TM05P02MI6

P-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

V_{DS} = -20V I_D = -5.0A

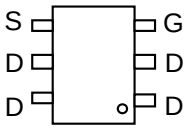
$R_{DS(ON)}$ =38mΩ(typ.) @V_{GS}=-4.5V

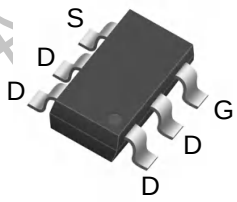
100% UIS Tested

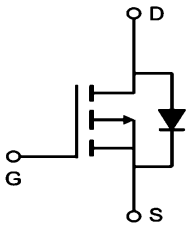
100% R_g Tested

Green Product

MI6:SOT-23-6L







Marking: D9LA

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-5	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-3	A
I_{DM}	Pulsed Drain Current[2]	-12.5	A
P_D	Total Power Dissipation[3]	2	W
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	---	80	℃/W
R	Thermal Resistance Junction Case[1]			℃/W

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Electrical Characteristics: (T_C=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	-20	----	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=-16V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±8V, V_{DS}=0A	---	---	±10	μA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	-0.4	-0.65	-1.0	V
$R_{DS(ON)}$	Drain-Source On Resistance	V_{GS}=-4.5V,I_D=-5A	---	38	45	mΩ
		V_{GS}=-2.5V,I_D=-4A	---	47	56	
G_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-5A	---	16	---	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=-10V, V_{GS}=0V, f=1MHz	---	1450	---	pF
C_{oss}	Output Capacitance		---	205	---	
C_{rss}	Reverse Transfer Capacitance		---	160	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	VDS= -10V RL= 2Ω, ID = -5A, VGS= -4.5V,Rg=3Ω	---	9	---	ns
t_r	Rise Time		---	1	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	91	---	ns
t_f	Fall Time		---	31	---	ns
Q_g	Total Gate Charge	V_{GS}=-4.5V,V_{DS}=-10V,I_D=-5A	---	17.2	---	nC
Q_{gs}	Gate-Source Charge		---	1.3	---	nC
Q_{gd}	Gate-Drain "Miller" Charge		---	4.5	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Source-Drain Diode Forward Voltage	V_{GS}=0V,I_S=1A	---	-0.8	-1	V
Is	Diode Forward Current	---	---	---	-5	A
Trr	Body Diode Reverse Recovery Time	I F =-5A, dI/dt=100A/μs	---	33	---	Ns
Qrr	Body Diode Reverse Recovery Charge	I F =-5A, dI/dt=100A/μs	---	14	---	Nc

Notes:
1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t < 10 sec.
3. Pulse Test : Pulse Width≤300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

