Record of Letter Ballot Review by TC Chapter for Procedural Review

Region/Locale: China

Global Technical Committee: Photovoltaic TC Chapter Cochairs: Guangchun Zhang/CSI Standards Staff: Isadora Jin/SEMI China

	Scheduled in Background Statement	Actual
Date	10/25/2019	10/25/2019
Location	Beijing	Beijing
Reason for Change of Date and/or Location (if changed)		

Note: See Regulations ¶ 9.5 Exceptions for allowable reason to change.

I. Document Number and Title

Document Number	Document Title
5842D	New Standard: Test Method for Metal-Wrap-Through
	Solar Cell Via Resistance

II. Tally

Standards staff to fill in.

Voting Tally: As-cast tally after close of voting period

Note: A minimum of 60% of the Voting Interests that have TC Members within the global technical committee that issued the Letter Ballot must return Votes. (*Regulations* ¶ 9.6.2.1.1)

Voting Tally (with example values):

Voting Interest:	Returned Vote		Distributio		Return Rate	
Letter Ballot	93	÷	153	=	60.8%	≥60%
Intercommittee Ballot	40					
Voting Interest Reject(s)	2		Total Vot	Voters with Rejects		2
Voting Interest Accept(s)	70					

Note: See *Regulations* § 3.2.1 for definition of Voting Interest.

III. Rejects

Voting Interest Reject 1 (Voting Interest Name: Peter Wagner Consulting)

Voter Reject 1 (Voter: Peter Wagner and Peter Wagner Consulting)
Negative 1

Neg	legative 1							
	Referenced Section/	*TF/TC Chapter to fill in, including text in the ballot if necessary.						
	Paragraph	¶ 1 Purpose						
Ne			ginal complete Negati ied.	ve text (e.g., issue, justification	, suggestion) should be			
Negative	Negative Text	The Purpose section is inadequate. It does not tell the reader why this standard would be needed. Is the via resistance an issue between customer and supplier? I'd guess that it is the series resistance that is specified. Or is there a specification for the via filling paste that needs to be tested? For internal measurements of a supplier of solar cells a standardized test method is not needed. Standardized test methods are needed only when measurement data are exchanged between different parties.						
TF	input (optional)							
	Withdrawal	X	No Negative withdrawa	al made by Voter.	GO TO "Related" subsection			
	(check one)		Withdrawal document r MM/DD/YYYY.	received by Standards staff on	GO TO "Final" subsection → (A)			
	Motion and	X	'Related' is mutually ag	GO TO "Persuasive" subsection				
	Reason (check one)		Negative is not related. (Needs ≥2/3 votes to pass.)					
			Reason XXXX					
Rel	Motion by/ 2 nd by	Nan	Name (Company)/Name (Company)					
Related	Discussion							
		XX Y-XX N; Motion passed/failed.						
	Result of Vote (check one)		[Negative is not related	l.] < 2/3	GO TO "Persuasive" subsection			
	(61100110)		2/3 ≤ [Negative is not re	elated.]	GO TO "Final" subsection → (B)			
			Negative is related and	persuasive. (Needs >1/3 votes	to pass.)			
Per	Motion and	X	Negative is related and	not persuasive. (Needs ≥2/3 vot	es to pass.)			
Persuasive	Motion and Reason (check one)		Reason	Via is a must and key design for determines the quality of a centriciancy, but also designed for design of MWT pattern remains to the distribution of the vias. It is of the testing method for via characterization of MWT cells and	III. It is not only designed for or long time reliability. But the ots of choices, from the numbers a necessary to setup a standard as. This is important for the			

	Motion by/ 2 nd by	Jing	Jingbing Dong (CSI) / Zhixin Li (LINTON)						
	Discussion		tuangchun Zhang (CSI): Please add the development history into the background. This ill help the members in other region review and avoid repeated rejects.						
		47 Y	-6 N; Motion passed						
	Result of Vote		[Negative is related apersuasive.] > 1/3	and	Is a technical change recommended?		Y	GO TO "Address by Technical Change Option" subsection	
	(check one)		[Negative is related a persuasive.] < 2/3	and not	(check one)		N	GO TO "Final" subsection → (E)	
		X	2/3 ≤ [Negative is rel and not persuasive.]	< 90%	GO TO "Final" s	ubse	ctio	n → (C)	
			90% ≤ [Negative is rand not persuasive.]					inding Option" subsection	
No	This option can be used only "if the TC Chapter finds a Negative not persuasive by a vote equal to or greater than 90% of the persons voting on the action". (Regulations ¶ 9.6.1.4.5.2)								
t Sigr	Use of "Not significant finding option" (check one)		It is mutually agreed upon to term the Negative "not significant".					GO TO "Final" subsection → (D)	
Not Significant Finding Option			It is mutually agreed upon to term the Negative "significant".					GO TO "Final" subsection → (C)	
Fin		Whether or not the Negative is "not significant" is decided by a vote.							
ding	Motion	The	Negative is "not significant".						
J	Motion by/ 2 nd by	Nam	ne (Company)/Name	(Compar	ny)				
	Vote		XX Y-XX N; Motion passed with simple majority					GO TO "Final" subsection → (D)	
	Vote		XX Y-XX N; Motion f	Y-XX N; Motion failed with simple majority				GO TO "Final" subsection → (C)	
			(A) W	ithdrawn	(counted under I	h in d	lispo	osition)	
			(B) No	ot related	(counted under	i in d	ispo	sition)	
	(check if	Χ	(C) R	elated an	d not persuasive (signif	ican	t)	
Final	applicable)		` '		ant <mark>(counted und</mark>		n dis	sposition)	
<u>a</u>			(E) ad	ddressed	d persuasive and by technical chan	ge		DOCUMENT FAILS	
	()		(F) Ac	ddressed	by technical chan	ge (c	oun	ted under k disposition)	
	(check if applicable)		Comment generated	l. See Se	ction V-(ii) Comn	nent i	# X.		

