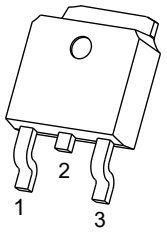
JIANGSU CHANGJING ELECTRONICS TECHNOLOGY CO., LTD

TO-252-2L Plastic-Encapsulate MOSFETS

CJU02N60M1 N-Channel Power MOSFET

$V_{(BR)DSS}$	$R_{DS(on)}$MAX	I_D
600V	2.7Ω@10V	2A

TO-252-2L



1. GATE
2. DRAIN
3. SOURCE

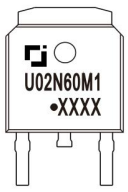
General Description

The high voltage MOSFET uses an advanced termination scheme to provide enhanced voltage-blocking capability without degrading performance over time. In addition , this advanced MOSFET is designed to withstand high energy in avalanche and commutation modes . The new energy efficient design also offers a drain-to-source diode with a fast recovery time. Designed for high voltage, high speed switching applications in power suppliers, converters and PWM motor controls , these devices are particularly well suited for bridge circuits where diode speed and commutating safe operating areas are critical and offer additional and safety margin against unexpected voltage transients.

FEATURES

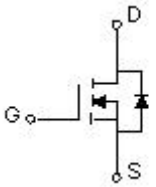
- Robust High Voltage Termination
- Avalanche Energy Specified
- Source-to-Drain Diode Recovery Time Comparable to a Discrete Fast Recovery Diode
- Diode is Characterized for Use in Bridge Circuits
- I_{DSS} and $V_{DS(on)}$ Specified at Elevated Temperature

MARKING



U02N60M1= Device code
Solid dot = Green molding compound device, if none, the normal device
XXXX=Code

EQUIVALENT CIRCUIT



Maximum ratings (T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	600	V
Gate-Source Voltage	V_{GS}	±30	
Continuous Drain Current	I_D ①	2	A
Pulsed Drain Current	I_{DM} ②	8	
Single Pulsed Avalanche Energy	E_{AS} ③	88	mJ
Power Dissipation	P_D ①	31	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$ ⑥	100	℃/W
Thermal Resistance from Junction to Case	$R_{\theta JC}$ ①	4	℃/W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 ~+150	℃

MOSFET ELECTRICAL CHARACTERISTICS

T_J =25℃ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	600			V
Zero gate voltage drain current	I_{DSS}	V_{DS}=600V, V_{GS} =0V			1.0	μA
Gate-body leakage current	I_{GSS}	V_{DS}=0V, V_{GS} =±30V			±100	nA
On characteristics ④						
Gate-threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D =250μA	2.0	3.4	4.0	V
Static drain-source on-sate resistance	$R_{DS(on)}$	V_{GS}=10V, I_D =1A		2.7	3.7	Ω
Dynamic characteristics ⑤						
Input capacitance	C_{iss}	V_{DS} =25V,V_{GS} =0V, f =1MHz		322		pF
Output capacitance	C_{oss}			38		
Reverse transfer capacitance	C_{rss}			7		
Gate resistance	R_g	f =1MHz		5.7		Ω
Switching characteristics ⑤						
Total gate charge	Q_g	V_{GS}=10V, V_{DS}=25V, I_D=2A		1.6		nC
Gate-source charge	Q_{gs}			2.1		
Gate-drain charge	Q_{gd}			6.2		
Turn-on delay time	$t_{d(on)}$	V_{DD}=25V, V_{GS}=10V, R_G=18Ω, I_D =2A		1.8		nS
Turn-on rise time	t_r			3.2		
Turn-off delay time	$t_{d(off)}$			7.4		
Turn-off fall time	t_f			7.6		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V_{SD} ④	V_{GS} =0V, I_S=2A			1.4	V
Continuous drain-source diode forward current	I_S ①				2.0	A
Pulsed drain-source diode forward current	I_{SM} ②				8.0	A
Reverse recovery time	trr	dIF/dt = 100A/μs, I_S = 2A, V_{DD} = 400V		192		ns
Reverse recovery charge	Qrr			1027		nC

Notes:

1.T_C=25℃ Limited only by maximum temperature allowed.

