

# RTK10N80C / 10N80F

RTK10N80C / 10N80F – 800V 10A N-channel Si Power MOSFET

## Features

- Proprietary New Planar Technology
- $R_{DS(ON)}$  (Typ)=  $1.0\Omega$  @  $V_{GS}=10V$
- Low Gate Charge Minimize Switching Loss
- Fast Recovery Body Diode

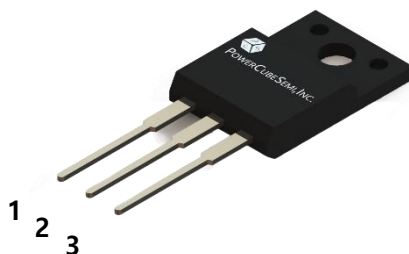
## Applications

- ATX Power
- LCD Panel Power

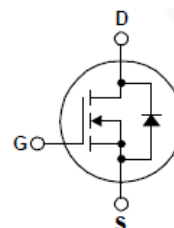
## Pin Description

- 1 : Gate  
2 : Drain  
3 : Source

| Part Number | Package | Note |
|-------------|---------|------|
| RTK10N80F   | TO-220F |      |



PKG type : TO-220F



## Absolute Maximum Ratings $T_C=25^\circ\text{C}$ Unless Otherwise Noted

| Symbol    | Parameter                                 |                        | Value      | Unit             |
|-----------|-------------------------------------------|------------------------|------------|------------------|
| $V_{DSS}$ | Drain to Source Voltage                   |                        | 800        | V                |
| $V_{GSS}$ | Gate to Source Voltage                    |                        | $\pm 30$   |                  |
| $I_D$     | Continuous Drain Current ( $V_{GS}=10V$ ) | $T_C=25^\circ\text{C}$ | 10         | A                |
| $I_{DM}$  | Pulsed Drain Current                      | $T_C=25^\circ\text{C}$ | 30         | A                |
| $P_D$     | Power dissipation                         | $T_C=25^\circ\text{C}$ | 55         | W                |
| $E_{AS}$  | Avalanche Energy, Single Pulsed           |                        | 460        | mJ               |
| $T_J$     | Maximum Junction Temperature              |                        | -55 to 150 | $^\circ\text{C}$ |
| $T_{STG}$ | Storage Temperature Range                 |                        | -55 to 150 | $^\circ\text{C}$ |

## Static Characteristics

$T_J = 25^\circ\text{C}$  unless otherwise specified

| Symbol       | Parameter                               | Test Condition                    | Numerical |      |           | Unit     |
|--------------|-----------------------------------------|-----------------------------------|-----------|------|-----------|----------|
|              |                                         |                                   | Min       | Typ. | Max.      |          |
| $BV_{DSS}$   | Drain-Source Breakdown Voltage          | $V_{GS} = 0V, I_D = 250\mu A$     | 800       | -    | -         | V        |
| $I_{DSS}$    | Zero Gate Voltage Drain Current         | $V_{DS} = 800V, V_{GS} = 0V$      | -         | -    | 1         | $\mu A$  |
| $I_{GSS}$    | Gate-Source Leakage Current             | $V_{GS} = \pm 30V, V_{DS} = 0V$   | -         | -    | $\pm 100$ | nA       |
| $V_{GS(th)}$ | Gate Threshold Voltage                  | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 2.0       | -    | 4.0       | V        |
| $R_{DS(on)}$ | Static Drain-Source on state resistance | $V_{GS} = 10V, I_D = 4A$          | -         | 1.0  | 1.15      | $\Omega$ |

## Dynamic Characteristics

| Symbol       | Parameter                    | Test Condition                                            | Numerical |      |      | Unit |
|--------------|------------------------------|-----------------------------------------------------------|-----------|------|------|------|
|              |                              |                                                           | Min       | Typ. | Max. |      |
| $C_{iss}$    | Input capacitance            | $V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$                     | -         | 2900 | -    | pF   |
| $C_{oss}$    | Output capacitance           |                                                           | -         | 200  | -    |      |
| $C_{rss}$    | Reverse transfer capacitance |                                                           | -         | 25   | -    |      |
| $t_{d(on)}$  | Turn-on Delay time           | $V_{DS} = 400V, I_D = 10A, V_{GS} = 10V, R_G = 4.7\Omega$ | -         | 19   | -    | ns   |
| $T_r$        | Turn-on Rise time            |                                                           | -         | 10   | -    |      |
| $t_{d(off)}$ | Turn-off Delay time          |                                                           | -         | 68   | -    |      |
| $T_f$        | Turn-off Fall time           |                                                           | -         | 23   | -    |      |

