

FMSBSS123

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FMSBSS123

100V N-Channel Enhancement Mode MOSFET

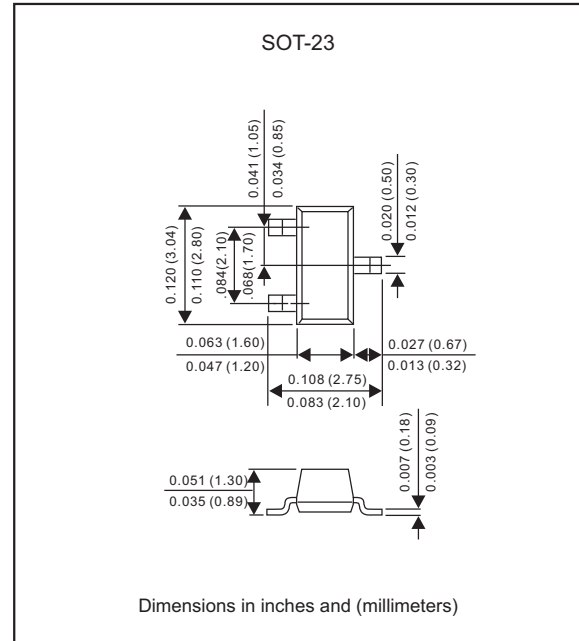
Features

- Low on-resistance $R_{DS(ON)}$: max 6.0 Ω
- Low input capacitance : typ 42.7pF
- Fast switching speed : typ 20ns
- Low output capacitance : typ 14pF
- Low threshold : max 2.0V
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen-free part, ex. FMSBSS123-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	MIN.	TYP.	MAX.	Unit
Drain-source voltage	V_{DS}			100	V
Drain current-continuous *1	I_D			170	mA
-pulsed*2	I_{DM}			680	mA
Gate- source voltage-continuous	V_{GS}			± 20	V
Non-repetitive ($t_p \leq 50\mu\text{s}$)	V_{GSM}			± 40	V
Total device dissipation FR-5 Board *3	P_D			225	mW
$T_A=25^{\circ}\text{C}$				1.8	mW/ $^{\circ}\text{C}$
Derate above 25°C					
Typical thermal resistance junction to ambient	$R_{\theta JA}$			556	$^{\circ}\text{C}/\text{W}$
Operation junction temperature range	T_J	-55		+150	$^{\circ}\text{C}$
Storage temperature range	T_{STG}	-55		+150	$^{\circ}\text{C}$

*1: The Power dissipation of the package may result in a lower continuous drain current

