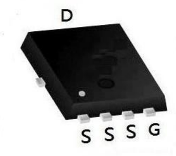
V_{DSS}	30 V
I_D	100 A
$R_{DS(ON)}$	3.3mΩ

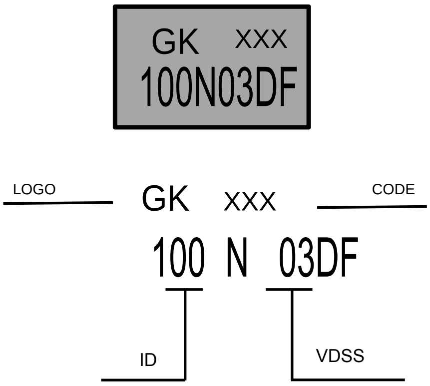
Description

The 100N03DF is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The 100N03DF meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

PDFN3x3

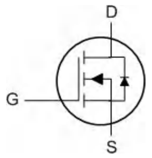




Features

- Super Low Gate Charge
- 100% EAS Guaranteed
- Green Device Available
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

Equivalent Circuit



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		10s	Steady State	
V_{DS}	Drain-Source Voltage	30		V
V_{GS}	Gate-Source Voltage	±20		V
I_D@T_C=25˚C	Continuous Drain Current, V_{GS} @ 10V[1]	100		A
I_D@T_C=100˚C	Continuous Drain Current, V_{GS} @ 10V[1]	50		A
I_D@T_A=25˚C	Continuous Drain Current, V_{GS} @ 10V[1]	30	19	A
I_D@T_A=70˚C	Continuous Drain Current, V_{GS} @ 10V[1]	25	16	A
I_{DM}	Pulsed Drain Current[2]	162		A
EAS	Single Pulse Avalanche Energy[3]	144.7		mJ
I_{AS}	Avalanche Current	53.8		A
P_D@T_C=25˚C	Total Power Dissipation[4]	62.5		W
P_D@T_A=25˚C	Total Power Dissipation[4]	6	2.42	W
T_{STG}	Storage Temperature Range	-55 to 150		˚C
T_J	Operating Junction Temperature Range	-55 to 150		˚C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	62	˚C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1] (t ≤10s)	---	25	˚C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	2.4	˚C/W

Electrical Characteristics (T_J=25℃unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=250μA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =30V, V_{GS} = 0V,	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS} =0V,V_{GS} = ±20V	-	-	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	1.0	1.5	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note3	V_{GS} =10V, I_D =30A	-	3.3	4.7	mΩ
		V_{GS} =4.5V, I_D =20A	-	4.5	7.5	
C_{iss}	Input Capacitance	V_{DS} =15V, V_{GS} =0V, f = 1.0MHz	-	3450	-	pF
C_{oss}	Output Capacitance		-	330	-	pF
C_{rss}	Reverse Transfer Capacitance		-	295	-	pF
Q_g	Total Gate Charge	V_{DS} =15V, I_D =30A, V_{GS} =10V	-	45	-	nC
Q_{gs}	Gate-Source Charge		-	3	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	15	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=15V, I_D=30A, R_{GEN}=3Ω, V_{GS} =10V	-	21	-	ns
t_r	Turn-on Rise Time		-	32	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	59	-	ns
t_f	Turn-off Fall Time		-	34	-	ns
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	50	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	200	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S=30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F=20A,dI/dt=100A/μs	-	15	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	4	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: T_J=25℃, V_G=10V, R_G=25Ω， L=0.5mH， I_{AS}=18.4A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

