

Single N-channel MOSFET

ELM32402LA-S

General description

ELM32402LA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance.

Features

- $V_{ds}=20V$
- $I_d=20A$
- $R_{ds(on)} < 50m\Omega$ ($V_{gs}=5V$)
- $R_{ds(on)} < 85m\Omega$ ($V_{gs}=2.5V$)

Maximum absolute ratings

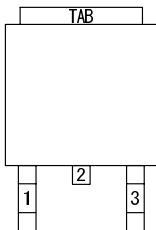
Parameter		Symbol	Limit	Unit	Note
Gate-source voltage		V_{gs}	± 16	V	
Continuous drain current	$T_a=25^{\circ}C$	I_d	20	A	
	$T_a=100^{\circ}C$		13		
Pulsed drain current		I_{dm}	40	A	3
Power dissipation	$T_a=25^{\circ}C$	P_d	26	W	
	$T_a=100^{\circ}C$		11		
Junction and storage temperature range		T_j, T_{stg}	-55 to 150	$^{\circ}C$	

Thermal characteristics

Parameter		Symbol	Typ.	Max.	Unit	Note
Maximum junction-to-case	Steady-state	$R\theta_{jc}$		4.8	$^{\circ}C/W$	
Maximum junction-to-ambient	Steady-state	$R\theta_{ja}$		110.0	$^{\circ}C/W$	

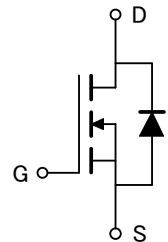
Pin configuration

TO-252-3 (TOP VIEW)



Pin No.	Pin name
1	GATE
2	DRAIN
3	SOURCE

Circuit



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Electrical characteristics

Ta=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250 μ A, Vgs=0V	20			V	
Zero gate voltage drain current	Idss	Vds=16V, Vgs=0V			1	μ A	
		Vds=13.2V, Vgs=0V, Tj=125°C			10		
Gate-body leakage current	Igss	Vds=0V, Vgs= $\pm$ 16V			$\pm$ 100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250 μ A	0.45	0.75	1.00	V	
On state drain current	Id(on)	Vgs=4.5V, Vds=10V	20			A	1
Static drain-source on-resistance	Rds(on)	Vgs=5V, Id=6A		37	50	m Ω	1
		Vgs=2.5V, Id=5A		55	85	m Ω	
Forward transconductance	Gfs	Vds=10V, Id=6A		13		S	1
Diode forward voltage	Vsd	If=Is, Vgs=0V			1.3	V	1
Max. body-diode continuous current	Is				20	A	
Pulsed body-diode current	Ism				40	A	3
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=15V, f=1MHz		195		pF	
Output capacitance	Coss			125		pF	
Reverse transfer capacitance	Crss			50		pF	
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=5V, Vds=10V, Id=10A		7.5		nC	2
Gate-source charge	Qgs			0.9		nC	2
Gate-drain charge	Qgd			4.0		nC	2
Turn-on delay time	td(on)	Vgs=5V, Vds=10V, Id $\approx$ 1A Rl=1 Ω , Rgen=3.3 Ω		4.5		ns	2
Turn-on rise time	tr			49.5		ns	2
Turn-off delay time	td(off)			12.0		ns	2
Turn-off fall time	tf			6.0		ns	2

NOTE :

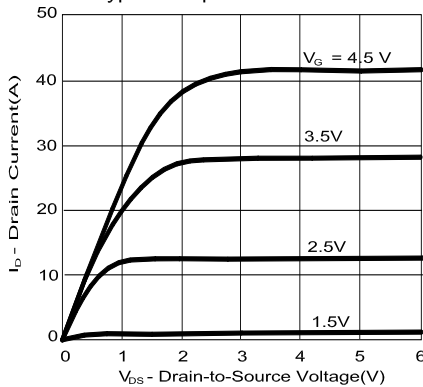
1. Pulse test : Pulsed width $\leq$ 300 μ sec and Duty cycle $\leq$ 2%.
2. Independent of operating temperature.
3. Pulsed width limited by maximum junction temperature.

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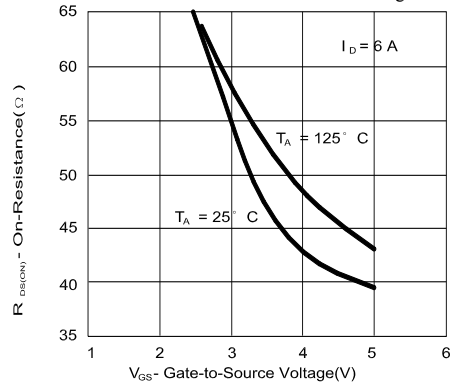
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Typical electrical and thermal characteristics

