List

FMOS2302A1

3A, 20V N-Channel Enhancement Mode Field Effect Transistor

Features

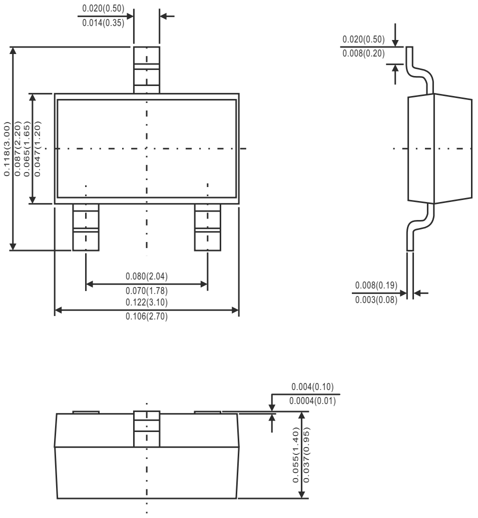
- V_{DS} = 20V, I_D=3A.
- $R_{DS(ON)} \leq$ 60mΩ, @V_{GS} = 4.5V.
- $R_{DS(ON)} \leq$ 115mΩ, @V_{GS} = 2.5V.
- Lead free product is acquired.
- We declare that the material of product compliance with RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.FMOS2302A1-H.

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

SOT-23



Dimensions in inches and (millimeters)

Maximum ratings (T_C=25°C unless otherwise noted)

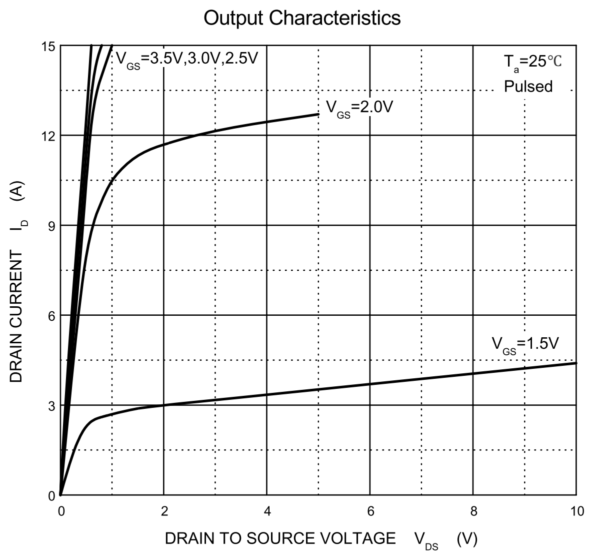
Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	20	V
Gate-source voltage	V_{GS}	±8	V
Continuous drain current [A] (T_C=25℃)	I_D	3	A
Continuous source-drain diode current	I_S	0.6	A
Power dissipation (T_A=25℃)	P_D	0.35	W
Thermal resistance form junction to ambient (t ≤ 5s)	$R_{\theta JA}$	357	℃/W
Operating Junction temperature range	T_j	+150	℃
Storage temperature range	T_{STG}	-55 to +150	℃

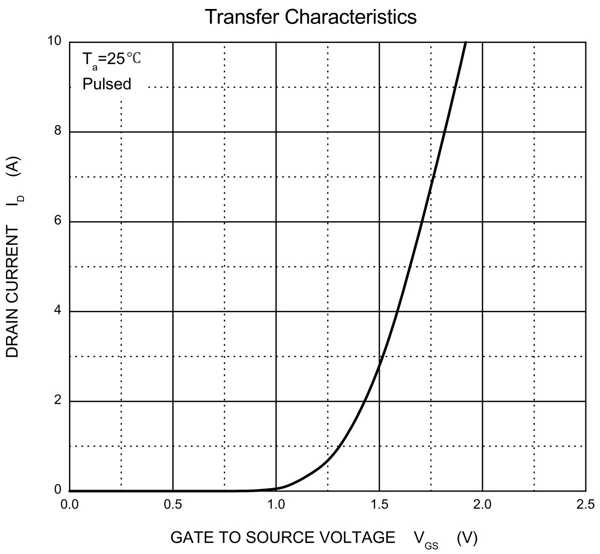
Electrical characteristics (At T_j=25°C unless otherwise specified)

