

FMOS2301W-Q1

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-2.3A -20V P-Channel Enhancement Mode MOSFET

Features

- $V_{DS} = -20$, $I_D = -2.3A$.
- TrenchFET power MOSFET.
- Qualified to AEC-Q101 standards for high reliability.
- Lead free parts meet RoHS requirements.
- Suffix "-H" for Halogen-free part, ex. FMOS2301W-Q1-H.

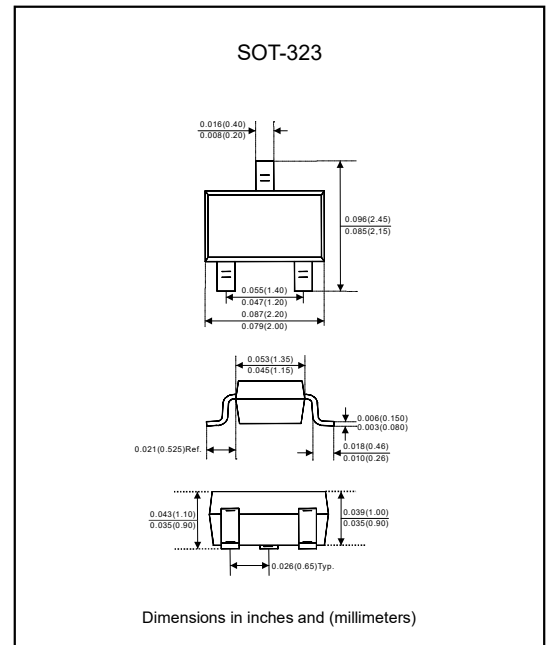
Applications

- 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	-2.3	A
Pulsed drain current	I_{DM}	-10	A
Continuous source-drain diode current	I_S	-0.72	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 ($t \leq 5s$)	$R_{\theta JA}$	357	$^\circ\text{C/W}$

