FMOS2302C

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FMOS2302C

20V N-Channel Enhancement Mode MOSFET

Features

- $R_{DS(ON)} \leqq 65m\Omega @ V_{GS}=4.5V$
- $R_{DS(ON)} \leqq 90m\Omega @ V_{GS}=2.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen-free part, ex.FMOS2302C-H

Applications

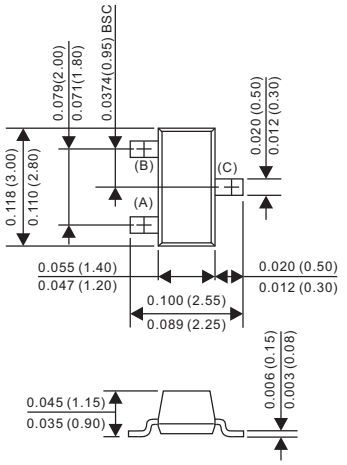
- Power management in note book
- Portable equipment
- Battery powered system
- Load switch
- DSC

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

SOT-23



Dimensions in inches and (millimeters)

Maximum ratings (AT T_A=25°C unless otherwise noted)

PARAMETER	SYMBOL	Limit	UNIT
Drain-source voltage	V_{DS}	20	V
Gate-source voltage	V_{GS}	±12	V
Continuous drain current	I_D	3.3	A
Pulsed drain current (Note 1)	I_{DM}	12	A
Drain-sourec diode forward current (Note1)	I_S	1	A
Power dissipation T_A =25°C T_A =75°C	P_D	1.25 0.75	W
Operation junction temperature range	T_J	-55 to +150	°C
Storage temperature range	T_{STG}	-55 to +150	°C
Junction-to-ambient (Note1)	$R_{\theta JA}$	100	°C/W

Note:

1.The device mounted on 1in^2 FR-4 board with 2 oz copper

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Electrical characteristics (At T_A=25°C unless otherwise noted)

PARAMETER	CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Static						
Drain-source breakdown voltage	V_{GS} = 0V, I_D= 250uA	BV_{DSS}	20			V
Zero gate voltage drain current	V_{DS} =20V, V_{GS} = 0V	I_{DSS}			1.0	μA
Gate-body leakage current	V_{GS} = ±12V, V_{DS}=0	I_{GSS}			±0.1	uA
Gate threshold voltage	V_{DS} = V_{GS}, I_D = 250uA	$V_{GS(th)}$	0.5	0.8	1.0	V
Drain-source on-state resistance	V_{GS} = 4.5V, I_D = 2.8A V_{GS} = 2.5V, I_D= 2.0A	$R_{DS(ON)}$		50 65	65 90	mΩ
Diode forward voltage	I_S=1.7A, V_{GS}=0V	V_{SD}			1.2	V
Forward transconductanec	V_{DS}=5V, I_D=4A	gfs		7		S
Dynamic (Note 2)						
Total gate charge	V_{DS}=10V, V_{GS}=4.5V, I_D=2.8A	Q_g		5.3		nC
Gate-source charge		Q_{gs}		0.8		
Gate-drain charge		Q_{gd}		1.5		
Intput capacitance	V_{DS} = 6V, V_{GS} = 0V, f=1.0MHz	C_{iss}		280		pF
Output capacitance		C_{oss}		45		
Reverse transfer capacitance		C_{rss}		40		
Turn-on delay time	V_{DD}=6V, R_L =6Ω V_{GEN}=4.5V, R_G=6Ω I_D=1A	$t_{d(on)}$		3.5		ns
Turn-on rise time		t_r		19.5		
Turn-off delay time		$t_{d(off)}$		22.8		
Turn-off fall time		t_f		24.2		

Note:

1. Pulse test; pulse width ≦ 300us, duty cycle≦ 2%.
2. Guaranteed by design, not subject to production testing.

Rating and characteristic curves (FMOS2302C)

