

# FMOS2312

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# FMOS2312

## 20V N-Channel Enhancement Mode MOSFET

### Features

- TrenchFET power MOSFET
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen-free part, ex. FMOS2312-H.

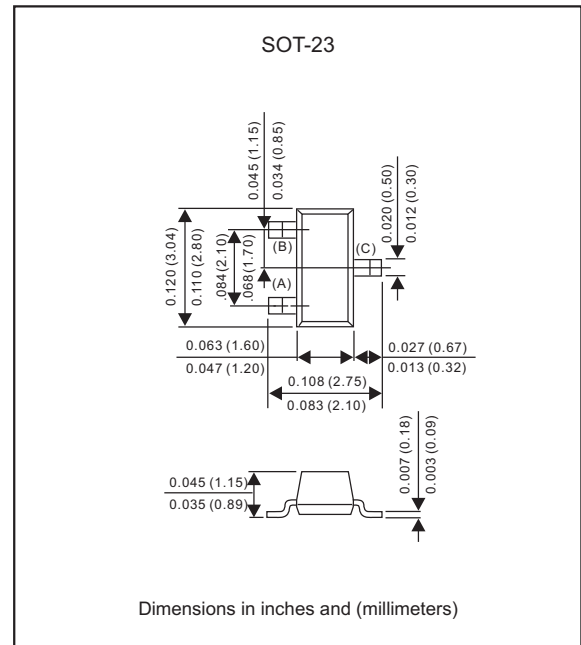
### Application

- Load switch for portable devices
- DC/DC converter

### 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	$V_{DS}$			20	V
Continuous drain current (t=5s)	$I_D$			5.0	A
Pulsed drain current	$I_{DM}$			20	A
Continuous source-drain diode current	$I_S$			1.04	A
Gate-source voltage	$V_{GS}$			$\pm 8.0$	V
Power dissipation (t=5s)	$P_D$			350	mW
Thermal resistance junction to ambient	$R_{\theta JA}$		357		$^{\circ}\text{C}/\text{W}$
Operation junction temperature range	$T_J$	-55		+150	$^{\circ}\text{C}$
Storage temperature range	$T_{STG}$	-55		+150	$^{\circ}\text{C}$