Neg	Section/	*TF/TC Chapter to fill in, including text in the ballot if necessary. ¶ 4 Figure 1 and Figure 2
Negative	Negative Text	*Original complete Negative text (e.g., issue, justification, suggestion) should be copied.
		Figs. 1 and 2: The schematic drawings for current source and voltmeter are not according to international standards.
TF	input (optional)	

	Withdrawal	X No Negative withdrawal	made by Voter.	GO TO "Related" subsection				
((check one)	Withdrawal document re-	Withdrawal document received by Standards staff on MM/DD/YYYY.					
	Motion and	X 'Related' is mutually agre	eed upon. (Needs no motion	GO TO "Persuasive" subsection				
	Reason	Negative is not related. (Needs ≥2/3 votes to pass.)					
	(check one)	Reason						
Rel	Motion by/ 2 nd by							
Related	Discussion							
		XX Y-XX N; Motion passed/fa	ailed.					
	Result of Vote (check one)	[Negative is not related.]	< 2/3	GO TO "Persuasive" subsection				
	(chook one)	2/3 ≤ [Negative is not rela	ated.]	GO TO "Final" subsection → (B)				
		Negative is related and p	persuasive. (Needs >1/3 vote	es to pass.)				
	Motion and Reason (check one)	X Negative is related and n	votes to pass.)					
	(0.0000000)		ard four-probe testing method for ity.					
ק	Motion by/ 2 nd by	Jingbing Dong (CSI) / Zhixin Li (LINTON)						
ersı	Discussion	None						
Persuasive		48 Y- 5 N; Motion passed.						
ve	Result of Vote	[Negative is related and persuasive.] > 1/3	Is a technical change recommended?	GO TO "Address by Technical Change Option" subsection				
	(check one)	[Negative is related and	not (check one)	N GO TO "Final" subsection				
		persuasive.] < 2/3 2/3 ≤ [Negative is related and not persuasive.] < 90		→ (E) etion → (C)				
		x 90% ≤ [Negative is related and not persuasive.]	GO TO "Not Significar	nt Finding Option" subsection				
Z		be used only "if the TC Chap of the persons voting on th		ersuasive by a vote equal to or 0.6.1.4.5.2)				
ot Sigr	Use of "Not	X It is mutually agreed upo significant".	n to term the Negative "not	GO TO "Final" subsection → (D)				
Not Significant Finding Option	significant finding option" (check one)	It is mutually agreed upo "significant".	GO TO "Final" subsection → (C)					
[Fir	(Clieck Olle)	Whether or not the Negative is "not significant" is decided by a vote.						
ıdin	Motion	nt".						
9	Motion by/ 2 nd by	Name (Company)/Name (Cor	The Negative is "not significant". Name (Company)/Name (Company)					

Water			XX Y-XX N; Mo	otion passed with simple majority	GO TO "Final" subsection → (D)	
	Vote		XX Y-XX N; Mo	otion failed with simple majority	GO TO "Final" subsection → (C)	
			(A)	Withdrawn (counted under h in d	isposition)	
	(check if		(B)	Not related (counted under i in d	disposition)	
			(C)	Related and not persuasive (signif	icant)	
Final	applicable)	Χ	(D)	Not significant (counted under j in	n disposition)	
a			(E)	Related and persuasive and not addressed by technical change		
			(F)	Addressed by technical change (counted under k disposition		
	(check if applicable)		Comment generated. See Section V-(ii) Comment # X.			

neg	ative 3							
	Referenced Section/	*TF/TC Chapter to fill in, including text in the ballot if necessary.						
Neg	Paragraph	§12.1.2						
Negative	Negative Text	сор	ied.	ve text (e.g., issue, justification	,			
	_		i.2: This is too general. H e reported.	lere it has to be listed which char	acteristics and conditions have			
TFi	input (optional)							
	Withdrawal	X	No Negative withdrawal	made by Voter.	GO TO "Related" subsection			
	(check one)		Withdrawal document re MM/DD/YYYY.	eceived by Standards staff on	GO TO "Final" subsection → (A)			
	Motion and	X	'Related' is mutually agr	reed upon. (Needs no motion.)	GO TO "Persuasive" subsection			
	Reason (check one)		Negative is not related.					
			Reason	XXXX				
Rela	Motion by/ 2 nd by	Name (Company)/Name (Company)						
Related	Discussion							
		XX	Y-XX N; Motion passed/t	failed.				
	Result of Vote (check one)] < 2/3	GO TO "Persuasive" subsection			
	,		2/3 ≤ [Negative is not re	elated.]	GO TO "Final" subsection → (B)			
Pe			Negative is related and	persuasive. (Needs >1/3 votes t	to pass.)			
Persuasive	Motion and Reason	X	Negative is related and	not persuasive. (Needs ≥2/3 vot	es to pass.)			
sive	(check one)		Reason	This standard only defines a test with cell structure and process of this standard.				

