

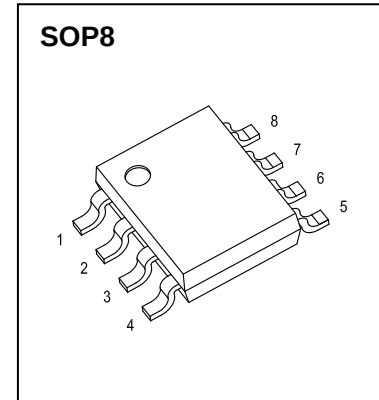


JIANGSU CHANGJING ELECTRONICS TECHNOLOGY CO., LTD.

## SOP8 Plastic-Encapsulate MOSFETS

### CJQ20N03 N-Channel Power MOSFET

| $V_{(BR)DSS}$ | $R_{DS(on)}$ TYP | $I_D$ |
|---------------|------------------|-------|
| 30V           | 4.2mΩ@10V        | 20A   |
|               | 5.4mΩ@4.5V       |       |



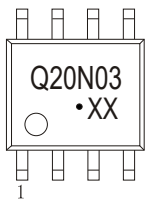
#### DESCRIPTION

The CJQ20N03 combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . This device is ideal for load switch and battery protection applications

#### APPLICATIONS

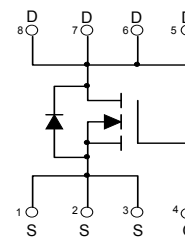
- Battery protection applications
- Load switch

#### MARKING



Q20N03 = Device code.  
Solid dot = Green molding compound device.  
if none, the normal device.  
XX = Code.

#### Equivalent Circuit



#### ABSOLUTE MAXIMUM RATINGS ( $T_a=25^\circ\text{C}$ unless otherwise noted)

| Parameter                                        | Symbol            | Limit    | Unit               |
|--------------------------------------------------|-------------------|----------|--------------------|
| Drain-Source Voltage                             | $V_{DS}$          | 30       | V                  |
| Gate-Source Voltage                              | $V_{GS}$          | $\pm 20$ | V                  |
| Continuous Drain Current                         | $I_D$ ①           | 20       | A                  |
| Pulsed Drain Current                             | $I_{DM}$ ②        | 75       | A                  |
| Single Pulsed Avalanche Energy                   | $E_{AS}$ ③        | 180      | mJ                 |
| Power Dissipation                                | $P_D$ ④           | 3.0      | W                  |
| Thermal Resistance from Junction to Ambient      | $R_{\theta JA}$ ⑥ | 41.7     | $^\circ\text{C/W}$ |
| Operating Junction and Storage Temperature Range | $T_J, T_{stg}$    | -55~+150 | $^\circ\text{C}$   |

