

Single P-channel MOSFET

ELM43401CA-S

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

■General description

ELM43401CA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage.

■Features

- $V_{ds} = -30V$
- $I_d = -4.3A$
- $R_{ds(on)} = 65m\Omega$ ($V_{gs} = -10V$)
- $R_{ds(on)} = 75m\Omega$ ($V_{gs} = -4.5V$)
- $R_{ds(on)} = 100m\Omega$ ($V_{gs} = -2.5V$)

■Maximum absolute ratings

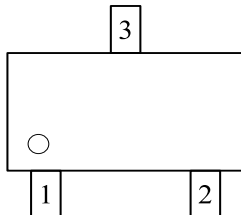
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		V_{ds}	-30	V	
Gate-source voltage		V_{gs}	± 12	V	
Continuous drain current	$T_a = 25^\circ C$	I_d	-4.3	A	
	$T_a = 70^\circ C$		-3.6		
Pulsed drain current		I_{dm}	-20	A	2
Power dissipation	$T_a = 25^\circ C$	P_d	1.4	W	3
	$T_a = 70^\circ C$		0.9		
Storage temperature range		T_{stg}	-55 to 150	$^\circ C$	
Operating junction temperature range		T_j	-55 to 150	$^\circ C$	

■Thermal characteristics

Parameter		Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-to-ambient	$t \leq 10s$	$R_{\theta ja}$	-	85	$^\circ C/W$	1
Thermal resistance junction-to-ambient			-	125	$^\circ C/W$	1

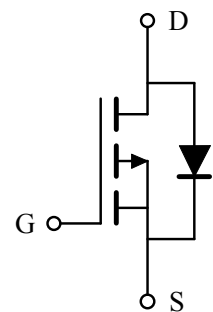
■Pin configuration

SOT-23(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

■Circuit



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■Electrical characteristics

Tj=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	
BVdss Temperature coefficient	$\frac{\Delta BV_{dss}}{\Delta T_j}$	Reference to 25°C, Id=-1mA	-	-0.014	-	V/°C	
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-3A	-	55	65	mΩ	2
		Vgs=-4.5V, Id=-3A	-	65	75		
		Vgs=-2.5V, Id=-2A		85	100		
Gate threshold voltage	Vgs(th)	Vgs=Vds, Id=-250μA	-0.45	-	-1.20	V	
Vgs(th) Temperature coefficient	ΔVgs(th)		-	2.6	-	mV/°C	
Drain-source leakage current	Idss	Vds=-24V, Vgs=0V	-	-	-1	μA	
		Vds=-24V, Vgs=0V, Tj=55°C	-	-	-5		
Gate-source leakage current	Igss	Vgs=±12V, Vds=0V	-	-	±100	nA	
Forward transconductance	Gfs	Vds=-5V, Id=-3A	-	5.6	-	S	
Continuous source current	Is	Vgs=Vds=0V, Force Current	-	-	-4.3	A	1, 4
Diode forward voltage	Vsd	Vgs=0V, Is=-1A	-	-	-1.2	V	2
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vds=-15V, Vgs=0V, f=1MHz	-	920	-	pF	
Output capacitance	Coss		-	73	-	pF	
Reverse transfer capacitance	Crss		-	71	-	pF	
SWITCHING PARAMETERS							
Total gate charge (-4.5V)	Qg	Vds=-15V, Vgs=-4.5V Id=-3A	-	11.9	-	nC	
Gate-source charge	Qgs		-	1.8	-	nC	
Gate-drain charge	Qgd		-	3.0		nC	
Turn-on delay time	td(on)	Vdd=-15V, Vgs=-4.5V Rgen=3.3Ω, Id=-3A	-	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 :