	Motion by/ 2 nd by	Jing	bing Dong (CSI) / Zh	nixin Li (l	LINTON)				
	Discussion	Non	None						
		48 Y	- 5 N ; Motion passed	l.					
	Result of Vote		[Negative is related a persuasive.] > 1/3	and	Is a technical Y change recommended?		Y	GO TO "Address by Technical Change Option" subsection	
	(check one)		[Negative is related a persuasive.] < 2/3	and not	(check one)		N	GO TO "Final" subsection → (E)	
			2/3 ≤ [Negative is relative is relative.]	< 90%	GO TO "Final" s	ubse	ctio	n → (C)	
		X	90% ≤ [Negative is real					inding Option" subsection	
N C			e used only "if the TC Chapter finds a Negative not persuasive by a vote equal to or of the persons voting on the action". (<i>Regulations</i> ¶ 9.6.1.4.5.2)						
ot Sign	Use of "Not		It is mutually agreed upon to term the Negative "not significant".					GO TO "Final" subsection → (D)	
Not Significant Finding Option	significant finding option" (check one)		It is mutually agreed upon to term the Negative "significant".					GO TO "Final" subsection → (C)	
Fin		X	Whether or not the N	d by a vote.					
ding	Motion	The	The Negative is "not significant".						
	Motion by/ 2 nd by	Jing	Jingbing Dong (CSI) / Zhixin Li (LINTON)						
	Vote	X	48 Y-7 N; Motion pas	sed with	simple majority			GO TO "Final" subsection → (D)	
	vote		XX Y-XX N; Motion failed with simple majority				GO TO "Final" subsection → (C)		
			(A) Wi	ithdrawn	(counted under l	h in c	disp	osition)	
			(B) No	ot related	(counted under	i in d	lispo	osition)	
	(check if		(C) Re	elated an	d not persuasive (signi	fican	t)	
Final	applicable)	Χ	(D) No	ot signific	ant (counted und	ler j i	n di	sposition)	
<u>a</u>			(E) ad	dressed	d persuasive and by technical chan	ge		DOCUMENT FAILS	
			(F) Ad	ldressed	by technical chan	ge (c	oun	ted under k disposition)	
	(check if applicable)		Comment generated.	See Se	ction V-(ii) Comn	nent	# X.		

	<u> </u>	<u> </u>			
	z	Referenced Section/	*TF/TC Chapter to fill in, including text in the ballot if necessary.		
ı	рe		Appendix 1		
	Negati	Paragraph	§ A1-1.2 and § A1-1.3		
	I ≲ [i negative rext	*Original complete Negative text (e.g., issue, justification, suggestion) should be		
			copied.		

		A1-1.2 and A1-1.3: Details how the tests were performed are missing. Were they performed on one day one measurement after the other. Or were they performed on several days. A correct R&R study would be needed. Assuming a tolerance for the via resistance on 1 mOhm (based on Figure A1-2) and the standard deviation of 0.2176 this would result in a P(6 sigma)/T ratio of 130 % (see SEMI M32). Usually a value of at least 20 % is required for					
		P(6 sigma)/T ratio of a good test method.		of at least 20 % is required for			
TFi	nput (optional)						
	Withdrawal	X No Negative wi	thdrawal mad	e by Voter.		GO TO "Related" subsection	
((check one)	Withdrawal doc MM/DD/YYYY.		ed by Standards st	aff on	GO TO "Final" subsection → (A)	
	Motion and	X 'Related' is mut	tually agreed ι	ıpon. <mark>(Needs no n</mark>	notion.)	GO TO "Persuasive" subsection	
	Reason	Negative is not	related. (Nee	ds ≥2/3 votes to p	ass.)		
	(check one)	Reason	XXXX	(
Related	Motion by/ 2 nd by	Name (Company)/N	ame (Compar	ny)			
ated	Discussion						
		XX Y-XX N; Motion	passed/failed				
	Result of Vote (check one)	[Negative is not related.] < 2/3				GO TO "Persuasive" subsection	
		2/3 ≤ [Negative	2/3 ≤ [Negative is not related.]			GO TO "Final" subsection → (B)	
	Motion and Reason (check one)	Negative is related and persuasive. (Needs >1/3 votes to pass.)					
		X Negative is related and not persuasive. (Needs ≥2/3 votes to pass.)					
		Reason				to show an applied case using that the testing method works.	
P	Motion by/ 2 nd by	Jingbing Dong (CS	I) / Zhixin Li (LINTON)			
ersi	Discussion						
Persuasive		48 Y -7 N ; Motion pa	assed.				
Ve	Result of Vote	[Negative is rela persuasive.] > 1		Is a technical change recommended?	Y	GO TO "Address by Technical Change Option" subsection	
	(check one)	[Negative is related persuasive.] < 2		(check one)	N	GO TO "Final" subsection → (E)	
		2/3 ≤ [Negative and not persuas		GO TO "Final" s	ubsectio	n → (C)	
		X 90% ≤ [Negative is related and not persuasive.] GO TO "Not Significant				Finding Option" subsection	
Sign		be used only "if the % of the persons vot				uasive by a vote equal to or 1.4.5.2)	
Not Significan		It is mutually ag significant".	It is mutually agreed upon to term the Negative "not GO TO "Final" subsection				

	Use of "Not significant finding option"		It is mutually a "significant".	greed upon to term the Negative	GO TO "Final" subsection → (C)					
	(check one)	X	Whether or not	Whether or not the Negative is "not significant" is decided by a vote.						
	Motion	The	The Negative is "not significant".							
	Motion by/ 2 nd by	Jing	Jingbing Dong (CSI) / Li Huang (SEMILAB)							
	Vote	X	46 Y-7 N ; Moti	on passed with simple majority	GO TO "Final" subsection → (D)					
	vote		XX Y-XX N; Mo	otion failed with simple majority	GO TO "Final" subsection → (C)					
			(A)	Withdrawn (counted under h in di	sposition)					
			(B)	Not related (counted under i in dis	sposition)					
	(check if		(C)	Related and not persuasive (signific	cant)					
Final	applicable)	Х	(D)	Not significant (counted under j in	disposition)					
<u>a</u>			(E)	Related and persuasive and not addressed by technical change	DOCUMENT FAILS					
			(F)	Addressed by technical change (co	unted under k disposition)					
	(check if applicable)		Comment gene	erated. See Section V-(ii) Comment #	X.					