RATING AND CHARACTERISTIC CURVES

Figure1: Output Characteristics

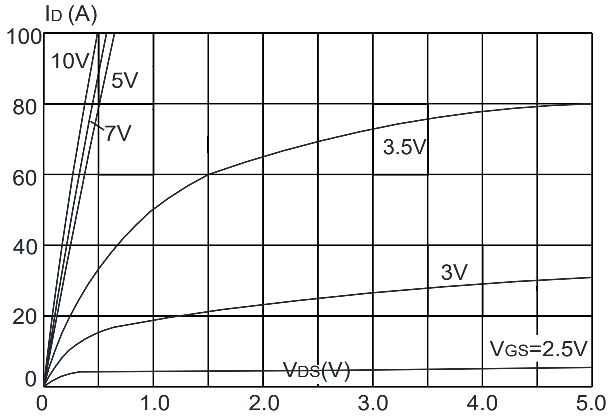


Figure 2: Typical Transfer Characteristics

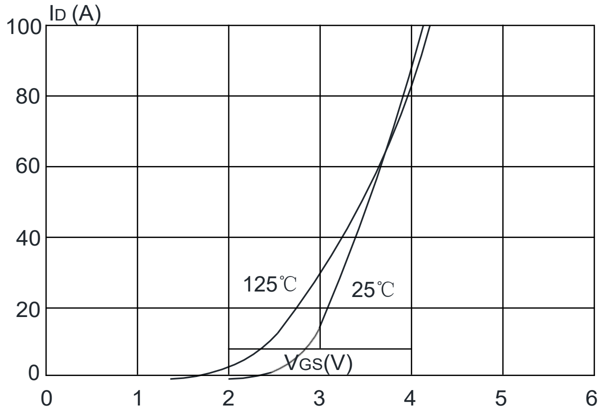


Figure 3: On-resistance vs. Drain Current

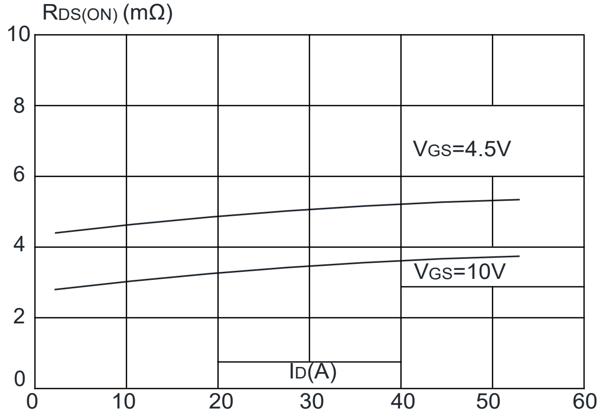


Figure 4: Body Diode Characteristics

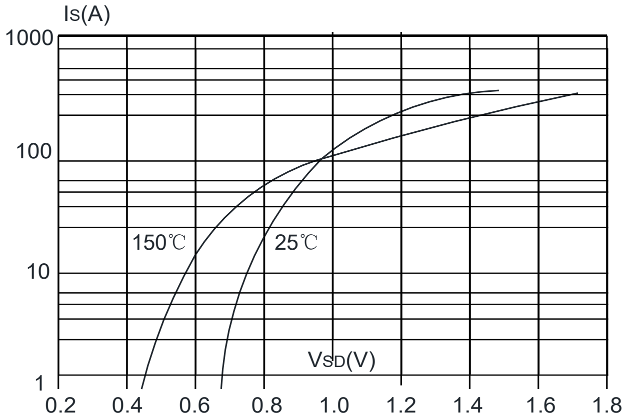


Figure 5: Gate Charge Characteristics

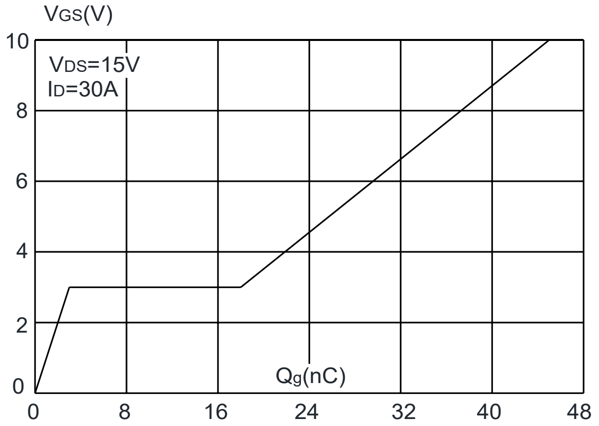
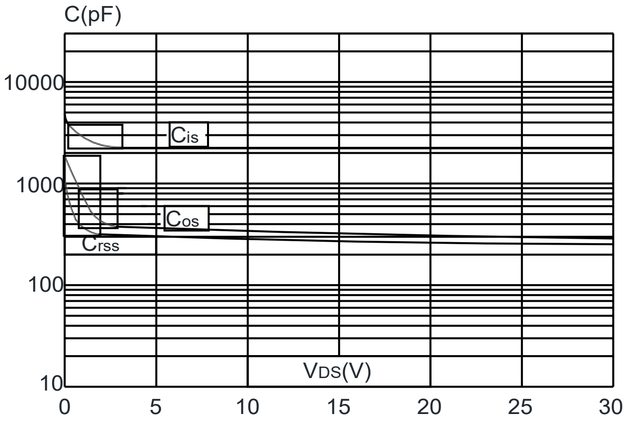


