

Single P-channel MOSFET

ELM4P2301FCA-S

<https://www.elm-tech.com>

■General description

ELM4P2301FCA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage.

■特長

- $V_{ds} = -20V$
- $I_d = -3.3A$ ($V_{gs} = -4.5V$)
- $R_{ds(on)} = 100m\Omega$ ($V_{gs} = -4.5V$)
- $R_{ds(on)} = 135m\Omega$ ($V_{gs} = -2.5V$)
- $R_{ds(on)} = 240m\Omega$ ($V_{gs} = -1.8V$)

■Maximum absolute ratings

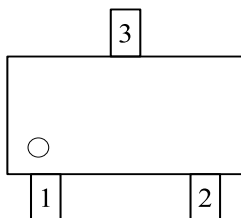
Parameter	Symbol	Limit	Unit	Note
Drain-source voltage	V_{ds}	-20	V	
Gate-source voltage	V_{gs}	± 12	V	
Continuous drain current ($V_{gs} = -4.5V$)	I_d	$T_a = 25^\circ C$ -3.3	A	1
		$T_a = 70^\circ C$ -2.6		
Pulsed drain current	I_{dm}	-13	A	2
Power dissipation	P_d	1.4	W	3
Junction and storage temperature range	T_j, T_{stg}	- 55 to +150	$^\circ C$	

■Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-to-ambient	$R_{\theta ja}$	-	125	$^\circ C/W$	1
Thermal resistance junction-to-ambient ($t \leq 10s$)		-	90	$^\circ C/W$	

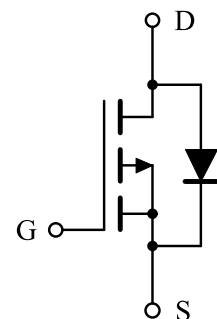
■Pin configuration

SOT-23S(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

■Circuit



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■Electrical characteristics

T_j=25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BV _{dss}	V _{gs} =0V, I _d =-250μA	-20	-	-	V	
Zero gate voltage drain current	I _{dss}	V _{ds} =-16V, V _{gs} =0V	-	-	-1	μA	
		V _{ds} =-16V, V _{gs} =0V T _j =55°C	-	-	-5		
Gate-body leakage current	I _{gss}	V _{ds} =0V, V _{gs} =±12V	-	-	±100	nA	
Gate threshold voltage	V _{gs(th)}	V _{ds} =V _{gs} , I _d =-250μA	-0.45	-0.60	-1.00	V	
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =-4.5V, I _d =-3.0A	-	76	100	mΩ	2
		V _{gs} =-2.5V, I _d =-2.0A	-	110	135		
		V _{gs} =-1.8V, I _d =-0.9A	-	160	240		
Forward transconductance	G _{fs}	V _{ds} =-5V, I _d =-3A	-	12.2	-	S	
Diode forward voltage	V _{sd}	I _s =-1A, V _{gs} =0V	-	-	-1	V	2
Max. body-diode continuous current	I _s	V _{gs} =V _{ds} =0V, Force Current	-	-	-3	A	1, 4
DYNAMIC PARAMETERS							
Input capacitance	C _{iss}	V _{gs} =0V, V _{ds} =-15V f=1MHz	-	677	-	pF	
Output capacitance	C _{oss}		-	82	-	pF	
Reverse transfer capacitance	C _{rss}		-	73	-	pF	
SWITCHING PARAMETERS							
Total gate charge (-4.5V)	Q _g	V _{gs} =-4.5V, V _{ds} =-15V I _d =-3A	-	10.1	-	nC	
Gate-source charge	Q _{gs}		-	1.21	-	nC	
Gate-drain charge	Q _{gd}		-	2.46	-	nC	
Turn-on delay time	t _{d(on)}	V _{gs} =-4.5V, V _{ds} =-10V I _d =-3A, R _{gen} =3.3Ω	-	5.6	-	ns	
Turn-on rise time	t _r		-	32.2	-	ns	
Turn-off delay time	t _{d(off)}		-	45.6	-	ns	
Turn-off fall time	t _f		-	29.2	-	ns	

NOTE :

