UNIKC
Semiconductor

P2206BK
N-Channel Enhancement Mode MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
60V	22.5mΩ @V_{GS} = 10V	24A
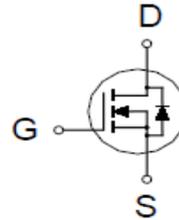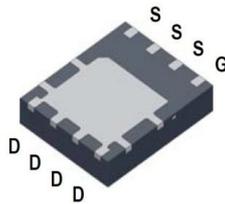
PDFN 5X6P

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C = 25 °C	I_D	24	A
	T_C = 100 °C		15	
Pulsed Drain Current[1]		I_{DM}	80	
Continuous Drain Current	T_A = 25 °C	I_D	8	
	T_A = 70 °C		6.8	
Avalanche Current		I_{AS}	26	
Avalanche Energy	L = 0.1mH	E_{AS}	33.8	mJ
Power Dissipation	T_C = 25 °C	P_D	30	W
	T_C = 100 °C		12	
Power Dissipation[3]	T_A = 25 °C	P_D	3.6	W
	T_A = 70 °C		2.3	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE		SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Ambient[2]	t $\leqq$ 10s	$R_{\theta JA}$		35	
Junction-to-Ambient[2]	Steady-State	$R_{\theta JA}$		65	°C / W
Junction-to-Case	Steady-State	$R_{\theta JC}$		4.2	

[1]Pulse width limited by maximum junction temperature.

[2]The value of $R_{\theta JA}$ is measured with the device mounted on 1in[2] FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.

[3]The Power dissipation is based on $R_{\theta JA}$ t $\leqq$ 10s value.

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ELECTRICAL CHARACTERISTICS (T_J = 25 °C, Unless Otherwise Noted)

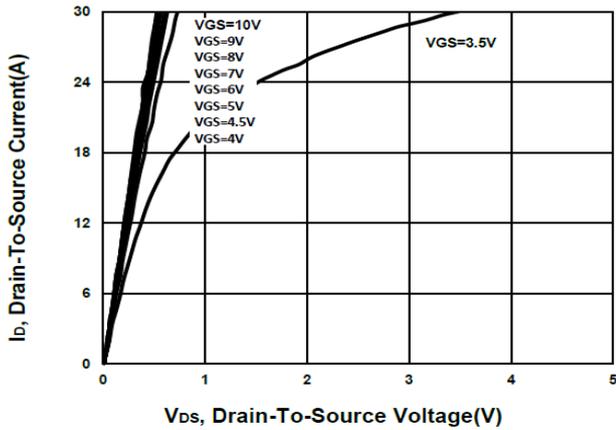| PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNITS
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250µA	60			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	1.3	1.75	2.3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 48V, V_{GS} = 0V			1	µA
		V_{DS} = 40V, V_{GS} = 0V, T_J = 55 °C			10	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 4.5V, I_D = 8A		19	30	mΩ
		V_{GS} = 10V , I_D = 8A		16.5	22.5	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 8A		35		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		1039		pF
Output Capacitance	C_{oss}			123		
Reverse Transfer Capacitance	C_{rss}			82		
Gate Resistance	R_g	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz		1		Ω
Total Gate Charge[2]	Q_g V_{GS} =10V	V_{DS} = 30V, I_D = 8A		23		nC
	V_{GS} = 4.5V			13		
Gate-Source Charge[2]	Q_{gs}			3.4		
Gate-Drain Charge[2]	Q_{gd}			7.6		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DS} = 30V, $I_D \cong$ 8A, V_{GS} = 10V, R_{GEN} = 6Ω		38		nS
Rise Time[2]	t_r			22		
Turn-Off Delay Time[2]	$t_{d(off)}$			100		
Fall Time[2]	t_f			32		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)						
Continuous Current	I_S				2.7	A
Forward Voltage[1]	V_{SD}	I_F = 8A, V_{GS} = 0V			1.3	V
Reverse Recovery Time	t_{rr}	I_F = 8A, dI_F/dt = 100A / µS		20		nS
Reverse Recovery Charge	Q_{rr}			11		nC

[1]Pulse test : Pulse Width $\le$ 300 µsec, Duty Cycle $\le$ 2%.