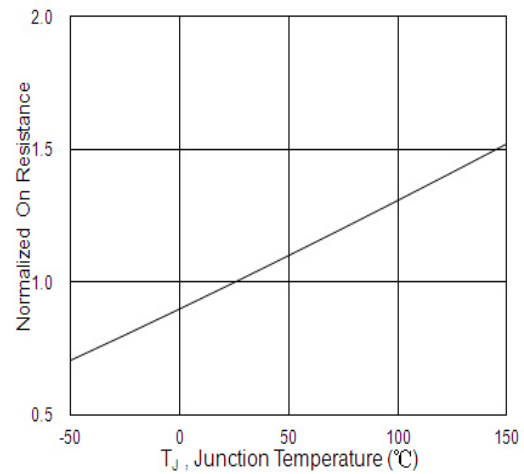
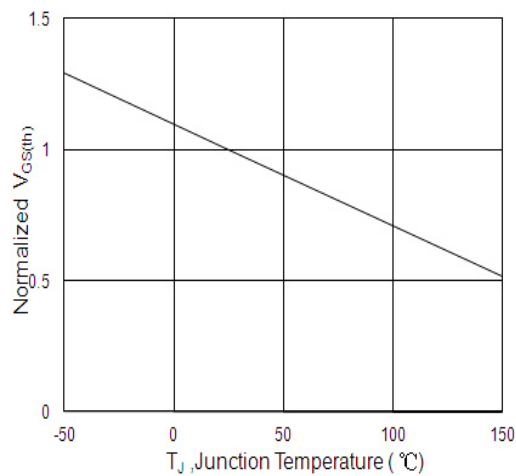
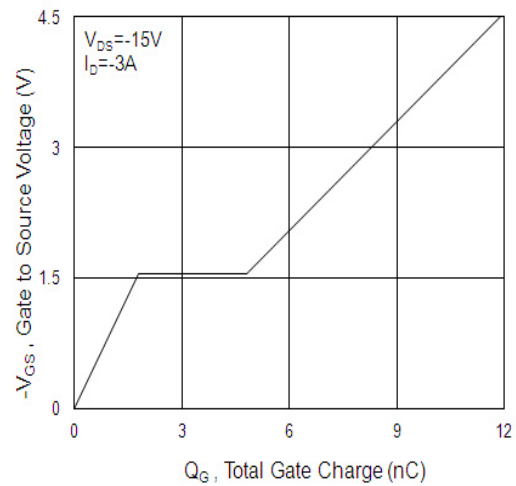
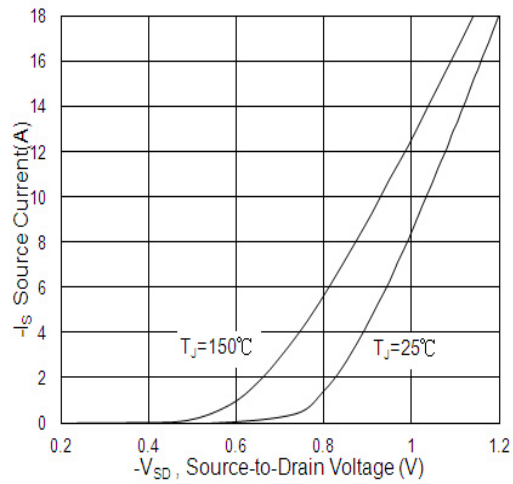
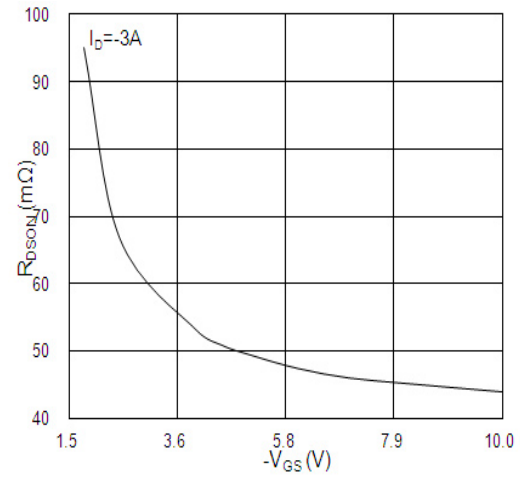
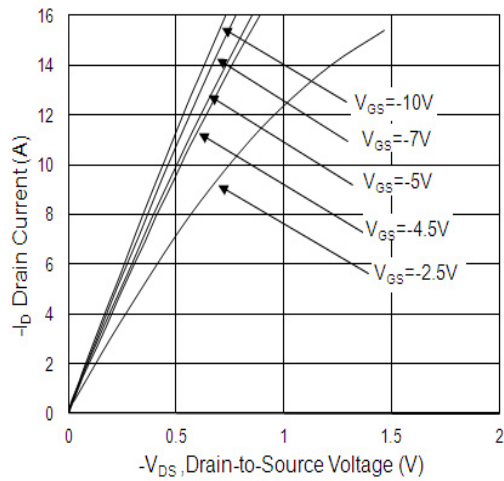
1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300μs and duty cycle ≤ 2%.
3. The power dissipation is limited by 150°C junction temperature.
4. The data is theoretically the same as Id and Idm, in real applications, should be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

