FMNN2300-H

List

FMNN2300-H

5.2A 20V N-Channel Enhancement Mode Power MOSFET

Features

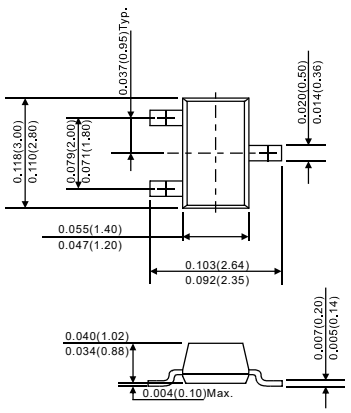
- V_{DS}=20V, I_D=5.2A.
- $R_{DS(ON)}$≤ 24mΩ, @V_{GS}=4.5V, I_D=4.0A.
- $R_{DS(ON)}$≤ 36mΩ, @V_{GS}=2.5V, I_D=3.0A.
- Super High density cell trench design for low $R_{DS(on)}$.
- Rugged and reliable.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21).

Mechanical data

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

Package outline

SOT-23



Dimensions in inches and (millimeters)

Maximum ratings (At T_A=25℃ unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain to source voltage	V_{DS}	20	V
Gate-source voltage	V_{GS}	±12	V
Continuous drain current (Note1)	I_D	5.2	A
Pulsed drain current (Note2)	I_{DM}	21	A
Power dissipation (Note1) (T_A=25℃)	P_D	0.72	W
Power dissipation (Note1) (T_A=70℃)	P_D	0.46	W
Thermal resistance, junction to ambient (Note1)	$R_{\theta JA}$	100	℃/W
Junction temperature	T_J	+150	℃
Storage temperature range	T_{STG}	-55 to + 150	℃

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Electrical characteristics (At T_A=25℃ 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}=±12V, V_{DS}=0V			±100	nA
On characteristics (Note 2)						
Gate threshold voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	0.5	0.7	1.2	V
Static drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=4A		19	24	mΩ
		V_{GS}=2.5V, I_D=3A		21	36	
Dynamic parameters (Note 3)						
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=8V, f=1.0MHz		412		pF
Out capacitance	C_{oss}			56		
Reverse transfer capacitance	C_{rss}			38		
Switching parameters (Note 3)						
Total gate charge	Q_g	V_{DS}=10V, V_{GS}=4.5V, I_D=4.0A		10		nC
Gate-source charge	Q_{gs}			0.65		
Gate-drain charge	Q_{gd}			1.5		
Turn-on delay time	$t_{d(on)}$	V_{DD}=10V, I_D=4.0A, V_{GS}=4.5V,R_G=6Ω		5		ns
Rise time	t_r			3		
Turn-off delay time	$t_{d(off)}$			18		
Fall time	t_f			6		
Source-drain diode ratings and characteristics						
Source to drain forward voltage drop (Note2)	V_{SD}	I_S=3A, V_{GS}=0V			1.2	V
Source to drain continuous current (Note1)	I_S				5.2	A

Note: 1.Surface Mounted on FR4 Board, t ≤ 10 sec.
2.Pulse Width limited by maximum junction temperature.

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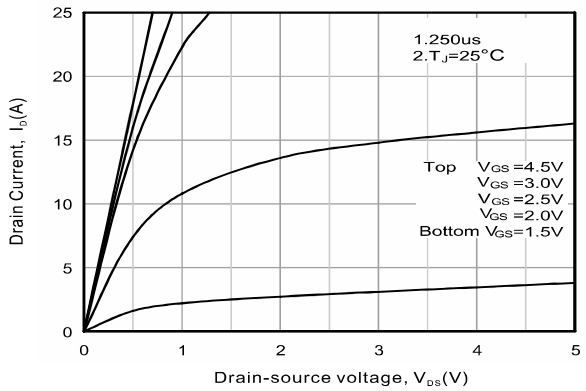
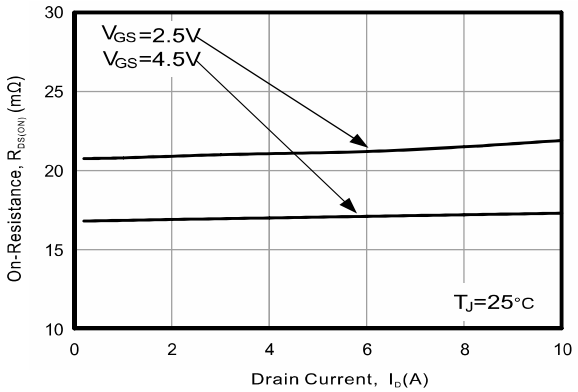
Rating and characteristic curves

