LITEON®
OPTOELECTRONICS

Product /Process Change Notification

PCN Number:PCN-20200096
Create Date: 10/12/2020
Issue By: Harriet Wang

Customer name: ALL Customer

1. Change Type:Add alternative PTR dice in LTV-8XX series

2.Parts Affected or Product Description: LTV-816, LTV-826, LTV-846, LTV-817, LTV-827, LTV-847, LTV-814, LTV-824, LTV-844 series

3. Description and Extent of Change: (1) Original PTR dice : OTC

New PTR dice : CRS / TK

(2) Qualified by reliability test as attachment.

4.Reasona of Change: Long lead time of original source

5.Effective Date of Change: Upon customer approve if any

6. Availability of Sample and Datasheet: Oct 12th , 2020

Customer Approval Portion :

* Approved (✓) ,

Remark : _____

* Rejected (_____) ,

Reason : _____

SIGNATURE : Kate Chang

DATE : 20. Oct. 2020.

LITE-ON DCC
RELEASE
QLS-OD-FC006/A4

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Product /Process Change Notification

PCN Number : PCN-20200096

Create Date : 10/12/2020

Issue By : Jacky Chiang, Anron Chen

Customer Name : All customers related to LTV-8X6, LTV-8X7, LTV-8X4 series

1. Change Type :

Add alternative PTR dice in LTV-8XX series

2. Parts Affected or Product Description :

LTV-816, LTV-826, LTV-846, LTV-817, LTV-827, LTV-847,

LTV-814, LTV-824, LTV-844 series

3. Description and Extent of Change :

(1) Original PTR dice : OTC

New PTR dice : CRS / TK

(2) Qualified by reliability test as attachment.

Part number	LTV-816	LTV-817	LTV-814
CRS	LTV-816 RA report (CRS).pdf	LTV-817 RA report (CRS).pdf	LTV-814 RA report (CRS).pdf
TK	LTV-816 RA report (TK).pdf	LTV-817 RA report (TK).pdf	LTV-814 RA report (TK).pdf

Product /Process Change Notification

4. **Reason of Change :**

Long lead time of original source

5. **Effected Date of Change :**

Upon customer approve if any

6. **Availability of Sample and Datasheet :**

Oct 12th , 2020

7. **Issued by:**

Jacky Chiang

PD : _____ PM : Anna Chen

Customer Approval Portion :

***Approved (✓),** Kuto Cheng 20.Oct.2020.

Remark : _____

***Rejected (_____),**

Reason : _____

Sincerely yours,
PM/OSD LOB
Lite-On Technology Corp.

RELIABILITY TEST REPORT

Lite-on Opto Technology Co.,ltd.

Part NO： LTV-816
Product Type： Photocouple

Reliability Item:

Test title	Sample size	Test Condition	Test Result	Remark
Pre-conditioning test	693	Bake in oven 125'C for 24hrs Soak in 85'C85%RH for168hrs IR-Reflow (3*Reflow peak260℃)	Pass	
High temperature operation life	77	Ta=110℃,If=20mA,Ic=30mA,1000hrs	Pass	
High temperature reverse bias	77	Ta=110°C,Vce=80V,Vce=absolute max,1000hrs	Pass	
High temp High Humidity Reverse	77	Ta=85°C, 85%RH, VCE=64V, 1000hrs	Pass	
High temperature storage	77	Ta=150℃,1000hrs	Pass	
Low Temp Storage Life Test	77	Ta=-55°C, 1000 hrs	Pass	
Thermal Shock	77	125℃~-55℃,dwell time:15min 15min ,Test time1000cycle	Pass	
Autoclave	77	Temp=121°C, 100%RH and 30Psi, 48hrs	Pass	
Solder Resistance	77	Ta=260℃ 10sec	Pass	
Solder ability test	77	Ta=230℃ 5sec	Pass	

Test Item:

Parameter	Symbol	Condition	Min	Max	Unit
LED Forward Voltage	VF	IF=20mA	-	1.4	V
Reverse Current	IR	VR=4V	-	10	μA
Collector-emitter voltage breakdown	BVCEO	IC=0.1mA	80	-	V
Emitter-collector voltage breakdown	BVECO	IE=10μA	6	-	V
Collector-emitter saturation voltage	VCE(sat)	IF=20mA, IC=1mA	-	0.2	V
Current Transfer Ratio	CTR	IF=5mA, VCE=5V	300	600	%
Collector dark current	ICEO	VCE=20V	-	100	nA

Reliability criteria:

1. Reading value for each step test not over 50% Delta for VF, BVCEO, BVECO, CTR parameter.
2. Reading value for each step test not over spec limit for IR, ICEO and VCE(sat) parameter.
3. Short and open is criteria of Temp cycling and Autoclave test item.

Final Conclusion of reliability test:

All samples unit under test are conforming to reliability criteria.

Lab's comment:

- The value on each test item (next page) is average value from all units under test except defect sample.
- Effect this the results relate only to the items tested
- The report shall not be reproduced except in full, without the written approval of the laboratory.

Prepared By: Guili Jia

Approved By: Wei li

Test summary table. (Average value for all units under test)

High temperature operation life

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.222	1.222	1.222	1.222	1.219		Pass
		Ratio	—	0.003%	0.003%	-0.007%	-0.184%		
IR	uA	Mean Data	0.006	0.004	0.004	0.008	0.011		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	128.850	128.287	128.326	128.332	128.377		
		Ratio	—	-0.436%	-0.407%	-0.402%	-0.367%		
Bveco	V	Mean Data	10.228	10.225	10.228	10.226	10.229		
		Ratio	—	-0.033%	0.003%	-0.015%	0.006%		
Vcesat	V	Mean Data	0.040	0.038	0.039	0.039	0.041		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	362.813	392.844	382.806	366.771	336.310		
		Ratio	—	8.277%	5.511%	1.091%	-7.305%		
ICEO	nA	Mean Data	6.157	6.627	6.161	5.995	5.533		
		Ratio	—	—	—	—	—		

High temperature reverse bias

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.228	1.229	1.229	1.229	1.227		Pass
		Ratio	—	0.067%	0.068%	0.089%	-0.022%		
IR	uA	Mean Data	0.004	0.005	0.004	0.003	0.005		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	125.966	125.496	125.560	125.565	125.580		
		Ratio	—	-0.373%	-0.323%	-0.319%	-0.307%		
Bveco	V	Mean Data	10.232	10.227	10.233	10.231	10.233		
		Ratio	—	-0.053%	0.013%	-0.008%	0.009%		
Vcesat	V	Mean Data	0.040	0.039	0.039	0.039	0.039		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	361.236	390.979	396.070	396.981	393.690		
		Ratio	—	8.234%	9.643%	9.895%	8.984%		
ICEO	nA	Mean Data	6.665	7.106	7.294	7.264	6.900		
		Ratio	—	—	—	—	—		

High temperature High humidity reverse bias

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.222	1.222	1.223	1.223	1.222		Pass
		Ratio	—	0.023%	0.108%	0.115%	-0.026%		
IR	uA	Mean Data	0.002	0.003	0.004	0.003	0.005		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	131.939	131.522	132.017	132.007	132.028		
		Ratio	—	-0.316%	0.059%	0.051%	0.067%		
Bveco	V	Mean Data	10.191	10.189	10.196	10.195	10.199		
		Ratio	—	-0.018%	0.044%	0.040%	0.071%		
Vcesat	V	Mean Data	0.041	0.039	0.039	0.038	0.038		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	360.716	391.958	406.020	411.411	416.728		
		Ratio	—	8.661%	12.559%	14.054%	15.528%		
ICEO	nA	Mean Data	7.682	7.947	4.606	4.777	4.948		
		Ratio	—	—	—	—	—		

High temperature storage

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.219	1.220	1.222	1.221	1.220		Pass
		Ratio	—	0.002%	0.220%	0.132%	0.068%		
IR	uA	Mean Data	0.004	0.006	0.004	0.005	0.003		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	131.246	130.834	130.755	130.798	130.807		
		Ratio	—	-0.314%	-0.374%	-0.341%	-0.334%		
Bveco	V	Mean Data	10.214	10.212	10.211	10.214	10.214		
		Ratio	—	-0.016%	-0.029%	-0.001%	0.004%		
Vcesat	V	Mean Data	0.040	0.039	0.038	0.039	0.042		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	366.427	395.981	404.614	386.081	361.268		
		Ratio	—	8.065%	10.421%	5.363%	-1.408%		
ICEO	nA	Mean Data	7.952	8.349	8.285	8.486	8.157		
		Ratio	—	—	—	—	—		

Low temperature storage

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.223	1.223	1.225	1.224	1.222		Pass
		Ratio	—	0.065%	0.185%	0.085%	-0.011%		
IR	uA	Mean Data	0.003	0.005	0.006	0.004	0.004		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	132.945	132.499	132.423	132.473	132.548		
		Ratio	—	-0.336%	-0.393%	-0.355%	-0.299%		
Bveco	V	Mean Data	10.201	10.199	10.203	10.206	10.208		
		Ratio	—	-0.022%	0.022%	0.044%	0.064%		
Vcesat	V	Mean Data	0.041	0.040	0.040	0.040	0.040		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	360.490	388.582	392.138	392.239	391.094		
		Ratio	—	7.793%	8.779%	8.807%	8.490%		
ICEO	nA	Mean Data	7.567	7.815	7.623	7.751	7.259		
		Ratio	—	—	—	—	—		

