



TM002P06I

P-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

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

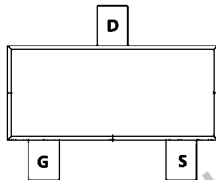
$R_{DS(ON)} = 3600m\Omega$ (typ.) @ $V_{GS} = -10V$

100% UIS Tested

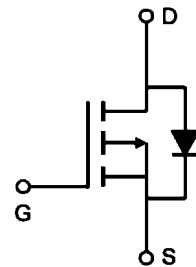
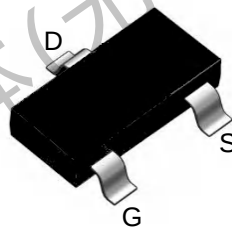
100% R_g Tested



I: SOT-23



Marking: PD



Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-0.2	A
$I_D @ T_A = 70^\circ C$	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	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	---	162	$^\circ C/W$
R	Thermal Resistance Junction Case ¹			$^\circ C/W$

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Electrical Characteristics : ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = -250\mu A$	BV_{DSS}	-60	--	--	V
Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = -250\mu A$	$V_{GS(TH)}$	-1.0	-2.0	-3.0	V
Gate-Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
Drain-Source Leakage Current	$V_{GS} = 0V, V_{DS} = -60V$	I_{DSS}	--	--	-1	μA
	$V_{GS} = 0V, V_{DS} = -60V$ $T_J = 125^{\circ}C$		--	--	-150	
Drain-Source On-State Resistance (Note 3)	$V_{GS} = -10V, I_D = -150mA$	$R_{DS(on)}$	--	3600	6000	m Ω
	$V_{GS} = -4.5V, I_D = -130mA$		--	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	$V_{GS} = -10V, V_{DS} = -30V,$ $I_D = -150mA, R_G = 6\Omega$	$t_{d(on)}$	--	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	$I_S = -150mA,$	t_{rr}	--	24	--	ns
Reverse Recovery Charge	$dI/dt = 100A/\mu s$	Q_{rr}	--	14	--	nC

Notes:

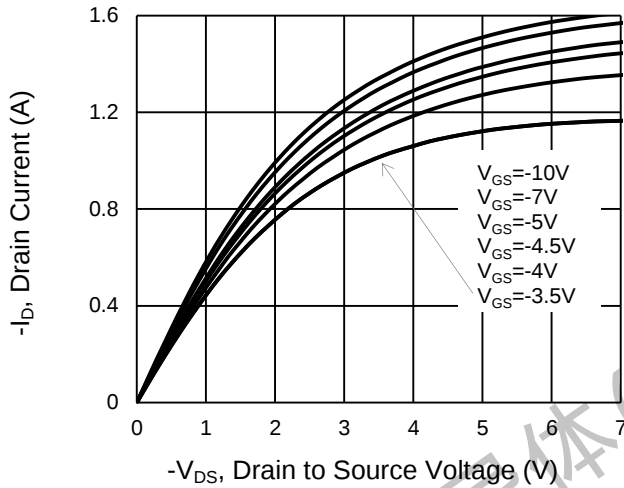
1. Silicon limited current only.
2. Pulse test: Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Switching time is essentially independent of operating temperature.



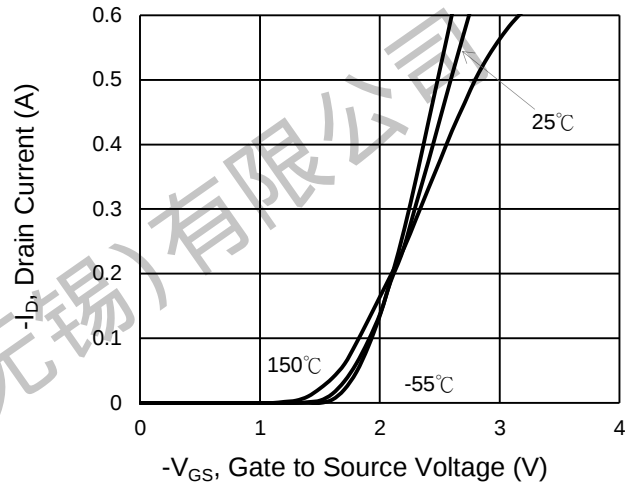
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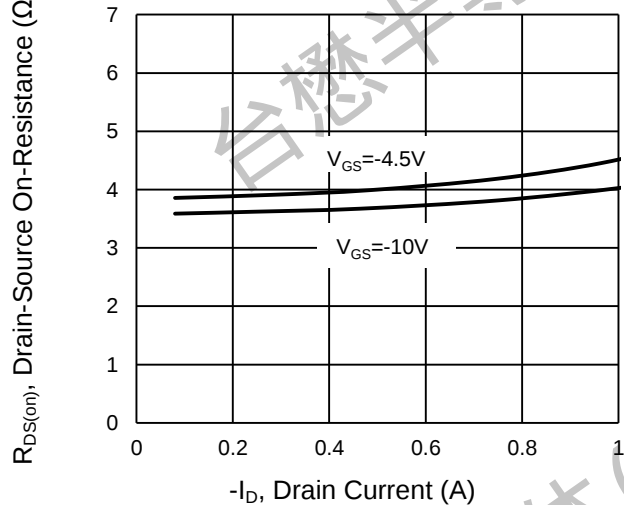
Output Characteristics



