FMOSBSS123K-Q1

List

FMOSBSS123K-Q1

170mA, 100V N-Channel Enhancement Mode MOSFET - ESD Protected

Features

- High density cell design for extremely low $R_{DS(ON)}$.
- Voltage controlled small signal switch.
- Rugged and reliable.
- ESD Protected.
- -Q1 for automotive and other applications requiring unique site and control change requirements AEC-Q101 qualified and PPAP capable.
- RoHs compliant & Halogen - Free.
- Suffix "-H" indicates Halogen-free part, ex.FMOSBSS123K-Q1-H.

Application

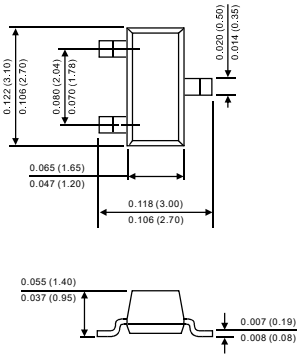
- Small servo motor controls.
- Power MOSFET gate drivers.
- Switching application.

Mechanical data

- Case : SOT-23-3, Plastic.
- Terminals : Solderable per MIL-STD-202, METHOD208.
- Polarity : Indicated by cathode band.
- Approx weight : 0.0084 grams.

Package outline

SOT-23



Dimensions in inches and (millimeters)

Maximum ratings (T_A=25°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 (Note 1)	I_D	170	mA
Pulsed drain current (Note 2)	I_{DM}	680	mA
Power dissipation	P_D	350	mW
Thermal resistance form junction to ambient (Note 1)	$R_{\theta JA}$	357	℃/W
Operating Junction temperature range	T_j	+150	℃
Storage temperature range	T_{STG}	-55 to +150	℃
Lead temperature for soldering purposes (1/8" form case for 10s)	T_L	260	℃

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Electrical characteristics (At T_j=25°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			100	nA
Gate-source leakage current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±1	μA
On characteristics						
Gate threshold voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		2.5	V
Static drain-source on-resistance (Note 2)	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=170mA			10	Ω
		V_{GS}=10V, I_D=170mA			6	
Forward Transconductance	g_{FS}	V_{GS}=10V, I_D=170mA	80			mS
Dynamic Parameters (Note 4)						
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		29	60	pF
Output capacitance	C_{oss}			10	15	
Reverse transfer capacitance	C_{rss}			2	6	
Switching parameters						
Total gate charge	Q_g	V_{GS}=10V, V_{DS}=10V, I_D=220mA		1.4	2	nC
Gate to source charge	Q_{gs}			0.15	0.25	
Gate to Drain charge	Q_{gd}			0.2	0.4	
Turn-on delay time	$t_{d(on)}$	V_{DS}=30V, V_{GS}=10V, I_D=2.8A, R_G=50Ω			8	ns
Turn-on rise time	t_r				8	
Turn-off delay time	$t_{d(off)}$				13	
Turn-off fall time	t_f				16	
Source-drain diode ratings and characteristics						
Continuous diode forward current	I_S				0.55	A
Pulse diode forward current	I_{SM}				2	A
Diode forward voltage (Note 2)	V_{SD}	V_{GS}=0V, I_{SD}=340mA			1.3	V

Note : 1. Surface mounted on FR4 board using the minimum recommended pad size.
2. Pulse Test : Pulse width = 300us , Duty Cycle ≤ 2%.
3. Switching characteristics are independent of operating junction temperature.
4. Guaranteed by design, not subject to production testing.