[2]Independent of operating temperature.
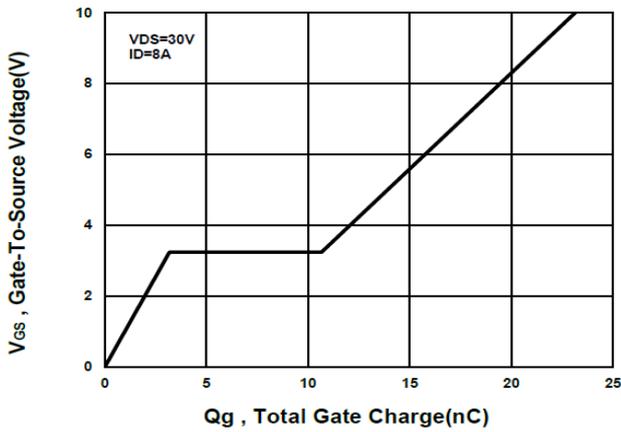
P2206BK
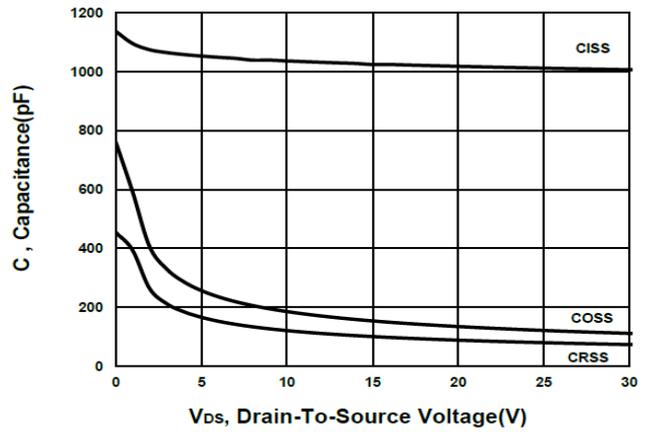## N-Channel Enhancement Mode MOSFET

Output Characteristics

I_D, Drain-To-Source Current(A) vs V_{DS}, Drain-To-Source Voltage(V)

VGS=10V
VGS=9V
VGS=8V
VGS=7V
VGS=6V
VGS=5V
VGS=4.5V
VGS=4V
VGS=3.5V

Transfer Characteristics

I_D, Drain-To-Source Current(A) vs V_{GS}, Gate-To-Source Voltage(V)

125℃   -20℃
25℃
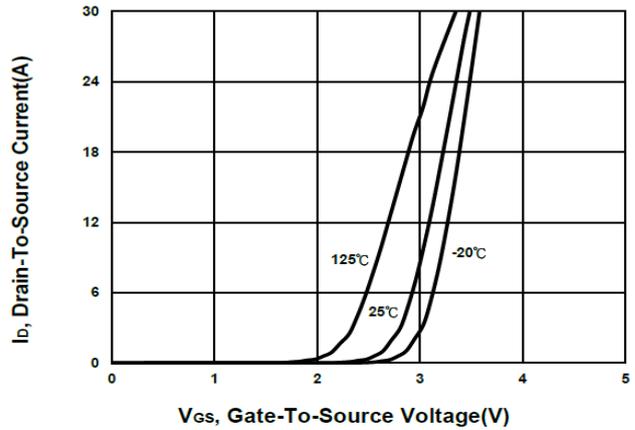
Gate charge Characteristics

V_{GS}, Gate-To-Source Voltage(V) vs Q_g, Total Gate Charge(nC)

VDS=30V
ID=8A

Capacitance Characteristic

C, Capacitance(pF) vs V_{DS}, Drain-To-Source Voltage(V)

CISS
COSS
CRSS

On-Resistance VS Gate-To-Source

$R_{DS(ON)}$ON-Resistance(OHM) vs V_{GS}, Gate-To-Source Voltage(V)

ID=8A
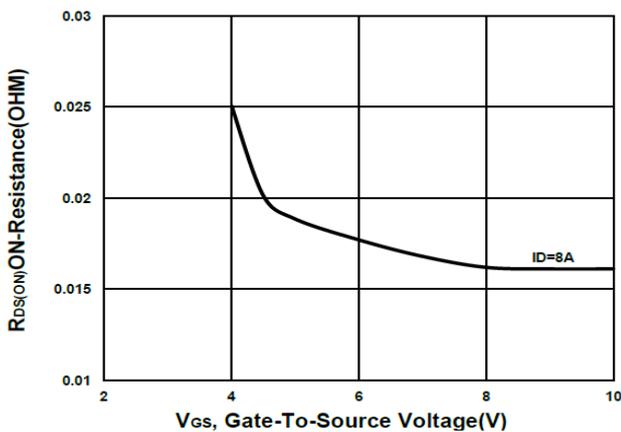
On-Resistance VS Drain Current

$R_{DS(ON)}$ON-Resistance(OHM) vs I_D, Drain-To-Source Current(A)