*2: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2.0\%$

*3: FR-5 = 1.0 $\times$ 0.75 $\times$ 0.062 in

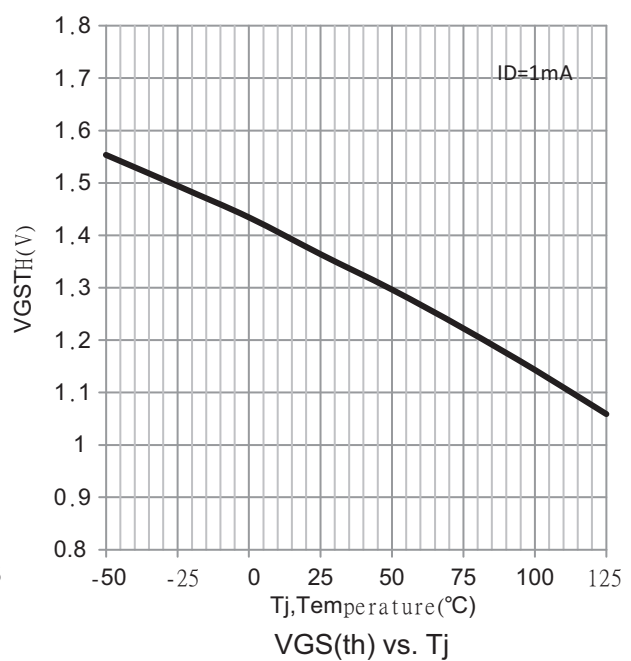
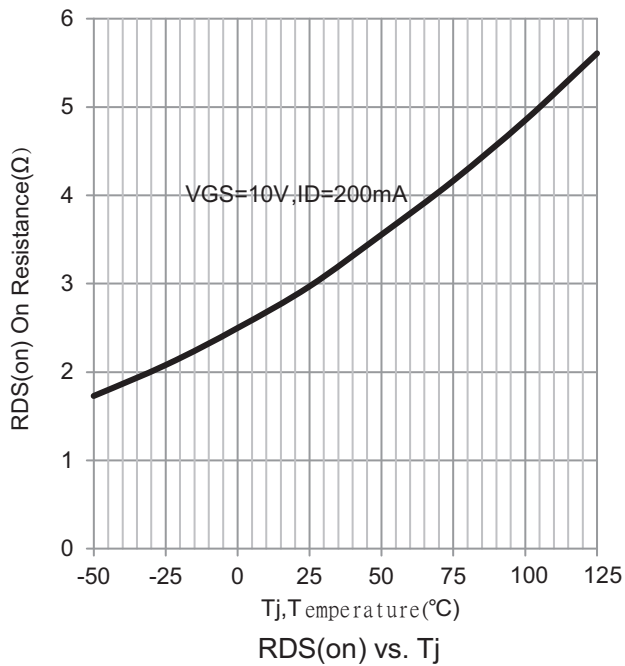
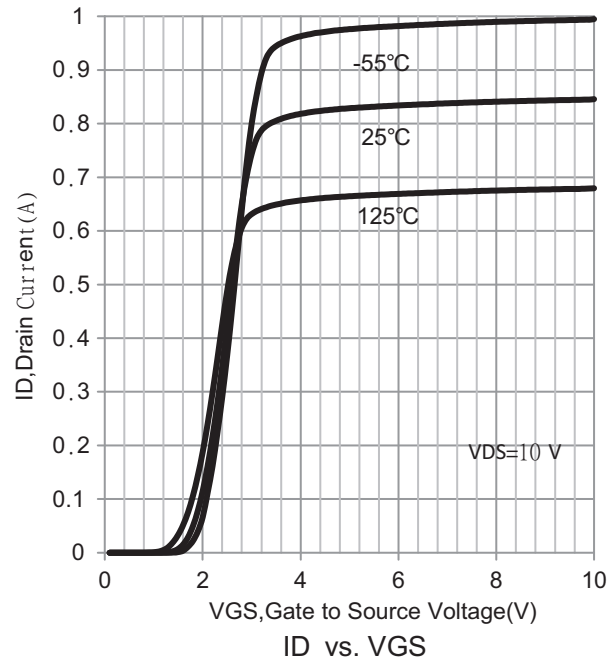
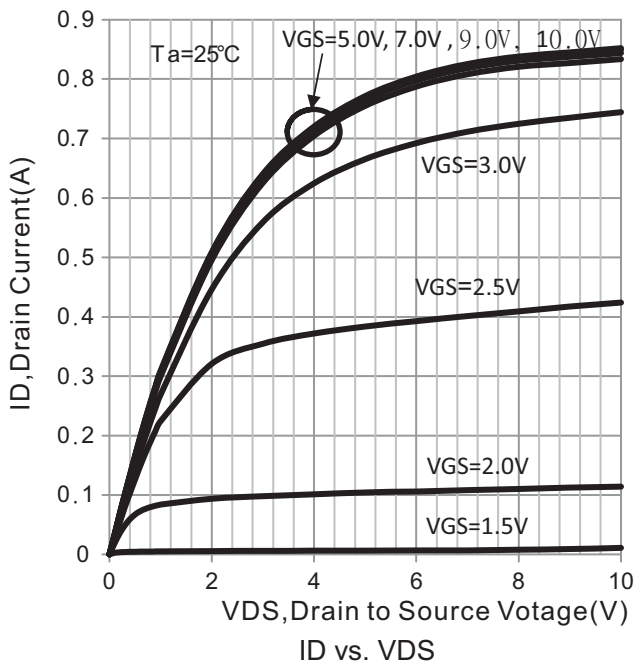
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Electrical characteristics (At $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	MIN.	TYP.	MAX.	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{GS}=0V, I_D=250\mu A$	B_{VDSS}	100			V
Zero gate voltage drain current	$V_{GS}=0V, V_{DS}=100V, T_J=25^{\circ}C$ $V_{GS}=0V, V_{DS}=100V, T_J=125^{\circ}C$	I_{DSS}			1.0 60	μA
Gate-body leakage current	$V_{GS}=20V, V_{DS}=0$	I_{GSS}			50	nA
On characteristics *4						
Gate threshold voltage	$V_{DS}=V_{GS}, I_D=1.0mA$	$V_{GS(th)}$	0.8		2.0	V
Static drain-source on-resistance	$V_{GS}=10V, I_D=100mA$	$R_{DS(ON)}$		5.0	6.0	Ω
Forward transconductance	$V_{GS}=0V, I_D=100mA$	g_{fs}	0.8			S
Dynamic characteristics						
Input capacitance	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$	C_{iss}		42.7		pF
Output capacitance		C_{oss}		14		
Reverse transfer capacitance		C_{rss}		3.0		
Total gate charge	$V_{DS}=10V, V_{GS}=10V, I_D=0.22A$	Q_g		6.32		nC
Gate-source charge		Q_{gs}		1.55		
Gate-drain charge		Q_{gd}		0.68		
Switching characteristics *4						
Turn-on delay time	$V_{CC}=30V, I_C=0.28A, V_{GS}=10V,$ $R_{GS}=50\Omega$	$t_{d(on)}$		20		ns
Turn-off delay time		$t_{d(off)}$		40		
Reverse diode						
Diode forward on-voltage	$I_D=0.34A, V_{GS}=0V$	V_{SD}			1.3	V