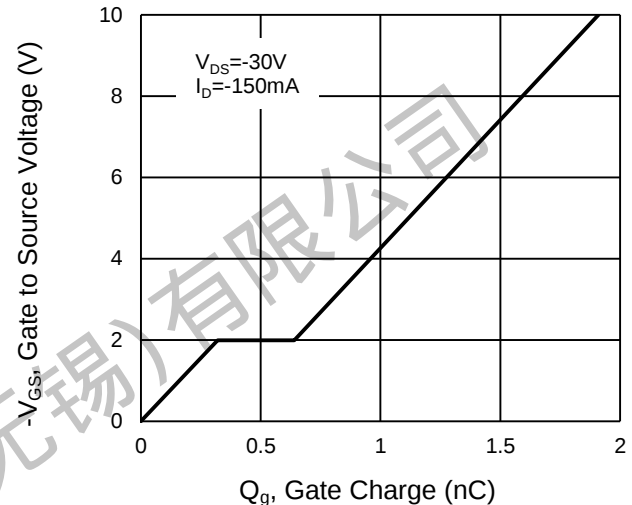
Transfer Characteristics



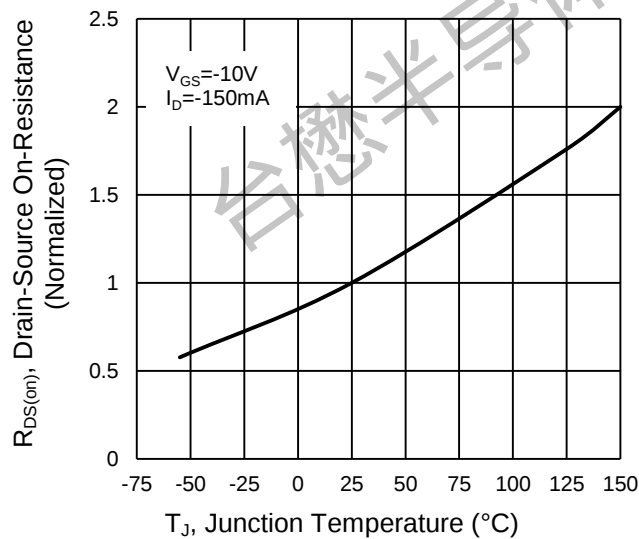
On-Resistance vs. Drain Current



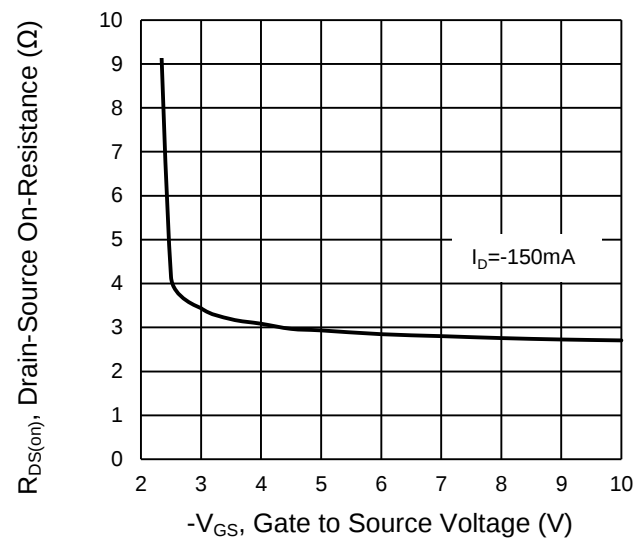
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



On-Resistance vs. Gate-Source Voltage

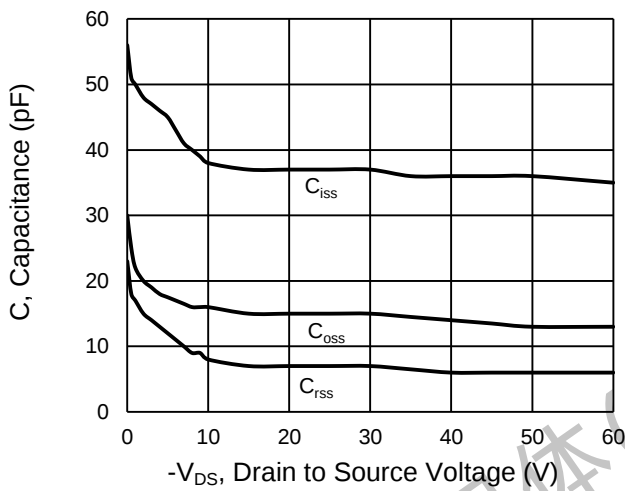




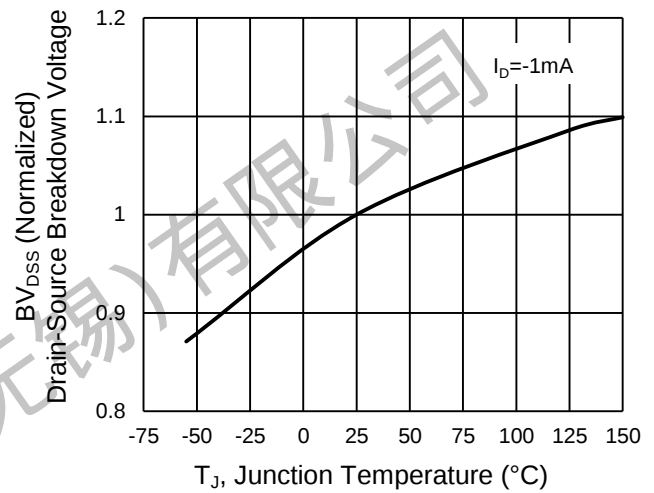
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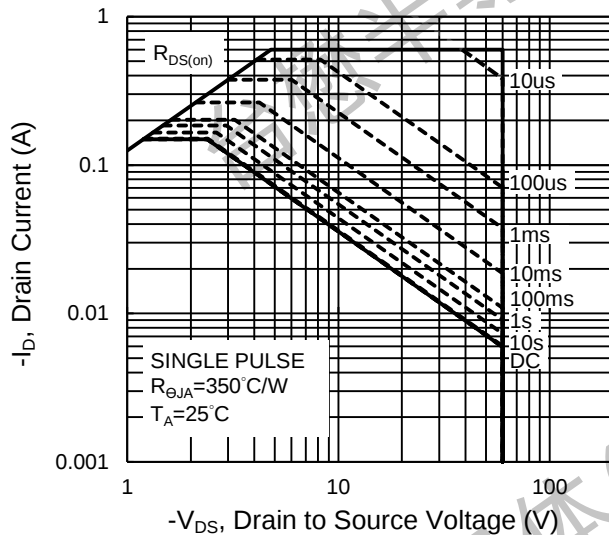
Capacitance vs. Drain-Source Voltage



