TM002P06I

P-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

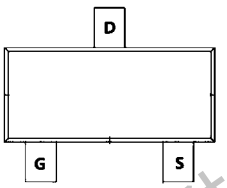
V_{DS} =-60V I_D =-0.2A

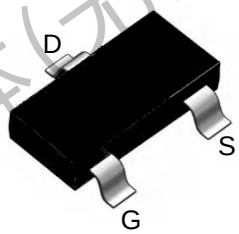
$R_{DS(ON)}$=3600mΩ (typ.)@V_{GS}= -10V

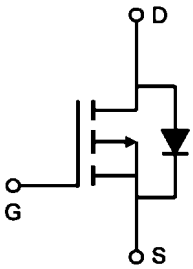
100% UIS Tested

100% R_g Tested

I:SOT-23







Marking: PD9

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ -10V[1]	-0.2	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ -10V	-0.12	A
I_{DM}	Pulsed Drain Current	0.5	A
P_D	Total Power Dissipation[1]	300	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]	---	162	℃/W
R	Thermal Resistance Junction Case[1]			℃/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = -250μA	BV_{DSS}	-60	--	--	V
Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = -250μA	$V_{GS(TH)}$	-1.0	-2.0	-3.0	V
Gate-Source Leakage Current	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Drain-Source Leakage Current	V_{GS} = 0V, V_{DS} = -60V	I_{DSS}	--	--	-1	μA
	V_{GS} = 0V, V_{DS} = -60V T_J =125°C		--	--	-150	
Drain-Source On-State Resistance (Note 3)	V_{GS} = -10V, I_D = -150mA	$R_{DS(on)}$	--	3600	6000	mΩ
	V_{GS} = -4.5V, I_D = -130mA		--	4200	8000	
Forward Transconductance (Note 3)	V_{DS} = -5V, I_D = -150mA	g_{fs}	--	0.5	--	S
Dynamic (Note 3)						
Total Gate Charge	V_{GS} = -10V, V_{DS} = -30V, I_D = -150mA	Q_g	--	1.9	--	nC
Total Gate Charge	V_{GS} = -4.5V, V_{DS} = -30V, I_D = -130mA	Q_g	--	1	--	
Gate-Source Charge		Q_{gs}	--	0.3	--	
Gate-Drain Charge		Q_{gd}	--	0.3	--	
Input Capacitance	V_{GS} = 0V, V_{DS} = -30V f = 1.0MHz	C_{iss}	--	37	--	pF
Output Capacitance		C_{oss}	--	15	--	
Reverse Transfer Capacitance		C_{rss}	--	7	--	
Switching (Note 3)						
Turn-On Delay Time	V_{GS} = -10V, V_{DS} = -30V, I_D = -150mA, R_G = 6Ω	$t_{d(on)}$	--	10	--	ns
Turn-On Rise Time		t_r	--	15	--	
Turn-Off Delay Time		$t_{d(off)}$	--	21	--	
Turn-Off Fall Time		t_f	--	78	--	
Source-Drain Diode						
Forward Voltage (Note 2)	V_{GS} = 0V, I_S = -150mA	V_{SD}	--	--	-1.2	V
Reverse Recovery Time	I_S = -150mA , dI/dt = 100A/μs	t_{rr}	--	24	--	ns
Reverse Recovery Charge		Q_{rr}	--	14	--	nC

Notes:

1. Silicon limited current only.
2. Pulse test: Pulse Width ≤ 300μs, duty cycle ≤ 2%.
3. Switching time is essentially independent of operating temperature.

