

FMOS2302W**List**

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FMOS2302W

2.1A, 20V N-Channel Enhancement Mode MOSFET

Features

- $R_{DS(ON)} \leq 60\text{m}\Omega @ V_{GS}=4.5\text{V}$
- $R_{DS(ON)} \leq 115\text{m}\Omega @ V_{GS}=2.5\text{V}$
- TrenchFET power MOSFET
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen-free part, ex.FMOS2302W-H

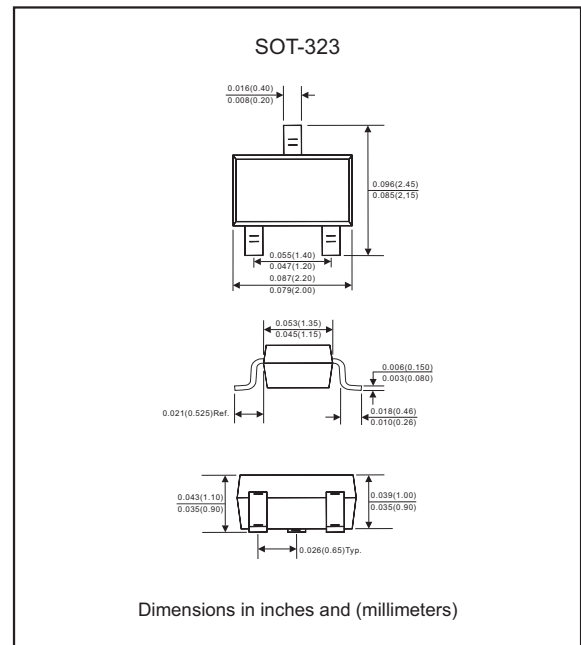
Applications

- Load switch for portable devices
- DC/DC Converter

Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-323
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.006 gram

Package outline



Maximum ratings (AT $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	20	V
Gate-source voltage	V_{GS}	± 8	V
Continuous drain current	I_D	2.1	A
Continuous source-drain diode current	I_S	0.6	A
Power dissipation	P_D	0.35	W
Operating Junction temperature range	T_J	+150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$
Thermal resistance Junction to ambient	$R_{\theta JA}$	357	$^\circ\text{C/W}$

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

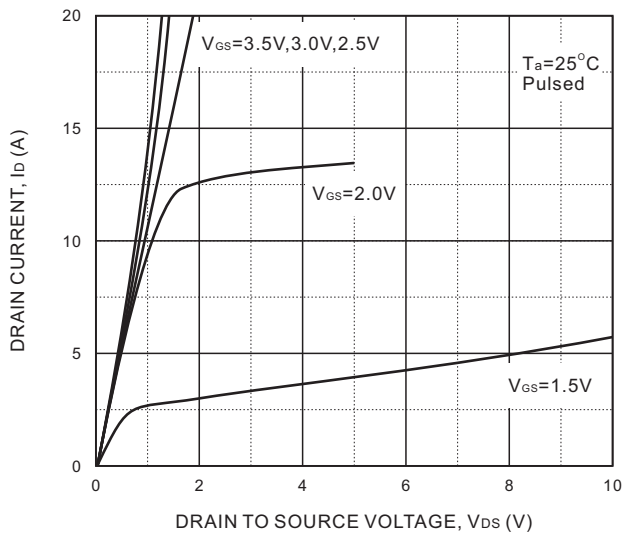
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	$I_D=10\mu\text{A}$, $V_{GS}=0\text{V}$	20			V
Drain-source leakage current	I_{DSS}	$V_{DS}=20\text{V}$, $V_{GS}=0\text{V}$			1	μA
Gate-source leakage current	I_{GSS}	$V_{DS}=0\text{V}$, $V_{GS}=\pm 8\text{V}$			± 100	nA
On characteristics						
Gate threshold voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	0.65		1.2	V
Forward transconductance (Note 1)	g_{FS}	$V_{DS}=5\text{V}$, $I_D=3\text{A}$		8		S
Static drain-source on-resistance (Note 1)	$R_{DS(ON)}$	$V_{GS}=4.5\text{V}$, $I_D=3.6\text{A}$		35	60	m Ω
		$V_{GS}=2.5\text{V}$, $I_D=3.1\text{A}$		45	115	
Diode forward voltage	V_{SD}	$I_S=0.94\text{A}$, $V_{GS}=0\text{V}$		0.76	1.2	V
Switching parameters (Note 2)						
Input capacitance	C_{iss}	$V_{DS}=10$, $V_{GS}=0\text{V}$, $f=1\text{MHz}$		300		pF
Output capacitance	C_{oss}			120		
Reverse transfer capacitance	C_{rss}			80		
Total gate charge	Q_g	$V_{GS}=4.5$, $V_{DS}=10\text{V}$, $I_D=3.6\text{A}$		4.0	10	nC
Gate to source charge	Q_{gs}			0.65		
Gate to Drain charge	Q_{gd}			1.5		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=10\text{V}$, $V_{GS}=4.5\text{V}$, $I_D=3.6\text{A}$ $R_g=6\Omega$, $R_L=5.5\Omega$		7	15	ns
Rise time	t_r			55	80	
Turn-off delay time	$t_{d(off)}$			16	60	
Fall time	t_f			10	25	