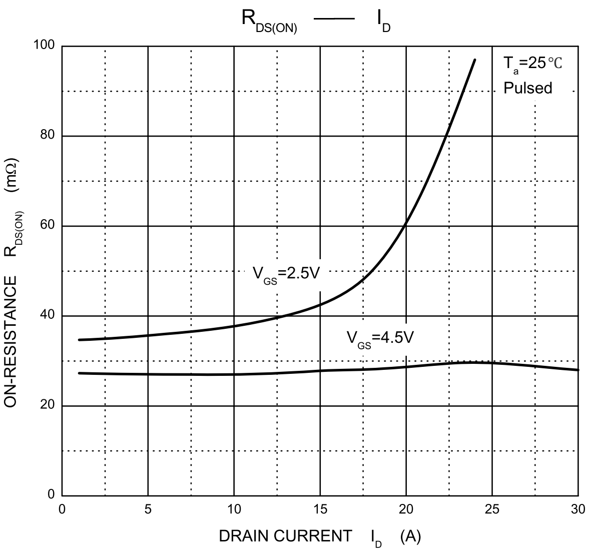
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	I_D=10μA, V_{GS}=0V	20			V
Drain-source leakage current	I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	μA
Gate-source leakage current	I_{GSS}	V_{GS}=±8V, V_{DS}=0V			±100	nA
On characteristics						
Gate threshold voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=50μA	0.65	0.95	1.2	V
Static drain-source on-resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=3.6A		45	60	mΩ
		V_{GS}=2.5V, I_D=3.1A		70	115	
Dynamic Parameters						
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=10V, f=1.0MHZ		300		pF
Output capacitance	C_{oss}			120		
Reverse transfer capacitance	C_{rss}			80		
Gate resistance	R_g	f = 1MHz		6.0		Ω
Switching parameters						
Total gate charge	Q_g	V_{GS}=4.5V, V_{DS}=10V, I_D=3.6A		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_{DS}=10V, V_{GS}=4.5V, I_D=3.6A R_G=6Ω, R_L=5.5Ω		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						
Drain - source diode forward voltage (Note 1)	V_{SD}	V_{DS}=0V, I_D=0.94A		0.76	1.2	V

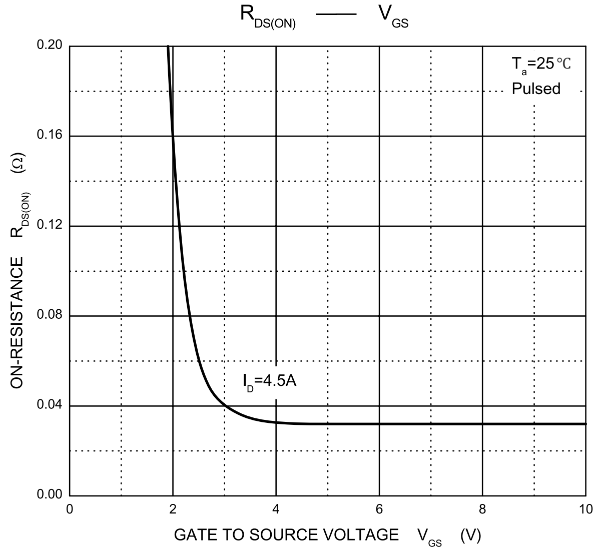
Note : 1.Pulse Test : pulse width ≤ 300μs, Duty cycle ≤ 2%.
2.These parameters have no way to verify.

Typical Performance Characteristics (FMOS2302A1)

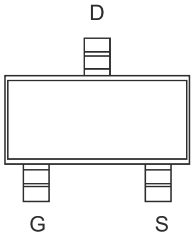
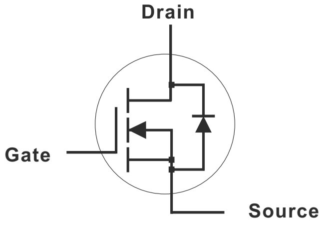








Pinning information

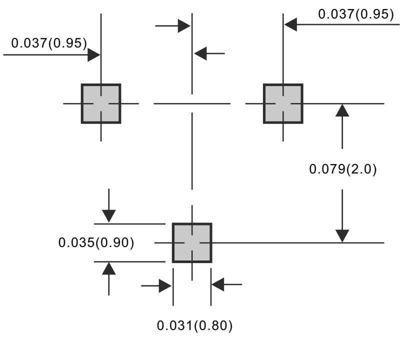
Pin	Simplified outline	Symbol
PinD Drain PinG Gate PinS Source		

