30V N-ChannelEnhancement Mode Power MOSFET

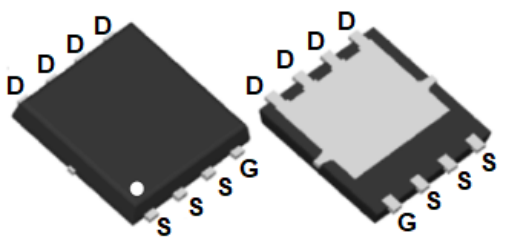
Features

- V_{DS}= 30V, I_D = 40A
  $R_{DS(on)}$ <5mΩ @V_{GS} = 10V
  $R_{DS(on)}$ <6.5mΩ @V_{GS} = 4.5V
- Green Device Available
- Low Gate Charge
- Advanced High Cell Density Trench Technology
- 100% EAS Guaranteed

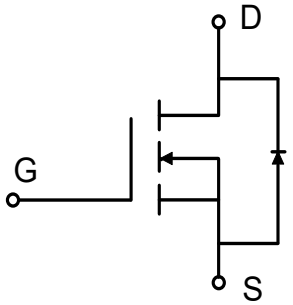
Applications

- Power Management Switches
- DC/DC Converter

Schematic & PIN Configuration



PDFN3030-8L



Absolute Maximum Ratings (T_A = 25°C, unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25°C	I_D	40	A
	T_C=100°C		25	
Pulsed Drain Curren[1]		I_{DM}	160	A
Single Pulse Avalanche Energy[2]		EAS	96.8	mJ
Total Power Dissipation	T_C=25°C	P_D	59	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient[3]	$R_{\theta JA}$	62	°C/W
Thermal Resistance from Junction-to-Case	$R_{\theta JC}$	2.1	°C/W

Electrical Characteristics (T_J = 25°C, unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	30	-	-	V
Gate-body Leakage current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25°C	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V	-	-	1	μA
	T_J=100°C			-	-	100	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.6	2.5	V
Drain-Source On-Resistance[4]		$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A	-	3.9	5	mΩ
			V_{GS} = 4.5V, I_D = 10A	-	5	6.5	
Forward Transconductance[4]		g_{fs}	V_{DS}= 10V , I_D= 20A	-	70	-	S
Dynamic Characteristics[5]							
Input Capacitance		C_{iss}	V_{DS} = 15V, V_{GS} =0V, f =1MHz	-	2295	-	pF
Output Capacitance		C_{oss}		-	277	-	
Reverse Transfer Capacitance		C_{rss}		-	209	-	
Gate Resistance		R_g	f =1MHz	-	2.0	-	Ω
Switching Characteristics[5]							
Total Gate Charge		Q_g	V_{GS} = 4.5V, V_{DS} = 15V, I_D= 20A	-	20	-	nC
Gate-Source Charge		Q_{gs}		-	5	-	
Gate-Drain Charge		Q_{gd}		-	7.2	-	
Turn-On Delay Time		$t_{d(on)}$	V_{GS} =10V, V_{DD} = 15V, R_G = 3Ω, I_D= 20A	-	9	-	ns
Rise Time		t_r		-	16	-	
Turn-Off Delay Time		$t_{d(off)}$		-	43	-	
Fall Time		t_f		-	12	-	
Body Diode Reverse Recovery Time		t_{rr}	I_F = 20A, dI/dt = 100A/μs	-	17	-	ns
Body Diode Reverse Recovery Charge		Q_{rr}		-	9	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage[4]		V_{SD}	I_S = 1A, V_{GS} = 0V	-	-	1.2	V
Continuous Source Current	T_C=25°C	I_S	-	-	-	40	A

Note :

1.Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.

2.The test condition is V_{DD}=25V, V_{GS}=10V, L=0.4mH, I_{AS}=22A

3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper,The value in any given application depends on the user's specific board design.

4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.