VGS=4.5V
VGS=10V
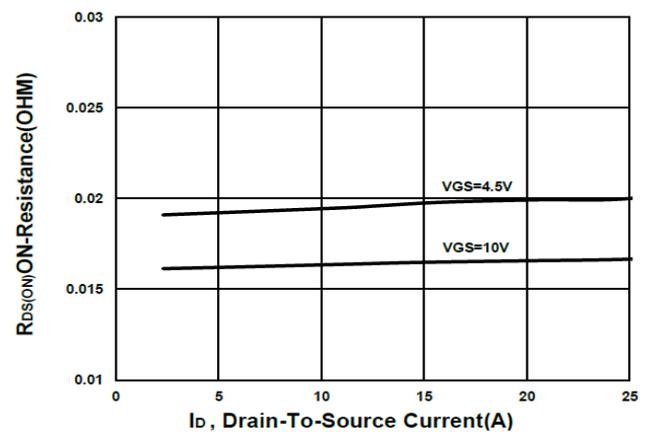
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On-Resistance VS Temperature

X-axis: T_J, Junction Temperature(°C) (-50 to 150)
Y-axis: Normalized Drain to Source ON-Resistance (0.4 to 2.2)

VGS=10V
ID=8A
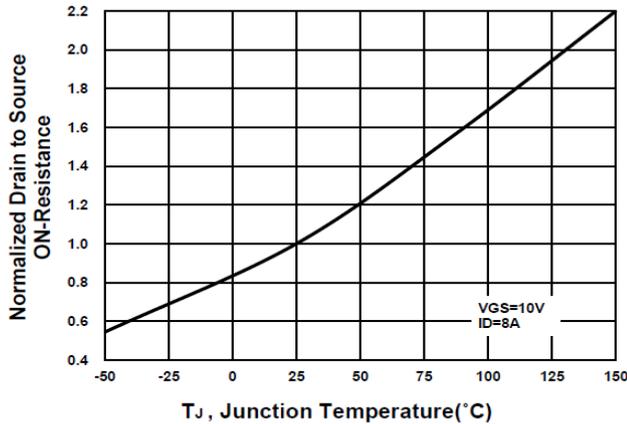
Source-Drain Diode Forward Voltage
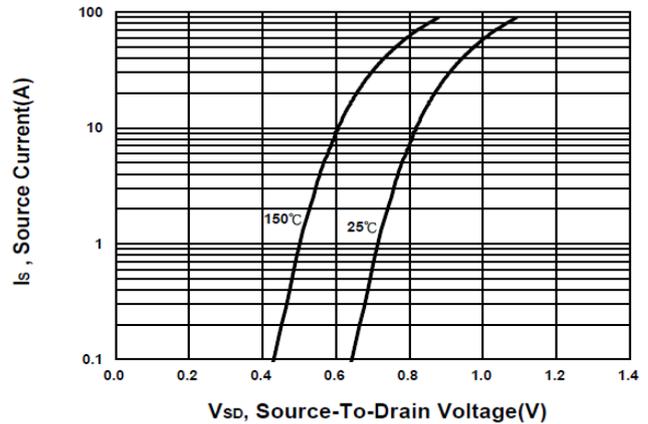
X-axis: V_{SD}, Source-To-Drain Voltage(V) (0.0 to 1.4)
Y-axis: I_S, Source Current(A) (0.1 to 100)

150℃   25℃

Safe Operating Area

X-axis: V_{DS}, Drain-To-Source Voltage(V) (0.1 to 1000)
Y-axis: I_D, Drain Current(A) (0.01 to 1000)

Operation in This Area
is Limited by RDS(ON)