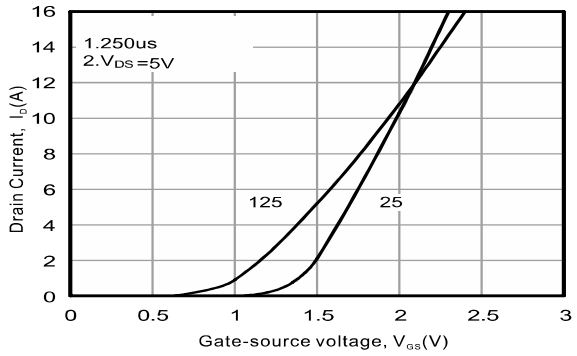
Output Characteristic



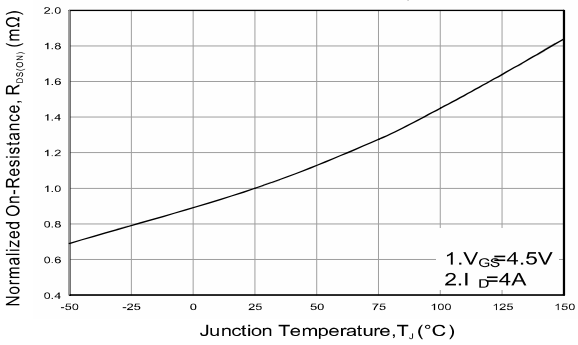
On-Resistance vs. Drain Current



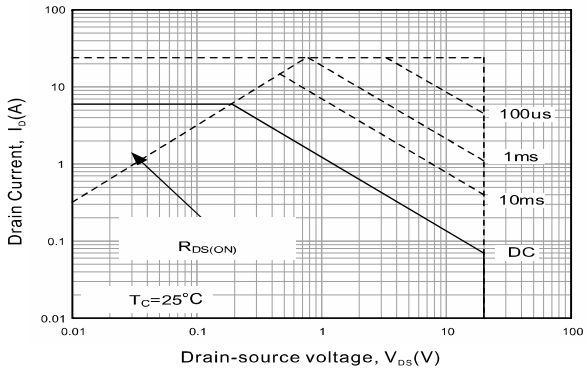
Transfer Characteristic



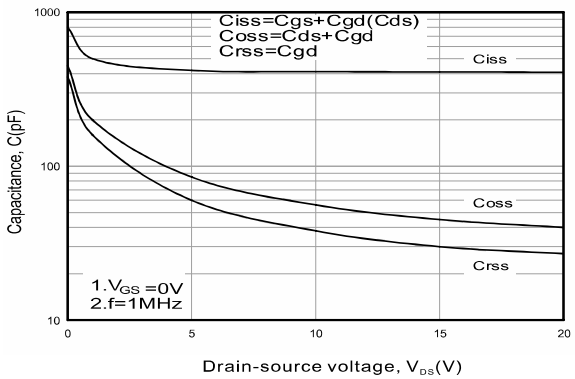
On-Resistance vs. Junction Temperature



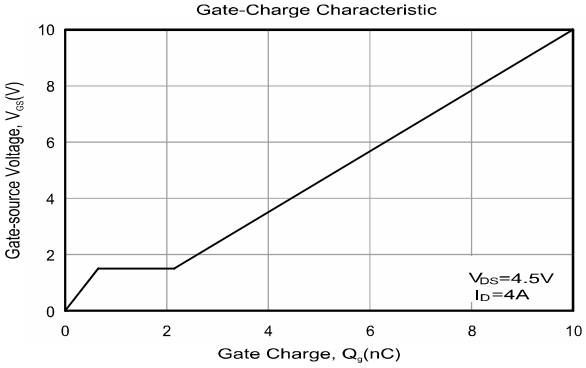
Safe Operation Area



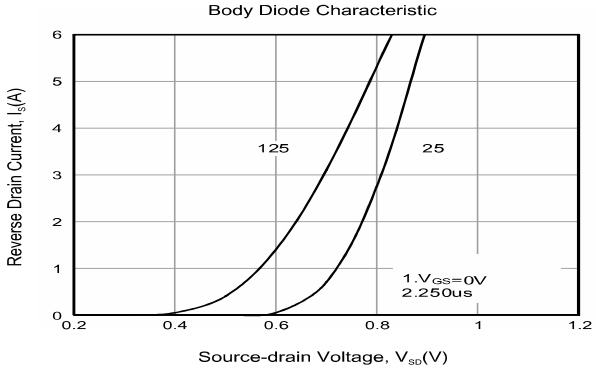
Capacitance Characteristic



Gate-Charge Characteristic



Body Diode Characteristic