Thermal Shock

Parameter	Unit	Item	0	pre	200	500	1000		Remark
V_F	V	Mean Data	1.223	1.222	1.224	1.223	1.224		Pass
		Ratio	—	-0.016%	0.093%	0.066%	0.099%		
IR	uA	Mean Data	0.004	0.004	0.004	0.005	0.006		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	131.605	131.201	131.145	131.118	131.099		
		Ratio	—	-0.307%	-0.349%	-0.370%	-0.384%		
Bveco	V	Mean Data	10.213	10.214	10.213	10.214	10.213		
		Ratio	—	0.011%	0.008%	0.009%	0.001%		
Vcesat	V	Mean Data	0.041	0.040	0.039	0.039	0.039		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	362.911	389.271	403.503	406.888	409.851		
		Ratio	—	7.264%	11.185%	12.118%	12.934%		
ICEO	nA	Mean Data	8.011	8.349	8.246	8.315	8.349		
		Ratio	—	—	—	—	—		

Autoclave

Parameter	Unit	Item	0	pre	48				Remark
V_F	V	Mean Data	1.223	1.224	1.228				Pass
		Ratio	—	0.061%	0.356%				
IR	uA	Mean Data	0.005	0.003	0.006				
		Ratio	—	—	—				
Bvceo	V	Mean Data	132.026	131.599	131.369				
		Ratio	—	-0.323%	-0.498%				
Bveco	V	Mean Data	10.205	10.204	10.196				
		Ratio	—	-0.014%	-0.091%				
Vcesat	V	Mean Data	0.041	0.040	0.039				
		Ratio	—	—	—				
CTR	%	Mean Data	358.992	381.893	409.416				
		Ratio	—	6.379%	14.046%				
ICEO	nA	Mean Data	7.943	8.212	7.853				
		Ratio	—	—	—				

Solder Resistance

Parameter	Unit	Item	0	pre	10S				Remark
V_F	V	Mean Data	1.217	1.218	1.219				Pass
		Ratio	—	0.048%	0.110%				
IR	uA	Mean Data	0.004	0.004	0.003				
		Ratio	—	—	—				
Bvceo	V	Mean Data	133.209	132.746	132.695				
		Ratio	—	-0.348%	-0.386%				
Bveco	V	Mean Data	10.233	10.232	10.234				
		Ratio	—	-0.011%	0.012%				
Vcesat	V	Mean Data	0.042	0.041	0.040				
		Ratio	—	—	—				
CTR	%	Mean Data	359.344	388.212	395.372				
		Ratio	—	8.034%	10.026%				
ICEO	nA	Mean Data	7.862	8.259	8.122				
		Ratio	—	—	—				

Solder Pot

Parameter	Unit	Item	0	pre	5S				Remark
V_F	V	Mean Data	1.218	1.219	1.220				Pass
		Ratio	—	0.077%	0.096%				
IR	uA	Mean Data	0.003	0.003	0.004				
		Ratio	—	—	—				
Bvceo	V	Mean Data	134.546	134.106	134.100				
		Ratio	—	-0.327%	-0.332%				
Bveco	V	Mean Data	10.226	10.224	10.230				
		Ratio	—	-0.023%	0.038%				
Vcesat	V	Mean Data	0.042	0.041	0.040				
		Ratio	—	—	—				
CTR	%	Mean Data	359.544	389.325	394.779				
		Ratio	—	8.283%	9.800%				
ICEO	nA	Mean Data	8.075	8.349	8.315				
		Ratio	—	—	—				

RELIABILITY TEST REPORT

Lite-on Opto Technology Co.,ltd.

Part NO： LTV-816
Product Type Photocoupler

Reliability Item:

Test title	Sample size	Test Condition	Test Result	Remark
Pre-conditioning test	693	Bake in oven 125'C for 24hrs Soak in 85'C85%RH for168hrs IR-Reflow (3*Reflow peak260℃)	Pass	
High temperature operation life	77	Ta=110℃,If=20mA,Ic=30mA,1000hrs	Pass	
High temperature reverse bias	77	Ta=110℃,Vce=80V,Vce=absolute max,1000hrs	Pass	
High temp High Humidity Reverse	77	Ta=85°C, 85%RH, VCE=64V, 1000hrs	Pass	
High temperature storage	77	Ta=150℃,1000hrs	Pass	
Low Temp Storage Life Test	77	Ta=-55°C, 1000 hrs	Pass	
Thermal Shock	77	125℃~-55℃,15min 15min ,Test time1000cycle	Pass	
Autoclave	77	Temp=121°C, 100%RH and 30Psi,	Pass	
Solder Resistance	77	Ta=260℃ 10sec	Pass	
Solder ability test	77	Ta=230℃ 5sec	Pass	

Test Item:

Parameter	Symbol	Condition	Min	Max	Unit
LED Forward Voltage	VF	IF=20mA	-	1.4	V
Reverse Current	IR	VR=-4V	-	10	µA
Collector-emitter voltage breakdown	BVCEO	IC=0.1mA	80	-	V
Emitter-collector voltage breakdown	BVECO	IE=10µA	6	-	V
Collector-emitter saturation voltage	VCE(sat)	IF=20mA, IC=1mA	-	0.2	V
Current Transfer Ratio	CTR	IF=5mA, VCE=5V	50	600	%
Collector dark current	ICEO	VCE=20V	-	100	nA

Reliability criteria:

1. Reading value for each step test not over 50% Delta for VF, BVCEO, BVECO, CTR parameter.
2. Reading value for each step test not over spec limit for IR, ICEO and VCE(sat) parameter.
3. Short and open is criteria of Temp cycling and Autoclave test item.

Final Conclusion of reliability test:

All samples unit under test are conforming to reliability criteria.

Lab's comment:

- The value on each test item (next page) is average value from all units under test except defect sample.
- Effect this the results relate only to the items tested
- The report shall not be reproduced except in full, without the written approval of the laboratory.

Prepared By: Guili Jia

Approved By: Wei li

Test summary table. (Average value for all units under test)

High temperature operation life

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.220	1.221	1.221	1.223	1.235		Pass
		Ratio	—	0.076%	0.121%	0.252%	1.265%		
IR	uA	Mean Data	0.003	0.003	0.003	0.003	0.003		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	100.309	100.277	100.373	100.349	100.332		
		Ratio	—	-0.032%	0.063%	0.040%	0.023%		
Bveco	V	Mean Data	8.934	8.932	8.933	8.934	8.933		
		Ratio	—	-0.023%	-0.015%	0.004%	-0.012%		
Vcesat	V	Mean Data	0.052	0.050	0.050	0.049	0.051		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	306.142	324.480	326.323	329.196	326.267		
		Ratio	—	5.990%	6.592%	7.531%	6.574%		
ICEO	nA	Mean Data	20.547	20.253	17.483	17.706	17.275		
		Ratio	—	—	—	—	—		

High temperature reverse bias

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.220	1.220	1.221	1.222	1.227		Pass
		Ratio	—	0.039%	0.108%	0.184%	0.573%		
IR	uA	Mean Data	0.003	0.004	0.003	0.004	0.004		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	99.883	99.878	99.977	99.953	99.921		
		Ratio	—	-0.005%	0.094%	0.070%	0.038%		
Bveco	V	Mean Data	8.859	8.857	8.858	8.859	8.858		
		Ratio	—	-0.019%	-0.010%	0.006%	-0.011%		
Vcesat	V	Mean Data	0.049	0.048	0.047	0.047	0.048		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	350.822	367.378	366.760	370.615	370.665		
		Ratio	—	4.719%	4.543%	5.642%	5.656%		
ICEO	nA	Mean Data	21.568	21.337	19.656	20.073	20.327		
		Ratio	—	—	—	—	—		

High temperature High humidity reverse bias

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.220	1.221	1.221	1.223	1.238		Pass
		Ratio	—	0.060%	0.102%	0.231%	1.524%		
IR	uA	Mean Data	0.004	0.004	0.003	0.003	0.004		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	100.168	100.142	100.061	100.059	100.061		
		Ratio	—	-0.026%	-0.107%	-0.109%	-0.107%		
Bveco	V	Mean Data	8.911	8.909	8.911	8.912	8.914		
		Ratio	—	-0.025%	-0.005%	0.007%	0.030%		
Vcesat	V	Mean Data	0.049	0.048	0.047	0.047	0.047		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	351.678	369.764	378.255	385.124	388.841		
		Ratio	—	5.143%	7.557%	9.510%	10.567%		
ICEO	nA	Mean Data	20.538	20.465	19.878	20.341	20.718		
		Ratio	—	—	—	—	—		