1ms
10ms
100ms
DC

NOTE:
1.VGS= 10V
2.TA=25°C
3.RθJA = 65°C/W
4.Single Pulse
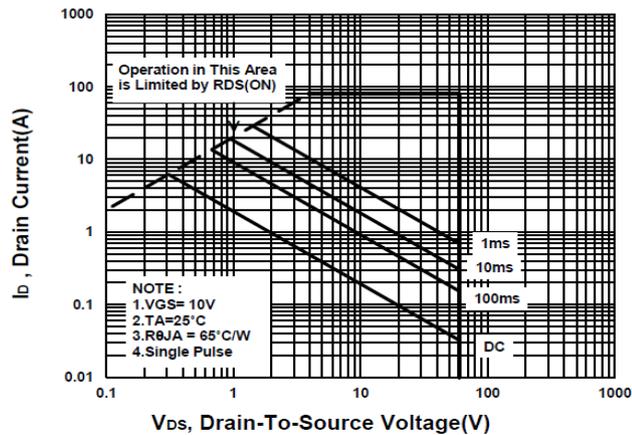
Single Pulse Maximum Power Dissipation

X-axis: Single Pulse Time(s) (0.001 to 100)
Y-axis: Power(W) (0 to 50)
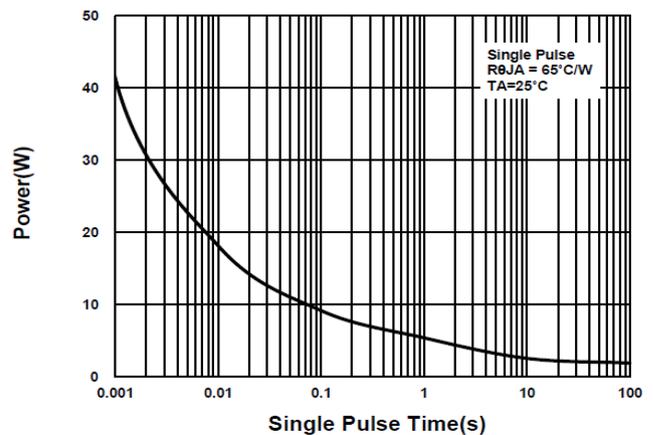
Single Pulse
RθJA = 65°C/W
TA=25°C

Transient Thermal Response Curve

X-axis: T_1, Square Wave Pulse Duration[sec] (0.0001 to 100)
Y-axis: r(t), Normalized Effective Transient Thermal Resistance (0.01 to 10)

