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SEMICONDUCTOR



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## AON7430-MS

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Product specification

## Description

The AON7430-MS uses advanced trench technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

## Features

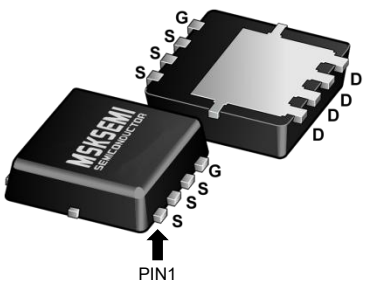
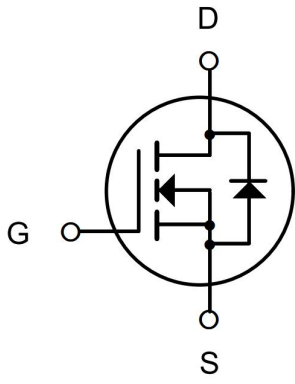

VDS = 30V ID =30 A

RDS(ON) < 13mΩ @ VGS=10V

## Application

- Battery protection
- Load switch
- Uninterruptible power supply

## Reference News

| PACKAGE OUTLINE   | N-Channel MOSFET   | Marking  |
|---|--|--|
|  <p>DFN3X3-8L</p> |  |  |

## Absolute Maximum Ratings (TC=25°C unless otherwise specified)

| Symbol      | Parameter  | Rating     | Units |
|-------------|--|------------|-------|
| VDS         | Drain-Source Voltage                             | 30         | V     |
| VGS         | Gate-Source Voltage                              | ±20        | V     |
| Id@Tc=25°C  | Continuous Drain Current, VGS @ 10V <sup>1</sup> | 30         | A     |
| Id@Tc=100°C | Continuous Drain Current, VGS @ 10V <sup>1</sup> | 18         | A     |
| IDM         | Pulsed Drain Current <sup>2</sup>                | 55         | A     |
| EAS         | Single Pulse Avalanche Energy <sup>3</sup>       | 22.1       | mJ    |
| IAS         | Avalanche Current                                | 21         | A     |
| Pd@Tc=25°C  | Total Power Dissipation <sup>4</sup>             | 20         | W     |
| TSTG        | Storage Temperature Range                        | -55 to 150 | °C    |
| TJ          | Operating Junction Temperature Range             | -55 to 150 | °C    |
| RθJA        | Thermal Resistance Junction-ambient <sup>1</sup> | 75         | °C/ W |
| RθJC        | Thermal Resistance Junction-Case <sup>1</sup>    | 6          | °C/ W |

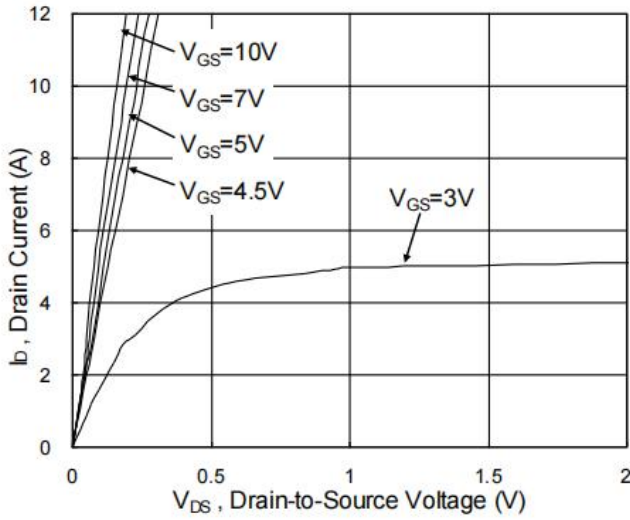
**Electrical Characteristics** (T<sub>J</sub>=25 °C, unless otherwise noted)

