Schedule of Scope to Certificate of Approval

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TESTD PARTS

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

ENVIRONMENTAL TEST

IEC 60068-2-1:2007	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 60068-2-53:2010	Tests and Guidance: Combined climatic (temperature/humidity) and dynamic (vibration/shock) tests
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)
JIS C 60068-2-78:2004	Damp heat, steady state
JIS D 0205:1987	Test method of weatherability for automotive parts
JIS K 6259:1993	Rubber, vulcanized or thermoplastics - Determination of ozone resistance
MIL STD 202G:2002	Test method standard electronic and electrical component parts
MIL STD 883J:2014	Test method standard microcircuts

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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

STRESS TEST

IEC 61340-3-1:2006/EIAJ ED-4701 Test Method 304
Human Body Model Electrostatic Discharge (HBM/ESD)
IEC 61340-3-2:2006/EIAJ ED-4701 Test Method 305
Charged Device Model Electrostatic Discharge (CDM/ESD)
EIAJ ED-4701 Test Method 306 (Latch-Up)

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, Sample Preparation (Decap, X-section, etc), NDE (Non-destructive Engineering), Physical & Chemical Analysis.

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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 ×10^5Ω ~ 10^{14}Ω
	(3)leakage current	: 1×10^{-3} ~ 10 A^{-11}
	(4)Capacitance	: 18pF ~ 1F *
	(5)Dielectric loss tangent(D factor)	: 10^* min
	(6)Impedanc	: 1Ω ~ 10^*MΩ
	(7)Temperature properties and gap of the capacitance.	: Temperature range -40℃ ~ +150℃□
	Attention□:□* The mark varies according to measurement frequency.	
Fixed register	(1)Resistance value	:1Ω ~ 100MΩ
	(2)Resistance temperature properties and gap of the resistance level.	:Temperature range -55℃ ~ +150℃
	(3)Voltage factor	:±0.02%/V
	(4)Insulation resistance	: 5 ×10^5Ω ~ 2×0^{14}Ω
	(5)Voltage endurance	: AC,DC 0 ~ 5kV
Variable resistor *potentiometer	(1)Resistance value	: 1Ω ~ 100MΩ
	(2)Mutual deviations	: ±3%
	(3)Resistance temperature properties and gap of the resistance level.	:Temperature range -40℃ ~ +150℃
	(4)Insulation resistance	: 5 ×10^5Ω ~ 10^{14}Ω
	(5)Voltage endurance	: AC,DC 0 ~ 5kV
	(6)Rotational noise	:Noise voltage 1mV
	(7)Intensive contact resistance	:1 mΩ
Varistor	Voltage at reference current	:1500V(1mA min)
Thermistor	(1)resistance value	:1Ω ~ 1000kΩ
	(2)The thermistor fixed number	:Temperature range -50℃ ~ +300℃

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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℃ ~ +150℃
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 Semicondctor 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× $10^5\Omega \sim 2\times10^{14}\Omega$
	(2)Withstand voltage	:AC,DC 0 ~ 5kV
	(3)Contact resistance under low voltage, the low electric current	:1mΩ ~ 100Ω
	(4)Chattering of the contact.	:1μsec max
Relay□ (Small form for control)	(1)Withstand voltage	:AC,DC 0 ~ 5kV
	(2)Insulation resistance	:5× $10^5\Omega \sim 2\times10^{14}\Omega$
	(3)Direct current resistance of the coil	:1Ω ~ 10kΩ
	(4)Contact resistance	:1mΩ ~ 100Ω
	(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	:1mΩ ~ 100Ω
	(2)Insulation resistance	:5×$10^5\Omega \sim 2\times10^{14}\Omega$
	(3)Withstand voltage	: AC,DC 0 ~ 5kV
	(4)Electrostatic capacity	:18pF ~ 1F
	(5)Change of the contact resistance	:1mΩ max
Printed circuit board	(1)Resistance of the plating part of the conductor and through hall part.	:1mΩ ~ 1000Ω
	(2)Withstand voltage	: AC,DC 0 ~ 5kV
	(3)Insulation resistance	: 5×$10^5\Omega \sim 10^{14}\Omega$

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MEASUREMENT RANGE

Optical component

Type / Part name	Measurable property value Measuring range
Luminescent diode (It is for indication.)	(1)Forward voltage :7V min (2)Reverse current :1mA min (3)Luminous intensity(Relative value) :----
LED (It is for illumination.)	1.Integrating sphere (1)Total luminous flux[lm] :Measurable wavelength range 350nm ~ 1000nm :F[lm] :min 32lm ~ In sunshine (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 :Measurable wavelength range 360nm ~ 830nm :Photometric distance 2m ~ 12m, • (2)Light intensity(Reference) :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] (3)Color temperature • : ---- (4)Chromaticity coordinate • :---- (5)The number of the color rendering evaluations : • Ra,R1 ~ R14