

P-Channel MOSFET MEM2301XG-N

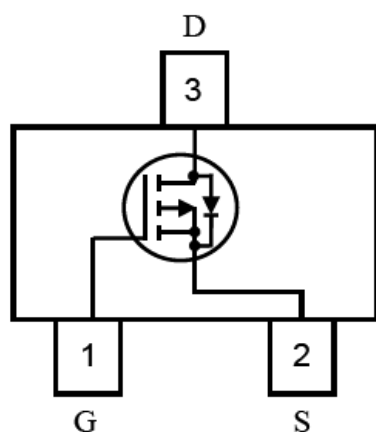
General Description

MEM2301XG-N Series P-channel enhancement mode field-effect transistor, These miniature surface mount MOSFETs utilize High Cell Density process. Low RDS(ON) assures minimal power loss and conserves energy, making this device ideal for use in power management circuitry. Typical applications are lower voltage application, power management in portable and battery-powered products such as computers, printers, and PCMCIA cards, cellular and cordless telephones.

Features

- -20V/-2.8A
RDS(ON), Vgs@-1.8V, Ids@-1.1A = 230mΩ
RDS(ON), Vgs@-2.5V, Ids@-2.0A = 140mΩ
RDS(ON), Vgs@-4.5V, Ids@-3.1A = 96mΩ
- High Density Cell Design For Ultra Low On-Resistance
- Fast switching speed
- High performance trench technology
- Low thermal impedance copper lead frame
- Subminiature surface mount package:SOT23

Pin Configuration



Typical Application

- Power management
- Load switch
- Battery protection

Absolute Maximum Ratings (TA = 25°C unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V _{DSS}	-20	V
Gate-Source Voltage	V _{GSS}	±12	V
Continuous Drain Current	I _D	-2.8	A
Pulsed Drain Current ^{1,2}	I _{DM}	-17	A
Total Power Dissipation	P _D	T _A =25°C	1.4
		T _A =70°C	0.8
Operating Temperature Range	T _{Opr}	-55~150	°C
Storage Temperature Range	T _{stg}	-55~150	°C

Thermal Characteristics

Parameter	Symbol	MAX.	Unit
Thermal Resistance, Junction-to-Ambient ³	R _{θJA}	90	°C/W

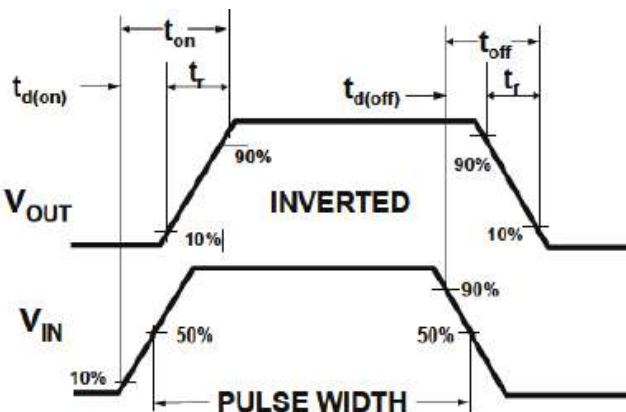
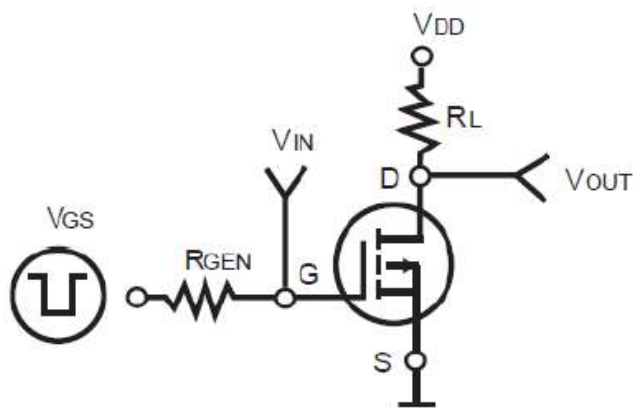
Electrical Characteristics