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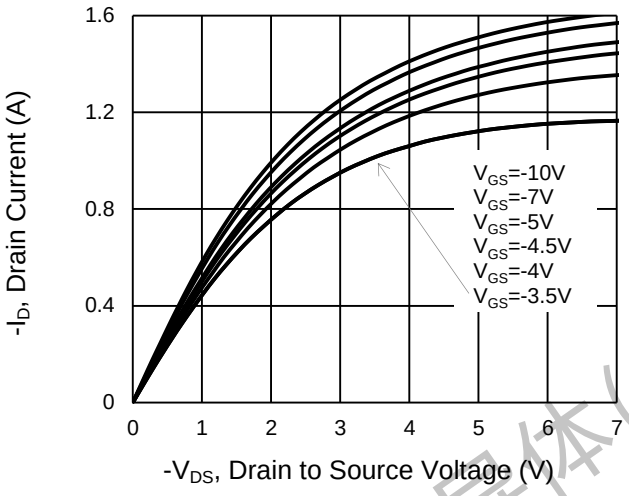
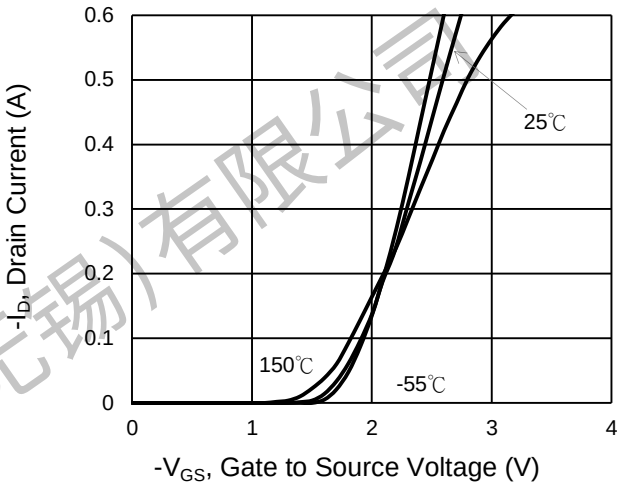
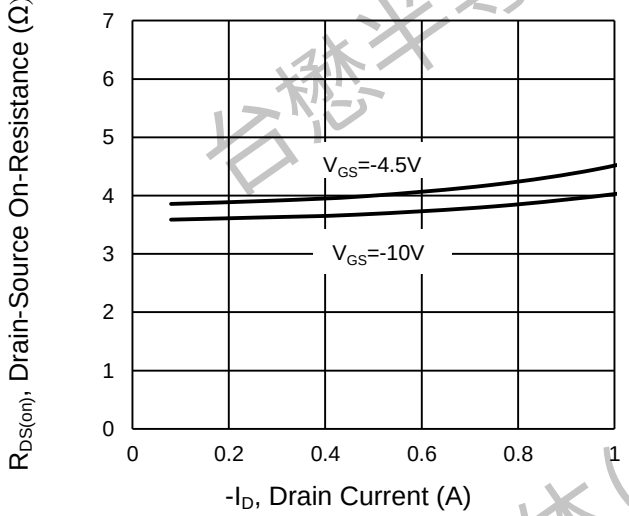
Output Characteristics



