

FMOSBSS138K2-Q1

List

List.....	1
Package outline.....	2
Features.....	2
Applications.....	2
Mechanical data.....	2
Maximum ratings	2
Electrical characteristics.....	3
Rating and characteristic curves.....	4
Pinning information.....	5
Marking.....	5
Suggested solder pad layout.....	5
Packing information.....	6
Reel packing.....	7
Suggested thermal profiles for soldering processes.....	7

FMOSBSS138K2-Q1

0.22A 50V N-Channel Enhancement Mode MOSFET ESD Protection

Features

- $V_{DS} = 50V$, $I_D = 0.22A$.
- $R_{DS(ON)} < 3.5\Omega$ @ $V_{GS}=10V$, $I_D=0.22A$.
- $R_{DS(ON)} < 6.0\Omega$ @ $V_{GS}=4.5V$, $I_D=0.22A$.
- High density cell design for extremely low $R_{DS(ON)}$.
- Reliable and rugged.
- Qualified to AEC-Q101 standards for high reliability.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.FMOSBSS138K2-Q1-H.

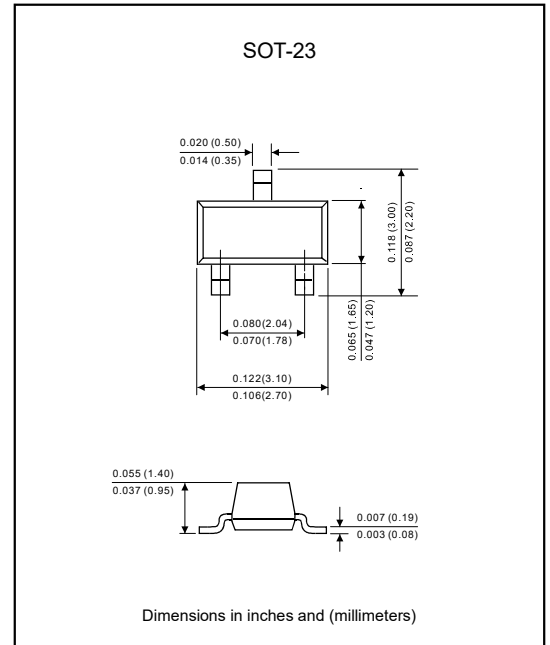
Applications

- Direct logic-level interface: TTL/CMOS.
- Drivers: relays, solenoids, lamps, hammers, display.
- Memories, transistors, etc...
- Battery operated systems.
- Solid-state relays.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-23.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Mounting Position : Any.

Package outline



Maximum ratings ($T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	50	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current	I_D	0.22	A
Power dissipation	P_D	0.35	W
Thermal resistance form junction to ambient	$R_{\theta JA}$	357	$^\circ C/W$
Operating Junction temperature	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$

FMOSBSS138K2-Q1

Electrical characteristics (At $T_A=25^{\circ}\text{C}$ unless otherwise specified)