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■ Typical electrical and thermal characteristics



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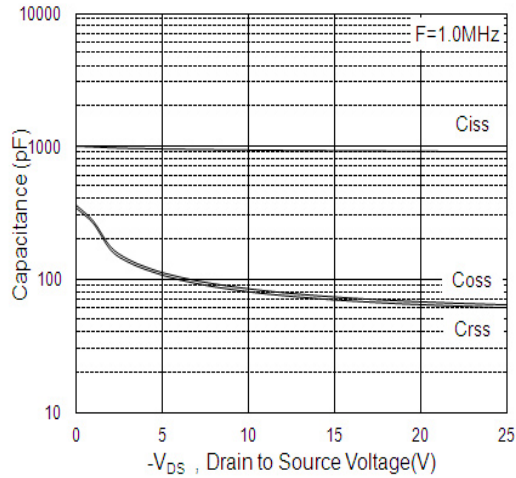


Fig.7 Capacitance

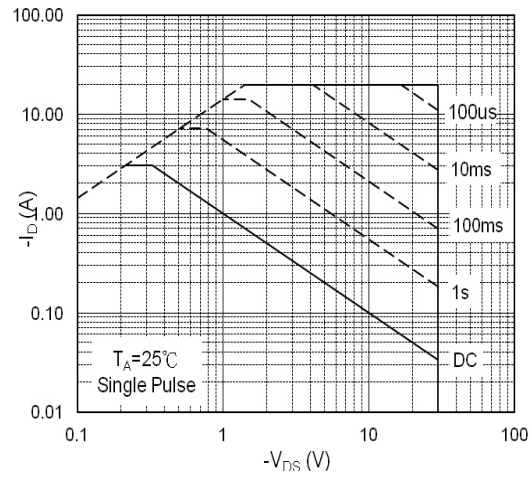


Fig.8 Safe Operating Area

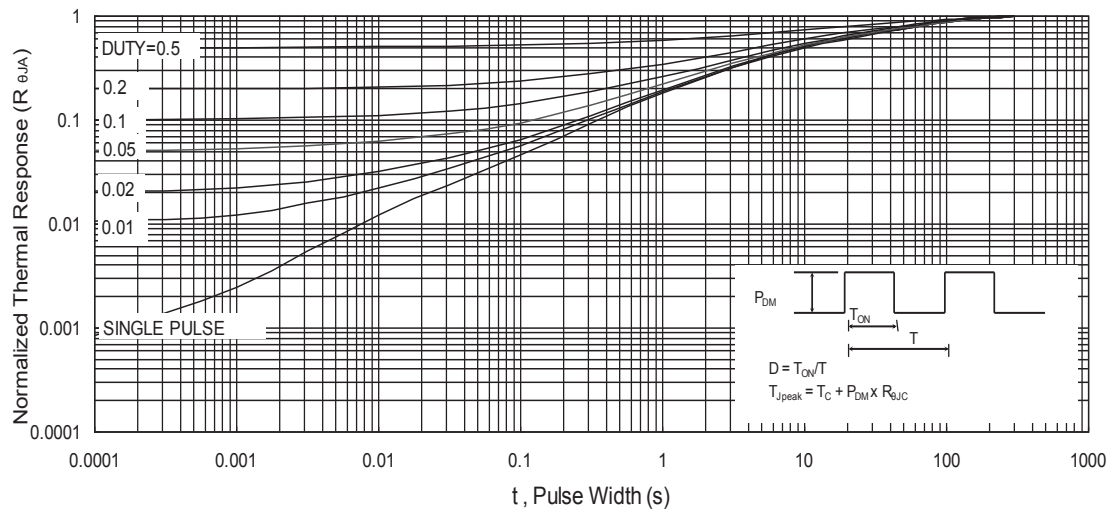


Fig.9 Normalized Maximum Transient Thermal Impedance

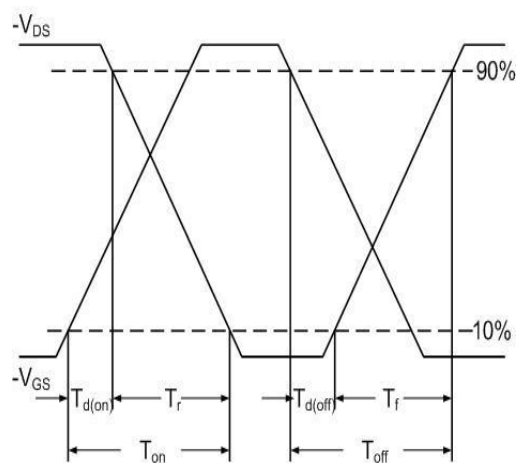


Fig.10 Switching Time Waveform

