



## Schedule of Scope to Certificate of Approval

### Independent Testing Laboratory

IECQ Certificate No.: IECQ-L JQAJP 13.0002

CB Certificate No.: JQAQ0002-001-T

Schedule Number: IECQ-L JQAJP 13.0002-S

Rev No.: 5

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### TESTD PARTS

Fixed capacitor, Fixed resistor, Potentiometer, Varistor, Thermistor, Connector, Relay, Switch, Printed circuit board, Semiconductor Devices, Semiconductor Integrated Circuit and Optical Component

### ENVIRONMENTAL TEST

IEC 60068-2-1:2013	Cold
IEC 60068-2-2:2007	Dry heat
IEC 60068-2-11:1981	Salt mist
IEC 60068-2-14:2009	Change of temperature
IEC 60068-2-20:2008	Test methods for solderability and resistance to soldering heat of devices with leads
IEC 60068-2-30:2005	Damp heat, cyclic (12+12-hour cycle)
IEC 60068-2-38:2009	Composite temperature/humidity cyclic test
JIS C 60068-2-42:1993	Sulphur dioxide test for contacts and connections
JIS C 60068-2-43:1993	Hydrogen sulphide test for contacts and connections
IEC 60068-2-45:1980	Immersion in cleaning solvents
IEC 60068-2-52:1996	Salt mist, cyclic (sodium chloride solution)
IEC 60068-2-54:2006	Soldering. Solderability testing by the wetting balance method
IEC 60068-2-58:2004	Test methods for solderability, resistance to dissolution of metallization and to soldering heat of SMD
IEC 60068-2-60:1995	Flowing mixed gas corrosion test
IEC 60068-2-66:1994	Damp heat, steady state (unsaturated pressurized vapour)
IEC 60068-2-78:2012	Damp heat, steady state
MIL STD 202G	Test method standard electronic and electrical component parts
MIL STD 883J	Test method standard microcircuits

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#### MECHANICAL TEST

IEC 60068-2-6:2007	Vibration (sinusoidal)
IEC 60068-2-21:2006	Robustness of terminations and integral mounting devices
IEC 60068-2-27:2008	Shock
IEC 60068-2-31:2008	Rough handling shocks, primarily for equipment-type specimens
IEC 60068-2-53:2010	Tests and Guidance: Combined climatic (temperature/humidity) and dynamic (vibration/shock) tests

#### STRESS TEST

JEITA ED-4701/302:2013

Environmental and endurance test methods for semiconductor devices  
(Stress test I-2)

Test method 304A	Human body model electrostatic discharge (HBM/ESD)
Test method 305C	Charged device model electrostatic discharge (CDM/ESD)
Test method 306B	Latch-up

JEITA ED-4701/600:2013

Environmental and endurance test methods for semiconductor devices  
(Specific test for discrete semiconductors)

Test method 601	Power cycling test (Molding type)
Test method 602	Power cycling test (Non-molding type/short time)
Test method 603	Power cycling test (Non-molding type/long time)

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### LED OPTICAL CHARACTERISTIC TEST

JIS C 7801:2009	Measuring methods of lamps for general lighting
JIS C 8152-1:2012	Photometry of white light emitting diode for general lighting – Part 1: LED packages
JIS C 8152-2:2012	Photometry of white light emitting diode for general lighting – Part 2: LED modules and LED light engines
JIS C 8105-5:2011	Luminaires – Part 5: Gonio-photometric method

### OTHER TEST

Failure Analysis, Construction Analysis, Elemental Analysis, Thermal Analysis and Internal Gas Analysis of Electronic component, including Electrical Analysis, NDE (Non-destructive Engineering), Physical Analysis, Chemical Analysis and Sample Preparation (Decap, X-section, etc),

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### MEASUREMENT RANGE

Passive component

Type / Part name	Measurable property value	Measuring range
Fixed capacitor	(1)Voltage endurance (DC)	: AC,DC 0 ~ 5kV
	(2)Insulation resistance	: $5 \times 10^5 \Omega \sim 10^{14} \Omega$
	(3)leakage current	: $1 \times 10^{-3} \sim 10 \text{ A}^{-11}$
	(4)Capacitance	: 18pF ~ 1F*
	(5)Dielectric loss tangent(D factor)	: 10 <sup>-1</sup> min
	(6)Impedanc	: $1 \Omega \sim 10^* \text{ M}\Omega$
	(7)Temperature properties and gap of the capacitance.	: Temperature range -40°C ~ +150°C
Attention : * The mark varies according to measurement frequency.		
Fixed resistor	(1)Resistance value	: 1 $\Omega$ ~ 100M $\Omega$
	(2)Resistance temperature properties and gap of the resistance level.	: Temperature range -55°C ~ +150°C
	(3)Voltage factor	: $\pm 0.02\%/V$
	(4)Insulation resistance	: $5 \times 10^5 \Omega \sim 2 \times 10^{14} \Omega$
	(5)Voltage endurance	: AC,DC 0 ~ 5kV
Variable resistor *potentiometer	(1)Resistance value	: 1 $\Omega$ ~ 100M $\Omega$
	(2)Mutual deviations	: $\pm 3\%$
	(3)Resistance temperature properties and gap of the resistance level.	: Temperature range -40°C ~ +150°C
	(4)Insulation resistance	: $5 \times 10^5 \Omega \sim 10^{14} \Omega$
	(5)Voltage endurance	: AC,DC 0 ~ 5kV
	(6)Rotational noise	: Noise voltage 1mV
	(7)Intensive contact resistance	: 1 m $\Omega$
Varistor	Voltage at reference current	: 1500V(1mA min)
Thermistor	(1)resistance value	: 1 $\Omega$ ~ 1000k $\Omega$
	(2)The thermistor fixed number	: Temperature range -50°C ~ +300°C

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### MEASUREMENT RANGE

Active component part [Individual semiconductor part]

Type / Part name	Measurable property value	Measuring range
Transistor *Bipolar	(1)Collector-base breakdown voltage	:1V ~ 1.5kV
	(2)Collector-emitter breakdown voltage	:1V ~ 1.5kV
	(3)Emitter base breakdown voltage	:100V min
	(4)Collector base interception electric current	:1nA ~ 100mA
	(5)Collector emitter interception electric current	:1nA ~ 100mA
	(6)Emitter base interception electric current	:1nA ~ 100mA
	(7)The collector emitter saturation voltage	:7V min ( $I_C < 17A$ )
	(8)DC current gain	:25 ~ 25,000 ( $I_C < 17A$ )
Transistor *Field effect form	(1)Gate source breakdown voltage	:1V ~ 1.5kV
	(2)Gate leak electric current	:1pA ~ 100mA
	(3)Drain current	:1nA ~ 1A
	(4)The gate cut-off voltage	: ~ 100V
	(5)The drain source saturation voltage	:7V min ( $I_D < 17A$ )
Diode *Small signal *I rectify a small electric current *Constant voltage *Small electric current switching	(1)Forward voltage	:7V min ( $I_F < 17A$ )
	(2)Reverse current	:1na ~ 100mA ( $V_R < 100V$ )
	(3)Breakdown voltage	:1V ~ 1.5kV
	(4)Zener voltage	:100V min
	(5)Dynamic resistance	:50Ω max
	(6)Temperature coefficient	:Temperature range -55°C ~ +150°C
Thyristor *3 reverse-blocking terminals *Small electric current	(1)Off electric current	:1mA ( $V_L < 1kV$ )
	(2)Reverse current	:1na ~ 1mA ( $V_L < 1kV$ )
	(3)ON-state voltage	:7V ( $I_{TM} < 10A$ )
	(4)Gate trigger	:1000V min
	(5)Holding current	:10A ( $V_{TM} < 7V$ )

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### MEASUREMENT RANGE

Active component part Semiconductor Devices [Integrated circuit]

