

Single P-channel MOSFET

ELM3F401JA-S

■ General description

ELM3F401JA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance.

■ Features

- $V_{ds} = -30V$
- $I_d = -8A$
- $R_{ds(on)} < 20m\Omega$ ($V_{gs} = -10V$)
- $R_{ds(on)} < 35m\Omega$ ($V_{gs} = -4.5V$)

■ Maximum absolute ratings

$T_a = 25^\circ C$. Unless otherwise noted.

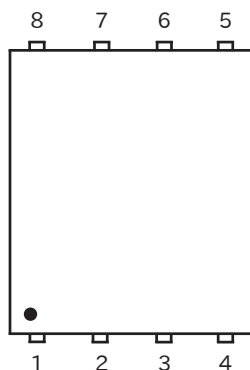
Parameter	Symbol	Limit	Unit	Note	
Drain-source voltage	V_{ds}	-30	V		
Gate-source voltage	V_{gs}	± 20	V		
Continuous drain current	I_d	$T_a = 25^\circ C$	-8.0	A	4
		$T_a = 70^\circ C$	-6.3		
Pulsed drain current	I_{dm}	-80	A	3	
Avalanche current	I_{as}	-29	A		
Avalanche energy	E_{as}	42	mJ		
Power dissipation	P_d	$T_c = 25^\circ C$	2.0	W	
		$T_c = 70^\circ C$	1.2		
Junction and storage temperature range	T_j, T_{stg}	-55 to 150	$^\circ C$		

■ Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Maximum junction-to-case	$R_{\theta jc}$		6	$^\circ C/W$	
Maximum junction-to-ambient	$R_{\theta ja}$		62	$^\circ C/W$	5

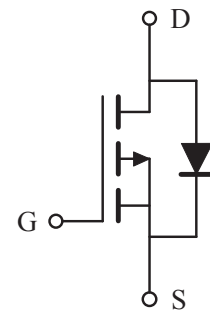
■ Pin configuration

PDFN-3x3(TOP VIEW)



Pin No.	Pin name
1	SOURCE
2	SOURCE
3	SOURCE
4	GATE
5	DRAIN
6	DRAIN
7	DRAIN
8	DRAIN

■ Circuit



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■Electrical characteristics

Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V	-30			V	
Zero gate voltage drain current	Idss	Vds=-24V, Vgs=0V			-1	μA	
		Vds=-20V, Vgs=0V Ta=125°C			-10		
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			-100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-1.0	-1.5	-3.0	V	
On state drain current	Id(on)	Vds=-5V, Vgs=-10V	-80			A	1
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-9A		15	20	mΩ	1
		Vgs=-4.5V, Id=-7A		23	35		
Forward transconductance	Gfs	Vds=-5V, Id=-9A		23		S	1
Diode forward voltage	Vsd	If=-9A, Vgs=0V			-1	V	1
Max. body-diode continuous current	Is				-25	A	4
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-15V f=1MHz		1300		pF	
Output capacitance	Coss			212		pF	
Reverse transfer capacitance	Crss			200		pF	
Gate resistance	Rg	Vgs=0V, Vds=0V, f=1MHz		2.8		Ω	
SWITCHING PARAMETERS							
Total gate charge (Vgs=-10V)	Qg	Vds=-15V, Id=-9A		29.4		nC	2
Total gate charge (Vgs=-4.5V)	Qg			15.6		nC	2
Gate-source charge	Qgs			3.8		nC	2
Gate-drain charge	Qgd			7.8		nC	2
Turn-on delay time	td(on)	Vgs=-10V, Vds=-15V Id=-9A, Rgen=6Ω		20		ns	2
Turn-on rise time	tr			12		ns	2
Turn-off delay time	td(off)			55		ns	2
Turn-off fall time	tf			36		ns	2
Body diode reverse recovery time	trr	If=-9A, dIf/dt=100A/μs		14.3		ns	
Body diode reverse recovery charge	Qrr			4.2		nC	

NOTE :

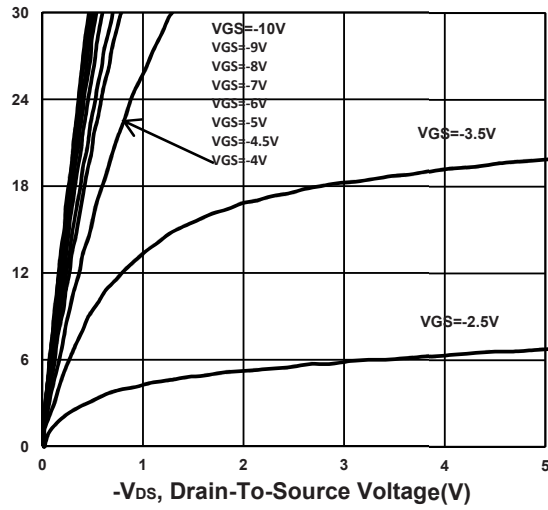
1. Pulse test : Pulsed width ≤ 300μsec and Duty cycle ≤ 2%.
2. Independent of operating temperature.
3. Pulsed width limited by maximum junction temperature.
4. Package limitation current is 30A.
5. The value of Rθja is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with Ta =25°C. The value in any given application depends on the user's specific board design.