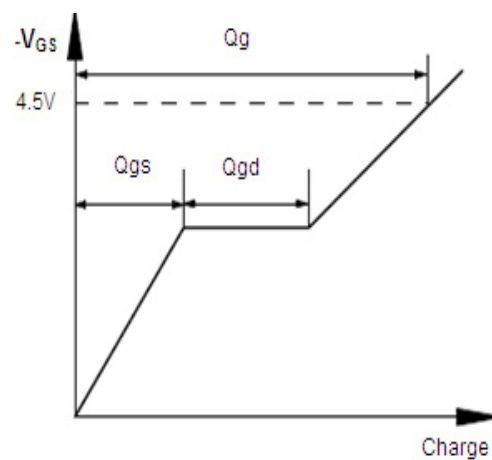


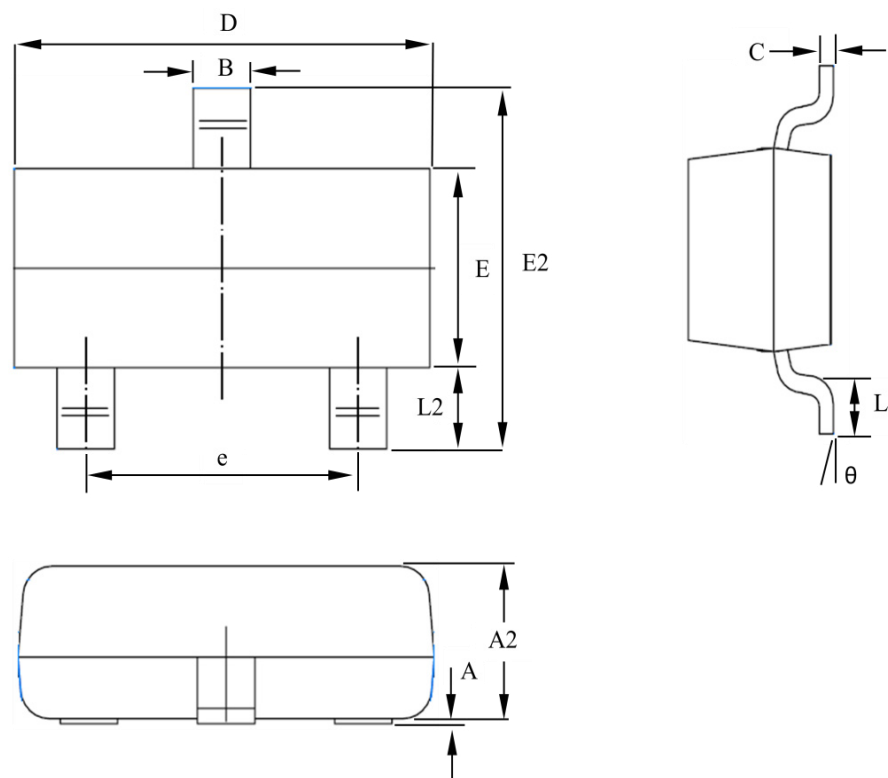
Fig.11 Gate Charge Waveform

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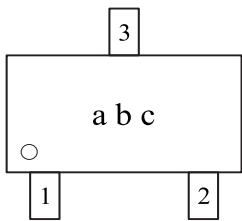
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■SOT-23 dimension (3,000pcs/reel)



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



Symbols	Content
a	Product code
b	Yearly code : ex 2019=9, 2020=A, 2021=B, 2022=C...
c	Sequence : 1 to 9, A to Z