High temperature storage

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.220	1.221	1.221	1.223	1.247		Pass
		Ratio	—	0.085%	0.110%	0.285%	2.229%		
IR	uA	Mean Data	0.003	0.003	0.003	0.004	0.004		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	99.900	99.891	99.896	99.868	99.912		
		Ratio	—	-0.008%	-0.004%	-0.031%	0.012%		
Bveco	V	Mean Data	8.852	8.850	8.851	8.858	8.872		
		Ratio	—	-0.021%	-0.015%	0.068%	0.219%		
Vcesat	V	Mean Data	0.049	0.048	0.048	0.049	0.051		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	355.119	372.762	362.838	351.783	324.245		
		Ratio	—	4.968%	2.174%	-0.939%	-8.694%		
ICEO	nA	Mean Data	21.688	21.417	20.940	22.031	32.974		
		Ratio	—	—	—	—	—		

Low temperature storage

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.219	1.219	1.220	1.222	1.234		Pass
		Ratio	—	0.021%	0.097%	0.243%	1.196%		
IR	uA	Mean Data	0.005	0.004	0.003	0.003	0.003		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	100.103	100.092	99.967	99.895	99.909		
		Ratio	—	-0.012%	-0.136%	-0.208%	-0.194%		
Bveco	V	Mean Data	8.912	8.910	8.911	8.914	8.912		
		Ratio	—	-0.022%	-0.009%	0.018%	0.003%		
Vcesat	V	Mean Data	0.050	0.048	0.048	0.047	0.048		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	344.902	362.975	367.864	373.334	372.415		
		Ratio	—	5.240%	6.657%	8.243%	7.977%		
ICEO	nA	Mean Data	21.043	21.099	18.452	20.619	20.740		
		Ratio	—	—	—	—	—		

Thermal Shock

Parameter	Unit	Item	0	pre	100	200	500	800	1000	Remark
V_F	V	Mean Data	1.220	1.220	1.219	1.220	1.221	1.223	1.222	Pass
		Ratio	—	0.016%	-0.067%	-0.025%	0.064%	0.277%	0.155%	
IR	uA	Mean Data	0.004	0.004	0.004	0.004	0.003	0.004	0.003	
		Ratio	—	—	—	—	—	—	—	
Bvceo	V	Mean Data	100.132	100.132	100.043	99.998	99.947	99.881	99.888	
		Ratio	—	0.001%	-0.089%	-0.133%	-0.184%	-0.250%	-0.243%	
Bveco	V	Mean Data	8.912	8.910	8.910	8.910	8.911	8.913	8.912	
		Ratio	—	-0.025%	-0.027%	-0.027%	-0.022%	0.009%	-0.007%	
Vcesat	V	Mean Data	0.049	0.048	0.048	0.048	0.048	0.047	0.048	
		Ratio	—	—	—	—	—	—	—	
CTR	%	Mean Data	350.652	367.961	367.813	366.561	366.549	367.134	368.188	
		Ratio	—	4.936%	4.894%	4.537%	4.533%	4.700%	5.001%	
ICEO	nA	Mean Data	20.435	20.746	20.475	20.803	19.006	19.647	20.692	
		Ratio	—	—	—	—	—	—	—	

Autoclave

Parameter	Unit	Item	0	pre	48	96	168		Remark
V_F	V	Mean Data	1.220	1.220	1.220	1.224	1.224		Pass
		Ratio	—	0.026%	-0.005%	0.337%	0.390%		
IR	uA	Mean Data	0.003	0.004	0.003	0.004	0.003		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	99.980	99.974	99.590	99.504	99.566		
		Ratio	—	-0.005%	-0.390%	-0.476%	-0.414%		
Bveco	V	Mean Data	8.881	8.878	8.878	8.881	8.923		
		Ratio	—	-0.029%	-0.030%	0.004%	0.478%		
Vcesat	V	Mean Data	0.050	0.048	0.047	0.050	0.050		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	347.132	364.258	410.450	394.806	403.158		
		Ratio	—	4.934%	18.240%	13.734%	16.140%		
ICEO	nA	Mean Data	21.032	21.178	23.279	23.736	44.568		
		Ratio	—	—	—	—	—		

Solder Resistance

Parameter	Unit	Item	0	pre	10S				Remark
V_F	V	Mean Data	1.220	1.220	1.220				Pass
		Ratio	—	-0.041%	-0.036%				
IR	uA	Mean Data	0.003	0.004	0.002				
		Ratio	—	—	—				
Bvceo	V	Mean Data	99.759	99.759	99.738				
		Ratio	—	0.000%	-0.021%				
Bveco	V	Mean Data	8.838	8.836	8.836				
		Ratio	—	-0.020%	-0.015%				
Vcesat	V	Mean Data	0.050	0.048	0.048				
		Ratio	—	—	—				
CTR	%	Mean Data	344.534	361.057	360.296				
		Ratio	—	4.796%	4.575%				
ICEO	nA	Mean Data	21.646	21.965	24.743				
		Ratio	—	—	—				

Solder Pot

Parameter	Unit	Item	0	pre	5S				Remark
V_F	V	Mean Data	1.220	1.220	1.220				Pass
		Ratio	—	-0.017%	-0.029%				
IR	uA	Mean Data	0.004	0.003	0.002				
		Ratio	—	—	—				
Bvceo	V	Mean Data	99.707	99.683	99.641				
		Ratio	—	-0.024%	-0.066%				
Bveco	V	Mean Data	8.838	8.836	8.836				
		Ratio	—	-0.023%	-0.020%				
Vcesat	V	Mean Data	0.050	0.048	0.048				
		Ratio	—	—	—				
CTR	%	Mean Data	349.856	368.457	368.589				
		Ratio	—	5.317%	5.355%				
ICEO	nA	Mean Data	21.638	21.962	27.225				
		Ratio	—	—	—				

RELIABILITY TEST REPORT

Lite-on Opto Technology Co.,ltd.

Part NO： LTV-814
Product Type Photocouple

Reliability Item:

Test title	Sample size	Test Condition	Test Result	Remark
Pre-conditioning test	693	Bake in oven 125'C for 24hrs Soak in 85'C85%RH for168hrs IR-Reflow (3*Reflow peak260℃)	Pass	
High temperature operation life	77	Ta=110℃,If=20mA,Ic=30mA,1000hrs	Pass	
High temperature reverse bias	77	Ta=110℃,Vce=80V,Vce=absolute max,1000hrs	Pass	
High temp High Humidity Reverse	77	Ta=85°C, 85%RH, VCE=64V, 1000hrs	Pass	
High temperature storage	77	Ta=150℃,1000hrs	Pass	
Low Temp Storage Life Test	77	Ta=-55°C, 1000 hrs	Pass	
Thermal Shock	77	125℃~-55℃,15min 15min ,Test time1000cycle	Pass	
Autoclave	77	Temp=121°C, 100%RH and 30Psi, 48hrs	Pass	
Solder Resistance	77	Ta=260℃ 10sec	Pass	
Solder ability test	77	Ta=230℃ 5sec	Pass	

Test Item:

Parameter	Symbol	Condition	Min	Max	Unit
LED Forward Voltage	VF±	IF=20mA	-	1.4	V
Collector-emitter voltage breakdown	BVCEO	IC=0.1mA	35	-	V
Emitter-collector voltage breakdown	BVECO	IE=10μA	6	-	V
Collector-emitter saturation voltage	VCE(sat)±	IF=20mA, IC=1mA	-	0.2	V
Current Transfer Ratio	CTR±	IF=1mA, VCE=5V	100	200	%
Collector dark current	ICEO	VCE=20V	-	100	nA

Reliability criteria:

1. Reading value for each step test not over 50% Delta for VF, BVCEO, BVECO, CTR parameter.
2. Reading value for each step test not over spec limit for , ICEO and VCE(sat) parameter.
3. Short and open is criteria of Temp cycling and Autoclave test item.

Final Conclusion of reliability test:

All samples unit under test are conforming to reliability criteria.

Lab's comment:

- The value on each test item (next page) is average value from all units under test except defect sample.
- Effect this the results relate only to the items tested
- The report shall not be reproduced except in full, without the written approval of the laboratory.

Prepared By: Guili Jia

Approved By: Wei li

Test summary table. (Average value for all units under test)

High temperature operation life

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_{F+}	V	Mean Data	1.224	1.223	1.224	1.223	1.226		Pass
		Ratio	—	-0.045%	-0.006%	-0.010%	0.221%		
V_{F-}	V	Mean Data	1.224	1.223	1.224	1.223	1.227		
		Ratio	—	-0.041%	0.010%	-0.030%	0.258%		
Bvceo	V	Mean Data	134.998	134.505	134.600	134.652	134.598		
		Ratio	—	-0.365%	-0.295%	-0.256%	-0.296%		
Bveco	V	Mean Data	9.968	9.963	9.962	9.963	9.954		
		Ratio	—	-0.048%	-0.066%	-0.049%	-0.143%		
Vcesat +	V	Mean Data	0.046	0.044	0.044	0.044	0.043		
		Ratio	—	—	—	—	—		
Vcesat -	V	Mean Data	0.045	0.043	0.043	0.042	0.042		
		Ratio	—	—	—	—	—		
CTR +	%	Mean Data	246.937	269.814	265.527	261.842	261.763		
		Ratio	—	9.264%	7.528%	6.036%	6.004%		
CTR -	%	Mean Data	257.628	283.349	287.854	288.858	294.398		
		Ratio	—	9.984%	11.733%	12.122%	14.273%		
ICEO	nA	Mean Data	6.018	6.311	5.580	5.447	5.128		
		Ratio	—	—	—	—	—		