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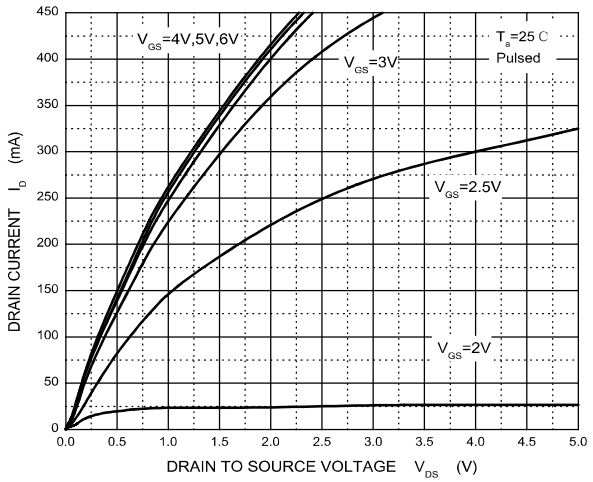
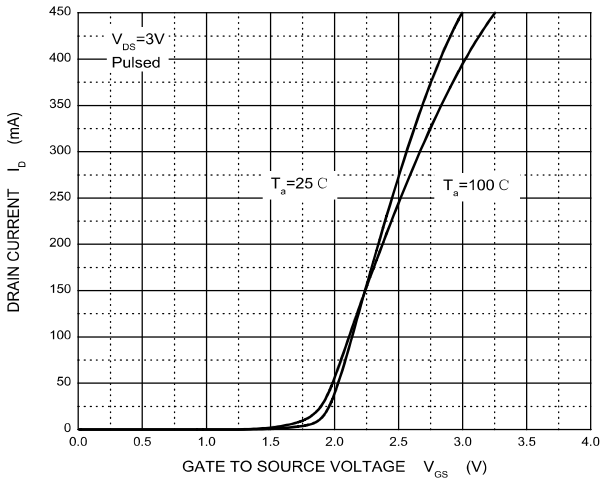
Rating and characteristic curves

