

TM30N06DF

N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

General Features

$V_{DS} = 60V$ $I_D = 30A$

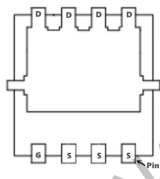
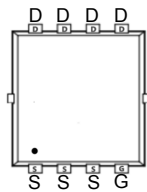
$R_{DS(ON)} = 24m\Omega$ (typ.) @ $V_{GS} = 10V$

100% UIS Tested

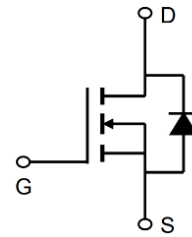
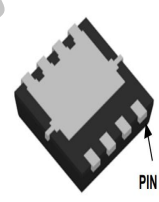
100% R_g Tested



DF:PDFN3x3-8L



Marking 30N06



Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $-V_{GS} @ -10V^1$	30	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $-V_{GS} @ -10V^1$	16	A
I_{DM}	Pulsed Drain Current ²	74	A
EAS	Single Pulse Avalanche Energy ³	22	mJ
IAS	Avalanche Current	13	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation ⁴	31.3	W
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	3.12	$^\circ C/W$

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Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	65	---	V
$\Delta BVDSS/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.044	---	$V/^{\circ}\text{C}$
RDS(ON)	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=15A$	---	24	30	$m\Omega$
		$V_{GS}=4.5V, I_D=7A$	---	29	38	$m\Omega$
VGS(th)	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.6	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.8	---	$mV/^{\circ}\text{C}$
IDSS	Drain-Source Leakage Current	$V_{DS}=48V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=48V, V_{GS}=0V, T_J=55^{\circ}\text{C}$	---	---	5	
IGSS	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=5V, I_D=15A$	---	25.3	---	S
Rg	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	---	2.5	---	Ω
Qg	Total Gate Charge (10V)	$V_{DS}=48V, V_{GS}=10V, I_D=15A$	---	19	---	nC
Qgs	Gate-Source Charge		---	2.5	---	
Qgd	Gate-Drain Charge		---	5	---	
Td(on)	Turn-On Delay Time	$V_{DD}=30V, V_{GS}=10V, R_G=3.3\Omega, I_D=15A$	---	2.8	---	ns
Tr	Rise Time		---	16.6	---	
Td(off)	Turn-Off Delay Time		---	21.2	---	
Tf	Fall Time		---	5.6	---	
Ciss	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1MHz$	---	1027	---	pF
Coss	Output Capacitance		---	65	---	
Crss	Reverse Transfer Capacitance		---	46	---	
Is	Continuous Source Current ^{1,6}	$V_G=V_D=0V, \text{Force Current}$	---	---	30	A
ISM	Pulsed Source Current ^{2,6}		---	---	40	A
VSD	Diode Forward Voltage ²	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$	---	---	1.2	V
trr	Reverse Recovery Time	$I_F=15A, dI/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	---	12.2	---	nS
Qrr	Reverse Recovery Charge	$T_J=25^{\circ}\text{C}$	---	7.3	---	nC

Note :

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width .The EAS data shows Max. rating .
- 3、The test cond $\leq 300\mu s$ duty cycle $\leq 2\%$, duty cycle ition is $T_J=25^{\circ}\text{C}$, $V_{DD}=48V$, $V_G=10V$, $R_G=25\Omega$, $L=0.1mH$, $I_{AS}=13A$
- 4、The power dissipation is limited by 175°C junction temperature
- 5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.