Fig-1. Output Characteristics

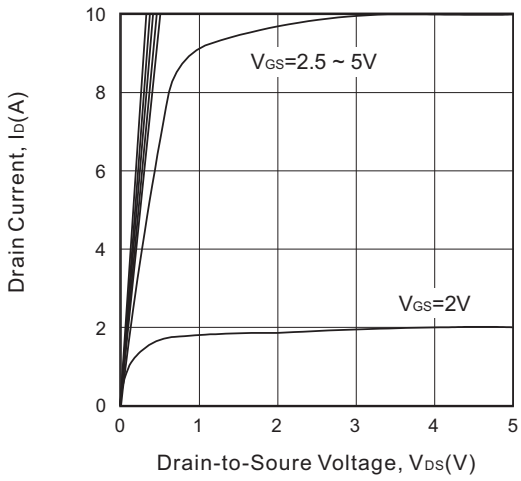


Fig-2.Transfer Characteristics

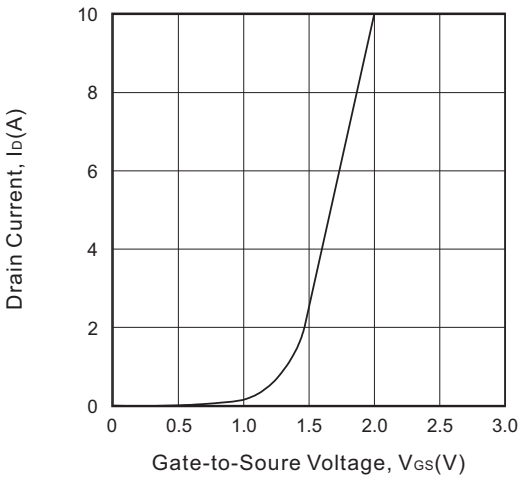


Fig-3.On-Resistance vs. Drain Current

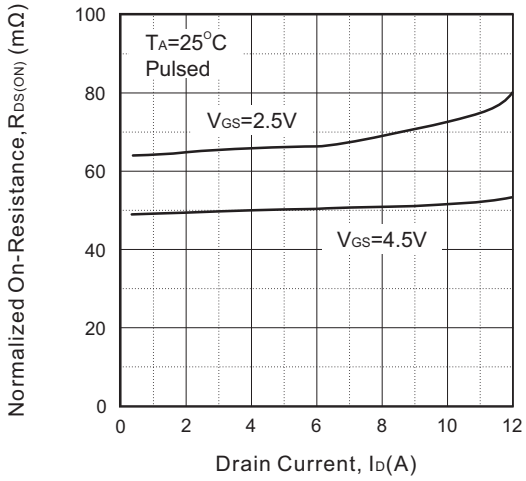


Fig-4.On-Resistance vs. Gate-to-Source Voltage

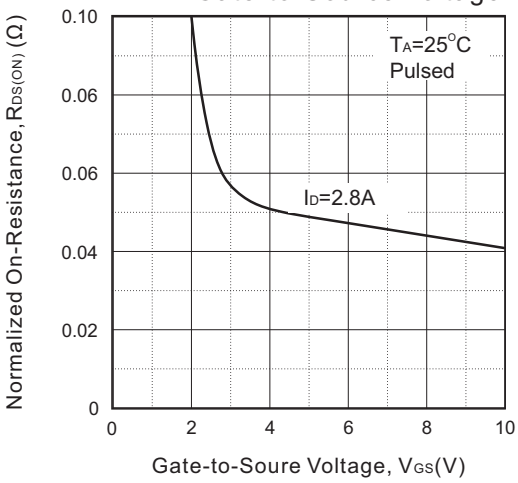
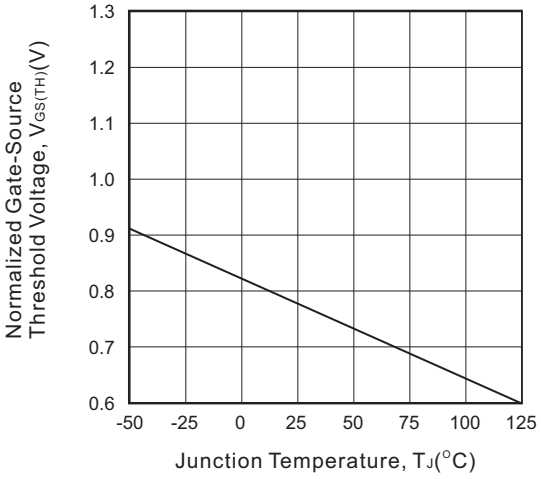


Fig-5. Gate Threshold Variation with Temperature



Rating and characteristic curves (FMOS2302C)