Typical Characteristics

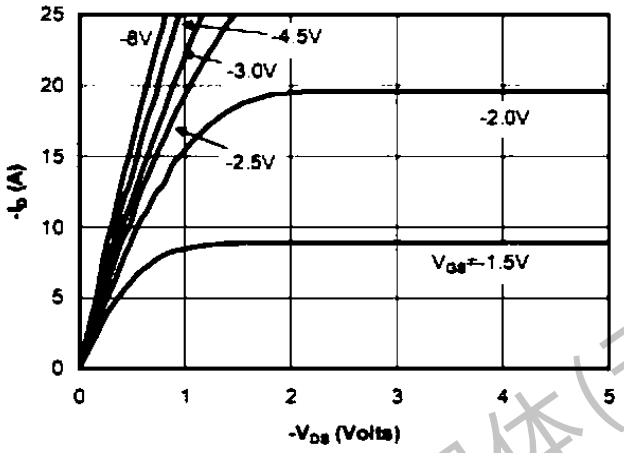

Fig 1: On-Region Characteristics

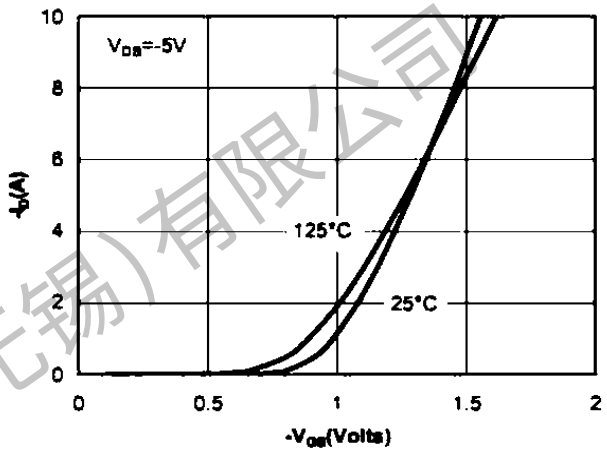

Figure 2: Transfer Characteristics

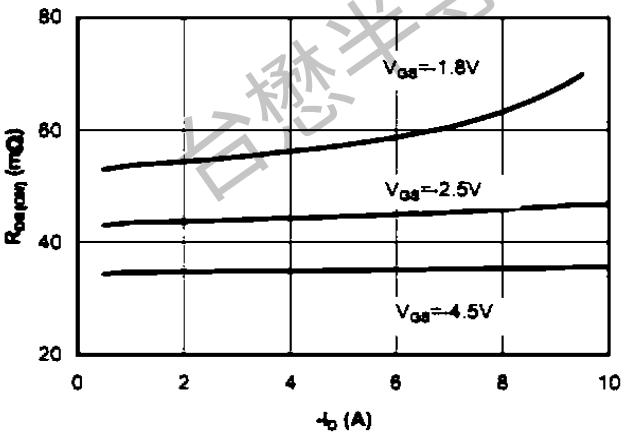

Figure 3: On-Resistance vs. Drain Current and Gate Voltage

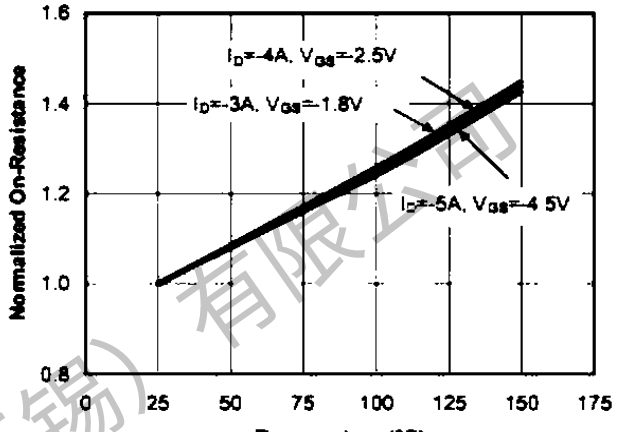

Figure 4: On-Resistance vs. Junction Temperature

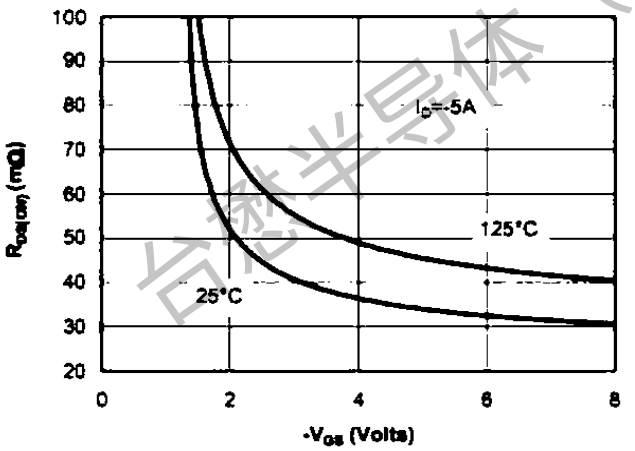

Figure 5: On-Resistance vs. Gate-Source Voltage

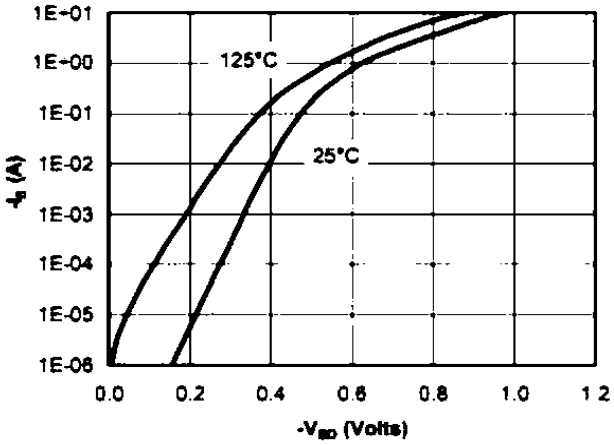

Figure 6: Body-Diode Characteristics

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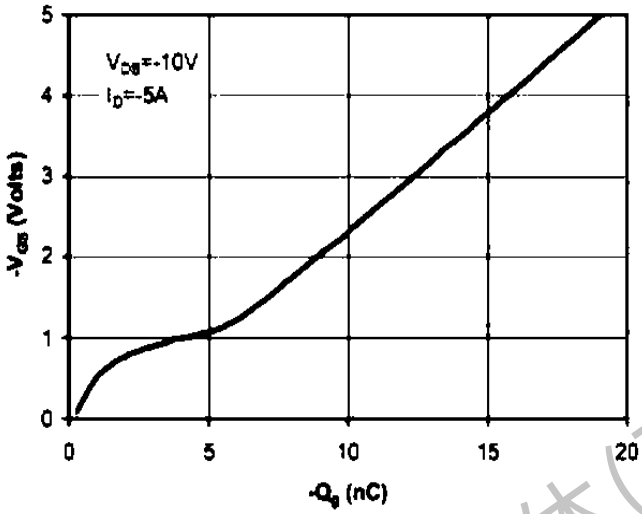

Figure 7: Gate-Charge Characteristics

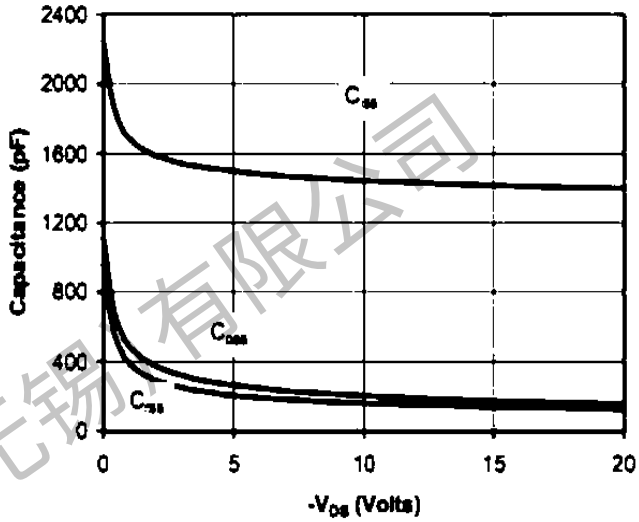

Figure 8: Capacitance Characteristics

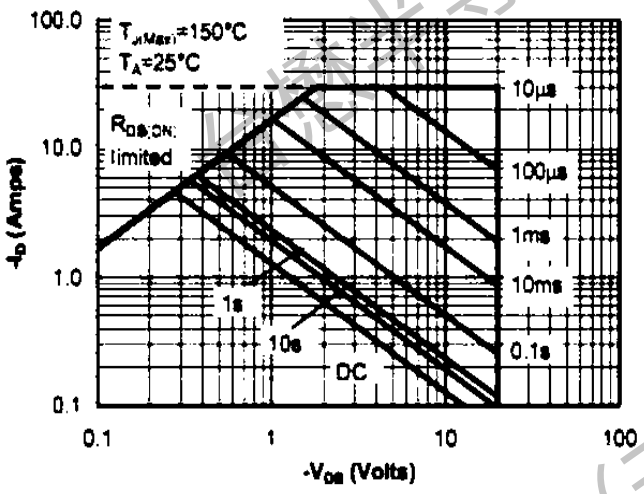

Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

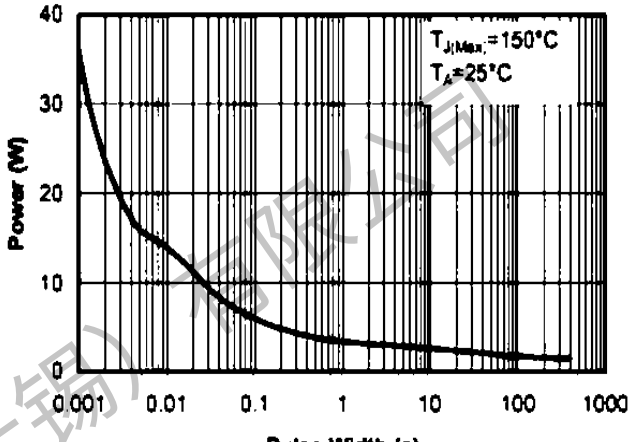

Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

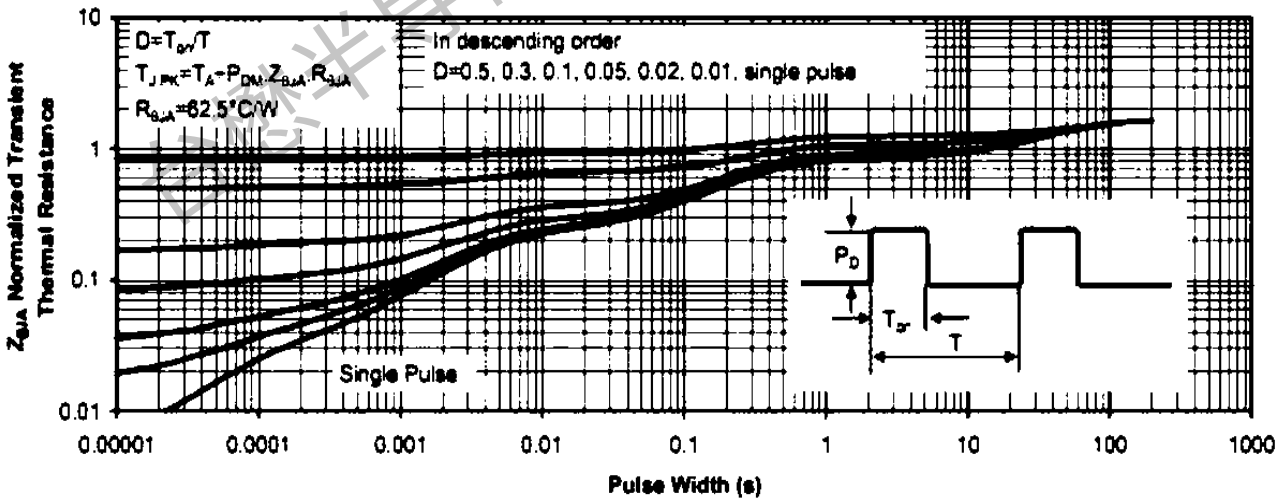

Figure 11: Normalized Maximum Transient Thermal Impedance

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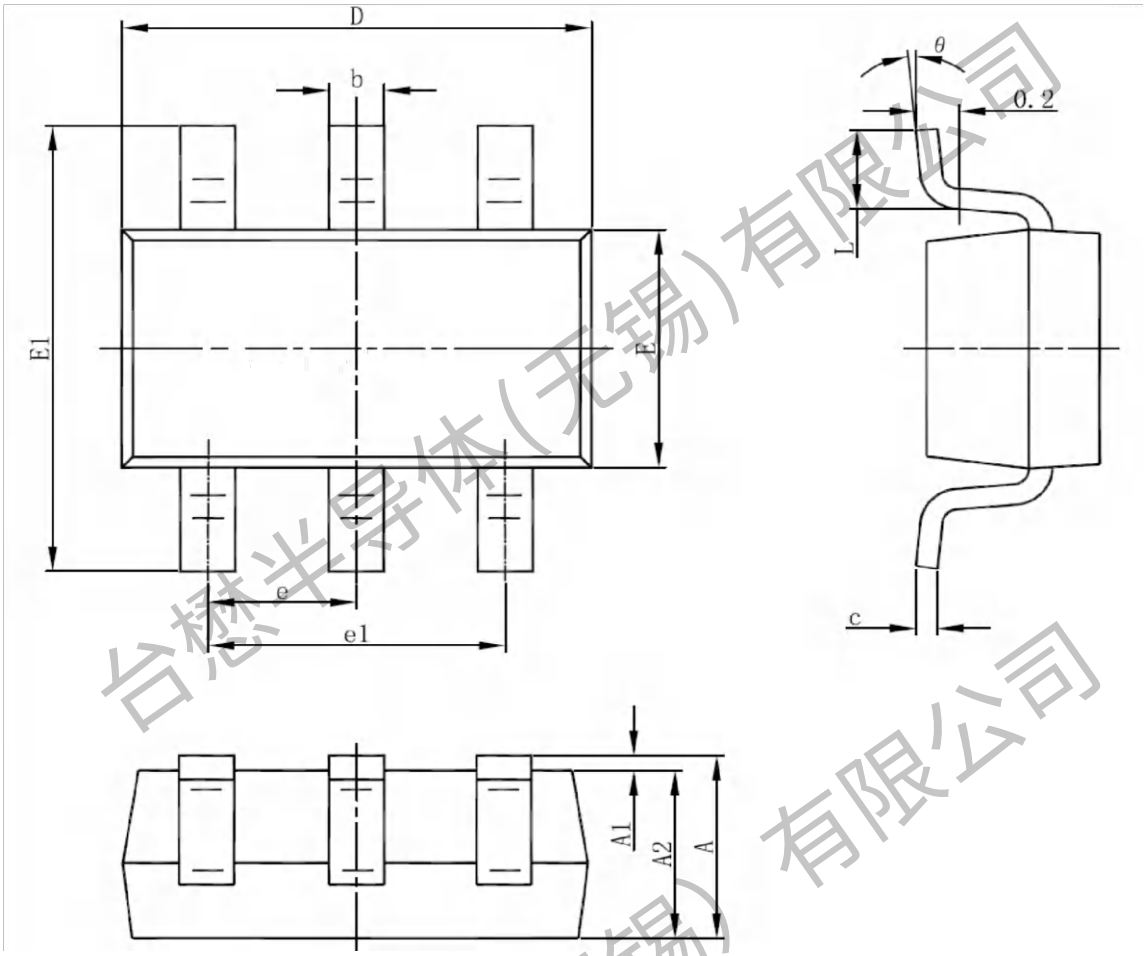
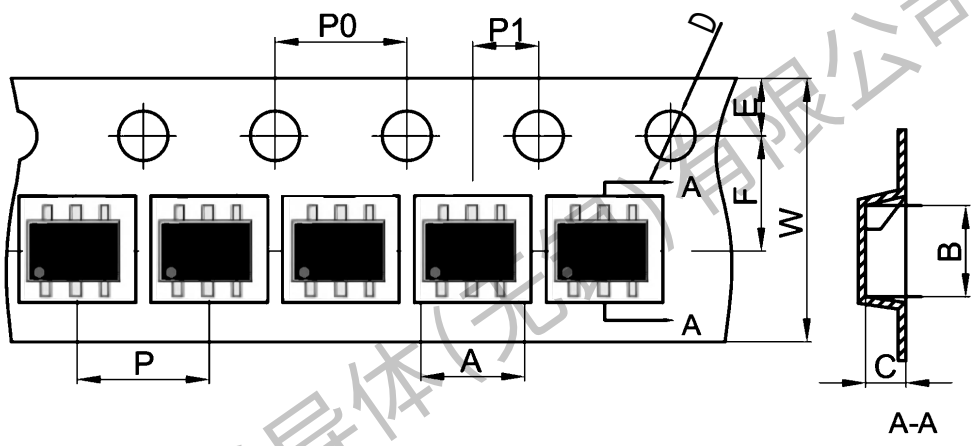
Package Mechanical Data:SOT-23-6L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

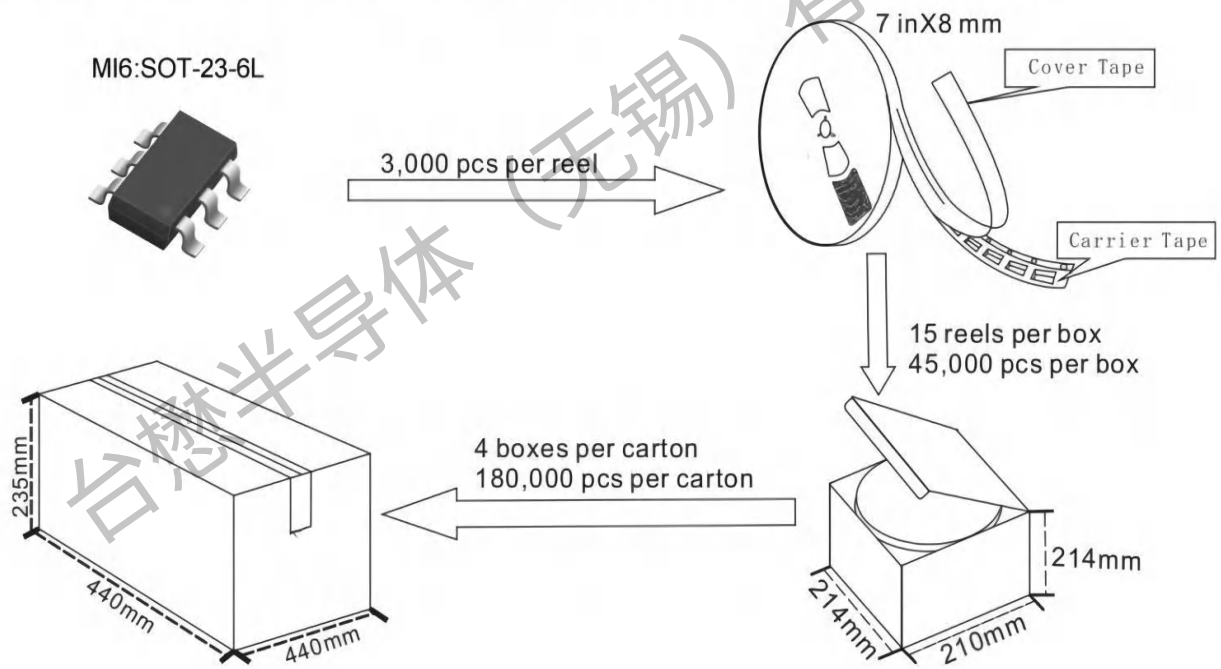
SOT-23-6L Embossed Carrier Tape



Dimensions are in millimeter										
Pkg type	A	B	C	D	E	F	P0	P	P1	W
SOT-23-6L	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

SOT-23-6L Packing

The method of packaging and dimension are shown as below figure. (Dimension in mm)



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Revision history:

Date	Rev	Description	Page
2023.06.22	23.06	Original	