5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

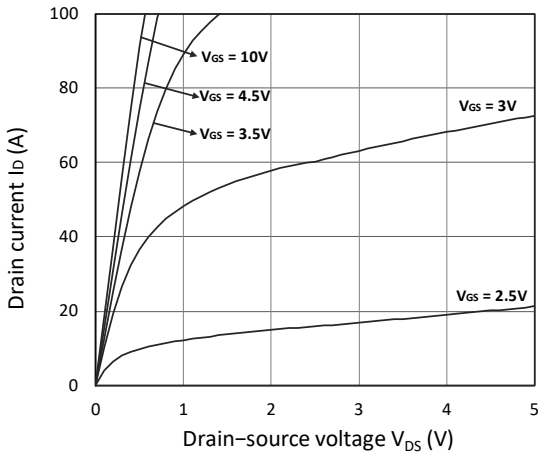


Figure 1. Output Characteristics

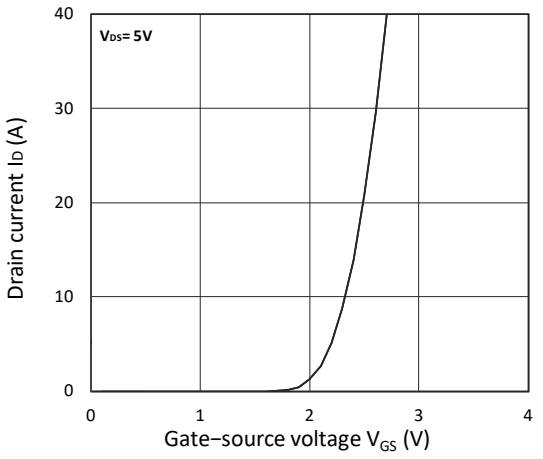


Figure 2. Transfer Characteristics

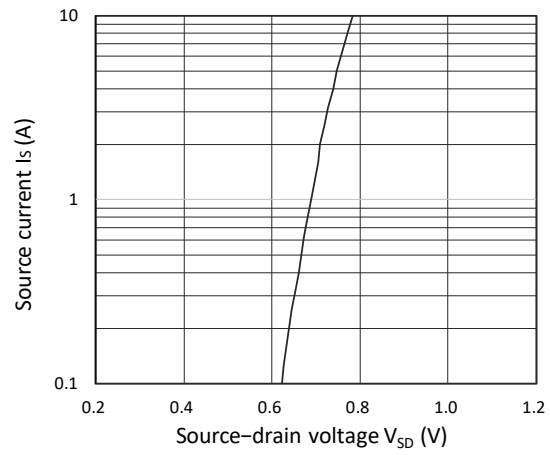


Figure 3. Forward Characteristics of Reverse

