

Ultra-High-Power Resistors

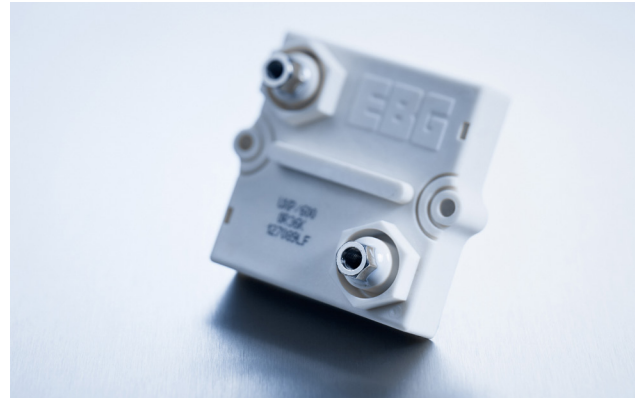
Series UXP-600

600 W resistor, US Patent-No. 5,355,281

For variable speed drives, power supplies, control devices, robotics, motor control and other power designs, the easy mounting fixture assures an auto-calibrated pressure to the cooling plate of about 120 to 160 N.

Features

- 600 W operating power
- Tolerance range $\pm 10\%$ to $\pm 5\%$ (tighter on special request)
- Ohmic range 0.1 Ω to 1.5 M Ω (higher value on special request)
- Non-Inductive design
- ROHS compliant
- High insulation & partial discharge performance
- Materials in accordance with UL 94 V-0



Technical Specifications

| | |
|--|--|
| Resistance value | 0.1 Ω \leq 0.2 Ω (HC-version) > 0.2 Ω \leq 1.5 M Ω (higher value on special request) |
| Resistance tolerance | $\pm 10\%$ to $\pm 5\%$ $\pm 2\%$ to $\pm 1\%$ on special request for limited ohmic value with the reduction of the max. power / pulse rating (ask for details) |
| Temperature coefficient | ± 500 ppm/ $^{\circ}$ C (0.1 Ω \leq 0.2 Ω) Standard ± 150 ppm/ $^{\circ}$ C (> 0.2 Ω \leq 1.5 M Ω) Standard lower TCR on special request for limited ohmic value |
| Power rating | 600 W at 85 $^{\circ}$ C bottom case temperature |
| Short time overload | 1,000 W at 70 $^{\circ}$ C for 10sec., $\Delta R = 0.4\%$ max. |
| Maximum working voltage | 5,000 V DC \approx 3,500 V AC RMS (50 Hz) higher voltage on request, not exceeding max. power |
| Electric strength voltage | 7 kVrms / 50 Hz / 500 VA, test time 1 min. (up to 12 kVrms on request) voltages above 10 kVrms are tested at DC equivalent to avoid pre damage of component |
| Partial discharge | 4 kVrms < 10 pC (up to 7 kVrms < 10 pC on request) acc. to IEC 60270 |
| Peak current | up to 1,500 A depending on pulse length and frequency (ask for details) |
| Insulation resistance | > 10 G Ω at 1,000 V |
| Single shot voltage | up to 12 kV norm wave (1.5/50 μ sec) |
| Creeping distance | > 42mm (standard, higher on request) |
| Air distance | > 14mm (standard, higher on request) |
| Inductance | ≥ 80 nH (typical), measuring frequency 10 kHz |
| Capacity/mass | ≥ 110 pF (typical), measuring frequency 10 kHz |
| Capacity/parallel | ≥ 40 pF (typical), measuring frequency 10 kHz |
| Operating temperature | -55 $^{\circ}$ C to +155 $^{\circ}$ C |
| Mounting - max. torque for contacts | 2 Nm |
| Mounting - max. torque | 1.8 Nm M4 screws |
| Contacts | standard M5 (M4 on special request) connection screw thread max. 7mm |
| Internal Temperature Sensor | PT-1000 / PT-100 / Type K / Type J (ask for details) |
| Cable variation | HV-cable / Flying leads (ask for details) |
| Weight | ~ 120 g |

General Specifications

Electric support

Alumina ceramic metalized with EBG ALTOX film on the bottom for improved heat transfer and optimum discharge

Encapsulation

Resin-filled epoxy casing with large creeping distance to mass, large air distance between the terminals and high insulation resistance (CTI 600)

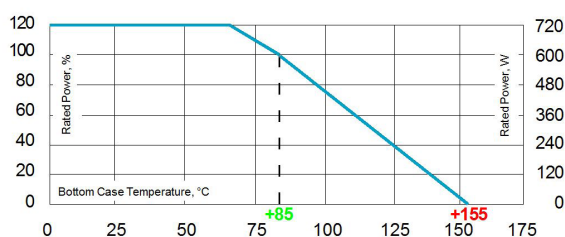
Resistance Element

Special design for low inductance and capacitance values. The element employs our special METOXFILM, which demonstrates stability while covering high wattage and pulse loading

Contacts

- Easy load connection with M4 and M5 screws (Inch thread terminals on request)
- Connector height available from 25 to 42 mm
- Various sleeves for increasing creeping distance up to 85 mm or potted cable connections are available on request

Power Rating



Please note most all of our UXP customers have their own custom designed drawing. Therefore please do not hesitate to discuss your special needs with the local representative or contact us directly.