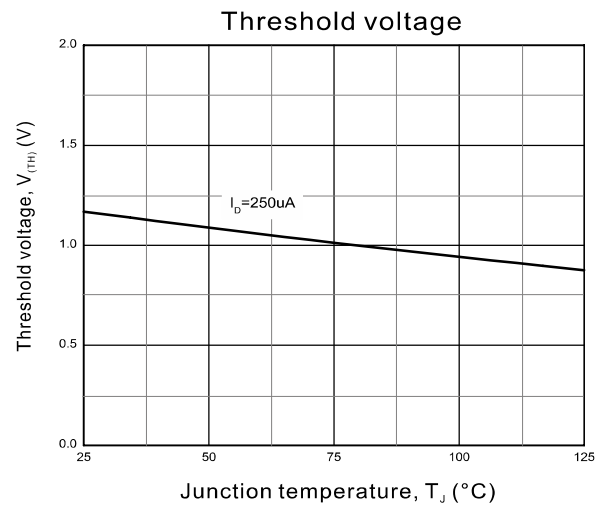
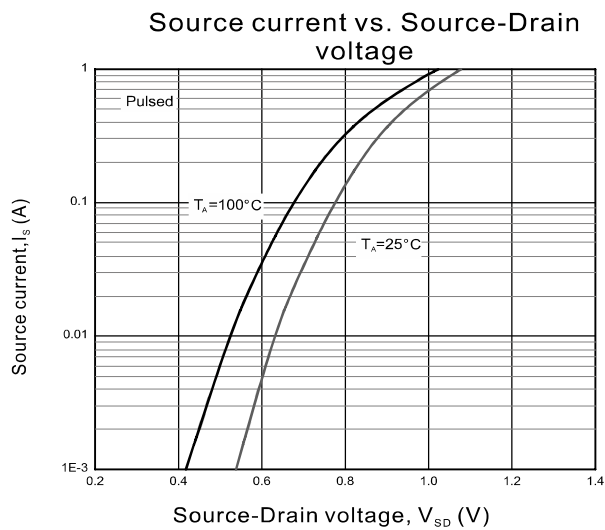
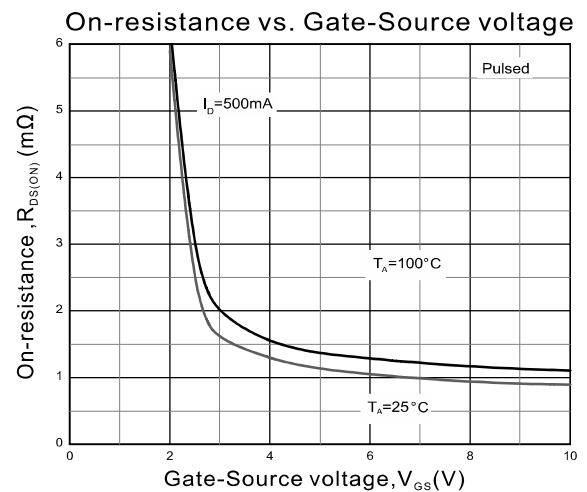
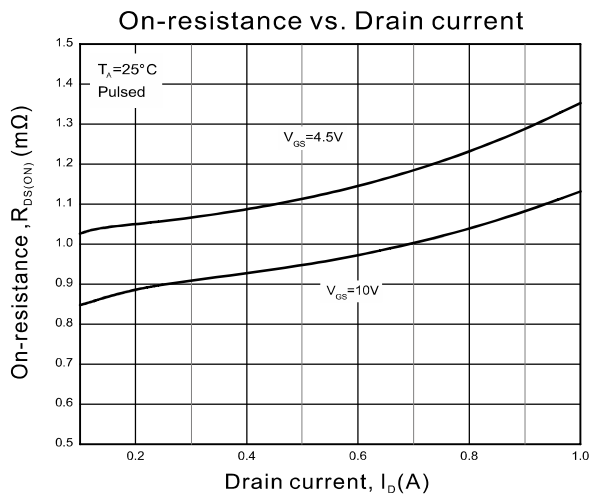
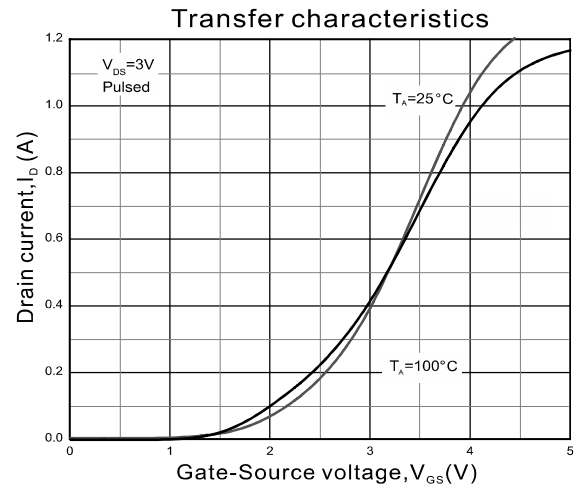
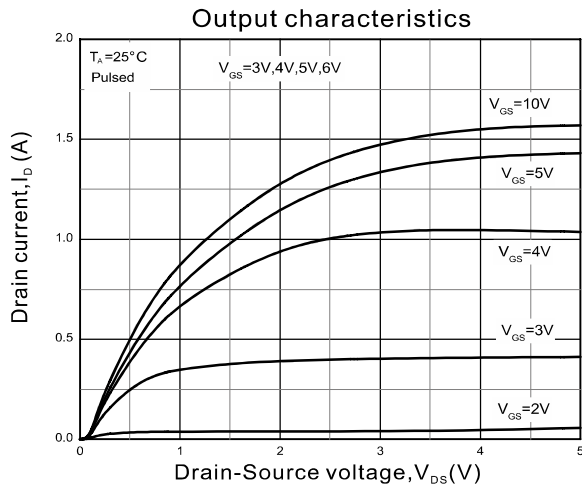
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	50			V
Drain-source leakage current	I _{DSS}	V _{DS} =50V, V _{GS} =0V			0.5	μA
		V _{DS} =30V, V _{GS} =0V			0.1	
Gate-source leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±5	μA
On characteristics						
Gate threshold voltage (Note1)	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	0.8		1.5	V
Static drain-source on-resistance (Note1)	R _{DS(ON)}	V _{GS} =10V, I _D =0.22A			3.5	Ω
		V _{GS} =4.5V, I _D =0.22A			6	
Forward transconductance (Note1)	g _{FS}	V _{DS} =10V, I _D =0.22A	0.12			S
Dynamic Parameters (Note 2)						
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		27		pF
Output capacitance	C _{oss}			13		
Reverse transfer capacitance	C _{rss}			6		
Switching parameters						
Turn-on delay time (Note1,2)	t _{d(on)}	V _{DS} =10V, V _{DD} =30V, I _D =0.29A, R _G =6Ω			5	ns
Rise time (Note1,2)	t _r				18	
Turn-off delay time (Note1,2)	t _{d(off)}				36	
Fall time (Note1,2)	t _f				14	
Source-drain diode ratings and characteristics						
Drain - source diode forward voltage (Note1)	V _{SD}	V _{GS} =0V, I _S =0.44A			1.4	V