Fig-6. Maximum Safe Operating Area

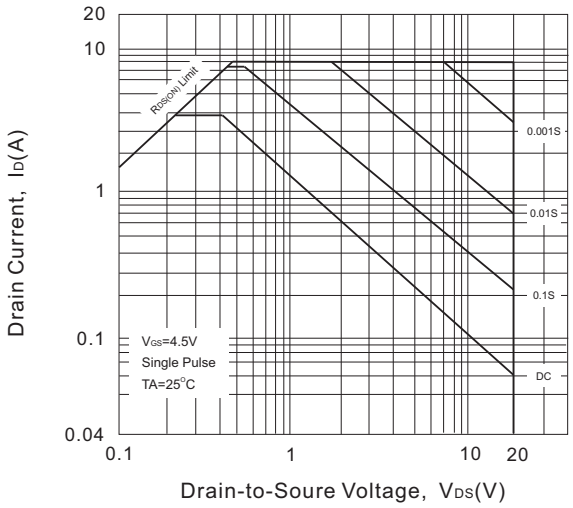


Fig-7. Body Diode Forward Voltage Variation with Source Current

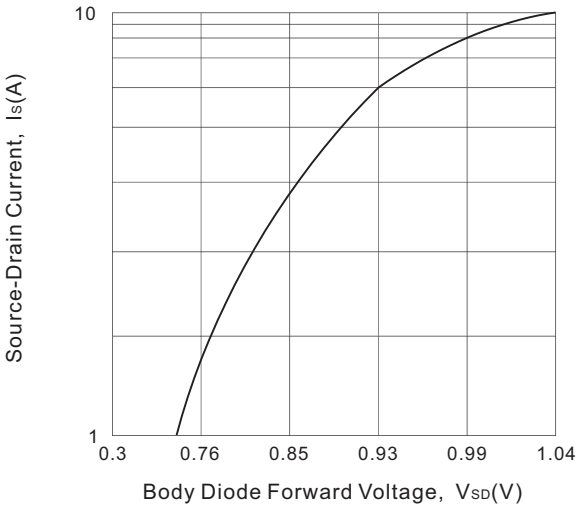
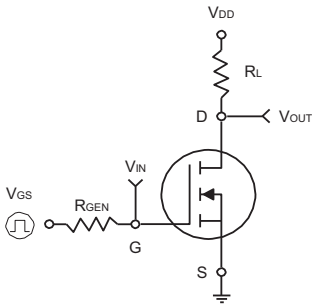


Fig-8. Switching Test Circuit and Switching Waveforms



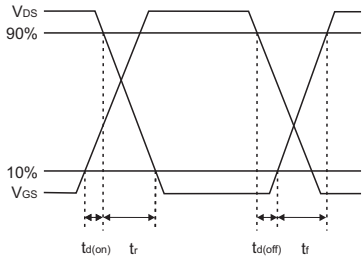
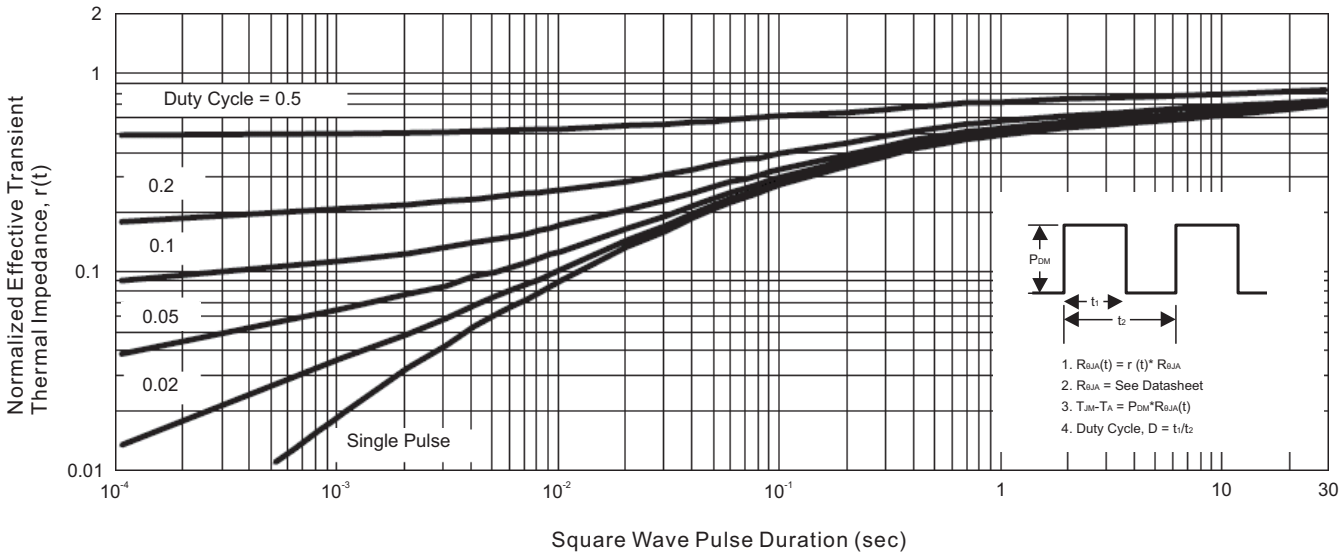