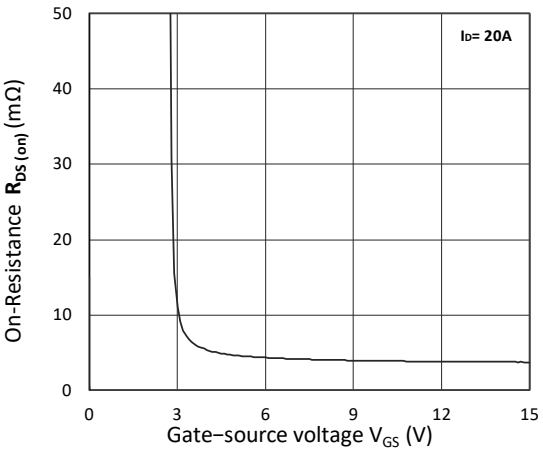


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

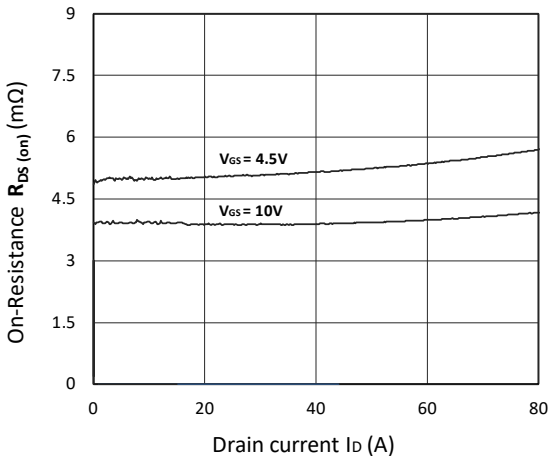


Figure 5. $R_{DS(ON)}$ vs. I_D

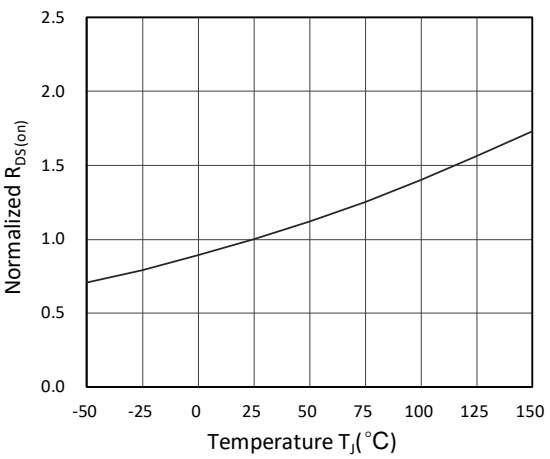


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

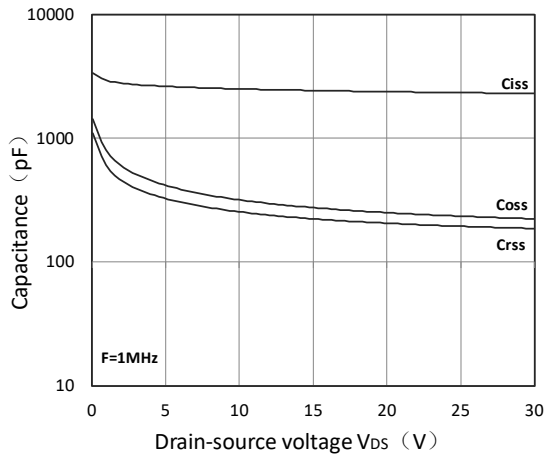


