

FMOSBSS123KW-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
High reliability test capabilities.....	8

FMOSBSS123KW-Q1

0.17A 100V N-Channel Enhancement Mode MOSFET ESD Protection

Features

- $V_{DS}=100V$, $I_D=0.17A$.
- $R_{DS(ON)} \leq 10\Omega$ @ $V_{GS}=4.5V$, $I_D=0.17A$.
- $R_{DS(ON)} \leq 6\Omega$ @ $V_{GS}=10V$, $I_D=0.17A$.
- High density cell design for extremely low on-resistance.
- Voltage controlled small signal switch.
- Rugged and reliable.
- ESD protected.
- Qualified to AEC-Q101 standards for high reliability.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates halogen-free part, ex. FMOSBSS123KW-Q1-H.

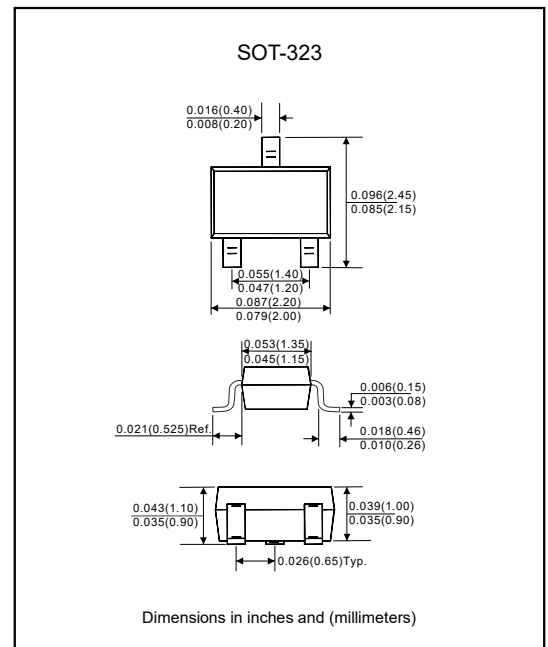
Applications

- Small servo motor controls.
- Power MOSFET gate drivers.
- Switching application.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-323.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Mounting Position : Any.

Package outline



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

Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	100	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current (Note1)	I_D	0.17	A
Pulse drain current ($t_p=10\mu s$)	I_{DM}	0.68	A
Continuous source-drain diode current	I_S	0.17	A
Power dissipation	P_D	0.35	W
Thermal resistance, junction to ambient (Note1)	$R_{\theta JA}$	357	$^\circ C/W$
Operating Junction temperature	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$
Lead temperature for soldering purposes (1/8" from case for 10 seconds)	T_L	260	$^\circ C$

FMOSBSS123KW-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	100			V
Drain-source leakage current	I _{DSS}	V _{DS} =100V, V _{GS} =0V			1	μA
		V _{DS} =20V, V _{GS} =0V			0.1	
Gate-source leakage current	I _{GSS}	V _{GS} =±20V, V _{GS} =0V			±1	μA
On characteristics						
Gate threshold voltage (Note2)	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1		2.5	V
Static drain-source on-resistance (Note2)	R _{DS(on)}	V _{GS} =4.5V, I _D =0.17A			10	Ω
		V _{GS} =10V, I _D =0.17A			6	
Forward transconductance (Note2)	g _{FS}	V _{DS} =10V, I _D =170mA	80			mS
Dynamic parameters (Note4)						
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		29	60	pF
Out capacitance	C _{oss}			10	15	
Reverse transfer capacitance	C _{rss}			2	6	
Switching parameters (Note3, 4)						
Total gate charge	Q _g	V _{GS} =10V, V _{DS} =10V, I _D =0.22A		1.4	2	nC
Gate-source charge	Q _{gs}			0.15	0.25	
Gate-drain charge	Q _{gd}			0.2	0.4	
Turn-on delay time	t _{d(on)}	V _{DD} =30V, V _{GS} =10V, R _G =50Ω, I _D =2.8A			8	ns
Rise time	t _r				8	
Turn-off delay time	t _{d(off)}				13	
Fall time	t _f				16	
Source-drain diode ratings and characteristics						
Drain-source diode forward voltage	V _{SD}	I _S =0.34A , V _{GS} =0V			1.3	V

Note : 1. Surface mounted on FR4 board using the minimum recommended pad size.