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Typical Characteristics

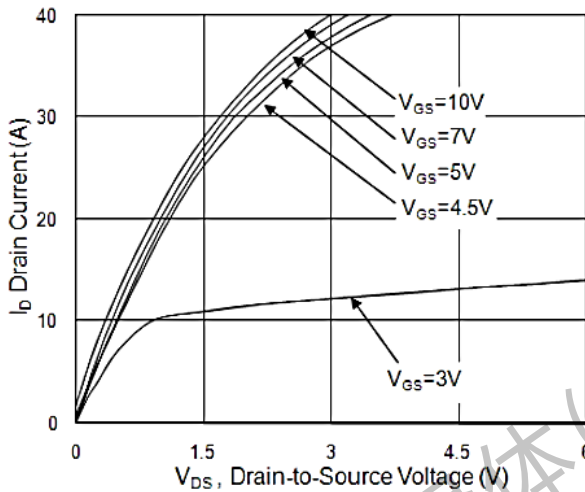


Fig.1 Typical Output Characteristics

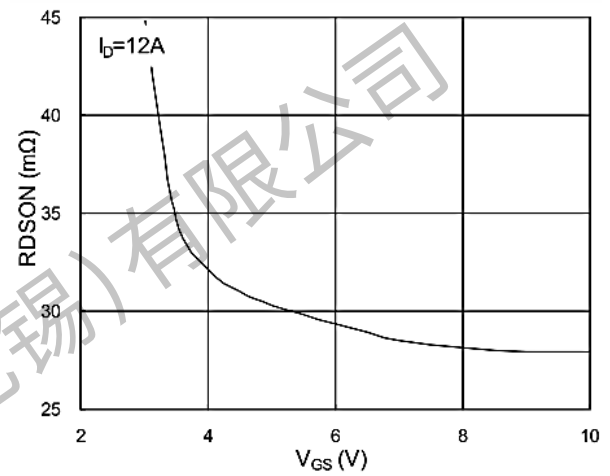


Fig.2 On-Resistance vs. Gate-Source

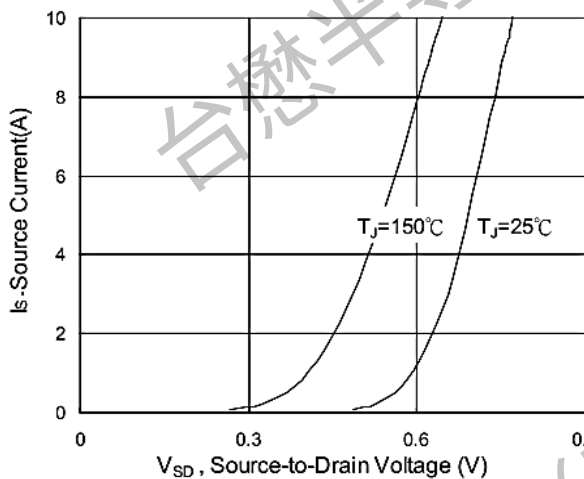


Fig.3 Forward Characteristics Of Reverse

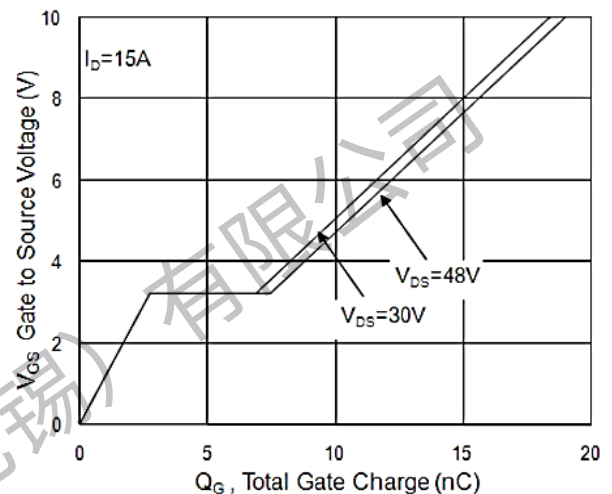


