FMSBSS123-H

List

FMSBSS123-H

170mA 100V N-Channel Enhancement Mode MOSFET

Features

- Low on-resistance $R_{DS(ON)} \leq 6\ \Omega$, @$V_{GS}$=10V, I_D=170mA.
  $R_{DS(ON)} \leq 10\Omega$, @V_{GS}=4.5V, I_D=170mA.
- Low input capacitance : typ 29pF.
- Fast switching speed : typ 8ns.
- Low output capacitance : Max=15pF.
- Low threshold : max 2.0V.
- Lead-free parts meet RoHS requirements.

Applications

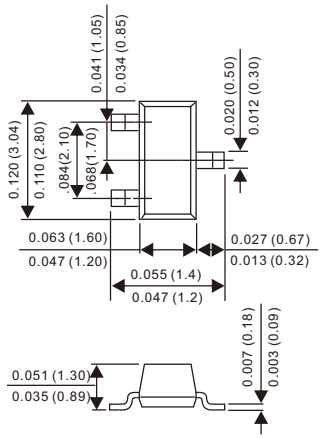
- TrenchFET Power MOSFET
- Load Switch for Portable Devices.
- DC/DC Converter.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-23.
- Terminals : Solder plated, solder able per MIL-STD-750, Method 2026.
- Weight : Approximated 8mg.

Package outline

SOT-23



Dimensions in inches and (millimeters)

Maximum Ratings (At T_A=25°C Unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain source voltage	V_{DS}	100	V
Gate source voltage	V_{GS}	±20	V
Drain current continuous (Note 1)	I_D	170	mA
Pulsed drain current (t_p=10μs)	I_{DM}	680	mA
Power Dissipation	P_D	350	mW
Thermal resistance, junction to ambient	$R_{\theta JA}$	357	°C/W
Operating junction temperature range	T_J	+150	°C
Storage temperature range	T_{STG}	-50 to +150	°C

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Electrical characteristics (At T_A=25°C unless otherwise specified)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static parameters						
Drain-source breakdown voltage	I_D=250μA, V_{GS}=0V	BV_{DSS}	100			V
Drain-source leakage current	V_{DS}=100V, V_{GS}=0V	I_{DSS}			1.0	μA
Gate-source leakage current	V_{GS}=±20V, V_{DS}=0V	I_{GSS}			±50	nA
Gate threshold voltage(Note 3)	V_{DS}=V_{GS}, -I_D=250μA (Note 3)	$V_{GS(TH)}$	1.0	1.7	2.0	V
Static drain-source on-state resistance (Note 3)	V_{GS}=10V, I_D=170mA	$R_{DS(ON)}$			6.0	Ω
	V_{GS}=4.5V, I_D=170mA				10	
Forward Transconductance(Note 3)	V_{DS}=10, I_D=170mA (Note 3)	gfs	80			mS
Dynamic parameters						
Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1.0MHz	C_{iss}		29	60	pF
Out capacitance		C_{oss}		10	15	
Reverse transfer capacitance		C_{rss}		2.0	6.0	
Switching parameters						
Total gate charge	V_{GS}=10V, V_{DS}=10V, I_D=0.22A	Q_g		1.4	2.0	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	V_{DS}=30V, V_{GS}=10V, R_G=50Ω, I_D=0,28A	$t_{d(on)}$		8		ns
Rise time		t_r		13		
Turn-off delay time		$t_{d(off)}$		8		
Fall time		t_f		16		
Source-drain diode ratings and characteristics						
Drain-source diode forward voltage	I_{SD}=0.34A, V_{GS}=0V	V_{SD}			1.3	V

Notes : 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 producing.

