

FMS2301

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FMS2301

20V P-Channel Enhancement Mode MOSFET

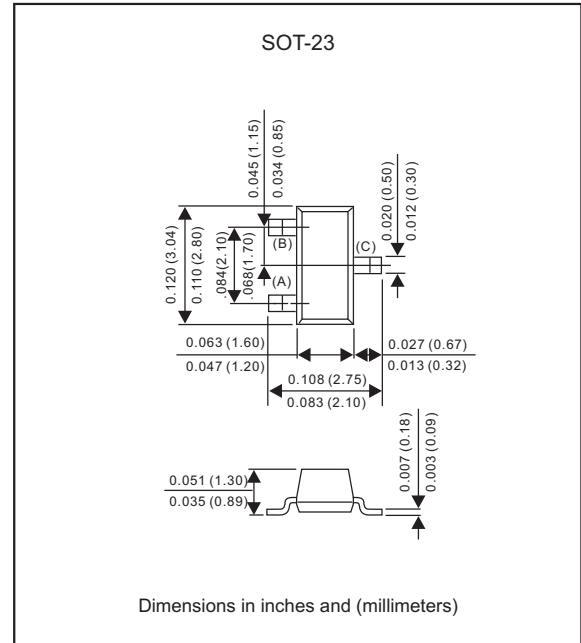
Features

- $R_{DS(ON)} \leq 110m\Omega @ V_{GS} = -4.5V$
- $R_{DS(ON)} \leq 150m\Omega @ V_{GS} = -2.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- In compliance with EU RoHS 2002/95/EC directives.
- Suffix "-H" indicates Halogen-free part, ex. FMS2301-H.

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 $T_A = 25^\circ C$ unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	Limit	UNIT
Drain-source voltage		V_{DSS}	-20	V
Drain current-continue	$T_A = 25^\circ C$	I_D	-2.7	A
	$T_A = 70^\circ C$		-2.1	
	-pulsed	I_{DM}	-11	
Gate- source voltage-continue		V_{GS}	± 8.0	V
Maximum power dissipation	$T_A = 25^\circ C$	P_D	1.3	W
	$T_A = 70^\circ C$		0.8	
Thermal resistance-junction to ambient*		$R_{\theta JA}$	100	$^\circ C/W$
Operation junction temperature range		T_J	-55 to +150	$^\circ C$
Storage temperature range		T_{STG}	-65 to +150	$^\circ C$