## Gate Charge Characteristics

| Symbol       | Parameter                     | Test Condition                               | Numerical |      |      | Unit |
|--------------|-------------------------------|----------------------------------------------|-----------|------|------|------|
|              |                               |                                              | Min       | Typ. | Max. |      |
| $Q_{g(tot)}$ | Total gate charge at 10V      | $V_{DS} = 640V, I_D = 10A, V_{GS(on)} = 10V$ | -         | 60   | -    | nC   |
| $Q_{gs}$     | Gate to source gate charge    |                                              | -         | 13   | -    |      |
| $Q_{gd}$     | Gate to drain "Miller" charge |                                              | -         | 22   | -    |      |



## Diode Characteristics

| Symbol   | Parameter                             | Test Condition                                | Numerical |      | Unit    |
|----------|---------------------------------------|-----------------------------------------------|-----------|------|---------|
|          |                                       |                                               | Typ.      | Max. |         |
| $I_{SD}$ | Continuous Source Current             |                                               | -         | 10   | A       |
| $I_{SM}$ | Pulsed Source Current                 |                                               | -         | 40   |         |
| $V_{SD}$ | Drain to source diode forward voltage | $I_{SD}=10A, V_{GS} = 0V$                     | -         | 1.5  | V       |
| $T_{rr}$ | Reverse recovery time                 | $I_F=10A, V_{GS}=0V,$<br>$dI_F/dt=100A/\mu s$ | 200       | -    | ns      |
| $Q_{rr}$ | Reverse recovery charge               |                                               | 2.2       | -    | $\mu C$ |

## Thermal Characteristics

| Symbol          | Parameter                               | Value | Unit          |
|-----------------|-----------------------------------------|-------|---------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case    | 2.02  | $^{\circ}C/W$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 100   | $^{\circ}C/W$ |