High temperature reverse bias

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_{F+}	V	Mean Data	1.226	1.225	1.226	1.226	1.228		Pass
		Ratio	—	-0.033%	0.005%	0.024%	0.227%		
V_{F-}	V	Mean Data	1.226	1.226	1.226	1.226	1.229		
		Ratio	—	-0.057%	-0.016%	0.017%	0.219%		
Bvceo	V	Mean Data	132.757	132.212	132.259	132.248	132.191		
		Ratio	—	-0.411%	-0.375%	-0.384%	-0.427%		
Bveco	V	Mean Data	9.897	9.892	9.890	9.890	9.885		
		Ratio	—	-0.044%	-0.066%	-0.067%	-0.116%		
Vcesat	V	Mean Data	0.045	0.043	0.042	0.042	0.042		
		Ratio	—	—	—	—	—		
Vcesat	V	Mean Data	0.044	0.042	0.042	0.042	0.042		
		Ratio	—	—	—	—	—		
CTR +	%	Mean Data	253.307	276.820	280.197	281.943	287.383		
		Ratio	—	9.283%	10.616%	11.305%	13.453%		
CTR -	%	Mean Data	258.310	282.697	285.668	287.799	293.294		
		Ratio	—	9.441%	10.591%	11.416%	13.544%		
ICEO	nA	Mean Data	6.199	6.512	6.449	6.450	6.397		
		Ratio	—	—	—	—	—		

High temperature High humidity reverse bias

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_{F+}	V	Mean Data	1.227	1.226	1.226	1.226	1.228		Pass
		Ratio	—	-0.044%	-0.024%	-0.044%	0.151%		
V_{F-}	V	Mean Data	1.228	1.227	1.227	1.227	1.230		
		Ratio	—	-0.054%	-0.033%	-0.043%	0.148%		
Bvceo	V	Mean Data	132.324	131.773	131.835	131.852	131.777		
		Ratio	—	-0.416%	-0.369%	-0.357%	-0.413%		
Bveco	V	Mean Data	9.891	9.886	9.885	9.889	9.883		
		Ratio	—	-0.045%	-0.054%	-0.015%	-0.076%		
Vcesat +	V	Mean Data	0.045	0.043	0.043	0.043	0.042		
		Ratio	—	—	—	—	—		
Vcesat -	V	Mean Data	0.043	0.041	0.041	0.040	0.040		
		Ratio	—	—	—	—	—		
CTR +	%	Mean Data	244.719	268.775	278.693	281.011	291.704		
		Ratio	—	9.830%	13.883%	14.830%	19.200%		
CTR -	%	Mean Data	272.878	299.094	304.460	306.283	312.689		
		Ratio	—	9.607%	11.573%	12.242%	14.589%		
ICEO	nA	Mean Data	6.343	6.627	7.069	7.225	7.027		
		Ratio	—	—	—	—	—		

High temperature storage

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_{F+}	V	Mean Data	1.227	1.228	1.227	1.226	1.229		Pass
		Ratio	—	0.056%	0.008%	-0.095%	0.163%		
V_{F-}	V	Mean Data	1.228	1.229	1.228	1.227	1.232		
		Ratio	—	0.066%	0.023%	-0.086%	0.322%		
Bvceo	V	Mean Data	130.459	129.713	129.902	129.995	129.952		
		Ratio	—	-0.571%	-0.426%	-0.355%	-0.388%		
Bveco	V	Mean Data	9.776	9.768	9.768	9.773	9.767		
		Ratio	—	-0.081%	-0.084%	-0.033%	-0.090%		
Vcesat +	V	Mean Data	0.044	0.041	0.042	0.043	0.046		
		Ratio	—	—	—	—	—		
Vcesat -	V	Mean Data	0.043	0.041	0.041	0.043	0.046		
		Ratio	—	—	—	—	—		
CTR +	%	Mean Data	256.673	284.966	284.529	272.243	258.782		
		Ratio	—	11.023%	10.853%	6.066%	0.822%		
CTR -	%	Mean Data	267.761	297.485	293.545	280.436	266.667		
		Ratio	—	11.101%	9.629%	4.733%	-0.409%		
ICEO	nA	Mean Data	6.472	6.740	6.886	7.112	6.965		
		Ratio	—	—	—	—	—		

Low temperature storage

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_{F+}	V	Mean Data	1.225	1.226	1.225	1.225	1.228		Pass
		Ratio	—	0.030%	0.012%	-0.049%	0.229%		
V_{F-}	V	Mean Data	1.226	1.226	1.226	1.225	1.228		
		Ratio	—	0.031%	0.018%	-0.057%	0.222%		
Bvceo	V	Mean Data	132.050	131.374	131.323	131.403	131.303		
		Ratio	—	-0.512%	-0.551%	-0.490%	-0.566%		
Bveco	V	Mean Data	9.840	9.833	9.836	9.838	9.830		
		Ratio	—	-0.068%	-0.045%	-0.015%	-0.105%		
Vcesat +	V	Mean Data	0.044	0.042	0.042	0.042	0.042		
		Ratio	—	—	—	—	—		
Vcesat -	V	Mean Data	0.044	0.042	0.042	0.042	0.041		
		Ratio	—	—	—	—	—		
CTR +	%	Mean Data	253.048	278.367	280.444	279.337	285.861		
		Ratio	—	10.005%	10.826%	10.389%	12.967%		
CTR -	%	Mean Data	257.042	283.059	284.959	283.365	289.961		
		Ratio	—	10.121%	10.861%	10.241%	12.807%		
ICEO	nA	Mean Data	6.343	6.633	6.643	6.771	6.642		
		Ratio	—	—	—	—	—		

Thermal Shock

Parameter	Unit	Item	0	pre	200	500	1000		Remark
V_{F+}	V	Mean Data	1.226	1.225	1.225	1.225	1.225		Pass
		Ratio	—	-0.090%	-0.101%	-0.146%	-0.091%		
V_{F-}	V	Mean Data	1.227	1.226	1.226	1.225	1.226		
		Ratio	—	-0.092%	-0.090%	-0.128%	-0.083%		
Bvceo	V	Mean Data	136.093	135.646	135.549	135.549	135.418		
		Ratio	—	-0.328%	-0.400%	-0.400%	-0.496%		
Bveco	V	Mean Data	9.961	9.959	9.962	9.963	9.958		
		Ratio	—	-0.026%	0.006%	0.016%	-0.033%		
Vcesat +	V	Mean Data	0.045	0.043	0.043	0.043	0.043		
		Ratio	—	—	—	—	—		
Vcesat -	V	Mean Data	0.044	0.043	0.042	0.043	0.042		
		Ratio	—	—	—	—	—		
CTR +	%	Mean Data	255.797	276.161	279.088	279.255	283.204		
		Ratio	—	7.961%	9.106%	9.171%	10.715%		
CTR -	%	Mean Data	258.371	279.767	282.610	282.791	286.812		
		Ratio	—	8.281%	9.381%	9.451%	11.008%		
ICEO	nA	Mean Data	5.764	6.094	6.117	6.217	6.190		
		Ratio	—	—	—	—	—		

Autoclave

Parameter	Unit	Item	0	pre	48				Remark
V_{F+}	V	Mean Data	1.223	1.223	1.222				Pass
		Ratio	—	-0.017%	-0.077%				
V_{F-}	V	Mean Data	1.223	1.223	1.222				
		Ratio	—	-0.007%	-0.070%				
Bvceo	V	Mean Data	135.050	134.517	134.390				
		Ratio	—	-0.394%	-0.488%				
Bveco	V	Mean Data	9.977	9.972	9.975				
		Ratio	—	-0.051%	-0.019%				
Vcesat +	V	Mean Data	0.045	0.043	0.043				
		Ratio	—	—	—				
Vcesat -	V	Mean Data	0.044	0.042	0.042				
		Ratio	—	—	—				
CTR +	%	Mean Data	255.685	278.623	298.206				
		Ratio	—	8.971%	16.630%				
CTR -	%	Mean Data	266.726	290.639	313.191				
		Ratio	—	8.965%	17.420%				
ICEO	nA	Mean Data	6.067	6.310	6.291				
		Ratio	—	—	—				

Solder Resistance

Parameter	Unit	Item	0	pre	10S				Remark
V_{F+}	V	Mean Data	1.225	1.225	1.226				Pass
		Ratio	—	0.006%	0.081%				
V_{F-}	V	Mean Data	1.226	1.226	1.227				
		Ratio	—	-0.001%	0.078%				
Bvceo	V	Mean Data	130.747	130.040	130.053				
		Ratio	—	-0.541%	-0.531%				
Bveco	V	Mean Data	9.793	9.786	9.788				
		Ratio	—	-0.067%	-0.052%				
Vcesat +	V	Mean Data	0.045	0.043	0.043				
		Ratio	—	—	—				
Vcesat -	V	Mean Data	0.044	0.042	0.042				
		Ratio	—	—	—				
CTR +	%	Mean Data	250.169	276.716	277.574				
		Ratio	—	10.611%	10.954%				
CTR -	%	Mean Data	262.841	290.336	291.009				
		Ratio	—	10.461%	10.717%				
ICEO	nA	Mean Data	6.216	6.547	6.589				
		Ratio	—	—	—				

Solder Pot

Parameter	Unit	Item	0	pre	5S				Remark
V_{F+}	V	Mean Data	1.226	1.225	1.226				Pass
		Ratio	—	-0.072%	-0.018%				
V_{F-}	V	Mean Data	1.226	1.225	1.226				
		Ratio	—	-0.070%	-0.020%				
Bvceo	V	Mean Data	128.765	128.180	128.155				
		Ratio	—	-0.454%	-0.473%				
Bveco	V	Mean Data	9.799	9.795	9.794				
		Ratio	—	-0.038%	-0.045%				
Vcesat +	V	Mean Data	0.046	0.043	0.044				
		Ratio	—	—	—				
Vcesat -	V	Mean Data	0.043	0.041	0.043				
		Ratio	—	—	—				
CTR +	%	Mean Data	239.909	266.658	268.891				
		Ratio	—	11.150%	12.081%				
CTR -	%	Mean Data	266.314	295.443	297.877				
		Ratio	—	10.938%	11.852%				
ICEO	nA	Mean Data	6.581	6.954	7.044				
		Ratio	—	—	—				

RELIABILITY TEST REPORT

Lite-on Opto Technology Co.,ltd.