Figure 7. Capacitance Characteristics

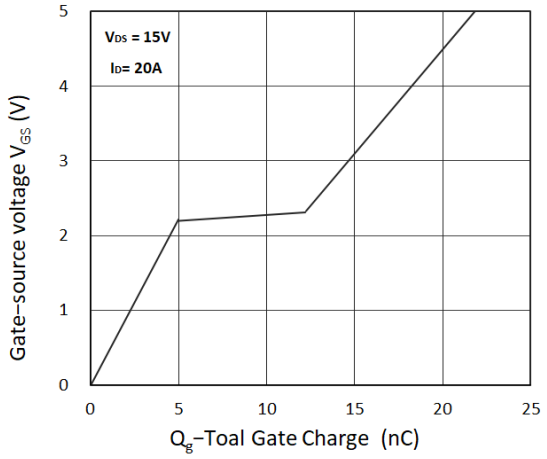


Figure 8. Gate Charge Characteristics

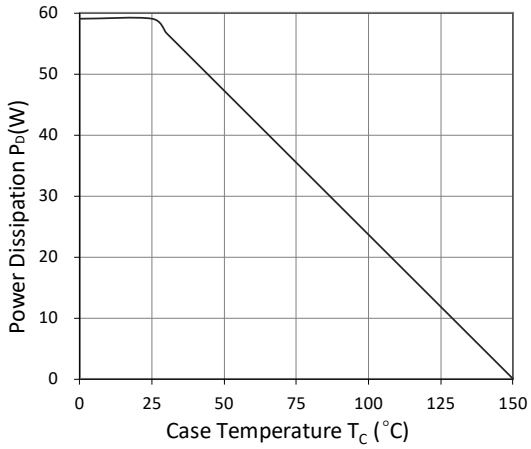


Figure 9. Power Dissipation

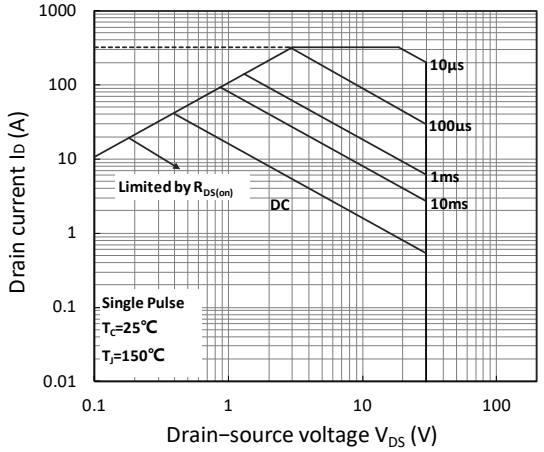


Figure10. Safe Operating Area

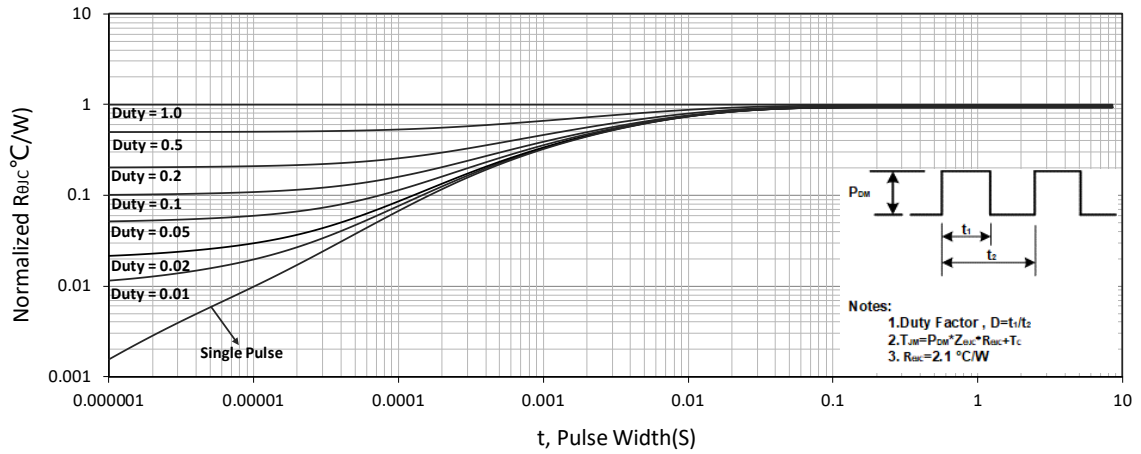