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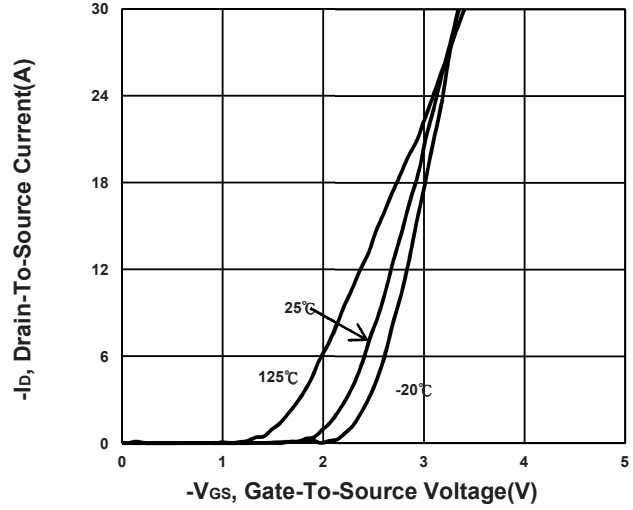
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■ Typical electrical and thermal characteristics

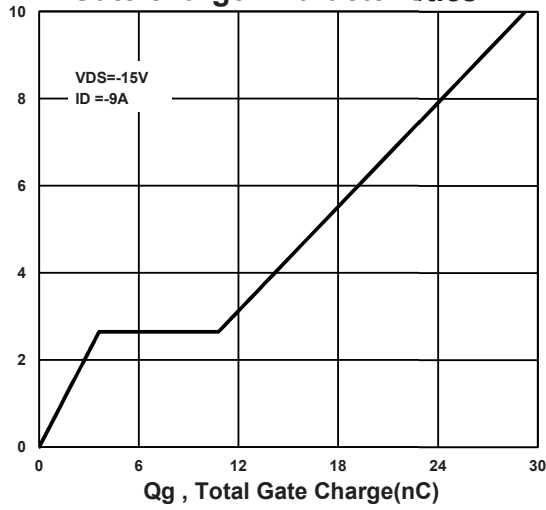
Output Characteristics



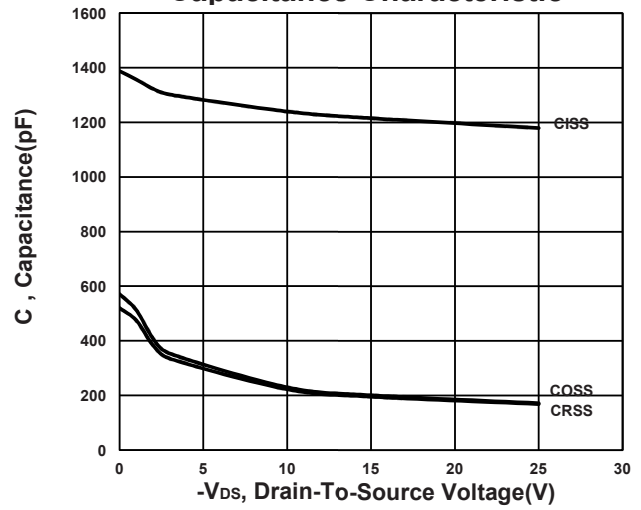
Transfer Characteristics



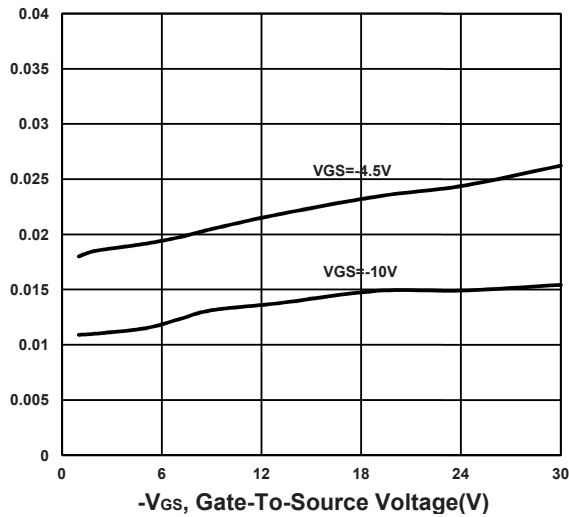
Gate charge Characteristics



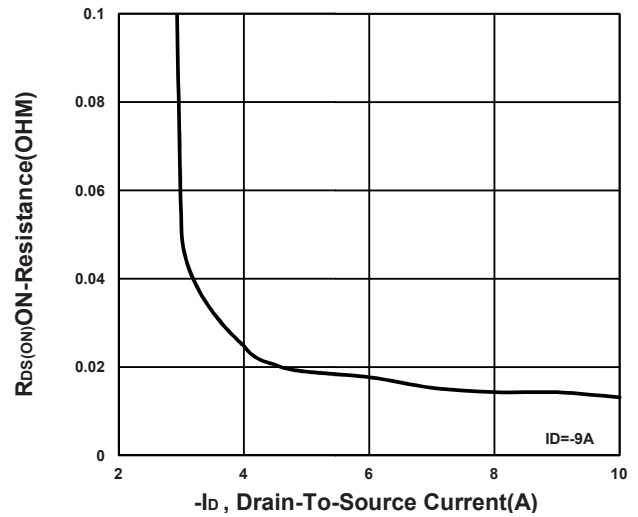
