FMOS2304-Q1-H

List

FMOS2304-Q1-H

3.3A 30V N-Channel Enhancement Mode Trench MOSFET

Features

- TrenchFET power MOSFET.
- Qualified to AEC-Q101 standards for high reliability.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21) .

Applications

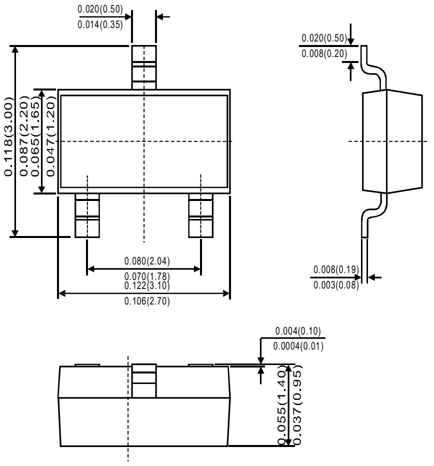
- Load switch for portable devices.
- DC/DC converter.

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.

Package outline

SOT-23



Dimensions in inches and (millimeters)

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

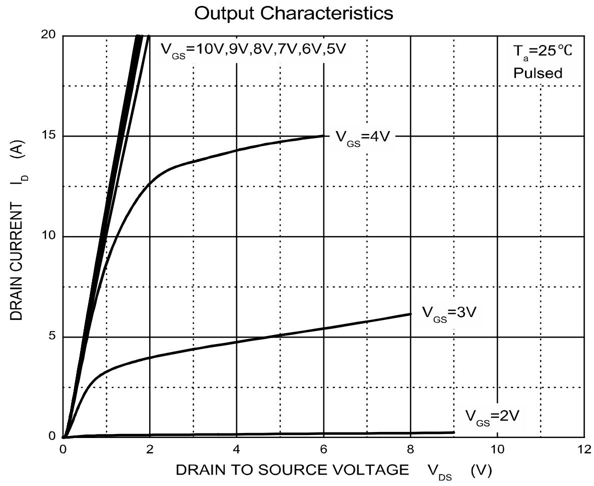
Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	30	V
Gate-source voltage	V_{GS}	±20	V
Continuous drain current	I_D	3.3	V
Pulsed drain current	I_{DM}	15	A
Continuous source-drain diode current	I_B	0.9	mA
Power dissipation	P_D	0.35	mW
Thermal resistance, junction to ambient (t ≤ 5s)	$R_{\Theta JA}$	357	℃/W
Junction temperature	T_J	+150	℃
Storage temperature range	T_{STG}	-55 to +150	℃

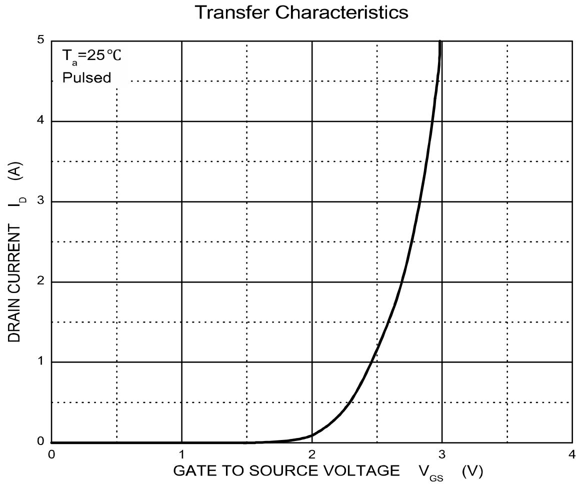
Electrical characteristics (At T_A=25°C unless otherwise noted)