| Symbol                              | Parameter                                      | Conditions   | Min. | Typ.  | Max.  | Unit  |
|-------------------------------------|--|--|------|-------|-------|-------|
| BV <sub>DSS</sub>                   | Drain-Source Breakdown Voltage                 | V <sub>GS</sub> =0V , I <sub>D</sub> =250uA  | 30   | ---   | ---   | V     |
| ΔBV <sub>DSS</sub> /ΔT <sub>J</sub> | BVDSS Temperature Coefficient                  | Reference to 25°C , I <sub>D</sub> =1mA  | ---  | 0.022 | ---   | V/°C  |
| R <sub>DS(ON)</sub>                 | Static Drain-Source On-Resistance <sup>2</sup> | V <sub>GS</sub> =10V , I <sub>D</sub> =10A   | ---  | 8     | 13    | mΩ    |
|                                     |  | V <sub>GS</sub> =4.5V , I <sub>D</sub> =5A   | ---  | 12    | 20    |       |
| V <sub>GS(th)</sub>                 | Gate Threshold Voltage                         | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA                                   | 1.0  | ---   | 2.5   | V     |
| ΔV <sub>GS(th)</sub>                | V <sub>GS(th)</sub> Temperature Coefficient    |  | ---  | -5.1  | ---   | Mv/°C |
| I <sub>DSS</sub>                    | Drain-Source Leakage Current                   | V <sub>DS</sub> =24V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C                          | ---  | ---   | 1     | uA    |
|                                     |  | V <sub>DS</sub> =24V , V <sub>GS</sub> =0V , T <sub>J</sub> =55°C                          | ---  | ---   | 5     |       |
| I <sub>GSS</sub>                    | Gate-Source Leakage Current                    | V <sub>GS</sub> = ± 20V , V <sub>DS</sub> =0V  | ---  | ---   | ± 100 | nA    |
| g <sub>fs</sub>                     | Forward Transconductance                       | V <sub>DS</sub> =5V , I <sub>D</sub> =1A   | ---  | 4.5   | ---   | S     |
| R <sub>g</sub>                      | Gate Resistance                                | V <sub>DS</sub> =0V , V <sub>GS</sub> =0V , f=1MHz   | ---  | 2.5   | ---   | Ω     |
| Q <sub>g</sub>                      | Total Gate Charge (4.5V)                       | V <sub>DS</sub> =20V , V <sub>GS</sub> =4.5V , I <sub>D</sub> =10A                         | ---  | 7.2   | ---   | nC    |
| Q <sub>gs</sub>                     | Gate-Source Charge                             |  | ---  | 1.4   | ---   |       |
| Q <sub>gd</sub>                     | Gate-Drain Charge                              |  | ---  | 2.2   | ---   |       |
| T <sub>d(on)</sub>                  | Turn-On Delay Time                             | V <sub>DD</sub> =12V , V <sub>GS</sub> =10V ,<br>R <sub>G</sub> =3.3<br>I <sub>D</sub> =5A | ---  | 4.1   | ---   | ns    |
| T <sub>r</sub>                      | Rise Time                                      |  | ---  | 9.8   | ---   |       |
| T <sub>d(off)</sub>                 | Turn-Off Delay Time                            |  | ---  | 15.5  | ---   |       |
| T <sub>f</sub>                      | Fall Time                                      |  | ---  | 6.0   | ---   |       |
| C <sub>iss</sub>                    | Input Capacitance                              | V <sub>DS</sub> =15V , V <sub>GS</sub> =0V , f=1MHz  | ---  | 572   | ---   | pF    |
| C <sub>oss</sub>                    | Output Capacitance                             |  | ---  | 81    | ---   |       |
| C <sub>rss</sub>                    | Reverse Transfer Capacitance                   |  | ---  | 65    | ---   |       |
| I <sub>s</sub>                      | Continuous Source Current <sup>1,5</sup>       | V <sub>G</sub> =V <sub>D</sub> =0V , Force Current   | ---  | ---   | 28    | A     |
| I <sub>SM</sub>                     | Pulsed Source Current <sup>2,5</sup>           |  | ---  | ---   | 55    | A     |
| V <sub>SD</sub>                     | Diode Forward Voltage <sup>2</sup>             | V <sub>GS</sub> =0V , I <sub>S</sub> =1A , T <sub>J</sub> =25°C                            | ---  | ---   | 1.2   | V     |

