FMSNN2312-H

List

FMSNN2312-H

5.0A 20V N-Channel Trench Enhancement Mode Power MOSFET

Features

- V_{DS}=20V, I_D=5A.
- $R_{DS(ON)}$ ≤ 31.8mΩ, @V_{GS}=4.5V, I_D=5.0A.
- $R_{DS(ON)}$ ≤ 35.6mΩ, @V_{GS}=2.5V, I_D=4.7A.
- $R_{DS(ON)}$ ≤ 41.4mΩ, @V_{GS}=1.8V, I_D=4.3A.
- Lead-free parts meet RoHS requirements
- Halogen-free (IEC61249-2-21).

Application

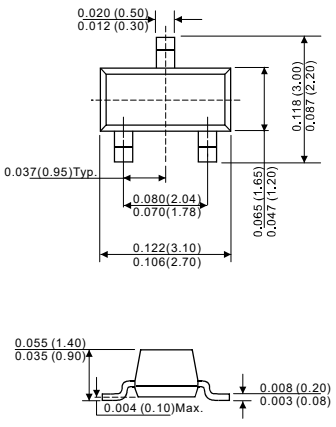
- DC/DC converters.
- Load switching for portable applications.

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.

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}	20	V
Gate source voltage		V_{GS}	±8	V
Drain current continuous	(t=5s)	I_D	5	A
Pulsed drain current		I_{DM}	20	A
Continuous source-drain diode current		I_S	1.04	A
Power dissipation	(t=5s)	P_D	0.35	W
Thermal resistance, junction to ambient		$R_{\theta JA}$	357	°C/W
Operating junction temperature		T_J	+150	°C
Storage temperature range		T_{STG}	-50 to +150	°C

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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	20			V
Drain-Source leakage current	I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	μA
Gate-Source leakage current	I_{GSS}	V_{GS}=±8V, V_{DS}=0V			±100	nA
On characteristics						
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	0.45	0.7	1.0	V
Static drain-source on-resistance (Note1)	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=5.0A		18	31.8	mΩ
		V_{GS}=2.5V, I_D=4.7A		23	35.6	
		V_{GS}=1.8V, I_D=4.3A		30	41.4	
Forward transconductance (Note1)	g_{FS}	V_{DS}=10V, I_D=5A		6		S
Dynamic characteristics (Note2)						
Input capacitance	C_{iss}	V_{DS}=10V, V_{GS}=0V, f=1.0MHz		865		pF
Output capacitance	C_{oss}			105		
Reverse transfer capacitance	C_{rss}			55		
Gate resistance	R_g	f=1.0MHz	0.5		4.8	Ω
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=10V, V_{GEN}=5V, I_D=4A, R_G=1Ω , R_L=2.2Ω			10	ns
Turn-on rise time	t_r				20	
Turn-off delay time	$t_{d(off)}$				32	
Turn-off fall time	t_f				12	
Drain-Source diode characteristics and maximum ratings						
Drain-Source diode forward voltage	V_{SD}	I_S=4A, V_{GS}=0V		0.75	1.2	V

Note: 1. Pulsed test: pulse width ≤ 300μs, duty cycle ≤ 2%.
2. These parameters have no way to verify.