* The device mounted on 1in² FR4 board with 2 oz copper

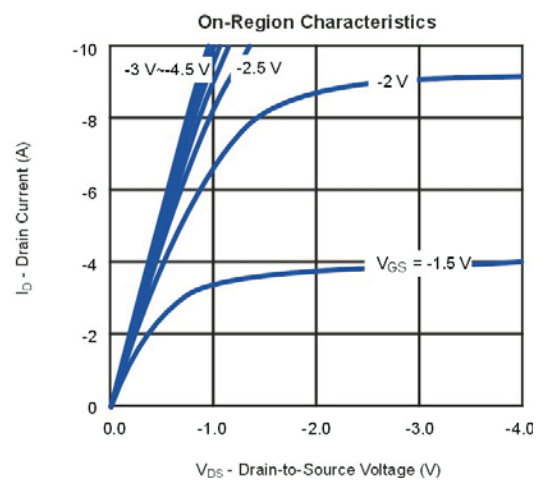
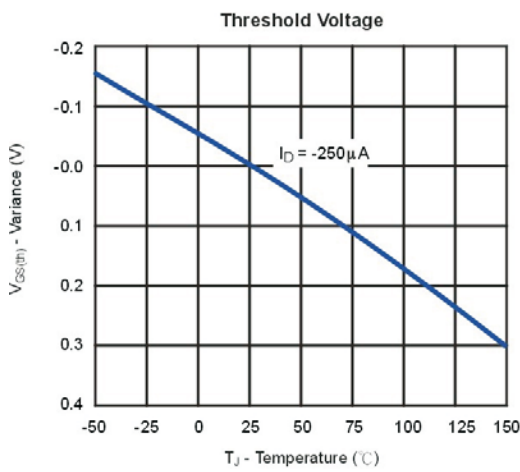
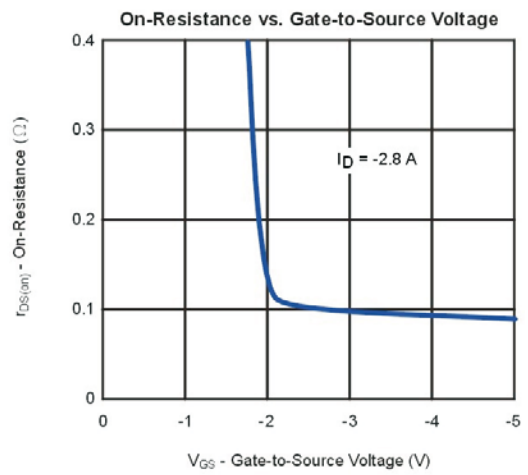
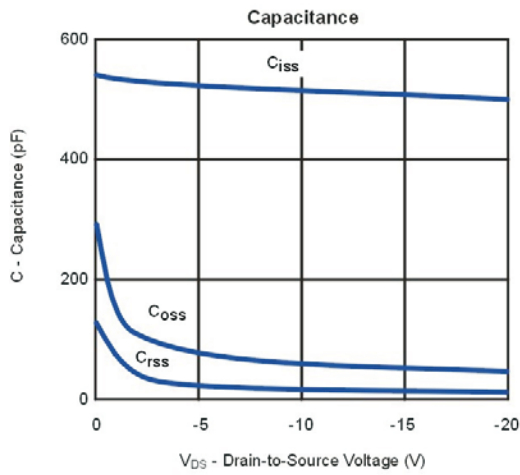
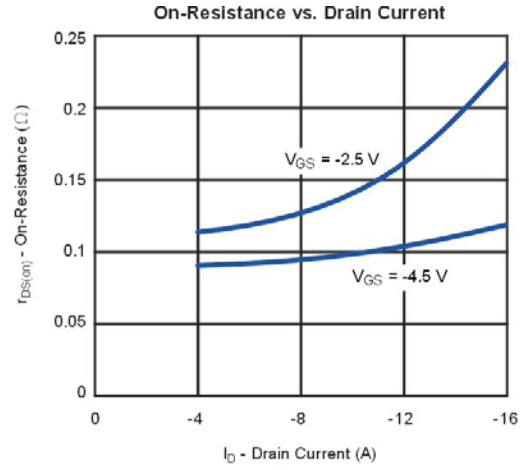
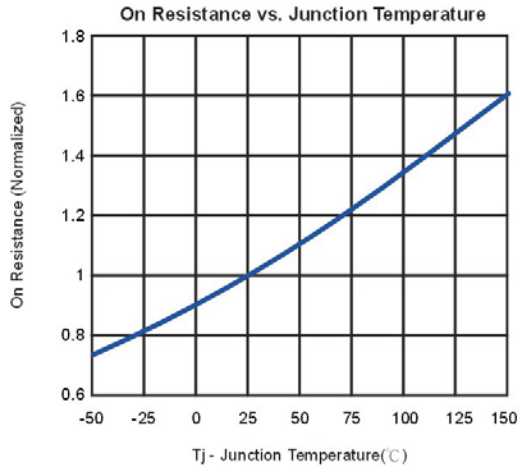
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Electrical characteristics (At $T_A=25^\circ\text{C}$ unless otherwise noted)