Part NO：LTV-814
Product Type Photocouple

Reliability Item:

Test title	Sample size	Test Condition	Test Result	Remark
Pre-conditioning test	693	Bake in oven 125'C for 24hrs Soak in 85'C85%RH for168hrs IR-Reflow (3*Reflow peak260℃)	Pass	
High temperature operation life	77	Ta=110℃,If=20mA,Ic=30mA,1000hrs	Pass	
High temperature reverse bias	77	Ta=110℃,Vce=80V,1000hrs	Pass	
High temp High Humidity Reverse	77	Ta=85°C, 85%RH, VCE=64V, 1000hrs	Pass	
High temperature storage	77	Ta=150℃,1000hrs	Pass	
Low Temp Storage Life Test	77	Ta=-55°C, 1000 hrs	Pass	
Thermal Shock	77	125℃~-55℃,dwell time:15min 15min ,Test time1000cycle	Pass	
Autoclave	77	Temp=121°C, 100%RH and 30Psi, 168hrs	Pass	
Solder Resistance	77	Ta=260℃ 10sec	Pass	
Solder ability test	77	Ta=230℃ 5sec	Pass	

Test Item:

Parameter	Symbol	Condition	Min	Max	Unit
LED Forward Voltage	VF±	IF=20mA	-	1.4	V
Collector-emitter voltage breakdown	BVCEO	IC=0.1mA	35	-	V
Emitter-collector voltage breakdown	BVECO	IE=10μA	6	-	V
Collector-emitter saturation voltage	VCE(sat)±	IF=20mA, IC=1mA	-	0.2	V
Current Transfer Ratio	CTR±	IF=1mA, VCE=5V	100	300	%
Collector dark current	ICEO	VCE=20V	-	100	nA

Reliability criteria:

1. Reading value for each step test not over 50% Delta for VF, BVCEO, BVECO, CTR parameter.
2. Reading value for each step test not over spec limit for , ICEO and VCE(sat) parameter.
3. Short and open is criteria of Temp cycling and Autoclave test item.

Final Conclusion of reliability test:

All samples unit under test are conforming to reliability criteria.

Lab's comment:

- The value on each test item (next page) is average value from all units under test except defect sample.
- Effect this the results relate only to the items tested
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Prepared By: Guili Jia

Approved By: Wei li

Test summary table. (Average value for all units under test)

High temperature operation life

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_{F+}	V	Mean Data	1.229	1.229	1.230	1.233	1.227		Pass
		Ratio	—	0.001%	0.106%	0.317%	-0.147%		
V_{F-}	V	Mean Data	1.230	1.234	1.231	1.229	1.230		
		Ratio	—	0.333%	0.115%	-0.073%	-0.001%		
Bvceo	V	Mean Data	99.348	99.286	99.507	99.574	99.610		
		Ratio	—	-0.063%	0.160%	0.228%	0.264%		
Bveco	V	Mean Data	8.921	8.918	8.908	8.915	8.914		
		Ratio	—	-0.031%	-0.145%	-0.065%	-0.086%		
Vcesat +	V	Mean Data	0.046	0.045	0.045	0.047	0.049		
		Ratio	—	—	—	—	—		
Vcesat -	V	Mean Data	0.042	0.041	0.041	0.041	0.041		
		Ratio	—	—	—	—	—		
CTR +	%	Mean Data	236.960	243.810	255.559	228.437	214.326		
		Ratio	—	2.891%	7.849%	-3.597%	-9.552%		
CTR -	%	Mean Data	238.134	244.286	261.344	248.080	248.697		
		Ratio	—	2.583%	9.747%	4.177%	4.436%		
ICEO	nA	Mean Data	0.034	0.020	0.018	0.019	0.016		
		Ratio	—	—	—	—	—		

High temperature reverse bias

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_{F+}	V	Mean Data	1.224	1.224	1.228	1.226	1.226		Pass
		Ratio	—	-0.075%	0.283%	0.130%	0.168%		
V_{F-}	V	Mean Data	1.225	1.228	1.230	1.229	1.229		
		Ratio	—	0.202%	0.396%	0.269%	0.318%		
Bvceo	V	Mean Data	99.038	98.983	99.015	99.030	99.002		
		Ratio	—	-0.056%	-0.023%	-0.008%	-0.036%		
Bveco	V	Mean Data	8.926	8.927	8.913	8.920	8.918		
		Ratio	—	0.007%	-0.148%	-0.071%	-0.085%		
Vcesat	V	Mean Data	0.045	0.045	0.045	0.045	0.044		
		Ratio	—	—	—	—	—		
Vcesat	V	Mean Data	0.042	0.041	0.041	0.041	0.041		
		Ratio	—	—	—	—	—		
CTR +	%	Mean Data	243.442	248.798	253.721	251.927	254.075		
		Ratio	—	2.200%	4.222%	3.485%	4.368%		
CTR -	%	Mean Data	231.511	237.129	241.189	239.275	240.847		
		Ratio	—	2.427%	4.181%	3.354%	4.033%		
ICEO	nA	Mean Data	0.052	0.023	0.015	0.015	0.021		
		Ratio	—	—	—	—	—		

High temperature High humidity reverse bias

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_{F+}	V	Mean Data	1.228	1.232	1.232	1.228	1.231		Pass
		Ratio	—	0.330%	0.330%	0.009%	0.232%		
V_{F-}	V	Mean Data	1.227	1.232	1.231	1.228	1.230		
		Ratio	—	0.361%	0.274%	0.035%	0.238%		
Bvceo	V	Mean Data	99.916	99.772	99.726	99.701	99.618		
		Ratio	—	-0.144%	-0.191%	-0.215%	-0.299%		
Bveco	V	Mean Data	8.924	8.910	8.910	8.923	8.915		
		Ratio	—	-0.152%	-0.157%	-0.008%	-0.092%		
Vcesat +	V	Mean Data	0.047	0.045	0.046	0.046	0.045		
		Ratio	—	—	—	—	—		
Vcesat -	V	Mean Data	0.042	0.040	0.041	0.041	0.041		
		Ratio	—	—	—	—	—		
CTR +	%	Mean Data	240.364	255.225	255.983	250.397	254.916		
		Ratio	—	6.183%	6.498%	4.174%	6.054%		
CTR -	%	Mean Data	239.994	255.447	254.622	249.838	254.510		
		Ratio	—	6.439%	6.095%	4.102%	6.048%		
ICEO	nA	Mean Data	0.034	0.039	0.020	0.021	0.016		
		Ratio	—	—	—	—	—		

High temperature storage

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_{F+}	V	Mean Data	1.228	1.229	1.228	1.228	1.228		Pass
		Ratio	—	0.109%	-0.019%	0.019%	0.031%		
V_{F-}	V	Mean Data	1.229	1.231	1.228	1.229	1.229		
		Ratio	—	0.175%	-0.014%	0.052%	0.060%		
Bvceo	V	Mean Data	101.099	101.036	101.057	101.005	101.003		
		Ratio	—	-0.062%	-0.042%	-0.093%	-0.095%		
Bveco	V	Mean Data	8.928	8.925	8.924	8.925	8.925		
		Ratio	—	-0.037%	-0.049%	-0.038%	-0.031%		
Vcesat +	V	Mean Data	0.047	0.046	0.046	0.046	0.049		
		Ratio	—	—	—	—	—		
Vcesat -	V	Mean Data	0.043	0.042	0.043	0.043	0.046		
		Ratio	—	—	—	—	—		
CTR +	%	Mean Data	233.232	240.557	246.055	239.071	214.497		
		Ratio	—	3.141%	5.498%	2.504%	-8.032%		
CTR -	%	Mean Data	225.453	232.067	231.583	222.096	198.964		
		Ratio	—	2.934%	2.719%	-1.489%	-11.749%		
ICEO	nA	Mean Data	0.041	0.041	0.019	0.026	0.018		
		Ratio	—	—	—	—	—		

