

Single P-channel MOSFET

ELM32401LA-S

General description

ELM32401LA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance.

Features

- $V_{ds} = -60V$
- $I_d = -7A$
- $R_{ds(on)} < 90m\Omega$ ($V_{gs} = -10V$)
- $R_{ds(on)} < 135m\Omega$ ($V_{gs} = -4.5V$)

Maximum absolute ratings

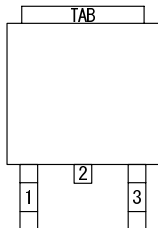
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		V_{ds}	-60	V	
Gate-source voltage		V_{gs}	± 20	V	
Continuous drain current	$T_a = 25^\circ C$	I_d	-7	A	
	$T_a = 70^\circ C$		-6		
Pulsed drain current		I_{dm}	-30	A	3
Power dissipation	$T_a = 25^\circ C$	P_d	28	W	
	$T_a = 70^\circ C$		18		
Junction 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	Steady-state	$R\theta_{jc}$		3	$^\circ C/W$	
Maximum junction-to-ambient	Steady-state	$R\theta_{ja}$		75	$^\circ C/W$	

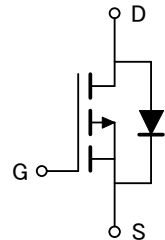
Pin configuration

TO-252-3 (TOP VIEW)



Pin No.	Pin name
1	GATE
2	DRAIN
3	SOURCE

Circuit



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Electrical characteristics

Ta=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=-250 μ A, Vgs=0V	-60			V	
Zero gate voltage drain current	Idss	Vds=-48V, Vgs=0V			-1	μ A	
		Vds=-44V, Vgs=0V, Tj=125°C			-10		
Gate-body leakage current	Igss	Vds=0V, Vgs= $\pm$ 20V			$\pm$ 250	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250 μ A	-1	-2	-3	V	
On state drain current	Id(on)	Vgs=-10V, Vds=-5V	-32			A	1
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-7A		70	90	m Ω	1
		Vgs=-4.5V, Id=-6A		100	135	m Ω	
Forward transconductance	Gfs	Vds=-10V, Id=-7A		9		S	1
Diode forward voltage	Vsd	Is=If, Vgs=0V			-1	V	1
Max. body-diode continuous current	Is				-1.3	A	
Pulsed body-diode current	Ism				-2.6	A	3
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-30V, f=1MHz		760		pF	
Output capacitance	Coss			90		pF	
Reverse transfer capacitance	Crss			40		pF	
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=-10V, Vds=-30V Id=-7A		15.0		nC	2
Gate-source charge	Qgs			2.5		nC	2
Gate-drain charge	Qgd			3.0		nC	2
Turn-on delay time	td(on)	Vgs=-10V, Vds=-20V Id $\approx$ -1A, Rgen=6 Ω		7	14	ns	2
Turn-on rise time	tr			10	20	ns	2
Turn-off delay time	td(off)			19	34	ns	2
Turn-off fall time	tf			12	22	ns	2
Body diode reverse recovery time	trr	If=-7A, dI/dt=100A/ μ s		15.5		ns	
Body diode reverse recovery charge	Qrr			7.9		nC	

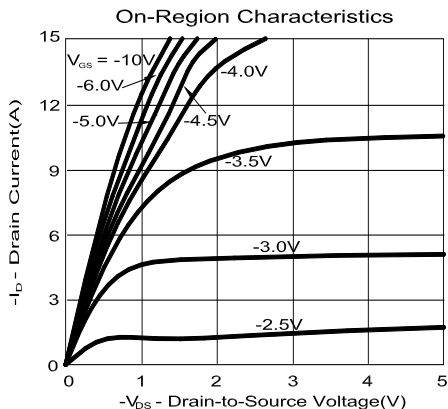
NOTE :

1. Pulse test : Pulsed width $\leq$ 300 μ sec and Duty cycle $\leq$ 2%.
2. Independent of operating temperature.
3. Pulsed width limited by maximum junction temperature.