Derating (thermal resist.) UXP-600 8.33 W/K (0.12K/W)
Power rating: 600 W at 85 $^{\circ}$ C bottom case temperature*
Please ask for detailed mounting procedure!

* This value is only applicable when using a thermal conduction to the heat sink $R_{th-cs} < 0.025$ K/W. This value can be obtained by using a thermal transfer compound with a heat conductivity of at least 1 W/mK. The flatness of the cooling plate must be better than 0.05 mm overall. Surface roughness should not exceed 6.4 μ m.

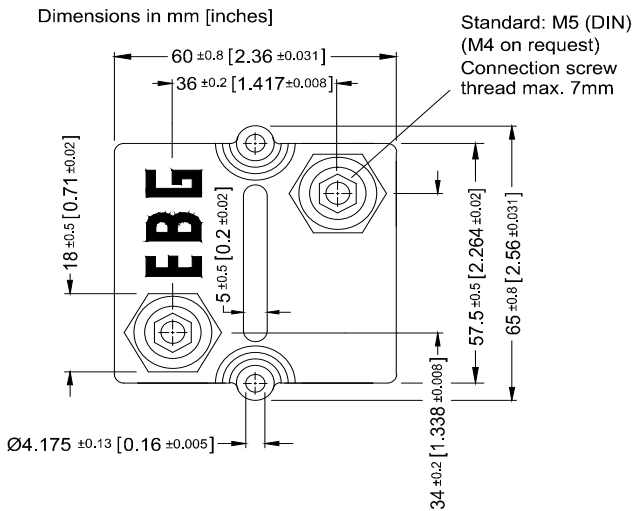
The above spec. sheet features our standard products. For further options please contact our local EBG representative or contact us directly.

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Dimensions



How to make a request

■ Standard terminal

UXP-600_Ohmic Value_Tolerance_Terminal Height_Contact

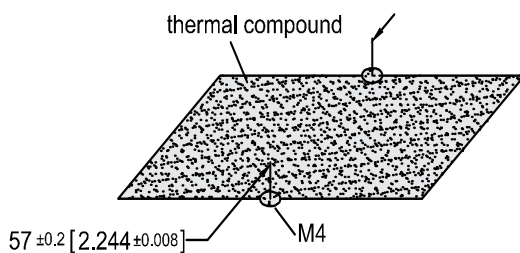
For example

UXP-600 5R 10% 30/32 M5

■ Examples for optional terminals

UXP-600 5R 10% 25/25 M5 or UXP-600-7 5R 10%

Borehole Distance



Test Specifications*

| Test | Method | Tolerance Drift** |
|--------------------------------|----------------------------|-------------------|
| Short time overload | 1,000 W/10sec. | 0.40% |
| Humidity steady state | 56 days/40°C/95% | 0.25% |
| Temp. Cycling | -55/+125/5cycles | 0.20% |
| Shock | 40g/4,000 times | 0.25% |
| Vibrations | 2-500Hz/10g | 0.25% |
| Load life 3,000cyl | PN 30 min. on / 30 min off | 0.40% |
| Terminal strengths f. contacts | 200N | 0.05% |

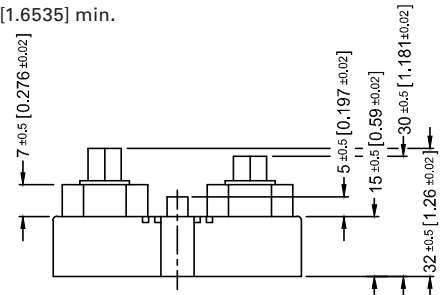
Standard Terminals

Air distance: 14mm [0.5512] min.

Creeping distance: 42mm [1.6535] min.

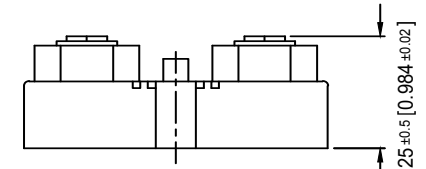
Terminal height 30/32

Standard



Terminal height 25/25

Optional



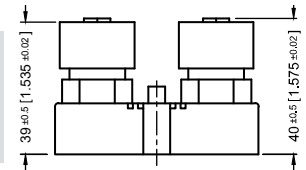
Terminal Options (for increased air & creeping distances)

Other terminal dimensions available, contact for more information

UXP-600-9

Air distance: 25mm [0.984] min.