## FMOS2312

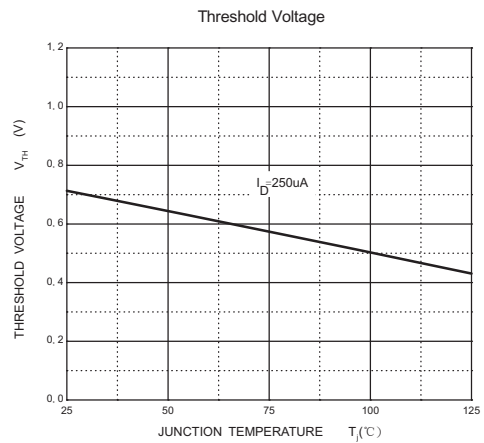
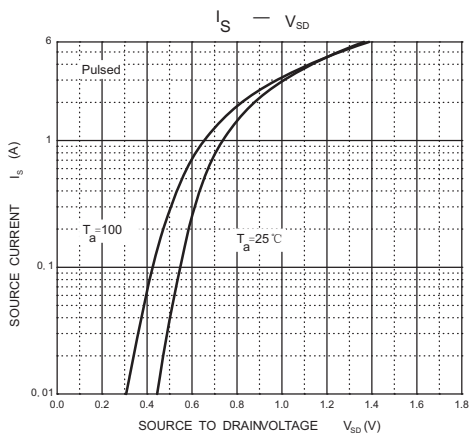
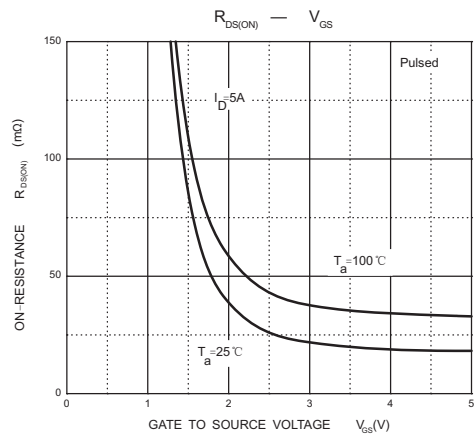
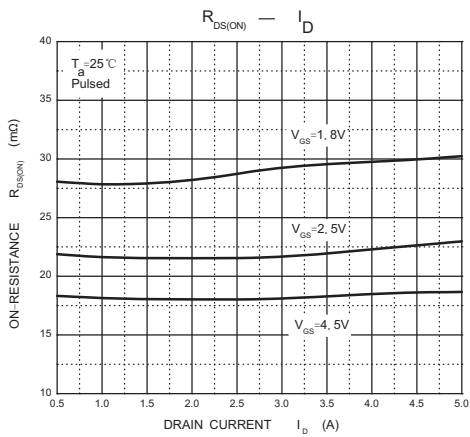
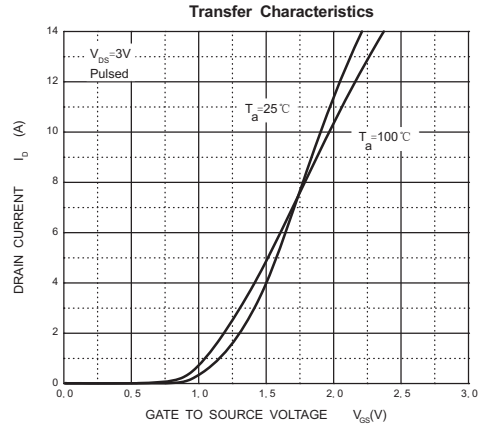
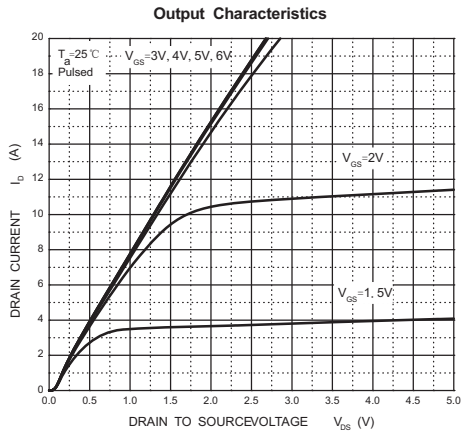
**Electrical characteristics** (At  $T_A=25^{\circ}\text{C}$  unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
<b>Off characteristics</b>						
Drain-source breakdown voltage	$V_{GS} = 0V, I_D = 250\mu A$	$V_{(BR)DSS}$	20			V
Zero gate voltage drain current	$V_{DS} = 20V, V_{GS} = 0V$	$I_{DSS}$			1.0	$\mu A$
Gate-source leakage current	$V_{GS} = \pm 8V, V_{DS} = 0V$	$I_{GSS}$			$\pm 100$	nA
<b>On characteristics</b>						
Gate threshold voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(th)}$	0.45	0.7	1.0	V
Drain-source on-resistance (note 1)	$V_{GS} = 4.5V, I_D = 5.0A$ $V_{GS} = 2.5V, I_D = 4.7A$ $V_{GS} = 1.8V, I_D = 4.3A$	$R_{DS(on)}$		0.018 0.023 0.030	0.0318 0.0356 0.0414	$\Omega$
Forward transconductance (note 1)	$V_{DS} = 10V, I_D = 5.0A$	$g_{FS}$		6.0		S
<b>Dynamic characteristics (note 2)</b>						
Input capacitance	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$	$C_{iss}$		865		pF
Output capacitance		$C_{oss}$		105		
Reverse transfer capacitance		$C_{rss}$		55		
Gate resistance	$f = 1MHz$	$R_G$	0.5		4.8	$\Omega$
<b>Switching characteristics (note 2)</b>						
Turn-on delay time	$V_{GEN} = 5V, V_{DD} = 10V, I_D = 4A$ $R_L = 2.2\Omega, R_G = 1.0\Omega$	$t_{d(on)}$			10	ns
Turn-on rise time		$t_r$			20	
Turn-off delay time		$t_{d(off)}$			32	
Turn-off fall time		$t_f$			12	
<b>Drain-source body diode characteristics</b>						
Diode forward voltage	$I_S = 4.0A, V_{GS} = 0V$	$V_{SD}$		0.75	1.2	V

