Single P-channel MOSFET

ELM43401CA-S

■General description

ELM43401CA-S uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate threshold voltage.

■Features

- Vds=-30V
- Id=-4.3A
- 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.

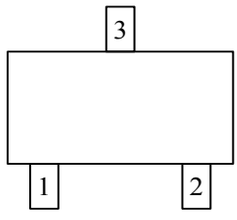
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		Vds	-30	V	
Gate-source voltage		Vgs	±12	V	
Continuous drain current	Ta=25°C	Id	-4.3	A	
	Ta=70°C		-3.6		
Pulsed drain current		Idm	-20	A	2
Power dissipation	Tc=25°C	Pd	1.4	W	3
	Tc=70°C		0.9		
Storage temperature range		Tstg	-55 to 150	°C	
Operating junction temperature range		Tj	-55 to 150	°C	

■Thermal characteristics

Parameter		Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-to-ambient	t ≤ 10s	Rθja	-	85	°C/W	1
Thermal resistance junction-to-ambient			-	125	°C/W	1

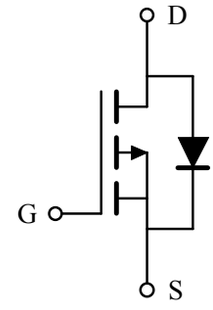
■Pin configuration

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=55°C			-5		
Gate-body leakage current	Igss	Vds=0V, Vgs=±12V			±100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-0.45		-1.20	V	
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-3.0A		55	65	mΩ	2
		Vgs=-4.5V, Id=-3.0A		65	75		
		Vgs=-2.5V, Id=-2.0A		85	100		
Forward transconductance	Gfs	Vds=-5V, Id=-3.0A		5.6		S	
Diode forward voltage	Vsd	Is=-1A, Vgs=0V			-1.2	V	2
Max. body-diode continuous current	Is	Vgs=Vds=0V, Force Current			-4.3	A	1, 4
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-15V, f=1MHz		920		pF	
Output capacitance	Coss			73		pF	
Reverse transfer capacitance	Crss			71		pF	
SWITCHING PARAMETERS							
Total gate charge (-4.5V)	Qg	Vgs=-4.5V, Vds=-15V Id=-3.0A		11.9		nC	
Gate-source charge	Qgs			1.8		nC	
Gate-drain charge	Qgd			3.0		nC	
Turn-on delay time	td(on)	Vgs=-4.5V, Vds=-15V Id=-3.0A, Rgen=3.3Ω		6.6		ns	
Turn-on rise time	tr			27.8		ns	
Turn-off delay time	td(off)			46.2		ns	
Turn-off fall time	tf			20.6		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 Id and Idm, in real applications, should be limited by total power dissipation.