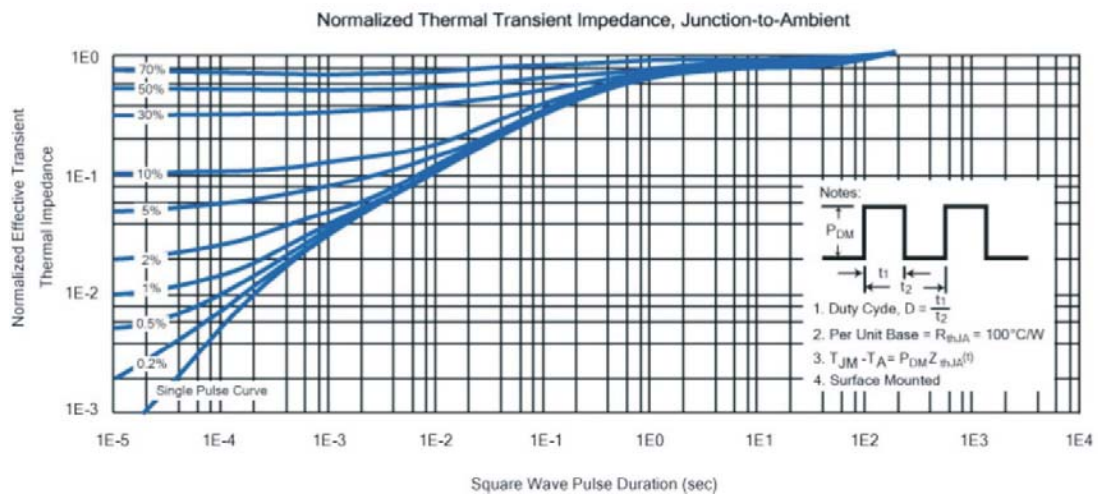
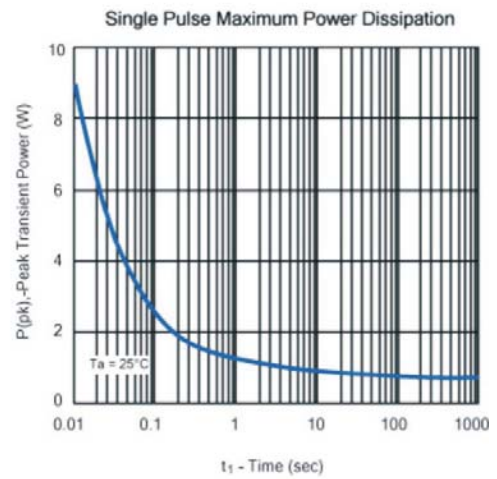
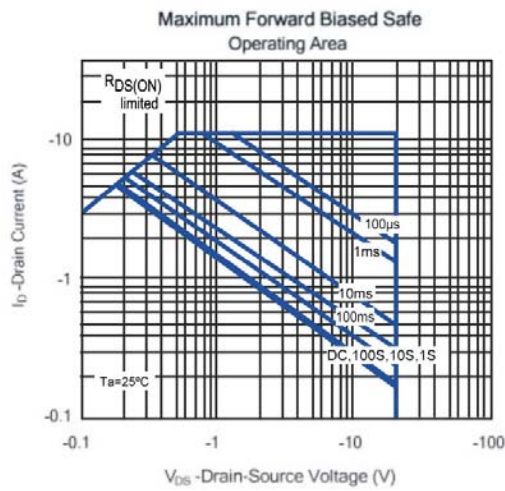
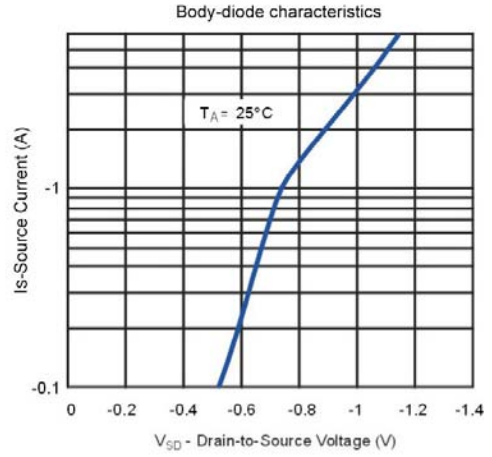
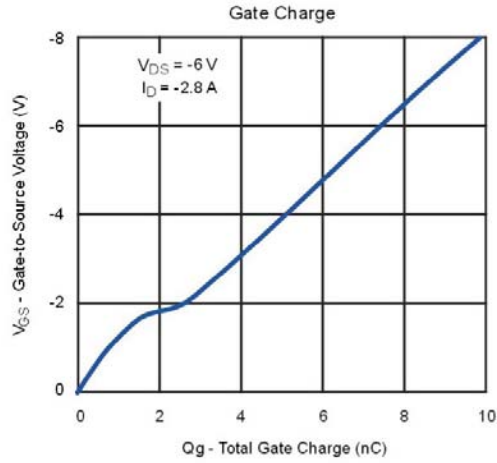
PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
STATIC						
Drain-source breakdown voltage	$V_{GS} = 0V, I_D = -250\mu A$	BV_{DSS}	-20			V
Zero gate voltage drain current	$V_{DS} = -20V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	I_{DSS}			-1.0	μA
Gate-body leakage current-forward	$V_{GS} = 8V, V_{DS} = 0$	I_{GSSF}			100	nA
Gate-body leakage current-reverse	$V_{GS} = -8V, V_{DS} = 0$	I_{GSSR}			-100	nA
Gate threshold voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	$V_{GS(th)}$	-0.4		-1.0	V
Static drain-source on-resistance ^a	$V_{GS} = -4.5V, I_D = -2.8A$ $V_{GS} = -2.5V, I_D = -2.0A$	$R_{DS(ON)}$		90 110	110 150	m Ω
Diode Forward Voltage	$V_{GS} = 0V, I_S = -1.0A, T_J = 25^\circ\text{C}$	V_{SD}		-0.7	-1.4	V
DYNAMIC						
Input capacitance	$V_{DS} = -15V, V_{GS} = 0V,$ $f = 1.0\text{MHz}$	C_{iss}		510		pF
Output capacitance		C_{oss}		53		
Reverse transfer capacitance		C_{rss}		17		
Total gate charge	$V_{DS} = -6.0V, I_D = -2.8A$ $V_{GS} = -4.5V$	Q_g		5.8		nC
Gate-source charge		Q_{gs}		1.7		
Gate-drain charge		Q_{gd}		1.2		
Turn-On Delay Time	$V_{DS} = -6.0V, R_L = 6.0\Omega, R_{GEN} = 6\Omega$ $V_{GS} = -4.5V$	$T_{d(on)}$		53		ns
		T_r		32		
Turn-Off Delay Time		$T_{d(off)}$		47		
		T_f		7		