Type / Part name	Measurable property value	Measuring range
TTL IC	(1)The high-level output voltage	:±30V
	(2)The low-level output voltage	:±30V
	(3)The input clamp voltage	:±30V
	(4)High-level input electric current	:±300mA
	(5)Low-level input electric current	:±300mA
	(6)Output short circuit current	:±300mA
	(7)High-level power supply electric current	:±300mA
	(8)Low-level power supply electric current	:±300mA
CMOS IC	(1)The high-level output voltage	:±30V
	(2)The low-level output voltage	:±30V
	(3)The high-level input voltage	:±20V
	(4)Low-level input electric current	:±20V
	(5)High-level output electric current	:±300mA
	(6)Low-level output electric current	:±300mA
	(7)Static consumption electric current	:±300mA
	(8)Input current	:±300mA
Analog semiconductor integrated circuit *Monolithic op-amp	(1)Input-offset voltage	:10μV ~ 128mV
	(2)Input offset current	:20pA ~ 16μA
	(3)Input bias current	:20pA ~ 16μA
	(4)Open loop voltage gain	:0.1V/mV ~ 1.2V/μV
	(5)The max power voltage	:10mV ~ 50V
	(6)Power consumption	:5mW ~ 6.4W
	(7)Common mode rejection ratio	:38 ~ 116dB
	(8)Supply voltage rejection ratio	:38 ~ 116dB
	(9)Aspect input voltage range	:100mV ~ 25V
	(10)Slew rate	:0.1 ~ 125V/μS

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### MEASUREMENT RANGE

Mechanical device

Type / Part name	Measurable property value	Measuring range
Connector (Electronic equipment use)	(1)Insulationresistanc	: $5 \times 10^5 \Omega \sim 2 \times 10^{14} \Omega$
	(2)Withstand voltage	:AC,DC 0 ~ 5kV
	(3)Contact resistance under low voltage, the low electric current	: $1 \text{m}\Omega \sim 100 \Omega$
	(4)Chattering of the contact.	:1μsec max
Relay (Small form for control)	(1)Withstand voltage	:AC,DC 0 ~ 5kV
	(2)Insulation resistance	: $5 \times 10^5 \Omega \sim 2 \times 10^{14} \Omega$
	(3)Direct current resistance of the coil	: $1 \Omega \sim 10 \text{k}\Omega$
	(4)Contact resistance	: $1 \text{m}\Omega \sim 100 \Omega$
	(5)Operating voltage	:1V max
	(6)Must-release voltage	:1V max
	(7)Operation time	:1msec max
	(8)Recovery time	:1msec max
	(9)Bounces of the point of contact	:1μsec max
	(10)Chattering of the point of contact	:1μsec max
Switch (Electronic equipment use)	(1)Contact resistance	: $1 \text{m}\Omega \sim 100 \Omega$
	(2)Insulation resistance	: $5 \times 10^5 \Omega \sim 2 \times 10^{14} \Omega$
	(3)Withstand voltage	: AC,DC 0 ~ 5kV
	(4)Electrostatic capacity	:18pF ~ 1F
	(5)Change of the contact resistance	: $1 \text{m}\Omega$ max
Printed circuit board	(1)Resistance of the plating part of the conductor and through hall part.	: $1 \text{m}\Omega \sim 1000 \Omega$
	(2)Withstand voltage	: AC,DC 0 ~ 5kV
	(3)Insulation resistance	: $5 \times 10^5 \Omega \sim 10^{14} \Omega$

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Optical component

Type / Part name	Measurable property value	Measuring range
Luminescent diode (It is for indication.)	(1)Forward voltage (2)Reverse current (3)Luminous intensity(Relative value)	:7V min :1mA min :----
LED (It is for illumination.)	1.Integrating sphere (1)Total luminous flux[lm]  (2)Color temperature[K] (3)Chromaticity coordinate (4)The number of the color rendering evaluations :Ra,R1 ~ R14  2.The light distribution measurement. (1)Light distribution curve  (2)Light intensity(Reference)  (3)Color temperature (4)Chromaticity coordinate (5)The number of the color rendering evaluations : Ra,R1 ~ R14	:Measurable wavelength range 350nm ~ 1000nm :F[lm] :min 32lm ~ In sunshine :---- :---- :---- :---- :Measurable wavelength range 360nm ~ 830nm :Photometric distance 2m ~ 12m, :Photometric distance Luminous intensity :2.0m : 9 ~ 3,680,000[cd] :3.0m : 20 ~ 8,200,000[cd] :6.0m : 83 ~ 33,000,000[cd] :12m : 330 ~ 132,000,000[cd] :---- :----

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