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

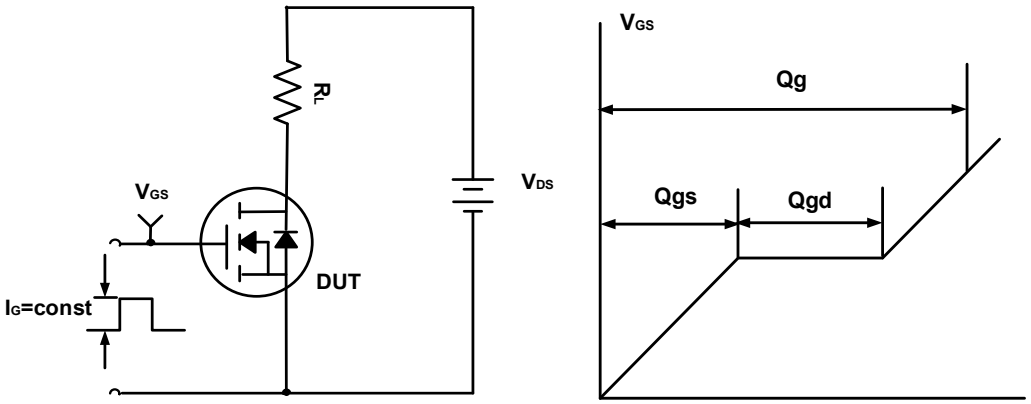


Figure A. Gate Charge Test Circuit & Waveforms

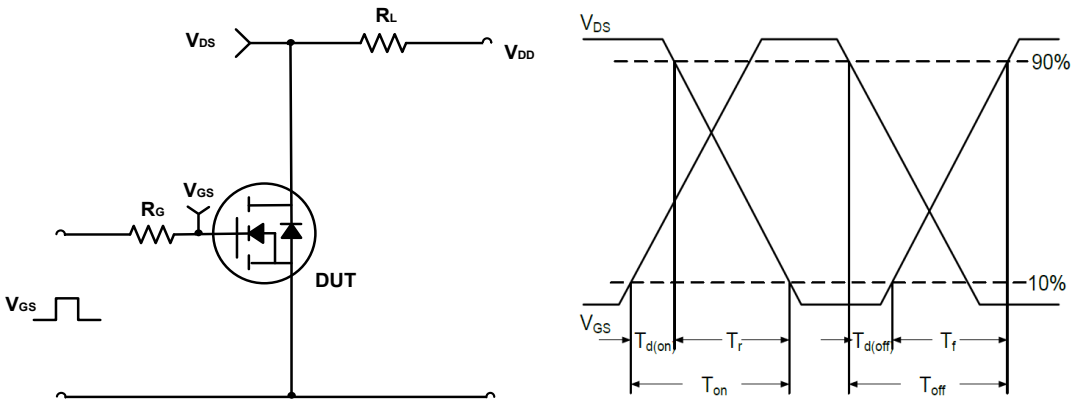


Figure B. Switching Test Circuit & Waveforms

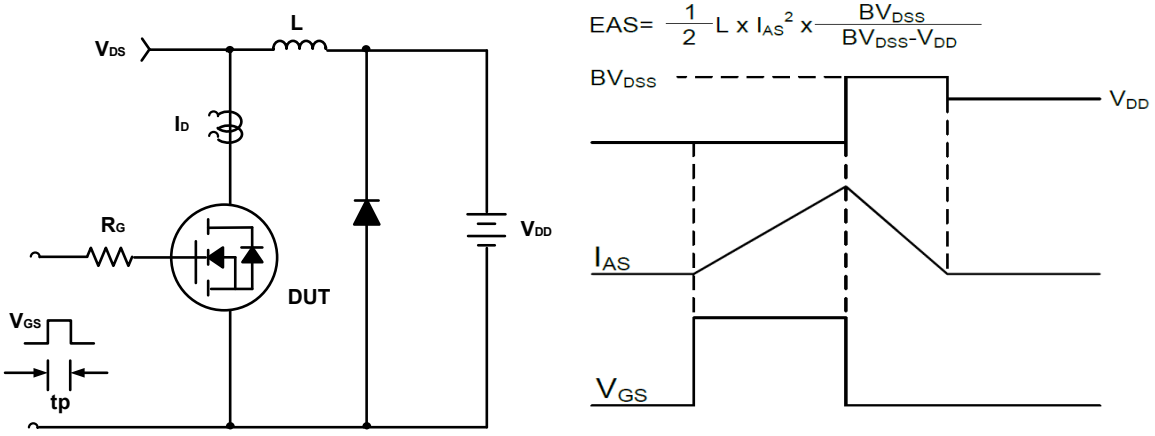
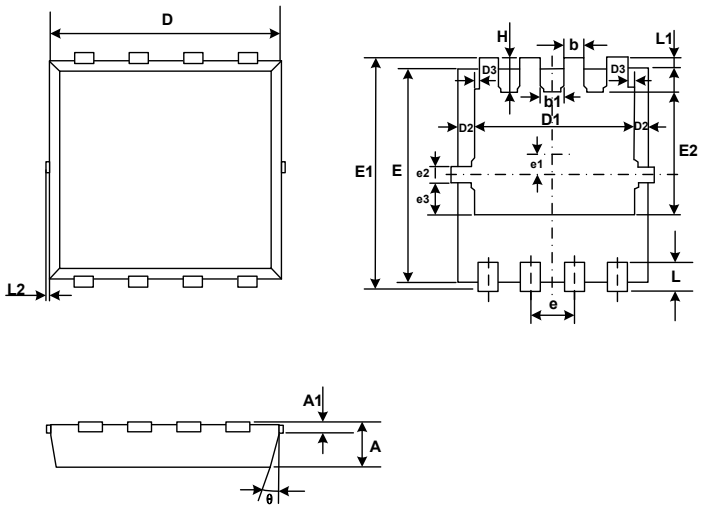