Disposition of Voting Interest Reject 1

Check only when the Document has not been failed.

4	Original	Original number (#) of Negatives (g)					
#	Number	of N	egatives withdrawn		(h)		
#	Number	of N	egatives found not related		(i)		
3	Number of Negatives found not significant (j)						
#			egatives addressed by technic t significant)	al change (Negative	(k)		
	Final		g - (h + i + j + k) = 0	Reject is Not Valid and is not included in the denominator of § VI. Approval Conditions Check			
			g - (h + i +j + k) >0	Reject is included in the denominator of § VI. Approval Conditions Check			
	Reject without a Negative Not Valid						

This table is needed for each Voting Interest Reject.

Note: If all of the Negatives included with a Reject Vote are withdrawn, determined to be not related, or determined to be not significant, the Reject Vote is not valid. (*Regulations* ¶ 9.4.3.3)

Note: A Negative addressed by a technical change is automatically considered to be not significant. (*Regulations* ¶ 9.6.1.4.5.2)

Voting Interest Reject 2 (Voting Interest Name: U.A. Associates) Voter Reject 1 (Voter: Larry Hartsough and U.A. Associates) Negative 1

	Referenced Section/ Paragraph		TC Chapter to fill in, in	cluding text in the ballot if nec	essary.			
	- I diagiapii	*Original complete Negative text (e.g., issue, justification, suggestion) should be copied.						
Negative	Negative Text	Per the Regulations, an Appendix is a necessary part of the Standard: 4.2.7 Appendix, n. — Official material required for using a Standard or Safety Guideline, published as a separate and distinct section within that Document. This Appendix merely contains experimental results showing examples of the types of results and repeatability. It should be included as Related Information (see Regulations 4.2.8). This could probably be accomplished via a Ratification Ballot. Comment 3, in A1– 1.1, "mainly" should be "many"; also "see Figure A3 1" should read "see Figure A1 1" (would be changed to RI1 1 after changing the Appendix to Related Information).						
TF	nput (optional)							
	Withdrawal		No Negative withdrawa	I made by Voter.	GO TO "Related" subsection			
	(check one)		Withdrawal document r MM/DD/YYYY.	GO TO "Final" subsection → (A)				
	Motion and	X	'Related' is mutually ag	reed upon. (Needs no motion.)	GO TO "Persuasive" subsection			
	Reason		Negative is not related.	(Needs ≥2/3 votes to pass.)				
	(check one)		Reason	xxxx				
Related	Motion by/ 2 nd by	Nan	ne (Company)/Name (Co					
ated	Discussion							
		XX '	Y-XX N; Motion passed/	failed.				
	Result of Vote (check one)		[Negative is not related	.] < 2/3	GO TO "Persuasive" subsection			
	,		2/3 ≤ [Negative is not re	GO TO "Final" subsection → (B)				
	Mation and	Х	Negative is related and	persuasive. (Needs >1/3 votes t	o pass.)			
Pe	Motion and Reason (check one)		Negative is related and	not persuasive. (Needs ≥2/3 vot	es to pass.)			
Persuasive			Reason	xxxx				
ive	Motion by/ 2 nd by	Jingbing Dong (CSI) / Zhixin Li (Linton)						
	Discussion	ı,		nodification should be processed	via a ratification ballot.			
		48 Y	7-5 N; Motion passed.					

	X	[Negative is related and persuasive.] > 1/3	Is a technical change recommended?	X	Υ	GO TO "Address by Technical Change Option" subsection
Result of Vote (check one)		[Negative is related and not persuasive.] < 2/3		N	GO TO "Final" subsection → (E)	
		2/3 ≤ [Negative is related and not persuasive.] < 90%	GO TO "Final" subsection → (C)			
		90% ≤ [Negative is related and not persuasive.]				inding Option" subsection
		ecommendations agraph number and at least o	one full sentence	are	requ	ired in "FROM" and "TO"

Technical Changes

FROM: Section/Paragraph

APPENDIX 1

REPEATABILITY AND REPRODUCIBILITY OF FOUR POINTS TEST

NOTICE: The material in this Appendix is an official part of SEMI [document 5842D] and was approved by full letter ballot procedures on [A&R approval date].

A1-1 Repeatability and reproducibility of Four Points Test

A1-1.1 More than 6500 via-holes have been measured with the four points test method on a mass production line, and the typical SEM pictures of mainly cross-sections were carried out with a microscope, see Figure A3-1. Line SOP standard is less than $100 \text{ m}\Omega$.

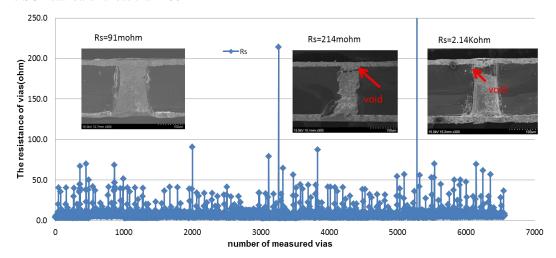


Figure A1-1

The distribution of via-holes resistance using the four points test method on production line and typical microscope pictures of via-hole cross-sections

A1-1.2 97 repeated tests were carried out with four points test method for a via-hole by the same person. The normal distribution was shown in figure A1-2. StDev is 0.2176.

