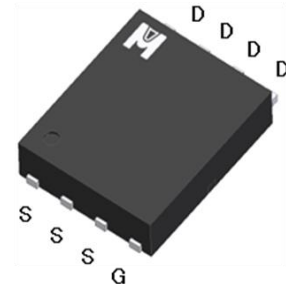
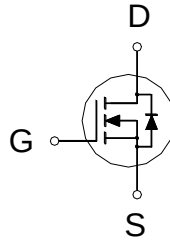




N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

|                            |       |
|----------------------------|-------|
| BV <sub>DSS</sub>          | 30V   |
| R <sub>DS(on)</sub> (MAX.) | 9.5mΩ |
| I <sub>D</sub>             | 50A   |



UIS, R<sub>g</sub> 100% Tested

RoHS & Halogen Free & TSCA Compliant

ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub> = 25 °C Unless Otherwise Noted)



| PARAMETERS/TEST CONDITIONS                     |                                                       | SYMBOL                            | LIMITS     | UNIT |
|------------------------------------------------|-------------------------------------------------------|-----------------------------------|------------|------|
| Gate-Source Voltage                            |                                                       | V <sub>GS</sub>                   | ±20        | V    |
| Continuous Drain Current                       | T <sub>C</sub> = 25 °C                                | I <sub>D</sub>                    | 50         | A    |
|                                                | T <sub>C</sub> = 100 °C                               |                                   | 35         |      |
| Pulsed Drain Current <sup>1</sup>              |                                                       | I <sub>DM</sub>                   | 140        |      |
| Avalanche Current                              |                                                       | I <sub>AS</sub>                   | 37.5       |      |
| Avalanche Energy                               | L = 0.1mH, I <sub>D</sub> =37.5A, R <sub>G</sub> =25Ω | E <sub>AS</sub>                   | 70         | mJ   |
| Repetitive Avalanche Energy <sup>2</sup>       | L = 0.05mH                                            | E <sub>AR</sub>                   | 15         |      |
| Power Dissipation                              | T <sub>C</sub> = 25 °C                                | P <sub>D</sub>                    | 50         | W    |
|                                                | T <sub>C</sub> = 100 °C                               |                                   | 26         |      |
| Operating Junction & Storage Temperature Range |                                                       | T <sub>J</sub> , T <sub>stg</sub> | -55 to 150 | °C   |

100% UIS testing in condition of V<sub>D</sub>=25V, L=0.1mH, V<sub>G</sub>=10V, I<sub>L</sub>=22A, Rated V<sub>DS</sub>=30V N-CH

THERMAL RESISTANCE RATINGS

| THERMAL RESISTANCE               | SYMBOL           | TYPICAL | MAXIMUM | UNIT   |
|----------------------------------|------------------|---------|---------|--------|
| Junction-to-Case                 | R <sub>θJC</sub> |         | 2.5     | °C / W |
| Junction-to-Ambient <sup>3</sup> | R <sub>θJA</sub> |         | 50      |        |

<sup>1</sup>Pulse width limited by maximum junction temperature.

<sup>2</sup>Duty cycle < 1%

<sup>3</sup>The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz.

Copper, in a still air environment with T<sub>A</sub> =25°C.

<sup>4</sup>Guarantee by Engineering test



ELECTRICAL CHARACTERISTICS ( $T_c = 25^\circ\text{C}$ , Unless Otherwise Noted)

