



# Test Report: ICL-28L

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28A AC Inrush Current Limiter

## ■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control Function Test

Component Stress Test

## ■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

## ■ RELIABILITY TEST

ENVIRONMENT TEST

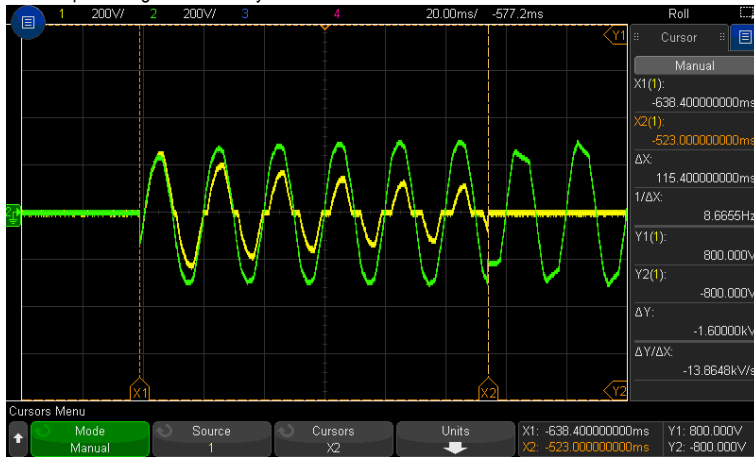
DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	AC CONTINUOUS RATED CURRENT	28A continuous	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST:OK
2	ALLOWED CAPACITIVE LOAD	6000μ F max.	I/P : 230 VAC O/P : 6000μ F Ta : 25°C	TEST:OK
3	INTERNAL RELAY LIMITING TIME (TON POWER ON)	230VAC/150±50ms	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 115.4ms

INPUT=230VAC/50HZ @ FULL LOAD

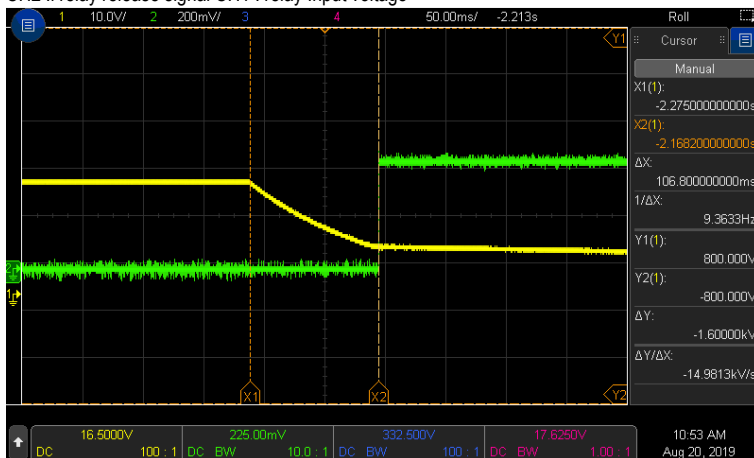
CH2 : INput Voltage CH1 :relay



4	INTERNAL RELAY RELEASE TIME	230VAC/100±50ms	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/106.8 ms
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INPUT=230VAC/50HZ @ FULL LOAD

CH2 : i relay release signal CH1 : relay Input voltage



### INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~264VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	135V~264V
			I/P: LOW-LINE-3V=177 V HIGH-LINE+15%=300 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST:OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P:180 VAC ~264 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK
3	INRUSH CURRENT (Typ.)	230V/ 48A	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I=45.6A/ 230VAC
<p>INPUT=230VAC/50HZ @ FULL LOAD CH2 :input Voltage CH4 :relay Current</p> <p>Ch2 200 V 4ms M4.00ms A Ch4 1.20 A Ch4 20.0 A 66.80 %</p>				
4	NO LOAD CONSUMPTION	<2 W	I/P : 264VAC O/P : NO LOAD Ta : 25°C	1.56W

### COMPONENT STRESS TEST

1	Input Capacitor Voltage	C5 Rated: 220 $\mu$ / 35V	I/P:High-Line +3V =267V O/P: (1)Full Load input on/off (2) Min load input on /Off Ta:25°C	(1) 27.5V (2) 27.5V (3) 27.5v
2	RELAY	RY1 Rated: 36V	I/P:High-Line +3V =267V O/P: (1)Full Load input on/off (2) Min load input on /Off Ta:25°C	(1) 27.5V (2) 27.5V (3) 27.5V

### PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INTERNAL PROTECTION	Protection type : Thermal fuse protects overload and fire	I/P: 230VAC O/P:FULL LOAD	TEST:OK

### E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 <input type="checkbox"/> CLASS A	I/P:230VAC/50HZ O/P:FULL LOAD Ta:25°C	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL
2	CONDUCTION	<input checked="" type="checkbox"/> EN55032 <input type="checkbox"/> EN55011 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	<input checked="" type="checkbox"/> EN55032 <input type="checkbox"/> EN55011 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 Level 3 AIR: 8KV / Contact: 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	<input checked="" type="checkbox"/> CRITERIA A <input type="checkbox"/> CRITERIA B
5	E.F.T	EN61000-4-4 Level 3	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	<input checked="" type="checkbox"/> CRITERIA A <input type="checkbox"/> CRITERIA B
6	SURGE	IEC61000-4-5 Level 4 L-N : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	<input checked="" type="checkbox"/> CRITERIA A <input type="checkbox"/> CRITERIA B
7	Test by certified Lab & Test Report Prepare Any contradictions of the test results, please refer to the latest EMC test report			

## RELIABILITY TEST

### ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																								
1	TEMPERATURE RISE TEST	MODEL : ICL-28L 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 23.4 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 61.9 °C																																																										
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=23.4°C</th> <th>HIGH AMBIENT Ta=61.9°C</th> </tr> </thead> <tbody> <tr><td>1</td><td>ZNR1</td><td>63.2°C</td><td>95.7°C</td></tr> <tr><td>2</td><td>C1</td><td>62.0°C</td><td>93.8°C</td></tr> <tr><td>3</td><td>FS1</td><td>60.3°C</td><td>90.7°C</td></tr> <tr><td>4</td><td>R8</td><td>60.5°C</td><td>90.1°C</td></tr> <tr><td>5</td><td>BD1</td><td>59.2°C</td><td>89.5°C</td></tr> <tr><td>6</td><td>ZD2</td><td>60.8°C</td><td>90.4°C</td></tr> <tr><td>7</td><td>C5</td><td>62.0°C</td><td>91.5°C</td></tr> <tr><td>8</td><td>ZD7</td><td>71.3°C</td><td>99.7°C</td></tr> <tr><td>9</td><td>Q2</td><td>70.7°C</td><td>99.8°C</td></tr> <tr><td>10</td><td>ZD1</td><td>71.5°C</td><td>100.3°C</td></tr> <tr><td>11</td><td>RY1</td><td>76.4°C</td><td>101.7°C</td></tr> <tr><td>12</td><td>C2</td><td>61.8°C</td><td>89.1°C</td></tr> <tr><td>13</td><td>PCB</td><td>69.9°C</td><td>98.5°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta=23.4°C	HIGH AMBIENT Ta=61.9°C	1	ZNR1	63.2°C	95.7°C	2	C1	62.0°C	93.8°C	3	FS1	60.3°C	90.7°C	4	R8	60.5°C	90.1°C	5	BD1	59.2°C	89.5°C	6	ZD2	60.8°C	90.4°C	7	C5	62.0°C	91.5°C	8	ZD7	71.3°C	99.7°C	9	Q2	70.7°C	99.8°C	10	ZD1	71.5°C	100.3°C	11	RY1	76.4°C	101.7°C	12	C2	61.8°C	89.1°C	13	PCB	69.9°C	98.5°C
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : 100 % LOAD Ta= -35 °C	TEST : OK																																																								



3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60 °C /95 %R.H NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta= 60 °C HUMIDITY= 95 %R.H	TEST : OK
4	TEMPERATURE COEFFICIENT	± 0.03 %/°C (0~60°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.0005%/°C (0~60°C)
5	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°C~ +90°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : STATIC		TEST : OK
6	THERMAL SHOCK TEST	1. Thermal shock Temperature : -35°C~ +65°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 16 CYCLE 5. Input/Output condition : 15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:230V/ FULL LOAD Burn In Test		TEST : OK
7	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 3G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK
8	CAPACITOR LIFE CYCLE	SUPPOSE C5 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 60 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 60 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 60 °C LIFE TIME		(1) 163978 HRS (2) 20356 HRS (3) 38249 HRS (4) 55613 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 1626.62K hrs min. MIL-HDBK-217F (25°C)		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	LIUTT		WANGDZ

2018.4.30 GP-A50-F010