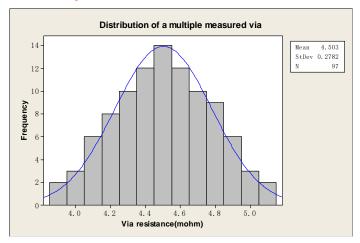
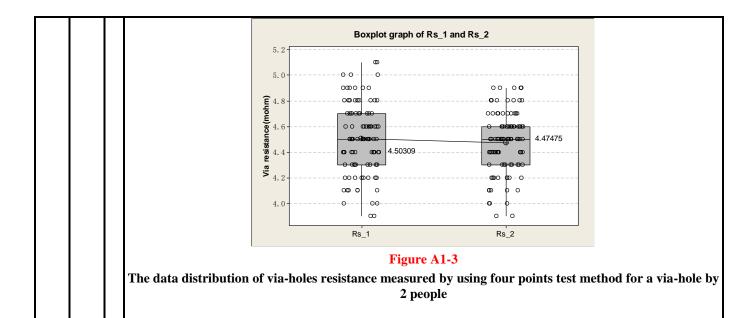


Figure A1-2

The data distribution of via-holes resistance measured by using four points test method for a via-hole by the same person

A1-1.3 100 repeated tests were carried out with four points test method for a via-hole by 2 people. The statistical data distribution is shown in Figure A1-3. The deviation of Rs_1 and Rs_2 mean value is $0.028 \text{ m}\Omega$.



TO: Section/Paragraph

RELATED INFORMATION 1

REPEATABILITY AND REPRODUCIBILITY OF FOUR POINTS TEST

R1-1 Repeatability and reproducibility of Four Points Test

R1-1.1 More than 6500 via-holes have been measured with the four points test method on a mass production line, and the typical SEM pictures of mainly many cross-sections were carried out with a microscope, see Figure R1-1. Line SOP standard is less than 100 m Ω .

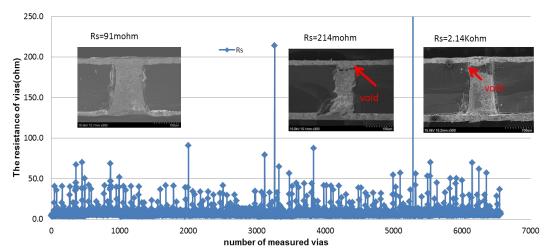


Figure R1-1

The distribution of via-holes resistance using the four points test method on production line and typical microscope pictures of via-hole cross-sections

R1-1.2 97 repeated tests were carried out with four points test method for a via-hole by the same person. The normal distribution was shown in Figure R1-2. StDev is 0.2176.

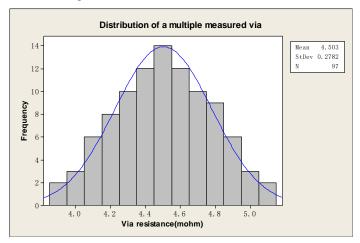
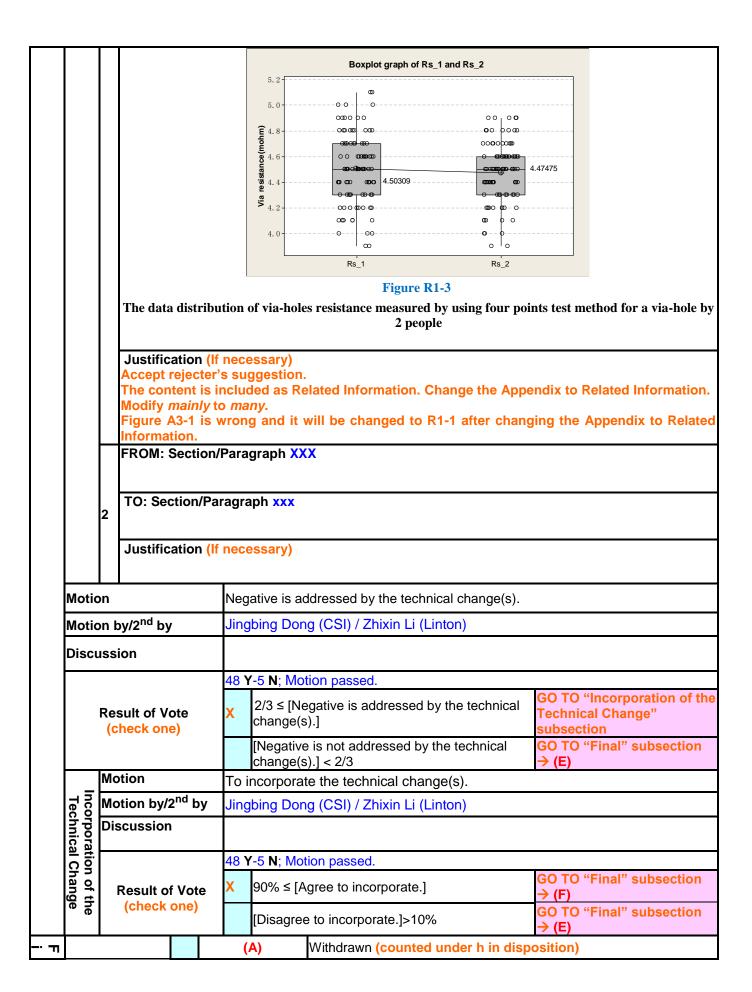


Figure R1-2

The data distribution of via-holes resistance measured by using four points test method for a via-hole by the same person

R1-1.3 100 repeated tests were carried out with four points test method for a via-hole by 2 people. The statistical data distribution is shown in Figure R1-3. The deviation of Rs_1 and Rs_2 mean value is $0.028 \text{ m}\Omega$.