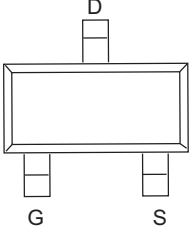
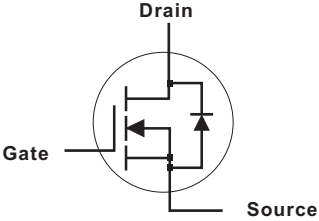
*4: Pulse test: Pulse width $\leq 300\mu s$, duty cycle $\leq 2.0\%$

Rating and characteristic curves (FMSBSS123)



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Pinning information

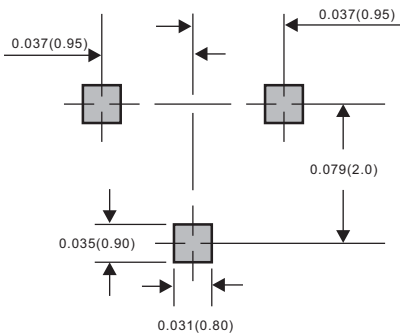
Pin	Simplified outline	Symbol
PinD Drain PinG Gate PinS Source		

Marking

Type number	Marking code
FMSBSS123	SA, B123

Suggested solder pad layout

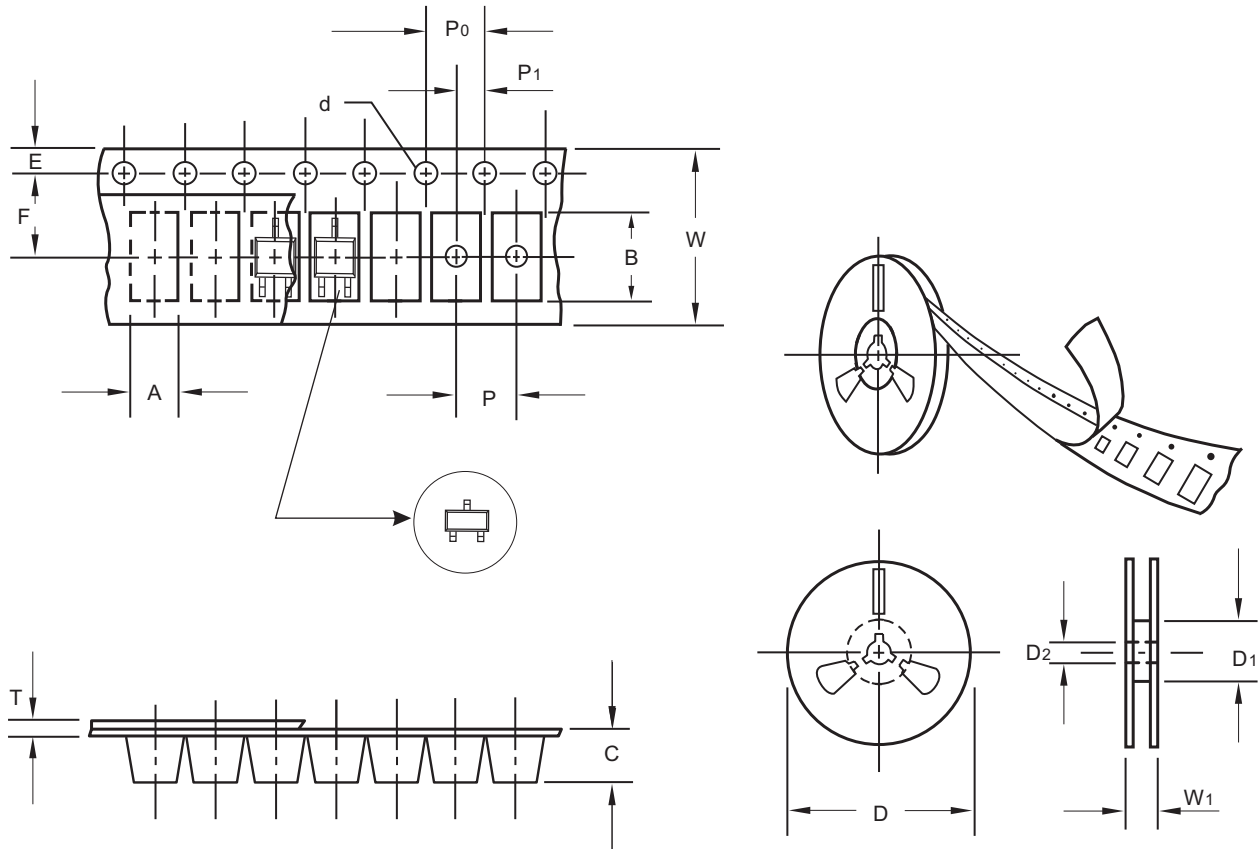
SOT-23



Dimensions in inches and (millimeters)

FMSBSS123

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.

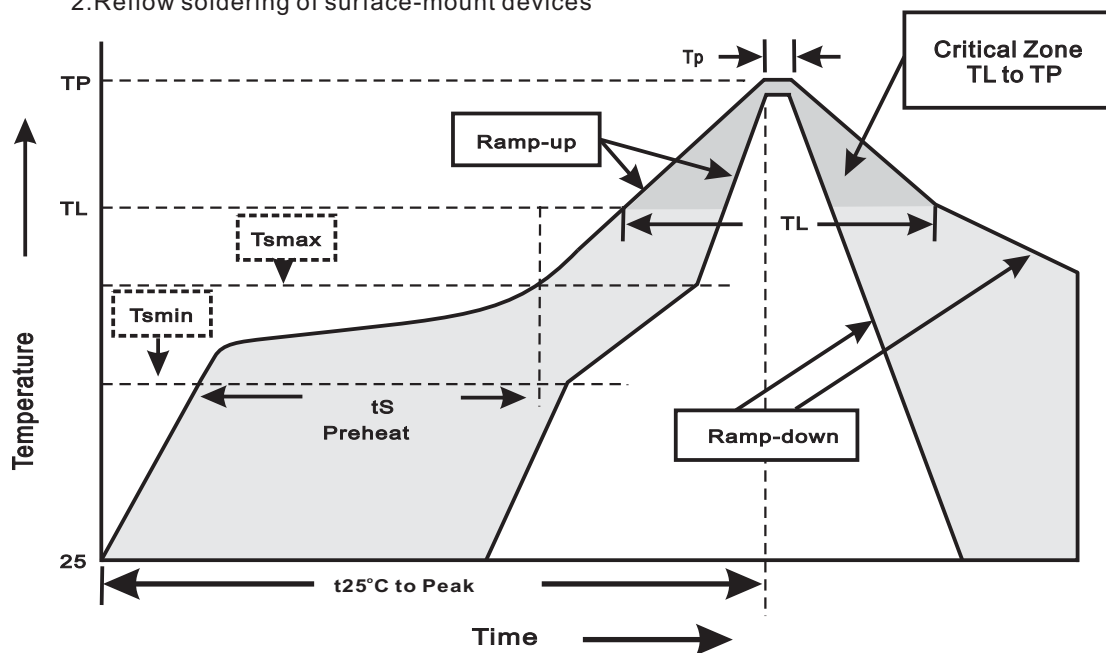
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Reel packing

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"	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°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 _{smmin}) -Temperature Max(T _{smmax}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smmax} 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

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High reliability test capabilities

Item Test	Conditions	Reference
1. High Temperature Gate Bias	Ta=150°C Vgs=0. 8 x BVGSS for 1000hours	JESD22-A108-C
2. High Temperature Reverse Bias	Ta=150°C Vds=0. 8 x BVDSS for 1000hours	JESD22-A108-C
3. Solder ability Test	Temp=245°C for 5sec	JESD22-B102-D
4. Pressure Cooker Test	Ta=121°C/ 100%RH Pressure=2Atm for 168hours	JESD22-A102-C
5. Temperature Cycle Test	-65°C/ 10min~ 150°C/ 10min Transfer<5min. total 1000 cycles.	JESD22-A104-B
6. Temperature Humidity Test	Ta=85°C Humidity=85%RH for 1000hours	JESD22-A101-B
7. High Temperature Storage Test	Ta=150°C for 1000hours	JESD22-B103-B