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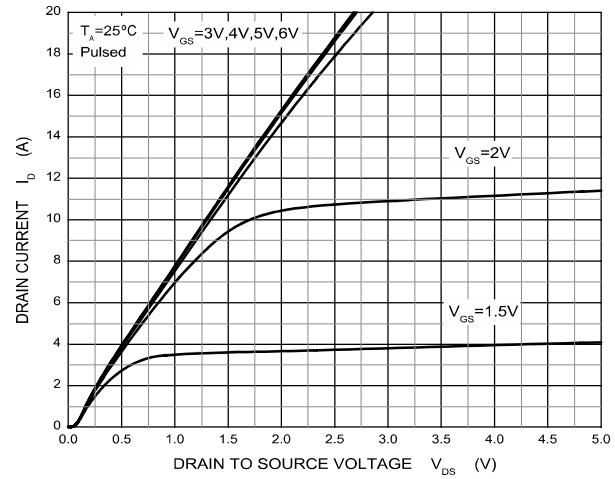
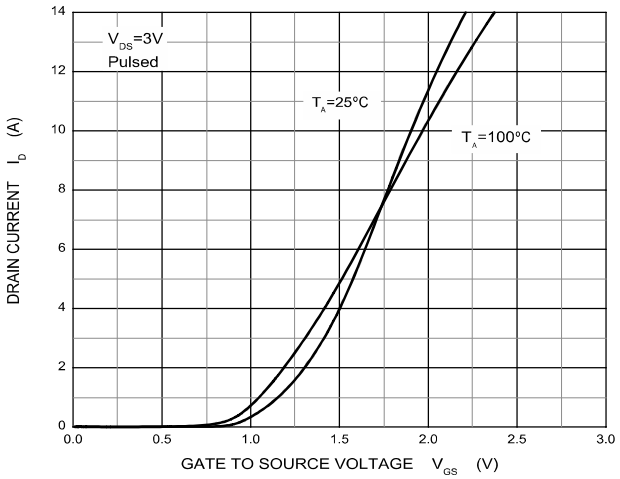
Rating and characteristic curves

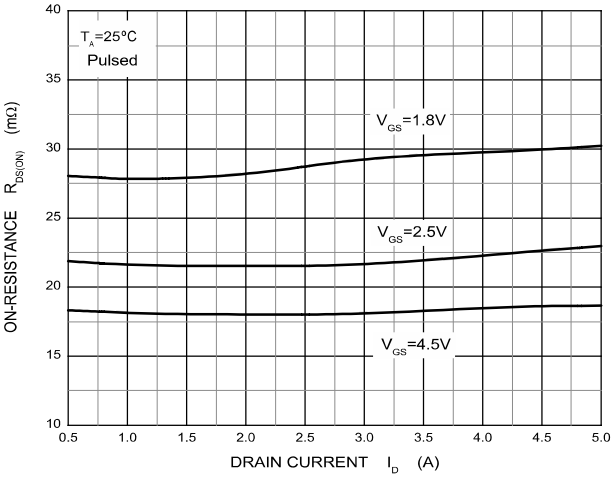
Output Characteristics



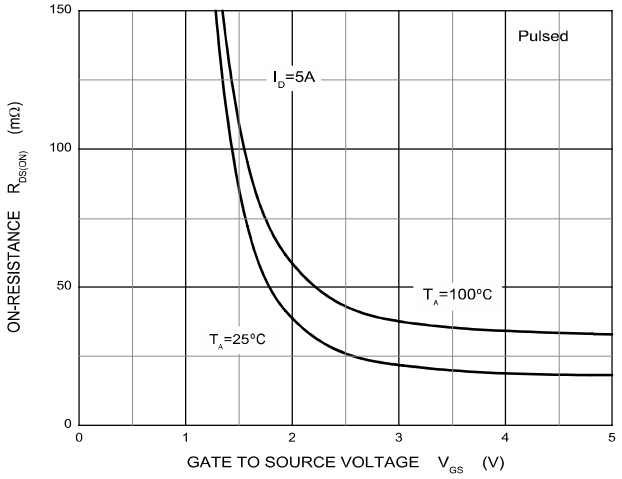
Transfer Characteristics



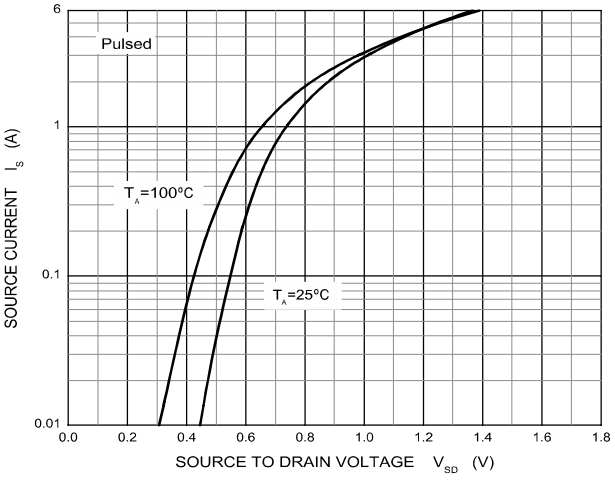
$R_{DS(ON)}$ —— I_D



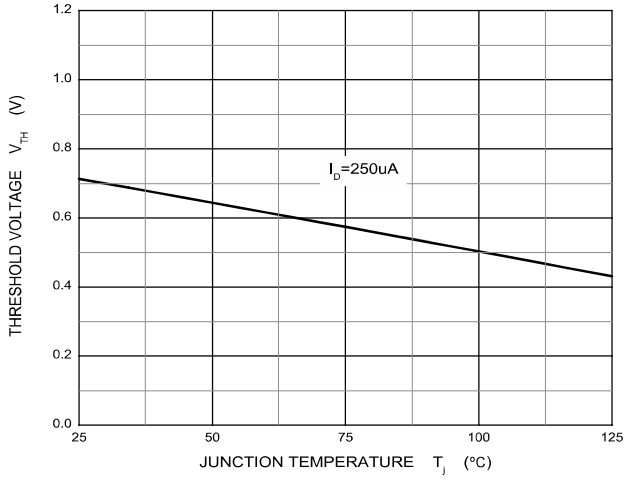
$R_{DS(ON)}$ —— V_{GS}



I_S —— V_{SD}



Threshold Voltage



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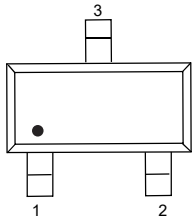
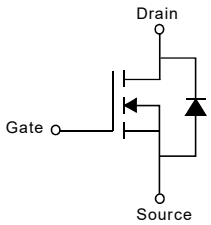
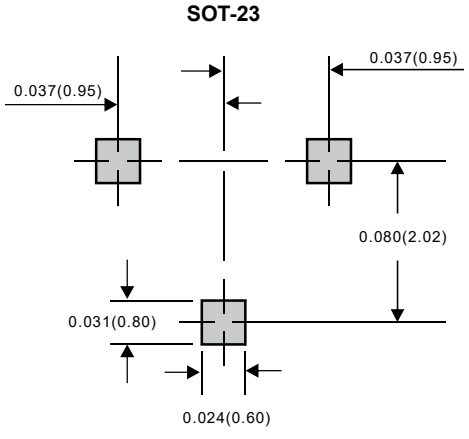
Pinning information

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

Marking

Type number	Marking code
FMSNN2312-H	S12

Suggested solder pad layout



Dimensions in inches and (millimeters)

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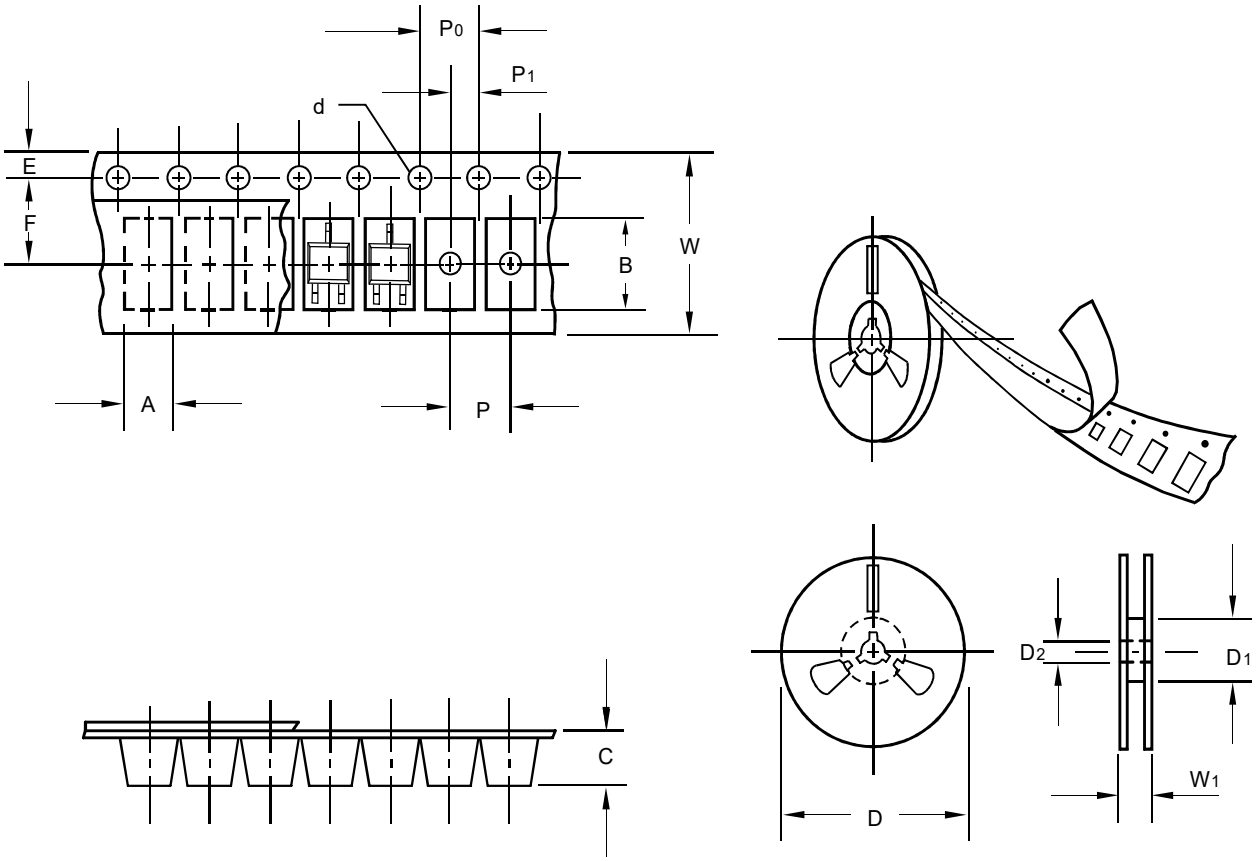
Packing information