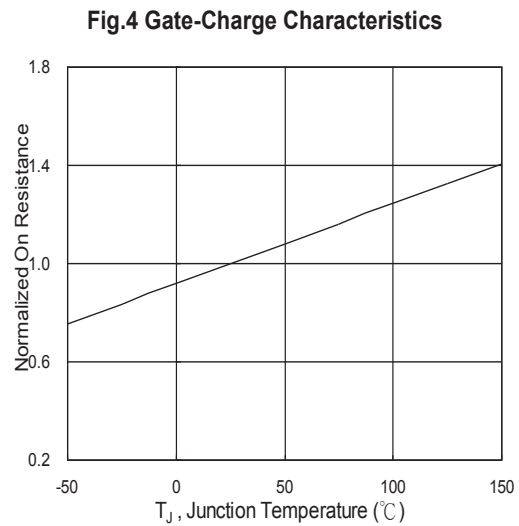
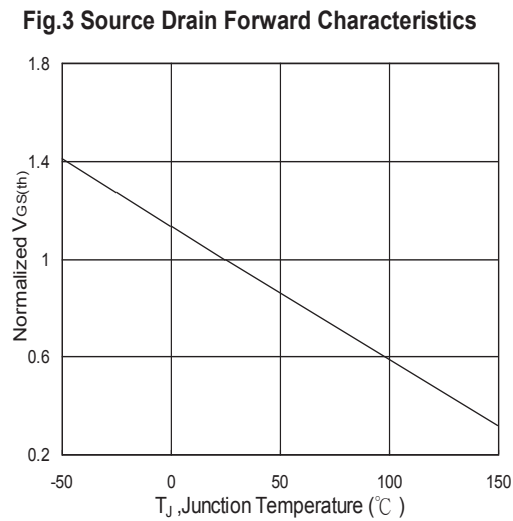
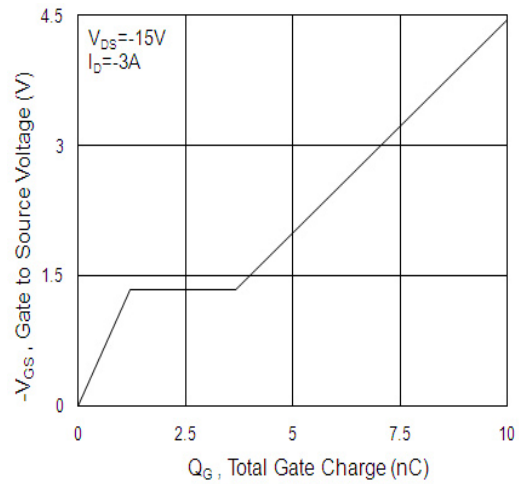
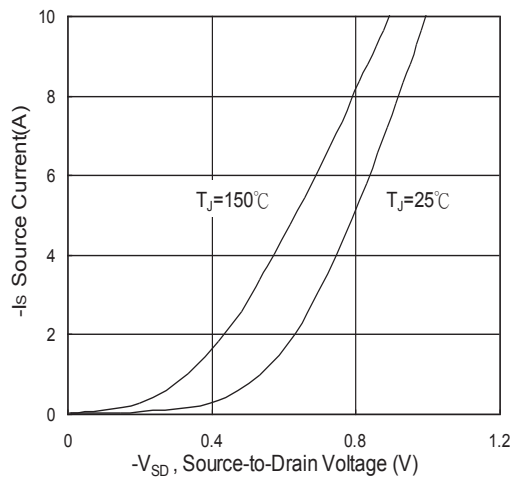
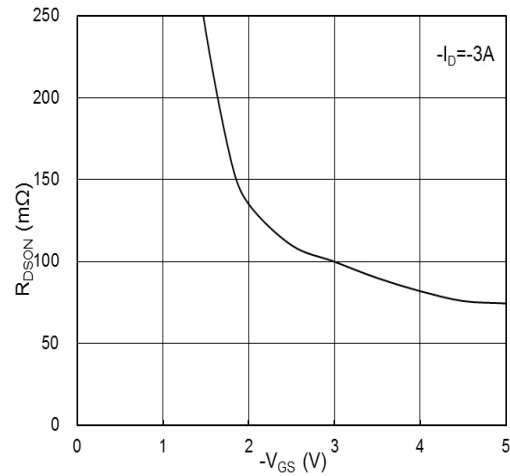
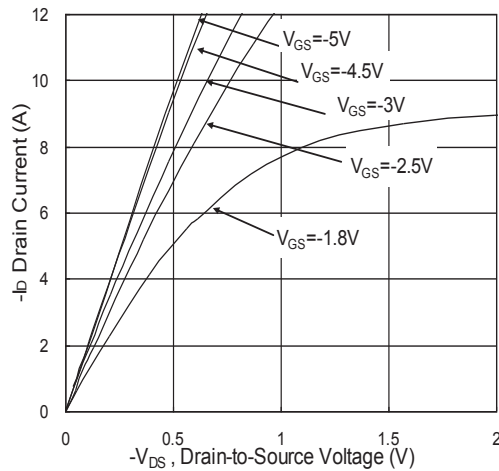
1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300μs and duty cycle ≤ 2%.
3. The power dissipation is limited by 150°C junction temperature.
4. The data is theoretically the same as I_d and I_{dm}, in real applications, should be limited by total power dissipation.