2.P_W≤10μs, Duty cycle≤1%.

3.EAS condition: V_{DD}=150V,V_{GS}=10V, L=10mH, Rg=25Ω Starting T_J = 25℃.

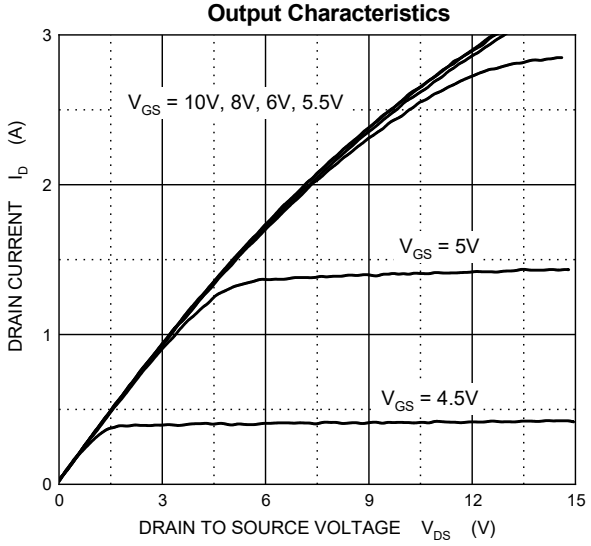
4.Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.

5.Guaranteed by design, not subject to production.

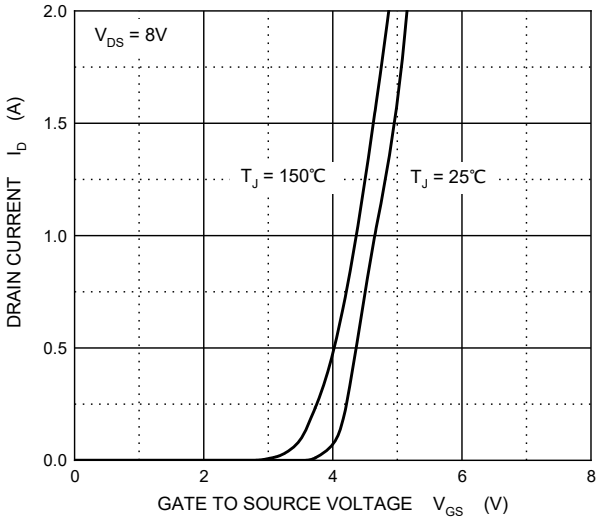
6.The value of RθJA is measured with the device in a still air environment with T_A=25℃.