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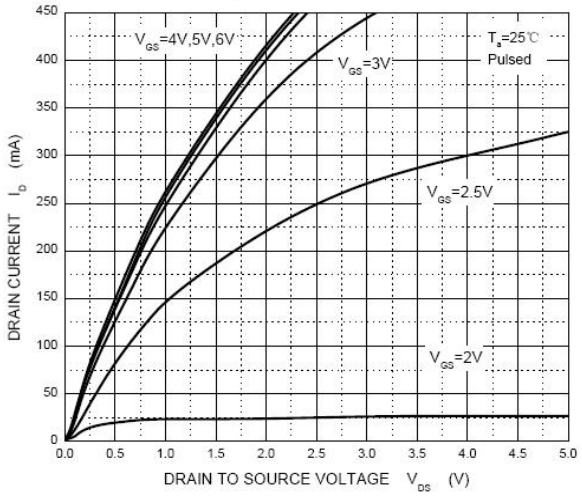
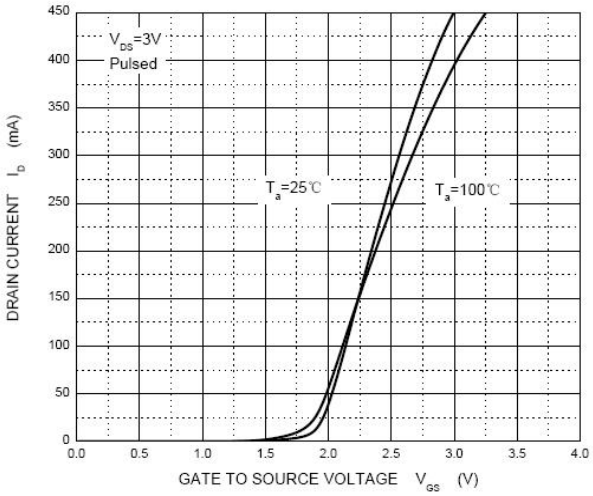
Rating and characteristic curves

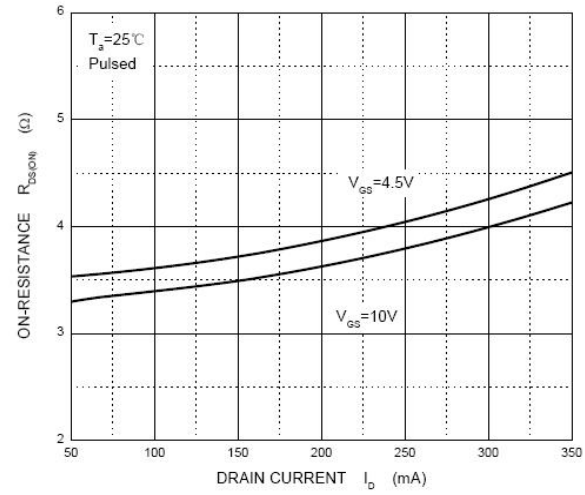
Output characteristics



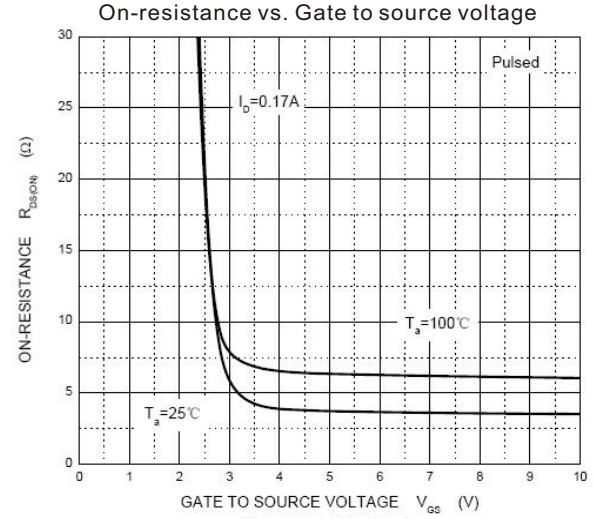
Transfer characteristics



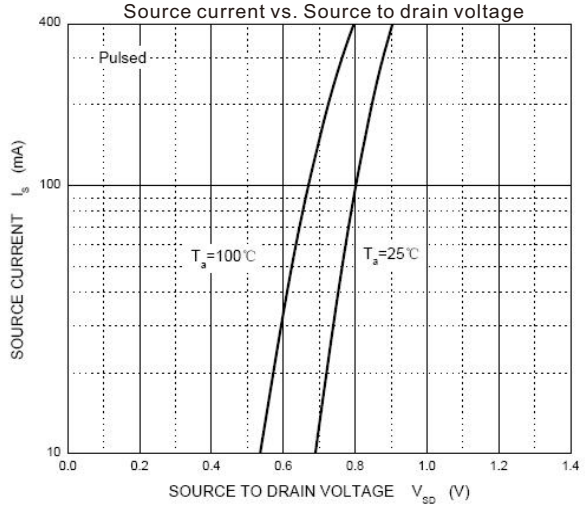
On-resistance vs. Drain current and gate voltage



