

Single N-channel MOSFET

ELM32420LA-S

General description

ELM32420LA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance.

Features

- $V_{ds}=20V$
- $I_d=45A$
- $R_{ds(on)} < 14m\Omega$ ($V_{gs}=5V$)
- $R_{ds(on)} < 26m\Omega$ ($V_{gs}=2.5V$)

Maximum absolute ratings

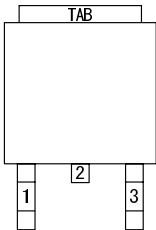
Parameter	Symbol	Limit	Unit	Note
Gate-source voltage	V_{gs}	± 12	V	
Continuous drain current	I_d	45	A	
		30		
Pulsed drain current	I_{dm}	140	A	3
Power dissipation	P_d	48	W	
		20		
Junction and storage temperature range	T_j, T_{stg}	-55 to 150	$^{\circ}C$	

Thermal characteristics

Parameter		Symbol	Typ.	Max.	Unit	Note
Maximum junction-to-case	Steady-state	$R\theta_{jc}$		2.6	$^{\circ}C/W$	
Maximum junction-to-ambient	Steady-state	$R\theta_{ja}$		110.0	$^{\circ}C/W$	

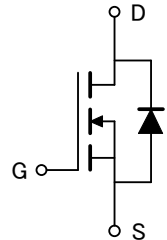
Pin configuration

TO-252-3 (TOP VIEW)



Pin No.	Pin name
1	GATE
2	DRAIN
3	SOURCE

Circuit



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Electrical characteristics

T_a=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BV _{dss}	I _d =250 μA, V _{gs} =0V	20			V	
Zero gate voltage drain current	I _{dss}	V _{ds} =16V, V _{gs} =0V			1	μA	
		V _{ds} =13.2V, V _{gs} =0V, T _j =125°C			10		
Gate-body leakage current	I _{gss}	V _{ds} =0V, V _{gs} =±12V			±100	nA	
Gate threshold voltage	V _{gs(th)}	V _{ds} =V _{gs} , I _d =250 μA	0.45	0.75	1.25	V	
On state drain current	I _{d(on)}	V _{gs} =4.5V, V _{ds} =5V	45			A	1
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =5V, I _d =18A		11	14	mΩ	1
		V _{gs} =2.5V, I _d =9A		18	26	mΩ	
Forward transconductance	G _{fs}	V _{ds} =10V, I _d =18A		26		S	1
Diode forward voltage	V _{sd}	I _f =I _s , V _{gs} =0V			1.3	V	1
Max. body-diode continuous current	I _s				45	A	
Pulsed body-diode current	I _{sm}				140	A	3
DYNAMIC PARAMETERS							
Input capacitance	C _{iss}	V _{gs} =0V, V _{ds} =15V, f=1MHz		500		pF	
Output capacitance	C _{oss}			310		pF	
Reverse transfer capacitance	C _{rss}			125		pF	
SWITCHING PARAMETERS							
Total gate charge	Q _g	V _{gs} =5V, V _{ds} =10V, I _d =18A		17.0		nC	2
Gate-source charge	Q _{gs}			1.5		nC	2
Gate-drain charge	Q _{gd}			10.5		nC	2
Turn-on delay time	t _{d(on)}	V _{gs} =5V, V _{ds} =10V, I _d ≈ 18A R _{gen} =3.3 Ω		7.5		ns	2
Turn-on rise time	t _r			83.0		ns	2
Turn-off delay time	t _{d(off)}			18.0		ns	2
Turn-off fall time	t _f			23.0		ns	2
Body diode reverse recovery time	t _{rr}			37		ns	
Peak reverse recovery current	I _{rm(rec)}	I _f =I _s , dI/dt=100A/μs		200		A	
Body diode reverse recovery charge	Q _{rr}			0.043		μC	

NOTE :

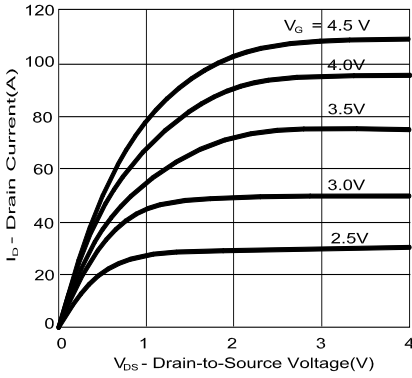
1. Pulse test : Pulsed width ≤ 300 μsec and Duty cycle ≤ 2%.
2. Independent of operating temperature.
3. Pulsed width limited by maximum junction temperature.
4. Duty cycle ≤ 1%.