Duty cycle=0.5
0.2
0.1
0.05
0.02
0.01
single pulse

Notes
P_{DM}
t1
t2
1.Duty cycle, D= t1 / t2
2.RthJA = 65 ℃/W
3.TJ-TA = P*RthJA(t)
4.RthJA(t) = r(t)*RthJA
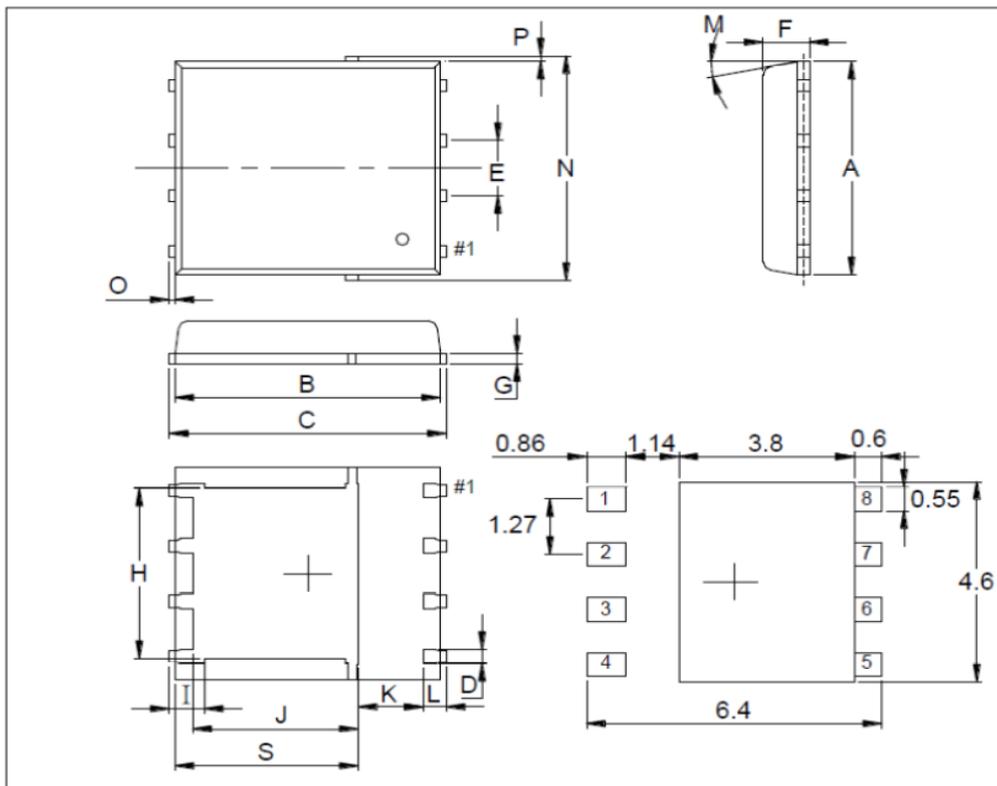
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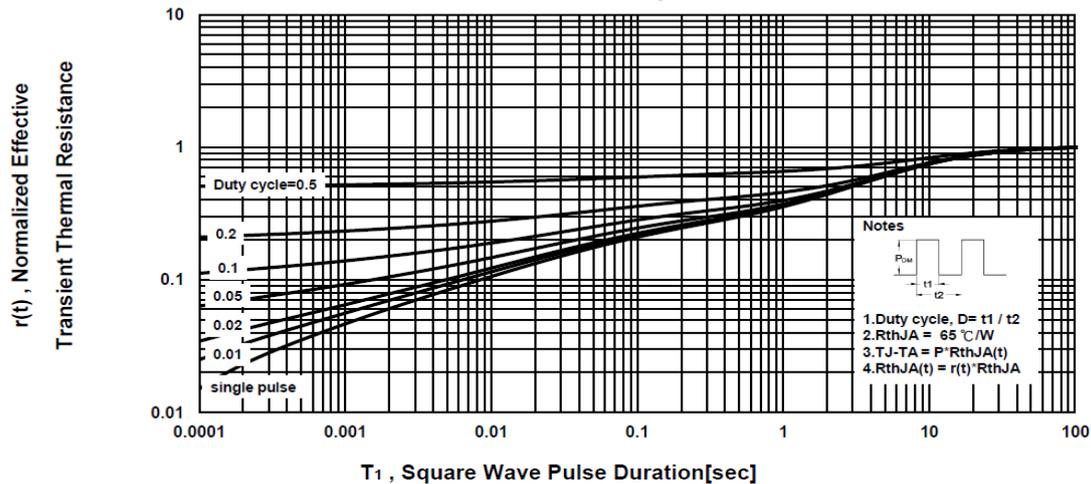
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Package Dimension

PDFN 5x6P MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	4.8		5.15	J	3.34		3.9
B	5.42		5.9	K	0.9		
C	5.9		6.35	L	0.38		0.711
D	0.3		0.51	M	0°		12°
E	1.17	1.27	1.37	N	4.8		5.4
F	0.8	1	1.2	O	0.05		0.36
G	0.15		0.35	P	0.05		0.25
H	3.67		4.31	S	3.73		4.19
I	0.38		0.71				

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A. Marking Information

D D D D

XXX → Logo

XXXXXXX → Part.NO.

XXXXXXXXX → LOT.NO.

S S S G
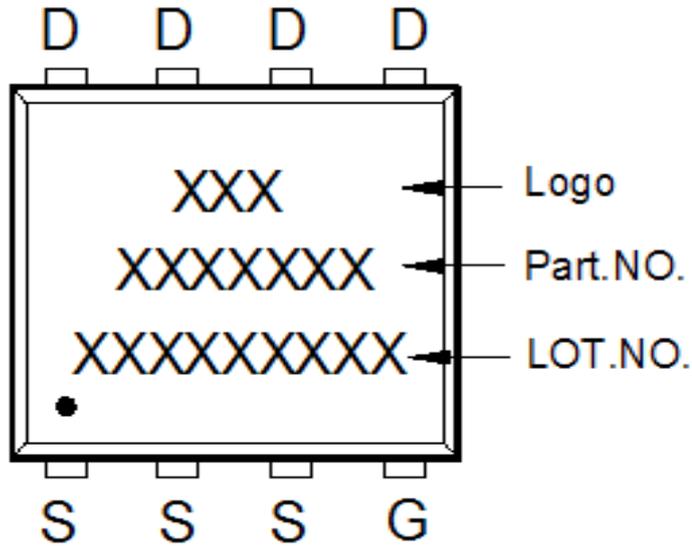
B. Tape&Reel Information:3000pcs/Reel