| PARAMETER                                                               | SYMBOL                                 | TEST CONDITIONS                                                                           | LIMITS |      |      | UNIT |
|-------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------------|--------|------|------|------|
|                                                                         |                                        |                                                                                           | MIN    | TYP  | MAX  |      |
| STATIC                                                                  |                                        |                                                                                           |        |      |      |      |
| Drain-Source Breakdown Voltage                                          | V <sub>(BR)DSS</sub>                   | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA                                              | 30     |      |      | V    |
| Gate Threshold Voltage                                                  | V <sub>GS(th)</sub>                    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                | 1      | 1.7  | 3    |      |
| Gate-Body Leakage                                                       | I <sub>GSS</sub>                       | V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V                                              |        |      | ±100 | nA   |
| Zero Gate Voltage Drain Current                                         | I <sub>DSS</sub>                       | V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V                                               |        |      | 1    | μA   |
|                                                                         |                                        | V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125 °C                      |        |      | 25   |      |
| On-State Drain Current <sup>1</sup>                                     | I <sub>D(ON)</sub>                     | V <sub>DS</sub> = 10V, V <sub>GS</sub> = 10V                                              | 50     |      |      | A    |
| Drain-Source On-State Resistance <sup>1</sup>                           | R <sub>DS(ON)</sub>                    | V <sub>GS</sub> = 10V, I <sub>D</sub> = 25A                                               |        | 8    | 9.5  | mΩ   |
|                                                                         |                                        | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 15A                                              |        | 11.5 | 14   |      |
| Forward Transconductance <sup>1</sup>                                   | g <sub>fs</sub>                        | V <sub>DS</sub> = 5V, I <sub>D</sub> = 20A                                                |        | 20   |      | S    |
| DYNAMIC                                                                 |                                        |                                                                                           |        |      |      |      |
| Input Capacitance                                                       | C <sub>iss</sub>                       | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 15V, f = 1MHz                                     |        | 992  |      | pF   |
| Output Capacitance                                                      | C <sub>oss</sub>                       |                                                                                           |        | 147  |      |      |
| Reverse Transfer Capacitance                                            | C <sub>rss</sub>                       |                                                                                           |        | 91   |      |      |
| Gate Resistance                                                         | R <sub>g</sub>                         | V <sub>GS</sub> = 15mV, V <sub>DS</sub> = 0V, f = 1MHz                                    |        | 1.7  |      | Ω    |
| Total Gate Charge <sup>1,2</sup>                                        | Q <sub>g</sub> (V <sub>GS</sub> =10V)  | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V,<br>I <sub>D</sub> = 25A                     |        | 17.8 |      | nC   |
|                                                                         | Q <sub>g</sub> (V <sub>GS</sub> =4.5V) |                                                                                           |        | 9.2  |      |      |
| Gate-Source Charge <sup>1,2</sup>                                       | Q <sub>gs</sub>                        |                                                                                           |        | 1.6  |      |      |
| Gate-Drain Charge <sup>1,2</sup>                                        | Q <sub>gd</sub>                        |                                                                                           |        | 4.8  |      |      |
| Turn-On Delay Time <sup>1,2</sup>                                       | t <sub>d(on)</sub>                     | V <sub>DS</sub> = 15V,<br>I <sub>D</sub> = 5A, V <sub>GS</sub> = 10V, R <sub>G</sub> = 3Ω |        | 8    |      | nS   |
| Rise Time <sup>1,2</sup>                                                | t <sub>r</sub>                         |                                                                                           |        | 10   |      |      |
| Turn-Off Delay Time <sup>1,2</sup>                                      | t <sub>d(off)</sub>                    |                                                                                           |        | 20   |      |      |
| Fall Time <sup>1,2</sup>                                                | t <sub>f</sub>                         |                                                                                           |        | 12   |      |      |
| SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T <sub>c</sub> = 25 °C) |                                        |                                                                                           |        |      |      |      |
| Continuous Current                                                      | I <sub>S</sub>                         |                                                                                           |        |      | 50   | A    |
| Pulsed Current <sup>3</sup>                                             | I <sub>SM</sub>                        |                                                                                           |        |      | 140  |      |
| Forward Voltage <sup>1</sup>                                            | V <sub>SD</sub>                        | I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0V                                    |        |      | 1.3  | V    |
| Reverse Recovery Time                                                   | t <sub>rr</sub>                        | I <sub>F</sub> = I <sub>S</sub> , dI <sub>F</sub> /dt = 100A / μS                         |        | 22   |      | nS   |
| Peak Reverse Recovery Current                                           | I <sub>RM(REC)</sub>                   |                                                                                           |        | 180  |      | A    |
| Reverse Recovery Charge                                                 | Q <sub>rr</sub>                        |                                                                                           |        | 12   |      | nC   |



杰力科技股份有限公司  
*Excelliance MOS Corporation*

EMB09N03HR

<sup>1</sup>Pulse test : Pulse Width  $\leq 300 \mu\text{sec}$ , Duty Cycle  $\leq 2\%$ .

