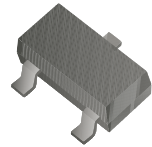


N-Channel MOSFET

RoHS Device
Halogen Free



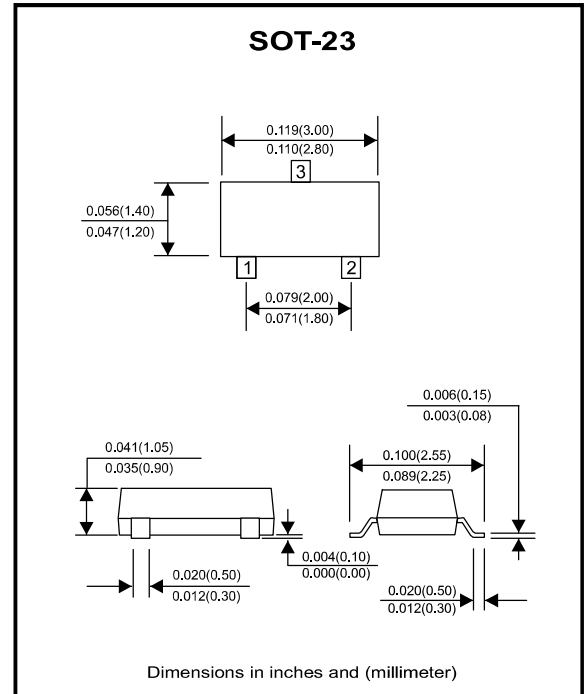
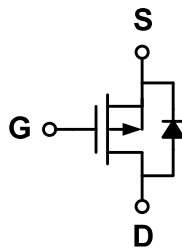
Features

- $V_{DS}=50V$, $I_D=0.22A$
- $R_{DS(ON)}=1.8\Omega$ (Typ.) @ $V_{GS}=4.5V$
 $R_{DS(ON)}=1.5\Omega$ (Typ.) @ $V_{GS}=10V$
- High Power and Current Handling Capability
- Lead Free Product is Acquired
- Surface Mount Package

Application

- Battery Protection
- Load Switch
- Power Management

Circuit Diagram



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

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		50	V
V_{GSS}	Gate-Source Voltage		± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ C$	0.22	A
		$T_C = 100^\circ C$	0.14	
I_{DM}	Pulsed Drain Current ^{note1}		0.88	A
P_D	Power Dissipation	$T_A = 25^\circ C$	0.35	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		375	$^\circ C/W$
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	$^\circ C$

Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D = 250μA	50	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =48V, V _{GS} = 0V,	-	-	1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±20V	-	-	±5	μA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	0.8	1	1.45	V
R _{DS(on)}	Static Drain-Source on-Resistance note2	V _{GS} =10V, I _D =0.5A	-	1.5	3	Ω
		V _{GS} =4.5V, I _D =0.2A	-	1.8	4	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	-	40	50	pF
C _{oss}	Output Capacitance		-	12	25	pF
C _{rss}	Reverse Transfer Capacitance		-	3.5	5	pF
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} = 30V, I _D =0.2A,	-	-	20	ns
t _{d(off)}	Turn-off Delay Time	R _{GEN} = 6Ω, V _{GS} =10V,	-	-	20	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	0.22	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	0.88	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _S =0.5A	0.5	-	1.3	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

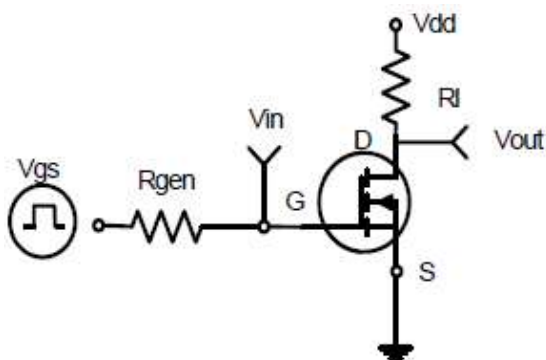
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$ **Typical Performance Characteristics**