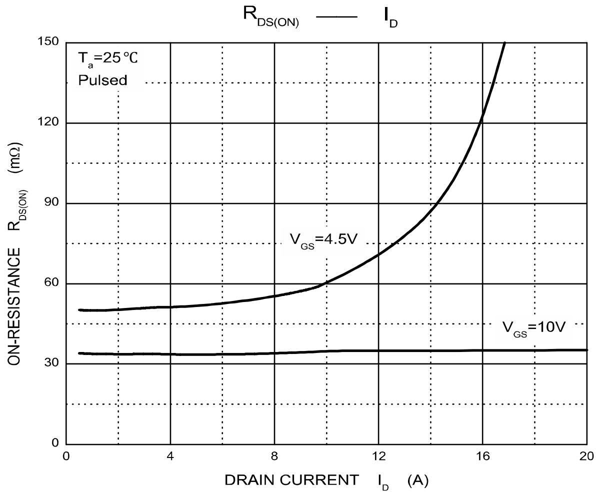
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	30			V
Drain-source leakage current	I_{DSS}	V_{DS} = 30V, V_{GS}=0V			1	μA
Gate-source leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
On characteristics						
Gate threshold voltage	$V_{GS(TH)}$	V_{DS} = V_{GS}, I_D = 250μA	1.2		2.2	V
Forward trans conductance (Note1)	g_{FS}	V_{DS} = 4.5V, I_D = 2.5A	2.5			S
Static drain-source on-resistance (Note1)	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 3.2A		49	60	mΩ
		V_{GS} = 4.5V, I_D = 2.8A		61	75	mΩ
Dynamic parameters (Note2)						
Input capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1.0MHZ		235		pF
Out capacitance	C_{oss}			45		
Reverse transfer capacitance	C_{rss}			17		
Switching parameters						
Turn-on delay time	$t_{d(on)}$	V_{DD} = 15V, V_{GEN} = 4.5V, R_G=1 Ω, R_L = 5.6Ω, I_D ≈ 2.7A		12	20	ns
Rise time	t_r			50	75	
Turn-off delay time	$t_{d(off)}$			12	20	
Fall time	t_f			22	35	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 15V, V_{GEN} = 10V, R_G = 1 Ω, R_L = 5.6Ω, I_D ≈ 2.7A		5	10	ns
Rise time	t_r			12	20	
Turn-off delay time	$t_{d(off)}$			10	15	
Fall time	t_f			5	10	
Gate resistance	R_g	f = 1MHz	0.8	4.4	8.8	Ω
Total gate charge	Q_g	V_{DS} = 15V, I_D = 3.4A, V_{GS} = 10V		4.5	6.7	nC
		V_{DS} = 15V, I_D = 3.4A, V_{GS} = 4.5V		2.1	3.2	
Gate source charge	Q_{gs}			0.85		
Gate drain charge	Q_{gd}			0.65		
Source-drain diode ratings and characteristics						
Maximum body-diode continuous current	I_S	T_C = 25ºC			1.4	A
Pulse diode forward current	I_{SM}				15	A
Diode forward voltage	V_{SD}	V_{GS} = 0V, I_S = 2.7A		0.8	1.2	V

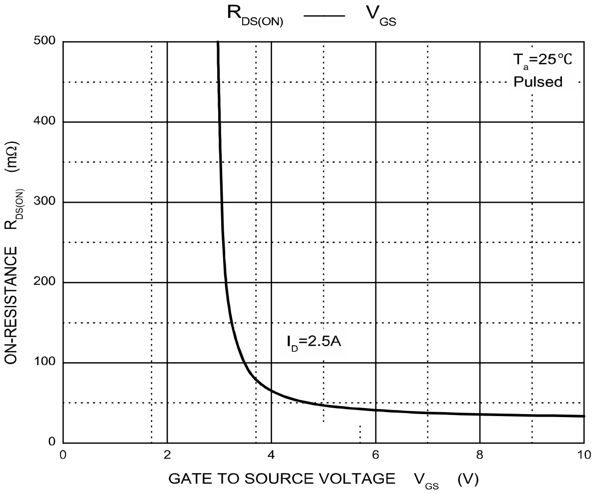
Notes :1. Pulse test : Pulse width ≤ 300μs, duty cycle ≤ 2%.
2. Guaranteed by design, not subject to production testing.

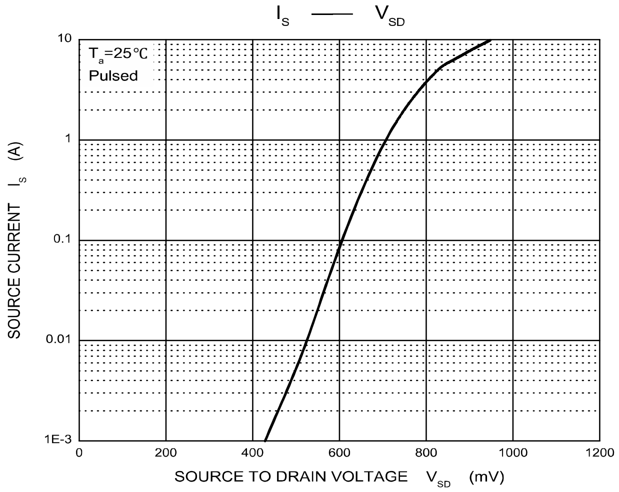
Rating and characteristic curves





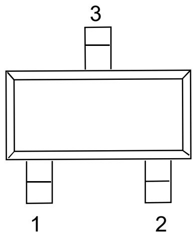
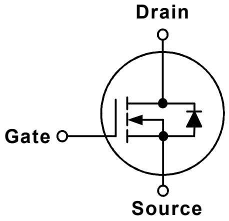






FMOS2304-Q1-H

Pinning information

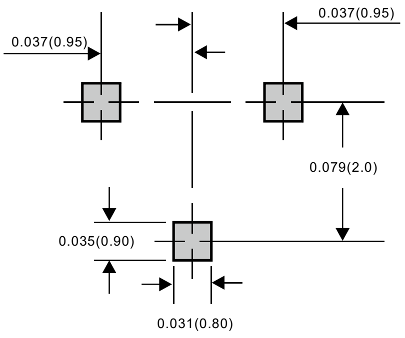
Pin	Simplified outline	Symbol
Pin 1 Gate Pin 2 Source Pin 3 Drain		

Marking

Type number	Marking Code
FMOS2304-Q1-H	2304

Suggested solder pad layout

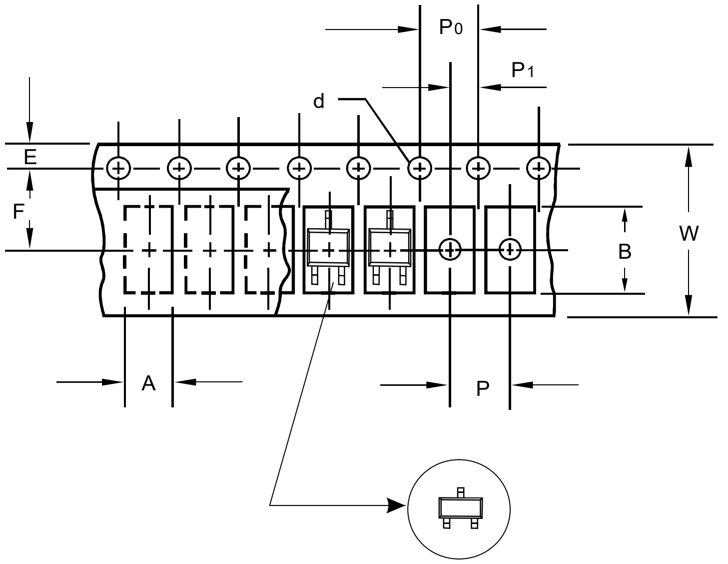
SOT-23

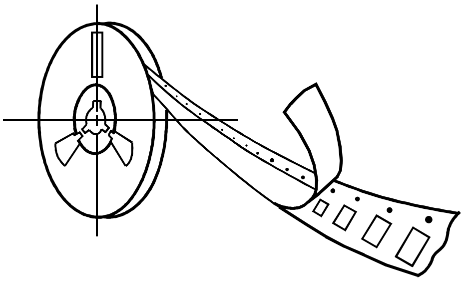


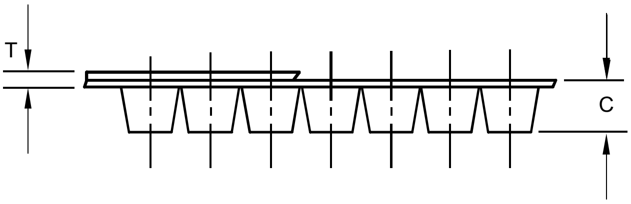
Dimensions in inches and (millimeters)