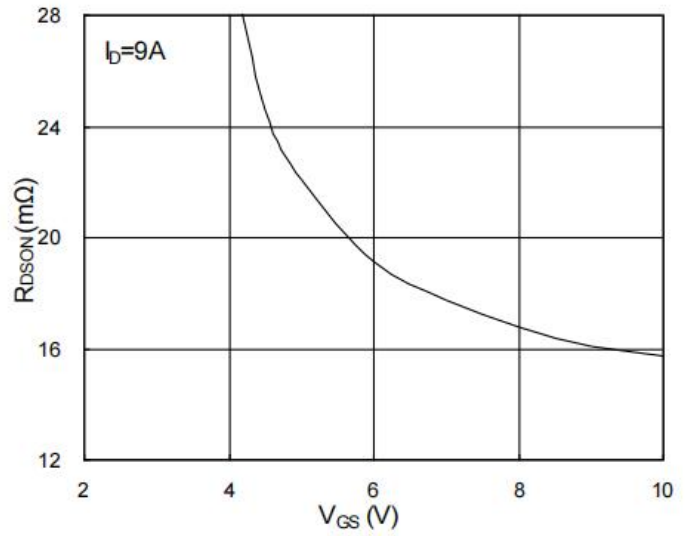
**Note :**

- The data tested by surface mounted on a 1 inch<sup>2</sup>FR-4 board with 2OZ copper.
- The data tested by pulsed , pulse width ≅ 300us , duty cycle ≅ 2%
- The EAS data shows Max. rating . The test condition is V<sub>DD</sub>=25V,V<sub>GS</sub>=10V,L=0.1mH,I<sub>AS</sub>=21A
- The power dissipation is limited by 150°C junction temperature 5.The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub> , in real applications , should be limited by total power dissipation.

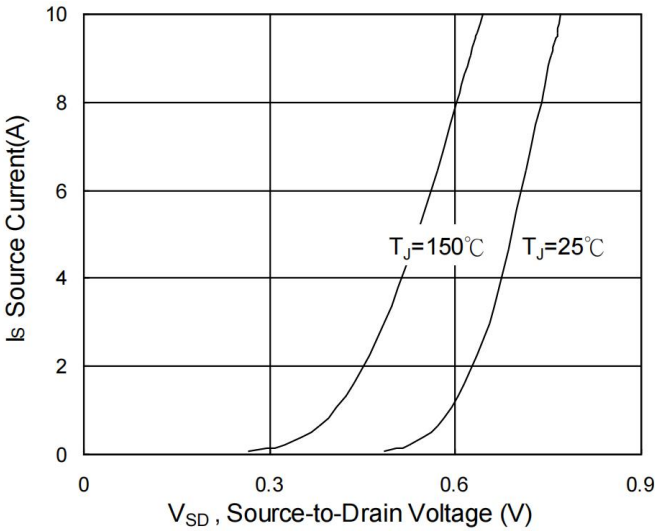
**Typical Characteristics**



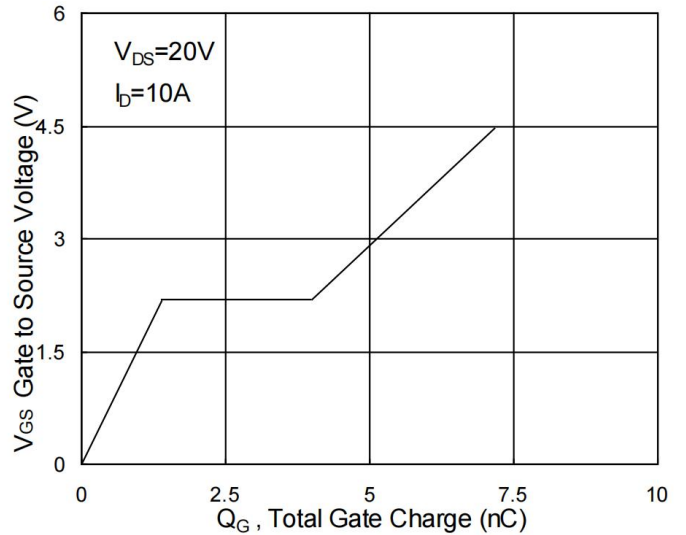
**Fig.1 Typical Output Characteristics**