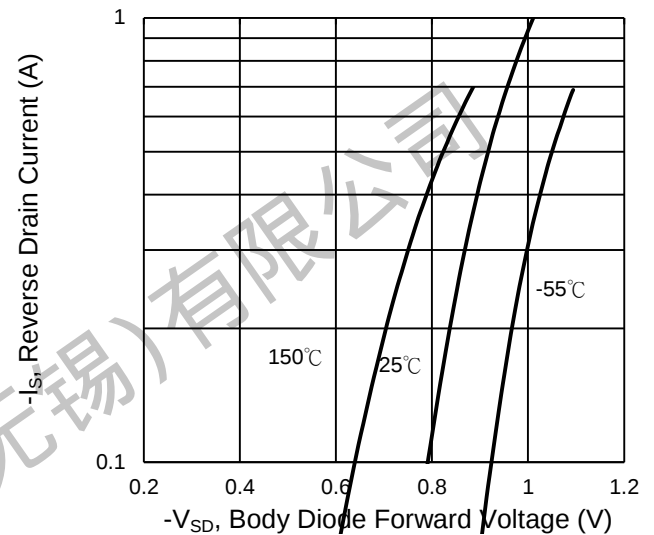
BV_{DSS} vs. Junction Temperature



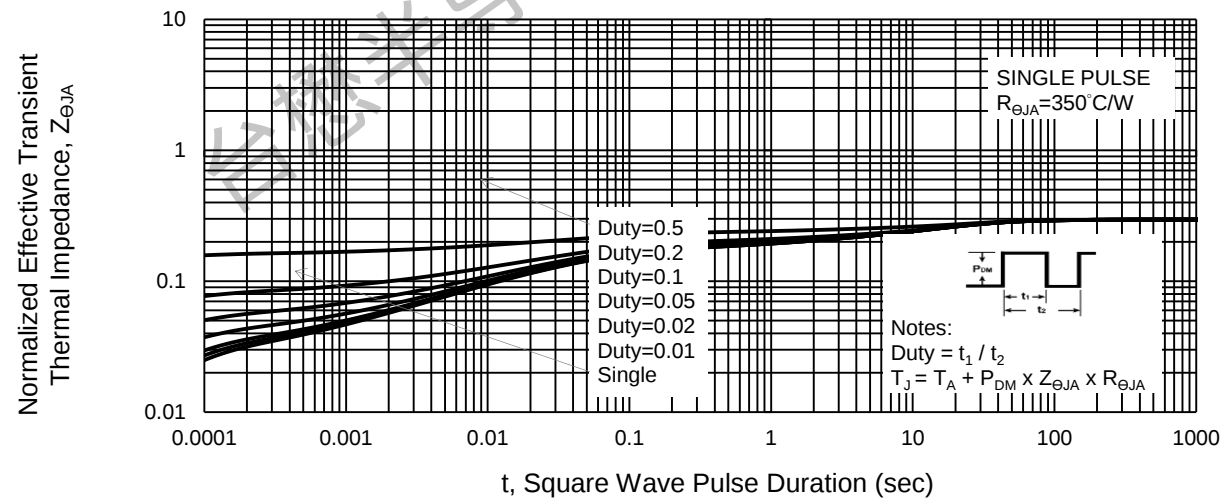
Maximum Safe Operating Area, Junction-to-Ambient



Source-Drain Diode Forward Current vs. Voltage



Normalized Thermal Transient Impedance, Junction-to-Ambient

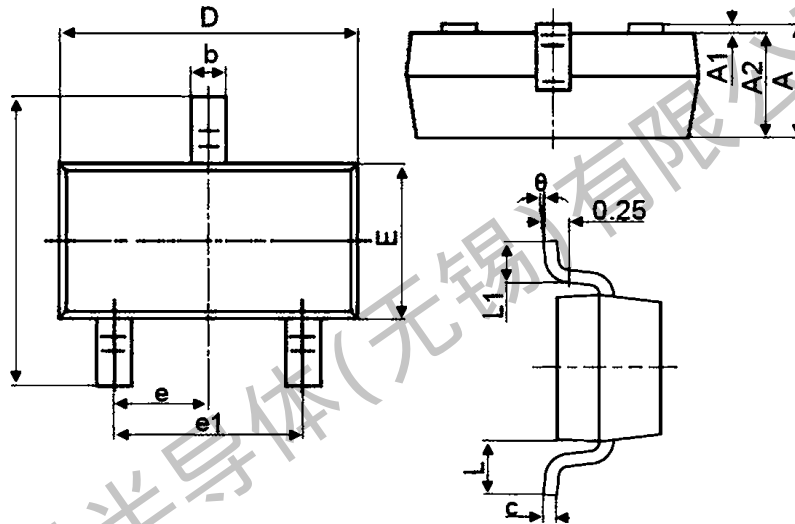




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Package Mechanical Data:SOT-23