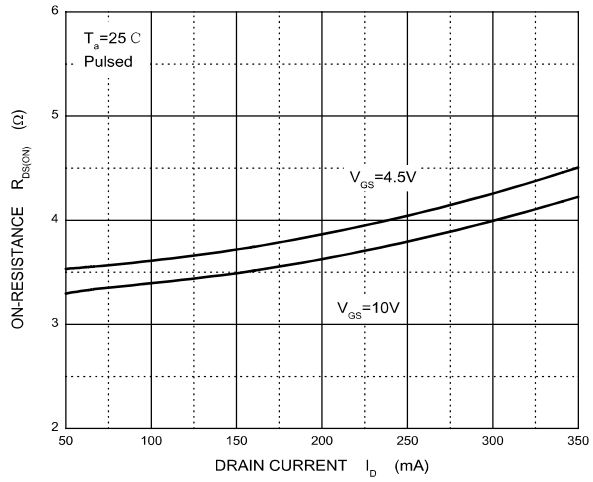
Output Characteristics



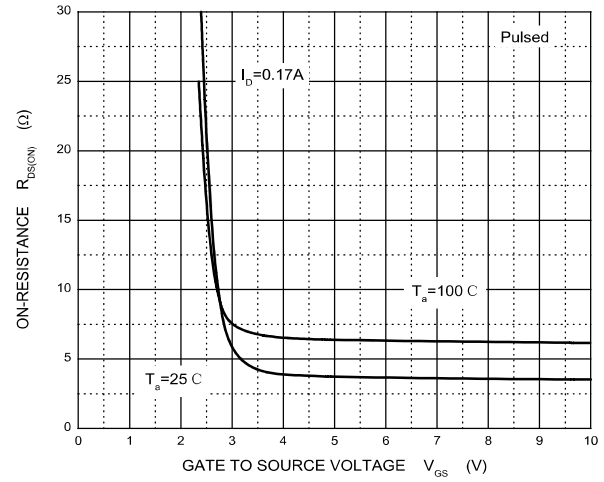
Transfer Characteristics



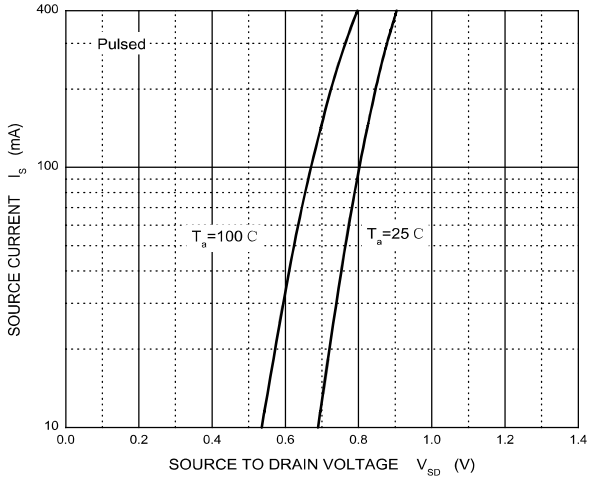
$R_{DS(ON)}$ —— I_D



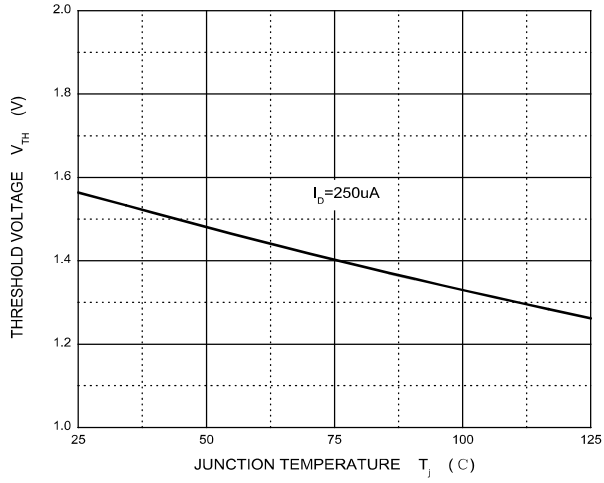
$R_{DS(ON)}$ —— V_{GS}



I_S —— V_{SD}



Threshold Voltage



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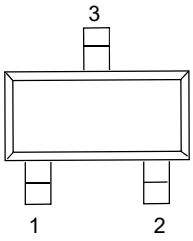
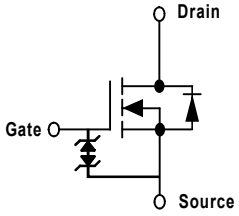
Pinning information

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

Marking

Type number	Marking code
FMOSBSS123K-Q1	B123K , 123K

Suggested solder pad layout

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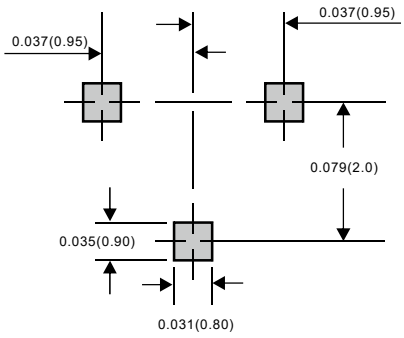

Dimensions in inches and (millimeters)

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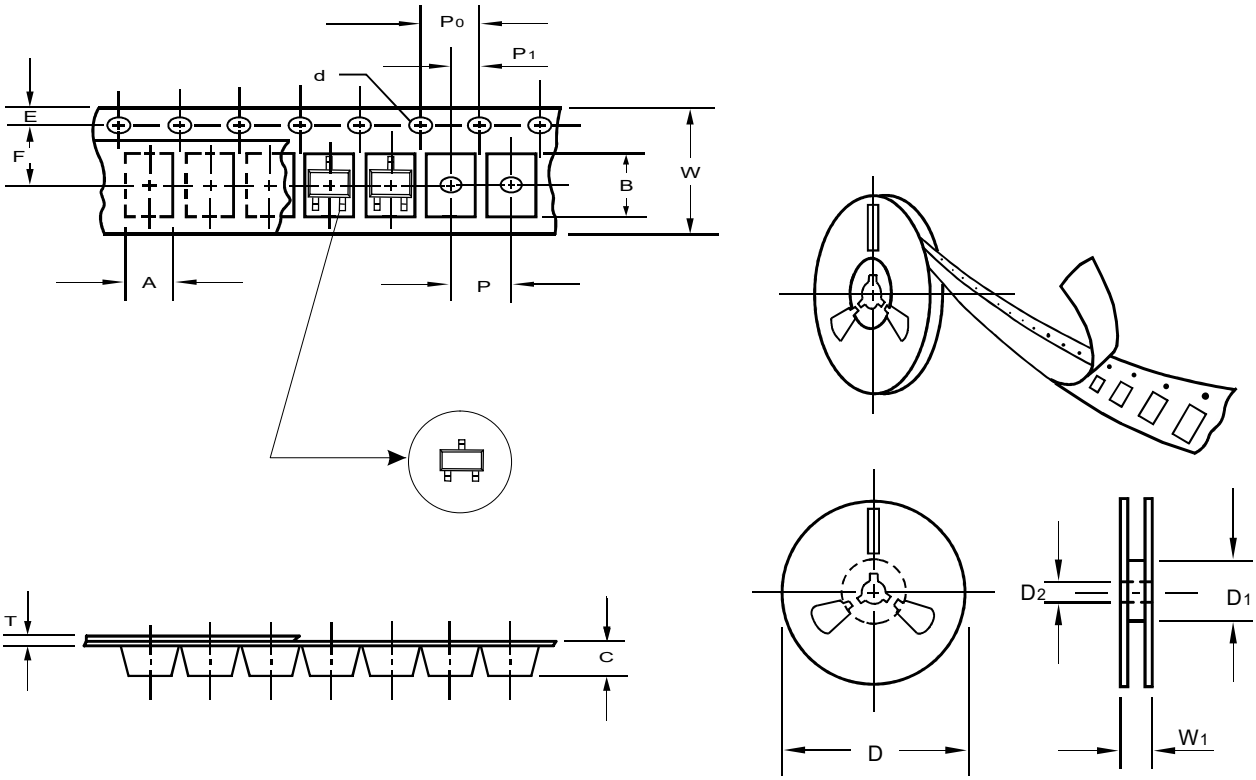
Packing information



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	D_1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D_1	min	54.40
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 accor dance with EIA standar RS-481-A and specifications listed above.

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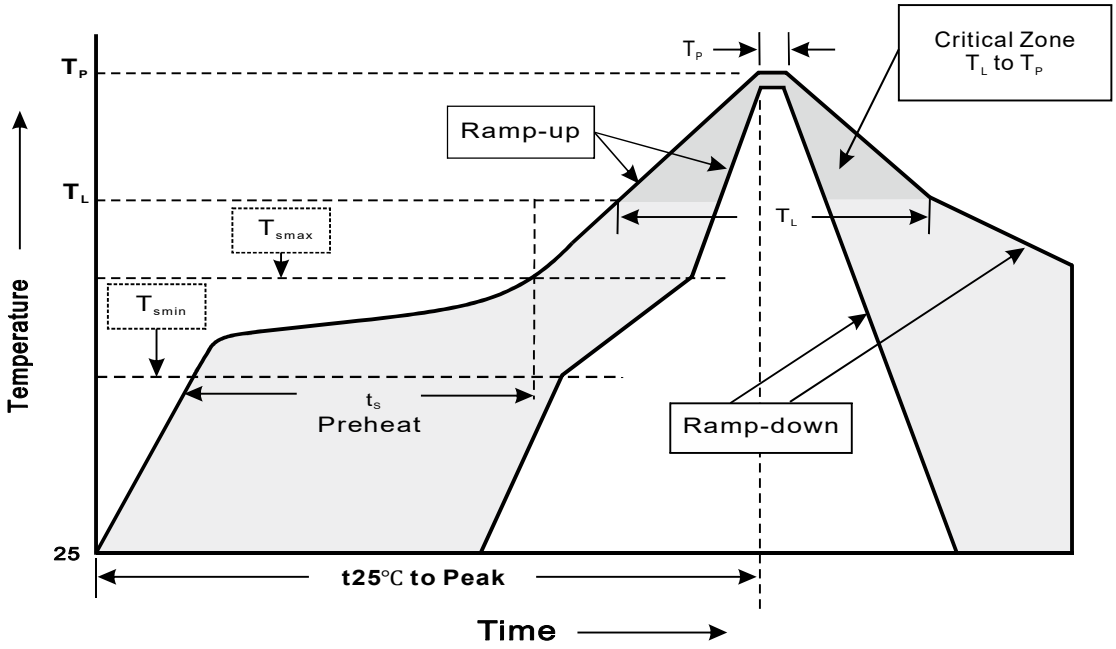
Reel packing

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)	APPROX. GROSS WEIGHT (kg)
SOT-23	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	11.6

Suggested thermal profiles for soldering processes

1.Storage environment: Temperature=5℃~40℃ 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℃/sec
Prehaeat -Temperature Min (T_{smin}) -Temperature Max (T_{smax}) -Time (min to max) (t_s)	 150℃ 200℃ 60 ~120sec
T_{smax} to T_L -Ramp-up rate	< 3℃/sec
Time maintained above: -Temperature (T_L) -Time(T_L)	 217℃ 60 ~ 260 sec
Peak Temperature(T_P)	255℃ -0/+5℃
Time within 5℃ of actual peak Temperature(T_P)	10 ~ 30sec
Ramp-down rate	< 6℃/sec
Time 25℃ to peak temperature	< 6 minutes