Typical Characteristics

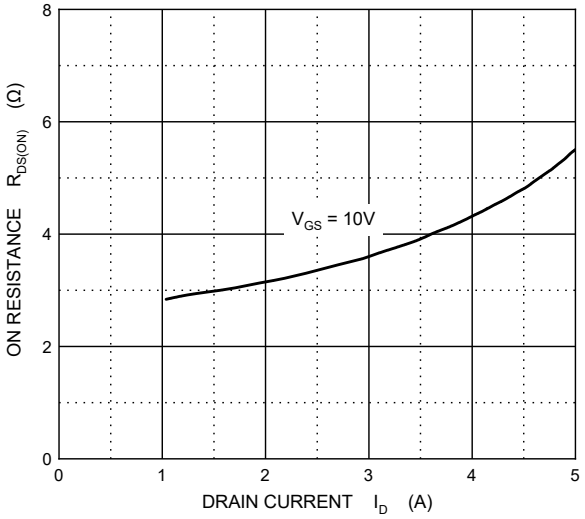
Output Characteristics



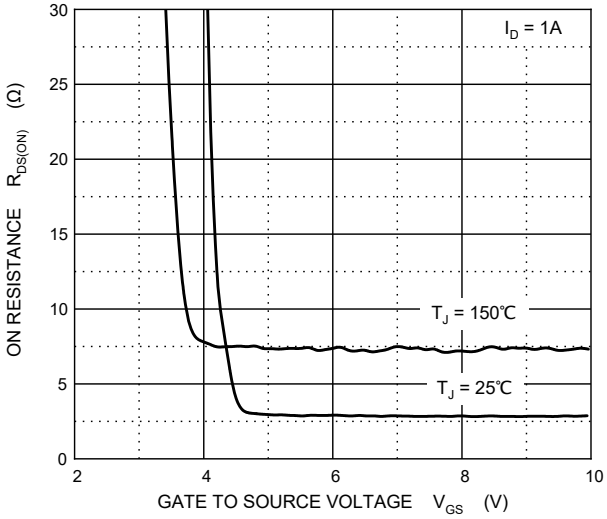
Transfer Characteristics



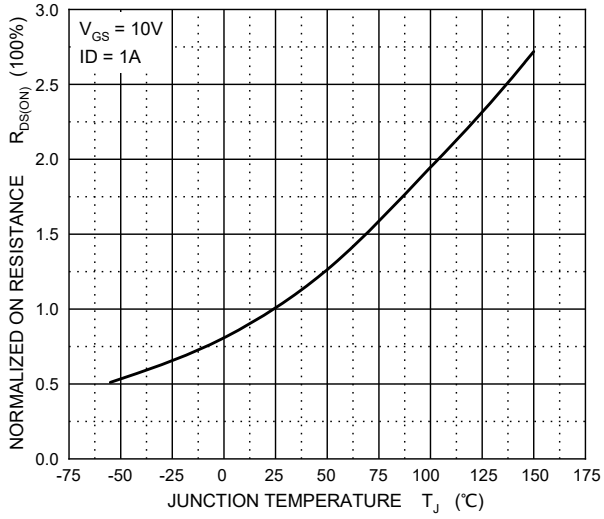
On Resistance vs. Drain Current



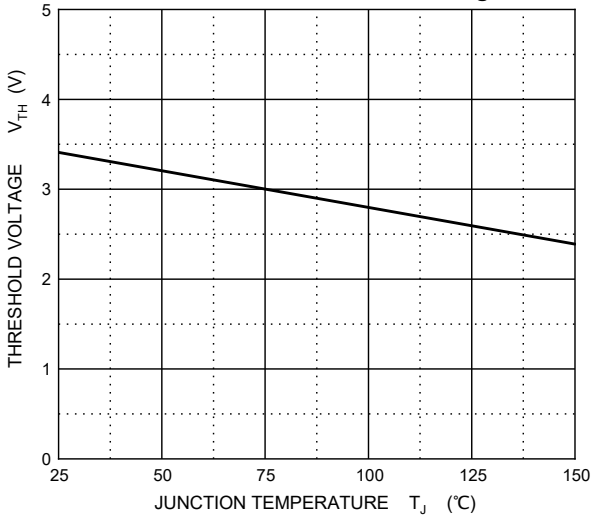
On Resistance vs. Gate-Source Bias



On Resistance vs. Junction Temperature

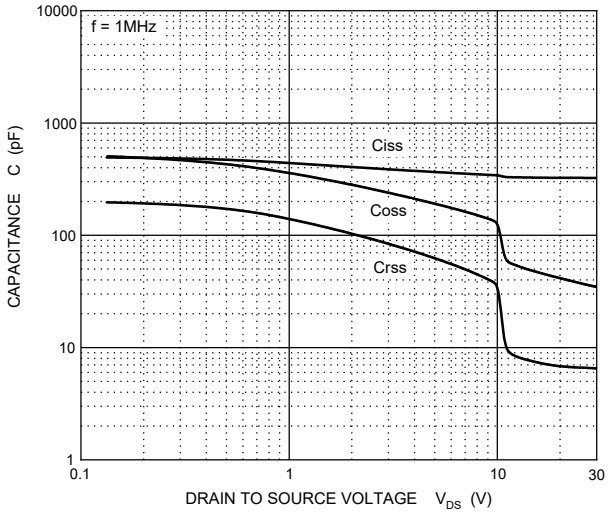


Gate-Source Threshold Voltage

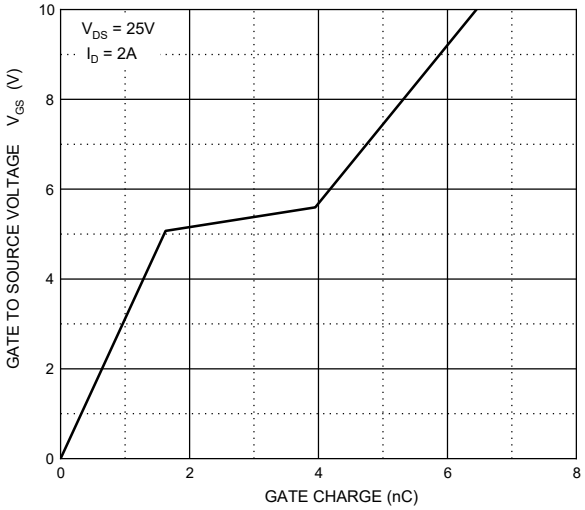


