MAC4DCMT4G	10 x 1	156504		
	MAC4DCNT4G	10 x 1	156504		
ITSM	2N6075AG	5 x 1	142045	f = 50Hz; T _J (initial) = 25°C	Meet datasheet spec
	2N6075BG	5 x 1	162199		
	MAC4DHMT4G	5 x 1	154361		
	MAC4DLMT4G	5 x 1	154361		
	MCR12DCNT4G	5 x 1	151834		
	MCR12DSMT4G	5 x 1	157982		
	MCR12DSNT4G	5 x 1	157982		
	MAC4DSMT4G	5 x 1	154360		
	MAC4DSNT4G	5 x 1	154360		
	MAC4DCMT4G	5 x 1	156504		
	MAC4DCNT4G	5 x 1	156504		
Thermal Resistance	2N6075AG	3 x 1	23-03-000126	Junction-to-Case R _{θJC}	
	MCR12DSNT4G	3 x 1	23-03-000126		

	MAC4DSNT4G	3 x 1	000000		
Tgt	2N6075AG	5 x 1	142045	Turn-on time	Meet datasheet spec
	2N6075BG	5 x 1	162199		
	MCR12DSNT4G	5 x 1	157982		
	MCR12DSMT4G	5 x 1	157982		
di/dt	MCR12DSNT4G	5 x 1	157982	Tj max	Meet datasheet spec
	MCR12DSMT4G	5 x 1	157982		
dv/dt	2N6075AG	5 x 1	142045	Tj max	Meet datasheet spec
	2N6075BG	5 x 1	162199		
	MAC4DHMT4G	5 x 1	154361		
	MAC4DLMT4G	5 x 1	156226/154361		Fail datasheet spec
	MCR12DCNT4G	5 x 1	151834		
	MCR12DSMT4G	5 x 1	157982		
	MCR12DSNT4G	5 x 1	157982		
	MAC4DSMT4G	5 x 1	154360		Meet datasheet spec
	MAC4DSNT4G	5 x 1	154360		
	MAC4DCMT4G	5 x 1	156504		
	MAC4DCNT4G	5 x 1	156504		
dv/dt(c)	2N6075AG	5 x 1	142045	Tj max	Meet datasheet spec
	2N6075BG	5 x 1	162199		
	MAC4DHMT4G	5 x 1	154361		
	MAC4DLMT4G	5 x 1	156226/154361		Fail datasheet spec
	MAC4DSMT4G	5 x 1	154360		
	MAC4DSNT4G	5 x 1	154360		
	MAC4DCMT4G	5 x 1	156504		
	MAC4DCNT4G	5 x 1	156504		

2.0 Recommendations & Conclusions:

Base on the above qualification test results, Littelfuse judged that the 2nd source qualification have been successfully completed and results were verified by qualification tests.

For the PNs which parametric test fail datasheet spec , Littelfuse has modified datasheet as follows:

PN	dv/dt		di/dt(c)	
	datasheet (after)	Datasheet(before)	datasheet(after)	Datasheet(before)
MAC4DCNT4G			avg.5 A/ms min.4 A/ms @ dv/dt(c)=4.8V/μs	avg.8.4 A/ms min.6 A/ms @ dv/dt(c)=18V/μs
MAC4DCMT4G				
MCR12DSNT4G	avg.45 V/μs min.37 V/μs @ RGK=100Ω	avg.10 V/μs min.2 V/μs @ RGK=1KΩ	min.2 A/ms	min.3 A/ms
MCR12DSMT4G				
MCR8DSNT4G				
MCR8DSMT4G				
MAC4DSNT4G				
MAC4DSMT4G				

Littelfuse released the 2nd source subcon manufacturing to production.

This notification is for your information and acknowledgement. If you have any other questions or concerns, please contact your local sales team or Sophia Lv, Bipolar Discrete Product Manager.

We value your business and look forward to assisting you whenever possible. Thank you!

Best Regards,

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Appendix--- Affected Part List

2N6071AG	MAC4DLM-1G	MCR12DSNT4G	MAC4DCMT4G
2N6071ATG	MAC4DSM-1G	MCR8DCMT4G	MAC4DCNT4G
2N6071BG	MAC4DSN-1G	MCR8DCNT4G	
2N6071BTG	MAC4DCM-1G	SCR12DCMT4G	
2N6073AG	MAC4DCN-1G	MCR12DCMT4G	
2N6073BG	MCR12DSN-1G	MCR12DCNT4G	
2N6075AG	MCR8DSMT4G	MAC4DHMT4G	
2N6075BG	MCR8DSNT4G	MAC4DLMT4G	
T2322BG	MCR12DSMT4G	MAC4DSMT4G	
MAC4DHM-1G	MCR12DSMT4H	MAC4DSNT4G	