			(B)	Not related (counted under i in dispo	osition)		
			(C)	t)			
	(check if applicable)		(D)	Not significant (counted under j in disposition)			
			(E)	Related and persuasive and not addressed by technical change	DOCUMENT FAILS		
		Χ	(F)	Addressed by technical change (counted under k disposition)			
	(check if applicable)		Comment generated. See Section V-(ii) Comment # X.				

Heg	ative 2								
N	Referenced Section/ Paragraph	*TF/T0	<u> </u>	ncluding text in the ballot if nec	essary.				
Negative	Negative Text	copie		, suggestion) should be					
TFi	input (optional)								
	Withdrawal	X N	lo Negative withdrawa	Il made by Voter.	GO TO "Related" subsection				
	(check one)		Vithdrawal document r	eceived by Standards staff on	GO TO "Final" subsection → (A)				
	Matian and	X 'F	Related' is mutually ag	reed upon. (Needs no motion.)	GO TO "Persuasive" subsection				
	Motion and Reason	N	legative is not related.	(Needs ≥2/3 votes to pass.)					
	(check one)	R	eason	xxxx					
Rel	Motion by/ 2 nd by	Name (Company)/Name (Company)							
Related	Discussion								
		XX Y-XX N; Motion passed/failed.							
	Result of Vote (check one)	[[Negative is not related	.] < 2/3	GO TO "Persuasive" subsection				
	(check one)	2/	/3 ≤ [Negative is not re	elated.]	GO TO "Final" subsection → (B)				
	Motion and	X N	egative is related and	persuasive. (Needs >1/3 votes t	o pass.)				
Pe	Reason (check one)	N	egative is related and	not persuasive. (Needs ≥2/3 vot	es to pass.)				
Persuasive	(Silosk olio)	R	eason	None					
ive	Motion by/ 2 nd by	Jingbi	ng Dong (CSI) / Zhix	in Li (Linton)					
	Discussion								
		48 Y -5	N; Motion passed.						

								1			
						re is related ive.] > 1/3	d and	Is a technical change recommended?	X	Υ	GO TO "Address by Technical Change Option" subsection
		ult of Vote eck one)				e is related ive.] < 2/3	d and not	(check one)		N	GO TO "Final" subsection → (E)
						egative is ı		GO TO "Final" s	ubse	ectio	$n \rightarrow (C)$
						persuasive					
					Go TO "Not Significant Finding Option" subsection ot persuasive.]						
		nical Chang					d at loast (one full sentence	aro	regu	ired in "FROM" and "TO"
	fields		purug	grapii		amber an	a at least (uic	roqu	inca in Tricom and To
	L					graph 4.1		hala Via A and Via	Core	. adia	cent to Via B. The letters b, d,
	Гес										A are connected through grid
	nic	lines of t									
	al C			on/Paragraph 4.1.1 in the dashed box is the measured hole, Via A and Via C are adjacent to Via B. The letters b, d, and							
>	Technical Changes		the fr	rontage	ges fronts of these three holes, which Via B, Via C and Via A are connected through grid						
ddr	ges			on (If necessary)							
ess					s suggestion and change <i>frontages</i> to <i>fronts</i> .						
by .	Motic	on		Ne	Negative is addressed by the technical change(s).						
Гес	Motic	on by/2 nd by	/	Jii	ng	bing Don	g (CSI) / Z	hixin Li (Linton)			
Address by Technical Change Option	Discu	ussion									
al C				48	3 Y	/-4 N ; Mot	ion passed	d.			
han		Decult of V	-4-	V	2/3 = [Negative is addressed by the technical Tochnical Change"					GO TO "Incorporation of the	
ge (Result of V (check on		X		change(s)		•			Technical Change" subsection
Opti					[Negative is not addressed by the technical						GO TO "Final" subsection
on		Motion		T	change(s).] < 2/3 To incorporate the technical change(s).					→ (E)	
	크		2nd by								
	echi	Discussion		y <u>Jii</u>	Jingbing Dong (CSI) / Zhixin Li (Linton)						
	ora	2100400101	-								
	tion C			48	3 Y	/-4 N ; Mot	ion passed	l			
	corporation of the Fechnical Change	Result o		X		90% ≤ [A	gree to inc	orporate.]			GO TO "Final" subsection → (F)
)e	(check	one)			[Disagree	to incorpo	orate.]>10%			GO TO "Final" subsection → (E)
					(,	A)	Withdrawn	(counted under I	h in	disp	osition)
					(В)	Not related	d (counted under	i in c	dispo	osition)
	(6	check if			(C)	Related ar	nd not persuasive (signi	ificar	nt)
Final		plicable)			(D)	Not signific	cant (counted und	ler j	in di	sposition)
<u>a</u>					(nd persuasive and			DOCUMENT FAILS
	X							by technical chan		coun	ted under k disposition)
	(check if			Comm							i i
	ар	plicable)	,	John	mment generated. See Section V-(ii) Comment # X.						