Note : 1. Pulse test; pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

2. These parameters have no way to verify.

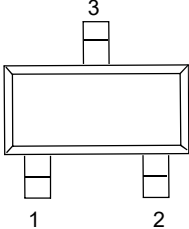
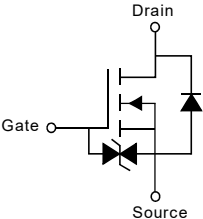
FMOSBSS138K2-Q1

Rating and characteristic curves



FMOSBSS138K2-Q1

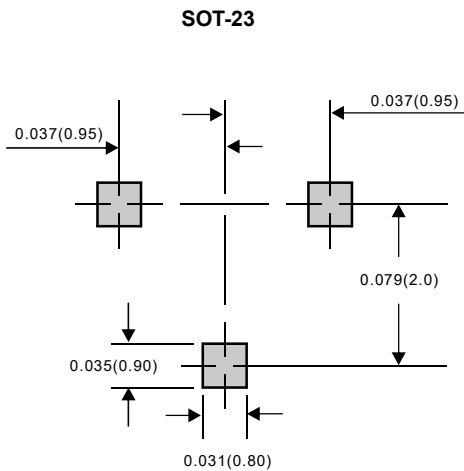
Pinning information

Pin	Simplified outline	Symbol
Pin 1 Gate Pin 2 Source Pin 3 Drain		

Marking

Type number	Marking code
FMOSBSS138K2-Q1	SS

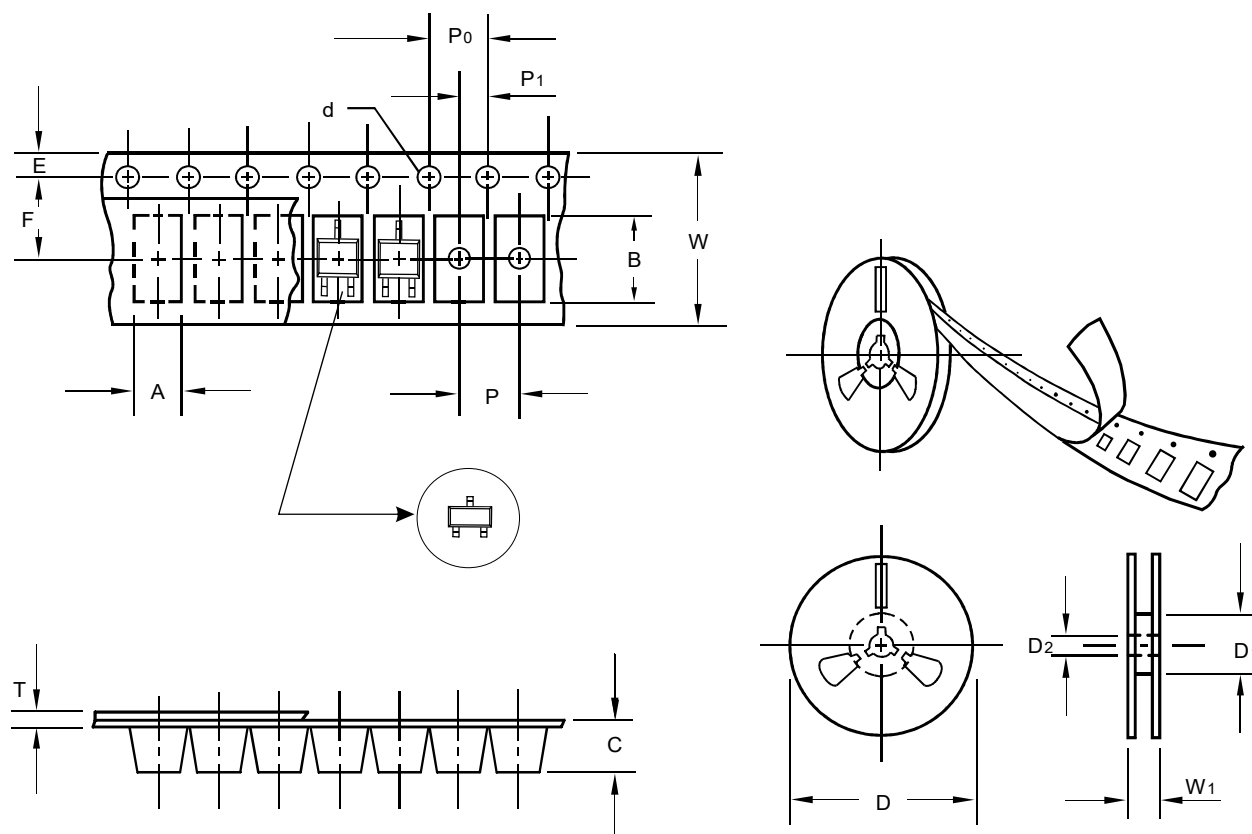
Suggested solder pad layout



Dimensions in inches and (millimeters)

FMOSBSS138K2-Q1

Packing information



unit:mm

Item	Symbol	Tolerance	SOT-23
Carrier width	A	0.1	3.15
Carrier length	B	0.1	2.77
Carrier depth	C	0.1	1.22