Fig.4 Gate-Charge Characteristics

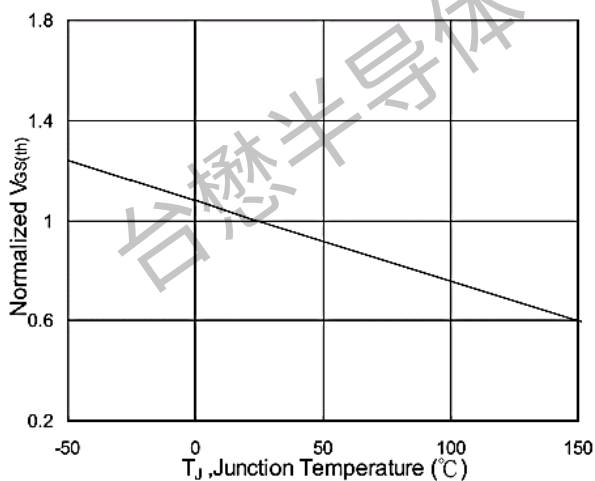


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

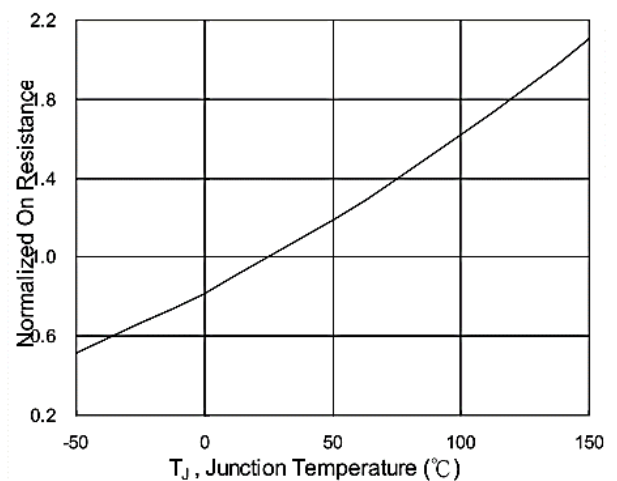


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

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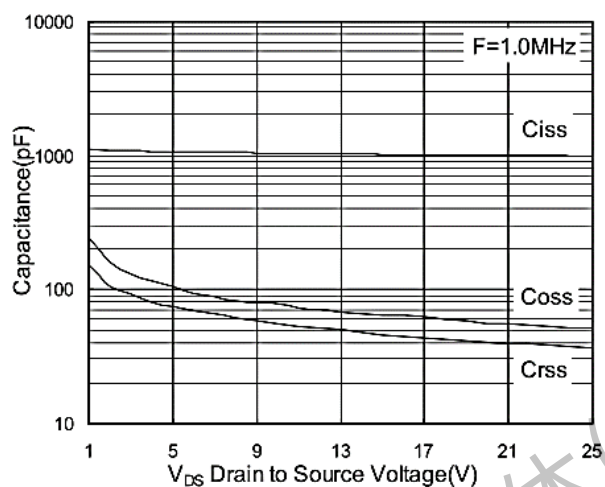