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	-20	-23	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	-0.4	-0.72	-1.1	V
Gate-Body Leakage	I_{GSS}	$V_{DS}=0V, V_{GS}=12V$	-	-	100	nA
		$V_{DS}=0V, V_{GS}=-12V$	-	-	-100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-20V, V_{GS}=0V$ $T_J=25^\circ C$	-	-	-1.0	μA
		$V_{DS}=-16V, V_{GS}=0V$ $T_J=55^\circ C$	-	-	-10	μA
Static Drain-Source On-Resistance	$R_{DS(ON)1}$	$V_{GS}=-1.8V, I_D=-1.1A$	-	230	260	m Ω
	$R_{DS(ON)2}$	$V_{GS}=-2.5V, I_D=-2.0A$	-	140	170	m Ω
	$R_{DS(ON)3}$	$V_{GS}=-4.5V, I_D=-2.8A$	-	98	130	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-1A$	3	5	-	S
Max. Diode Forward Current	I_S		-	-	-2.8	A
Source-drain (diode forward) voltage	V_{SD}	$V_{GS}=0V, I_S=-2.8A$	-	-0.82	-1.2	V
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = -10V,$ $V_{GS} = 0V,$ $f = 1\text{ MHz}$	-	320	-	pF
Output Capacitance	C_{oss}		-	60	-	
Reverse Transfer Capacitance	C_{rss}		-	35	-	
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = -10V,$ $I_D = -2.8A,$ $V_{GS} = -4.5V,$ $R_g = 6\Omega$	-	11	-	ns
Rise Time	t_r		-	5	-	
Turn-Off Delay Time	$t_{d(off)}$		-	22	-	
Fall-Time	t_f		-	8	-	
Total Gate Charge	Q_g	$V_{DS} = -10V,$ $V_{GS} = -4.5V,$ $I_D = -2.0A$	-	3.2	-	nC
Gate-Source Charge	Q_{gs}		-	0.6	-	
Gate-Drain Charge	Q_{gd}		-	0.9	-	

