

International Rectifier – Temecula Reliability Laboratory

QS-9000 and ISO-9000 Certified Facility; SQ-1000 Certified Laboratory

HEXFET America Facility: 41915 Business Park Drive Temecula, CA 92590 Phone 909-676-7500 Fax 909-676-9154

QUALIFICATION REPORT

Title	Lead Free Plating Solder Qualification (Thru-hole Packages)
Product/Part # *	TO-220, TO-247, TO-220 Full-Pak and TO-273 devices assembled in IRMX
Qualification Level	Q101 (Or current qualification level)
Silicon Technology	All technologies assembled in these packages.

REVISION HISTORY

#	Date	Author	Description of Changes
B	1/17/03	Rel Engr.	Initial release

INTRODUCTION

In compliance with worldwide Industry initiative of “Lead Free” material for semiconductor fabrication, IR is proposing the conversion of the existing 63Sn/37Pb solder plating process to a more environment friendly lead-free plating process:

- 99.3Sn/0.7Cu
- 98.4Sn/0.5Ag/1.0Cu
- 100%Sn for Super TO-220

SUMMARY/CONCLUSION

Based on the results of reliability stress testing, the lead free plating processes (99.3Sn/0.7Cu, 98.4Sn/0.5Ag/1.0Cu and 100%Sn Plating for TO-273) implemented for thru-hole devices is qualified to the Q101 level (or current device qualification level).

This qualification is applicable for TO-220, TO-220 Full-Pak, TO-273 and TO-247 packages.

Reliability Engineer

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QUALIFICATION TEST RESULTS

Part Type	IRF1404
Package	TO-220
Plating Solder	99.3Sn/0.7Cu
Tests	Test: Temperature Cycling
	R#: 2514A1
	Conditions: -55°C/150°C
	Duration: 1000 cycles
	Quantity: 1 lot x 77 devices
	Failures: 0 failures
	Test: High Humidity, High Temperature Reverse Bias (H3TRB)
	R#: 2514B1
	Conditions: 85°C/85%RH/32V
Duration: 1000 hours	
Quantity: 1 lot x 77 devices	
Failures: 0 failures	
Test: Autoclave	
R#: 2514F1	
Conditions: 121°C/100%RH/15psig	
Duration: 96 hours	
Quantity: 1 lot x 77 devices	
Failures: 0 failures	

Part Type	IRF1404
Package	TO-220
Plating Solder	98.4Sn/0.5Ag/1.0Cu
Tests	Test: Temperature Cycling
	R#: 2514A2
	Conditions: -55°C/150°C
	Duration: 1000 cycles
	Quantity: 1 lot x 77 devices
	Failures: 0 failures
	Test: High Humidity, High Temperature Reverse Bias (H3TRB)
	R#: 2514B2
	Conditions: 85°C/85%RH/32V
Duration: 1000 hours	
Quantity: 1 lot x 77 devices	
Failures: 0 failures	
Test: Autoclave	
R#: 2514F2	
Conditions: 121°C/100%RH/15psig	
Duration: 96 hours	
Quantity: 1 lot x 77 devices	
Failures: 0 failures	

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Part Type	IRG4BC20F
Package	TO-220
Plating Solder	99.3Sn/0.7Cu
Tests	Test: Temperature Cycling R#: 2514A3 Conditions: -55°C/150°C Duration: 1000 cycles Quantity: 1 lot x 77 devices Failures: 0 failures
	Test: High Humidity, High Temperature Reverse Bias (H3TRB) R#: 2514B3 Conditions: 85°C/85%RH/100V Duration: 1000 hours Quantity: 1 lot x 77 devices Failures: 0 failures
	Test: Autoclave R#: 2514F3 Conditions: 121°C/100%RH/15psig Duration: 96 hours Quantity: 1 lot x 77 devices Failures: 0 failures