Fig-9. Normalized thermal Transient Impedance Curve



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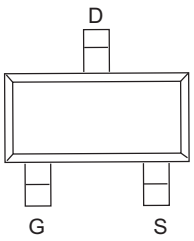
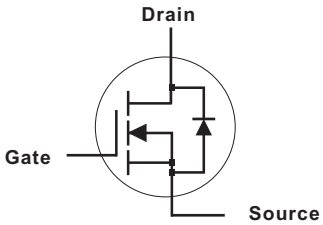
Pinning information

Pin	Simplified outline	Symbol
PinD Drain PinG Gate PinS Source		

Marking

Type number	Marking code
FMOS2302C	A2SHB, S2, 2302

Suggested solder pad layout

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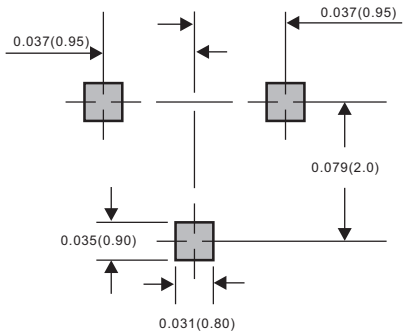

Dimensions in inches and (millimeters)

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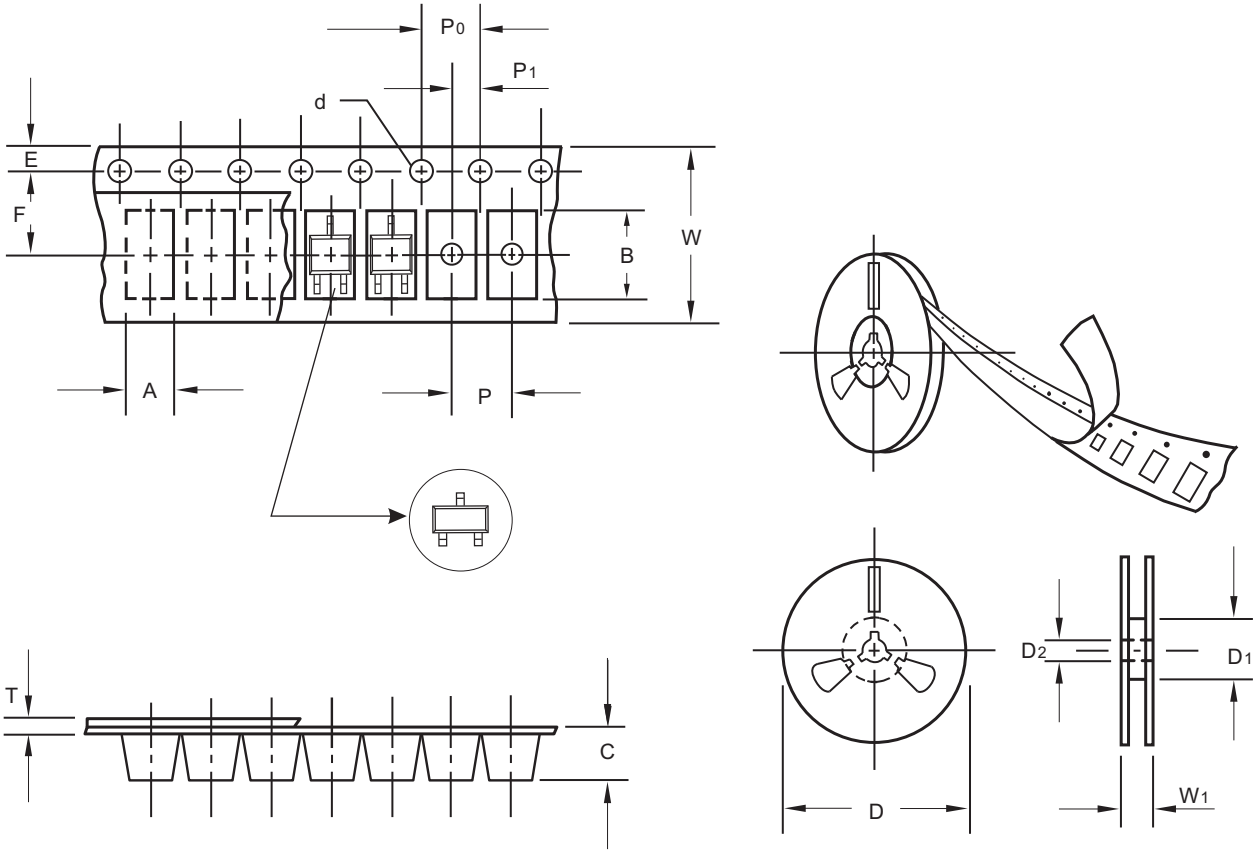
Packing information