Notes: a. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$, Guaranteed by design, not subject to production testing.

Rating and characteristic curves (FMS2301)

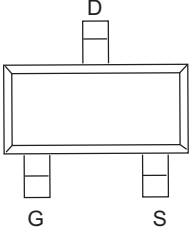
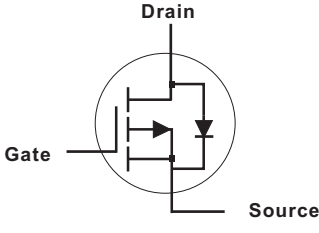


Rating and characteristic curves (FMS2301)



FMS2301

Pinning information

Pin	Simplified outline	Symbol
PinD Drain PinG Gate PinS Source		

Marking

Type number	Marking code
FMS2301	2301, 01
	WAG0A (Note 1)

Note: 1.

P/N :

“WAG” is FMS2301-H

“WA” shown on the 1st~2rd position on --- FMS2301

“G” shown on the 3th position on --- Green product-Halogen free

D/C :

0A is the sequence of “0-9” & “A-Z”

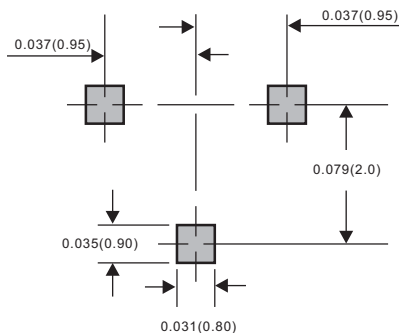
0~9 shown on the 4th position on ---2010~2019