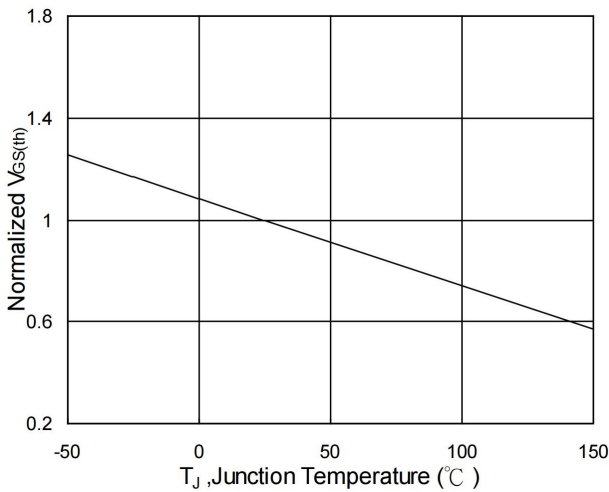
**Fig.2 On-Resistance vs. G-S Voltage**



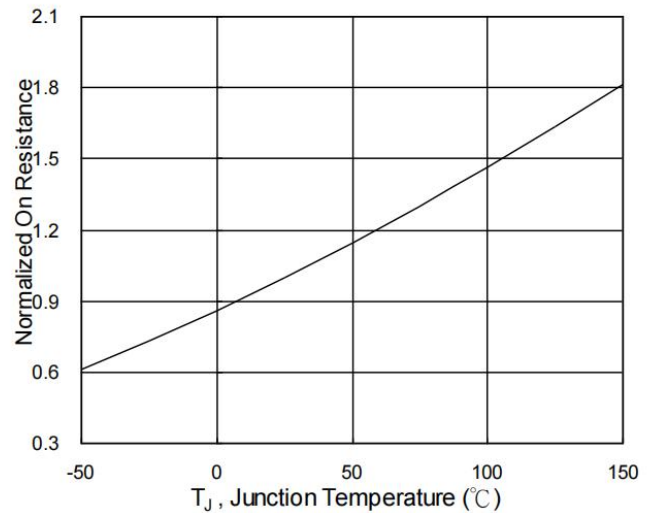
**Fig.3 Forward Characteristics of Reverse**



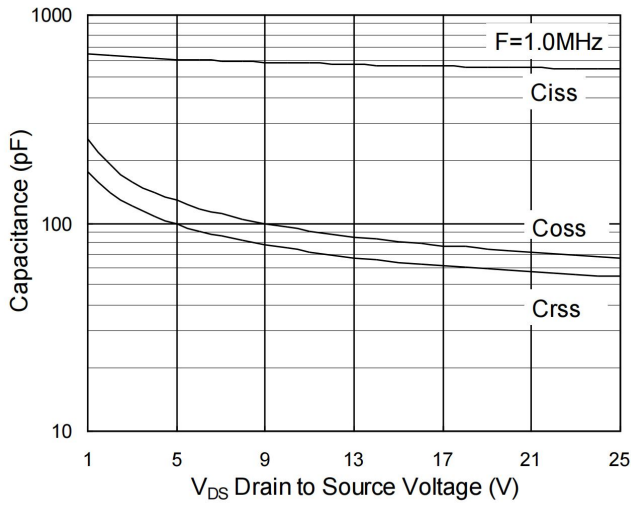
**Fig.4 Gate-Charge Characteristics**



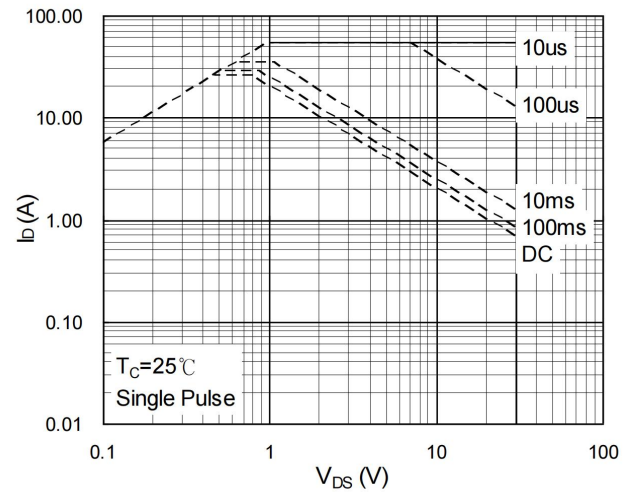
**Fig.5 Normalized V<sub>GS(th)</sub> vs. T<sub>J</sub>**