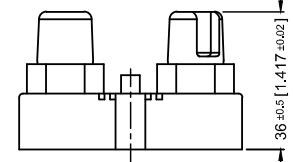
Creeping distance: 83mm [3.267] min.



UXP-600-7

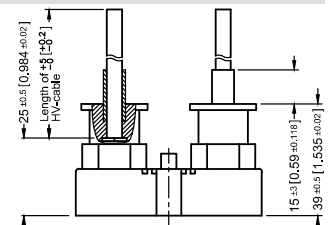
Air distance: 26.7mm [1.0512] min.

Creeping distance: 50mm [1.968] min.



UXP-600-8

Air and creeping distance depends on length of HV-cable



* The test methods are according to IEC 60068-2

** The tolerance drift is the possible change of the resistance value because of the certain test

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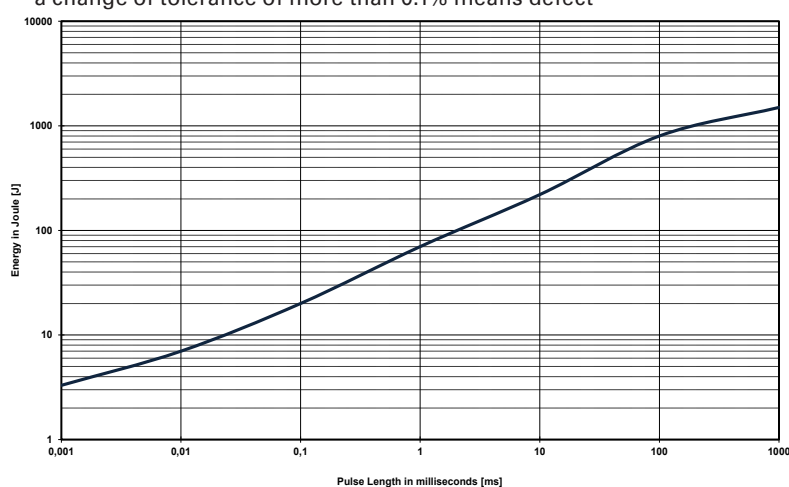
Pulse Energy Curve (typical rating)

Empirical tested at a UXP-600 3R2 10% resistor. The energy capability will vary depending on the ohmic value of the resistor

Test procedure

Every test resistor was mounted with thermal compound (0.9W/mK) on a water cooled heatsink

- Constant inlet water temperature: +50°C
- The test time of each tested resistor: 10min.
- Break time between two pulses: 1sec.
- To determine good / defect parts the ohmic value was measured before and after tests: a change of tolerance of more than 0.1% means defect



Description of Pulse Energy Curve

- Shape of pulse = e-function
- Time between two pulses = 1 second
- Pulse length [ms] = time constant of 1 tau (1 means tau = 1ms)

Example

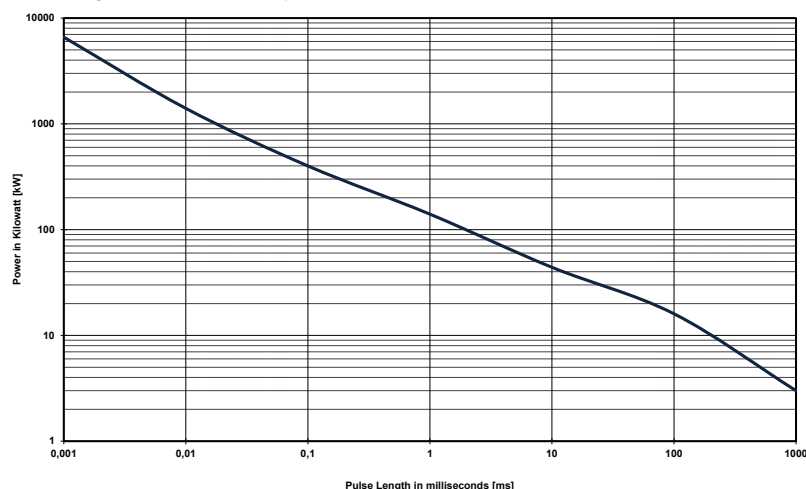
At 0.1ms tau the UXP-600 with 3R2 can withstand an energy level of 20J when the pulse pause time is $\geq 1s$

At a symmetrical frequency > 1 kHz at pulse length $\geq 10 \mu\text{sec}$. the maximum applied pulse energy for UXP-600 is a result out of the nominal power 600 W divided by the operating frequency (at 85°C bottom case) ($E = 600 \text{ W} / F$)

Power Curve (typical rating)

The power curve shows the max. possible power which can be applied for a certain duration.

Referring to the same test procedure as described above.



Description of Pulse Energy Curve

- Shape of pulse = e-function
- Time between two pulses = 1 second
- Pulse length [ms] = time constant of 1 tau (1 means tau = 1ms)

Example

For the time-constant of 10ms you can apply about 40kW, if the time between two such peaks is $\geq 1s$

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