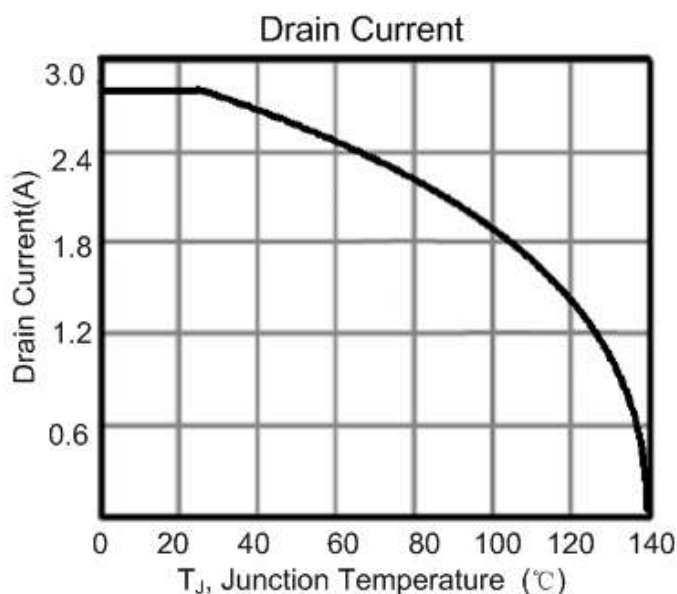
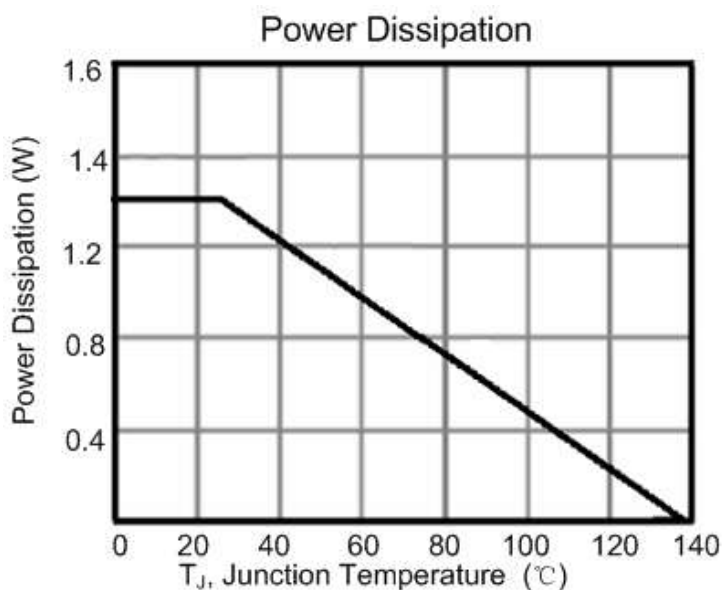
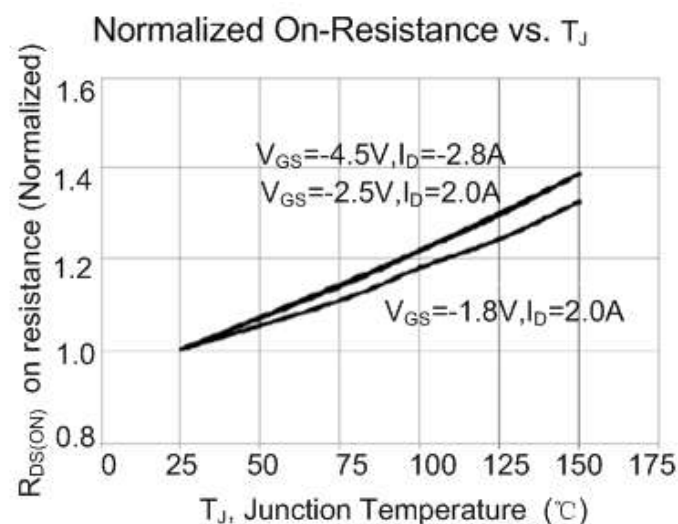
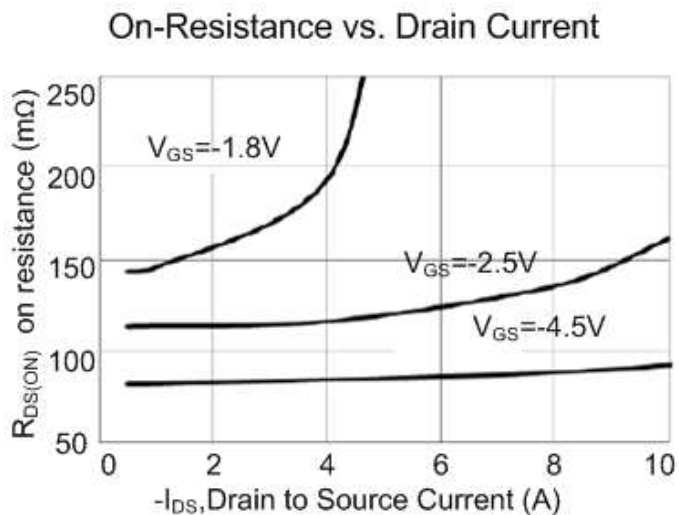
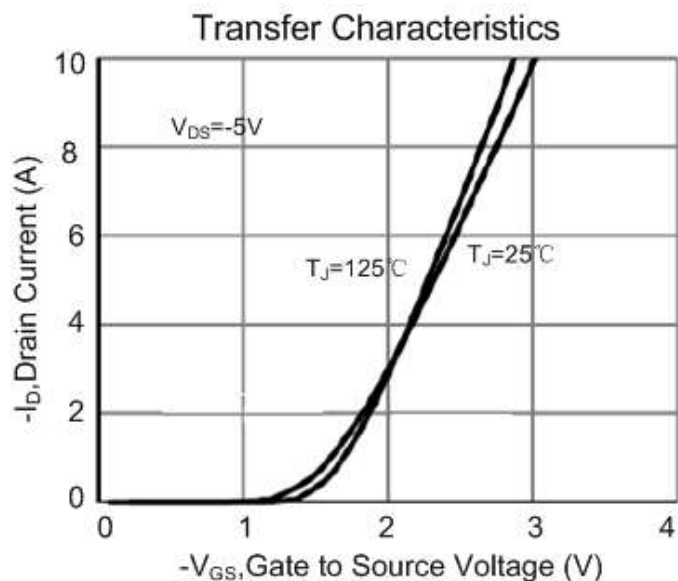
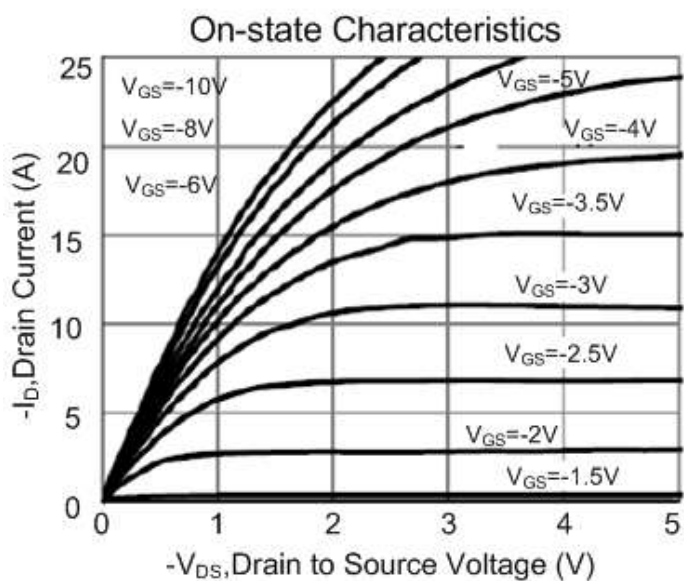
1、Pulse width limited by maximum junction temperature.