1.50+0.1 -0.0
8.00±0.10
4.00±0.10
2.00±0.05
5.50±0.05
1.75±0.1
R0.3 MAX
12.00±0.3
1.5+1.0 -0.1
1.4±0.1

TRL
Pin1
FEED DIRECYION

R159
R165±0.5

13
2.2
97.0±1.0
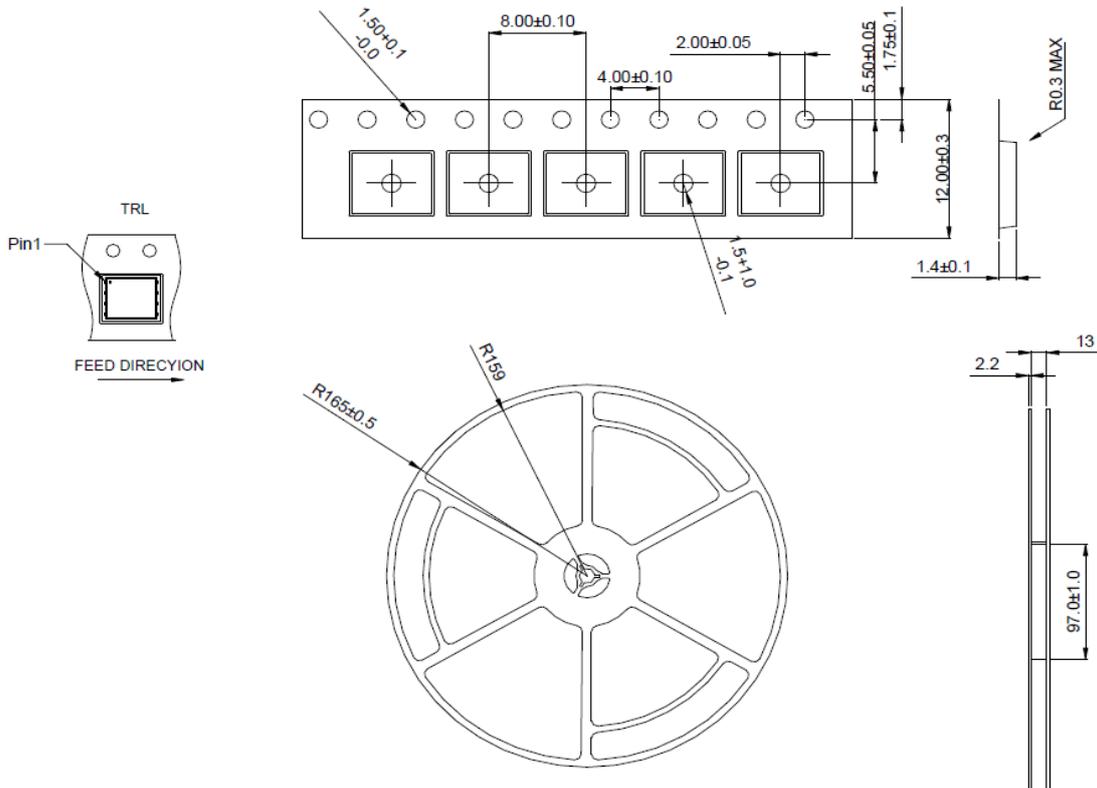
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C. Lot No.&Date Code rule

1.Lot No.

M N XXXXX XX

→ Sub-lot No

→ Order series no.

→ Foundry site

→ Assembly site

2.Date Code

D Y M X XXX

→ Order series no.& Sub-lot No

→ Week

→ Month (A:Jan ,B:Feb ,C:Mar ,D:Apr ,E:May, F:Jun,G:Jul,H:Aug,I:Sep,J:Oct,K:Nov,L:Dec)

→ Year (N:2011 ,O:2013 ,P:2014 ,R:2015 , S:2016 ,T:2017 ,U:2018…etc)