## Notes :

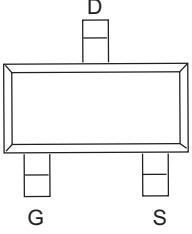
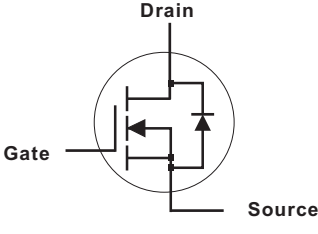
1. Pulse test : pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
2. These parameters have no way to verify.

# Rating and characteristic curves (FMOS2312)



# FMOS2312

## Pinning information

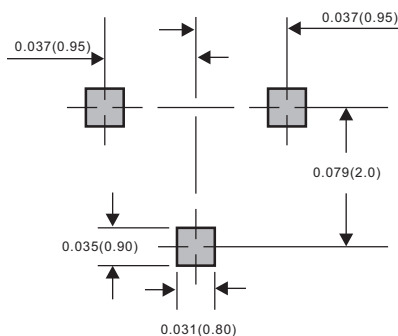
Pin	Simplified outline	Symbol
PinD Drain PinG Gate PinS Source		

## Marking

Type number	Marking code
FMOS2312	S12

## Suggested solder pad layout

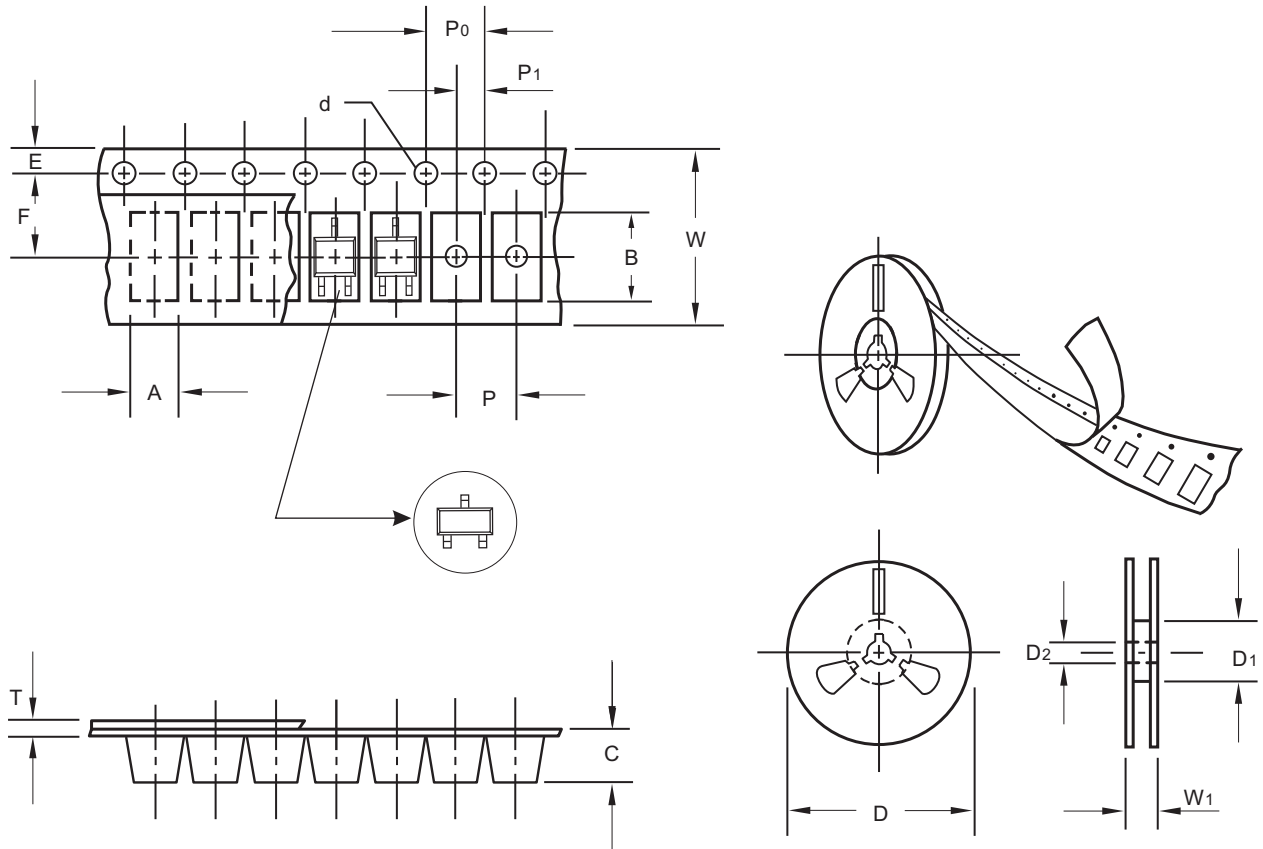
SOT-23



Dimensions in inches and (millimeters)

# FMOS2312

## 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	54.40
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	9.50