## MOSFET ELECTRICAL CHARACTERISTICS

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

| Parameter                                     | Symbol                | Test Condition                                                                         |                      | Min | Typ  | Max  | Unit |
|-----------------------------------------------|-----------------------|----------------------------------------------------------------------------------------|----------------------|-----|------|------|------|
| Off characteristics                           |                       |                                                                                        |                      |     |      |      |      |
| Drain-source breakdown voltage                | V <sub>(BR) DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA                                            |                      | 30  |      |      | V    |
| Zero gate voltage drain current               | I <sub>DSS</sub>      | V <sub>DS</sub> =24V,<br>V <sub>GS</sub> =0V                                           | T <sub>J</sub> =25℃  |     |      | 1.0  | μA   |
|                                               |                       |                                                                                        | T <sub>J</sub> =125℃ |     |      | 150  |      |
| Gate-body leakage current                     | I <sub>GSS</sub>      | V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V                                             |                      |     |      | ±100 | nA   |
| On characteristics ④                          |                       |                                                                                        |                      |     |      |      |      |
| Gate-threshold voltage                        | V <sub>GS(th)</sub>   | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                               |                      | 1.0 | 1.4  | 2.5  | V    |
| Static drain-source on-sate resistance        | R <sub>DS(on)</sub>   | V <sub>GS</sub> =10V, I <sub>D</sub> =10A                                              |                      |     | 4.2  | 4.8  | mΩ   |
|                                               |                       | V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A                                             |                      |     | 5.4  | 7.1  | mΩ   |
| Forward transconductance                      | g <sub>FS</sub>       | V <sub>DS</sub> =10V, I <sub>D</sub> =10A                                              |                      |     | 18.5 |      | S    |
| Dynamic characteristics ④ ⑤                   |                       |                                                                                        |                      |     |      |      |      |
| Input capacitance                             | C <sub>iss</sub>      | V <sub>DS</sub> = 15V,V <sub>GS</sub> = 0V,<br>f = 1MHz                                |                      |     | 2517 | 5000 | pF   |
| Output capacitance                            | C <sub>oss</sub>      |                                                                                        |                      |     | 406  | 800  |      |
| Reverse transfer capacitance                  | C <sub>rss</sub>      |                                                                                        |                      |     | 389  | 780  |      |
| Gate resistance                               | R <sub>g</sub>        | f =1MHz                                                                                |                      |     | 3.7  |      | Ω    |
| Switching characteristics ④ ⑤                 |                       |                                                                                        |                      |     |      |      |      |
| Total gate charge                             | Q <sub>g</sub>        | V <sub>DS</sub> =10V, V <sub>GS</sub> =25V,<br>I <sub>D</sub> =10A                     |                      |     | 60   | 120  | nC   |
| Gate-source charge                            | Q <sub>gs</sub>       |                                                                                        |                      |     | 4.5  | 9.0  |      |
| Gate-drain charge                             | Q <sub>gd</sub>       |                                                                                        |                      |     | 19   | 40   |      |
| Turn-on delay time                            | t <sub>d(on)</sub>    | V <sub>DS</sub> =15V,R <sub>L</sub> =0.75Ω,<br>V <sub>GS</sub> =10V,R <sub>G</sub> =3Ω |                      |     | 19   |      | ns   |
| Turn-on rise time                             | t <sub>r</sub>        |                                                                                        |                      |     | 44   |      |      |
| Turn-off delay time                           | t <sub>d(off)</sub>   |                                                                                        |                      |     | 58   |      |      |
| Turn-off fall time                            | t <sub>f</sub>        |                                                                                        |                      |     | 16.7 |      |      |
| Drain-Source Diode Characteristics            |                       |                                                                                        |                      |     |      |      |      |
| Drain-source diode forward voltage            | V <sub>SD</sub> ④     | V <sub>GS</sub> =0V, I <sub>S</sub> =10A                                               |                      |     |      | 1.2  | V    |
| Continuous drain-source diode forward current | I <sub>S</sub> ①      |                                                                                        |                      |     |      | 20   | A    |
| Pulsed drain-source diode forward current     | I <sub>SM</sub> ②     |                                                                                        |                      |     |      | 75   | A    |

Notes:

1.  $T_C = 25^{\circ}\text{C}$  Limited only by maximum temperature allowed.

2.  $P_W \leq 10\mu s$ , Duty cycle  $\leq 1\%$ .