2、Pulse test: PW $\leq 300\mu s$ duty cycle $\leq 2\%$.

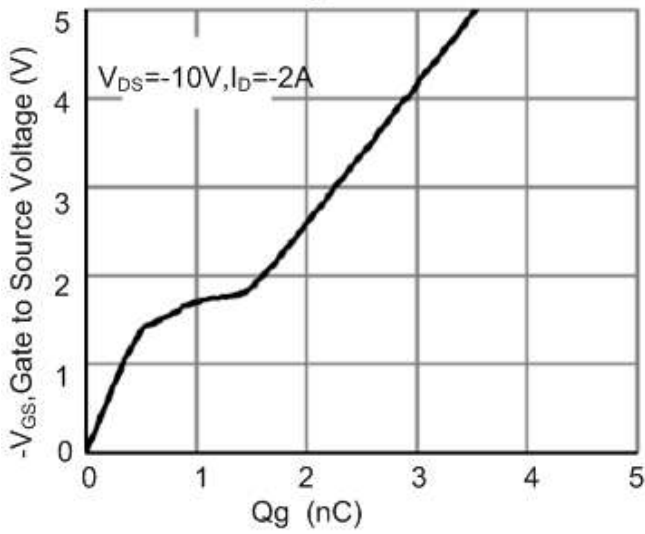
3、Surface Mounted on FR4 Board, $t \leq 5\text{ sec}$.