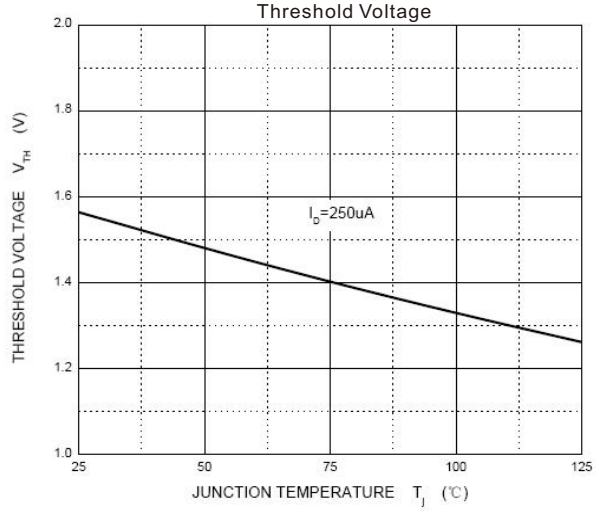
On-resistance vs. Gate to source voltage



Source current vs. Source to drain voltage



Threshold Voltage



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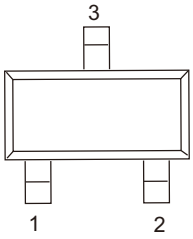
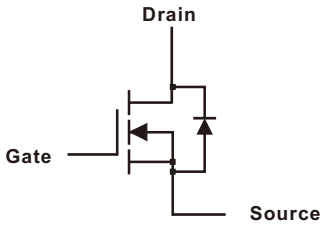
Pinning information

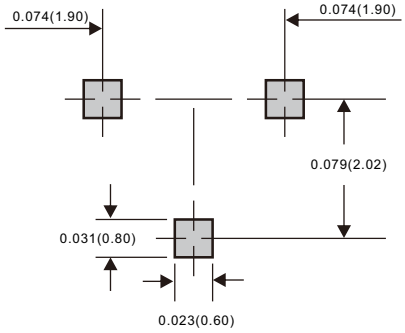
Pin	Simplified outline	Symbol
Pin 1 Gate Pin 2 Source Pin 3 Drain		

Marking

Type number	Marking code
FMSBSS123	SA, B123

Suggested solder pad layout

SOT-23



Dimensions in inches and (millimeters)

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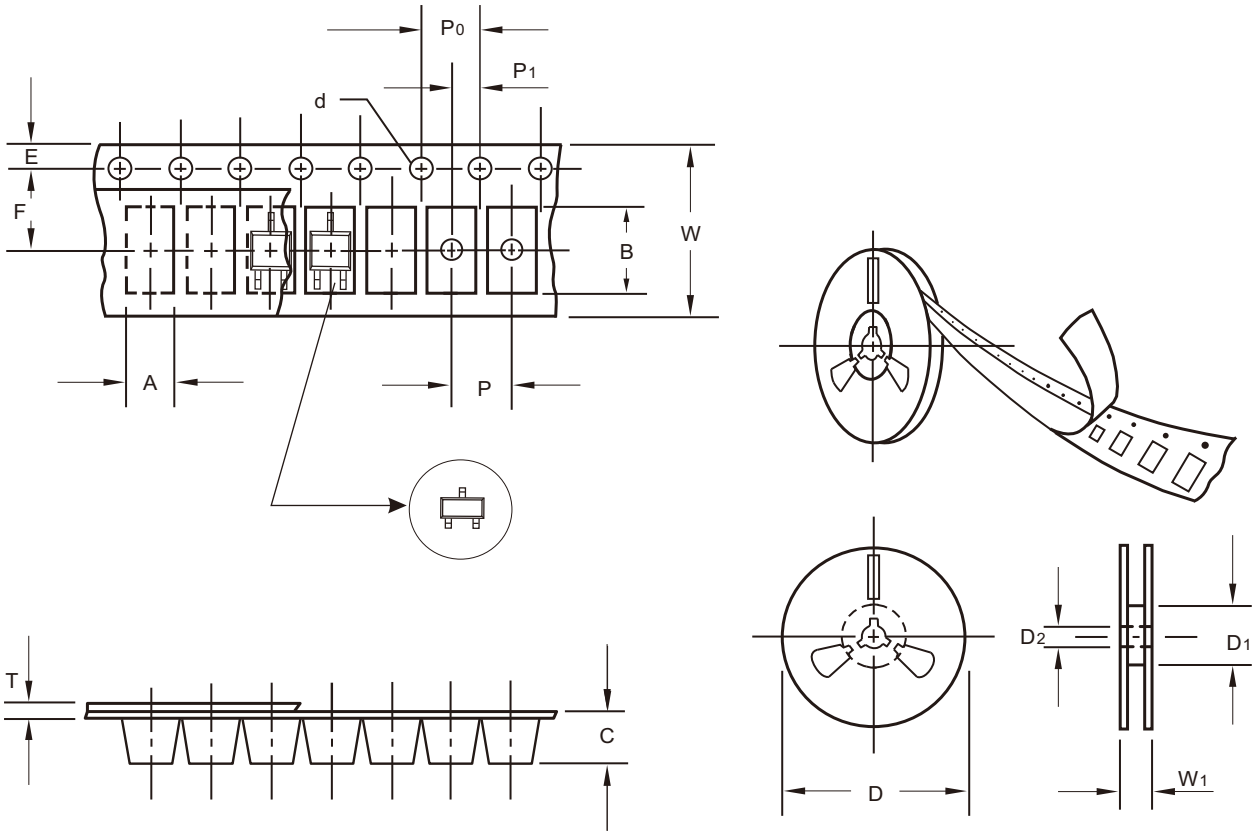
Packing information