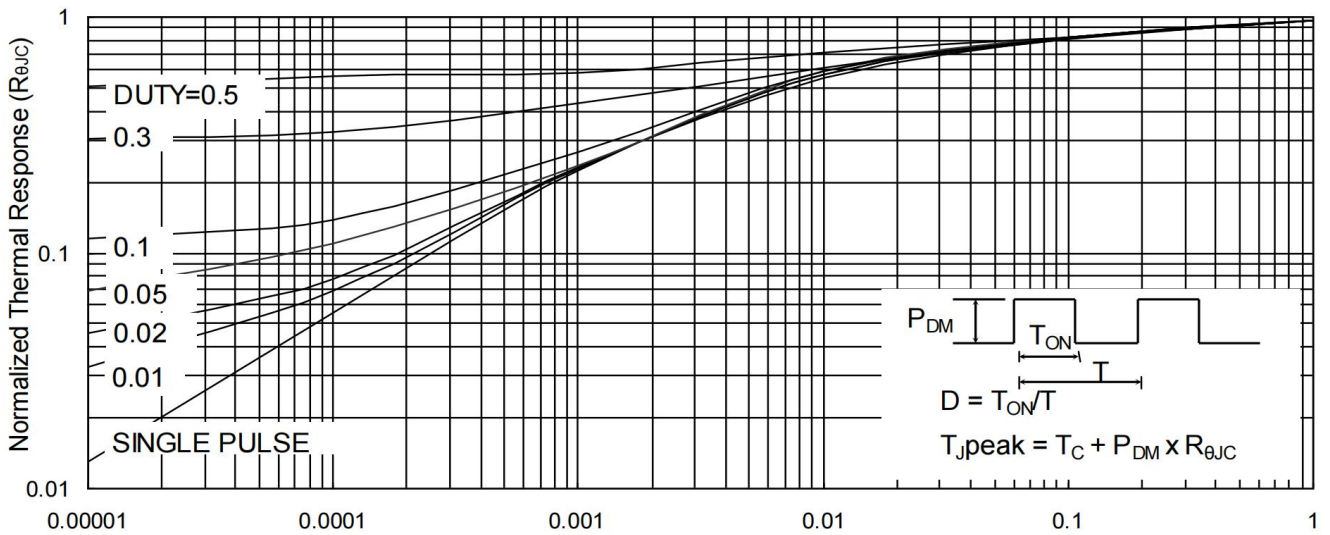
**Fig.6 Normalized R<sub>DS(on)</sub> vs. T<sub>J</sub>**