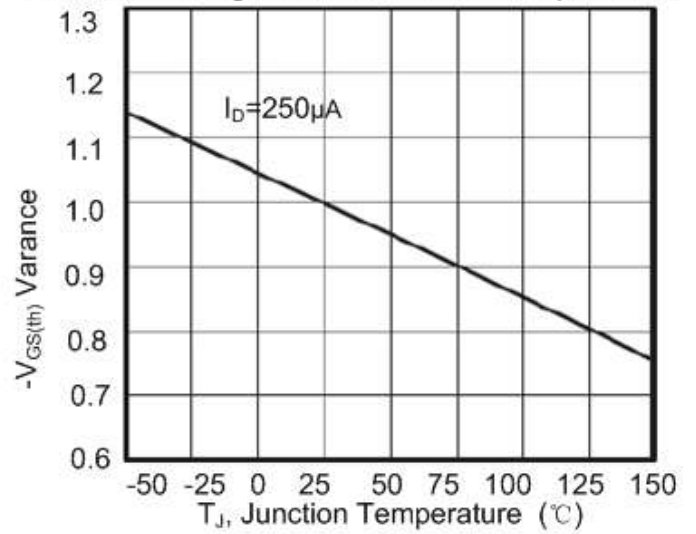
Typical Performance Characteristics



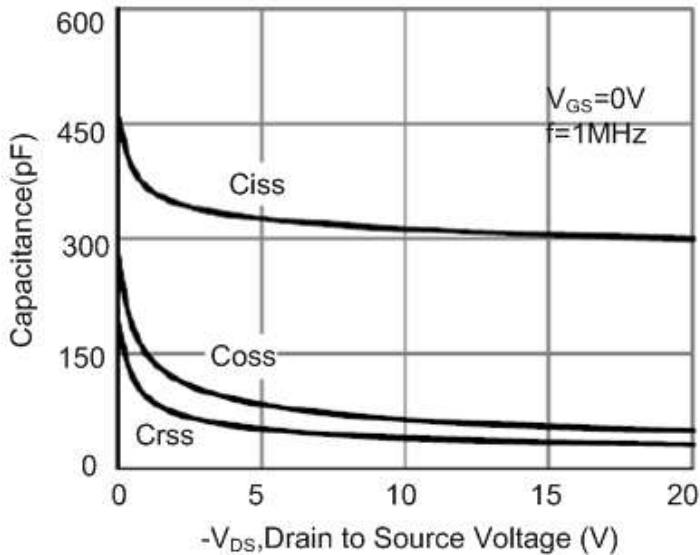
Gate Charge Characteristics



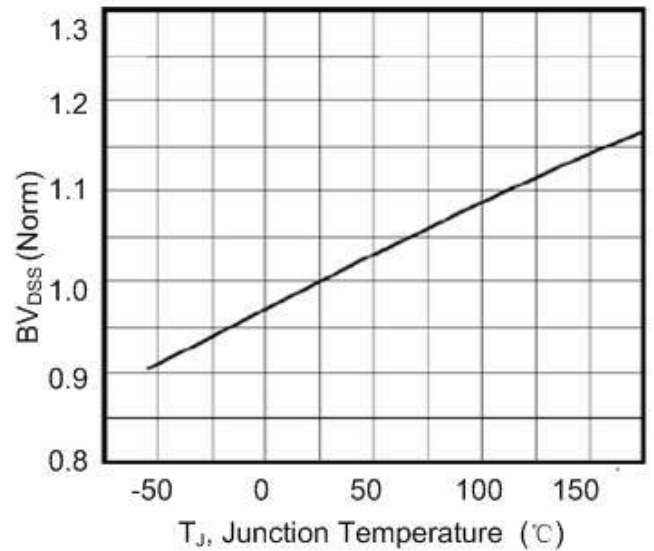
Threshold Voltage Variation with Temperature



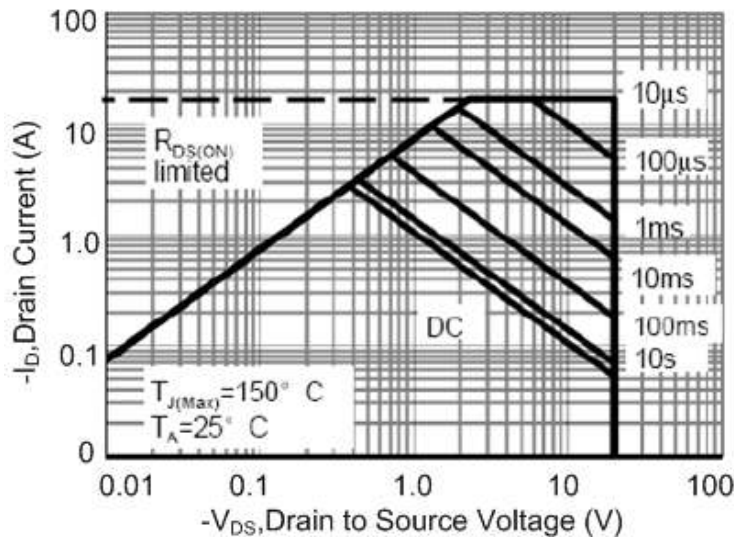
Capacitance vs. Drain-Source Voltage



Max. BV_{DSS} with Temperature

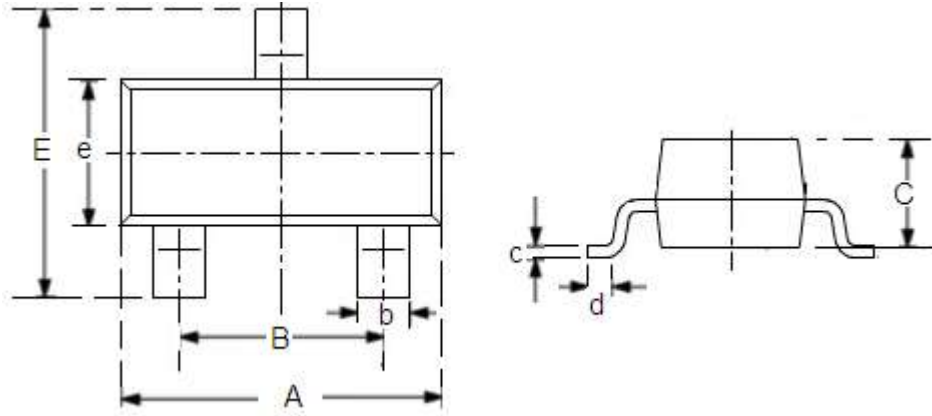


Maximum Safe Operation Area



Package Information

Package Type:SOT23 Unit:mm(inch)



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	2.7	3.1	0.1063	0.122
B	1.7	2.1	0.0669	0.0827
b	0.35	0.5	0.0138	0.0197
C	1.0	1.2	0.0394	0.0472
c	0.1	0.25	0.0039	0.0098
d	0.2	-	0.0079	-
E	2.1	2.64	0.0827	0.1039
e	1.2	1.4	0.0472	0.0551

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