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

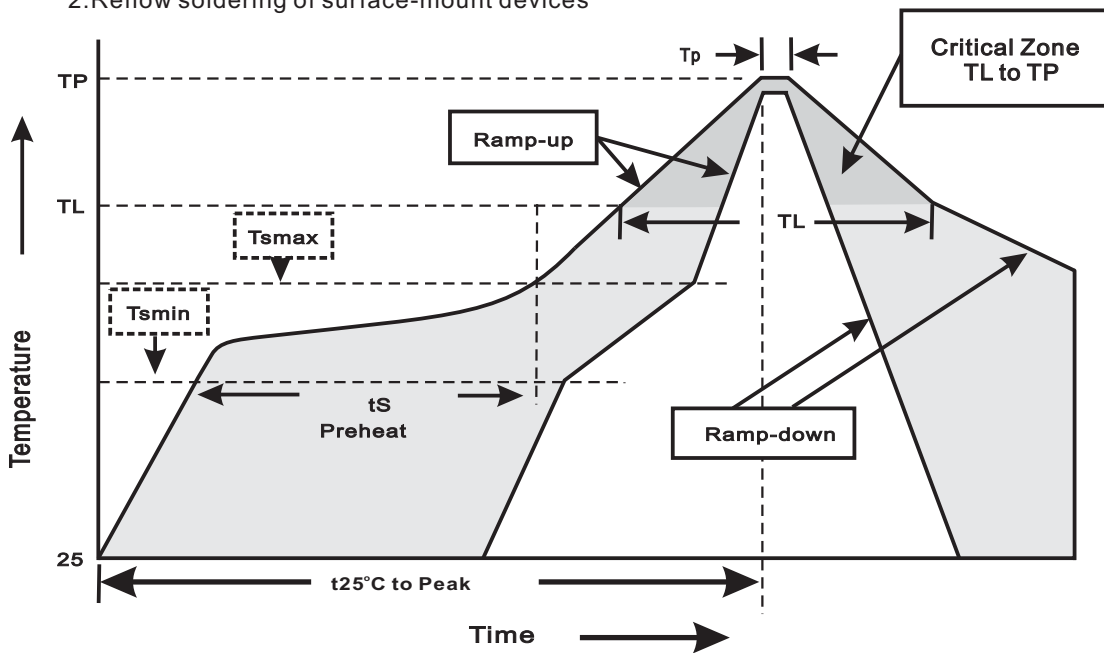
# FMOS2312

## 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 <sub>L</sub> to T <sub>P</sub> )	<3°C/sec
Preheat -Temperature Min(T <sub>sm</sub> ) -Temperature Max(T <sub>sm</sub> ) -Time(min to max)(t <sub>s</sub> )	150°C 200°C 60~120sec
T <sub>sm</sub> to T <sub>L</sub> -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(T <sub>L</sub> ) -Time(t <sub>L</sub> )	217°C 60~260sec
Peak Temperature(T <sub>P</sub> )	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t <sub>p</sub> )	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes