

FMSBSS123-Q1

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FMSBSS123-Q1

0.17A, 100V N-Channel Logic Level Enhancement MOSFET

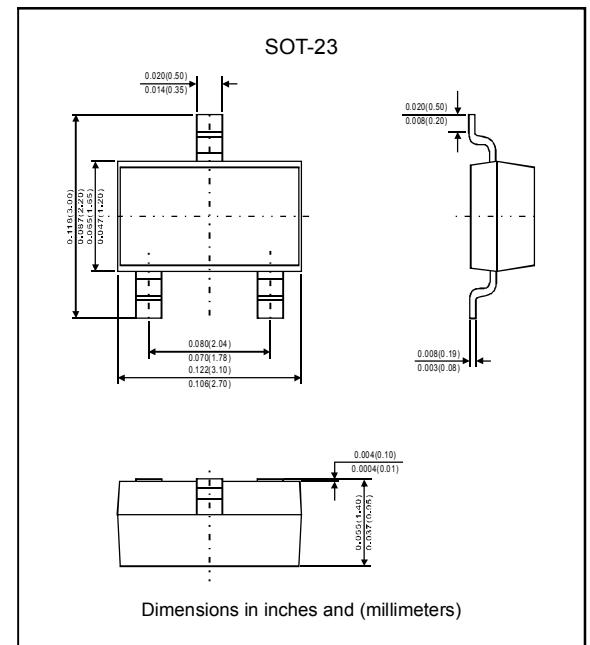
Features

- On-resistance $R_{DS(ON)} = 6.0\Omega$.
- Low input capacitance : 73pF (Typ).
- Fast switching speed : 31ns.
- Low output capacitance : 7pF (Typ).
- Low threshold : 2V.
- Qualified to AEC-Q101 standards for high reliability.
- In compliance with EU RoHS 2002/95/EC directives.
- Suffix "-H" indicates Halogen-free part, ex.FMSBSS123-Q1-H.

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.
- Weight : Approximated 0.008 gram.

Package outline



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

Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	100	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain Current	I_D	170	mA
Drain current pulse (Note 1)	I_{DM}	680	mA
Power dissipation	P_D	360	mW
Operating Junction temperature range	T_j	+150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$
Thermal resistance junction to ambient	$R_{\theta JA}$	500	$^\circ\text{C/W}$

FMSBSS123-Q1**Electrical characteristics** (At $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	100			V
Drain-source leakage current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$			1	μA
		$V_{DS}=20V, V_{GS}=0V$			10	nA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20V$			± 50	nA
On characteristics						
Gate threshold voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=1mA$	0.8		2.0	V
Static drain-source on-resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=170mA$			6	Ω
		$V_{GS}=4.5V, I_D=170mA$ (Note 1)			12	Ω
Dynamic parameters						
Input capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V, f=1.0MHz$		73		pF
Out capacitance	C_{oss}			7		
Reverse transfer capacitance	C_{rss}			3.4		
Switching parameters						
Turn-on delay time	$t_{d(on)}$	$V_{DS}=30V, V_{GS}=10V, R_G=6\Omega, I_D=280mA$			3.4	ns
Rise time	t_r				18	
Turn-off delay time	$t_{d(off)}$				31	
Fall time	t_f				5	

Note:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
2. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
3. The power dissipation is limited by 150°C junction temperature.
4. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

Rating and characteristic curves (FMSBSS123-Q1)