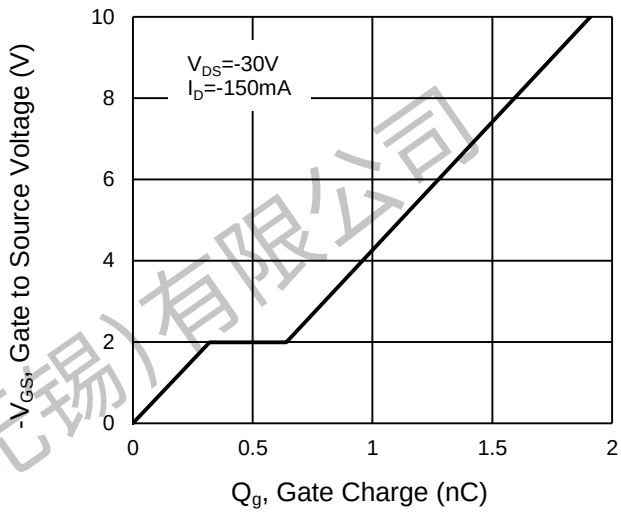
Transfer Characteristics



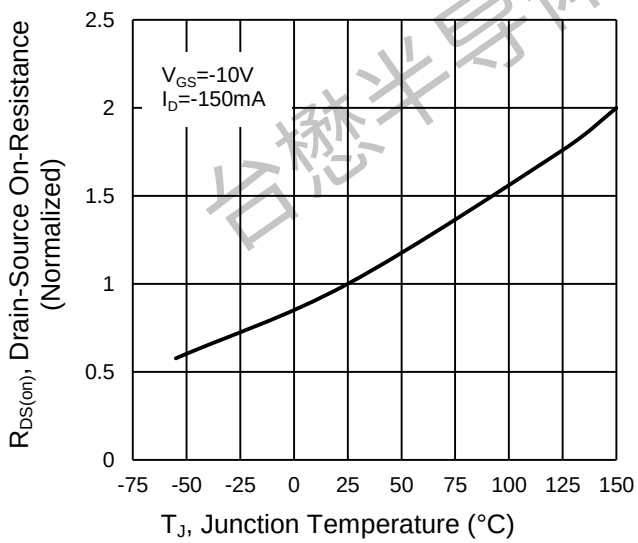
On-Resistance vs. Drain Current



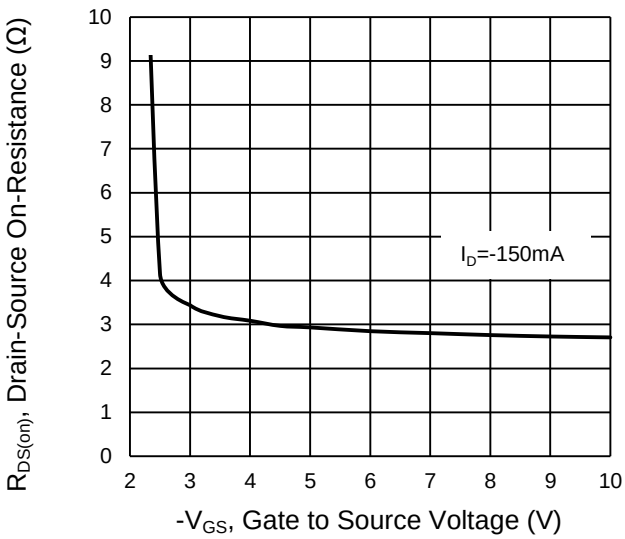
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



On-Resistance vs. Gate-Source Voltage



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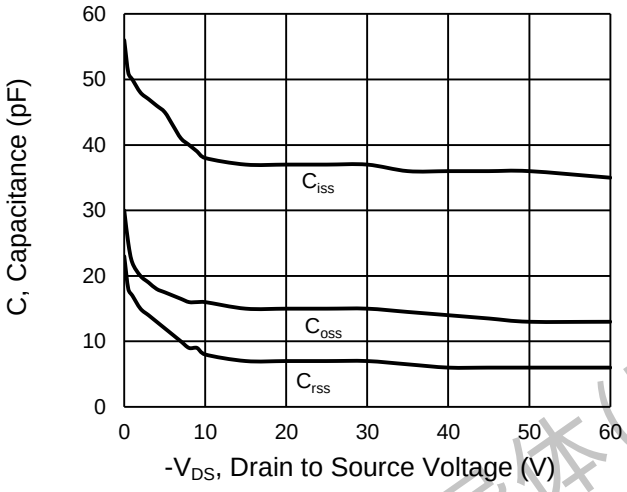
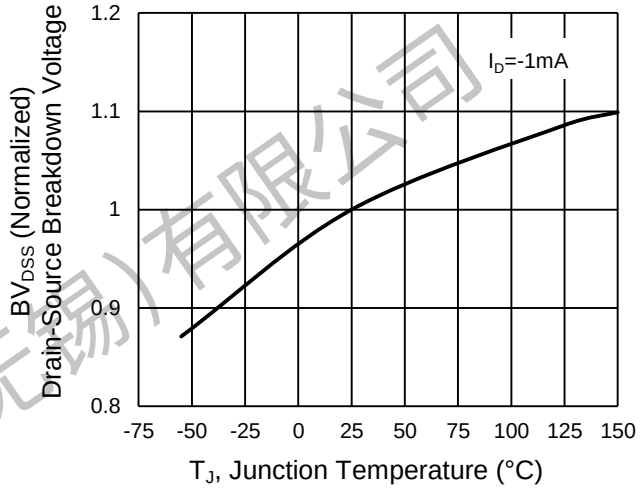
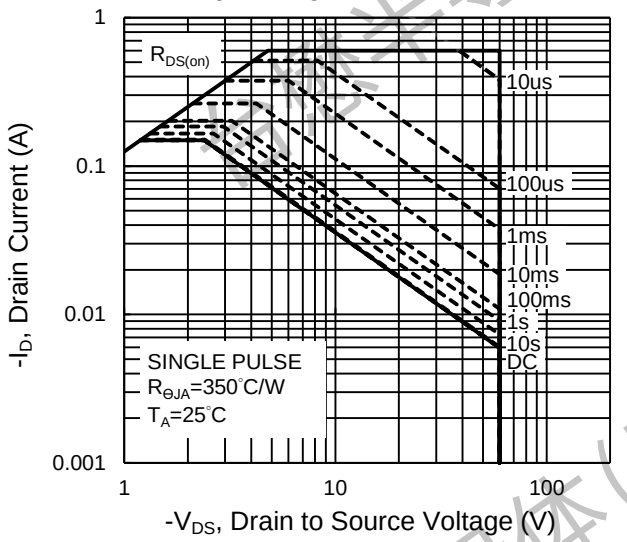
Capacitance vs. Drain-Source Voltage



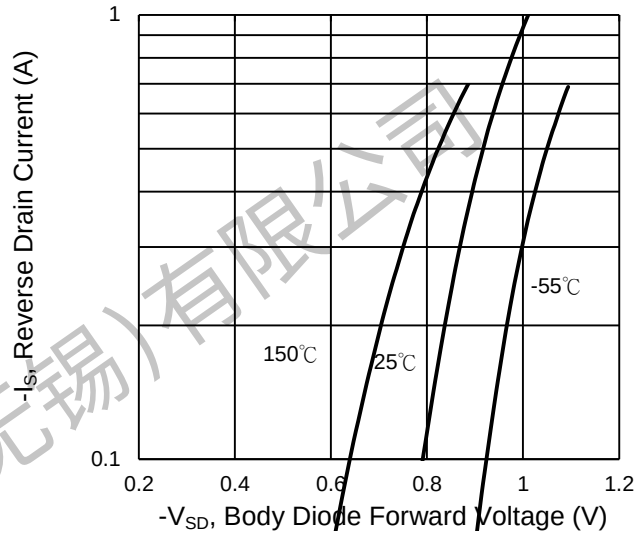
BV_{DSS} vs. Junction Temperature



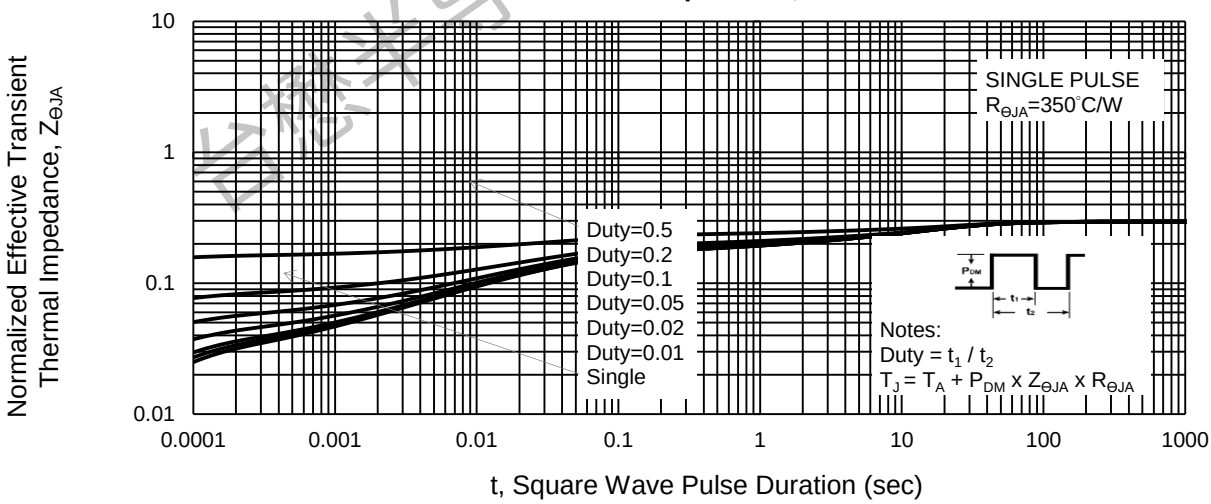
Maximum Safe Operating Area, Junction-to-Ambient