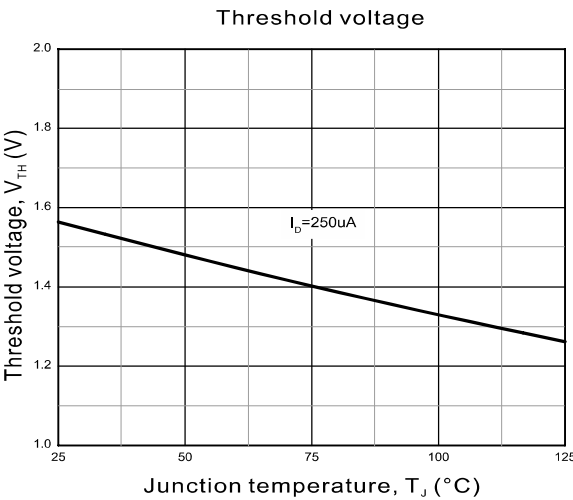
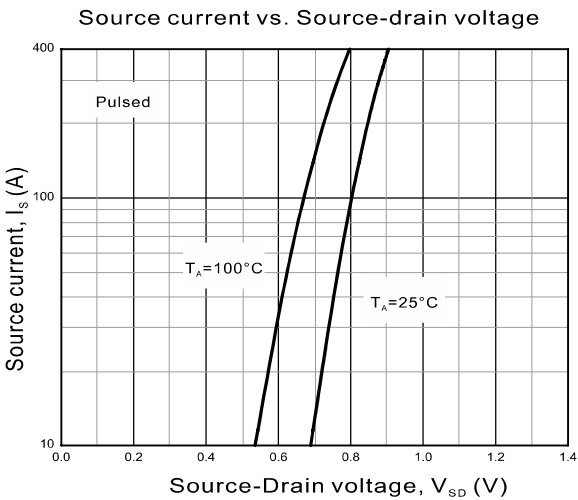
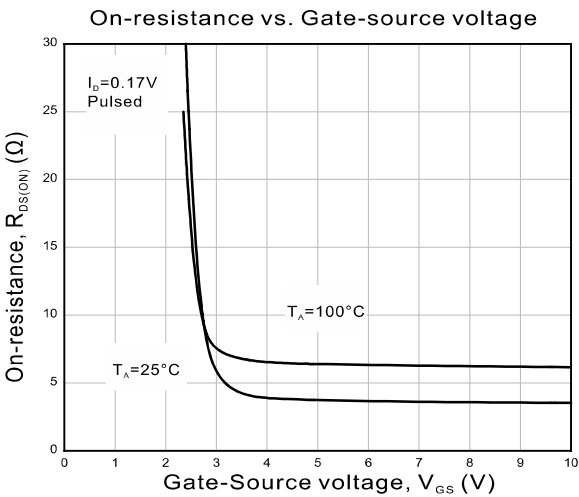
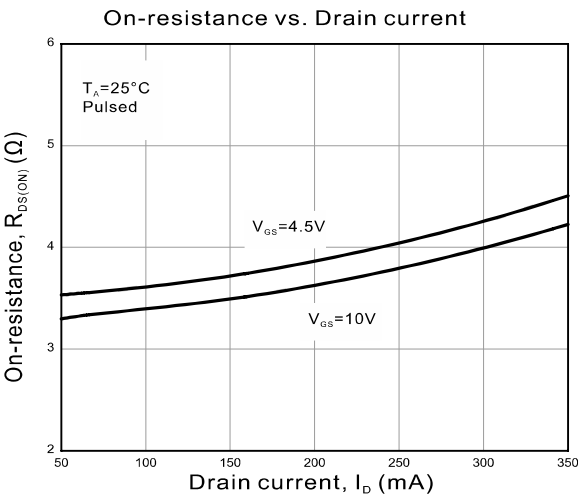