<sup>2</sup>Independent of operating temperature.

<sup>3</sup>Pulse width limited by maximum junction temperature.

Ordering & Marking Information:

Device Name: EMB09N03HR for EDFN 5 x 6



→ B09N03R: Device Name

→ ABCDEFG: Date Code

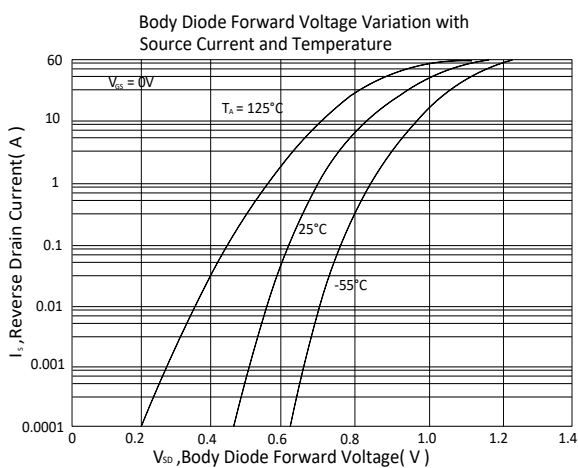
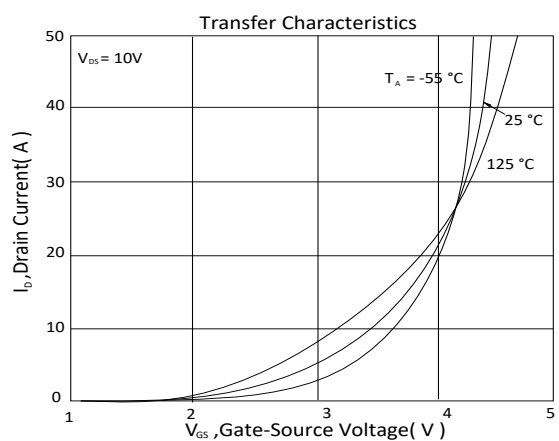
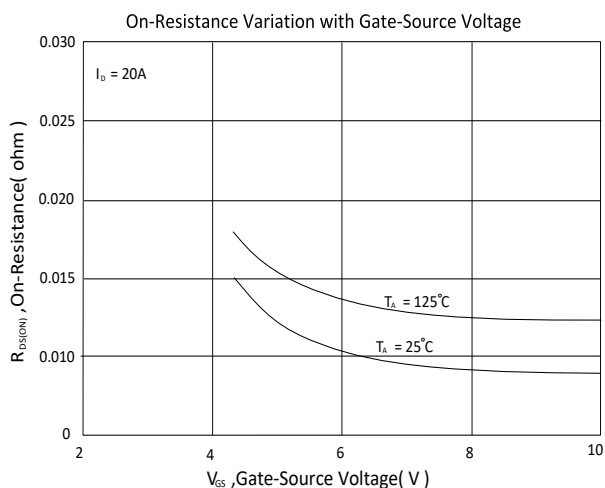
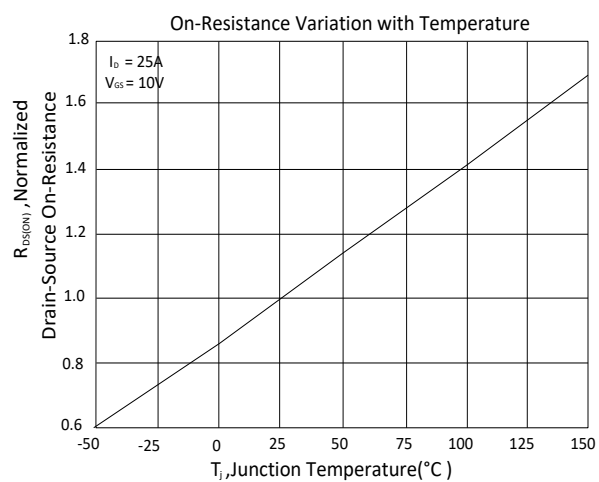
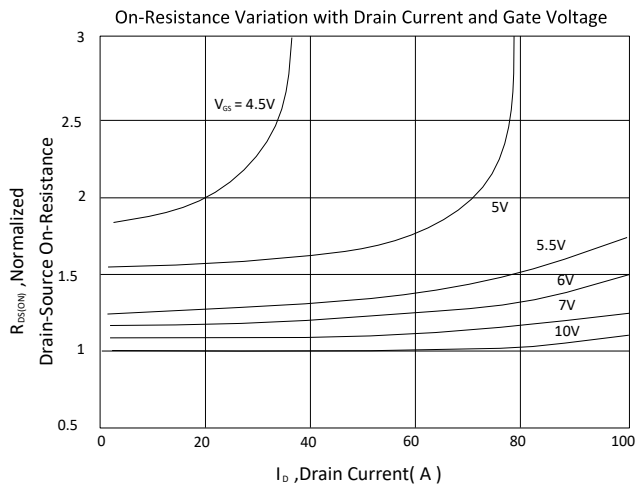
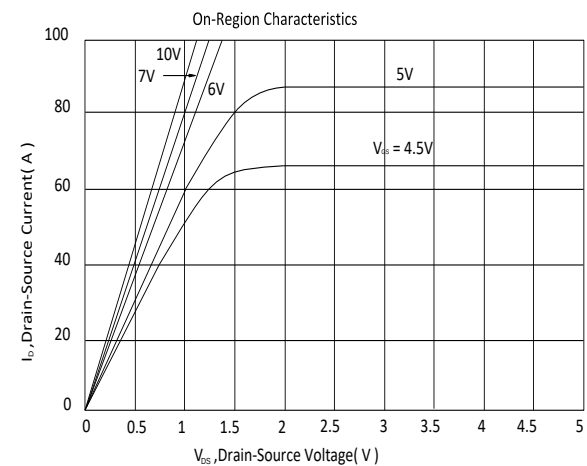
A: Assembly House

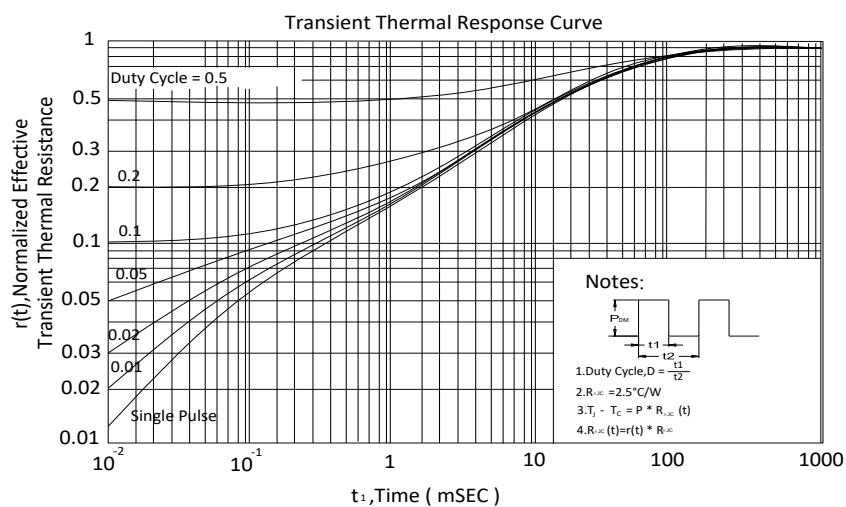
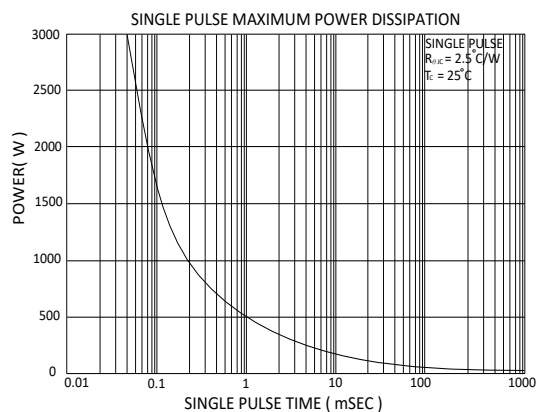
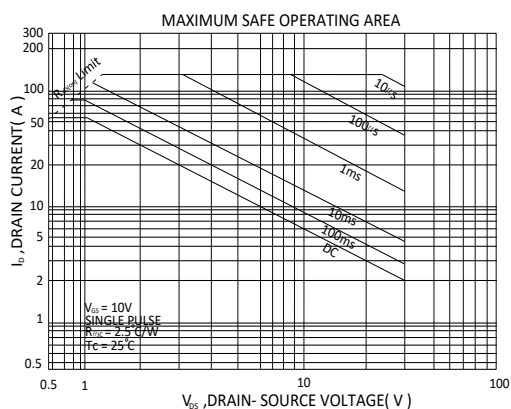
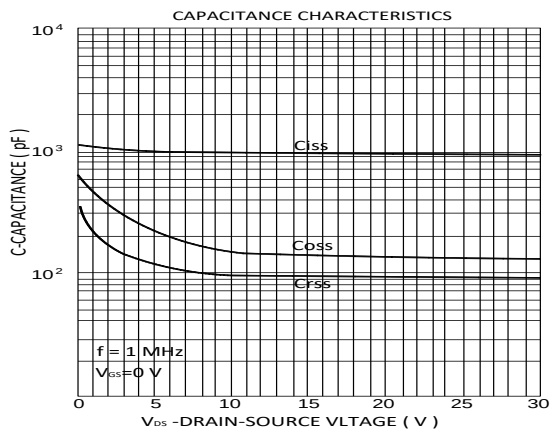
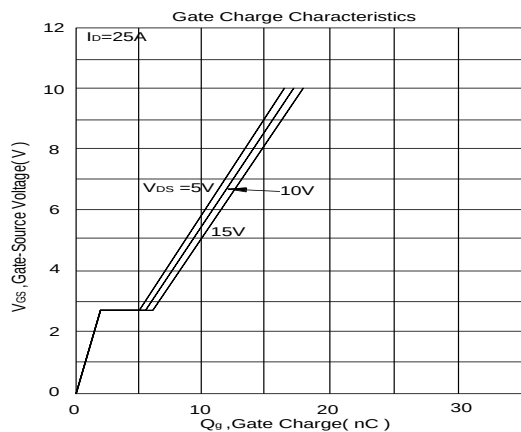
B: Year(A:2008 B:2009 C:2010....)

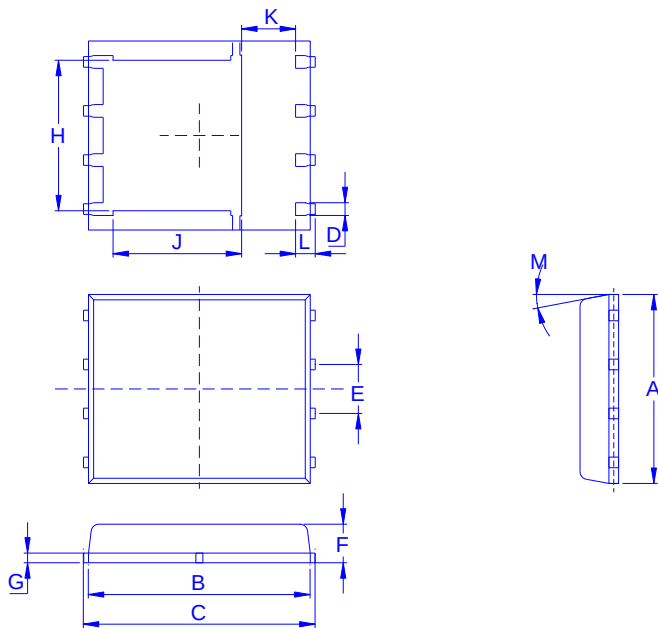
C: Month(A:01 B:02 C:03 D:04 E:05 F:06 G:07 H:08 I:09 J:10 K:11 L:12)

DEFG: Serial No.

