Single P-channel MOSFET

ELM23401CA-S

■General description

ELM23401CA-S uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate resistance.

■Features

- Vds=-30V
- Id=-4.0A
- Rds(on) = 65mΩ (Vgs=-10V)
- Rds(on) = 75mΩ (Vgs=-4.5V)
- Rds(on) = 100mΩ (Vgs=-2.5V)

■Maximum absolute ratings

Ta=25°C. Unless otherwise noted.

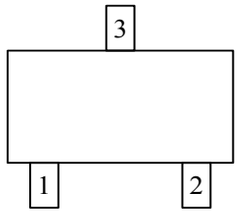
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		Vds	-30	V	
Gate-source voltage		Vgs	±12	V	
Continuous drain current	Ta=25°C	Id	-4.0	A	
	Ta=70°C		-3.2		
Pulsed drain current		Idm	-27	A	3
Power dissipation	Tc=25°C	Pd	1.2	W	2
	Tc=70°C		0.8		
Junction and storage temperature range		Tj, Tstg	-55 to 150	°C	

■Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Maximum junction-to-ambient	Rθja	100	125	°C/W	1

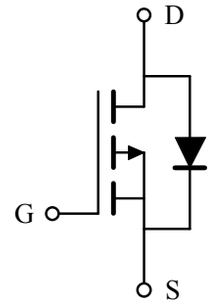
■Pin configuration

SOT-23(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

■Circuit



■Electrical characteristics

Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Vgs=0V, Id=-250μA	-30			V	
Zero gate voltage drain current	Idss	Vds=-24V, Vgs=0V			-1	μA	
		Vds=-24V, Vgs=0V, Ta=125°C			-10		
Gate-body leakage current	Igss	Vds=0V, Vgs=±12V			±100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-0.4	-0.7	-0.9	V	
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-4A		55	65	mΩ	4
		Vgs=-4.5V, Id=-3A		65	75		
		Vgs=-2.5V, Id=-2A		85	100		
Forward transconductance	Gfs	Vds=-10V, Id=-5A		15		S	
Diode forward voltage	Vsd	Is=-1A, Vgs=0V			-1	V	
Max. body-diode continuous current	Is	Vgs=Vds=0V, Force Current			-2	A	
Pulsed body-diode current	Ism				-16.4	A	4
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-15V, f=1MHz		830		pF	
Output capacitance	Coss			60		pF	
Reverse transfer capacitance	Crss			50		pF	
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=-4.5V, Vds=-15V Id=-4A		17.0		nC	4
Gate-source charge	Qgs			1.5		nC	4
Gate-drain charge	Qgd			0.9		nC	4
Turn-on delay time	td(on)	Vgs=-10V, Vds=-15V Id=-1A, Rgen=6Ω		5.4		ns	4
Turn-on rise time	tr			19.4		ns	4
Turn-off delay time	td(off)			45.9		ns	4
Turn-off fall time	tf			12.4		ns	4

NOTE :

1. The value of Rθja is measured with the device on 625mm² 70μ 2 layer copper 1.6t FR4 PCB in a still air environment with Ta=25°C.
2. The power dissipation Pd is based on Tj(max)=150°C, using ≤ 10s junction-to-ambient thermal resistance.
3. Repetitive rating, pulse width limited by temperature Tj(max)=150°C. Ratings are based on low frequency and duty cycles to keep initial Ta=25°C.
4. Pulse test : Pulsed width ≤ 300μsec and Duty cycle ≤ 2%.