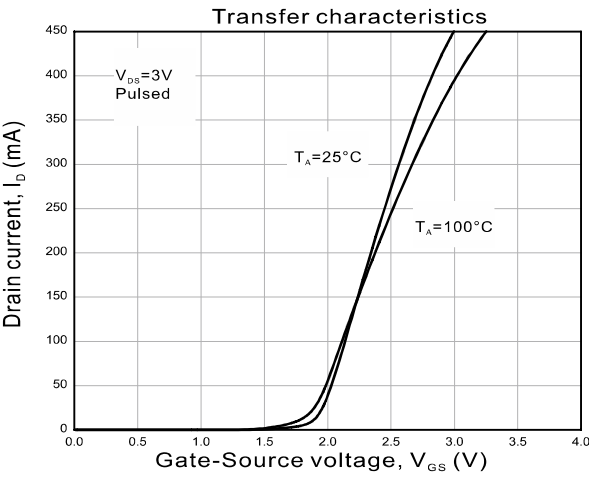
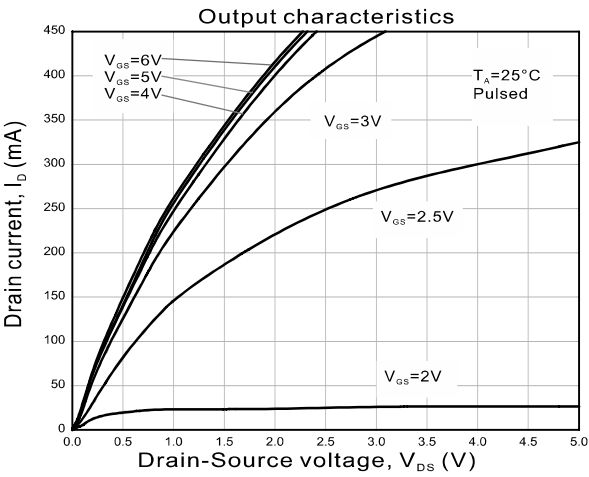
2. Pulse test: pulse width= 300 μs , duty cycles $\leq 2\%$.