Figure 6: Capacitance Characteristics



RATING AND CHARACTERISTIC CURVES

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

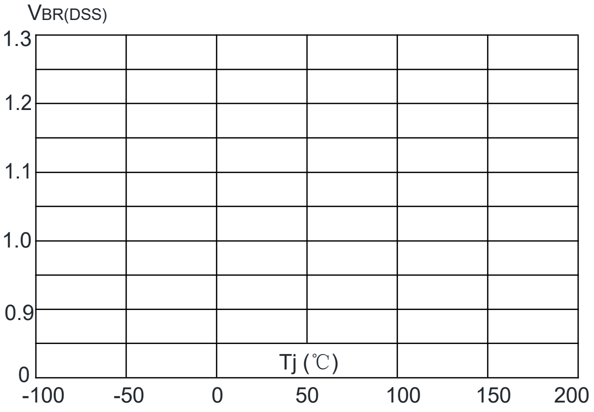


Figure 8: Normalized on Resistance vs. Junction Temperature

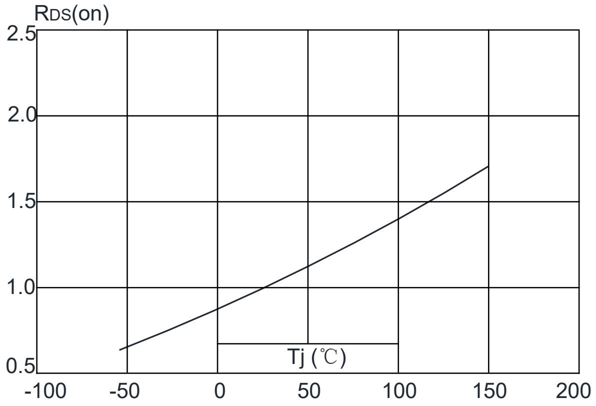


Figure 9: Maximum Safe Operating Area

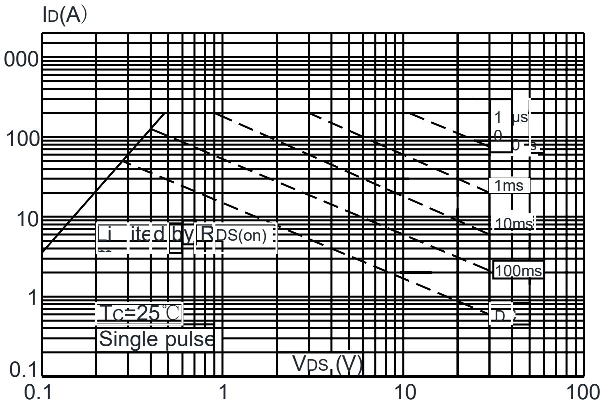


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

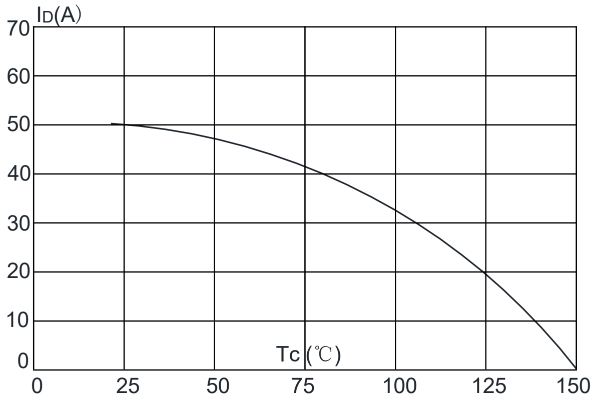
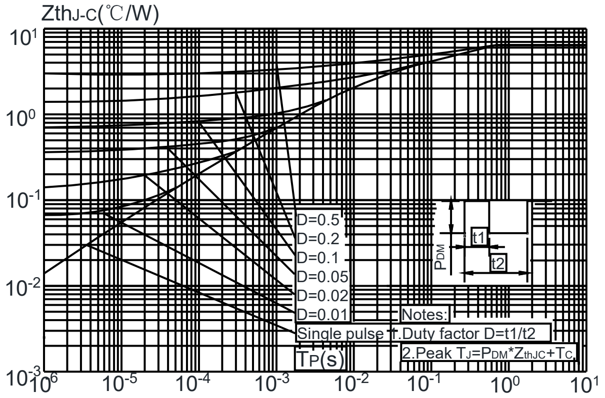


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case (PDFN3.3*3.3-8L)



Test Circuit

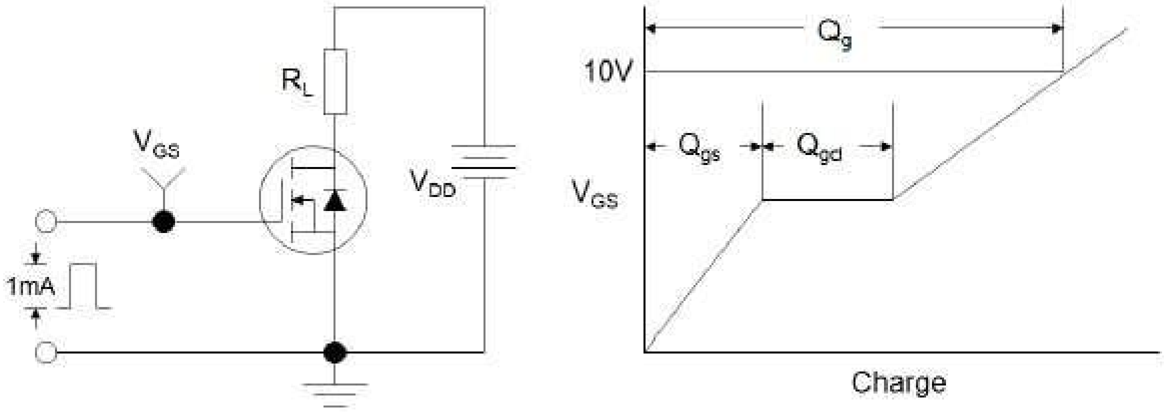


Figure1:Gate Charge Test Circuit & Waveform

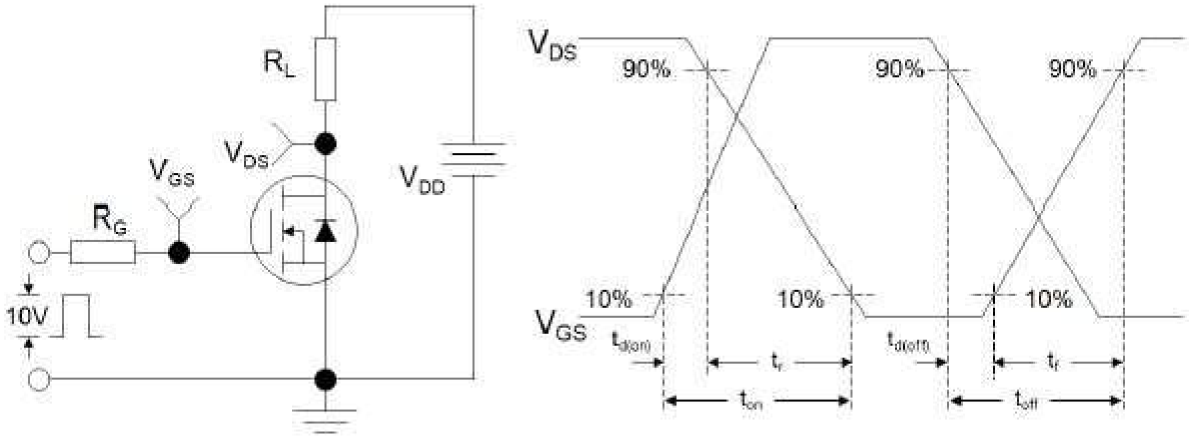


Figure 2: Resistive Switching Test Circuit & Waveforms

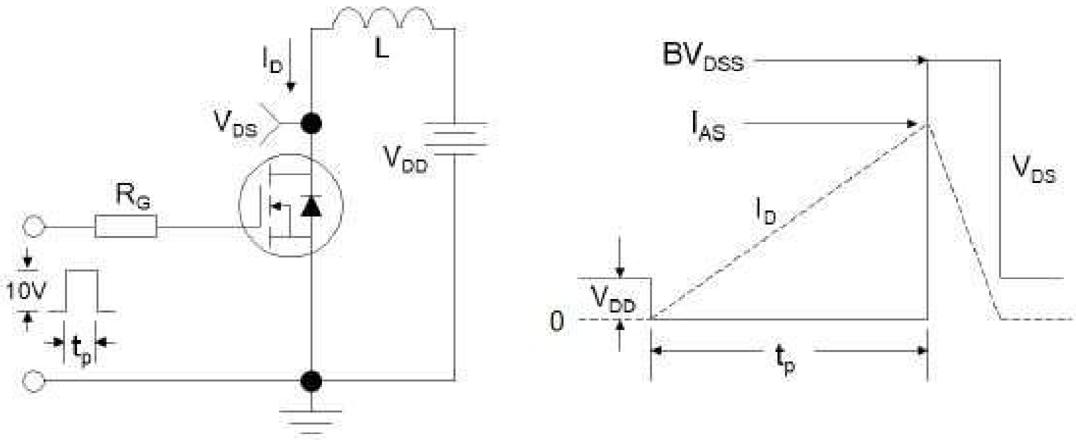
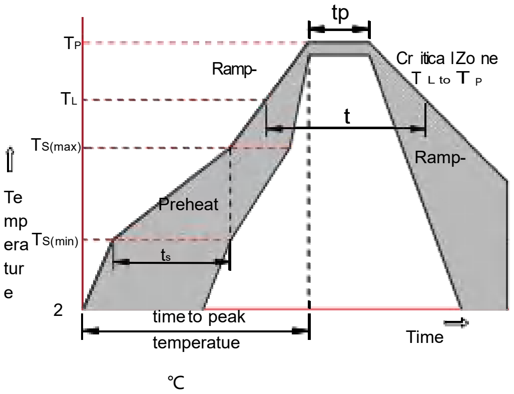


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

Soldering parameters

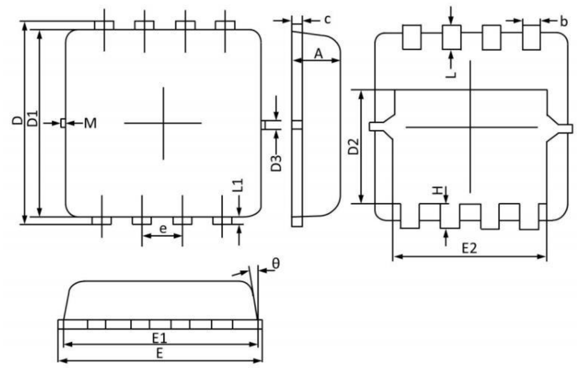
Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150℃
	-Temperature Max($T_{s(max)}$)	+200℃
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3℃/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3℃/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217℃
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_p)		+260(+0/-5)℃
Time within 5℃ of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6℃/sec. Max
Time 25℃ to Peak Temp (T_P)		8 min. Max
Do not exceed		+260℃