**TYPICAL CHARACTERISTICS**



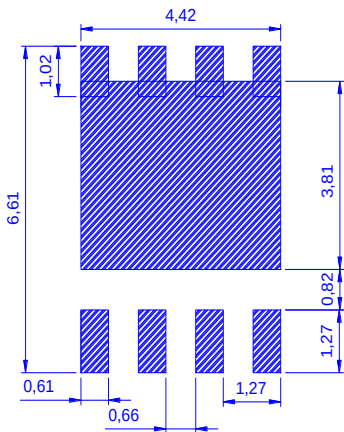




Dimension in mm

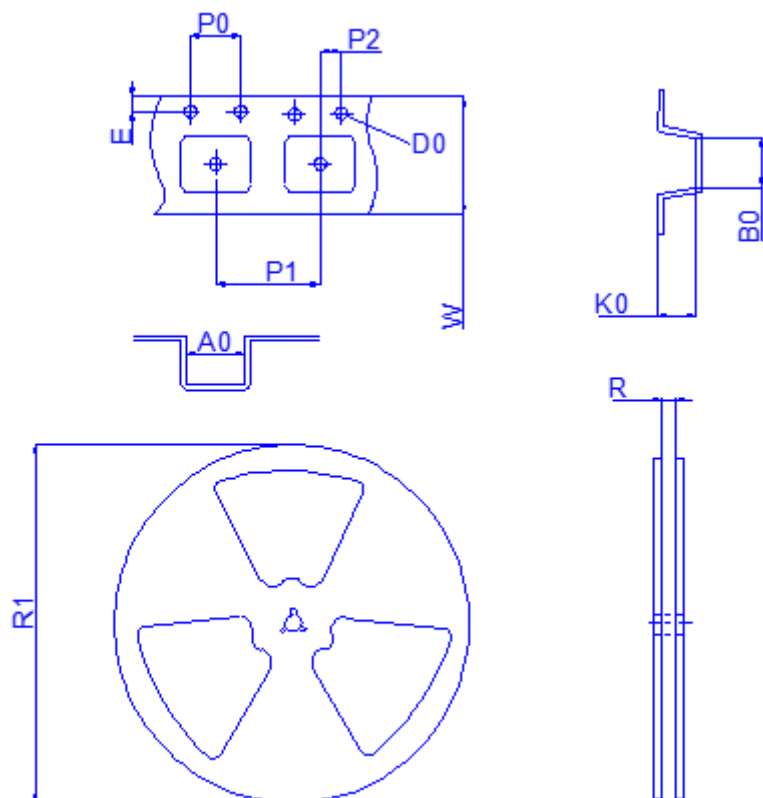
| Dimension | A   | B    | C    | D    | E    | F    | G    | H    | J    | K    | L    | M   |
|-----------|-----|------|------|------|------|------|------|------|------|------|------|-----|
| Min       | 4.8 | 5.55 | 5.9  | 0.3  | 1.17 | 0.85 | 0.15 | 3.61 | 3.18 | 1    | 0.38 | 0°  |
| Typ.      | 4.9 | 5.7  | 6    | 0.4  | 1.27 | 0.95 | 0.2  | 3.87 | 3.44 | 1.2  | 0.4  |     |
| Max       | 5.4 | 5.85 | 6.15 | 0.51 | 1.37 | 1.17 | 0.34 | 4.31 | 3.78 | 1.39 | 0.71 | 12° |

Recommended minimum pads





Tape&Reel Information:2500pcs/Reel



|                    |                       |
|--------------------|-----------------------|
| Package            | EDFN5X6               |
| Reel               | 13"                   |
| Device orientation | <p>FEED DIRECTION</p> |

Dimension in mm

| Dimension | Carrier tape |     |     |     |     |     |     |     |     | Reel |     |
|-----------|--------------|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|
|           | A0           | B0  | D0  | E   | K0  | P0  | P1  | P2  | W   | R    | R1  |
| Typ.      | 6.4          | 5.3 | 1.5 | 1.8 | 1.6 | 4   | 8   | 2   | 12  | 12.4 | 330 |
| ±         | 0.2          | 0.2 | 0.1 | 0.1 | 0.6 | 0.1 | 0.1 | 0.1 | 0.3 | 2    | 2   |