Neg	ative 3										
	Referenced Section/		C Chapter to fill in, ir	ncludi	ng text in the ball	lot if	nec	essary.			
Neç	Paragraph	§ 12.1.4									
Negative	Negative Text	*Original complete Negative text (e.g., issue, justification, suggestion) should be copied. in 12.1.4, what does "cure" mean?									
TFi	input (optional)										
	Withdrawal	X N	lo Negative withdrawa	ıl mad	e by Voter.			GO TO "Related" subsection			
	(check one)		Vithdrawal document r	eceive	ed by Standards st	aff o	n	GO TO "Final" subsection → (A)			
	Motion and	X 'F	Related' is mutually ag	reed ι	ıpon. <mark>(Needs no</mark> n	notio	n.)	GO TO "Persuasive" subsection			
	Reason	N	legative is not related.	(Nee	ds ≥2/3 votes to p	ass.)				
	(check one)	R	leason	XXXX							
Rela	Motion by/ 2 nd by	Name	(Company)/Name (Co	ompar	ny)						
Related	Discussion										
	Result of Vote (check one)	XX Y-XX N; Motion passed/failed.									
		[N	Negative is not related		GO TO "Persuasive" subsection						
		2/	/3 ≤ [Negative is not re	elated.]			GO TO "Final" subsection → (B)			
		X N	X Negative is related and persuasive. (Needs >1/3 votes to pass.)								
	Motion and Reason (check one)	N	legative is related and	not pe	ersuasive. (Needs	≥2/3	vot	es to pass.)			
	(check one)	R	leason	None							
 	Motion by/ 2 nd by	Jingbi	ing Dong (CSI) / Zhix	in Li (Linton)						
ers	Discussion	Jingbi	ing Dong (CSI): Use	data h	ere can be much	clea	rer.	Cure is mistake.			
Persuasive		48 Y -5	5 N ; Motion passed.								
ive	Popult of Voto		Negative is related and ersuasive.] > 1/3	k	Is a technical change recommended?	Х	Y	GO TO "Address by Technical Change Option" subsection			
	Result of Vote (check one)		Negative is related and ersuasive.] < 2/3	d not	(check one)		N	GO TO "Final" subsection → (E)			
		aı	/3 ≤ [Negative is relate nd not persuasive.] < 9	90%	GO TO "Final" s	ubse	ctio	n → (C)			
			0% ≤ [Negative is rela nd not persuasive.]	ted	GO TO "Not Sign	nifica	ant F	inding Option" subsection			

		nal				ndations umber ar	nd at least one full sentence are req	uired in "FROM" and "TO"			
	Tech Cha		12.1.4 Te	st result	ection/Paragraph 12.1.4 t result (including the test cure and the calculation results). tion/Paragraph 12.1.4						
Address	Technical Changes	1	12.1.4 Test result (including the test eure data and the calculation results). Justification (If necessary) Accept rejecter's suggestion and revise cure to data. Cure is mistake when editing to document.								
ess	Motic	on			Neg	jative is a	ddressed by the technical change(s).				
by .	Motic	n b	y/2 nd by	,	Jing	bing Dor	ng (CSI) / Zhixin Li (Linton)				
Гесһ	Discu	ıssi	on								
nica					48 \	/-5 N ; M o	tion passed.				
by Technical Change Option			sult of Vo		X	2/3 ≤ [Ne change(s	egative is addressed by the technical s).]	GO TO "Incorporation of the Technical Change" subsection			
ge O _l						[Negative change(s	e is not addressed by the technical s).] < 2/3	GO TO "Final" subsection → (E)			
otio	Motion					To incorporate the technical change(s).					
ם	nco Tec	Мо	tion by/2	2 nd by	Jing	bing Dor	ng (CSI) / Zhixin Li (Linton)				
	Incorporation of the Technical Change	Dis	cussion)							
	tion CI				48 \	48 Y-5 N; Motion passed.					
	of th	F	Result of		X	90% ≤ [A	gree to incorporate.]	GO TO "Final" subsection → (F)			
)e		(check	one)		[Disagre	e to incorporate.]>10%	GO TO "Final" subsection → (E)			
					(A)	Withdrawn (counted under h in dis	position)			
					(B)	Not related (counted under i in disp	oosition)			
	(0	che	ck if		(C)	Related and not persuasive (significa	nt)			
Final	applicable)			(D)	Not significant (counted under j in d	lisposition)				
<u>a</u>				(E)	Related and persuasive and not addressed by technical change	DOCUMENT FAILS				
	X				(F)	Addressed by technical change (cou	nted under k disposition)			
		(check if applicable)				nt genera	ted. See Section V-(ii) Comment # X				

Disposition of Voting Interest Reject 2

Check only when the Document has not been failed.

3	Original number (#) of Negatives	(g)
#	Number of Negatives withdrawn	(h)
#	Number of Negatives found not related	(i)
#	Number of Negatives found not significant	(j)

3		er of Negatives addressed by technical change (Negative les not significant) (k)							
		X	g - (h + i + j + k) = 0	Reject is Not Valid and is not included in the denominator of § VI. Approval Conditions Check					
	Final		g - (h + i +j + k) >0	Reject is included in the Approval Conditions Conditions Conditions					
			Reject without a Negative	Not Valid					

IV. Other Technical Issues None

V. Comments

V- (i) Voters' Comments
Commenter 1 (Yani He / LONGi LERRI) - Comment 1

		1.0	e / Longi LLkki) - Collinent i						
Comment	*TF	/TC Chapter	to fill in section/paragraph #, if necessary.						
nent	1. T	1. The requirments of force to fulfill a good contact between surface and probe should be included.							
	The	e TC Chaptei	r agreed to do one of the following actions.						
	*No motion is required in this step.								
	Already addressed by Commenter #, Comment #								
Δ		No further a	ction was taken by the TC Chapter.						
Action	Х	cases. The t	lard is to provide a method, the detailed testing conditions vary with in different testing details are not specified in this standard. The recommended force value is different testing equipment, this is not suggested to specify in Standards.						
		Refer to the TF for more consideration.							
		New Busine	ss						
		Editorial Change							
		Options	Case 1: No vote in this section:						
		for editorial	To be included and voted on as a group in § VI. Editorial Changes Other than Those Voted on in § V.						
		change (check	Case 2: Voted in this section:						
		one)	Original section number and at least one full sentence are required in "FROM" and "TO" fields.						
Edito		FROM: Sec	ction/Paragraph xxx						
Editorial Changes	1	TO: Sectio	n/Paragraph xxx						
nges		Justification (If necessary)							
М	otion	1	To approve above editorial change(s)						
М	otior	by/2 nd by	Name (Company)/Name (Company)						

Discussion	XXXX
Vote	XX Y-XX N; Motion passed/failed.