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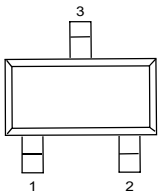
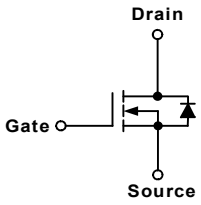
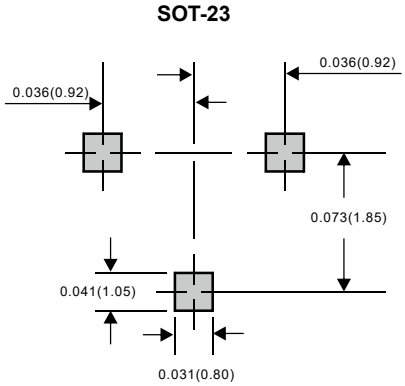
Pinning information

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

Marking

Type number	Marking code
FMNN2300-H	2302A

Suggested solder pad layout



Dimensions in inches and (millimeters)

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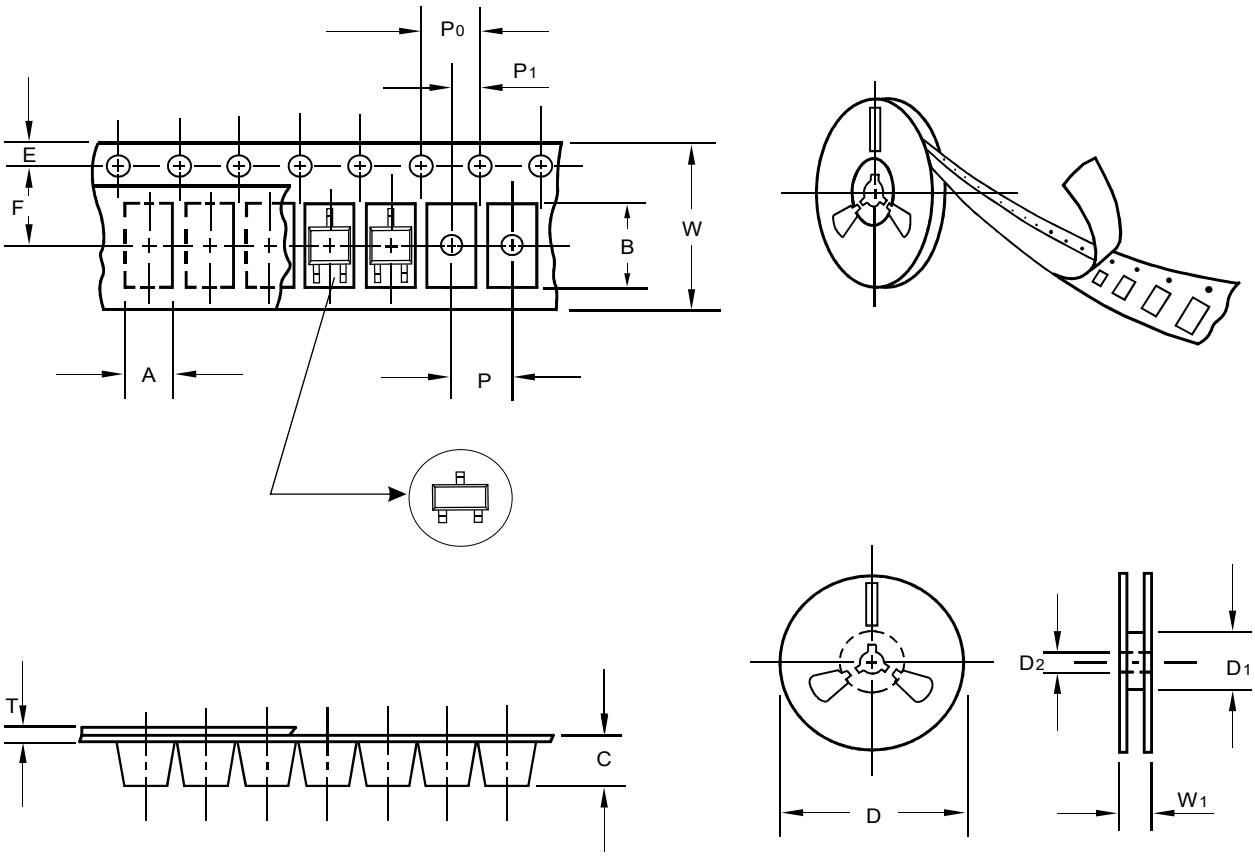
Packing information