Typical Characteristics

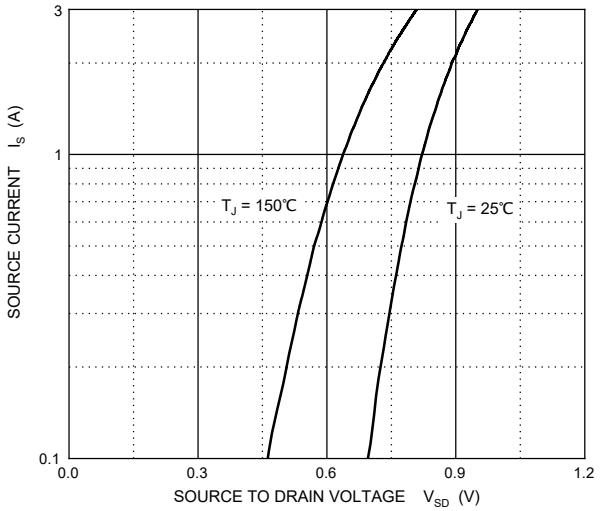
Typical Capacitances



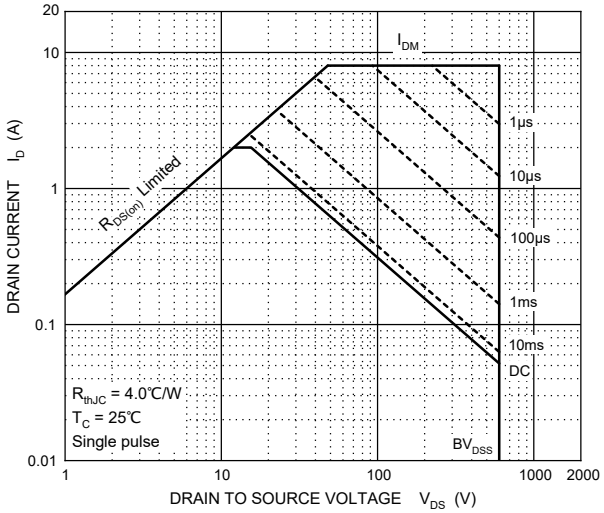
Gate Charge



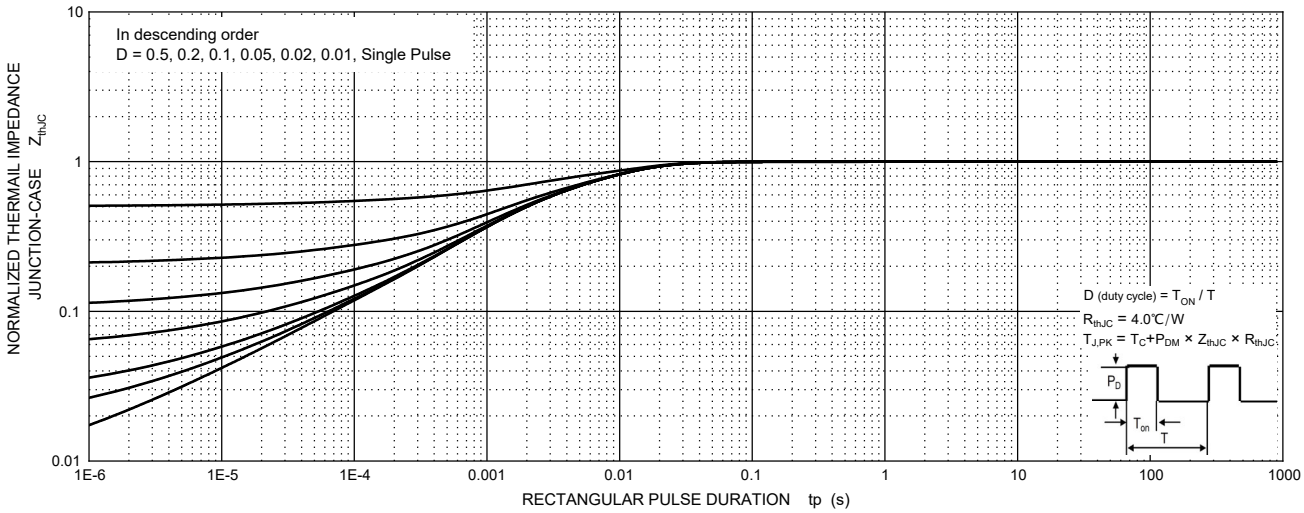
Source-Drain Diode Forward Characteristics



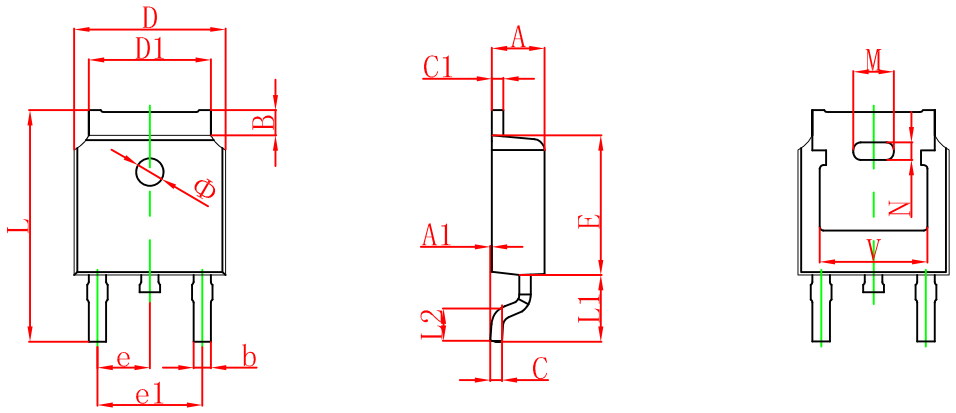
Maximum Safe Operating Area



Transient Thermal Impedance, Junction-Case

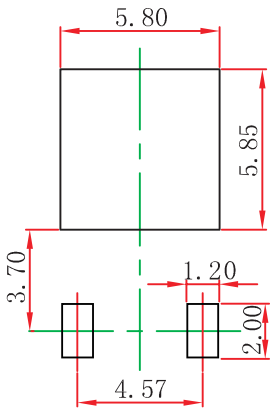


TO-252(4R)-2L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.380	0.087	0.094
A1	0.000	0.100	0.000	0.004
B	0.800	1.400	0.031	0.055
b	0.710	0.810	0.028	0.032
c	0.460	0.560	0.018	0.022
c1	0.460	0.560	0.018	0.022
D	6.500	6.700	0.256	0.264
D1	5.130	5.460	0.202	0.215
E	6.000	6.200	0.236	0.244
e	2.286 TYP.		0.090 TYP.	
e1	4.327	4.727	0.170	0.186
M	1.778REF.		0.070REF.	
N	0.762REF.		0.018REF.	
L	9.800	10.400	0.386	0.409
L1	2.9REF.		0.114REF.	
L2	1.400	1.700	0.055	0.067
V	4.830 REF.		0.190 REF.	
Φ	1.100	1.300	0.043	0.051

