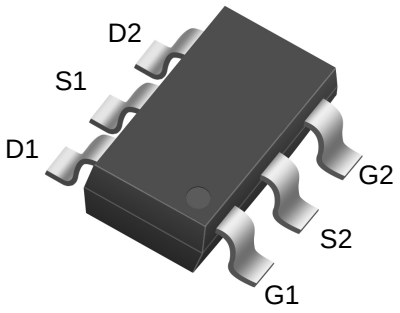
Description：

This N+P Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.

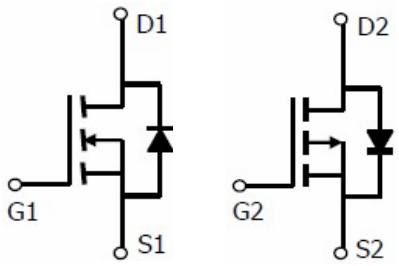


Features：

N-Channel:V_{DS}=40V,I_D=4.5A,$R_{DS(ON)}$<45mΩ @V_{GS}=10V（Typ：35mΩ）

P-Channel: V_{DS}=-40V,I_D=-3.5A,$R_{DS(ON)}$<80mΩ @V_{GS}=-10V（Typ：65mΩ）

1) Low gate charge.
2) Green device available.
3) Advanced high cell denity trench technology for ultra low $R_{DS(ON)}$.
4) Excellent package for good heat dissipation.
5) MSL3



Package Marking and Ordering Information：

Part NO.	Marking	Package	Packing
DO4614U	4614U	SOT-23-6D	3000pcs/Reel

Absolute Maximum Ratings：（T_A=25℃ unless otherwise noted）

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D	Continuous Drain Current- T_A=25℃[1]	4.5	-3.5	A
	Continuous Drain Current-T_A=100℃[1]	3.15	-2.4	
I_{DM}	Pulsed Drain Current [2]	18	-14	A
P_D	Power Dissipation	1.0	1.0	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		℃

Thermal Characteristics：

Symbol	Parameter	N-CH	P-CH	Units
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient	125	125	℃/W

N-Channel Electrical Characteristics: (T_A=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	40	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=40V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1	1.5	2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[3]	V_{GS}=10V,I_D=3A	---	35	45	mΩ
		V_{GS}=4.5V,I_D=2A	---	45	60	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=20V, V_{GS}=0V, f=1MHz	---	400	---	pF
C_{oss}	Output Capacitance		---	34.6	---	
C_{rss}	Reverse Transfer Capacitance		---	27	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=20V, I_D=3A, R_{ENG}=1Ω ,V_{GS}=4.5V	---	13	---	ns
t_r	Rise Time		---	45	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	12.6	---	ns
t_f	Fall Time		---	10.5	---	ns
Q_g	Total Gate Charge	V_{GS}=4.5V, V_{DS}=20V, I_D=3A	---	4	---	nC
Q_{gs}	Gate-Source Charge		---	1.4	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	1.1	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage	V_{GS}=0V, I_{SD}=3A	---	---	1.2	V
I_S	Continuous Drain Curren	V_D=V_G=0V	---	---	3.7	A
I_{SM}	Pulsed Drain Current		---	---	15	A
Trr	Reverse Recovery Time	I_F=3A,T_J=25℃ dI/dt=100A/us	---	12	---	ns
Qrr	Reverse Recovery Charge		---	6	---	nC

Notes:

1. Computed continuous current assumes the condition of $T_{j,Max}$ while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Test Circuit