Fig.7 Capacitance

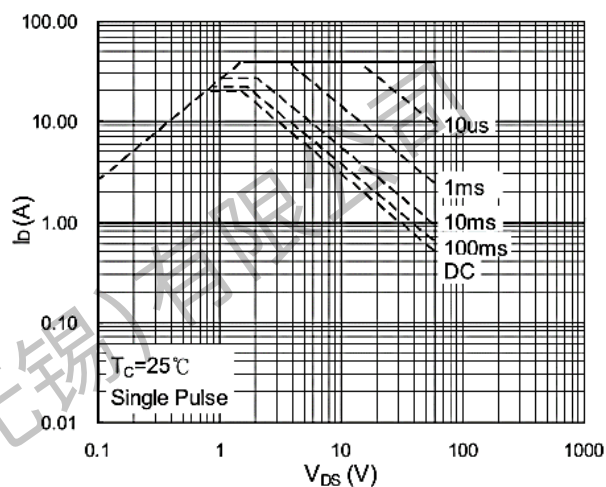


Fig.8 Safe Operating Area

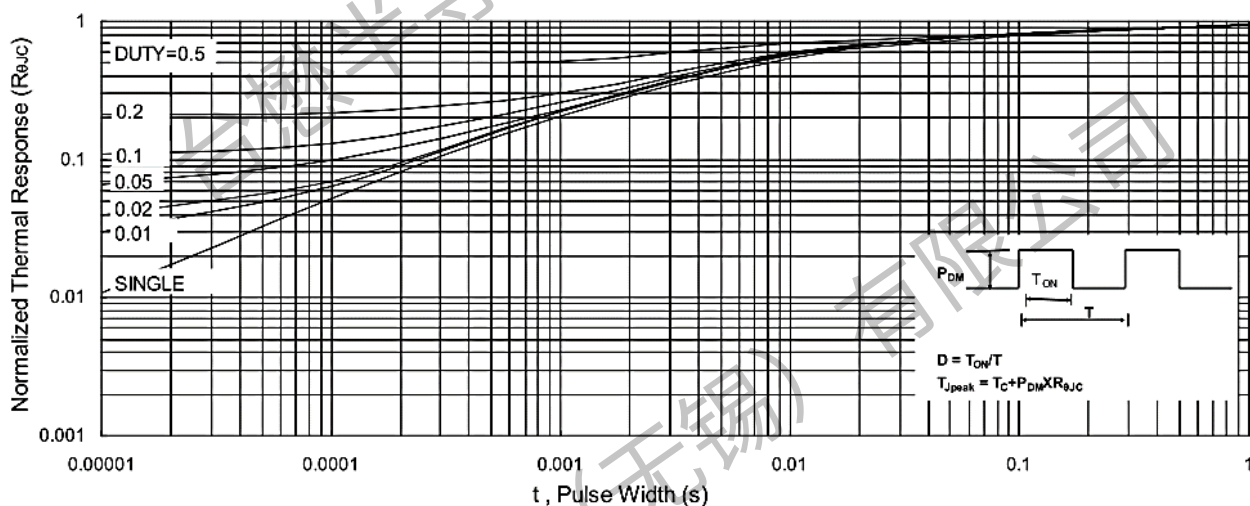


Fig.9 Normalized Maximum Transient Thermal Impedance

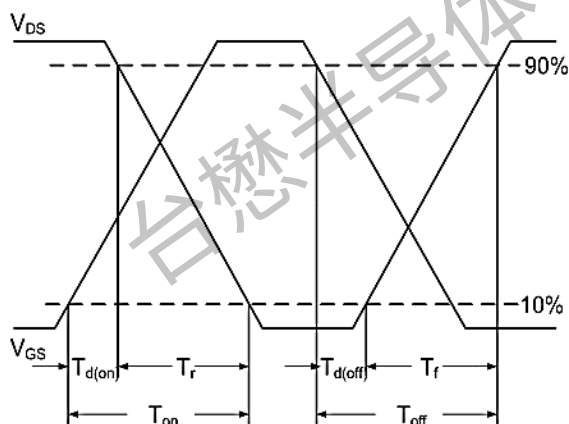


Fig.10 Switching Time Waveform

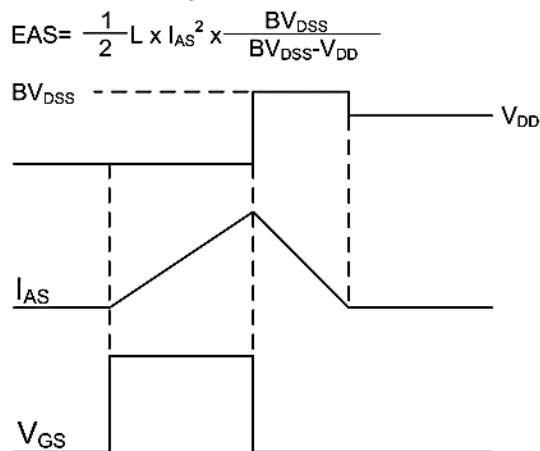
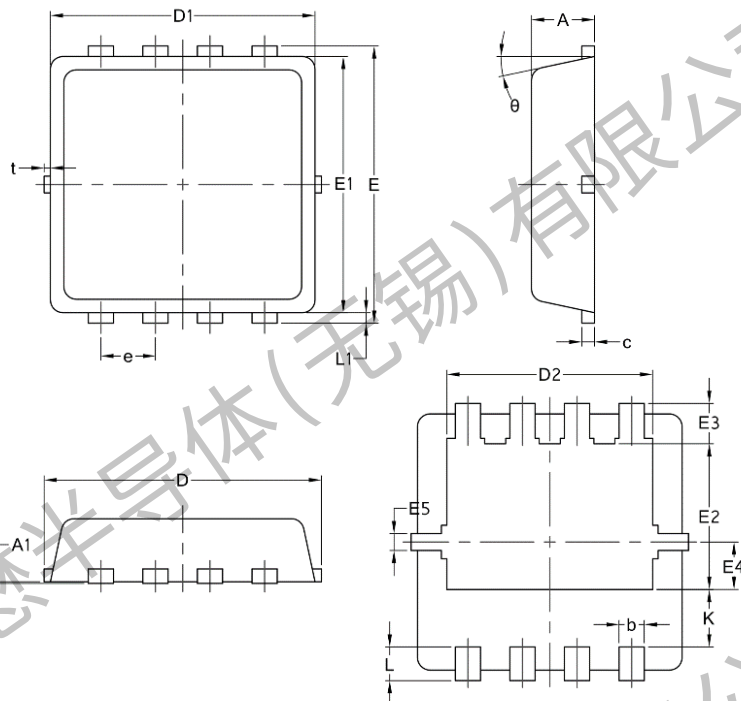