→ Assembly site
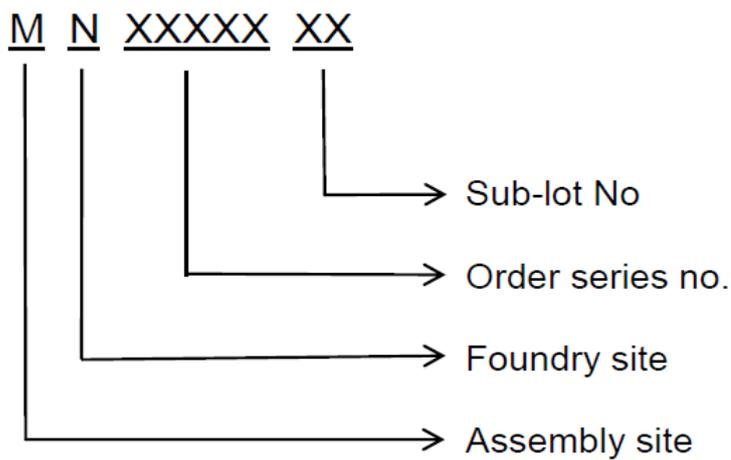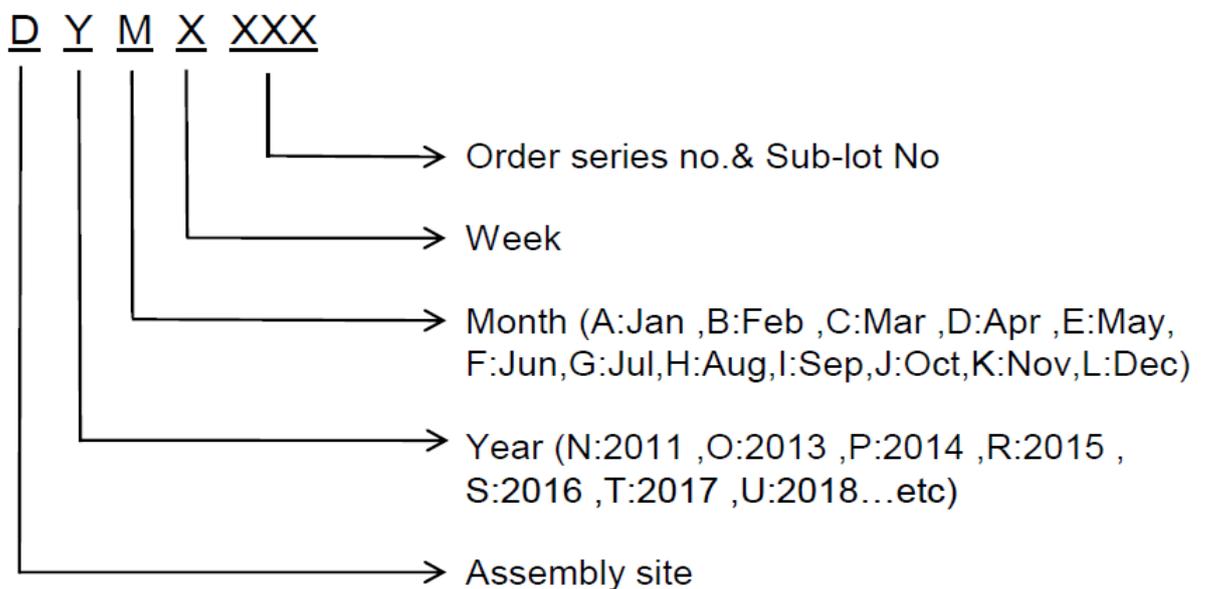
D.Label rule

标签内容(Label content)

1	Label Size	30 * 90 mm
2	Font style	Times New Roman or Arial (或可区分英文"O"和数字"0"，"G 和"Q"的字型即可)
3	U-NIKC	Height: 4 mm
4	Package	Height: 2 mm
5	Date	Height: 2 mm Shipping date: YYYY/MM/DD, ex. 2008/09/12
6	Device	Height: 3 mm (Max: 16 Digit)
7	Lot	Height: 3 mm (Max: 9 Digit) Sub lot
8	D/C	Height: 3 mm (Max: 7 Digit)
9	QTY	Height: 3 mm (Max: 6 Digit) Thousand mark is no needed
10	RoHS label	long axis: 12 mm minor axis:6 mm bottom color: White Font color: Black Font style: Arial
11	Halogen Free label	Diameter: 10 mm bottom color: Green Font color: Black Font style: Arial
12	Scan information	Device / Lot / D/C / QTY , Insert " / " between every parts. for example: P3055LDG/G12345601/GGG2301/2000 DPI (Dots per inch): Over 300 dpi Code : Code 128 Height: 6 mm at least