TM13P018MI

P-Channel Enhancement Mosfet

General Description

- Low R DS(ON)
- RoHS and Halogen-Free Compliant

Applications

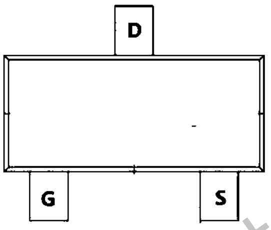
- Load switch
- PWM

General Features

V_{DS} = -18V I_D = -13A

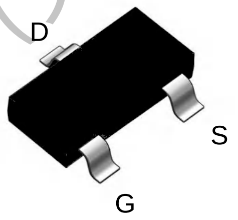
$R_{DS(ON)}$ = 10mΩ (typ.)@V_{GS}=-4.5V

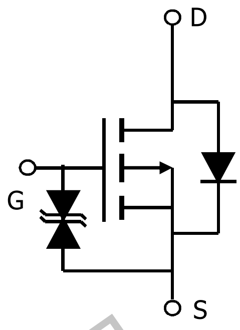
100% UIS Tested
100% R_g Tested



Marking: 13P018

MI:SOT-23-3L





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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-18	V
V_{GS}	Gate-Source Voltage	±12	V
I_D@T_A=25˚C	Continuous Drain Current, V_{GS} @ -4.5V	-13	A
I_D@T_A=70˚C	Continuous Drain Current, V_{GS} @ -4.5V	-8.3	A
I_{DM}	Pulsed Drain Current	-33	A
P_D@T_A=25˚C	Total Power Dissipation	1.6	W
T_{STG}	Storage Temperature Range	-55 to 175	˚C
T_J	Operating Junction Temperature Range	-55 to 175	˚C

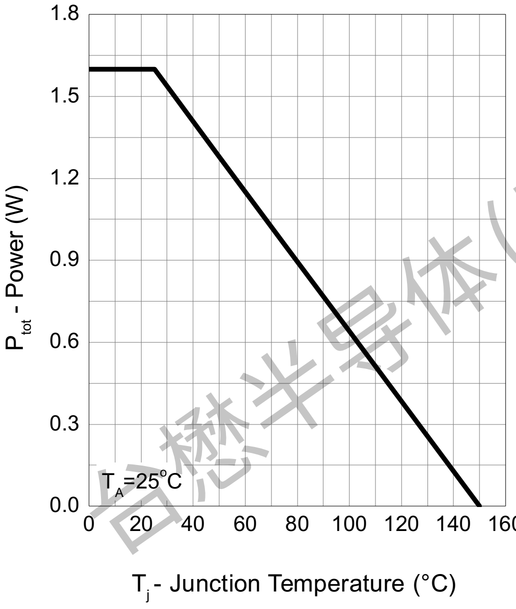
Thermal Data

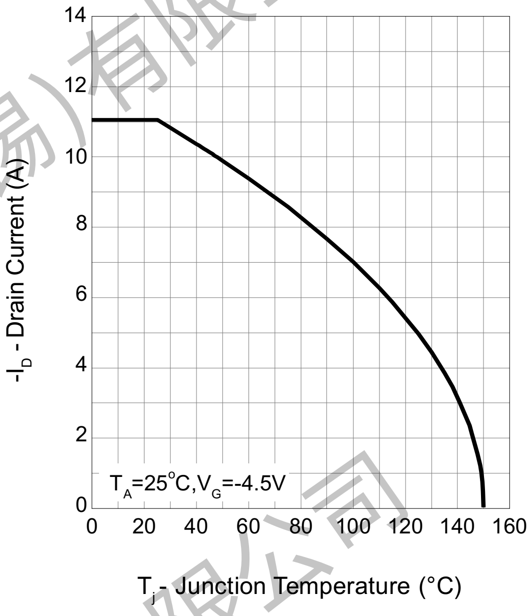
Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	80	˚C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	---	˚C/W