Fig.11 Unclamped Inductive Switching Waveform

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Package Mechanical Data:DFN3x3-8L

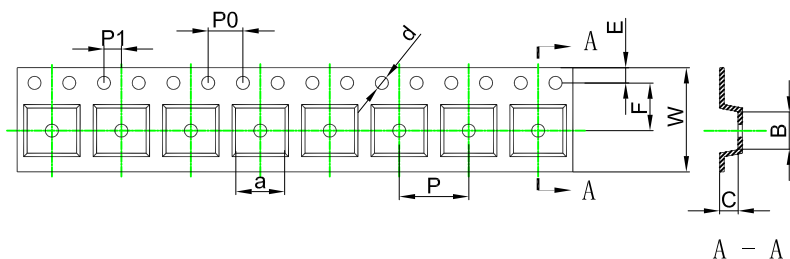


Symbol	Common		
	mm		
	Mim	Nom	Max
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.30	3.45
D1	3.00	3.15	3.25
D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.54	1.74	1.94
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.59	0.69	0.89
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	0	0.075	0.13
Φ	10	12	14

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PDFN3×3-8L Embossed Carrier Tape



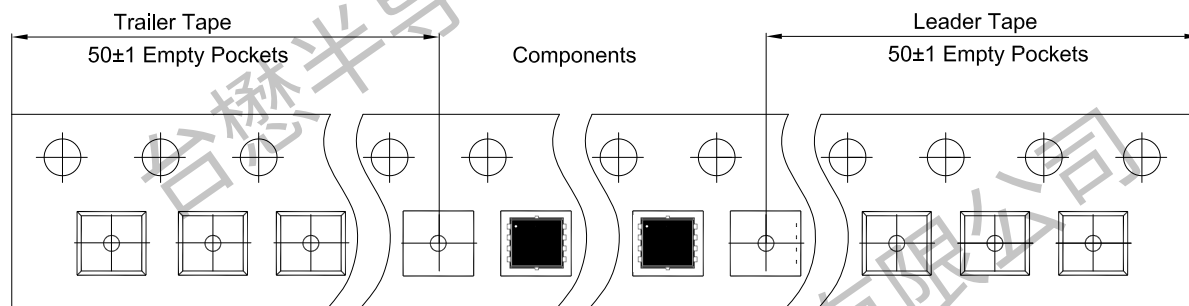
Packaging Description:

SOP-8L 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 2,500 units per 13" or 33cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

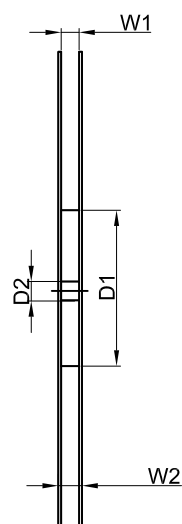
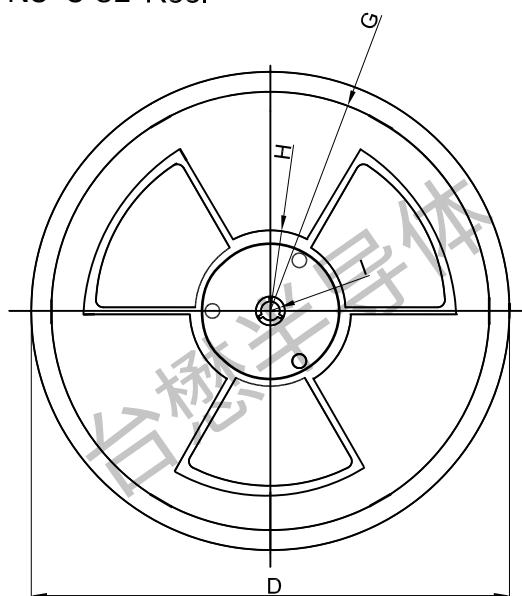
ALL DIM IN mm

Dimensions are in millimeter										
Pkg type	a	B	C	d	E	F	P0	P	P1	W
PDFN3×3-8L	6.40	5.40	2.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

PDFN3×3-8L Tape Leader and Trailer



PDFN3×3-8L Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
13"Dia	Ø330.00	100.00	13.00	R135.00	R55.00	R6.50	12.00	14.00

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
5,000 pcs	13 inch	10,000 pcs	370×355×52	50,000 pcs	400×360×368	

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Revision history:

Date	Rev	Description	Page
2023.06.26	23.06	Original	