A~Z shown on the 5th position on ---1week~26week

A~Z shown on the 5th position on ---27week~52week

Suggested solder pad layout

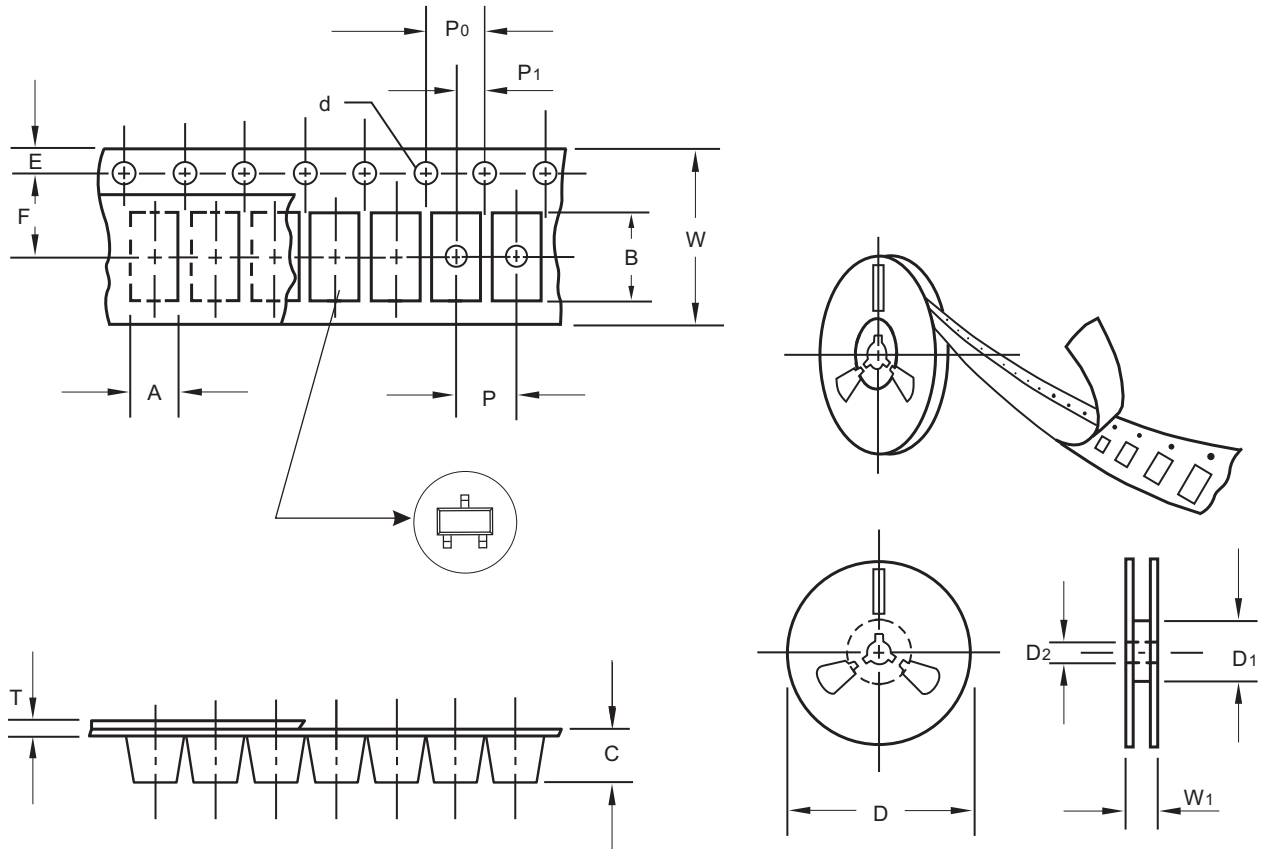
SOT-23



Dimensions in inches and (millimeters)

FMS2301

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	55.00
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	12.0

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

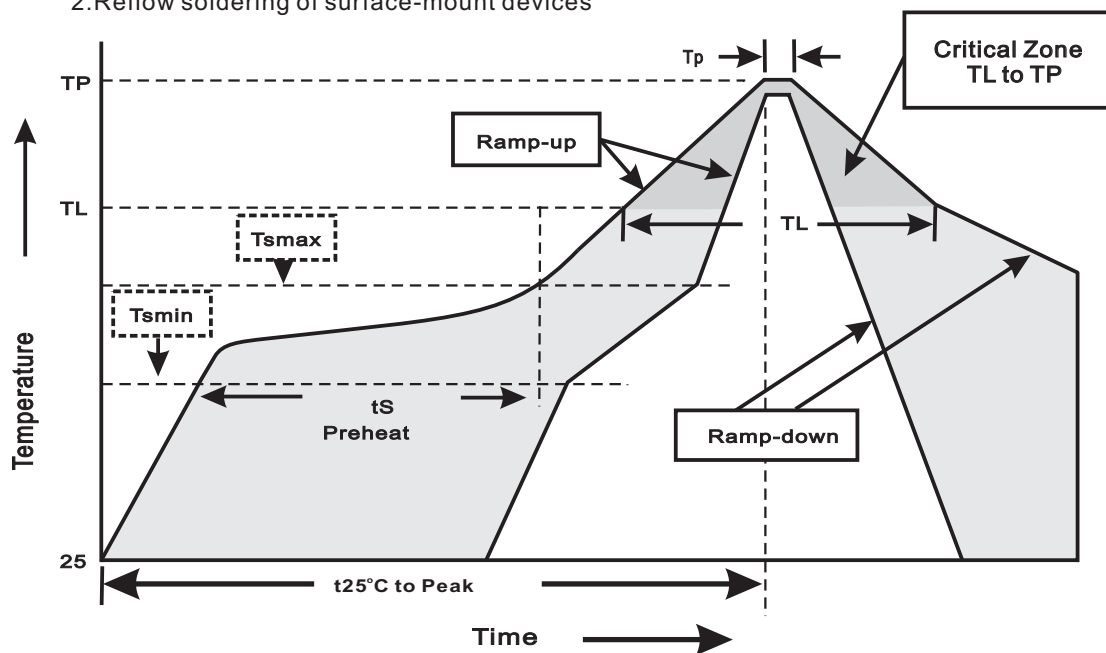
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Reel packing

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-23	7"	3000	4.0	30,000	183*183*123	178	383*262*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 _L to T _P)	<3°C/sec
Preheat -Temperature Min(T _{min}) -Temperature Max(T _{max}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{max} 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