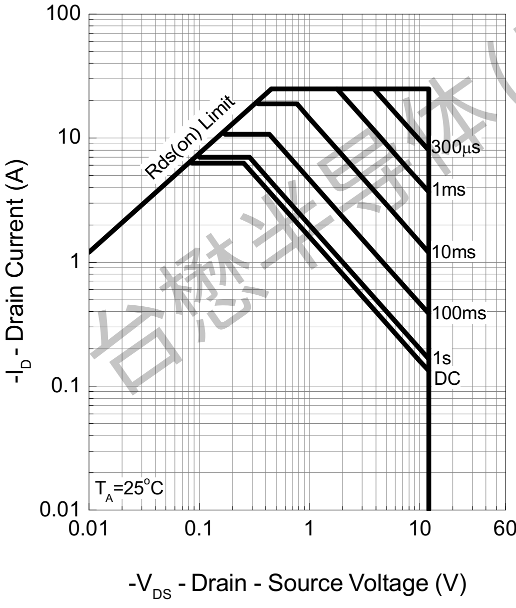
Electrical Characteristics (T$_J$=25℃ unless otherwise specified)

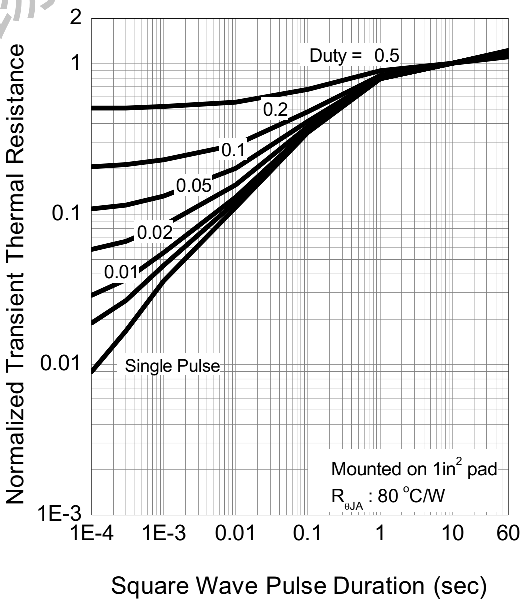
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=-250μA	-18	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-9.6V, V_{GS}=0V	-	-	-1	μA
		T_J=85°C	-	-	-30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=-250μA	-0.5	-	-1.0	V
I_{GSS}	Gate Leakage Current	V_{GS}=±12V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	V_{GS}=-4.5V, I_{DS}=-9.1A	-	10	13	mΩ
		V_{GS}=-2.5V, I_{DS}=-6A	-	15	18	
Diode Characteristics						
V_{SD}	Diode Forward Voltage	I_{SD}=-1A, V_{GS}=0V	- 0.4	-0.65	-1.0	V
t_{rr}	Reverse Recovery Time	I_{SD}=-6.3A, dI_{SD}/dt=100A/μs	-	31	-	ns
Q_{rr}	Reverse Recovery Charge		-	12	-	nC
Dynamic Characteristics						
R_g	Gate Resistance	V_{GS}=0V, V_{DS}=0V,F=1MHz	-	3	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-6V, Frequency=1.0MHz	-	1514	-	pF
C_{oss}	Output Capacitance		-	373	-	
C_{rss}	Reverse Transfer Capacitance		-	286	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=-6V, R_L=6Ω, I_{DS}=-1A, V_{GEN}=-4.5V, R_G=6Ω	-	9	-	ns
t_r	Turn-on Rise Time		-	13	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	54	-	
t_f	Turn-off Fall Time		-	50	-	
Gate Charge Characteristics						
Q_g	Total Gate Charge	V_{DS}=-6V, V_{GS}=-4.5V, I_{DS}=-6.3A	-	14.5	-	nC
Q_{gs}	Gate-Source Charge		-	1.8	-	
Q_{gd}	Gate-Drain Charge		-	4	-	

Typical Operating Characteristics


Power Dissipation

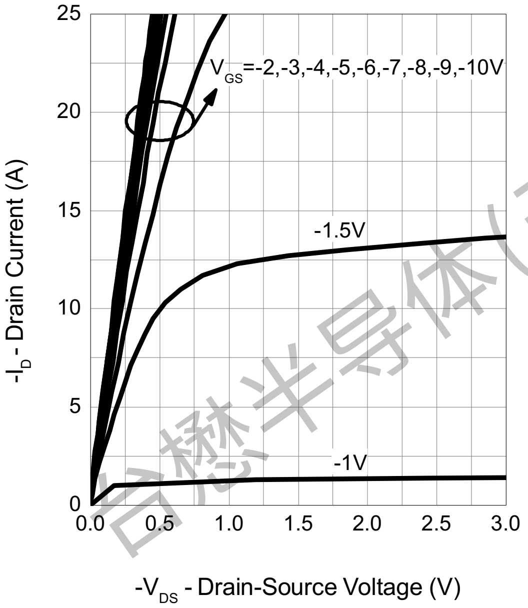

Drain Current


Safe Operation Area

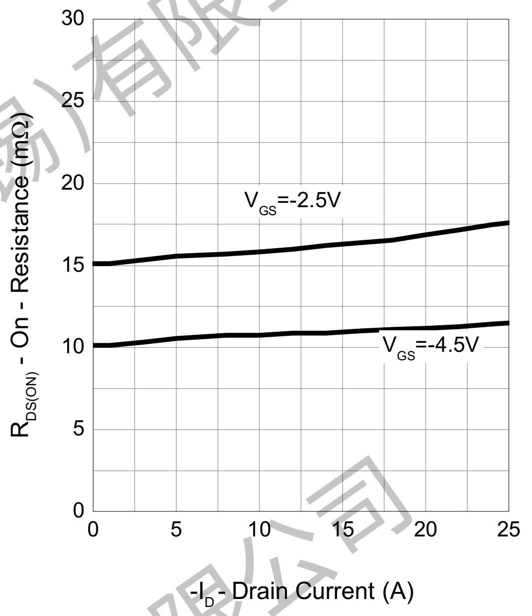

Thermal Transient Impedance

Typical Operating Characteristics (Cont.)