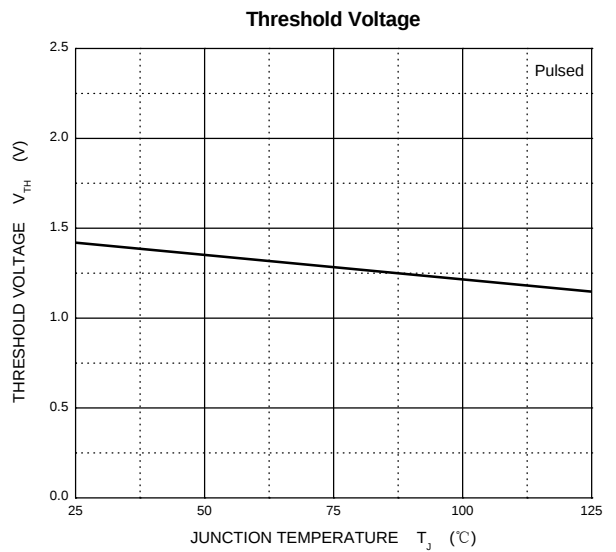
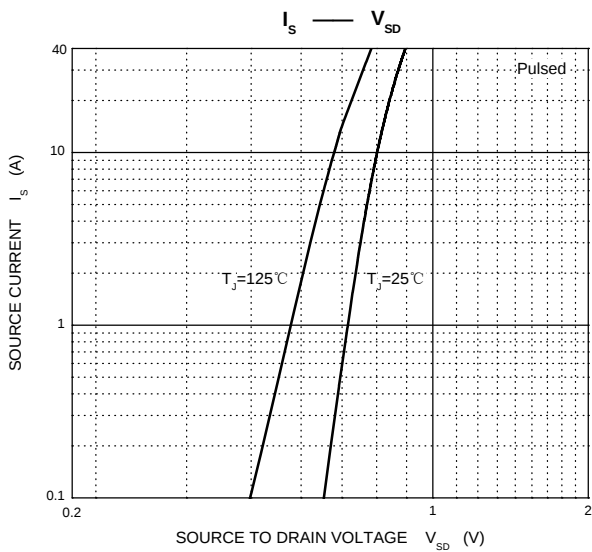
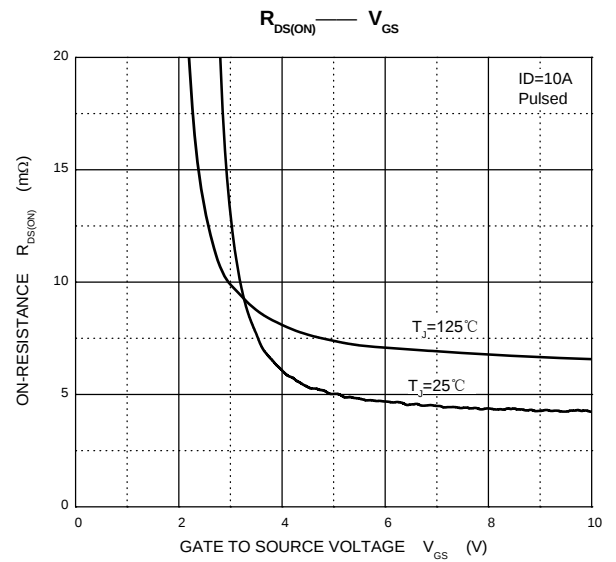
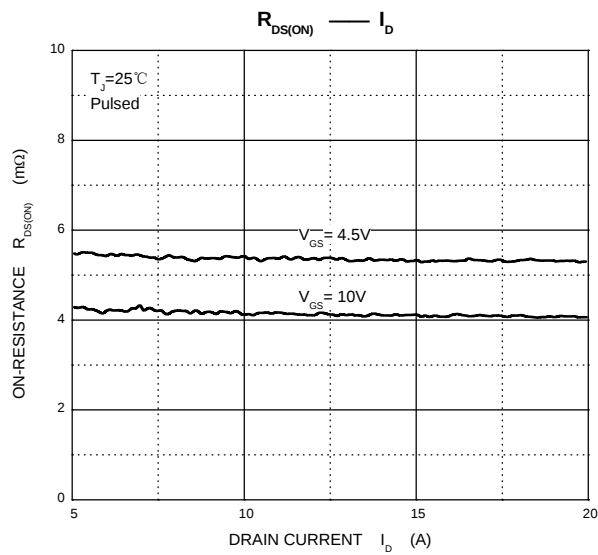
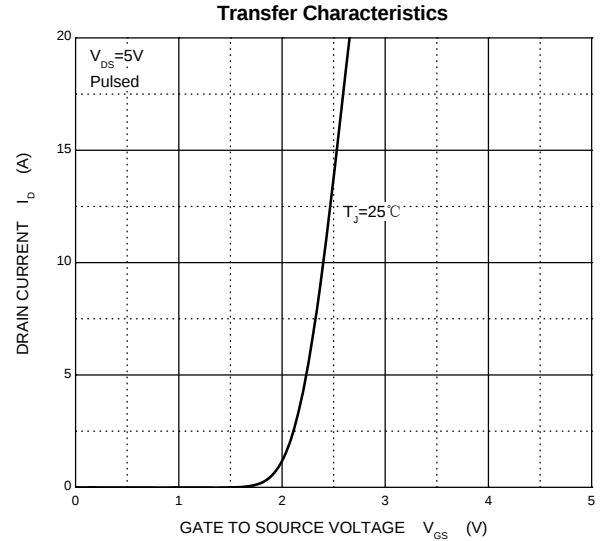
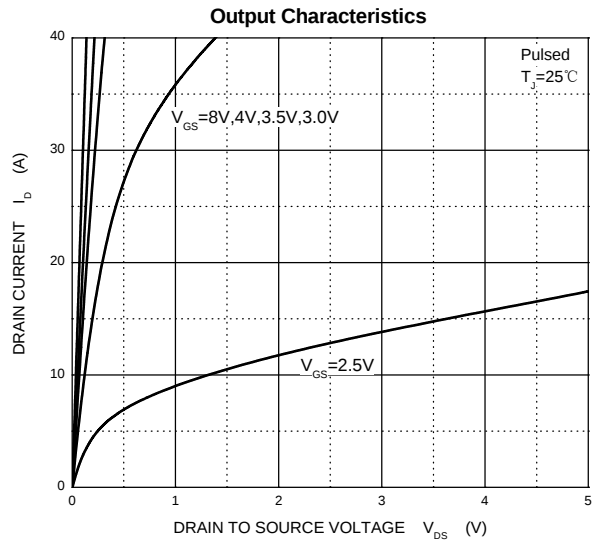
3. EAS condition:  $V_{DD} = 30V, V_{GS} = 10V, L = 0.5mH, R_g = 25\Omega$  Starting  $T_J = 25^{\circ}\text{C}$ .