■Typical electrical and thermal characteristics

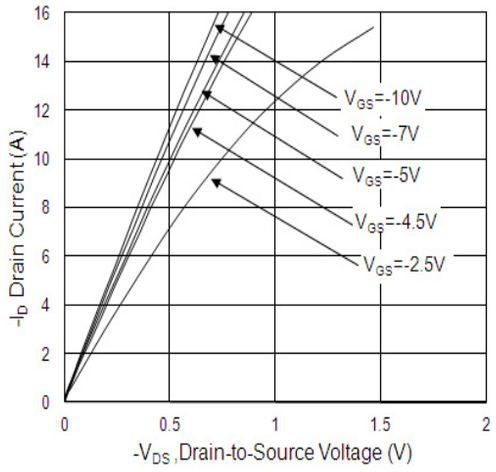


Fig.1 Typical Output Characteristics

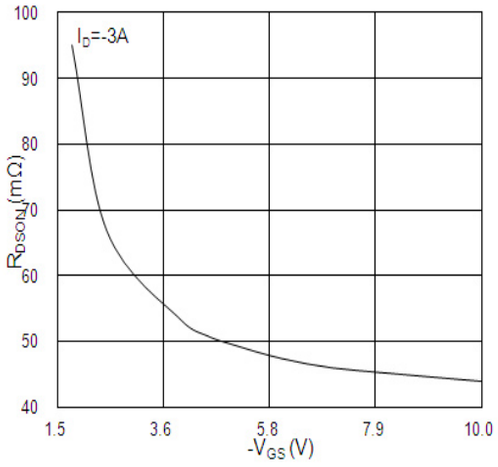


Fig.2 On-Resistance vs. G-S Voltage

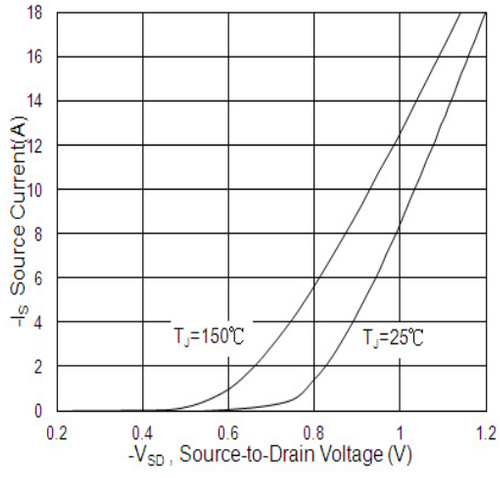


Fig.3 Source Drain Forward Characteristics

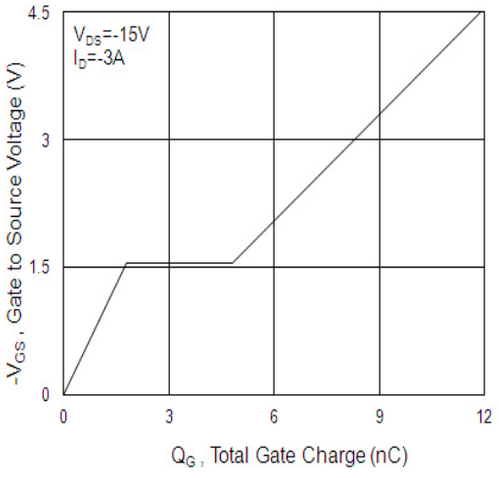


Fig.4 Gate-Charge Characteristics

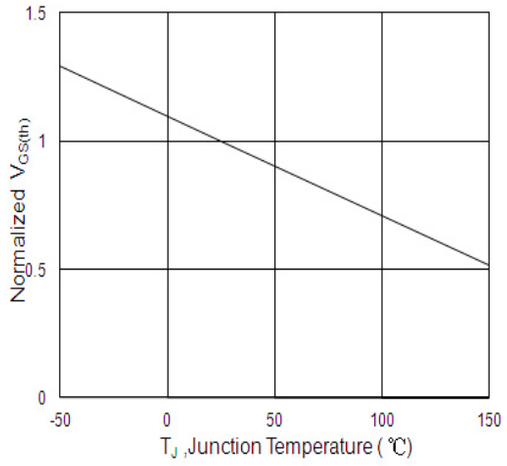


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