Low temperature storage

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_{F+}	V	Mean Data	1.229	1.231	1.228	1.227	1.229		Pass
		Ratio	—	0.148%	-0.059%	-0.123%	0.037%		
V_{F-}	V	Mean Data	1.229	1.231	1.228	1.227	1.229		
		Ratio	—	0.179%	-0.071%	-0.100%	0.040%		
Bvceo	V	Mean Data	99.882	99.803	99.868	99.890	99.836		
		Ratio	—	-0.079%	-0.013%	0.008%	-0.046%		
Bveco	V	Mean Data	8.943	8.938	8.943	8.945	8.942		
		Ratio	—	-0.052%	0.001%	0.021%	-0.015%		
Vcesat +	V	Mean Data	0.047	0.046	0.047	0.046	0.046		
		Ratio	—	—	—	—	—		
Vcesat -	V	Mean Data	0.043	0.042	0.042	0.042	0.042		
		Ratio	—	—	—	—	—		
CTR +	%	Mean Data	238.805	245.561	243.906	243.432	246.679		
		Ratio	—	2.829%	2.136%	1.937%	3.297%		
CTR -	%	Mean Data	234.510	240.512	237.580	238.113	241.049		
		Ratio	—	2.559%	1.309%	1.537%	2.788%		
ICEO	nA	Mean Data	0.036	0.039	0.028	0.031	0.136		
		Ratio	—	—	—	—	—		

Thermal Shock

Parameter	Unit	Item	0	pre	200	500	1000		Remark
V_{F+}	V	Mean Data	1.226	1.225	1.225	1.225	1.225		Pass
		Ratio	—	-0.066%	-0.137%	-0.117%	-0.103%		
V_{F-}	V	Mean Data	1.228	1.231	1.228	1.229	1.229		
		Ratio	—	0.257%	0.021%	0.107%	0.108%		
Bvceo	V	Mean Data	99.286	99.213	99.278	99.215	99.158		
		Ratio	—	-0.074%	-0.008%	-0.072%	-0.129%		
Bveco	V	Mean Data	8.918	8.916	8.920	8.917	8.917		
		Ratio	—	-0.021%	0.020%	-0.010%	-0.008%		
Vcesat +	V	Mean Data	0.046	0.045	0.046	0.045	0.045		
		Ratio	—	—	—	—	—		
Vcesat -	V	Mean Data	0.042	0.041	0.042	0.042	0.042		
		Ratio	—	—	—	—	—		
CTR +	%	Mean Data	241.127	249.890	244.504	245.389	245.276		
		Ratio	—	3.634%	1.401%	1.768%	1.721%		
CTR -	%	Mean Data	229.269	238.235	232.162	232.759	232.341		
		Ratio	—	3.911%	1.262%	1.522%	1.340%		
ICEO	nA	Mean Data	0.026	0.018	0.019	0.017	0.018		
		Ratio	—	—	—	—	—		

Autoclave

Parameter	Unit	Item	0	pre	48				Remark
V_{F+}	V	Mean Data	1.229	1.229	1.230				Pass
		Ratio	—	0.012%	0.123%				
V_{F-}	V	Mean Data	1.228	1.229	1.232				
		Ratio	—	0.081%	0.270%				
Bvceo	V	Mean Data	103.895	103.850	103.753				
		Ratio	—	-0.043%	-0.136%				
Bveco	V	Mean Data	8.929	8.927	8.923				
		Ratio	—	-0.022%	-0.065%				
Vcesat +	V	Mean Data	0.048	0.047	0.046				
		Ratio	—	—	—				
Vcesat -	V	Mean Data	0.044	0.043	0.042				
		Ratio	—	—	—				
CTR +	%	Mean Data	223.802	230.474	242.191				
		Ratio	—	2.982%	8.217%				
CTR -	%	Mean Data	217.924	224.760	242.874				
		Ratio	—	3.137%	11.449%				
ICEO	nA	Mean Data	0.039	0.060	1.367				
		Ratio	—	—	—				

Solder Resistance

Parameter	Unit	Item	0	pre	10S				Remark
V_{F+}	V	Mean Data	1.226	1.231	1.228				Pass
		Ratio	—	0.383%	0.160%				
V_{F-}	V	Mean Data	1.226	1.233	1.230				
		Ratio	—	0.565%	0.324%				
Bvceo	V	Mean Data	99.341	99.245	99.173				
		Ratio	—	-0.097%	-0.169%				
Bveco	V	Mean Data	8.918	8.905	8.913				
		Ratio	—	-0.140%	-0.054%				
Vcesat +	V	Mean Data	0.046	0.044	0.044				
		Ratio	—	—	—				
Vcesat -	V	Mean Data	0.042	0.041	0.041				
		Ratio	—	—	—				
CTR +	%	Mean Data	237.206	253.791	250.297				
		Ratio	—	6.992%	5.519%				
CTR -	%	Mean Data	228.095	242.229	240.540				
		Ratio	—	6.196%	5.456%				
ICEO	nA	Mean Data	0.052	0.024	0.020				
		Ratio	—	—	—				

Solder Pot

Parameter	Unit	Item	0	pre	5S				Remark
V_{F+}	V	Mean Data	1.231	1.236	1.230				Pass
		Ratio	—	0.434%	-0.047%				
V_{F-}	V	Mean Data	1.231	1.238	1.233				
		Ratio	—	0.569%	0.149%				
Bvceo	V	Mean Data	101.226	101.055	101.190				
		Ratio	—	-0.169%	-0.036%				
Bveco	V	Mean Data	8.923	8.908	8.923				
		Ratio	—	-0.167%	0.004%				
Vcesat +	V	Mean Data	0.046	0.044	0.045				
		Ratio	—	—	—				
Vcesat -	V	Mean Data	0.041	0.039	0.040				
		Ratio	—	—	—				
CTR +	%	Mean Data	239.951	255.600	248.858				
		Ratio	—	6.521%	3.712%				
CTR -	%	Mean Data	240.518	256.383	249.902				
		Ratio	—	6.596%	3.901%				
ICEO	nA	Mean Data	0.034	0.025	0.039				
		Ratio	—	—	—				

RELIABILITY TEST REPORT

Lite-on Opto Technology Co.,ltd.

Part NO： LTV-817
Product Type： Photocouple

Reliability Item:

Test title	Sample size	Test Condition	Test Result	Remark
Pre-conditioning test	693	Bake in oven 125'C for 24hrs Soak in 85'C85%RH for168hrs IR-Reflow (3*Reflow peak260℃)	Pass	
High temperature operation life	77	Ta=110℃,If=20mA,Ic=30mA,1000hrs	Pass	
High temperature reverse bias	77	Ta=110℃,Vce=80V,Vce=absolute max,1000hrs	Pass	
High temp High Humidity Reverse	77	Ta=85°C, 85%RH, VCE=64V, 1000hrs	Pass	
High temperature storage	77	Ta=150℃,1000hrs	Pass	
Low Temp Storage Life Test	77	Ta=-55°C, 1000 hrs	Pass	
Thermal Shock	77	125℃~-55℃,dwell time:15min 15min ,Test time1000cycle	Pass	
Autoclave	77	Temp=121°C, 100%RH and 30Psi, 48hrs	Pass	
Solder Resistance	77	Ta=260℃ 10sec	Pass	
Solder ability test	77	Ta=230℃ 5sec	Pass	

Test Item:

Parameter	Symbol	Condition	Min	Max	Unit
LED Forward Voltage	VF	IF=20mA	-	1.4	V
Reverse Current	IR	VR=4V	-	10	μA
Collector-emitter voltage breakdown	BVCEO	IC=0.1mA	35	-	V
Emitter-collector voltage breakdown	BVECO	IE=10μA	6	-	V
Collector-emitter saturation voltage	VCE(sat)	IF=20mA, IC=1mA	-	0.2	V
Current Transfer Ratio	CTR	IF=5mA, VCE=5V	300	600	%
Collector dark current	ICEO	VCE=20V	-	100	nA

Reliability criteria:

1. Reading value for each step test not over 50% Delta for VF, BVCEO, BVECO, CTR parameter.
2. Reading value for each step test not over spec limit for IR, ICEO and VCE(sat) parameter.
3. Short and open is criteria of Temp cycling and Autoclave test item.

Final Conclusion of reliability test:

All samples unit under test are conforming to reliability criteria.

Lab's comment:

- The value on each test item (next page) is average value from all units under test except defect sample.
- Effect this the results relate only to the items tested
- The report shall not be reproduced except in full, without the written approval of the laboratory.

Prepared By: Guili Jia

Approved By: Wei li

Test summary table. (Average value for all units under test)

High temperature operation life

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.218	1.218	1.218	1.218	1.216		Pass
		Ratio	—	0.003%	0.003%	-0.007%	-0.184%		
IR	uA	Mean Data	0.005	0.004	0.004	0.007	0.010		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	127.574	127.017	127.055	127.062	127.105		
		Ratio	—	-0.436%	-0.407%	-0.402%	-0.367%		
Bveco	V	Mean Data	10.167	10.164	10.167	10.166	10.168		
		Ratio	—	-0.033%	0.003%	-0.015%	0.006%		
Vcesat	V	Mean Data	0.040	0.039	0.039	0.040	0.041		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	385.971	417.920	407.240	390.182	357.776		
		Ratio	—	8.277%	5.511%	1.091%	-7.305%		
ICEO	nA	Mean Data	6.550	7.050	6.555	6.377	5.886		
		Ratio	—	—	—	—	—		

High temperature reverse bias

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.224	1.225	1.225	1.225	1.224		Pass
		Ratio	—	0.067%	0.068%	0.089%	-0.022%		
IR	uA	Mean Data	0.003	0.004	0.004	0.003	0.005		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	124.719	124.254	124.316	124.322	124.337		
		Ratio	—	-0.373%	-0.323%	-0.319%	-0.307%		
Bveco	V	Mean Data	10.171	10.166	10.172	10.170	10.172		
		Ratio	—	-0.053%	0.013%	-0.008%	0.009%		
Vcesat	V	Mean Data	0.041	0.040	0.039	0.039	0.039		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	384.294	415.935	421.351	422.320	418.820		
		Ratio	—	8.234%	9.643%	9.895%	8.984%		
ICEO	nA	Mean Data	7.091	7.559	7.759	7.727	7.341		
		Ratio	—	—	—	—	—		

High temperature High humidity reverse bias

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.218	1.219	1.220	1.220	1.218		Pass
		Ratio	—	0.023%	0.108%	0.115%	-0.026%		
IR	uA	Mean Data	0.002	0.003	0.004	0.003	0.005		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	130.633	130.220	130.710	130.700	130.720		
		Ratio	—	-0.316%	0.059%	0.051%	0.067%		
Bveco	V	Mean Data	10.131	10.129	10.135	10.135	10.138		
		Ratio	—	-0.018%	0.044%	0.040%	0.071%		
Vcesat	V	Mean Data	0.041	0.040	0.039	0.039	0.039		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	383.740	416.976	431.936	437.671	443.327		
		Ratio	—	8.661%	12.559%	14.054%	15.528%		
ICEO	nA	Mean Data	8.173	8.455	4.900	5.082	5.264		
		Ratio	—	—	—	—	—		

High temperature storage

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.216	1.216	1.219	1.217	1.217		Pass
		Ratio	—	0.002%	0.220%	0.132%	0.068%		
IR	uA	Mean Data	0.004	0.005	0.004	0.005	0.003		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	129.946	129.538	129.460	129.503	129.512		
		Ratio	—	-0.314%	-0.374%	-0.341%	-0.334%		
Bveco	V	Mean Data	10.153	10.151	10.150	10.153	10.153		
		Ratio	—	-0.016%	-0.029%	-0.001%	0.004%		
Vcesat	V	Mean Data	0.040	0.039	0.038	0.040	0.042		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	389.816	421.257	430.440	410.724	384.328		
		Ratio	—	8.065%	10.421%	5.363%	-1.408%		
ICEO	nA	Mean Data	8.459	8.882	8.814	9.027	8.677		
		Ratio	—	—	—	—	—		

Low temperature storage

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.219	1.220	1.221	1.220	1.219		Pass
		Ratio	—	0.065%	0.185%	0.085%	-0.011%		
IR	uA	Mean Data	0.003	0.004	0.006	0.003	0.003		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	131.629	131.187	131.112	131.161	131.236		
		Ratio	—	-0.336%	-0.393%	-0.355%	-0.299%		
Bveco	V	Mean Data	10.140	10.138	10.143	10.145	10.147		
		Ratio	—	-0.022%	0.022%	0.044%	0.064%		
Vcesat	V	Mean Data	0.042	0.040	0.040	0.040	0.040		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	383.500	413.385	417.168	417.275	416.058		
		Ratio	—	7.793%	8.779%	8.807%	8.490%		
ICEO	nA	Mean Data	8.050	8.314	8.109	8.245	7.723		
		Ratio	—	—	—	—	—		

Thermal Shock

Parameter	Unit	Item	0	pre	200	500	1000		Remark
V_F	V	Mean Data	1.219	1.219	1.220	1.220	1.220		Pass
		Ratio	—	-0.016%	0.093%	0.066%	0.099%		
IR	uA	Mean Data	0.003	0.003	0.004	0.004	0.006		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	130.302	129.902	129.847	129.820	129.801		
		Ratio	—	-0.307%	-0.349%	-0.370%	-0.384%		
Bveco	V	Mean Data	10.152	10.153	10.153	10.153	10.152		
		Ratio	—	0.011%	0.008%	0.009%	0.001%		
Vcesat	V	Mean Data	0.041	0.040	0.039	0.039	0.039		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	386.075	414.118	429.258	432.860	436.012		
		Ratio	—	7.264%	11.185%	12.118%	12.934%		
ICEO	nA	Mean Data	8.523	8.882	8.773	8.845	8.882		
		Ratio	—	—	—	—	—		

Autoclave

Parameter	Unit	Item	0	pre	48				Remark
V_F	V	Mean Data	1.220	1.220	1.224				Pass
		Ratio	—	0.061%	0.356%				
IR	uA	Mean Data	0.004	0.003	0.005				
		Ratio	—	—	—				
Bvceo	V	Mean Data	130.719	130.296	130.068				
		Ratio	—	-0.323%	-0.498%				
Bveco	V	Mean Data	10.144	10.143	10.135				
		Ratio	—	-0.014%	-0.091%				
Vcesat	V	Mean Data	0.042	0.041	0.039				
		Ratio	—	—	—				
CTR	%	Mean Data	381.906	406.269	435.549				
		Ratio	—	6.379%	14.046%				
ICEO	nA	Mean Data	8.450	8.736	8.355				
		Ratio	—	—	—				

Solder Resistance

Parameter	Unit	Item	0	pre	10S				Remark
V_F	V	Mean Data	1.214	1.214	1.215				Pass
		Ratio	—	0.048%	0.110%				
IR	uA	Mean Data	0.004	0.004	0.003				
		Ratio	—	—	—				
Bvceo	V	Mean Data	131.890	131.431	131.381				
		Ratio	—	-0.348%	-0.386%				
Bveco	V	Mean Data	10.172	10.171	10.173				
		Ratio	—	-0.011%	0.012%				
Vcesat	V	Mean Data	0.042	0.041	0.041				
		Ratio	—	—	—				
CTR	%	Mean Data	382.281	412.992	420.608				
		Ratio	—	8.034%	10.026%				
ICEO	nA	Mean Data	8.364	8.786	8.641				
		Ratio	—	—	—				

Solder Pot

Parameter	Unit	Item	0	pre	5S				Remark
V_F	V	Mean Data	1.215	1.216	1.216				Pass
		Ratio	—	0.077%	0.096%				
IR	uA	Mean Data	0.003	0.003	0.004				
		Ratio	—	—	—				
Bvceo	V	Mean Data	133.214	132.778	132.772				
		Ratio	—	-0.327%	-0.332%				
Bveco	V	Mean Data	10.165	10.163	10.169				
		Ratio	—	-0.023%	0.038%				
Vcesat	V	Mean Data	0.043	0.041	0.041				
		Ratio	—	—	—				
CTR	%	Mean Data	382.493	414.175	419.978				
		Ratio	—	8.283%	9.800%				
ICEO	nA	Mean Data	8.591	8.882	8.845				
		Ratio	—	—	—				

RELIABILITY TEST REPORT

Lite-on Opto Technology Co.,ltd.

Part NO： LTV-817
Product Type Photocoupler

Reliability Item:

Test title	Sample size	Test Condition	Test Result	Remark
Pre-conditioning test	693	Bake in oven 125'C for 24hrs Soak in 85'C85%RH for168hrs IR-Reflow (3*Reflow peak260℃)	Pass	
High temperature operation life	77	Ta=110℃,If=20mA,Ic=30mA,1000hrs	Pass	
High temperature reverse bias	77	Ta=110℃,Vce=80V,Vce=absolute max,1000hrs	Pass	
High temp High Humidity Reverse	77	Ta=85°C, 85%RH, VCE=64V, 1000hrs	Pass	
High temperature storage	77	Ta=150℃,1000hrs	Pass	
Low Temp Storage Life Test	77	Ta=-55°C, 1000 hrs	Pass	
Thermal Shock	77	125℃~-55℃,15min 15min ,Test time1000cycle	Pass	
Autoclave	77	Temp=121°C, 100%RH and 30Psi,	Pass	
Solder Resistance	77	Ta=260℃ 10sec	Pass	
Solder ability test	77	Ta=230℃ 5sec	Pass	

Test Item:

Parameter	Symbol	Condition	Min	Max	Unit
LED Forward Voltage	VF	IF=20mA	-	1.4	V
Reverse Current	IR	VR=-4V	-	10	µA
Collector-emitter voltage breakdown	BVCEO	IC=0.1mA	35	-	V
Emitter-collector voltage breakdown	BVECO	IE=10µA	6	-	V
Collector-emitter saturation voltage	VCE(sat)	IF=20mA, IC=1mA	-	0.2	V
Current Transfer Ratio	CTR	IF=5mA, VCE=5V	50	600	%
Collector dark current	ICEO	VCE=20V	-	100	nA

Reliability criteria:

1. Reading value for each step test not over 50% Delta for VF, BVCEO, BVECO, CTR parameter.
2. Reading value for each step test not over spec limit for IR, ICEO and VCE(sat) parameter.
3. Short and open is criteria of Temp cycling and Autoclave test item.