4. Pulse Test : Pulse Width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .

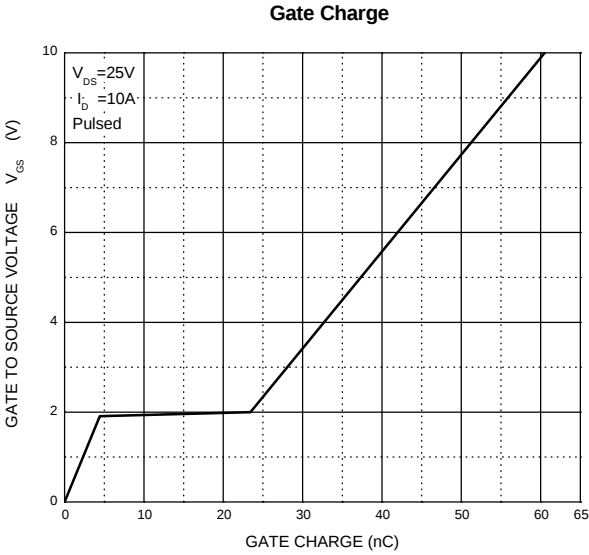
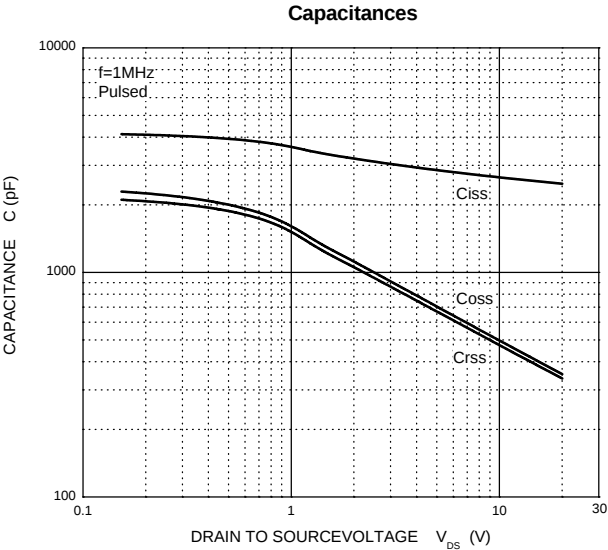
5. Guaranteed by design, not subject to production.