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	D_1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D_1	min	55.00
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	12.0

Note:Devices are packed in accor dance with EIA standar RS-481-A and specifications listed above.

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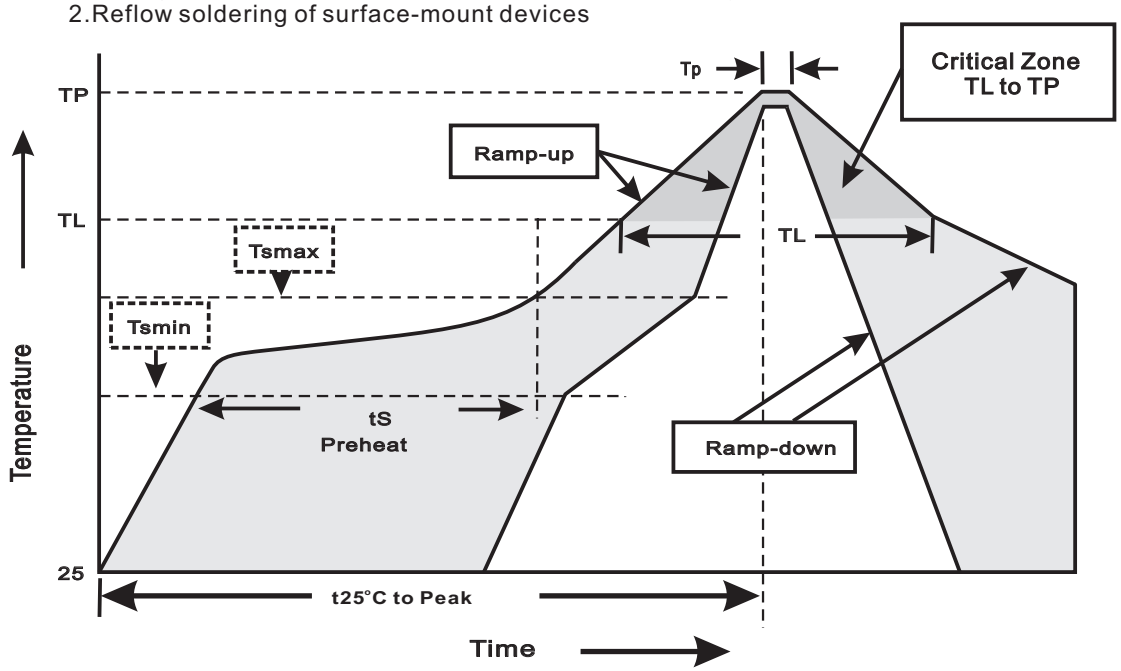
Reel packing

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"	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_L to T_P)	<3°C/sec
Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(t_s)	 150°C 200°C 60~120sec
Tsmax 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