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

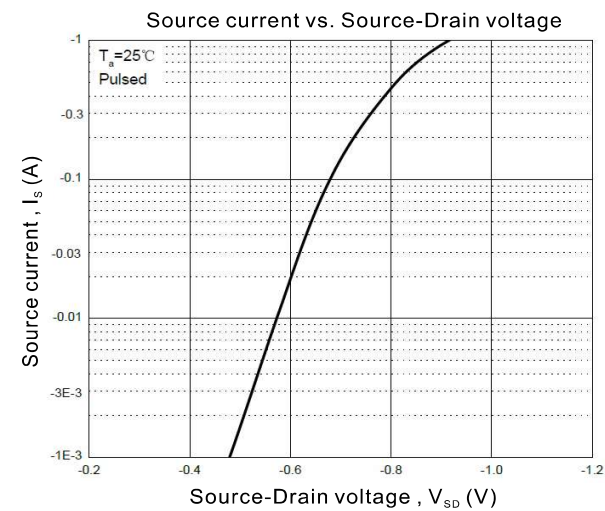
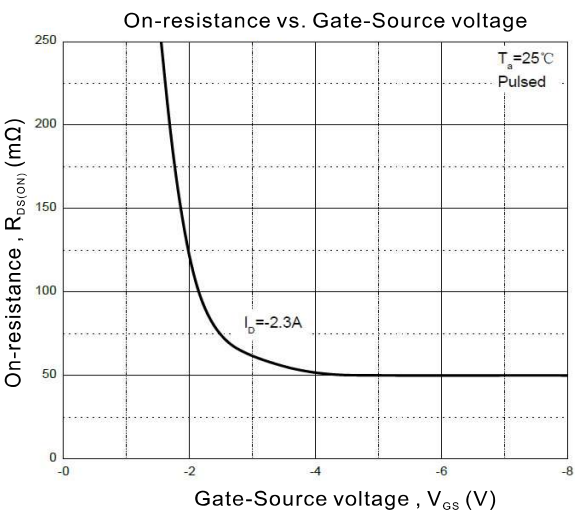
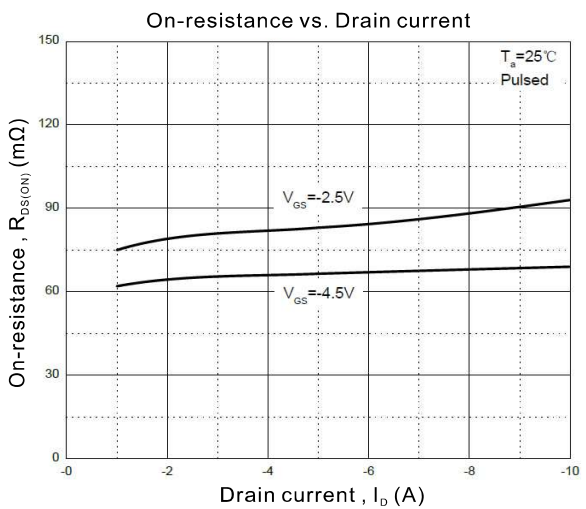
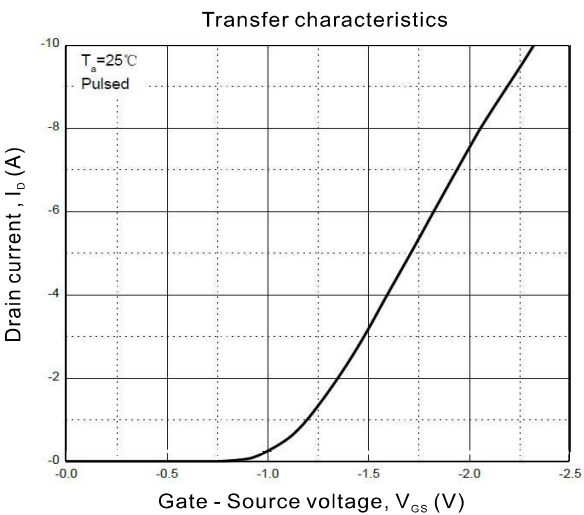
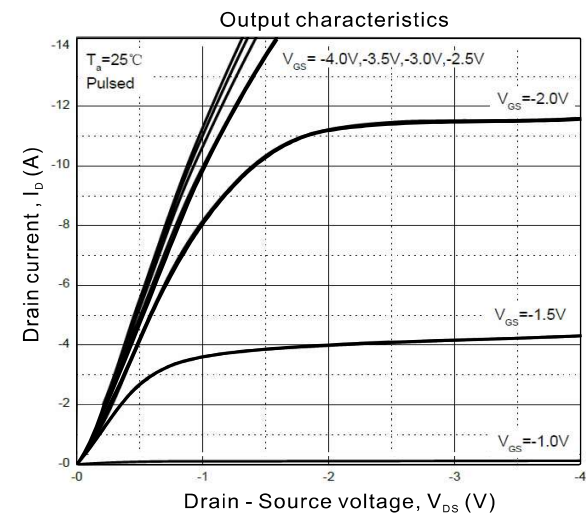
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	BV _{DSS}	I _D =-250μA, V _{GS} =0V	-20			V
Drain-source leakage current	I _{DSS}	V _{DS} =-20V, V _{GS} =0V			-1	μA
Gate-source leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±8V			±100	nA
On characteristics						
Gate threshold voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =-250μA	-0.4		-1	V
Forward transconductance (Note 1)	g _{FS}	V _{DS} =-5V, I _D =-2.8A		6.5		S
Static drain-source on-resistance (Note 1)	R _{DS(ON)}	V _{GS} =-4.5V, I _D =-2.3A		90	125	mΩ
		V _{GS} =-2.5V, I _D =-2.0A		110	155	
Switching parameters (Note 2)						
Input capacitance	C _{iss}	V _{DS} =-10, V _{GS} =0V, f=1MHz		405		pF
Ouput capacitance	C _{oss}			75		
Reverse transfer capacitance	C _{rss}			55		
Total gate charge	Q _g	V _{GS} =-4.5,V _{DS} = -10V, I _D =-2A		5.5	10	nC
		V _{GS} =-2.5,V _{DS} = -10V, I _D =-2A		3.3	6	
Gate to source charge	Q _{gs}			0.7		
Gate to Drain charge	Q _{gd}			1.3		
Gate resistance	R _g	f=1MHz		6		Ω
Turn-on delay time	t _{d(on)}	V _{DD} =-10V, V _{GEN} =-4.5V, I _D =-1A R _g =1Ω, R _L =10Ω		11	20	ns
Rise time	t _r			35	60	
Turn-off delay time	t _{d(off)}			30	50	
Fall time	t _f			10	20	
Source-drain diode ratings and characteristics						
Continuous source-drain diode current	I _S	T _C =25°C			-1.3	A
Pulse diode forward current (Note 1)	I _{SM}				-10	A
Body diode voltage	V _{SD}	I _S =-0.7A, V _{GS} =0V		-0.8	-1.2	V