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°

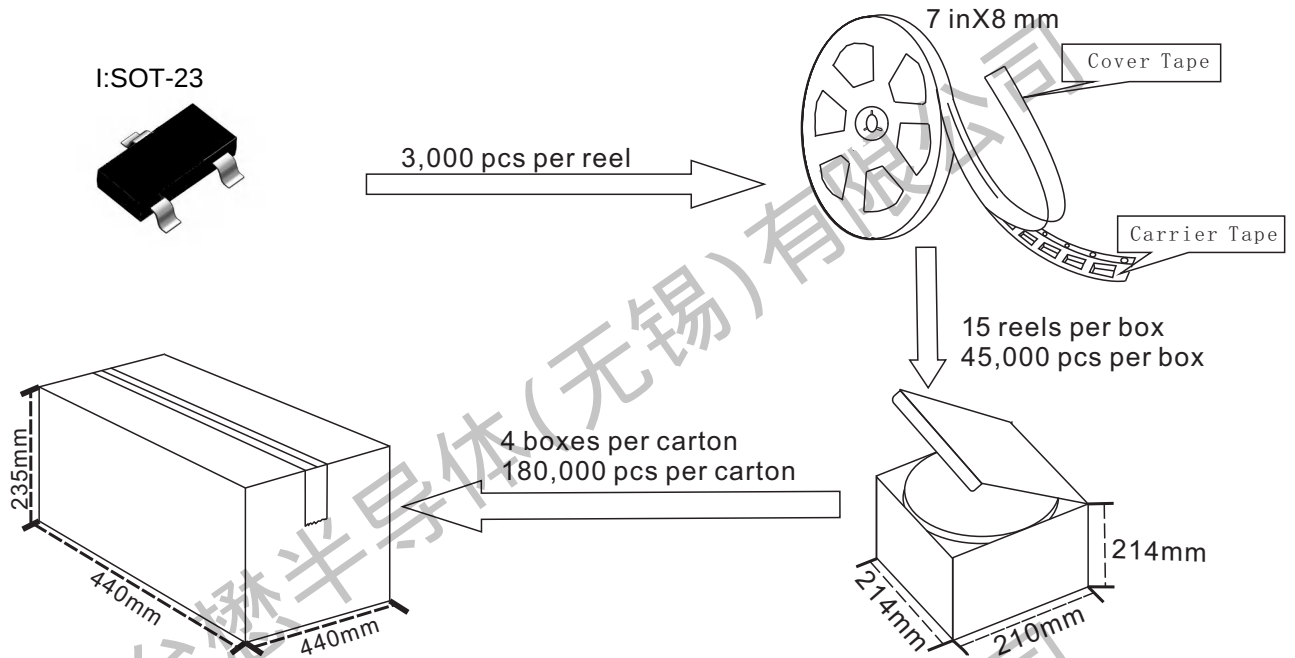


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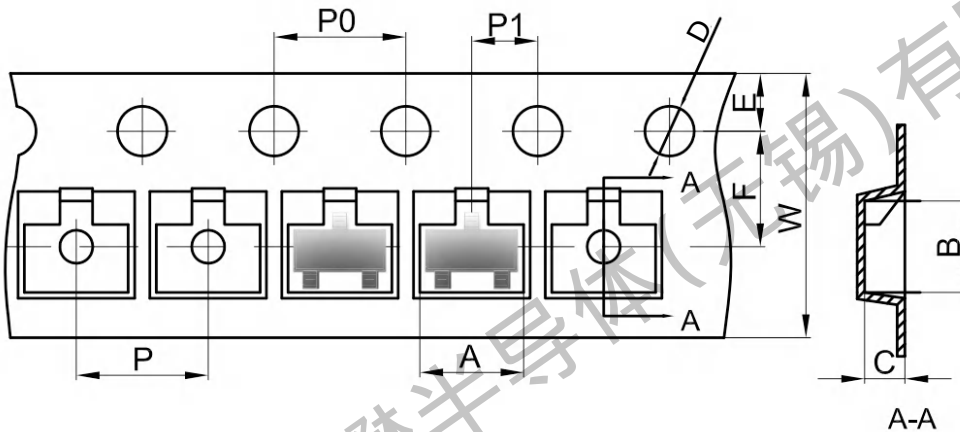
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SOT-23 Packing

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



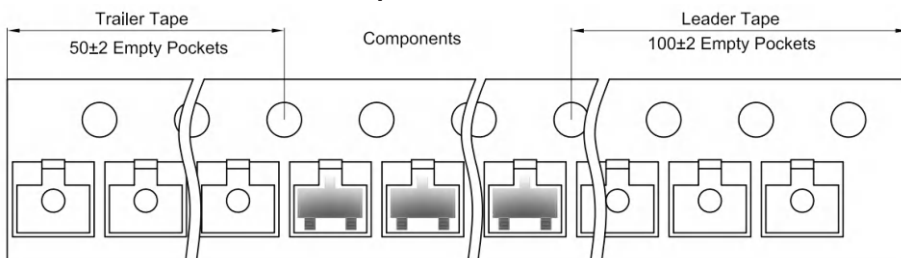
SOT-23 Embossed Carrier Tape



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	