Figure C. Unclamped Inductive Switching Circuit & Waveforms

Package Dimension

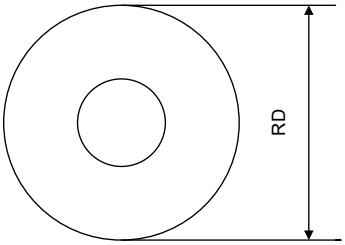
PDFN3030-8L



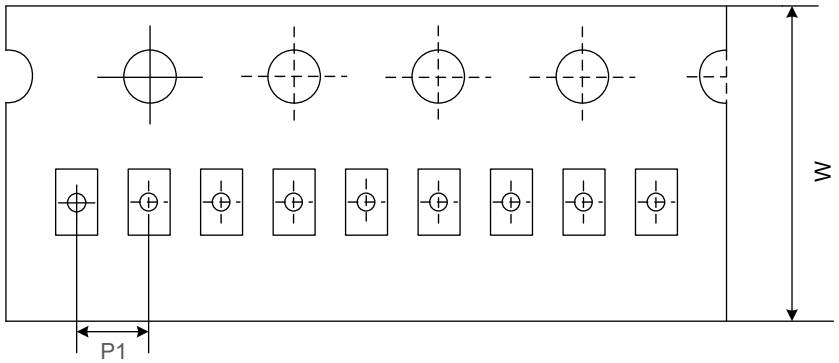
SYMBOL	MM	
	MIN	MAX
A	0.65	0.90
A1	0.10	0.25
D	2.90	3.25
D1	2.25	2.69
D2	0.35 RER	
D3	0.10 REF	
E	2.90	3.20
E1	3.00	3.60
E2	1.54	1.94
b	0.20	0.40
b1	0.35 REF	
e	0.65BSC	
e1	0.30 REF	
e2	0.20 REF	
e3	0.47 REF	
L	0.15	0.50
L1	0.13BSC	
L2	0.00	0.20
H	0.15	0.65
θ	0°	14°

Tape and Reel Information

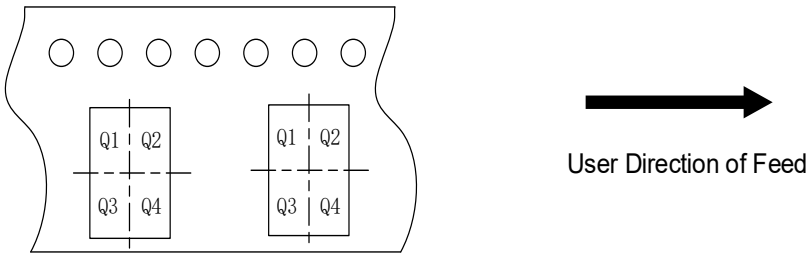
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape

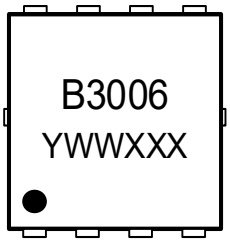


RD	Reel Dimensions	13 inch
W	Overall width of the carrier tape	12 mm
P1	Pitch between successive cavity centers	8mm
Pin1	Pin1 Quadrant	Q1

Ordering Information

Part	Package	Marking	Packing method	MPQ	MSL
EMQ40N03C	PDFN3030-8L	B3006	Tape and Reel	3K/Reel	3

Marking Information



B3006 = Device code

YWWXXX= Date code

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2021-12-09	Released Version	Qi Shu Kun	Qi Shu Kun	Liu Jia Ying
1.1	2023-12-05	Verify RDS(on) Add tape information	Qi Shu Kun	Qi Shu Kun	Liu Jia Ying
1.2	2023-12-12	Modify Specification Template	Qi Shu Kun	Qi Shu Kun	Liu Jia Ying
1.3	2023-12-18	Modified Parameter Tolerance	Qi Shu Kun	Qi Shu Kun	Liu Jia Ying