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■ Typical electrical and thermal characteristics



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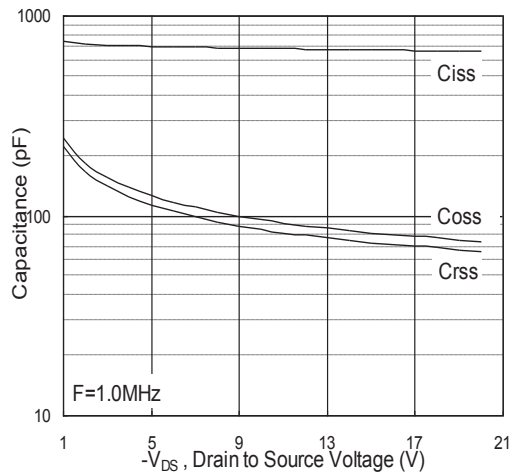


Fig.7 Capacitance

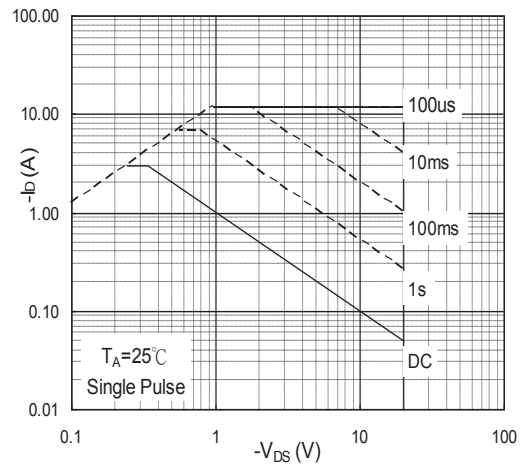


Fig.8 Safe Operating Area

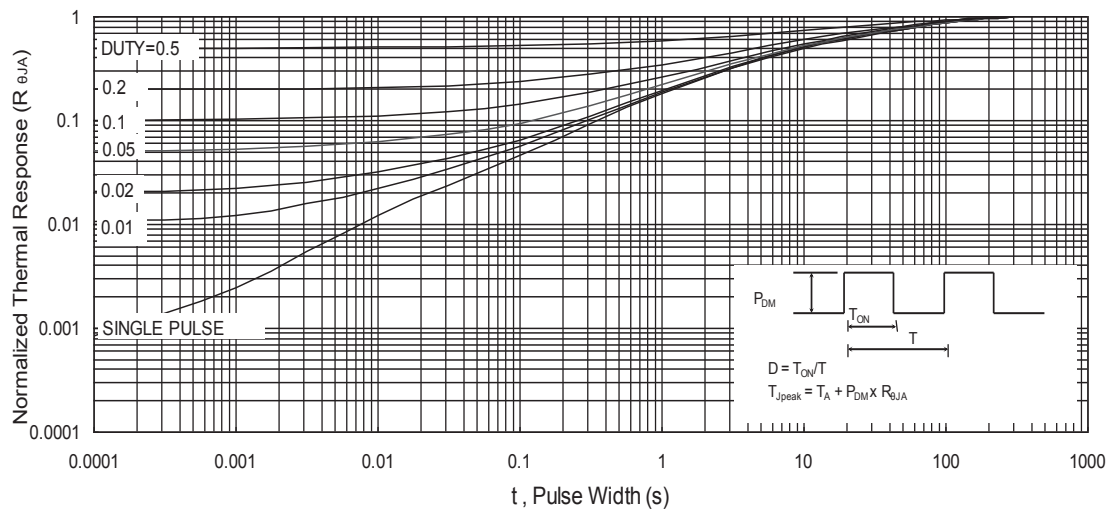


Fig.9 Normalized Maximum Transient Thermal Impedance

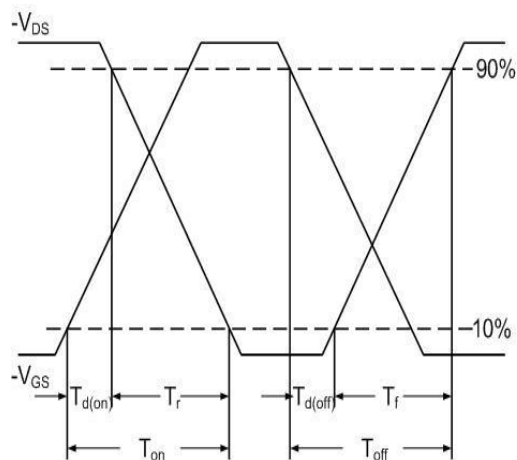


Fig.10 Switching Time Waveform

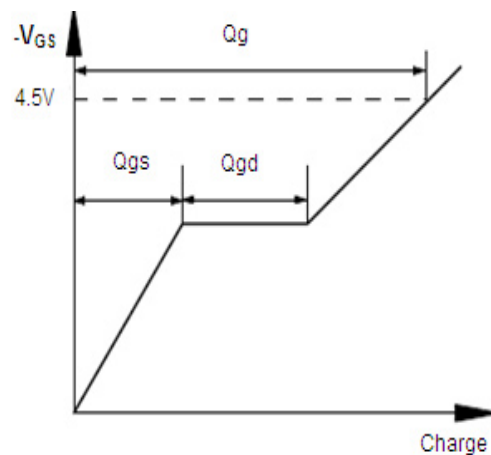