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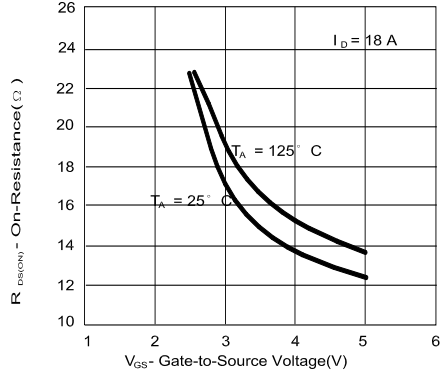
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Typical electrical and thermal characteristics

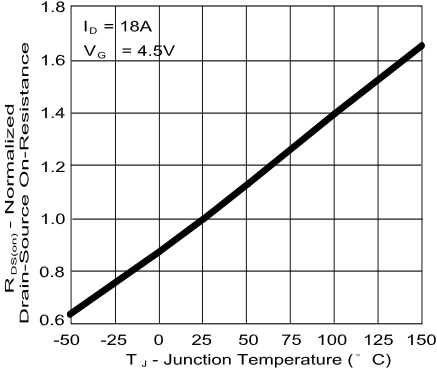
Typical output characteristics



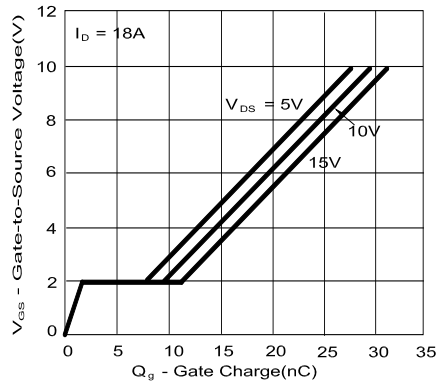
On-Resistance v.s. Gate Voltage



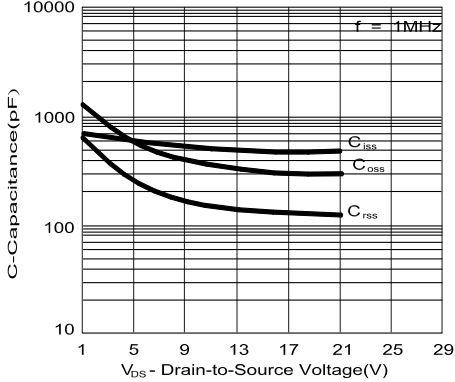
Normalized on-Resistance v.s. Junction Temperature



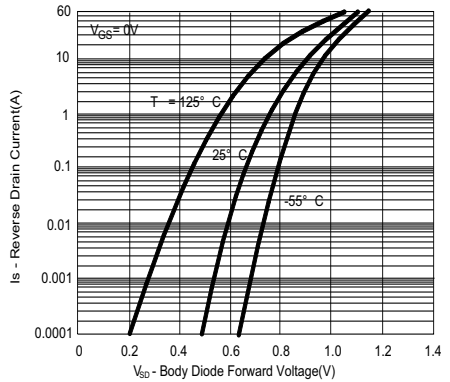
Gate Charge Characteristics



Typical Capacitance Characteristics



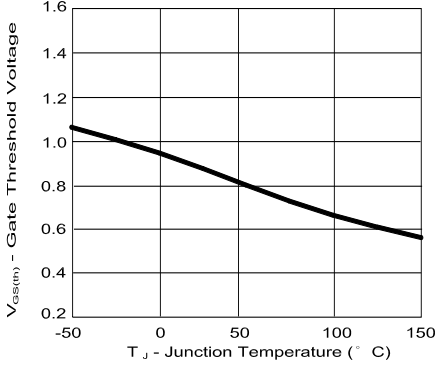
Body Diode Forward Voltage Variation with Source Current and Temperature



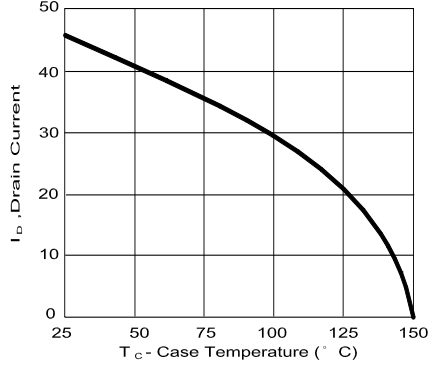
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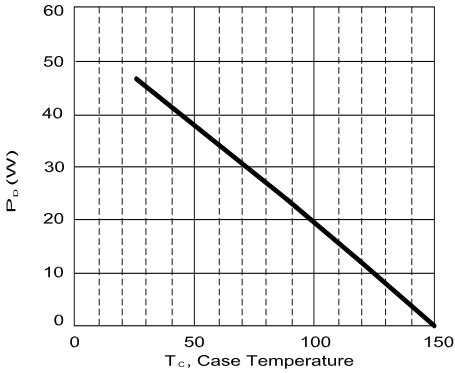
Gate Threshold Voltage v.s. Junction Temperature



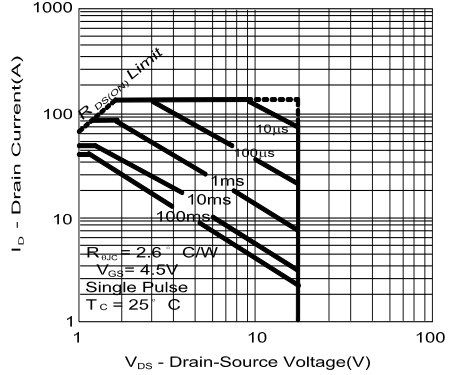
Maximum Drain Current v.s. Case Temperature



Typical Power Dissipation



Maximum Safe Operating Area



Effective Transient Thermal Impedance