Figure1:Switching Test Circuit

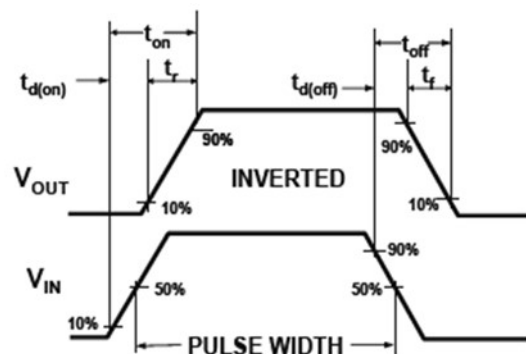
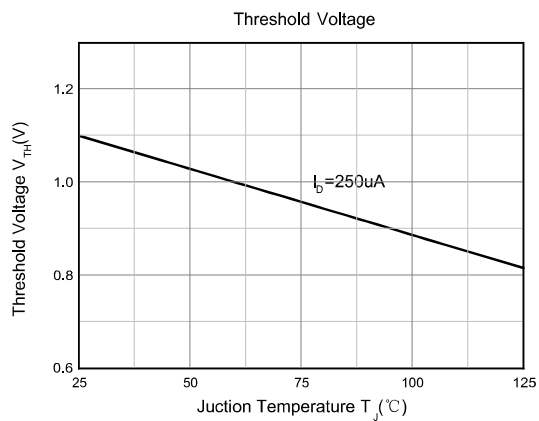
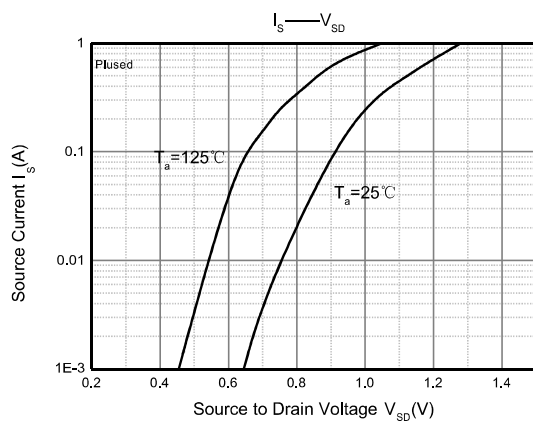
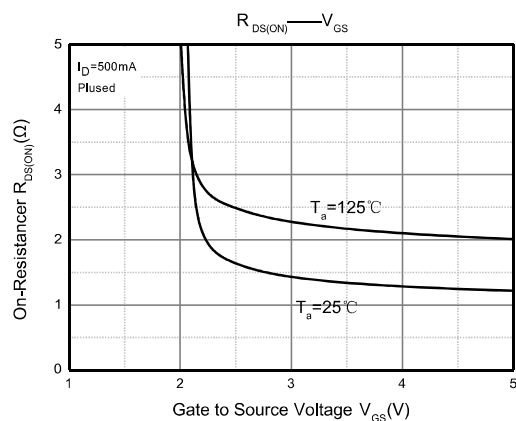
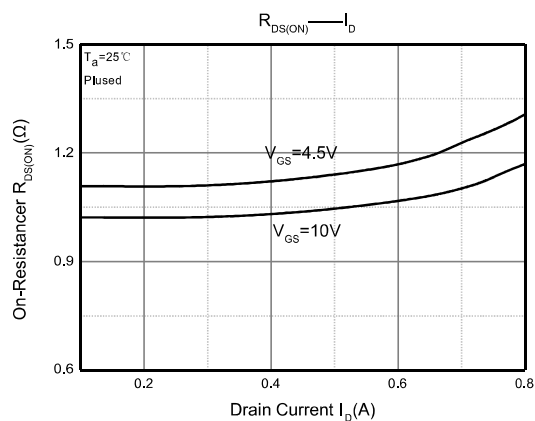
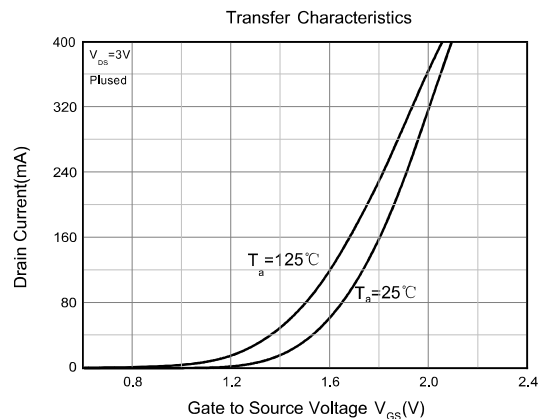
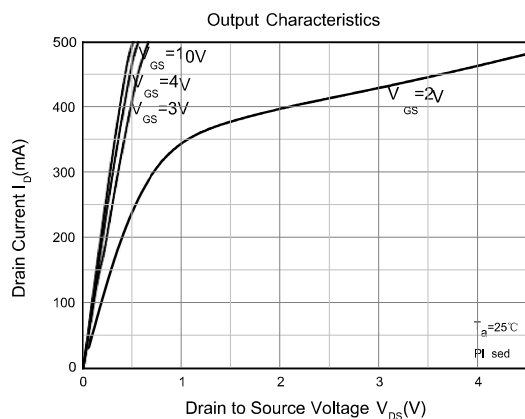