■Typical electrical and thermal characteristics

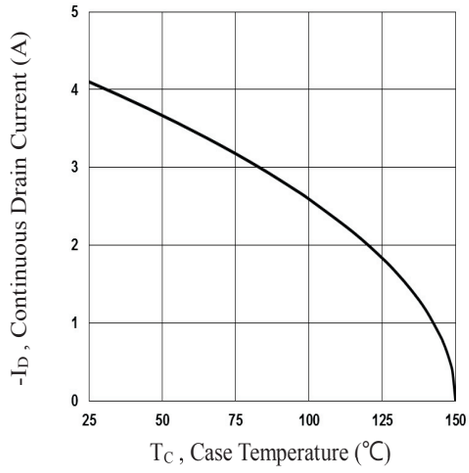


Fig.1 Continuous Drain Current vs. T_C

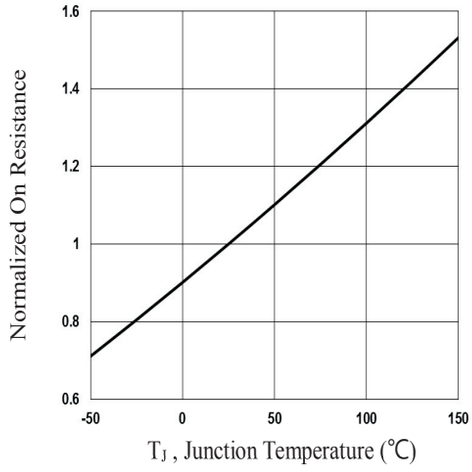


Fig.2 Normalized RDSON vs. T_J

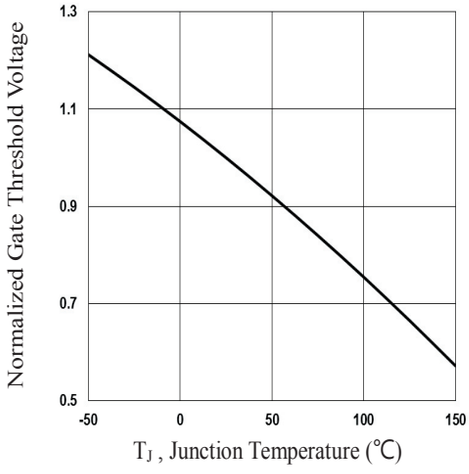


Fig.3 Normalized V_{th} vs. T_J

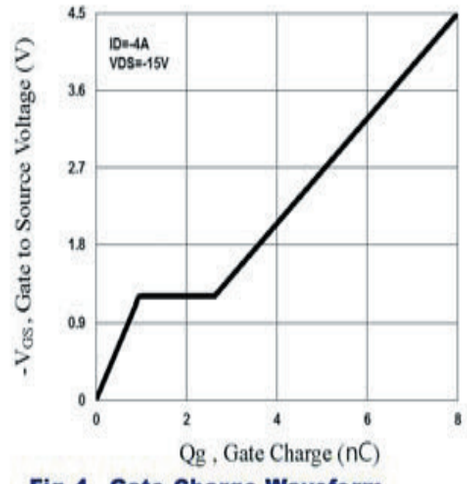


Fig.4 Gate Charge Waveform

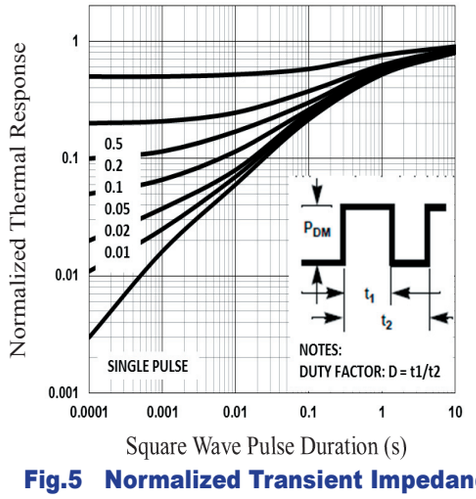


Fig.5 Normalized Transient Impedance

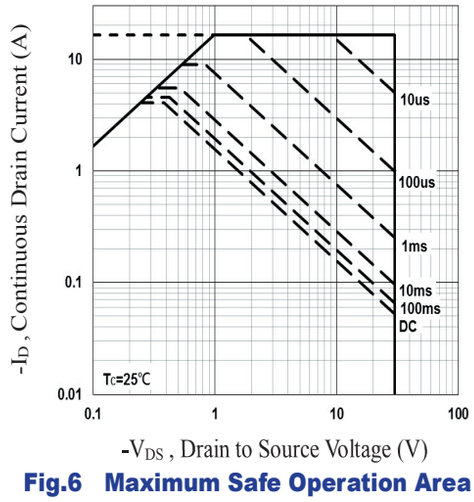


Fig.6 Maximum Safe Operation Area