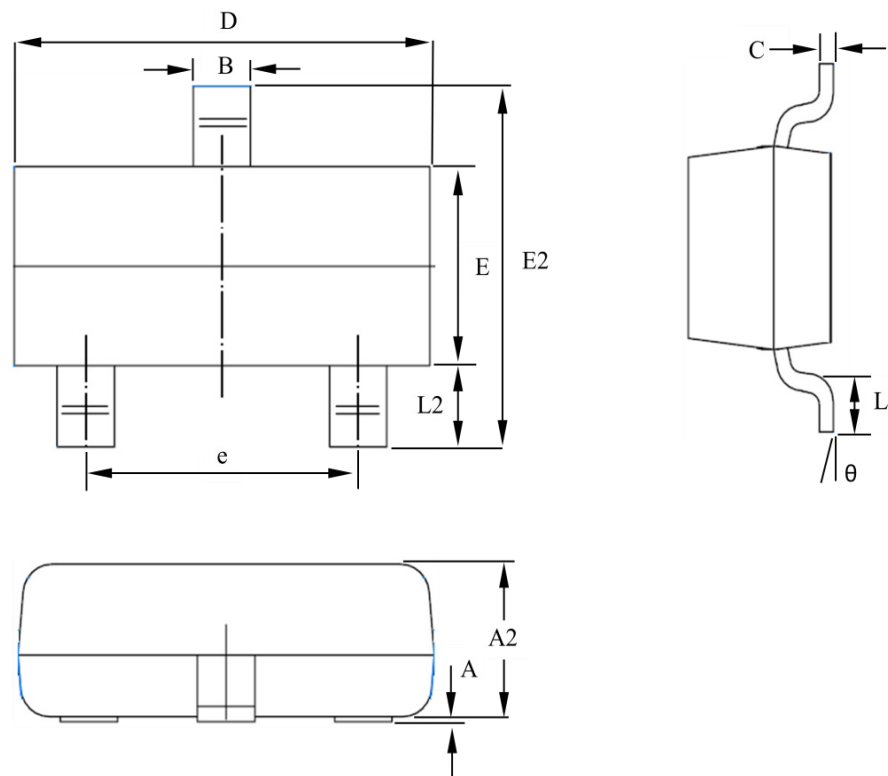
Fig.11 Gate Charge Waveform

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■SOT-23S dimension (3,000pcs/reel)



Symbols	Millimeters		Inches		Symbols	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.00	0.10	0.000	0.004	E2	2.25	2.55	0.089	0.100
A2	0.90	1.10	0.035	0.041	L	0.30	0.50	0.012	0.020
B	0.30	0.50	0.012	0.020	L2	0.50	0.60	0.020	0.024
C	0.08	0.15	0.003	0.006	θ	0°	8°	0°	8°
D	2.80	3.00	0.110	0.118	e	1.80	2.00	0.071	0.079
E	1.20	1.40	0.047	0.055					

■Marking