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	D_1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D_1	min	55.00
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	12.0

Note:Devices are packed in accor dance with EIA standar RS-481-A and specifications listed above.

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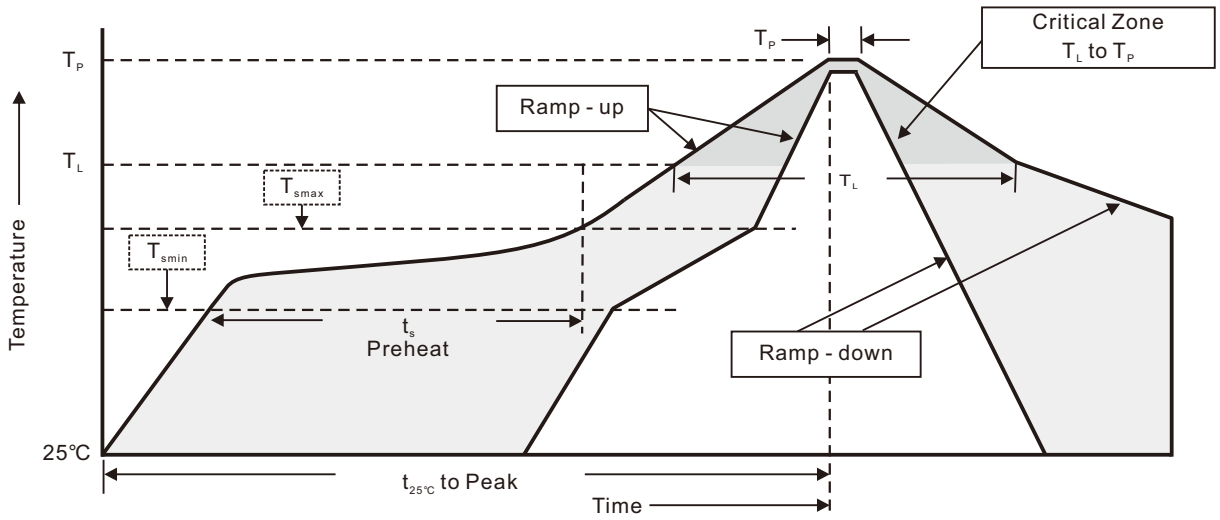
Reel packing

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
Preheat - Temperature Min (T_{smin}) - Temperature Max (T_{smax}) - Time (Min to Max) (t_s)	 150℃ 200℃ 60 ~ 120 sec
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 with 5℃ of actual peak temperature (T_P)	10 ~ 30 sec
Ramp-down rate	< 6℃ / sec
Time 25℃ to peak temperature	< 6 minutes