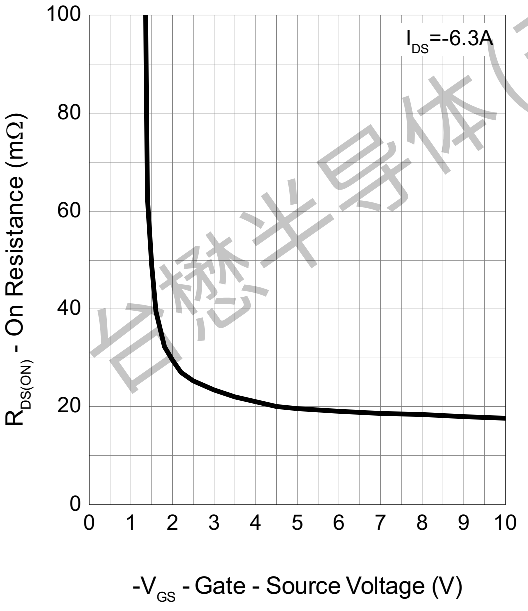
Output Characteristics



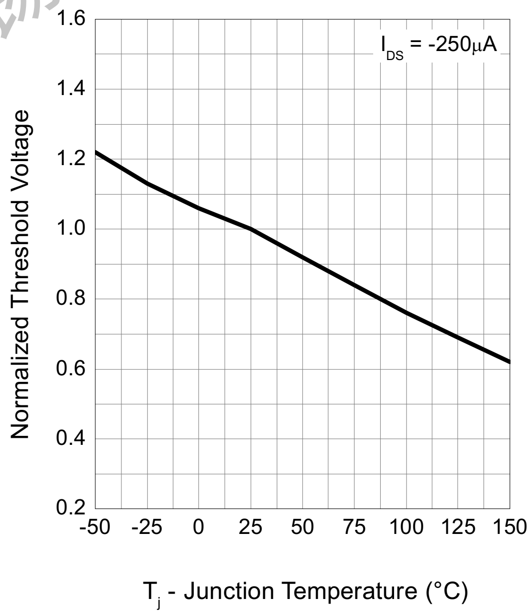
Drain-Source On Resistance



Gate-Source On Resistance

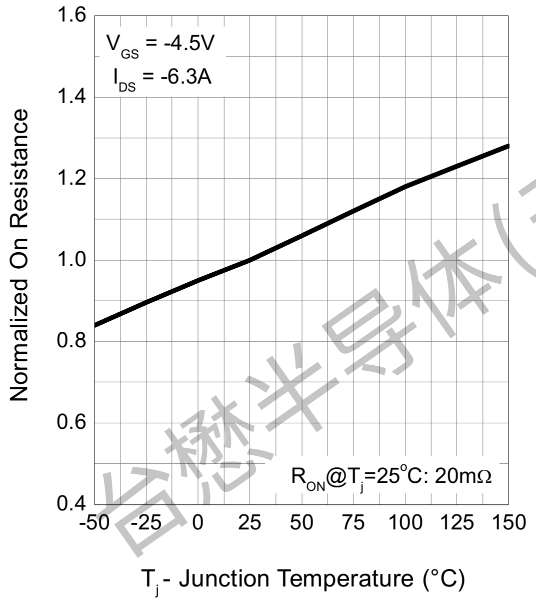


Gate Threshold Voltage

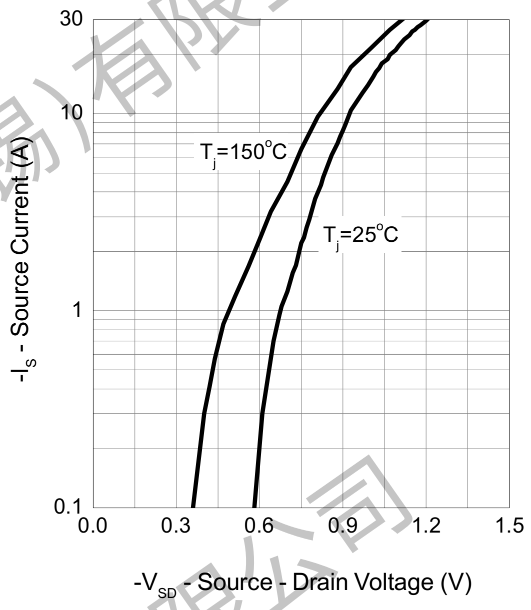


Typical Operating Characteristics (Cont.)