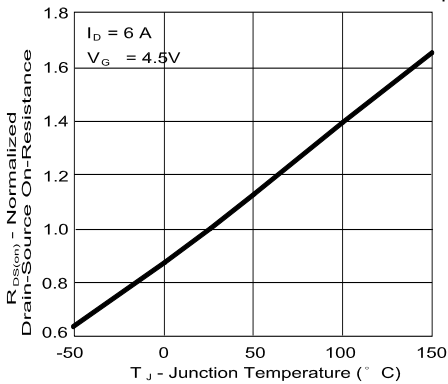
Typical output characteristics



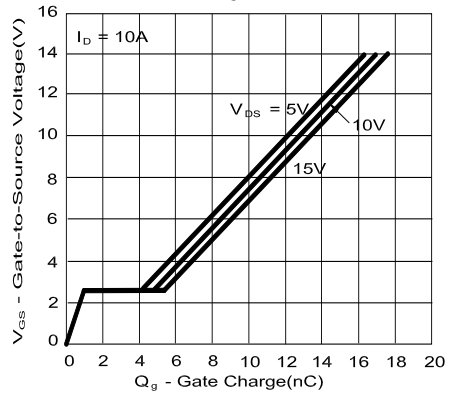
On-Resistance v.s. Gate Voltage



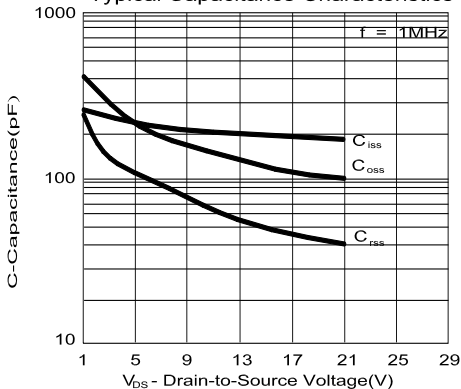
Normalized on-Resistance v.s. Junction Temperature



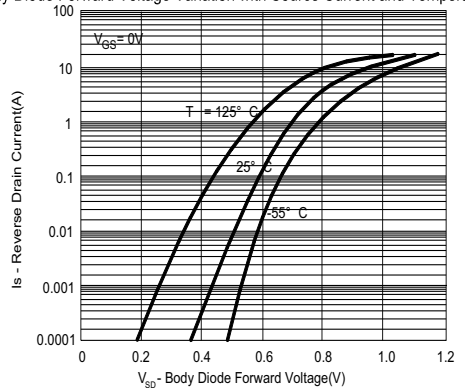
Gate Charge Characteristics



Typical Capacitance Characteristics



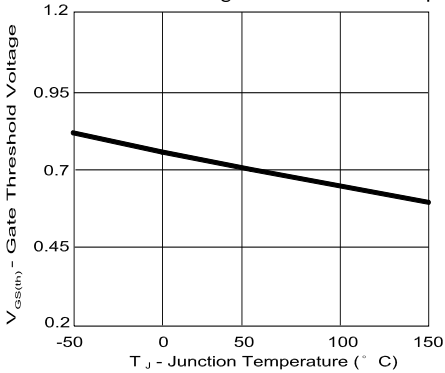
Body Diode Forward Voltage Variation with Source Current and Temperature



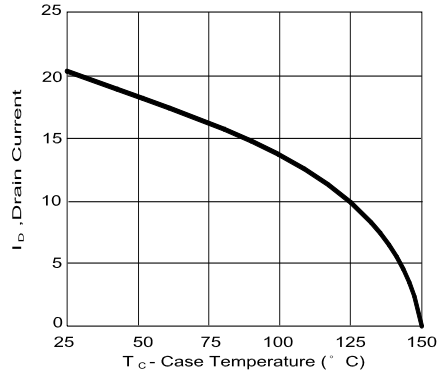
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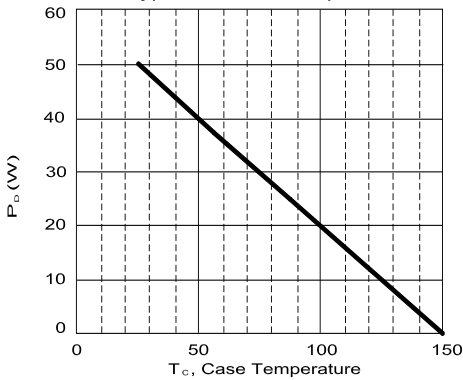
Gate Threshold Voltage v.s. Junction Temperature



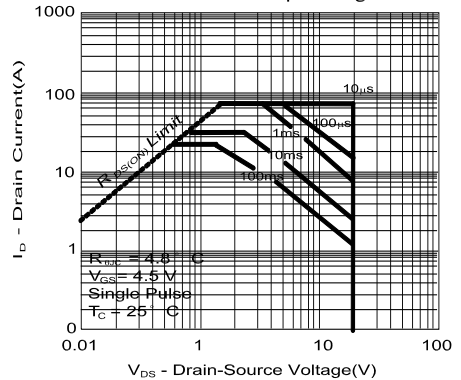
Maximum Drain Current v.s. Case Temperature



Typical Power Dissipation



Maximum Safe Operating Area



Effective Transient Thermal Impedance