Part Type	IRG4BC20F
Package	TO-220
Plating Solder	98.4Sn/0.5Ag/1.0Cu
Tests	Test: Temperature Cycling R#: 2514A4 Conditions: -55°C/150°C Duration: 1000 cycles Quantity: 1 lot x 77 devices Failures: 0 failures
	Test: High Humidity, High Temperature Reverse Bias (H3TRB) R#: 2514B4 Conditions: 85°C/85%RH/100V Duration: 1000 hours Quantity: 1 lot x 77 devices Failures: 0 failures
	Test: Autoclave R#: 2514F4 Conditions: 121°C/100%RH/15psig Duration: 96 hours Quantity: 1 lot x 77 devices Failures: 0 failures

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Part Type	IRLI3803
Package	TO-220 Fulpak
Plating Solder	99.3Sn/0.7Cu
Tests	Test: Temperature Cycling R#: 2514A5 Conditions: -55°C/150°C Duration: 1000 cycles Quantity: 1 lot x 77 devices Failures: 0 failures
	Test: High Humidity, High Temperature Reverse Bias (H3TRB) R#: 2514B5 Conditions: 85°C/85%RH/24V Duration: 1000 hours Quantity: 1 lot x 77 devices Failures: 0 failures
	Test: Autoclave R#: 2514F5 Conditions: 121°C/100%RH/15psig Duration: 96 hours Quantity: 1 lot x 77 devices Failures: 0 failures

Part Type	IRLI3803
Package	TO-220 Fulpak
Plating Solder	98.4Sn/0.5Ag/1.0Cu
Tests	Test: Temperature Cycling R#: 2514A6 Conditions: -55°C/150°C Duration: 1000 cycles Quantity: 1 lot x 77 devices Failures: 0 failures
	Test: High Humidity, High Temperature Reverse Bias (H3TRB) R#: 2514B6 Conditions: 85°C/85%RH/24V Duration: 1000 hours Quantity: 1 lot x 77 devices Failures: 0 failures
	Test: Autoclave R#: 2514F6 Conditions: 121°C/100%RH/15psig Duration: 96 hours Quantity: 1 lot x 77 devices Failures: 0 failures

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Part Type	IRFP2907
Polarity	N-channel
Package	TO-247
Plating Solder	99.3Sn/0.7Cu
Tests	Test: Temperature Cycling R#: 2514A7 Conditions: -55°C/150°C Duration: 1000 cycles Quantity: 1 lot x 77 devices Failures: 0 failures
	Test: High Humidity, High Temperature Reverse Bias (H3TRB) R#: 2514B7 Conditions: 85°C/85%RH/60V Duration: 1000 hours Quantity: 1 lot x 77 devices Failures: 0 failures

Part Type	IRFP2907
Package	TO-247
Plating Solder	98.4Sn/0.5Ag/1.0Cu
Tests	Test: Temperature Cycling R#: 2514A8 Conditions: -55°C/150°C Duration: 1000 cycles Quantity: 1 lot x 77 devices Failures: 0 failures
	Test: High Humidity, High Temperature Reverse Bias (H3TRB) R#: 2514B8 Conditions: 85°C/85%RH/60V Duration: 1000 hours Quantity: 1 lot x 77 devices Failures: 0 failures
	Test: Autoclave R#: 2514F8 Conditions: 121°C/100%RH/15psig Duration: 96 hours Quantity: 1 lot x 77 devices Failures: 0 failures

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Part Type	IRLBA3803
Package	TO-273
Plating Solder	100%Sn
Tests	Test: Temperature Cycling
	R#: 2513A2
	Conditions: -55°C/150°C
	Duration: 1000 cycles
	Quantity: 1 lot x 77 devices
	Failures: 0 failures
	Test: High Humidity, High Temperature Reverse Bias (H3TRB)
	R#: 2512B2
	Conditions: 85°C/85%RH/24V
Duration: 1000 hours	
Quantity: 1 lot x 77 devices	
Failures: 0 failures	
Test: Autoclave	
R#: 2513F2	
Conditions: 121°C/100%RH/15psig	
Duration: 96 hours	
Quantity: 1 lot x 77 devices	
Failures: 0 failures	