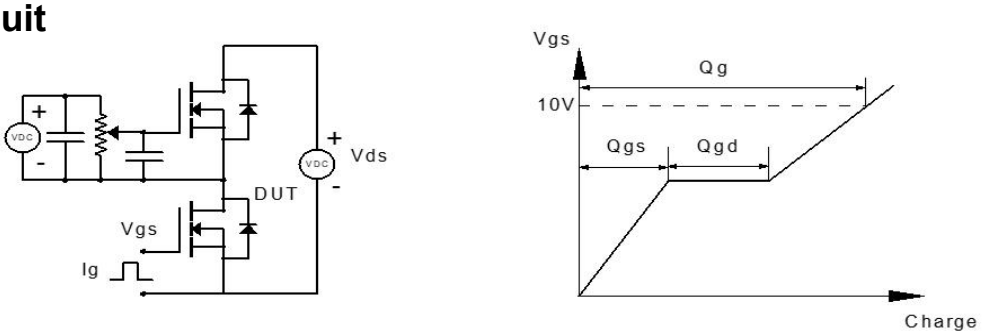


Figure 1: Gate Charge Test Circuit & Waveform

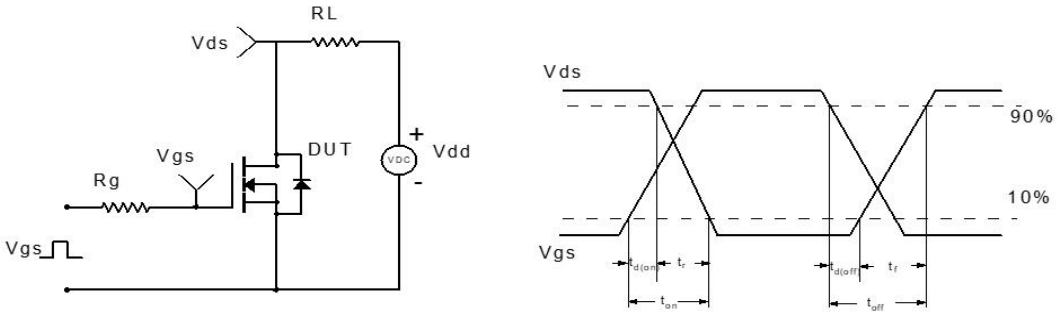


Figure 2: Resistive Switching Test Circuit & Waveform

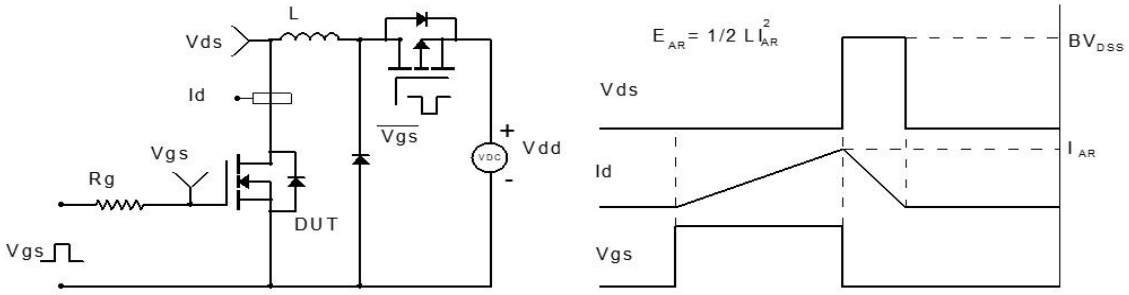


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

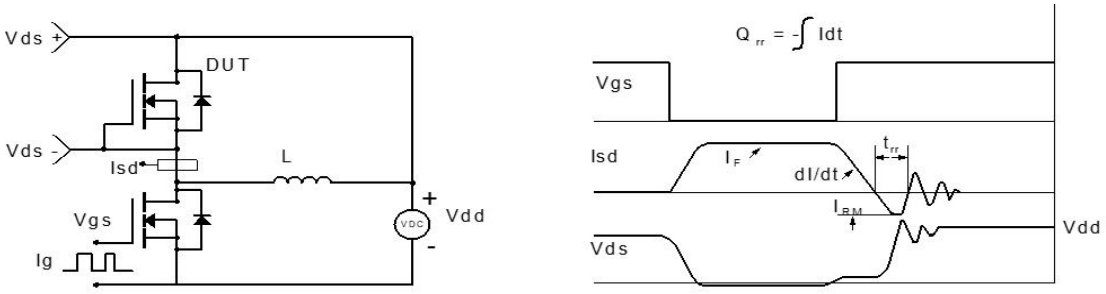


Figure 4: Diode Recovery Test Circuit & Waveform

P-Channel Electrical Characteristics: (T_A=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	-40	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=-40V	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	-1.2	-1.6	-2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[3]	V_{GS}=-10V,I_D=-5A	---	65	80	mΩ
		V_{GS}=-4.5V,I_D=-4A	---	75	90	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=-20V, V_{GS}=0V, f=1MHz	---	400	---	pF
C_{oss}	Output Capacitance		---	49	---	
C_{rss}	Reverse Transfer Capacitance		---	47.5	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD}= -20V,I_D=-5A V_{GS}= -10V, R_{GEN}=3Ω	---	14.7	---	ns
t_r	Rise Time		---	33.6	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	47	---	ns
t_f	Fall Time		---	42	---	ns
Q_g	Total Gate Charge	V_{GS}=-10V,V_{DS}=-20V, I_D=-5A	---	4	---	nC
Q_{gs}	Gate-Source Charge		---	2.3	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	2.2	---	nC
Drain-Source Diode Characteristics						
I_S	Continuous Drain to Source Diode	V_D=V_G=0V	---	---	-2.9	A
I_{SM}	Pulsed Drain to Source Diode		---	---	-11.6	---
V_{SD}	Source-Drain Diode Forward Voltage	V_{GS}=0V,I_S=-3A	---	---	-1.2	V

Notes:

1. Computed continuous current assumes the condition of $T_{j,Max}$ while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Test Circuit