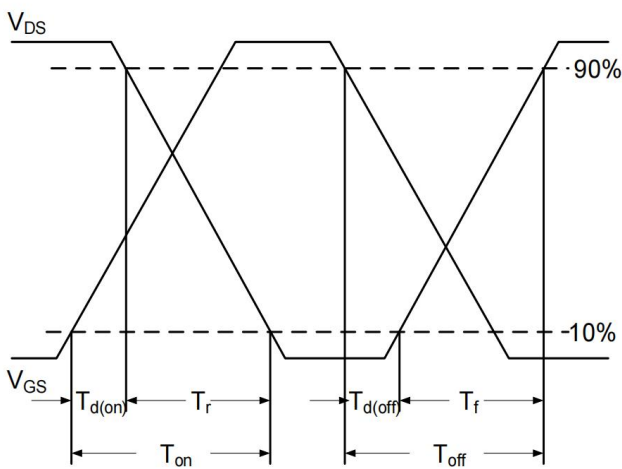
**Fig.7 Capacitance**



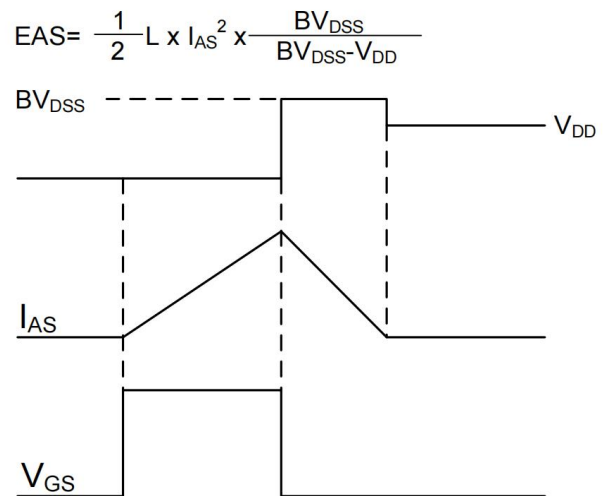
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**

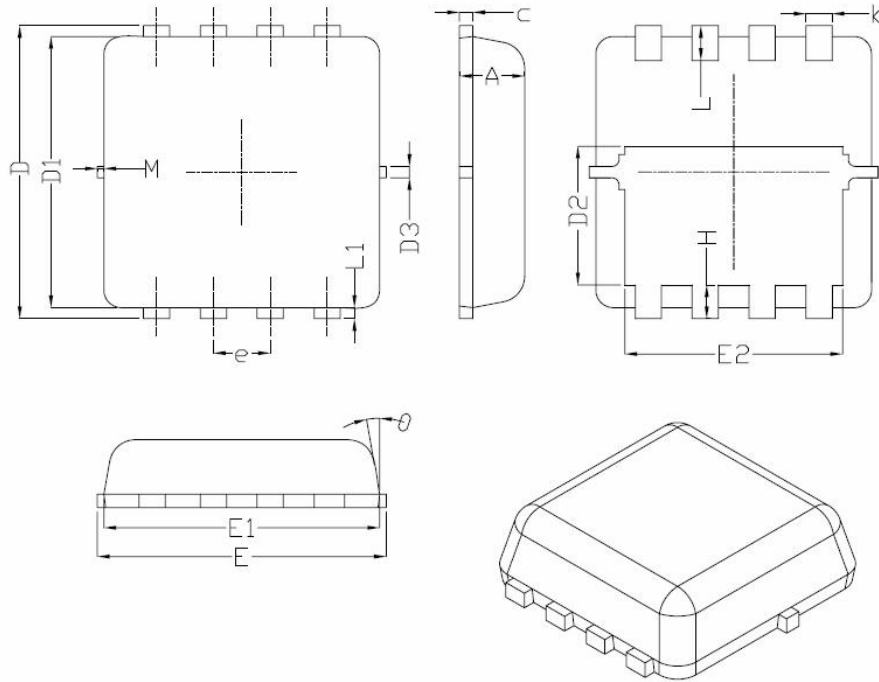


**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**

**DFN3X3-8L Package Information**



| Symbol | Dimensions In Millimeters |      |      |
|--------|---------------------------|------|------|
|        | Min.                      | Nom. | Max. |
| A      | 0.70                      | 0.75 | 0.80 |
| b      | 0.25                      | 0.30 | 0.35 |
| c      | 0.10                      | 0.15 | 0.25 |
| D      | 3.25                      | 3.35 | 3.45 |
| D1     | 3.00                      | 3.10 | 3.20 |
| D2     | 1.48                      | 1.58 | 1.68 |
| D3     | -                         | 0.13 | -    |
| E      | 3.20                      | 3.30 | 3.40 |
| E1     | 3.00                      | 3.15 | 3.20 |
| E2     | 2.39                      | 2.49 | 2.59 |
| e      | 0.65BSC                   |      |      |
| H      | 0.30                      | 0.39 | 0.50 |
| L      | 0.30                      | 0.40 | 0.50 |
| L1     | -                         | 0.13 | -    |
| M      | *                         | *    | 0.15 |
| θ      |                           | 10°  | 12°  |

**REEL SPECIFICATION**

| P/N        | PKG       | QTY  |
|------------|-----------|------|
| AON7430-MS | DFN3X3-8L | 5000 |

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