Source-Drain Diode Forward Current vs. Voltage



Normalized Thermal Transient Impedance, Junction-to-Ambient



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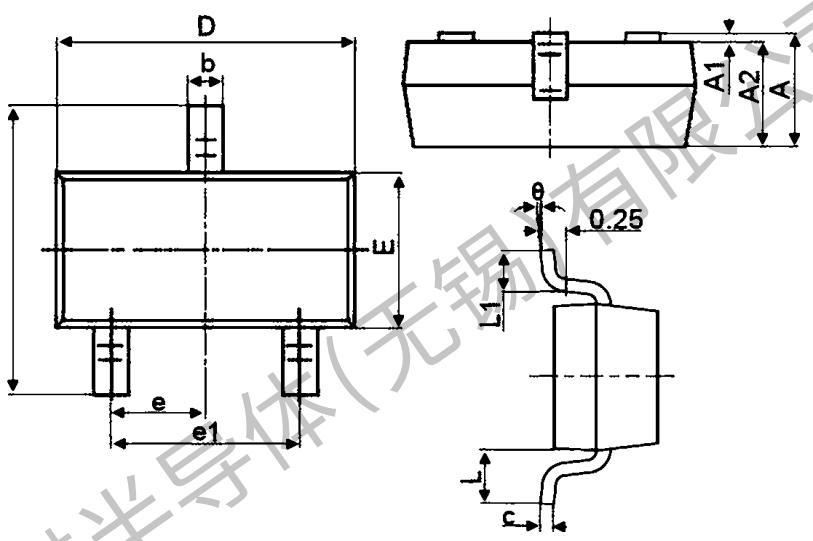
Package Mechanical Data:SOT-23