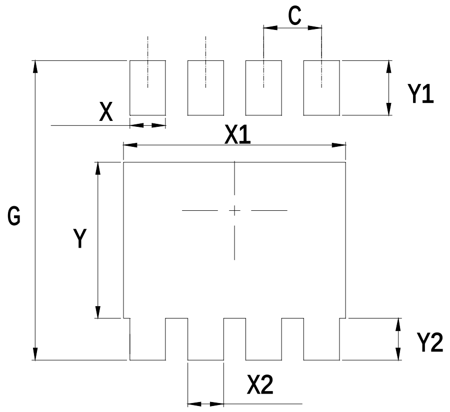
FIG5: Reflow condition



Package Dimensions & Suggested Pad Layout

PDFN3X3 Package Information





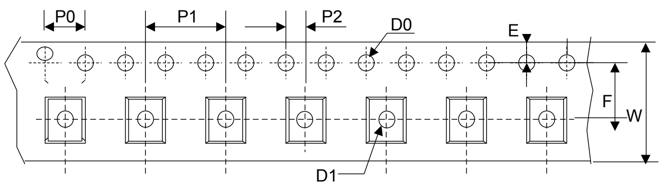
DIMENSIONS (unit : mm)

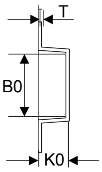
Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.70	0.75	0.80	**b**	0.25	0.30	0.35
C	0.10	0.15	0.25	**D**	3.25	3.35	3.45
D1	3.00	3.10	3.20	**D2**	1.78	1.88	1.98
D3	--	0.13	--	**E**	3.20	3.30	3.40
E1	3.00	3.15	3.20	**E2**	2.39	2.49	2.59
e	0.65BSC			**H**	0.30	0.39	0.50
L	0.30	0.40	0.50	**L1**	--	0.13	--
θ	--	10°	12°	**M**	*	*	0.15

Dimensions	Value (in mm)
C	0.65
G	3.60
X	0.40
X1	2.60
X2	0.40
Y	1.95
Y1	0.62
Y2	0.55

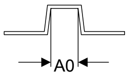
Tape & rell specification

Tape



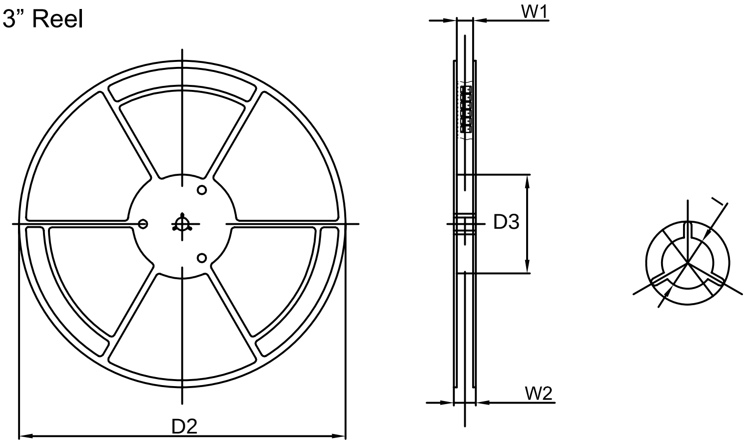


SECTION : B-B



SECTION : A-A

13” Reel



Symbol	Dimension (mm)
P0	4.00±0.20
P1	8.00±0.20
P2	2.00±0.20
D0	1.55±0.20
D1	1.55±0.20
E	1.75±0.20
F	5.50±0.20
W	12.00±0.20
A0	3.90±0.20
B0	3.80±0.20
K0	1.20±0.20
T	0.20±0.20
D2	330.0±5.0
D3	100.0±4.0
W1	12.0±5.0
W2	14.0±5.0
I	13.0±2.0

Quantity: 5000PCS