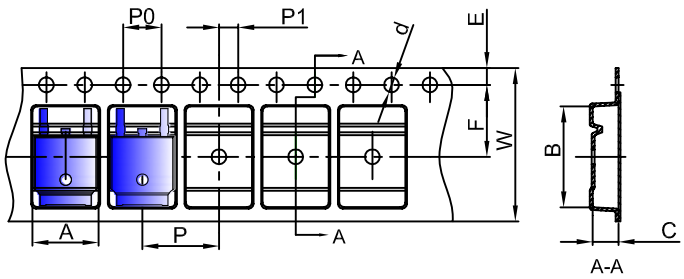
TO-252(4R)-2L Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

To-252(4R)-2L Tape and Reel

TO-252 Embossed Carrier Tape

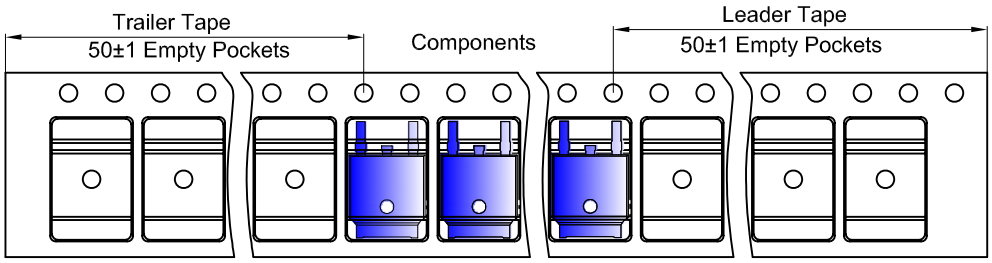


Packaging Description:

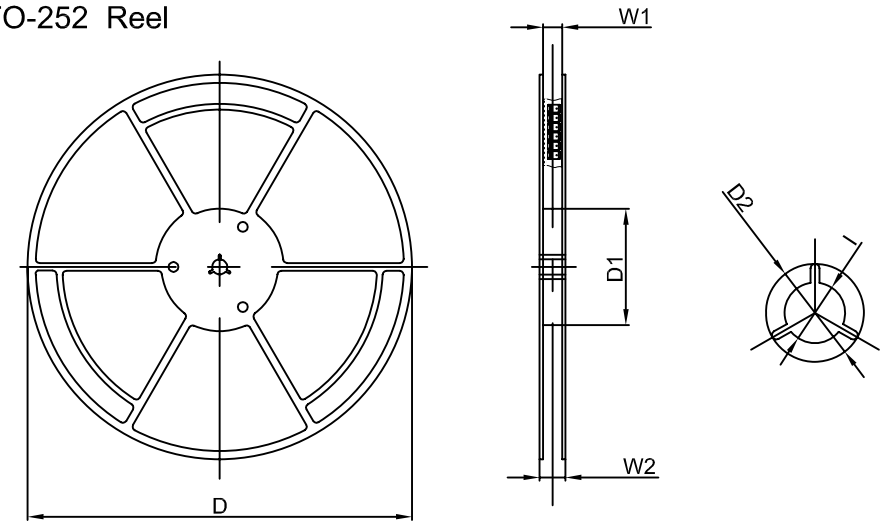
TO-252 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 25,00 units per 13" or 33.0 cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
TO-252	6.90	10.50	2.70	Ø1.55	1.75	7.50	4.00	8.00	2.00	16.00
(Tolerance)	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+/-0.1	+0.3/-0.1

TO-252 Tape Leader and Trailer



TO-252 Reel



Dimensions are in millimeter						
Reel Option	D	D1	D2	W1	W2	I
13"Dia	330.00	100.00	Ø21.00	16.40	21.00	Ø13.00
Tolerance	+/-2	+/-1	+/-1	+/-1	+/-1	+/-1

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
2,500 pcs	13inch	2,500 pcs	340×336×29	25,000 pcs	353×346×365	14.04