Final Conclusion of reliability test:

All samples unit under test are conforming to reliability criteria.

Lab's comment:

- The value on each test item (next page) is average value from all units under test except defect sample.
- Effect this the results relate only to the items tested
- The report shall not be reproduced except in full, without the written approval of the laboratory.

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Approved By: Wei li

Test summary table. (Average value for all units under test)

High temperature operation life

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.220	1.221	1.221	1.223	1.235		Pass
		Ratio	—	0.076%	0.121%	0.252%	1.265%		
IR	uA	Mean Data	0.003	0.003	0.003	0.003	0.003		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	100.309	100.277	100.373	100.349	100.332		
		Ratio	—	-0.032%	0.063%	0.040%	0.023%		
Bveco	V	Mean Data	8.934	8.932	8.933	8.934	8.933		
		Ratio	—	-0.023%	-0.015%	0.004%	-0.012%		
Vcesat	V	Mean Data	0.052	0.050	0.050	0.049	0.051		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	306.142	324.480	326.323	329.196	326.267		
		Ratio	—	5.990%	6.592%	7.531%	6.574%		
ICEO	nA	Mean Data	20.547	20.253	17.483	17.706	17.275		
		Ratio	—	—	—	—	—		

High temperature reverse bias

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.220	1.220	1.221	1.222	1.227		Pass
		Ratio	—	0.039%	0.108%	0.184%	0.573%		
IR	uA	Mean Data	0.003	0.004	0.003	0.004	0.004		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	99.883	99.878	99.977	99.953	99.921		
		Ratio	—	-0.005%	0.094%	0.070%	0.038%		
Bveco	V	Mean Data	8.859	8.857	8.858	8.859	8.858		
		Ratio	—	-0.019%	-0.010%	0.006%	-0.011%		
Vcesat	V	Mean Data	0.049	0.048	0.047	0.047	0.048		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	350.822	367.378	366.760	370.615	370.665		
		Ratio	—	4.719%	4.543%	5.642%	5.656%		
ICEO	nA	Mean Data	21.568	21.337	19.656	20.073	20.327		
		Ratio	—	—	—	—	—		

High temperature High humidity reverse bias

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.220	1.221	1.221	1.223	1.238		Pass
		Ratio	—	0.060%	0.102%	0.231%	1.524%		
IR	uA	Mean Data	0.004	0.004	0.003	0.003	0.004		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	100.168	100.142	100.061	100.059	100.061		
		Ratio	—	-0.026%	-0.107%	-0.109%	-0.107%		
Bveco	V	Mean Data	8.911	8.909	8.911	8.912	8.914		
		Ratio	—	-0.025%	-0.005%	0.007%	0.030%		
Vcesat	V	Mean Data	0.049	0.048	0.047	0.047	0.047		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	351.678	369.764	378.255	385.124	388.841		
		Ratio	—	5.143%	7.557%	9.510%	10.567%		
ICEO	nA	Mean Data	20.538	20.465	19.878	20.341	20.718		
		Ratio	—	—	—	—	—		

High temperature storage

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.220	1.221	1.221	1.223	1.247		Pass
		Ratio	—	0.085%	0.110%	0.285%	2.229%		
IR	uA	Mean Data	0.003	0.003	0.003	0.004	0.004		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	99.900	99.891	99.896	99.868	99.912		
		Ratio	—	-0.008%	-0.004%	-0.031%	0.012%		
Bveco	V	Mean Data	8.852	8.850	8.851	8.858	8.872		
		Ratio	—	-0.021%	-0.015%	0.068%	0.219%		
Vcesat	V	Mean Data	0.049	0.048	0.048	0.049	0.051		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	355.119	372.762	362.838	351.783	324.245		
		Ratio	—	4.968%	2.174%	-0.939%	-8.694%		
ICEO	nA	Mean Data	21.688	21.417	20.940	22.031	32.974		
		Ratio	—	—	—	—	—		

Low temperature storage

Parameter	Unit	Item	0	pre	168	500	1000		Remark
V_F	V	Mean Data	1.219	1.219	1.220	1.222	1.234		Pass
		Ratio	—	0.021%	0.097%	0.243%	1.196%		
IR	uA	Mean Data	0.005	0.004	0.003	0.003	0.003		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	100.103	100.092	99.967	99.895	99.909		
		Ratio	—	-0.012%	-0.136%	-0.208%	-0.194%		
Bveco	V	Mean Data	8.912	8.910	8.911	8.914	8.912		
		Ratio	—	-0.022%	-0.009%	0.018%	0.003%		
Vcesat	V	Mean Data	0.050	0.048	0.048	0.047	0.048		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	344.902	362.975	367.864	373.334	372.415		
		Ratio	—	5.240%	6.657%	8.243%	7.977%		
ICEO	nA	Mean Data	21.043	21.099	18.452	20.619	20.740		
		Ratio	—	—	—	—	—		

Thermal Shock

Parameter	Unit	Item	0	pre	100	200	500	800	1000	Remark
V_F	V	Mean Data	1.220	1.220	1.219	1.220	1.221	1.223	1.222	Pass
		Ratio	—	0.016%	-0.067%	-0.025%	0.064%	0.277%	0.155%	
IR	uA	Mean Data	0.004	0.004	0.004	0.004	0.003	0.004	0.003	
		Ratio	—	—	—	—	—	—	—	
Bvceo	V	Mean Data	100.132	100.132	100.043	99.998	99.947	99.881	99.888	
		Ratio	—	0.001%	-0.089%	-0.133%	-0.184%	-0.250%	-0.243%	
Bveco	V	Mean Data	8.912	8.910	8.910	8.910	8.911	8.913	8.912	
		Ratio	—	-0.025%	-0.027%	-0.027%	-0.022%	0.009%	-0.007%	
Vcesat	V	Mean Data	0.049	0.048	0.048	0.048	0.048	0.047	0.048	
		Ratio	—	—	—	—	—	—	—	
CTR	%	Mean Data	350.652	367.961	367.813	366.561	366.549	367.134	368.188	
		Ratio	—	4.936%	4.894%	4.537%	4.533%	4.700%	5.001%	
ICEO	nA	Mean Data	20.435	20.746	20.475	20.803	19.006	19.647	20.692	
		Ratio	—	—	—	—	—	—	—	

Autoclave

Parameter	Unit	Item	0	pre	48	96	168		Remark
V_F	V	Mean Data	1.220	1.220	1.220	1.224	1.224		Pass
		Ratio	—	0.026%	-0.005%	0.337%	0.390%		
IR	uA	Mean Data	0.003	0.004	0.003	0.004	0.003		
		Ratio	—	—	—	—	—		
Bvceo	V	Mean Data	99.980	99.974	99.590	99.504	99.566		
		Ratio	—	-0.005%	-0.390%	-0.476%	-0.414%		
Bveco	V	Mean Data	8.881	8.878	8.878	8.881	8.923		
		Ratio	—	-0.029%	-0.030%	0.004%	0.478%		
Vcesat	V	Mean Data	0.050	0.048	0.047	0.050	0.050		
		Ratio	—	—	—	—	—		
CTR	%	Mean Data	347.132	364.258	410.450	394.806	403.158		
		Ratio	—	4.934%	18.240%	13.734%	16.140%		
ICEO	nA	Mean Data	21.032	21.178	23.279	23.736	44.568		
		Ratio	—	—	—	—	—		

Solder Resistance

Parameter	Unit	Item	0	pre	10S				Remark
V_F	V	Mean Data	1.220	1.220	1.220				Pass
		Ratio	—	-0.041%	-0.036%				
IR	uA	Mean Data	0.003	0.004	0.002				
		Ratio	—	—	—				
Bvceo	V	Mean Data	99.759	99.759	99.738				
		Ratio	—	0.000%	-0.021%				
Bveco	V	Mean Data	8.838	8.836	8.836				
		Ratio	—	-0.020%	-0.015%				
Vcesat	V	Mean Data	0.050	0.048	0.048				
		Ratio	—	—	—				
CTR	%	Mean Data	344.534	361.057	360.296				
		Ratio	—	4.796%	4.575%				
ICEO	nA	Mean Data	21.646	21.965	24.743				
		Ratio	—	—	—				

Solder Pot

Parameter	Unit	Item	0	pre	5S				Remark
V_F	V	Mean Data	1.220	1.220	1.220				Pass
		Ratio	—	-0.017%	-0.029%				
IR	uA	Mean Data	0.004	0.003	0.002				
		Ratio	—	—	—				
Bvceo	V	Mean Data	99.707	99.683	99.641				
		Ratio	—	-0.024%	-0.066%				
Bveco	V	Mean Data	8.838	8.836	8.836				
		Ratio	—	-0.023%	-0.020%				
Vcesat	V	Mean Data	0.050	0.048	0.048				
		Ratio	—	—	—				
CTR	%	Mean Data	349.856	368.457	368.589				
		Ratio	—	5.317%	5.355%				
ICEO	nA	Mean Data	21.638	21.962	27.225				
		Ratio	—	—	—				