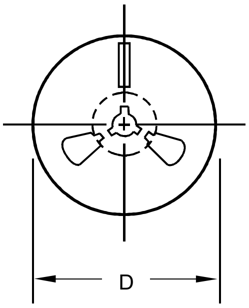
FMOS2304-Q1-H

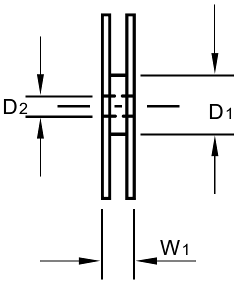
Packing information











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

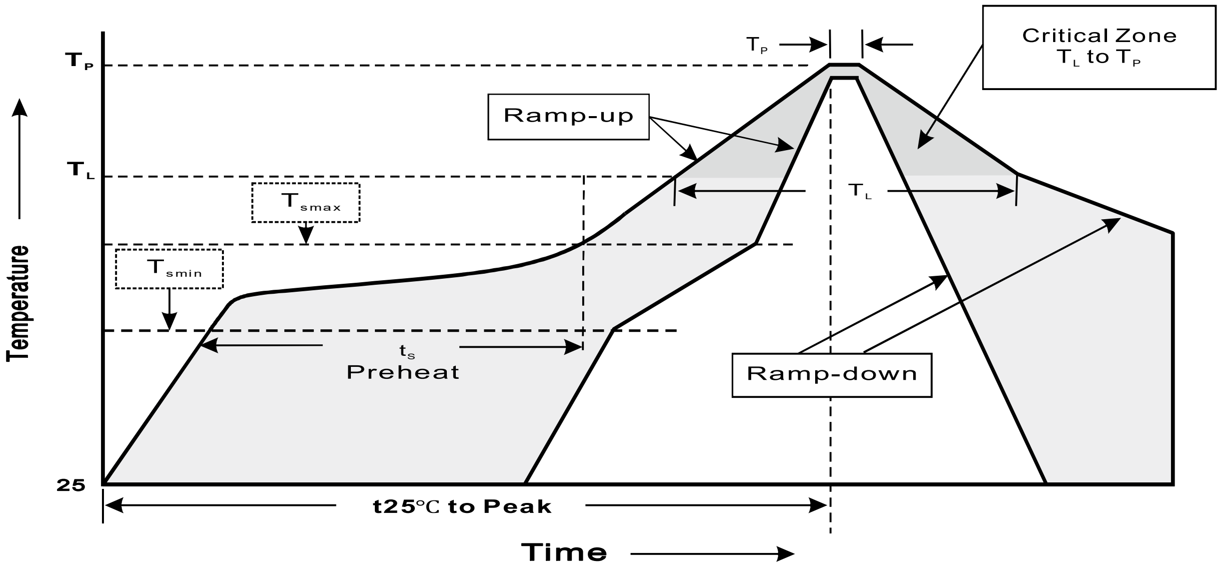
Note:Devices are packed in accor dance with EIA standar RS-481-A and specifications listed above.

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 to T_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

High reliability test capabilities

Item Test	Conditions	Reference
1. MSL Preconditioning	24hr bake@125°C+168hrs@85°C /85%RH+3xIR@260°C+1flux immersion+alcohol+DI H2O rinse	JESD22-A113
2. High Temperature Reverse Bias	V_{DS}=V_{DS}*80% (T_J=T_J max.)Test Duration:1000hrs	JESD22-A108
3. High Temperature Storage Life	Ta=150°C Test Duration:1000hrs	JESD22 A-103
4. Temperature Cycle	-55°C(15min) to 150°C(15min)Test Cycles:1000cycles	JESD22 A-104
5. Autoclave	P=2atm Ta=121°C RH=100% Test Duration:96hrs	JESD22 A-102
6. Solderability	245±5°C for 5sec	J-STD-002
7. Moisture Resistance	Ta=85°C/85% Relative humidity Test Duration:1000hrs	MIL-STD-750E METHOD 1021.2
8. Resistance To Solder Heat	260±5°C for 10sec	JESD22 B-106
9. High Temperature High Humidity Reverse Bias	Ta=85°C, 85%RH, V_{DS}=80% ratedV_{DS} Test Duration: 1000hrs	JESD22-A101