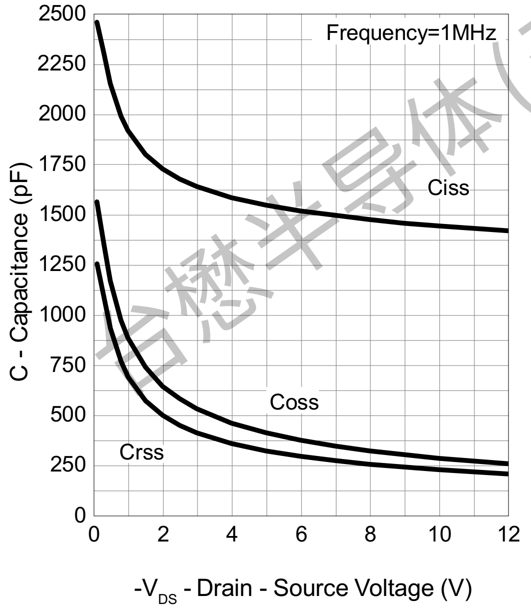
Drain-Source On Resistance



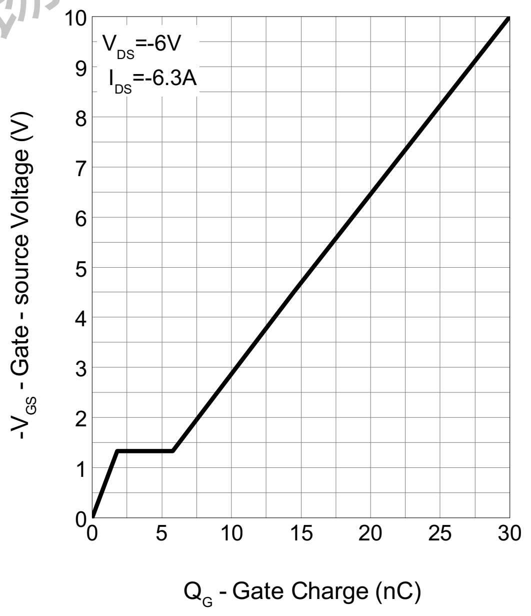
Source-Drain Diode Forward



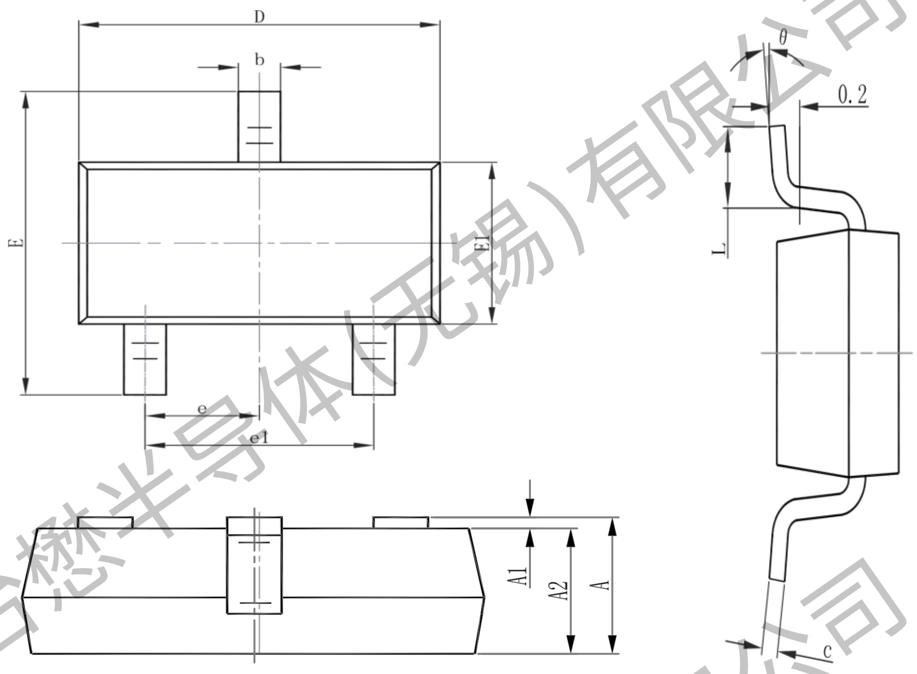
Capacitance



Gate Charge



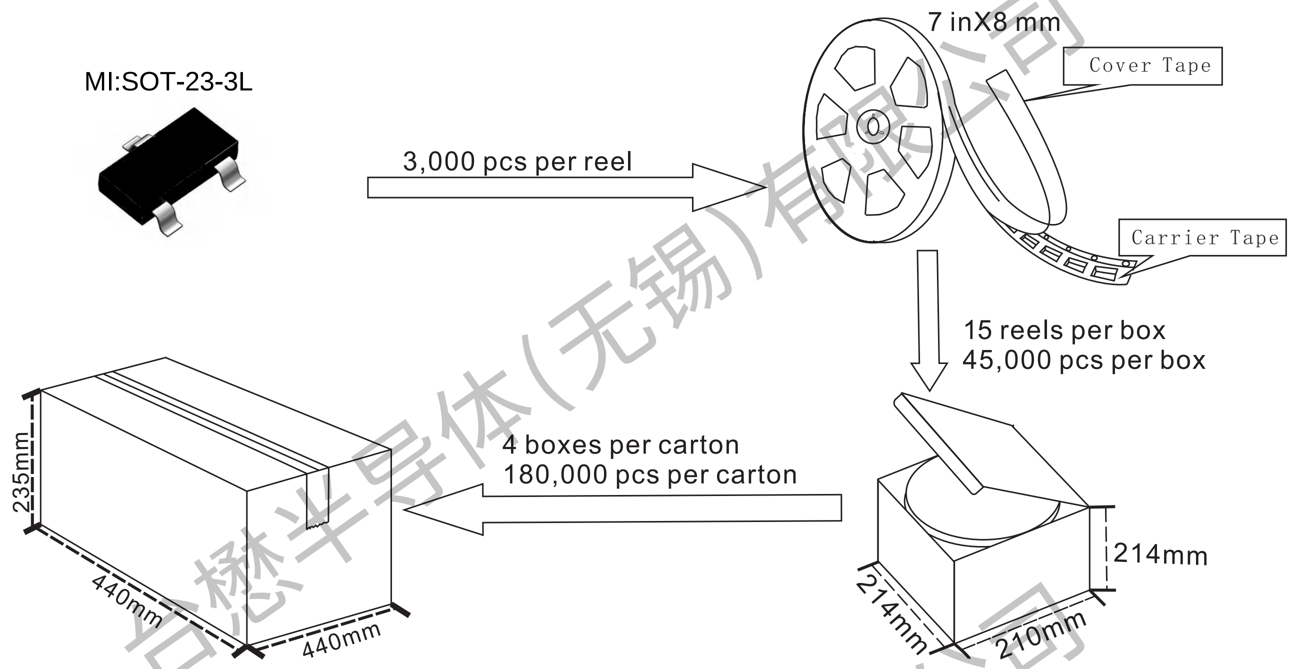
Package Mechanical Data:SOT-23-3L



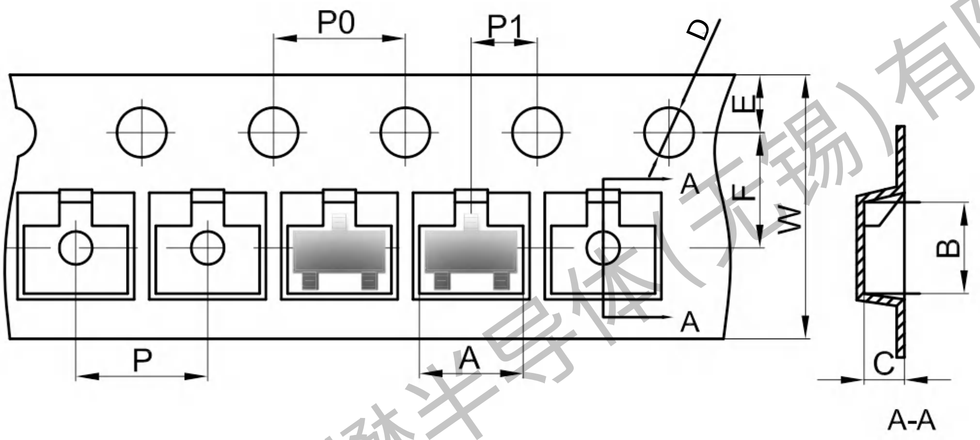
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	**Max.**	**Min.**	**Max.**
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	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-23-3L Packing

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

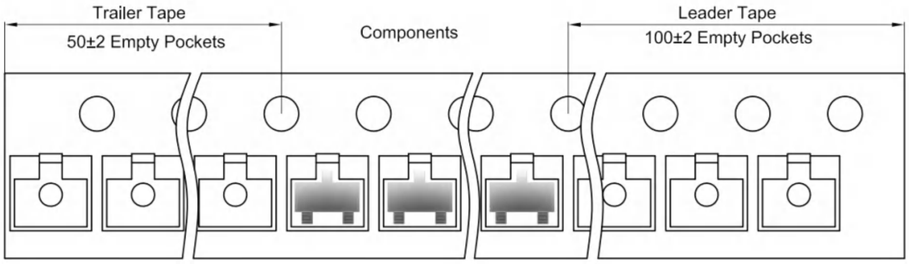


SOT-23-3L Embossed Carrier Tape



Dimensions are in millimeter										
Pkg type	A	B	C	D	E	F	P0	P	P1	W
SOT-23-3L	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

SOT-23-3L Tape Leader and Trailer



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Revision history:

Date	Rev	Description	Page
2023.06.29	23.06	Original	