unit:mm

Item	Symbol	Tolerance	SOT-23
Carrier width	A	0.5	3.15
Carrier length	B	0.5	2.77
Carrier depth	C	0.5	1.22
Sprocket hole	d	0.5	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	53.40
Feed hole diameter	D_2	0.5	12.00
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	0.5	0.23
Tape width	W	0.5	8.00
Reel width	W_1	5.0	12.30

Note:Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

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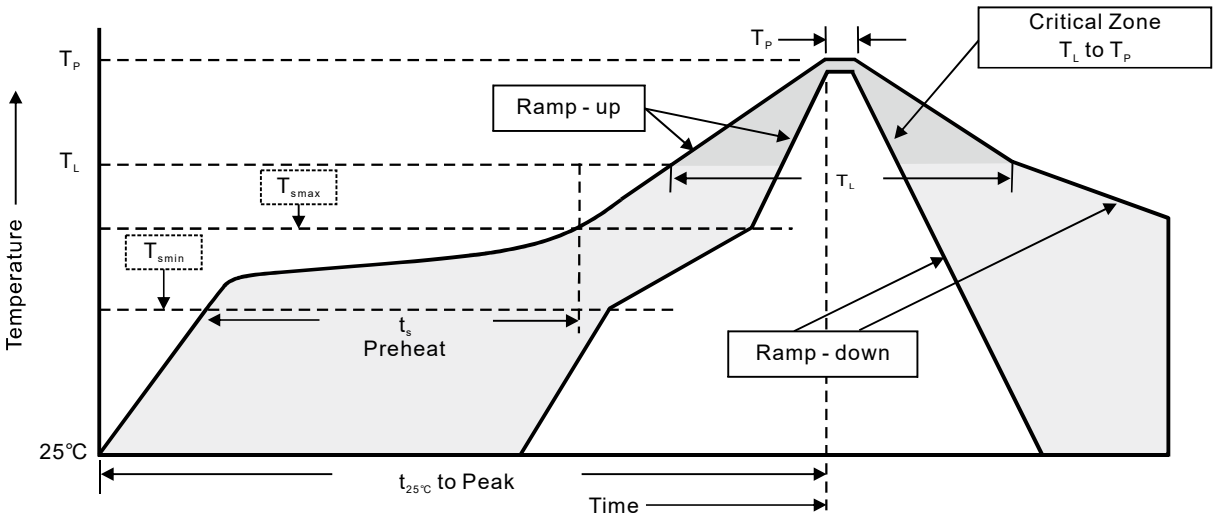
Reel packing

Package	Units (pcs)			Dimension (Unit : mm³)		
	Reel	Inner Box	Outer Box	Reel DIA,	Inner Box	Outer Box
SOT-23	3,000	30,000	180,000	178 (7")	183 x 120 x 180	390 x 385 x 205

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