3. Switching characteristics are independent of operating junction temperature.

4. Guaranteed by design, not subject to producing.

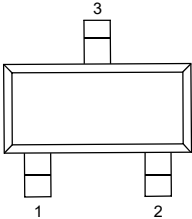
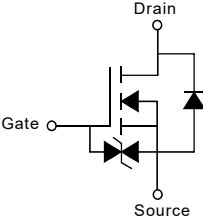
FMOSBSS123KW-Q1

Rating and characteristic curves



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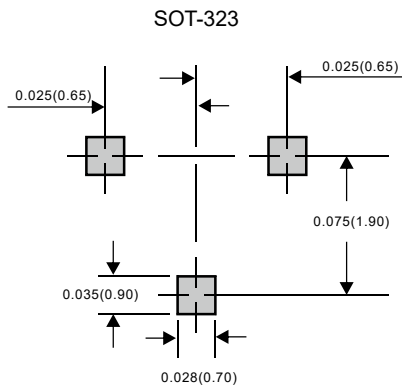
Pinning information

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

Marking

Type number	Marking code
FMOSBSS123KW-Q1	B123K

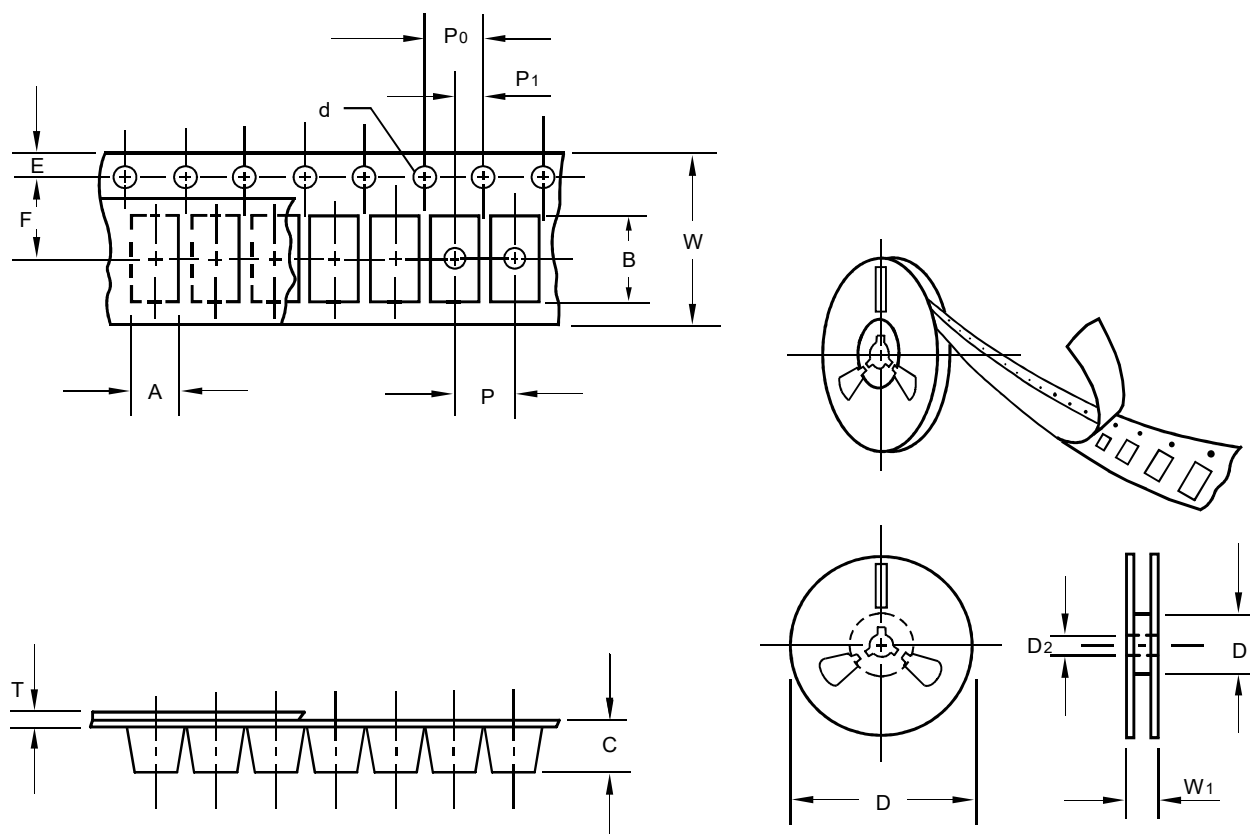
Suggested solder pad layout



Dimensions in inches and (millimeters)

FMOSBSS123KW-Q1

Packing information



unit:mm

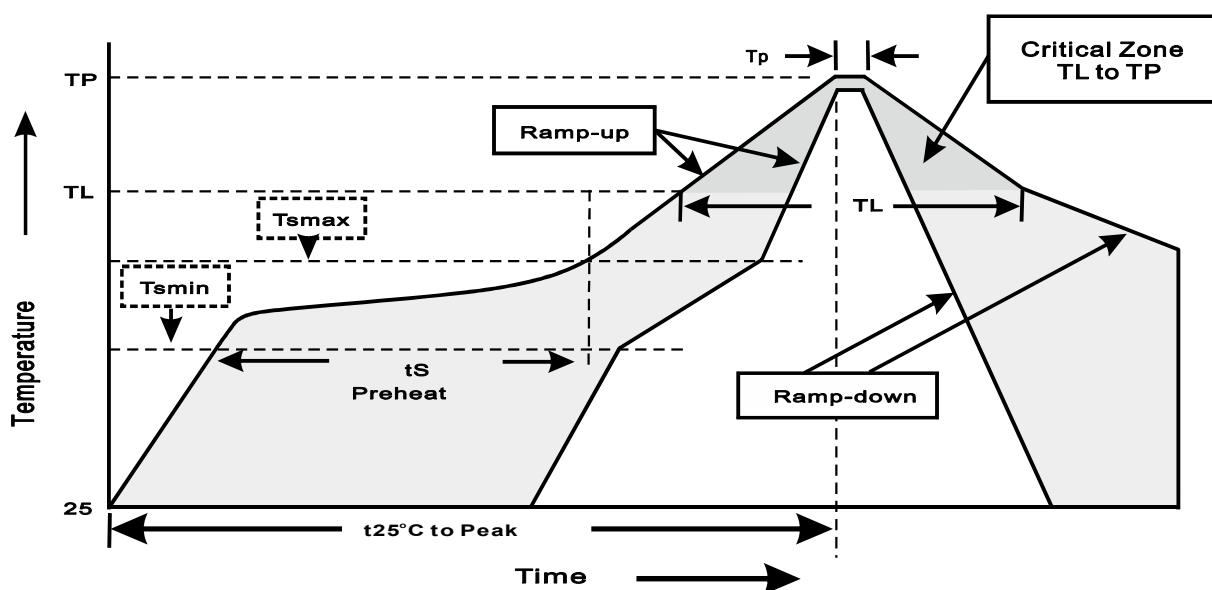
Item	Symbol	Tolerance	SOT-323
Carrier width	A	0.1	2.36
Carrier length	B	0.1	2.40
Carrier depth	C	0.1	1.20
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D ₁	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D ₁	min	62.00
Feed hole diameter	D ₂	0.5	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	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W ₁	1.0	11.40

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

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-323	7"	3,000	4.0	30,000	183*183*123	178	382*262*387	240,000

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



Profile Feature	Soldering Condition
Average ramp-up rate(T_L to T_P)	$<3^{\circ}\text{C}/\text{sec}$
Preheat -Temperature Min(T_{min}) -Temperature Max(T_{max}) -Time(min to max)(t_s)	150°C 200°C $60\sim 120\text{sec}$
T_{max} to T_L -Ramp-upRate	$<3^{\circ}\text{C}/\text{sec}$
Time maintained above: -Temperature(T_L) -Time(t_L)	217°C $60\sim 260\text{sec}$
Peak Temperature(T_P)	$255^{\circ}\text{C}-0/+5^{\circ}\text{C}$
Time within 5°C of actual Peak Temperature(t_P)	$10\sim 30\text{sec}$
Ramp-down Rate	$<6^{\circ}\text{C}/\text{sec}$
Time 25°C to Peak Temperature	$<6\text{minutes}$

FMOSBSS123KW-Q1**High reliability test capabilities**

Item Test	Conditions	Reference
1. MSL Preconditioning	24hr bake@125°C+168hrs@85°C /85%RH+3xIR@260°C+1flux immersion+alcohol+DI H2O rinse	JESD22-A113
2. High Temperature Reverse Bias	VBR=VBR NOM*80% (TJ=TJ max.)Test Duration:1000hrs	JESD22-A108
3. High Temperature Storage Life	Ta=150°C Test Duration:1000hrs	JESD22 A-103
4. Temperature Cycle	-55°C(15min) to 150°C(15min)Test Cycles:1000cycles	JESD22 A-104
5. Autoclave	P=2atm Ta=121°C RH=100% Test Duration:96hrs	JESD22 A-102
6. Solderability	245±5°C for 5sec	J-STD-002
7. Moisture Resistance	Ta=85°C/85% Relative humidity Test Duration:1000hrs	MIL-STD-750E METHOD 1021.2
8. Resistance To Solder Heat	260±5°C for 10sec	JESD22 B-106
9. High Temperature High Humidity Reverse Bias	Ta=85°C, 85%RH, with device reverse biased at 80% of rated breakdown voltage up to a maximum of 100V or limit of chamber Test Duration:1000hrs	JESD22-A101