## Typical Characteristics

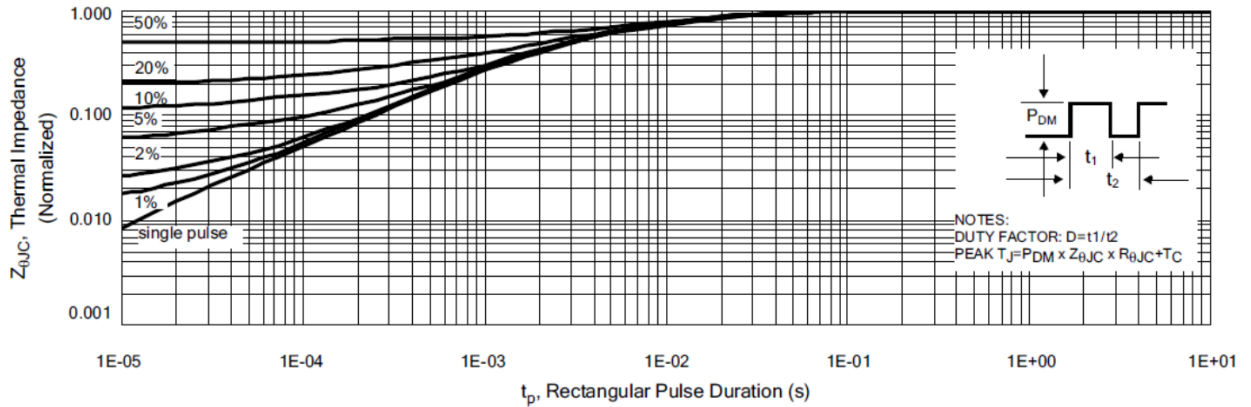


Figure 1. Maximum Effective Thermal Impedance, Junction to Case

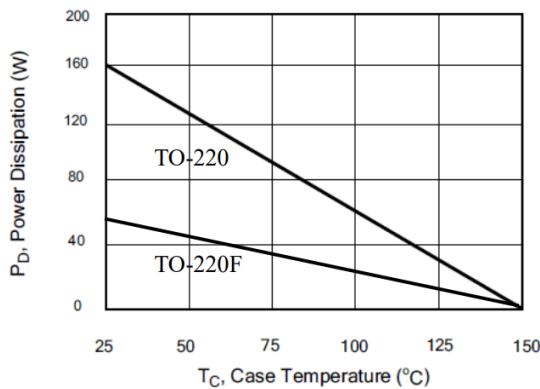


Figure 2. Maximum Power Dissipation vs. Case Temperature

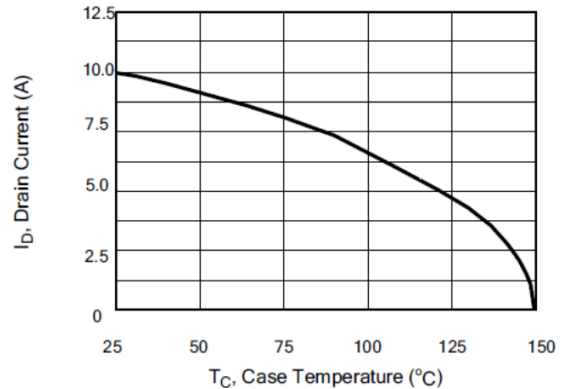


Figure 3. Maximum Continuous Drain Current vs. Case Temperature

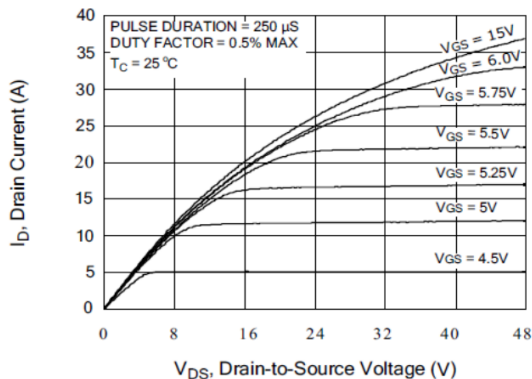


Figure 4. Typical Output Characteristics

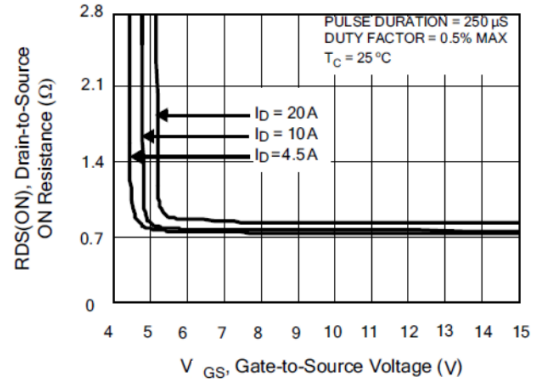


Figure 5. Typical Drain to Source On-Resistance vs. Gate Voltage and Drain Current