Note : 1. Pulse test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

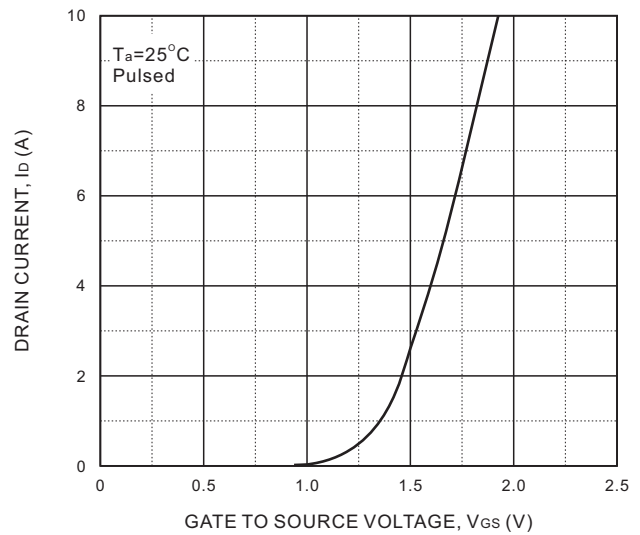
2. Guaranteed by design, not subject to production testing.

Rating and characteristic curves (FMOS2302W)

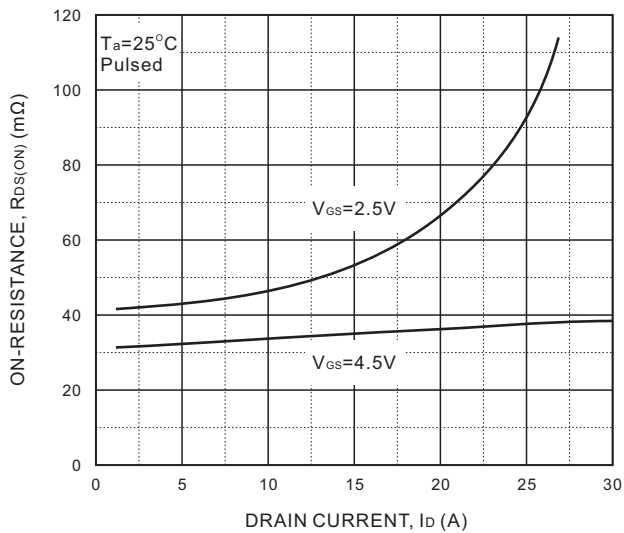
Output Characteristics



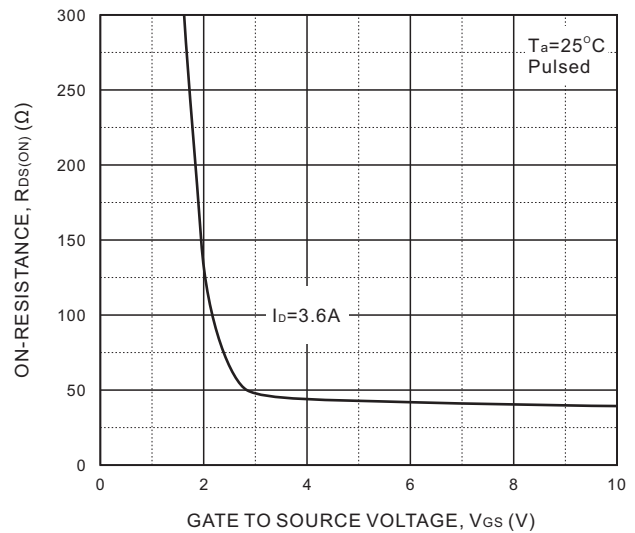
Transfer Characteristics



$R_{DS(ON)}$ — I_D

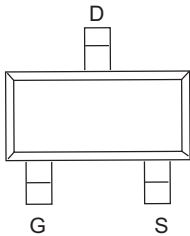
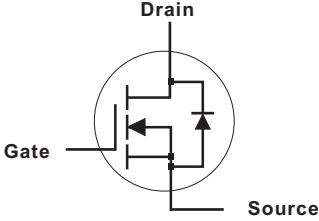


$R_{DS(ON)}$ — V_{GS}



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Pinning information

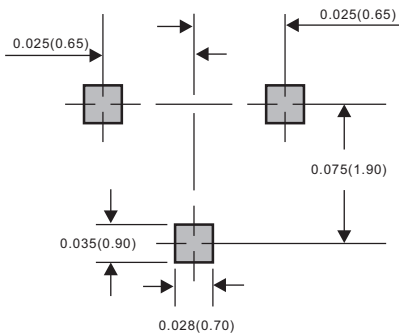
Pin	Simplified outline	Symbol
PinD Drain PinG Gate PinS Source		