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

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

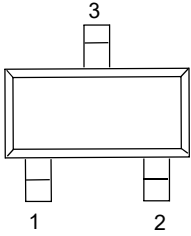
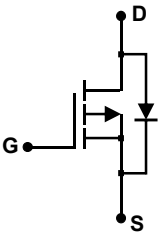
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Rating and characteristic curves



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Pinning information

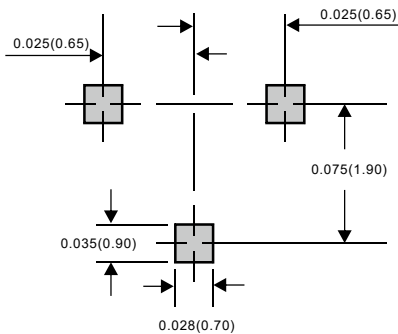
Pin	Simplified outline	Symbol
Pin 1 Gate Pin 2 Source Pin 3 Drain		

Marking

Type number	Marking code
FMOS2301W-Q1	2301

Suggested solder pad layout

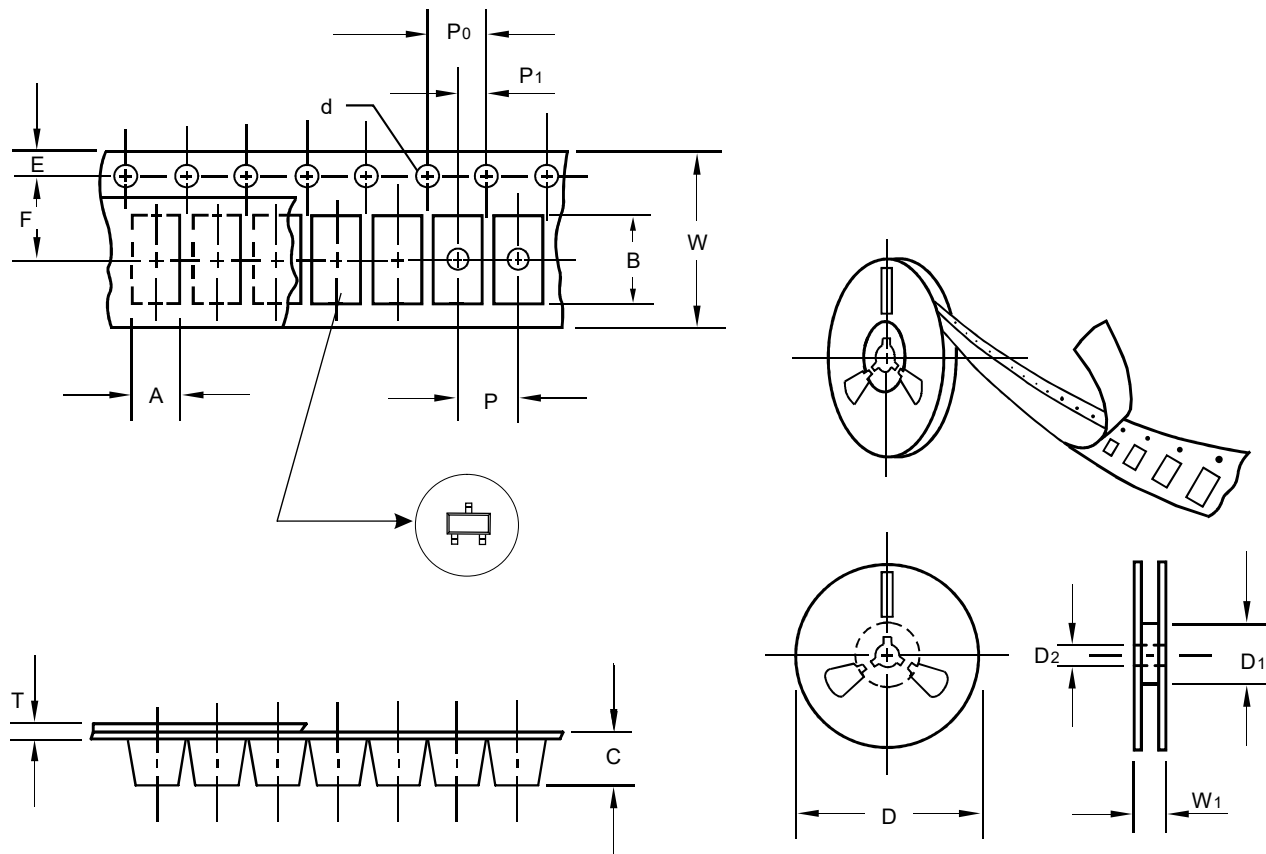
SOT-323



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	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	62.00
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	11.40

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

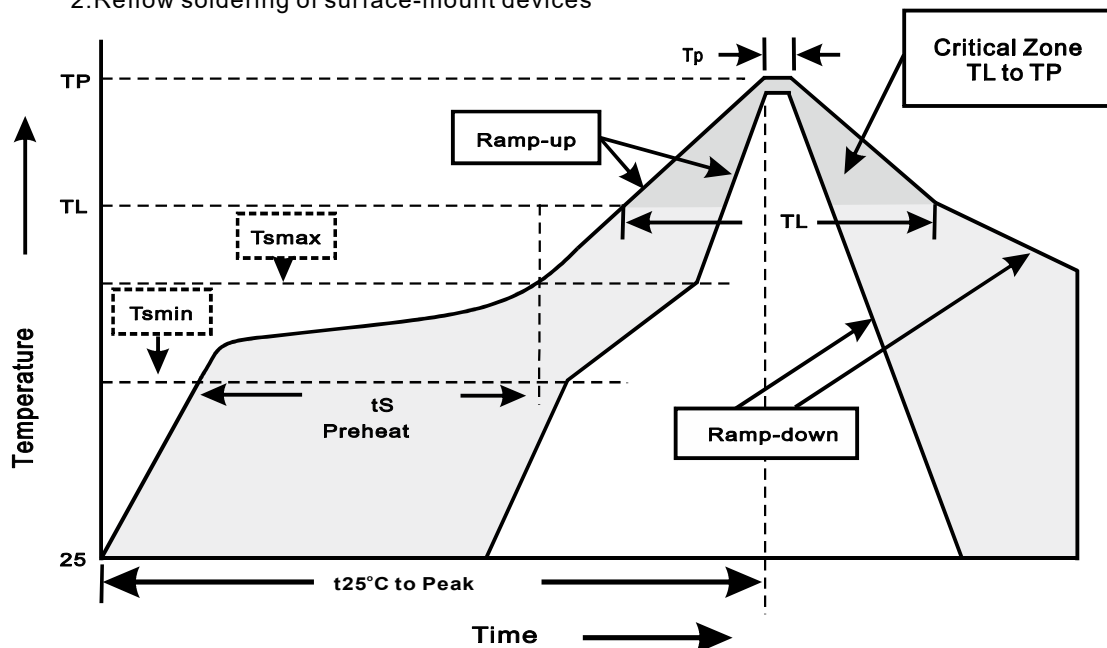
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Reel packing

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)	$<3^\circ\text{C/sec}$
Preheat -Temperature Min(T_{smin}) -Temperature Max(T_{smax}) -Time(min to max)(t_s)	150°C 200°C 60~120sec
T_{smax} to T_L -Ramp-upRate	$<3^\circ\text{C/sec}$
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	$<6^\circ\text{C/sec}$
Time 25°C to Peak Temperature	$<6\text{minutes}$