FIG.1 OHMIC REGION

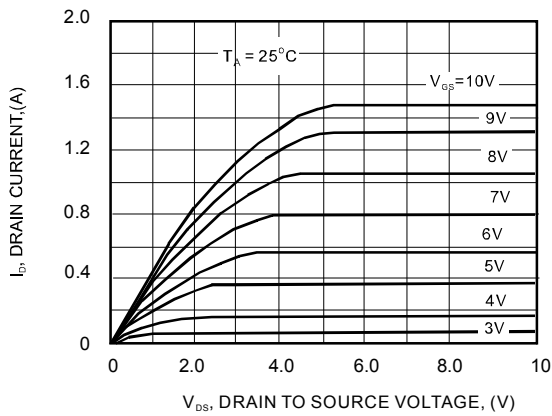


FIG.2 TRANSFER CHARACTERISTICS

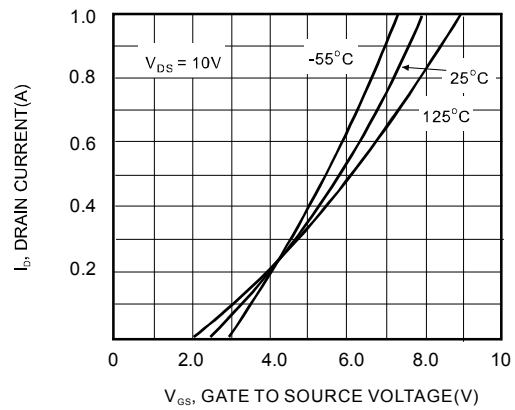


FIG.3 TEMPERATURE VS DRAIN-SOURCE ON-RESISTANCE

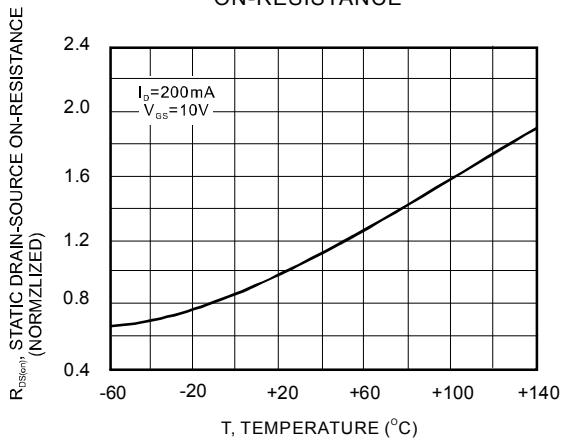
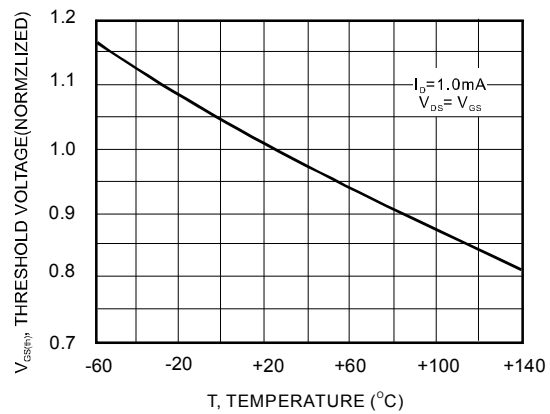
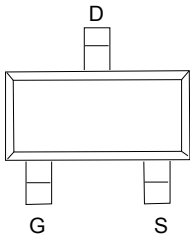
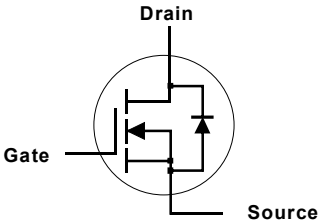


FIG.4 TEMPERATURE VS GATE THRESHOLD VOLTAGE



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Pinning information

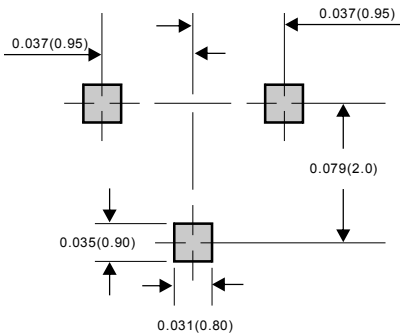
Pin	Simplified outline	Symbol
PinD Drain PinG Gate PinS Source		

Marking

Type number	Marking code
FMSBSS123-Q1	B123

Suggested solder pad layout

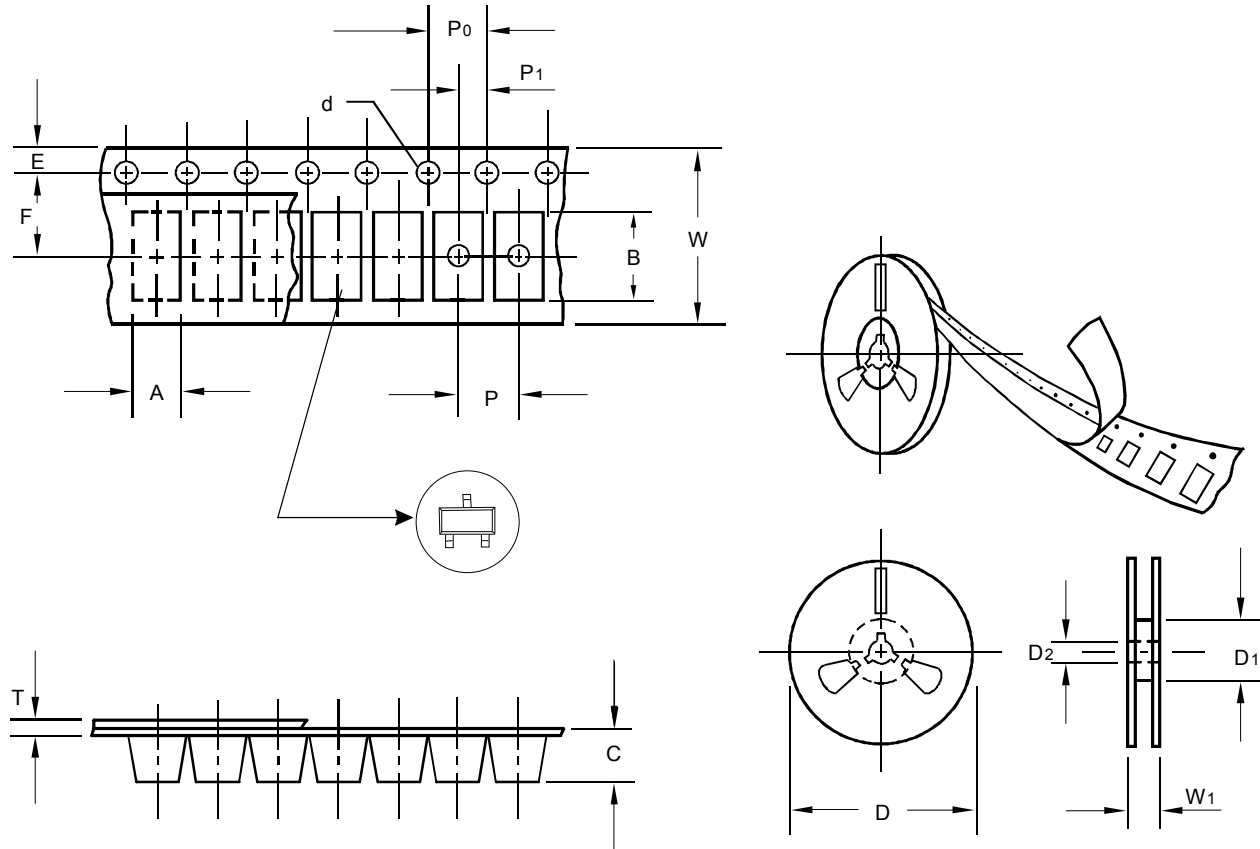
SOT-23



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	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.

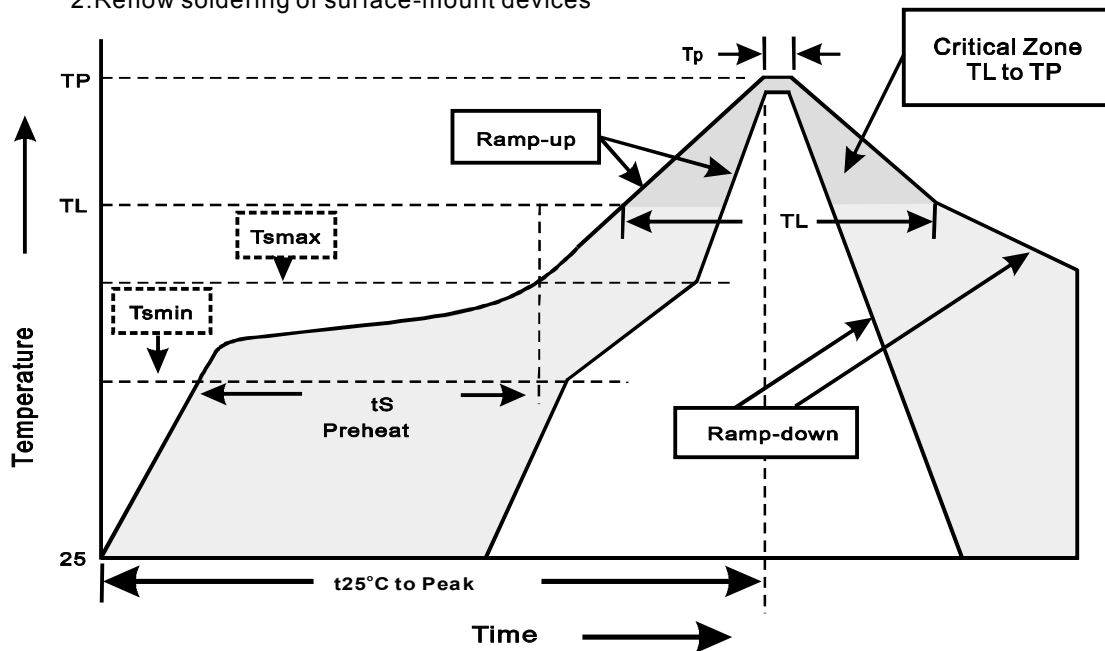
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Reel packing

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"	3000	4.0	30,000	183*183*123	178	383*262*387	240,000	11.6

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_{smin}) -Temperature Max(T_{smax}) -Time(min to max)(t_s)	150°C 200°C 60~120sec
T_{smax} 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