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
Tape width	W	0.1	8.00
Reel width	W_1	0.1	12.30

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

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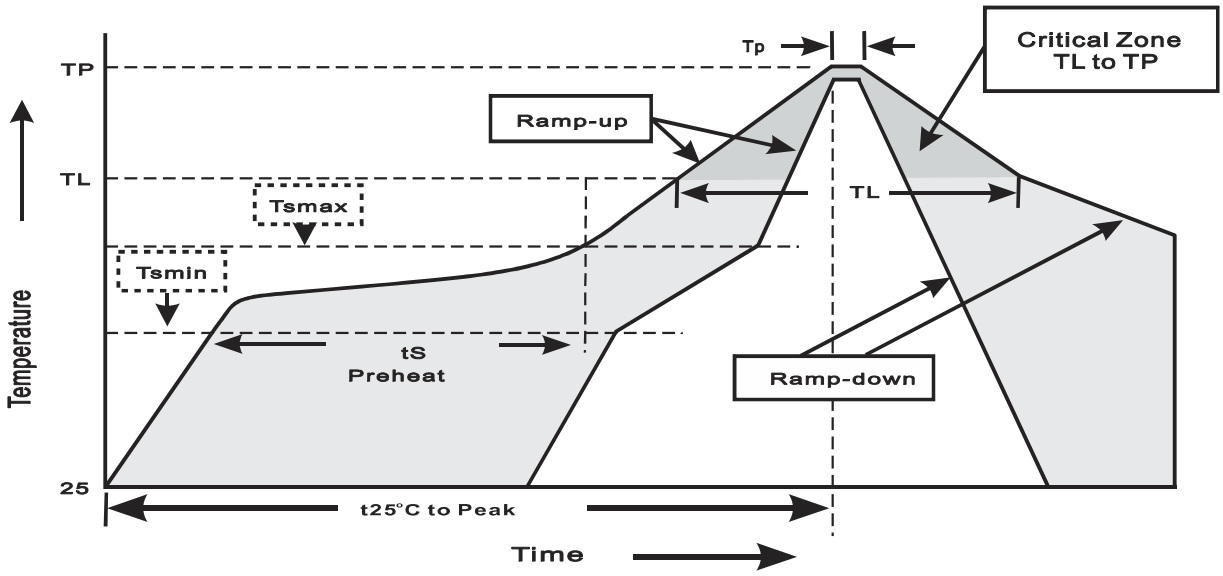
Reel packing

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)
SOT-23	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000

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(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(t_s)	 150°C 200°C 60~120sec
Tsmax 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