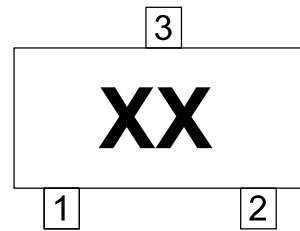
Figure2:Switching Waveforms

Typical Characteristic Curves



Marking Code

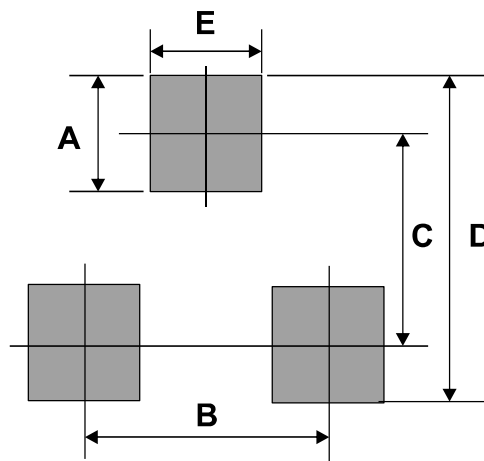
Part Number	Marking Code
LM138A	SS



xx= Product type marking code

Suggested PAD Layout

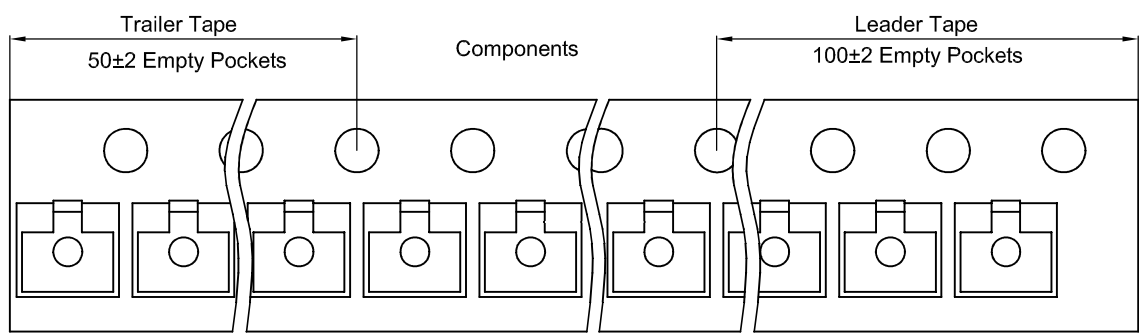
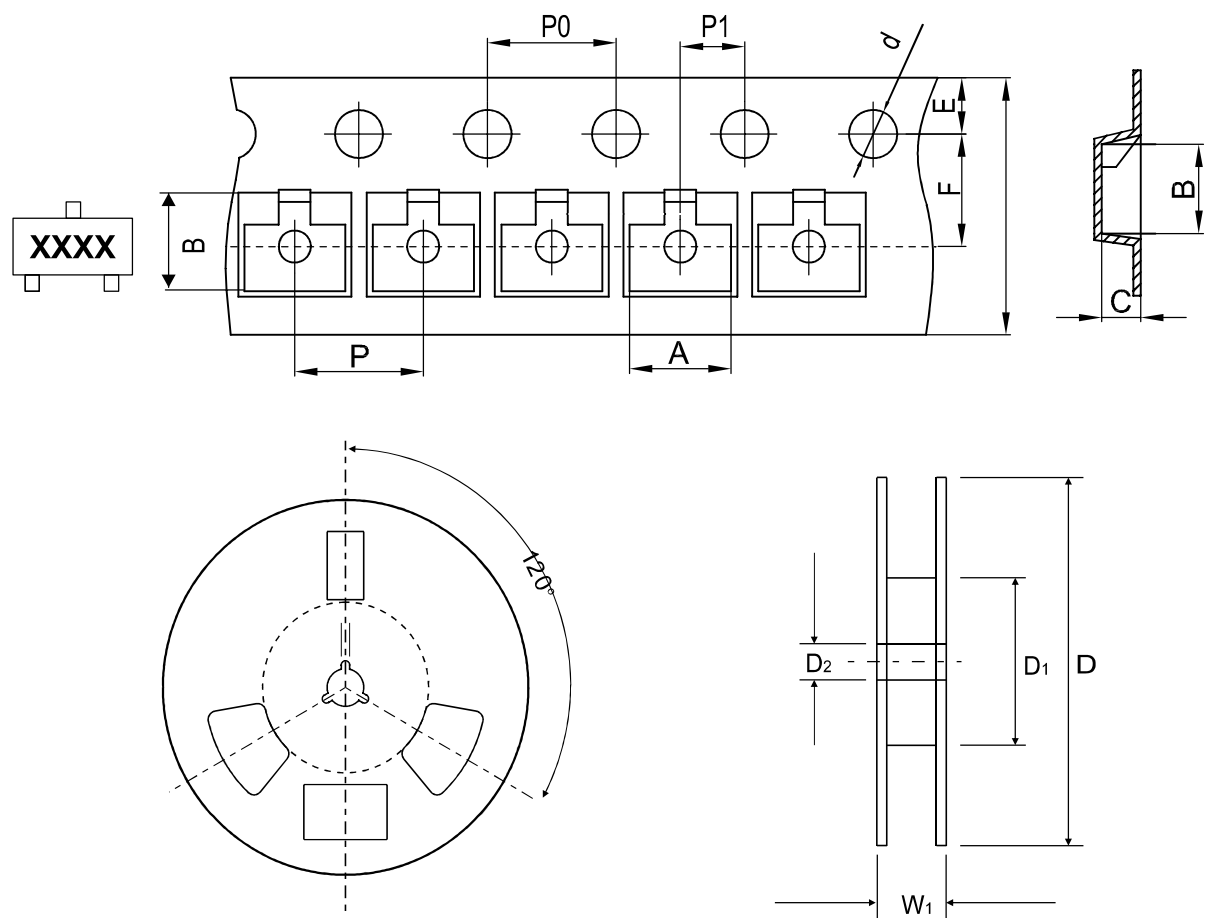
SIZE	SOT-23	
	(mm)	(inch)
A	0.80	0.031
B	1.90	0.075
C	2.02	0.080
D	2.82	0.111
E	0.60	0.024



Standard Packaging

Case Type	Qty Per Reel	Reel Size
	(Pcs)	(inch)
SOT-23	3,000	7

Reel Taping Specification



SOT-23	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	3.15 ± 0.10	2.77 ± 0.10	1.22 ± 0.10	1.50 ± 0.10	178.00 ± 2.00	54.40 ± 1.00	13.00 ± 1.00
	(inch)	0.124 ± 0.004	0.109 ± 0.004	0.048 ± 0.004	0.059 ± 0.004	7.008 ± 0.079	2.142 ± 0.039	0.512 ± 0.039

SOT-23	SYMBOL	E	F	P	P0	P1	W	W1
	(mm)	1.75 ± 0.10	3.50 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	$8.00 + 0.30 / - 0.10$	12.30 ± 1.00
	(inch)	0.069 ± 0.004	0.138 ± 0.004	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.004	$0.315 + 0.012 / - 0.004$	0.484 ± 0.039

Company reserves the right to improve product design , functions and reliability without notice.