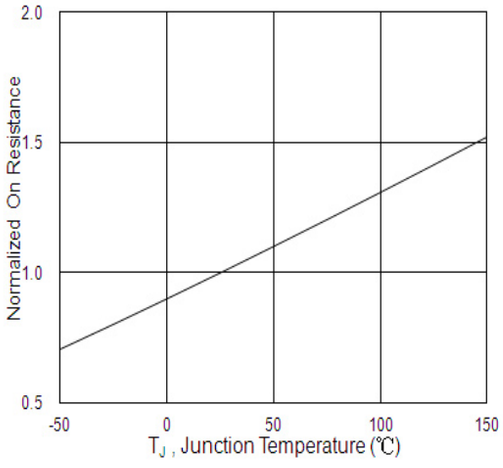


Fig.6 Normalized R_{DSON} vs. T_J

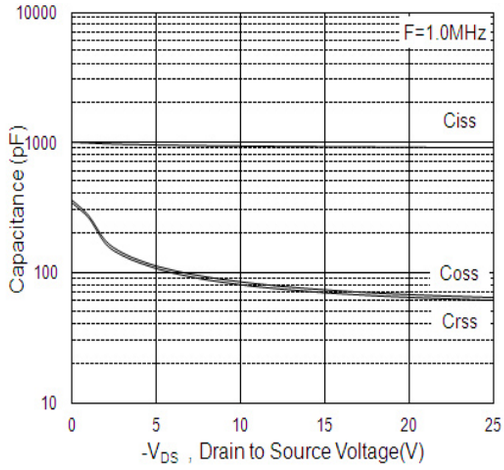


Fig.7 Capacitance

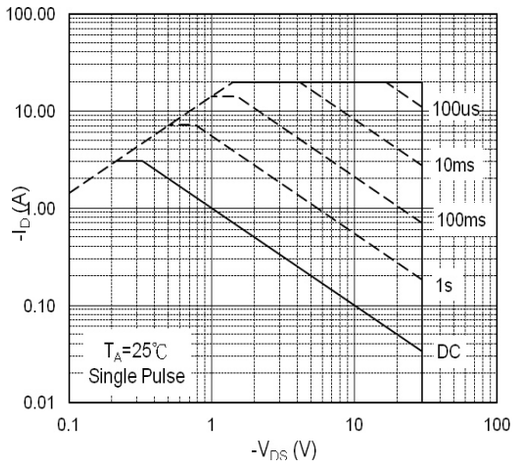


Fig.8 Safe Operating Area

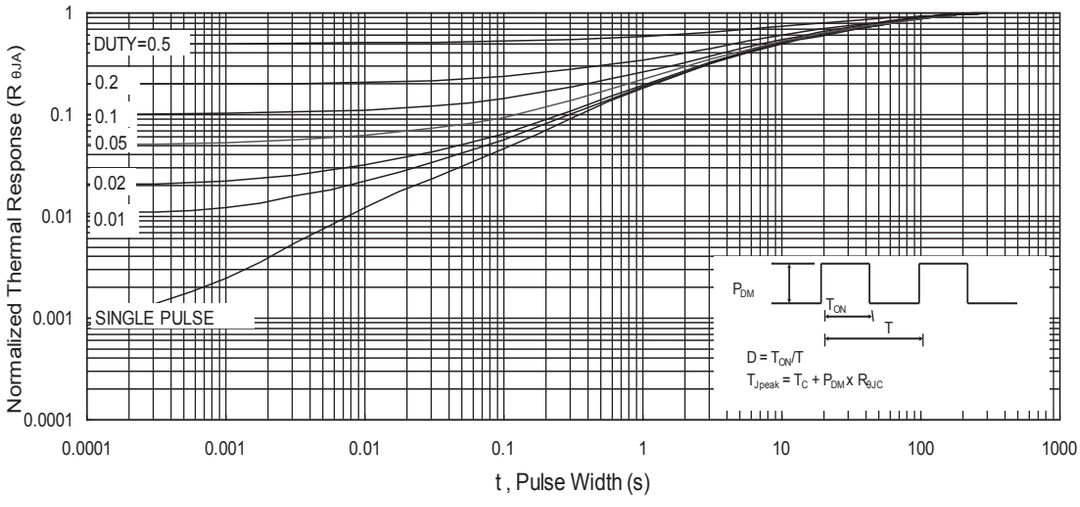


Fig.9 Normalized Maximum Transient Thermal Impedance

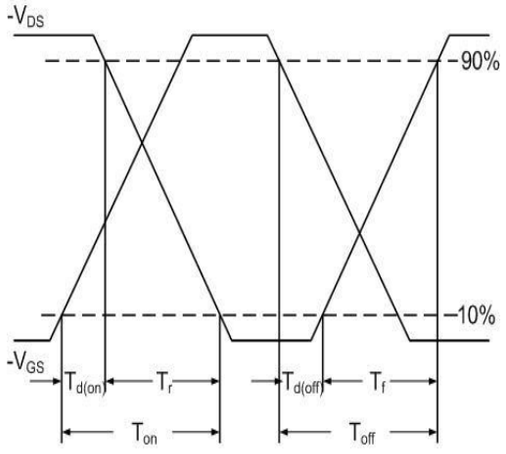


Fig.10 Switching Time Waveform

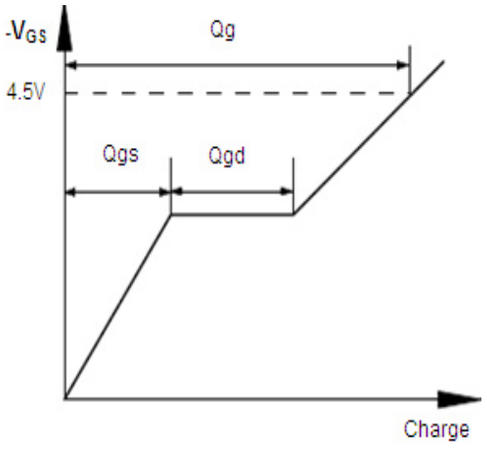


Fig.11 Gate Charge Waveform