## Typical Characteristics (Cont.)

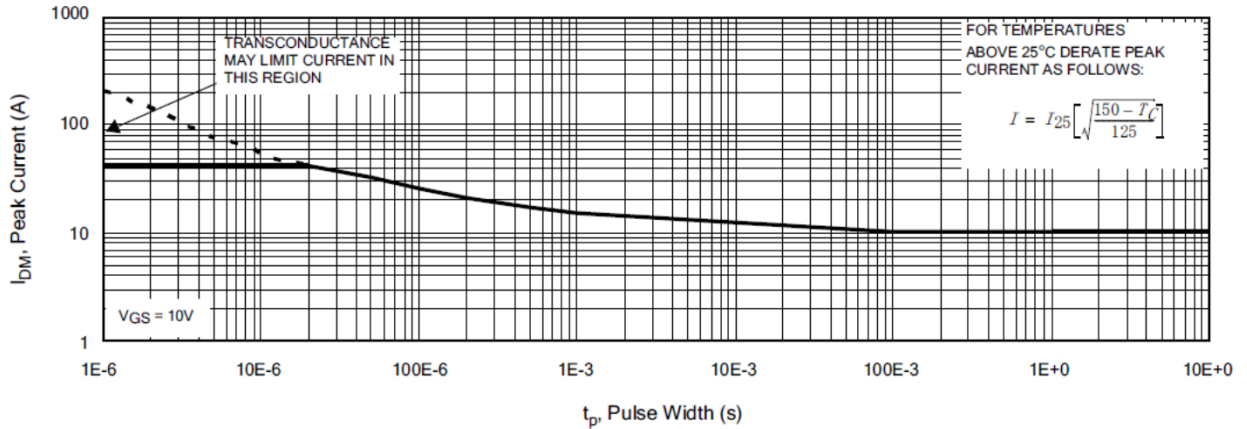


Figure 6. Maximum Peak Current Capability

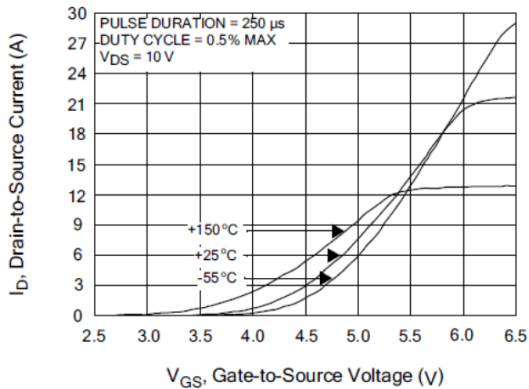


Figure 7. Typical Transfer Characteristics

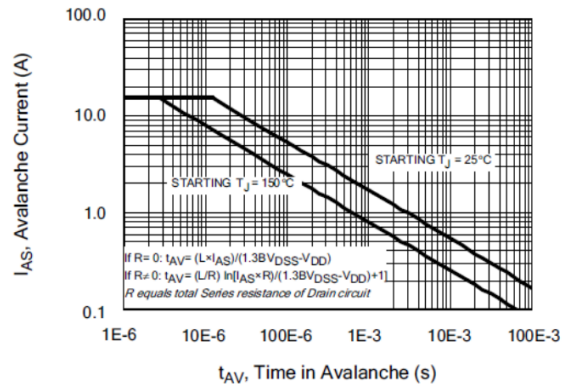


Figure 8. Unclamped Inductive Switching Capability

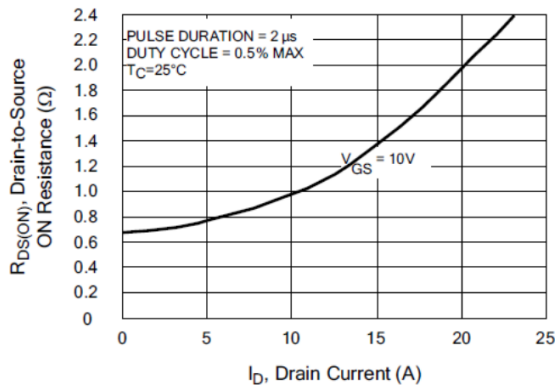


Figure 9. Typical Drain to Source On-Resistance vs. Drain Current

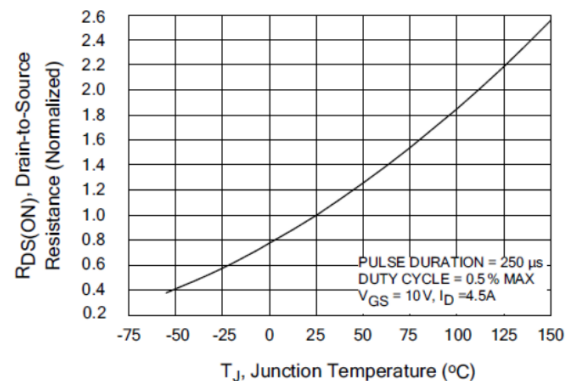
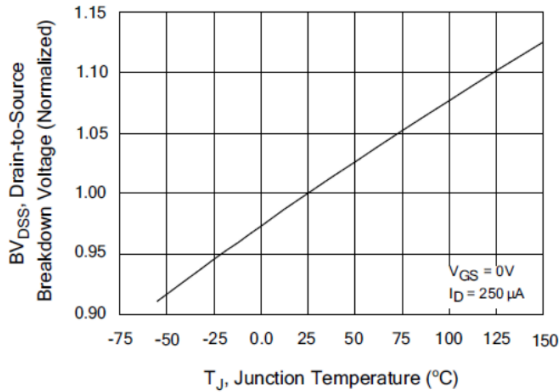
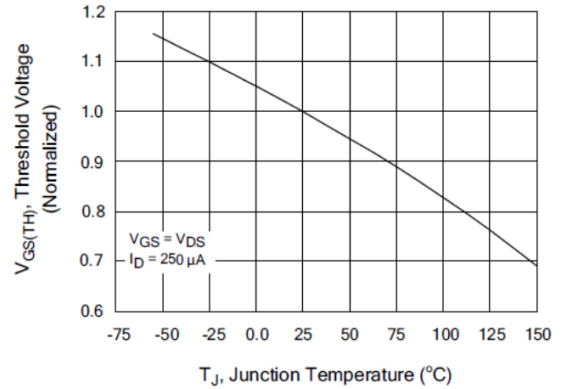


Figure 10. Typical Drain to Source On-Resistance vs. Junction Temperature

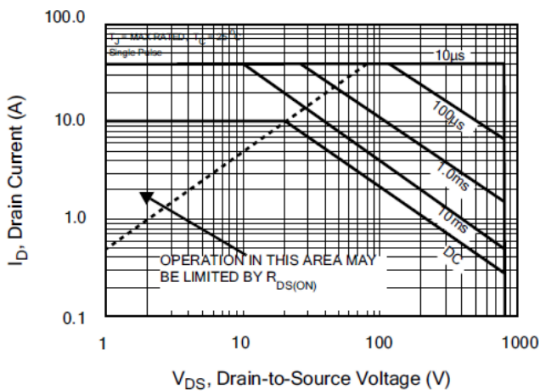
## Typical Characteristics



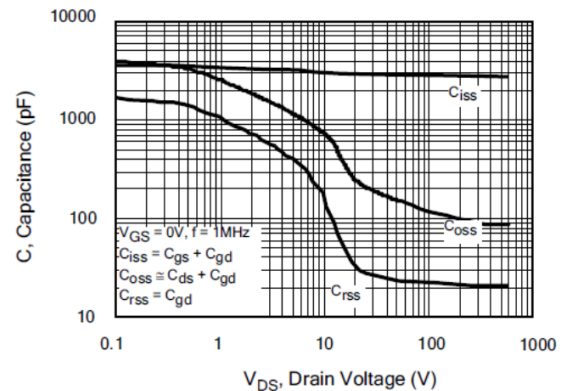
**Figure 11. Typical Breakdown Voltage vs. Junction Temperature**



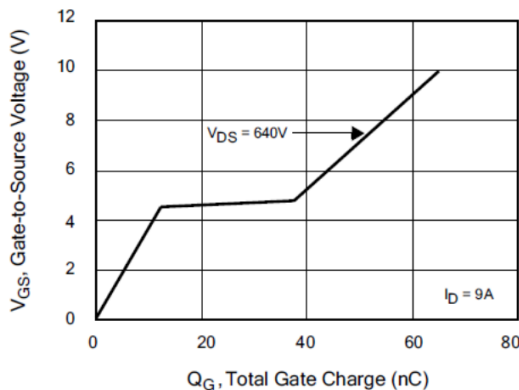
**Figure 12. Typical Threshold Voltage vs. Junction Temperature**



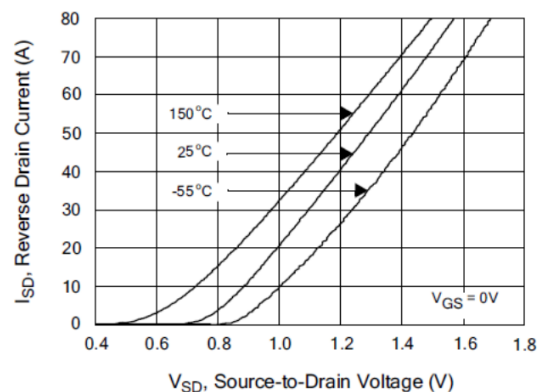
**Figure 13. Maximum Forward Bias Safe Operating Area**



**Figure 14. Typical Capacitance vs. Drain to Source Voltage**



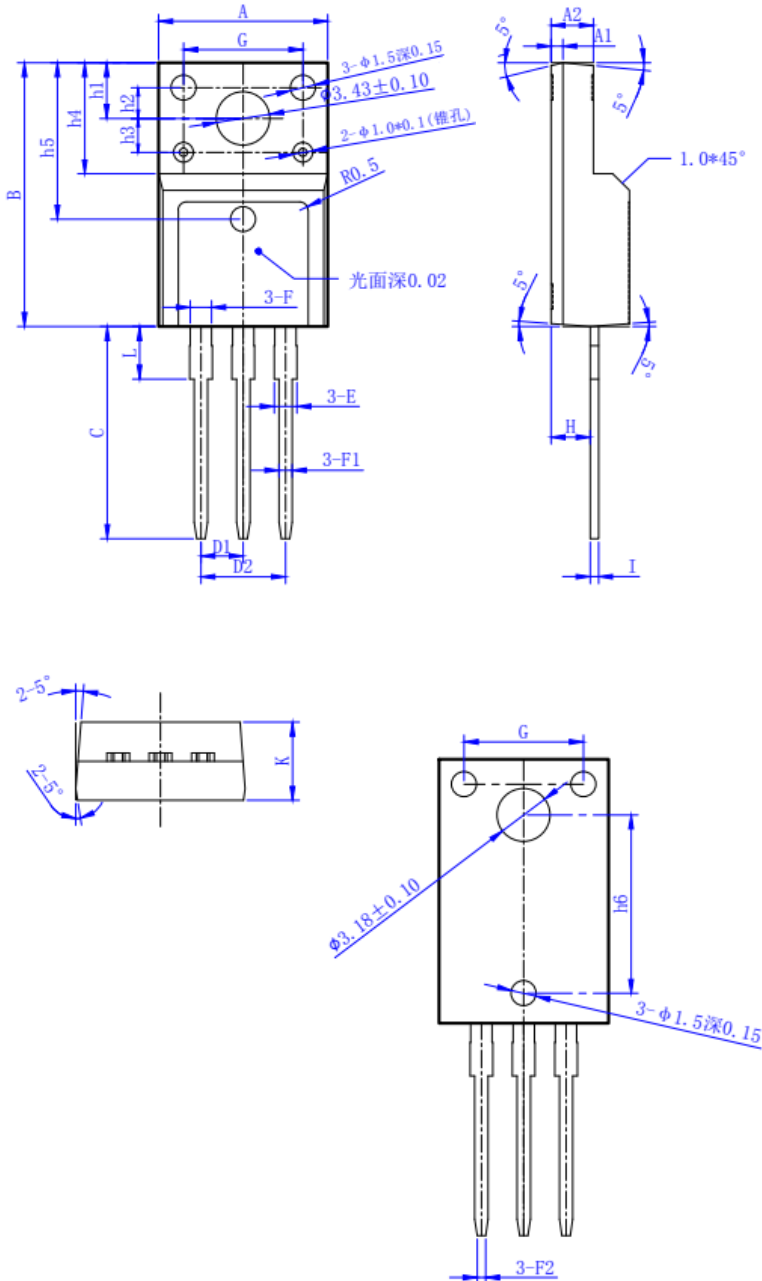
**Figure 15. Typical Gate Charge vs. Gate to Source Voltage**



**Figure 16. Typical Body Diode Transfer Characteristics**

## Package Outline

Unit : mm



| SYMBOL | DIMENSIONS |       |       |
|--------|------------|-------|-------|
|        | MIN        | NOM   | MAX   |
| A      | 10.00      | 10.20 | 10.40 |
| A1     | -          | 0.70  | -     |
| A2     | 2.35       | 2.55  | 2.75  |
| B      | 15.80      | 15.90 | 16.00 |
| C      | 13.00      | 13.25 | 13.50 |
| D1     | 2.54 BSC   |       |       |
| D2     | 5.08 BSC   |       |       |
| E      | 1.27       | 1.32  | 1.40  |
| F      | 1.25       | 1.28  | 1.30  |
| F1     | 0.75       | 0.80  | 0.85  |
| F2     | 0.35       | 0.40  | 0.50  |
| G      | 6.90       | 7.00  | 7.10  |
| H      | 2.66       | 2.76  | 2.86  |
| h1     | 3.20       | 3.30  | 3.40  |
| h2     | 1.70       | 1.80  | 1.90  |
| h3     | 2.00       | 2.10  | 2.20  |
| h4     | 6.70       | 6.79  | 6.90  |
| h5     | 9.30       | 9.41  | 9.50  |
| h6     | 10.44      | 10.54 | 10.64 |
| I      | 0.40       | 0.50  | 0.60  |
| K      | 4.60       | 4.70  | 4.80  |
| L      | 2.90       | 3.00  | 3.10  |