Marking

Type number	Marking Code
FMOS2302A1	2302

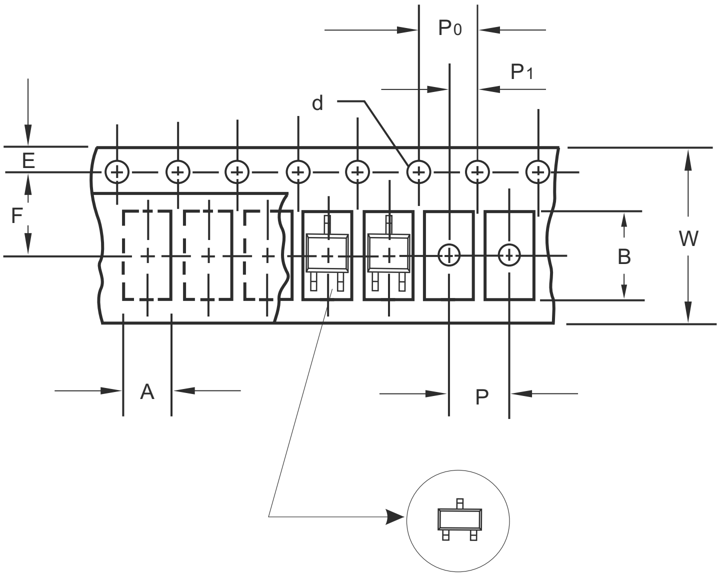
Suggested solder pad layout

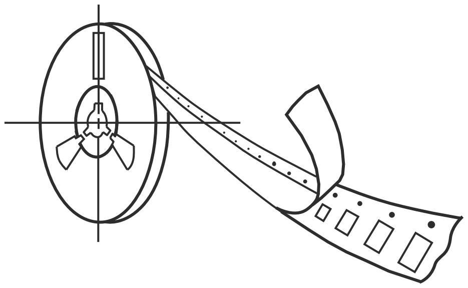
SOT-23

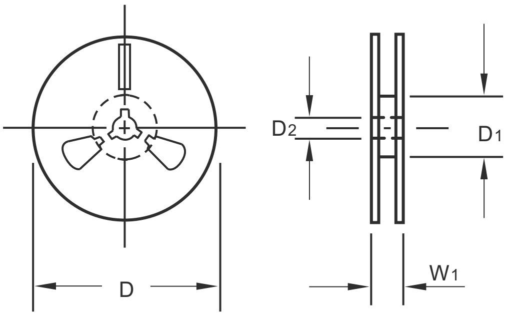


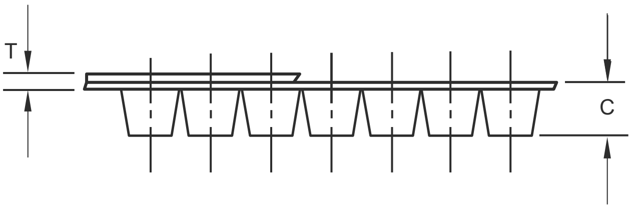
Dimensions in inches and (millimeters)

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	54.40
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 accor dance with EIA standar RS-481-A and specifications listed above.

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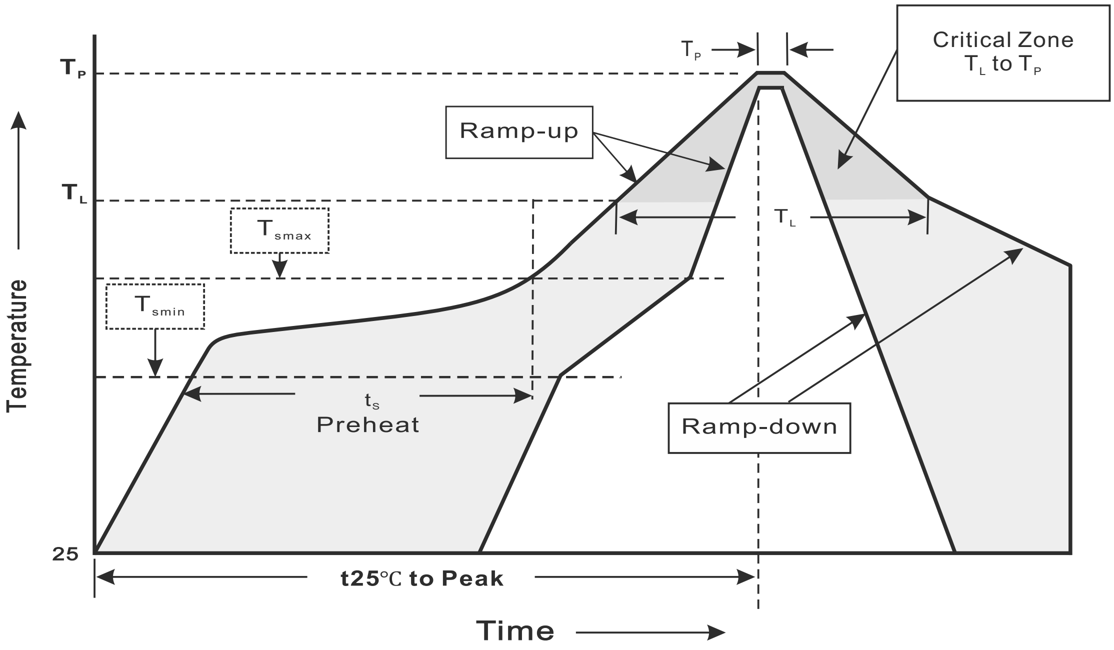
Reel packing

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℃~40℃ Humidity=55%±25%
2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile feature	Soldering Condition
Average ramp-up rate (T_L toT_P)	< 3℃/sec
Prehaeat -Temperature Min (T_{smin}) -Temperature Max (T_{smax}) -Time (min to max) (t_S)	150℃ 200℃ 60 ~120sec
T_{smax} to T_L -Ramp-up rate	< 3℃/sec
Time maintained above: -Temperature (T_L) -Time(T_L)	217℃ 60 ~ 260 sec
Peak Temperature(T_P)	255℃ -0/+5℃
Time within 5℃ of actual peak Temperature(T_P)	10 ~ 30sec
Ramp-down rate	< 6℃/sec
Time 25℃ to peak temperature	< 6 minutes