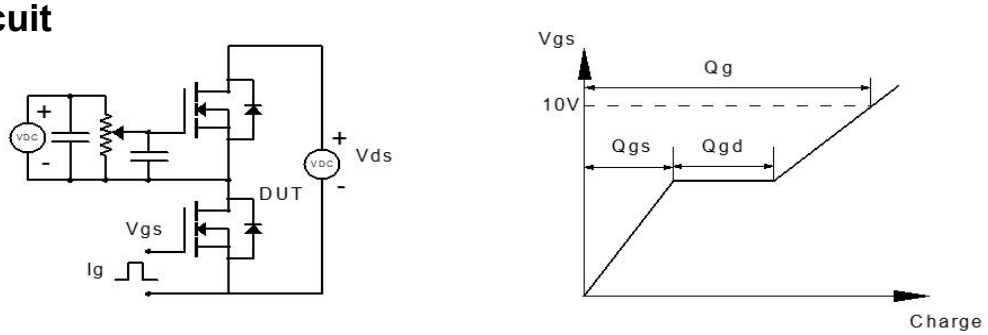


Figure 1: Gate Charge Test Circuit & Waveform

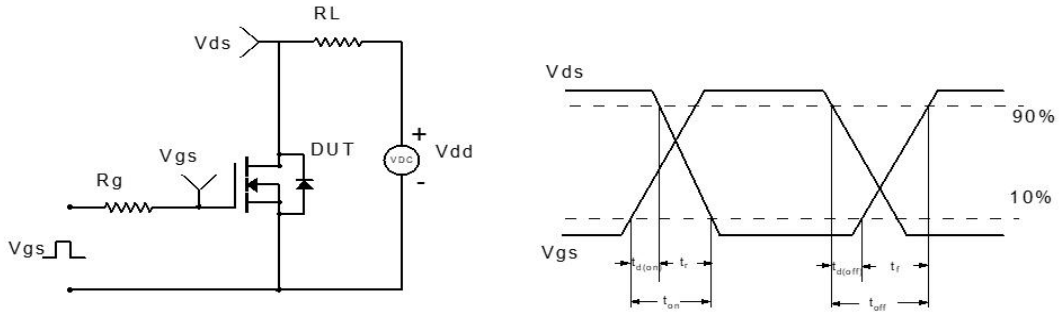


Figure 2: Resistive Switching Test Circuit & Waveform