6. The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with  $T_a = 25^{\circ}\text{C}, t \leq 10\text{sec}$ .

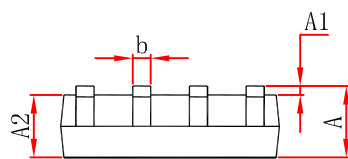
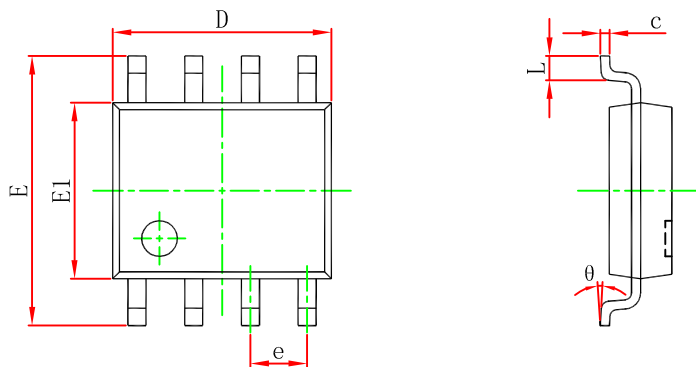
# Typical Characteristics



# Typical Characteristics

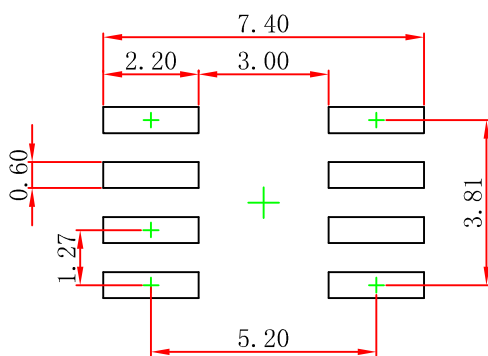


## SOP8 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.450                     | 1.750 | 0.053                | 0.069 |
| A1     | 0.100                     | 0.250 | 0.004                | 0.010 |
| A2     | 1.350                     | 1.550 | 0.053                | 0.061 |
| b      | 0.330                     | 0.510 | 0.013                | 0.020 |
| c      | 0.170                     | 0.250 | 0.007                | 0.010 |
| D      | 4.700                     | 5.100 | 0.185                | 0.201 |
| e      | 1.270 (BSC)               |       | 0.050 (BSC)          |       |
| E      | 5.800                     | 6.200 | 0.228                | 0.244 |
| E1     | 3.800                     | 4.000 | 0.150                | 0.157 |
| L      | 0.400                     | 1.270 | 0.016                | 0.050 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

## SOP8 Suggested Pad Layout



### Note:

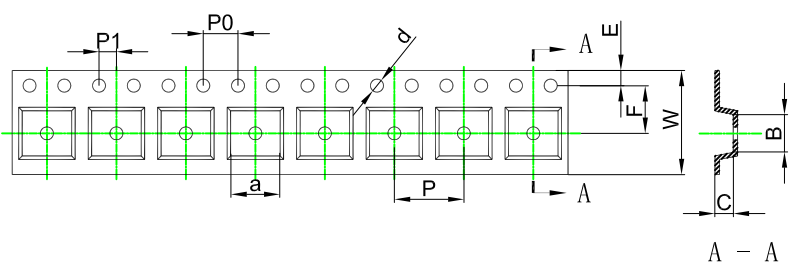
1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.

### NOTICE

JSCJ reserves the right to make modifications, enhancements, improvements, corrections or other changes without further notice to any product herein. JSCJ does not assume any liability arising out of the application or use of any product described herein.