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	55.00
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W1	1.0	12.0

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

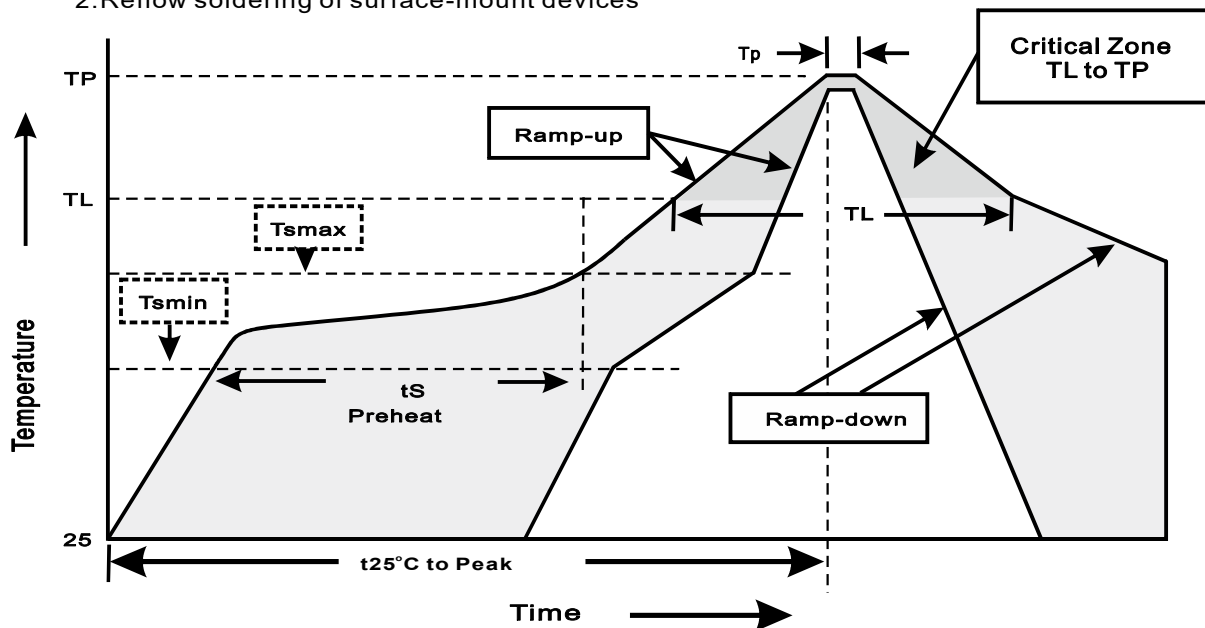
FMOSBSS138K2-Q1

Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)
SOT-23	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T _L to T _P)	<3°C/sec
Preheat - Temperature Min(T _{smín}) - Temperature Max(T _{smáx}) - Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smáx} to T _L - Ramp-upRate	<3°C/sec
Time maintained above: - Temperature(T _L) - Time(t _L)	217°C 60~260sec
Peak Temperature(T _P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t _p)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes