TOS5052

WITHSTANDING VOLTAGE TESTER

AC5kV
Transformer Capacity: 500 VA
Rise Time Control

Outline

TOS5052 is a special tester designed for withstand-voltage testing of electronic equipment and components conforming to various official safety standards. In addition to having an output of 5 kV AC at 100 mA, this model permits output voltage presetting, selection of output frequency (50 or 60 Hz), and rise-time control to control time for voltage to reach a preset level.

The display uses a large, high-brightness, color fluorescent tube for clear display of numbers, operation status, results, and other information.

For fast and accurate testing, the TOS5052 permits dual-axis operation of the test voltage range selector switch and voltage setting knob, and separate up-down keys for determination current and timer settings. Easier to use than ever before, the TOS5052 also incorporates various safety and security features, including key lock, interlock, high-voltage output terminals limiting the number of insertion holes, and large "DANGER" warning lamps. These features make using the TOS5052 safe and reliable.

Features

■ CONFORMITY TO VARIOUS STANDARDS

TOS5052 can perform withstand voltage tests of electronic equipment and components according to various current overseas standards, including UL, CSA, and BS, as well as Japan's Electrical Appliance Control Act and the JIS.

■ RISE-TIME CONTROL

The UL-type approval test and IEC require gradual voltage rise to a specified level. The rise-time control function of TOS5052 can automatically increase test voltage to a specified level as required by these standards.

■ HIGH-OUTPUT TEST VOLTAGE

TOS5052 has a high-capacity power supply with a maximum rated output of 500 VA (5 kV at 100 mA). (Maximum test time: 30 min)

■ ACCEPTANCE DETERMINATION BY THE WINDOW COMPARATOR METHOD

TOS5052 issues a FAIL result when it detects a current below the lower-limit reference value or a leak current over the upper-limit reference value set on the panel. This permits a wide range of reliable testing, including tests for disconnected and defective lead contacts.

Specifications

■ Output block

Output voltage range	0.50 kV to 5.00 kVAC (100 mA output possible range)
Voltage setting range	0.00 to 2.95 kV/0.00 to 5.45 kV, 2 ranges (3-digit digital setting)
Setting accuracy	±(2% of setting + 2 digits) at 0.20 kV or higher with no load
Resolution	10V
Maximum rated output *1	500VA (5kV/100mA)
Transformer capacity	500VA
Output voltage waveform *2	Sine wave
Distortion factor	Output voltage of 0.5 kV or higher: 2% or less (under no load or resistive load)
Frequency	50 or 60 Hz selectable (0.5% of setting, except during voltage rise)
Voltage regulation	9% or less (maximum rated load to no load)
Output type	PWM switching
Output voltage monitoring function	Output is shut off and protection is effected when the output voltage exceeds the set value plus 200V."kV" blinks when the output voltage falls below the set voltage minus 100V.

■ Output voltmeter

Analog

Scale	5kV f.s
Accuracy	±5% f.s
Indication	Mean-value response/rms-value indication

Digital

Accuracy	±1.5% f.s the measured voltage does not change within the digital voltmeter's response time.
Response	Mean-value response/rms-value indication (400 ms response time)
Hold function	The voltage measured at the end of test is held during the PASS or FAIL interval.

■ Ammeter

Digital

Measuring range	0.00 to 110mA
Accuracy	±(5% of upper cutoff current+ 20μA) when the measured current does not change within the digital ammeter's response time.
Response	Mean-value response/rms-value indication (400 ms response time)
Hold function	The current measured at the end of test is held during the PASS interval.

■ Judgement function

Judgement system	Window comparator system •FAIL is judged when a current greater than the upper cutoff current is detected. •FAIL is judged when a current smaller than the lower cutoff current is detected. •OUTPUT is shut off and FAIL SIGNAL is generated when FAIL is judged. •PASS SIGNAL is generated when no anomaly is found within the set time.
Upper cutoff current range	0.1 to 110mA
Lower cutoff current range	0.1 to 110mA The TOS5052 makes no lower pass/fail judgment while the voltage is rising and for approximately 0.2s after the voltage is made constant.
Judgement accuracy *3	±(5% of upper cutoff current +20μA)
Current detection method	Absolute value of current is integrated and compared against the reference value.
Calibration	The root mean square value of sine wave is calibrated using the pure resistive load.

Illuminators and LEDs

PASS	Lit for approximately 0.2 s when PASS is judged. Held on when PASS HOLD is enabled.
UPPER FAIL	Lit when a current greater than the upper cutoff current is detected and FAIL is judged.
LOWER FAIL	Lit when a current smaller than the lower cutoff current is detected and FAIL is judged.
Buzzer	•Turned on for approximately 0.2 s when PASS is judged. •Held on in the following cases: PASS is judged when PASS HOLD is enabled. UPPER FAIL is judged. LOWER FAIL is judged. The volume of the FAIL or PASS buzzer may be adjusted. The volume setting is common to both FAIL and PASS conditions because the same adjuster is used.

■ Time

Voltage rise time

Range	0.1 to 99.9s 0.1s step
Accuracy	±20ms

Test time

Range	0.3 to 999 s(TIMER OFF function available)
Accuracy	±20ms

■ Remote

5-pin DIN connector on the front panel
Start/stop control is achieved remotely using options.
•Remote controller: RC01-TOS, RC02-TOS
•High-voltage test probe: HP01A-TOS, HP02A-TOS
(Valid only when the test voltage is 4 kVAC.)

■ Signal I/O

14-pin Amphenol connector on the rear panel
Output signal
•Indicate the state of the TOS5052.
Input signal
•Shut off the output in conjunction with an external device via the INTERLOCK function.
•Turns on and off the output using a make contact such as a relay or switch.

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Specifications

■ Status Signal Output
The following modes are selected using the DIP switches on the rear panel (logical sum is taken when two or more modes are selected):

1. H.V ON
2. TEST
3. PASS
4. U FAIL
5. L FAIL
6. READY
7. PROTECTION
8. POWER ON

100 VAC is generated when the TOS5052 enters the selected state (100 VAC is generated even the AC line input range was changed).

Output type	Triode AC switch output
Output voltage	Approx. 100 V AC
Leak current	1 mA or less.
Maximum output current	0.3A
Isolation	1200 VAC, 1 second

■ Test Mode
The following special modes are selected using the DIP switches on the rear panel
1. DOUBLE ACTION
2. PASS HOLD
3. MOMENTARY
4. FAIL MODE
5. ON:60Hz/OFF:50Hz

■ Environment

Warranty range	
Temperature	5 to 35°C
Humidity	20 to 80% RH (non condensing)
Operating range	
Temperature	0 to 40°C
Humidity	20 to 80% RH (non condensing)
Storage range	
Temperature	-20 to 70°C
Humidity	90% RH or less (non condensing)

■ Power requirement

Allowable voltage range	90V to 110V The following power voltage options are factory options: (104V to 125V)(194V to236V) (207V to 250V)
Power consumption	
No load time (READY)	150 VA or less
Rated load time	1,000 VA max.
Allowable frequency range	45Hz to 65Hz

■ Insulation resistance — 30MΩ min. (500VDC), between AC line and chassis

■ Withstanding voltage — 1,200V AC (1 second), between AC line and chassis

■ Ground continuity — 25 A AC/0.1Ω max.

■ EMC *4 — Complied with the following standards
European Community Requirements (89/336/EEC)
EN 55011
Radiated Emissions Class A
Conducted Emissions Class A
EN50082-1
IEC801-2 Electro-static Discharge
IEC801-3 Radiated Susceptibility
IEC801-4 Fast Burst Transient
Under following conditions
1. Used HV test leadwires which is supplied.
2. No discharge in testing.
3. Used the shielded cable which length is less than three meters when the SIGNAL I/O is used.

■ Safety*4 — Complied with the following standards
•European Community Requirements (73/23/EEC)

■ Dimensions (maximum) — 320 (330) W×132 (150) H×420 (485) Dmm

■ Weight — Approx. 22 kg

■ Accessories

AC Power cable	1 piece.
High-voltage test leadwire TL01-TOS (1.5 m)	1 set
14-pin Amphenol plug	1 piece., assembly type
"DANGER HIGH VOLTAGE" sticker	1 sheet
AC power fuse	2 pieces. (2 fuses in the fuse holder including a spare fuse)
Operation manual	1 copy

*1 Pay attention to the limitations on output voltage delivery time as follows:
The heat dissipation of the high voltage generator section of the TOS5052 is one half of the normal wattage with respect to the rated output in view of size, weight, and cost of the TOS5052. Be sure to operate the TOS5052 within the limits shown in the below tables. If you operate the TOS5052 exceeding limits, the thermal fuse in the TOS5052 may blow out.

Ambient temperature t (°C)	Upper cutoff current I (mA)	Pause time	Maximum allowable continuous test time
t≤40°C (t≤104°F)	50<I≤100	No less than test time	≤30 minutes
	I≤50	Not required	Infinite

*2 Test voltage waveform
When an AC test voltage is applied to a capacitive load, it is possible that the voltage becomes higher even than that when in the no load state. Furthermore, waveform distortion also may occur if the capacitance of the load is voltage-dependent (such as of ceramics capacitors). When the test voltage is not higher than 1.5 kV and the capacitance is not larger than 1000 pF, such test voltage changes are only of negligible levels.
As the output type of the high-voltage generator block of the TOS5052 is PWM switching, switching noise and spike noise that the test voltage includes increase when the test voltage is 500 V or less. The lower the test voltage is, the more the waveform distortion increases.

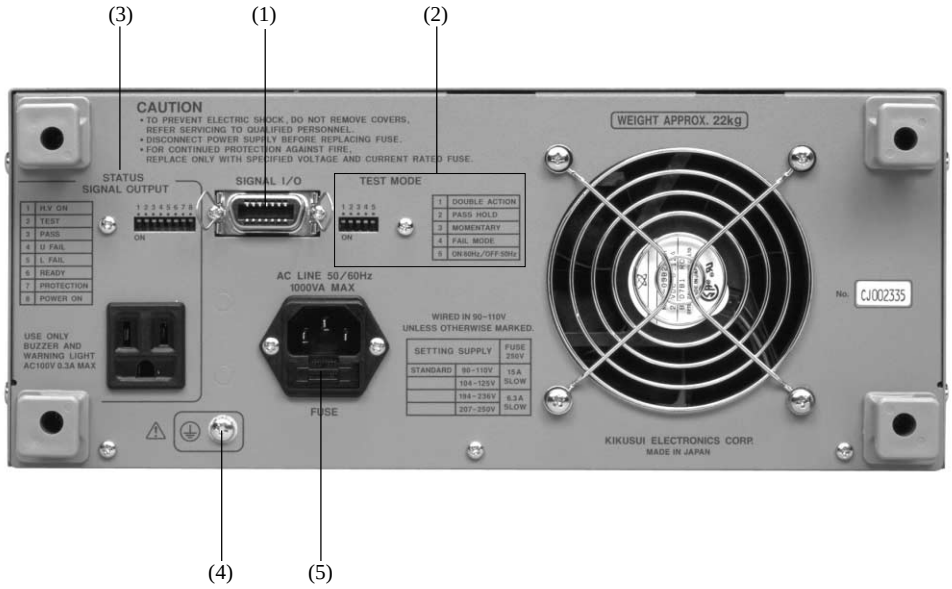
*3 A current that flows through the stray capacitance on the measurement leads or fixtures may cause measurement errors. The total judgment accuracy is sum of this current and the above-mentioned judgement accuracy. Approximate values of such currents are shown in the following table. Note that, in high-sensitivity high-voltage test, the current which flows through the stray capacitances may become larger than the preset lower cutoff current and the lower pass/fail judgment may not be successfully done.

Output voltage	1kV	2kV	3kV	4kV	5kV
When 350-mm-long test leadwires are used being suspended in air	2μA	4μA	6μA	8μA	10μA
When accessory test leadwires TL01-TOS are used (typical)	16μA	32μA	48μ A	64μA	80μA

When other test leadwires than the above are used, the values of the currents may differ depending on the conditions.

*4 CE marking are put only on the products sold in Europe.

Rear panel



(1)Signal I/O
Input/output connectors for interlock function input/output signals, start/stop remote control input signals and status output signal.

(2)Test Mode Switch
This DIP switch is used to select the five modes, namely, DOUBLE ACTION, PASS HOLD, MOMENTARY, FAIL MODE, and 50/60Hz.

(3)Status Signal Output Terminal
This output receptacle delivers a 100 VAC signal to drive an optional light unit or a buzzer unit. 100 VAC is delivered when the TOS5052 enters the mode that are selected with the DIP switches.

(4)Ground Terminal

(5)Line Input Terminal (integrated with fuse holder)