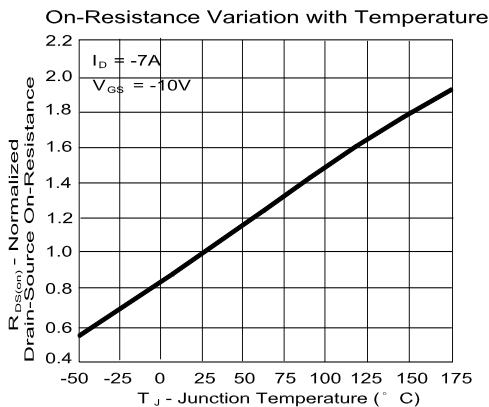
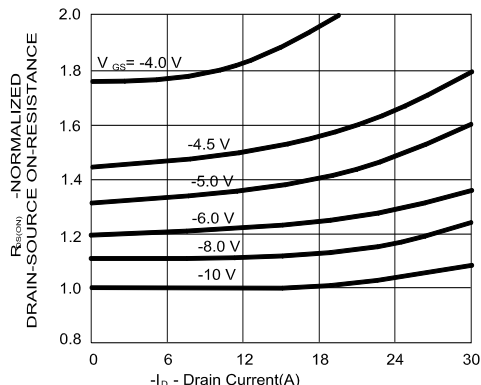
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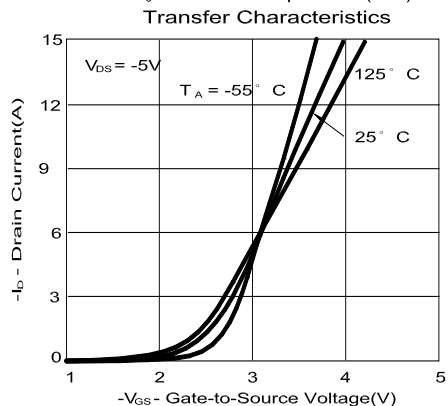
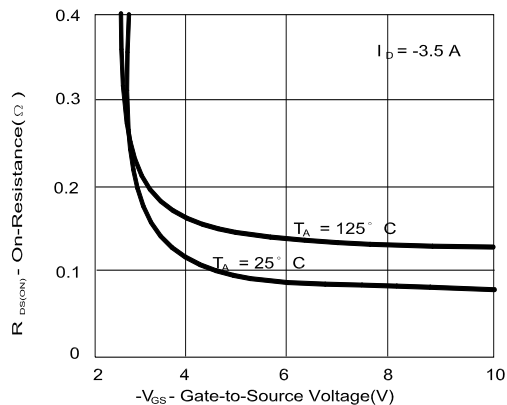
■ Typical electrical and thermal characteristics



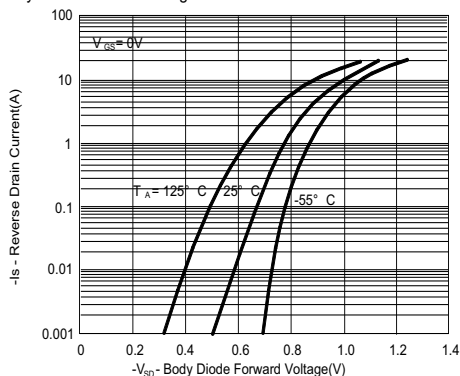
On-Resistance Variation with Drain Current and Gate Voltage



On-Resistance Variation with Gate-to-Source Voltage



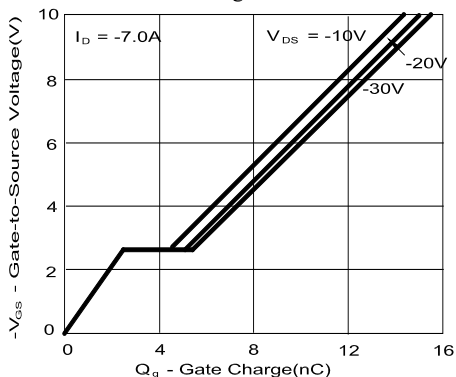
Body Diode Forward Voltage Variation with Source Current and Temperature



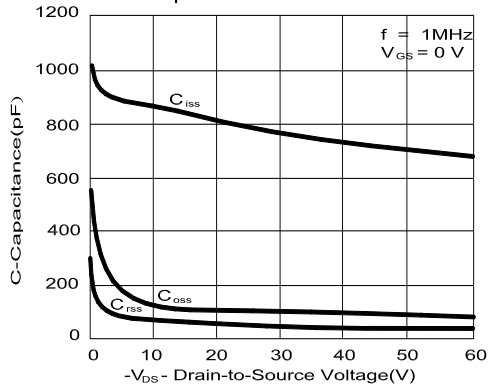
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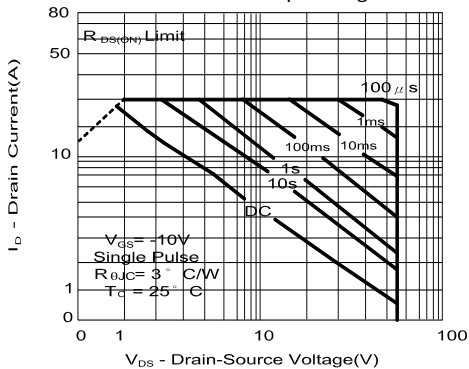
Gate Charge Characteristics



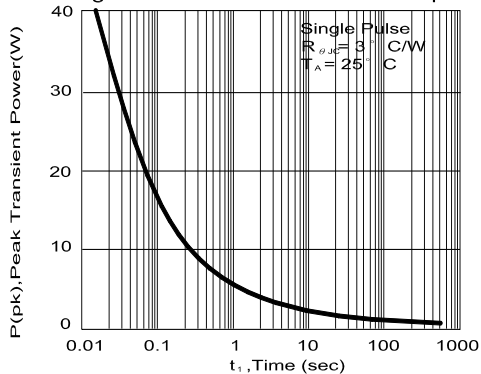
Capacitance Characteristics



Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve

