

Single N-channel MOSFET

ELM32416LA-S

General description

ELM32416LA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance.

Features

- $V_{ds}=25V$
- $I_d=46A$
- $R_{ds(on)} < 17m\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} < 25m\Omega$ ($V_{gs}=7V$)

Maximum absolute ratings

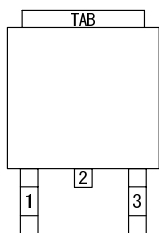
Parameter	Symbol	Limit	Unit	Note	
Gate-source voltage	V_{gs}	± 20	V		
Continuous drain current	I_d	$T_a=25^\circ C$	46	A	
		$T_a=100^\circ C$	28		
Pulsed drain current	I_{dm}	140	A	3	
Avalanche current	I_{ar}	20	A		
Avalanche energy	$L=0.1mH$	E _{as}	140	mJ	
Repetitive avalanche energy	$L=0.05mH$	E _{ar}	5.6	mJ	4
Power dissipation	P_d	$T_a=25^\circ C$	55	W	
		$T_a=100^\circ C$	33		
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	$R\theta_{jc}$		3.0	$^\circ C/W$	
Maximum junction-to-ambient	Steady-state	$R\theta_{ja}$		70.0	$^\circ C/W$	
Maximum case-to-heatsink		$R\theta_{cs}$	0.7		$^\circ C/W$	

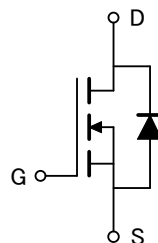
Pin configuration

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	25			V	
Zero gate voltage drain current	I _{dss}	V _{ds} =20V, V _{gs} =0V			25	μA	
		V _{ds} =20V, V _{gs} =0V, T _j =125°C			250		
Gate-body leakage current	I _{gss}	V _{ds} =0V, V _{gs} =±20V			±250	nA	
Gate threshold voltage	V _{gs(th)}	V _{ds} =V _{gs} , I _d =250 μA	0.8	1.2	2.5	V	
On state drain current	I _{d(on)}	V _{gs} =10V, V _{ds} =10V	45			A	1
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =10V, I _d =20A		14	17	mΩ	1
		V _{gs} =7V, I _d =18A		18	25	mΩ	
Forward transconductance	G _{fs}	V _{ds} =15V, I _d =30A		16		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}				150	A	3
DYNAMIC PARAMETERS							
Input capacitance	C _{iss}	V _{gs} =0V, V _{ds} =15V, f=1MHz		600		pF	
Output capacitance	C _{oss}			290		pF	
Reverse transfer capacitance	C _{rss}			100		pF	
SWITCHING PARAMETERS							
Total gate charge	Q _g	V _{gs} =10V, V _{ds} =12.5V I _d =20A		25.0		nC	2
Gate-source charge	Q _{gs}			2.9		nC	2
Gate-drain charge	Q _{gd}			7.0		nC	2
Turn-on delay time	t _{d(on)}	V _{gs} =10V, V _{ds} =15V, I _d ≈ 30A R _l =1 Ω, R _{gen} =2.5 Ω		7		ns	2
Turn-on rise time	t _r			7		ns	2
Turn-off delay time	t _{d(off)}			24		ns	2
Turn-off fall time	t _f			6		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	

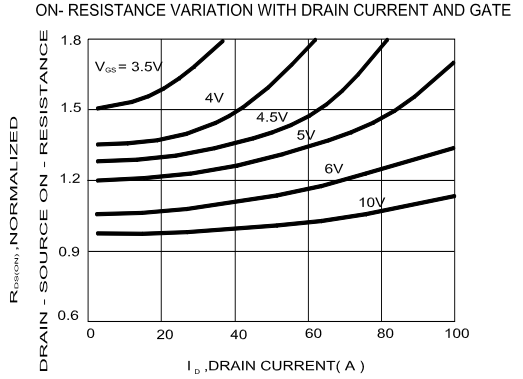
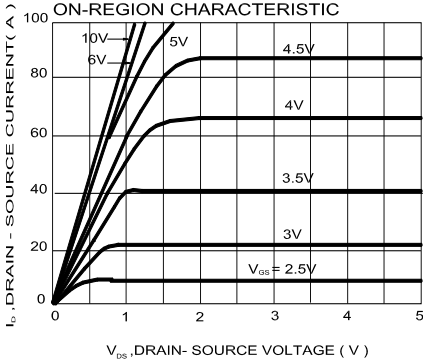
NOTE :

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%.

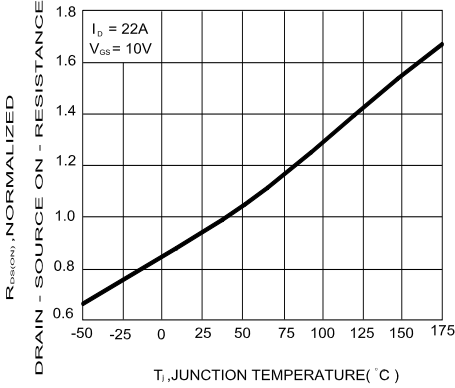
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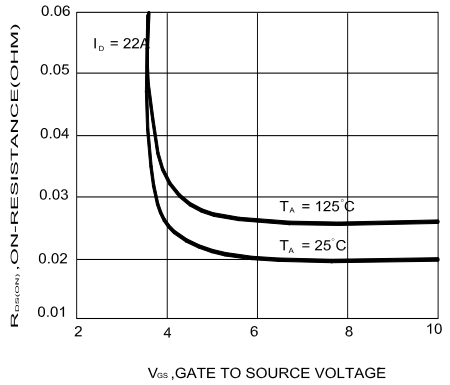
Typical electrical and thermal characteristics



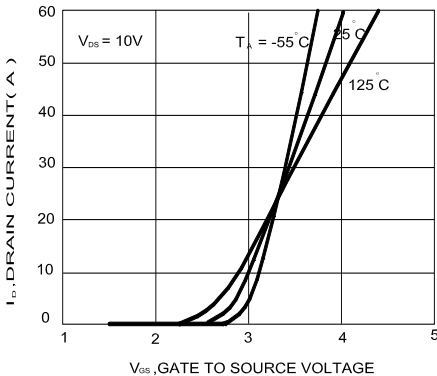
ON-RESISTANCE VARIATION WITH TEMPERATURE



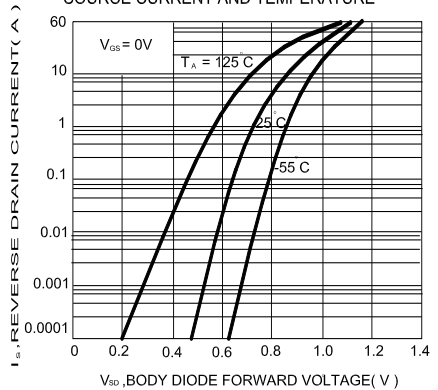
ON-RESISTANCE VARIATION WITH GATE-TO-SOURCE VOLTAGE



TRANSFER CHARACTERISTICS



BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE



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