SOP8 Tape and Reel

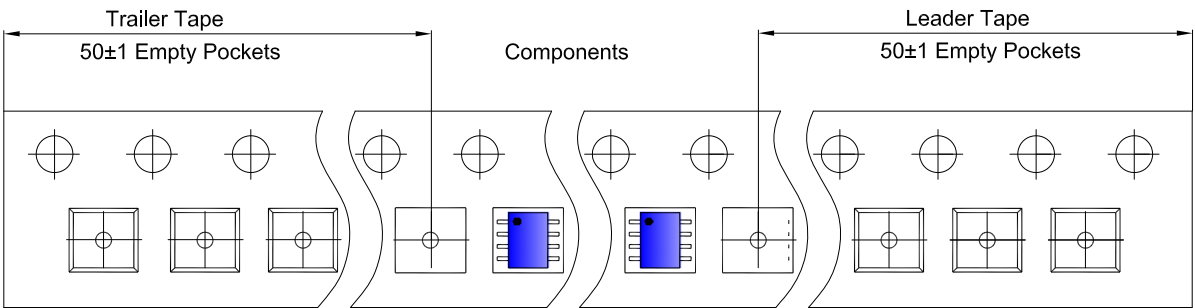
SOP8 Embossed Carrier Tape



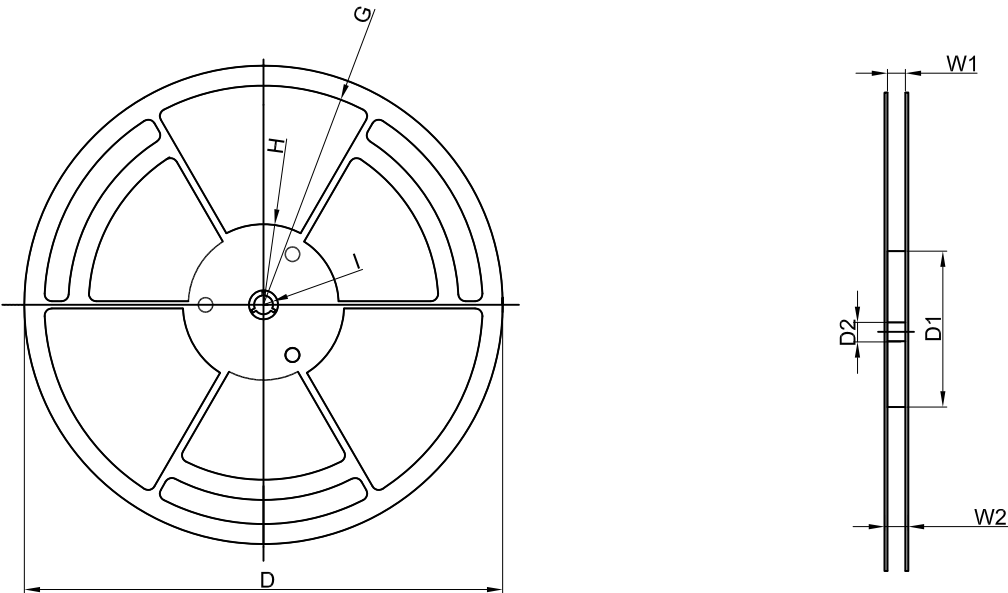
Packaging Description:  
 SOP8 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 4,000 units per 13" or 33cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).  
 ALL DIM IN mm

| Dimensions are in millimeter |      |      |      |       |      |      |      |      |      |       |
|------------------------------|------|------|------|-------|------|------|------|------|------|-------|
| Pkg type                     | a    | B    | C    | d     | E    | F    | P0   | P    | P1   | W     |
| SOP8                         | 6.40 | 5.40 | 2.10 | Ø1.50 | 1.75 | 5.50 | 4.00 | 8.00 | 2.00 | 12.00 |

SOP8 Tape Leader and Trailer



SOP8 Reel



| Dimensions are in millimeter |         |        |       |         |        |       |       |       |
|------------------------------|---------|--------|-------|---------|--------|-------|-------|-------|
| Reel Option                  | D       | D1     | D2    | G       | H      | I     | W1    | W2    |
| 13"Dia                       | Ø330.00 | 100.00 | 13.00 | R151.00 | R56.00 | R6.50 | 12.40 | 17.60 |

| REEL      | Reel Size | Box       | Box Size(mm) | Carton     | Carton Size(mm) | G.W.(kg) |
|-----------|-----------|-----------|--------------|------------|-----------------|----------|
| 4,000 pcs | 13 inch   | 8,000 pcs | 360×360×65   | 40,000 pcs | 565×380×390     |          |