Comment 2

111116	nent 2								
Comment	*TF/TC Chapter to fill in section/paragraph #, if necessary.								
nent	2. The morphology or shape of the top of probe should be emphasized.								
	The	The TC Chapter agreed to do one of the following actions.							
	*No motion is required in this step.								
	Already addressed by Commenter #, Comment #								
Action	Х	No further action was taken by the TC Chapter. The shape of probe's top is not recommended to emphasize in the document which makes no important sense. The detailed test method is illustrated very clearly in Section 4.							
		Refer to the	TF for more consideration.						
		New Busine	ess						
		Editorial Ch	ange						
		Options for editorial change (check one)	Case 1: No vote in this section: To be included and voted on as a group in § VI. Editorial Changes Other than Those Voted on in § V. Case 2: Voted in this section: Original section number and at least one full sentence are required in "FROM" and "TO" fields.						
Editori	1	FROM: Section/Paragraph xxx							
Editorial Changes		TO: Section/Paragraph xxx							
nges		Justification (If necessary)							
М	otion	1	To approve above editorial change(s)						
М	otion	by/2 nd by	Name (Company)/Name (Company)						
Di	iscus	ssion	XXXX						
V	ote		XX Y-XX N; Motion passed/failed.						

V-(ii) Comments Created by Handling Negative None

VI. Editorial Changes Other than Those Voted on in § V

None

VII. Approval Conditions Check

VII. - (i). Approval Rate

APPROVAL CONDITION 1: All Negatives have been discussed and were withdrawn, found not related, found not persuasive, or addressed by a technical change. (Regulations ¶ 9.6.2.1.2)

APPROVAL CONDITION 2: At least 90% of the sum of valid Voting Interest Accept and Voting Interest Reject Votes must be Accept. (Regulations ¶ 9.6.2.1.3)

Note: If both approval conditions are not satisfied, the Document fails.

		Accepts		(Accepts + Valid Rejects)			
Approval Rate	=	70	/	71	=	98.6%	≥90%

VII. – (ii) Approval Level (check one)

Note: See Regulations § 9.6.2 for further information.

Globally Approved (No Ratification Ballot needed):

The Letter Ballot meets the Letter Ballot approval conditions for the global technical committee.

X

Need a Ratification Ballot:

The Letter Ballot meets the Letter Ballot approval conditions for the TC Chapter and a Ratification Ballot will be issued to validate technical changes.

VIII. Safety Check

Note: See Regulations § 15 for further information.

	X	Th is	This is not a Safety Document , when all safety-related information is removed, the Document is still technically sound and complete. (<i>Regulations</i> ¶ 8.7.1)						
Motion				Safety Document , when all safety-related information is removed, the Document is not y sound and complete. (<i>Regulations</i> ¶ 8.7.2)					
	ecklist ($Regulations$ ¶ 15.3) is complete and has been included with the Document the balloting process. ($Regulations$ ¶ 15.1.2)								
	Motion by/2 nd by		by/2 nd by	Jingbing Dong (CSI) / Zhixin Li (Linton)					
	Discussion			None					
	Vote			47 Y-6 N; Motion passed					

IX. Intellectual Property (IP) Check

Note: This Letter Ballot may cover all or part of a Standard or Safety Guideline. Regardless of the coverage, this IP check applies to the entire Standard or Safety Guideline*. See *Regulations* § 16 for further information.

X	The TC Chapter meeting chair asked those participating, if they were aware of any patented technology that might be relevant (see <i>Regulations</i> ¶ 16.3.1.1) to the Standard or Safety Guideline; or, any copyrighted items or trademarks that are used/reproduced (see <i>Regulations</i> ¶ 16.4.1.2) in the Standard or Safety Guideline. (Also see, <i>Regulations</i> § 8.8)					
	X The question is NOT answered in affirmative (No potentially material patented technology or use/reproduction of copyrighted items/trademarks is known.)		GO TO SECTION X.			
		The question is answered in affirmative	Is any of the known IPs a patented		Yes, at least one of them is a patented technology	GO TO IX (a) "Patented Technology" subsection
			technology?		No	GO TO IX (b) "Copyright items" subsection

X. Action for This Document

Motion		This Document passed TC Chapter review as balloted and will be forwarded to the ISC A8 SC for procedural review.						
		This Document passed TC Chapter review with editorial changes and will be forwarded to the ISC A&R SC for procedural review.						
	X	This Document passed TC Chapter review with technical changes and with or without editorial changes and will be forwarded to the ISC A&R SC for procedural review. A Ratification Ballot will be issued to verify the technical changes.						
		This Document failed TC Chapter review and will be returned to the TF for rework.						
		This Document failed TC Chapter review and work will be discontinued.						
Motion by/ 2 nd by			Jingbing Dong (CSI) / Zhixin Li (Linton)					
[Discussion		Guangchun Zhang (CSI): Please add the development history into the background. This will help the members in other region review.					
Vote			47 Y-6 N					
	Final Action		X Motion passed					
			Motion failed					

Note: If the use of PMPT or copyrighted item is justified by the TC Chapter, LOA or release form must be received before publication can proceed.