Capacitance Characteristic



On-Resistance VS Gate-To-Source



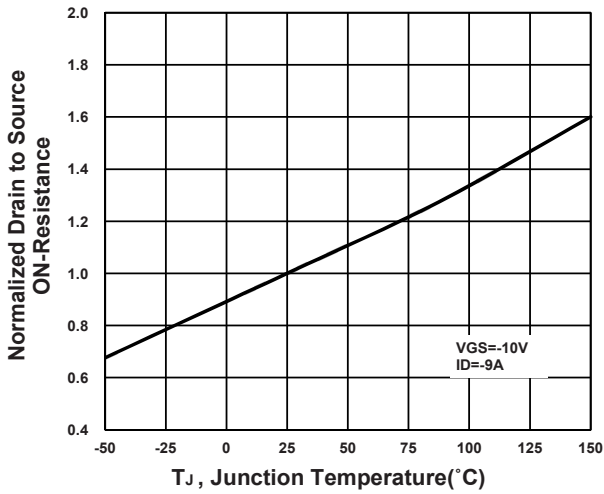
On-Resistance VS Drain Current



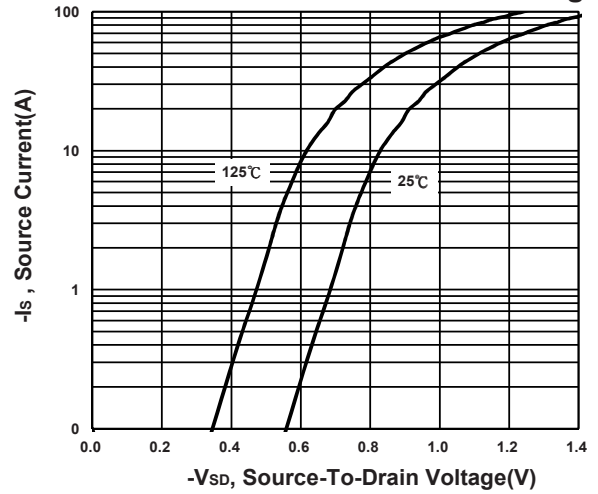
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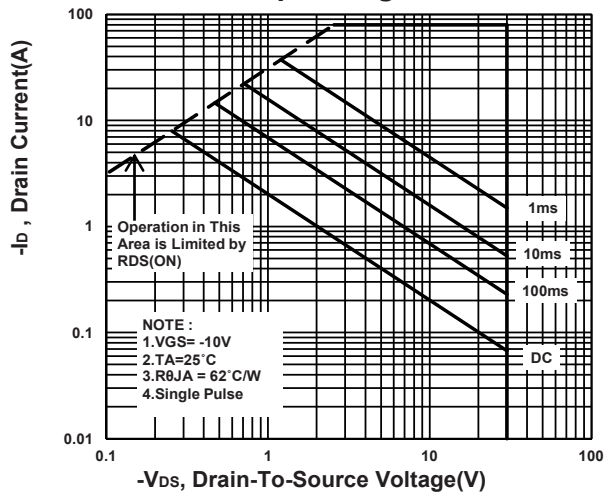
On-Resistance VS Temperature



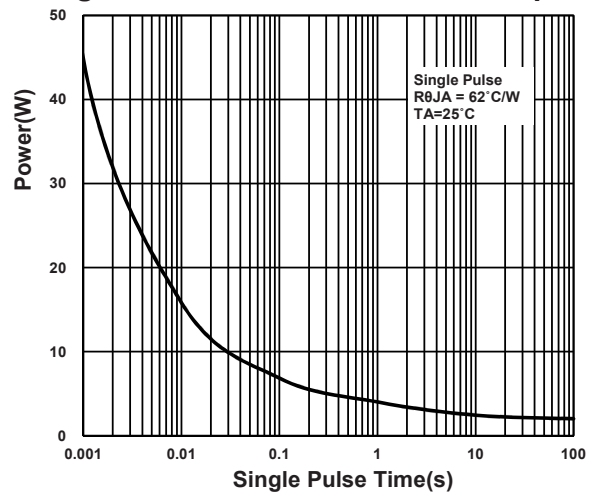
Source-Drain Diode Forward Voltage



Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve