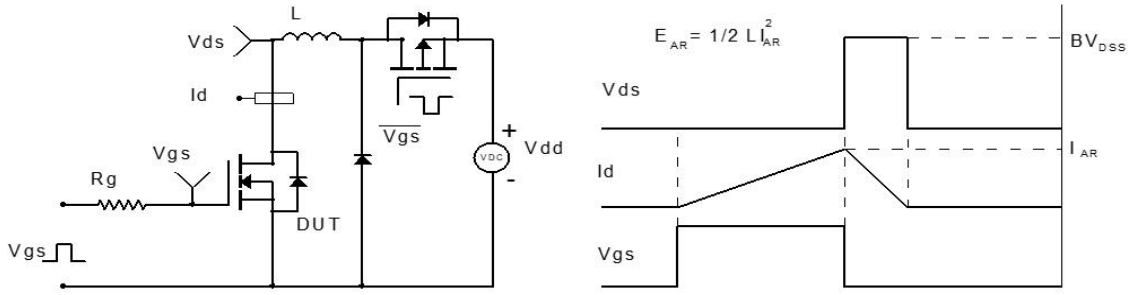


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

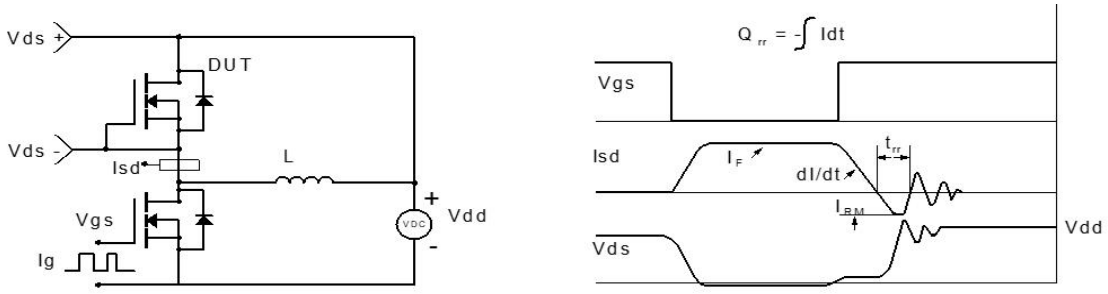
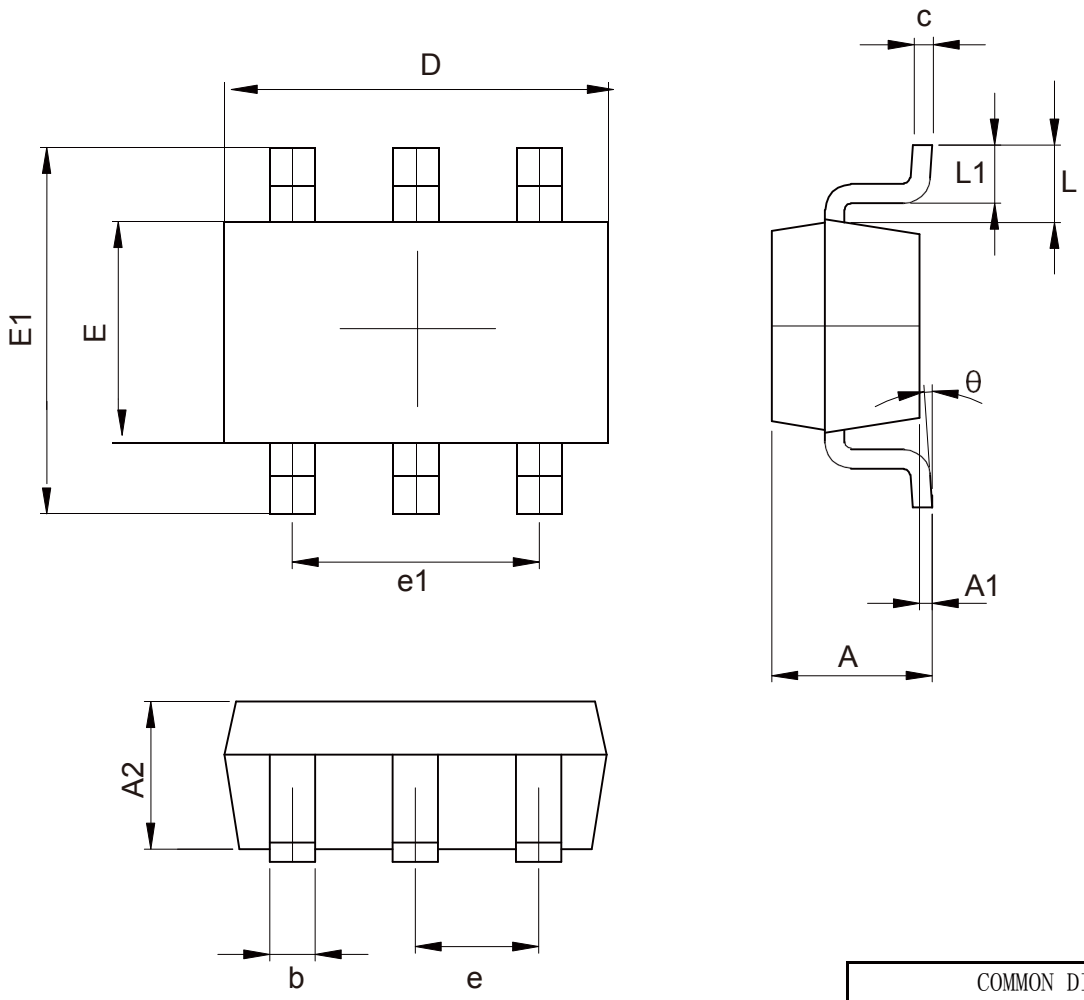


Figure 4: Diode Recovery Test Circuit & Waveform

SOT-23-6D Package Outline Data

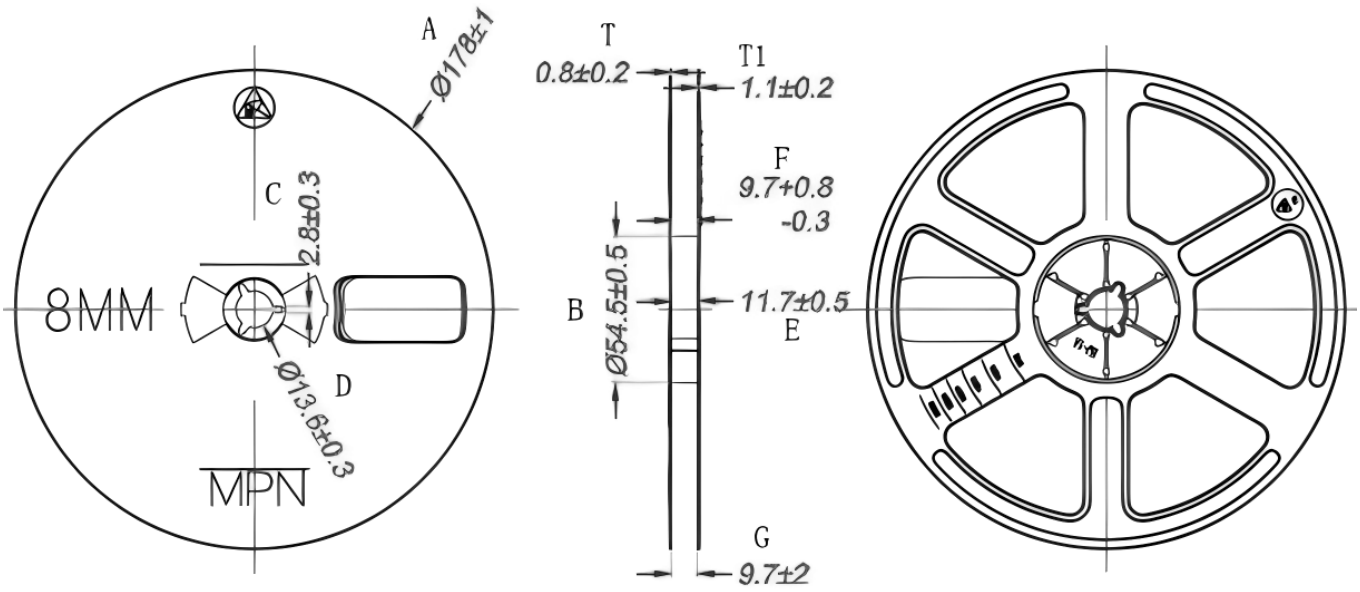


COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER			
SYMBOL	MIN	NOM	MAX
A	1.050	——	1.300
A1	0.000	——	0.200
A2	1.050	——	1.200
b	0.300	0.400	0.500
c	0.100	——	0.200
D	2.820	2.900	3.020
E	1.500	1.600	1.700
E1	2.650	2.800	2.950
e	0.950TYP		
e1	1.800	1.900	2.000
L	0.6REf		
L1	0.300	0.450	0.600
θ	0°	--	8°

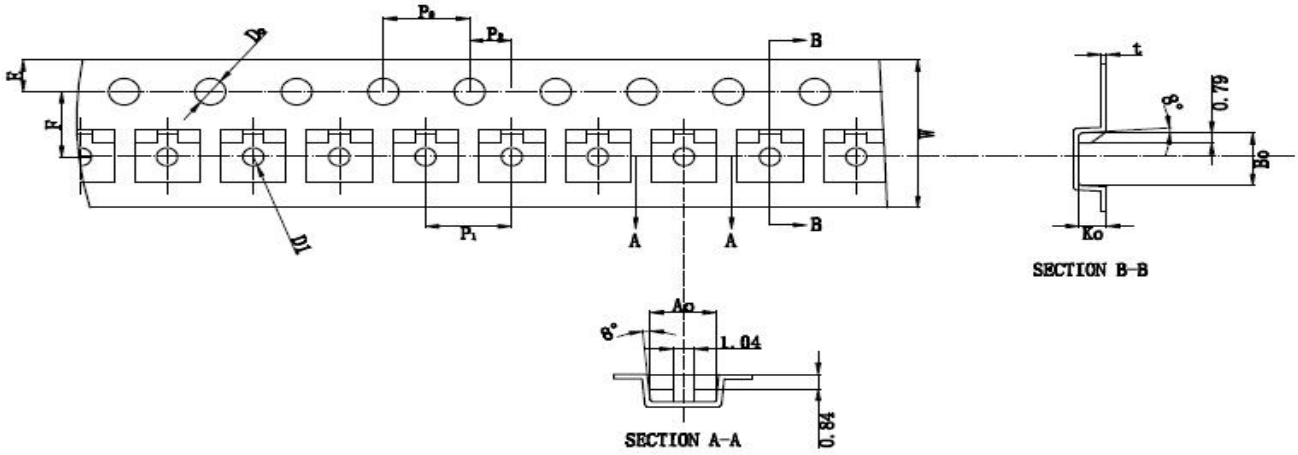
Unit:mm

Tape & Reel Information

Dimensions in mm

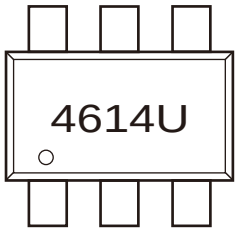


PKG TYPE	W	P	E	F	D	D1	Po	Po10	P2	A0	B0	K0	T
SOT23-6	8.00	4.00	1.75	3.50	1.50	1.00	4.00	40.00	2.00	3.13	3.22	1.30	0.20
Tolerance	±0.2	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.2	±0.1	±0.1	±0.1	±0.1	±0.03



Pulling direction

Marking Information：



Previous Version

Version	Date	Subjects (major changes since last revision)
1.0	2025-08-16	Release of final version

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