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

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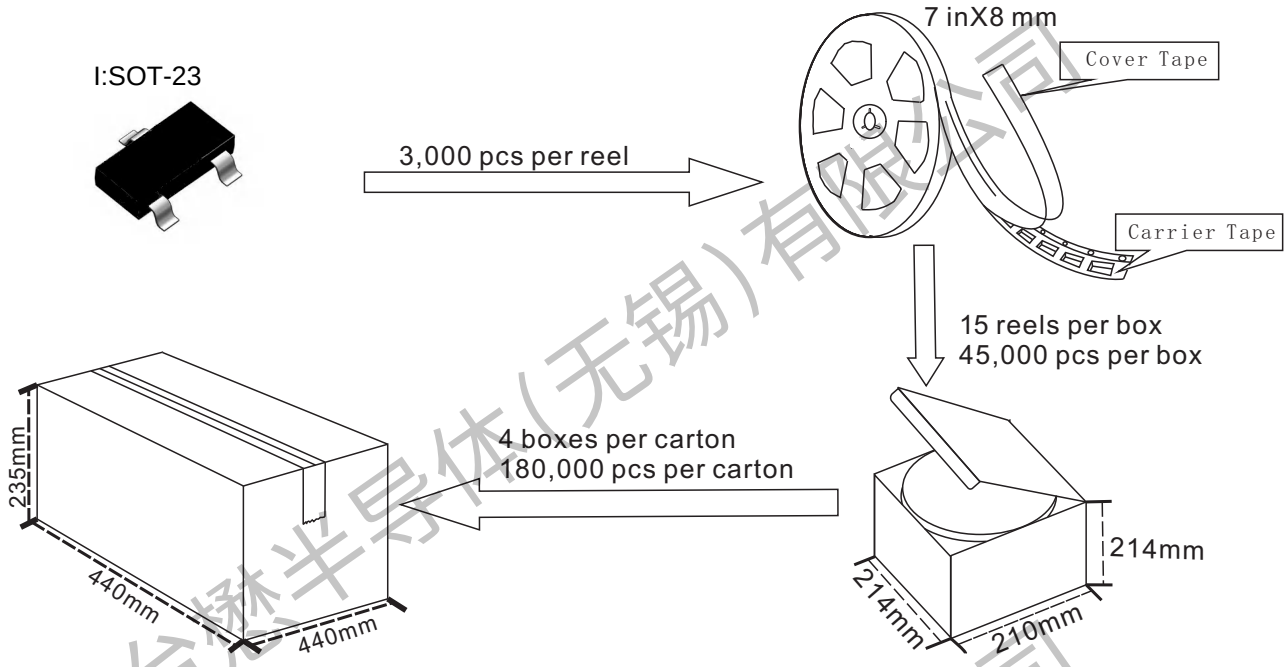
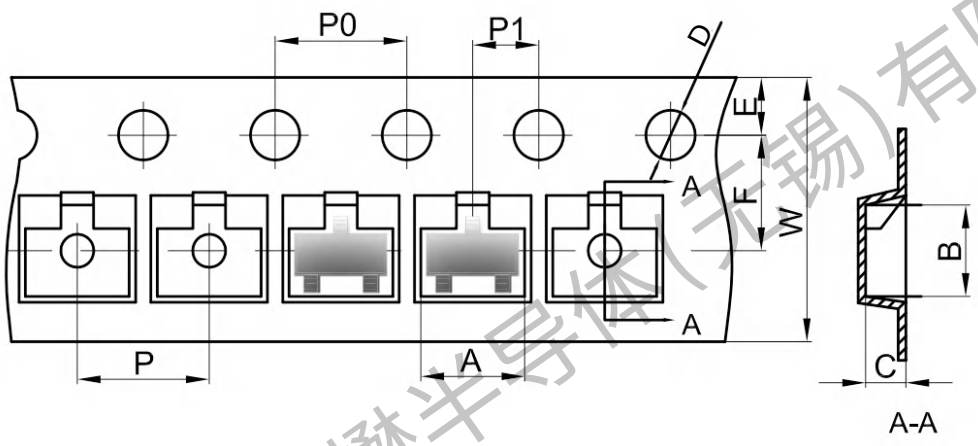
SOT-23 Packing

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

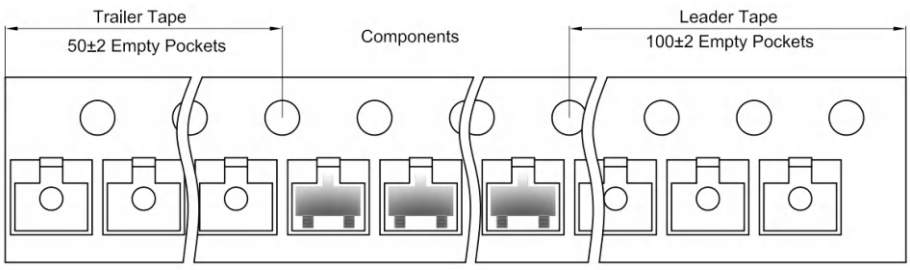


SOT-23 Embossed Carrier Tape



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

SOT-23 Tape Leader and Trailer



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Revision history:

Date	Rev	Description	Page
2023.07.01	23.07	Original	