Marking

Type number	Marking code
FMOS2302W	2302

Suggested solder pad layout

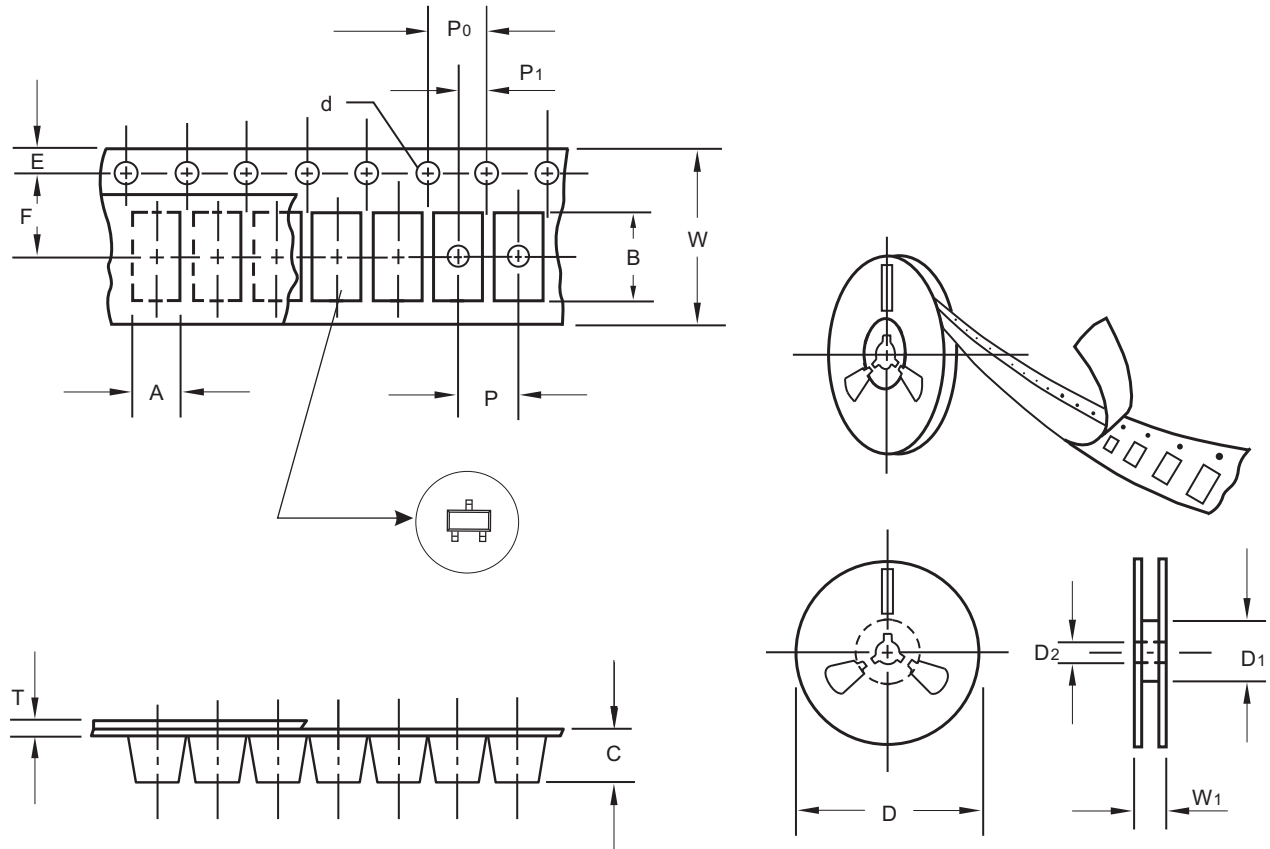
SOT-323



Dimensions in inches and (millimeters)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-323
Carrier width	A	0.1	2.36
Carrier length	B	0.1	2.40
Carrier depth	C	0.1	1.20
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	62.00
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	11.40

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

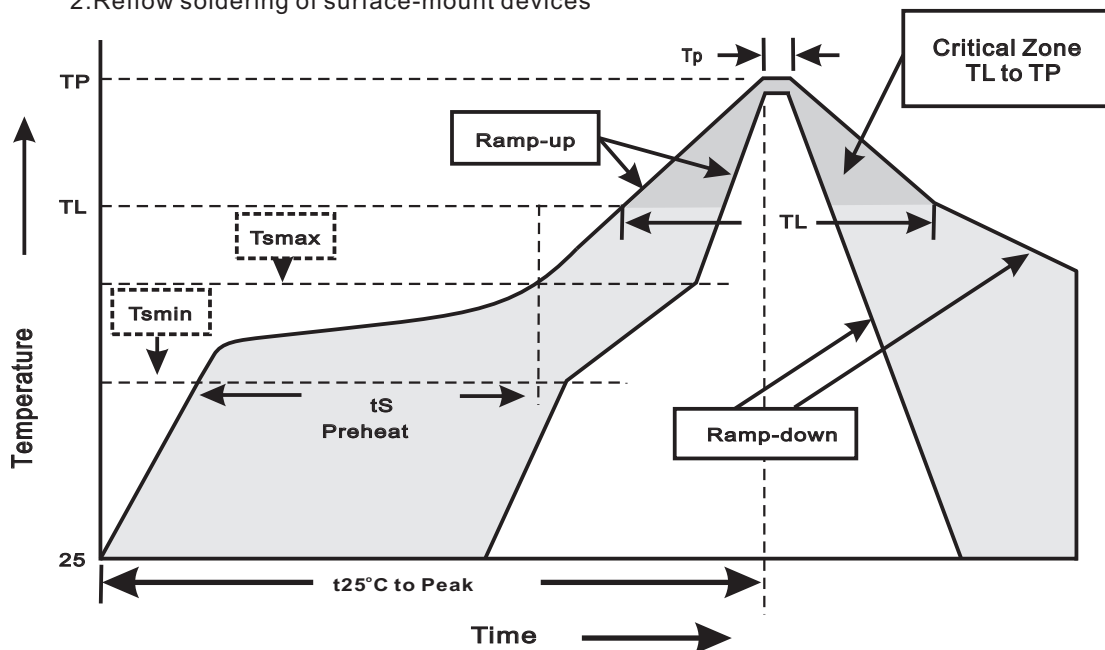
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Reel packing

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-323	7"	3,000	4.0	30,000	183*183*123	178	382*262*387	240,000	9.5

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 _{5min}) -Temperature Max(T _{5max}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{5max} 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