

Single P-channel MOSFET

ELM32413LA-S

General description

ELM32413LA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance.

Features

- $V_{ds} = -20V$
- $I_d = -10A$
- $R_{ds(on)} < 115m\Omega$ ($V_{gs} = -4.5V$)
- $R_{ds(on)} < 180m\Omega$ ($V_{gs} = -2.5V$)

Maximum absolute ratings

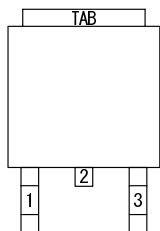
Parameter	Symbol	Limit	Unit	Note	
Drain-source voltage	V_{ds}	-20	V		
Gate-source voltage	V_{gs}	± 12	V		
Continuous drain current	I_d	$T_a = 25^\circ C$	-10.0	A	
		$T_a = 70^\circ C$	-6.2		
Pulsed drain current	I_{dm}	-24	A	3	
Power dissipation	P_d	$T_a = 25^\circ C$	25.0	W	
		$T_a = 70^\circ C$	9.6		
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	$R_{\theta jc}$		5	$^\circ C/W$	
Maximum junction-to-ambient	Steady-state	$R_{\theta ja}$		110	$^\circ C/W$	

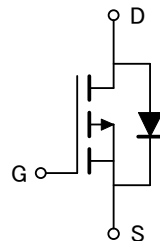
Pin configuration

TO-252-3 (TOP VIEW)



Pin No.	Pin name
1	GATE
2	DRAIN
3	SOURCE

Circuit



Single P-channel MOSFET

ELM32413LA-S

Electrical characteristics

Ta=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V	-20			V	
Zero gate voltage drain current	Idss	Vds=-16V, Vgs=0V			-1	μA	
		Vds=-13.2V, Vgs=0V, Tj=125°C			-10		
Gate-body leakage current	Igss	Vds=0V, Vgs=±12V			±100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-0.45	-0.80	-1.20	V	
On state drain current	Id(on)	Vgs=-4.5V, Vds=-5V	-24			A	1
Static drain-source on-resistance	Rds(on)	Vgs=-4.5V, Id=-3A		93	115	mΩ	1
		Vgs=-2.5V, Id=-2A		124	180	mΩ	
Forward transconductance	Gfs	Vds=-5V, Id=-3A		4.4		S	1
Diode forward voltage	Vsd	Is=-10A, Vgs=0V			-1.2	V	1
Max. body-diode continuous current	Is				-10	A	
Pulsed body-diode current	Ism				-24	A	3
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-6V, f=1MHz		430		pF	
Output capacitance	Coss			235		pF	
Reverse transfer capacitance	Crss			95		pF	
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=-4.5V, Vds=-10V Id=-3A		7.6	10.0	nC	2
Gate-source charge	Qgs			3.2		nC	2
Gate-drain charge	Qgd			2.0		nC	2
Turn-on delay time	td(on)	Vgs=-5V, Vds=-10V Id ≈ -1A, Rgen=6Ω			25	ns	2
Turn-on rise time	tr				60	ns	2
Turn-off delay time	td(off)				70	ns	2
Turn-off fall time	tf				60	ns	2

NOTE :

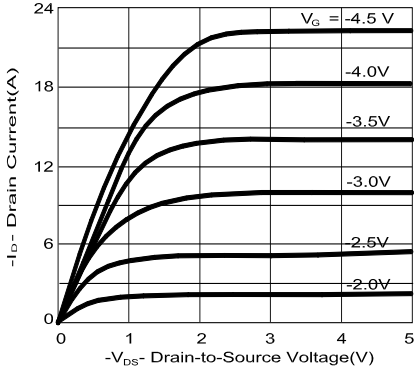
1. Pulse test : Pulsed width ≤ 300μsec and Duty cycle ≤ 2%.
2. Independent of operating temperature.
3. Pulsed width limited by maximum junction temperature.

Single P-channel MOSFET

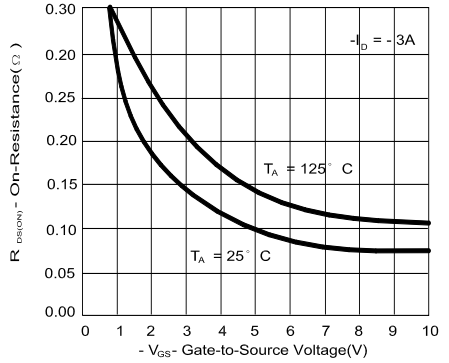
ELM32413LA-S

Typical electrical and thermal characteristics

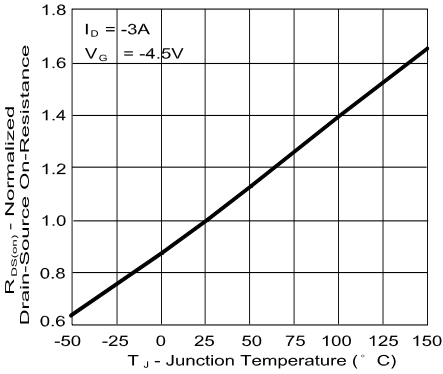
Typical output characteristics



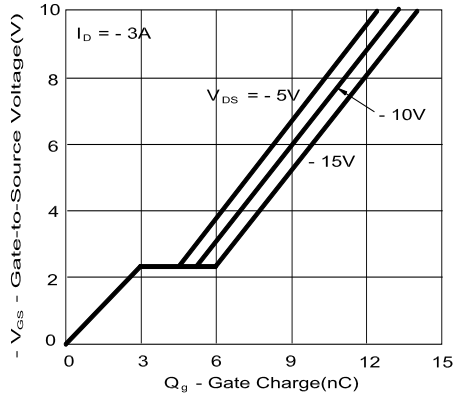
On-Resistance Variation with Gate-to-Source Voltage



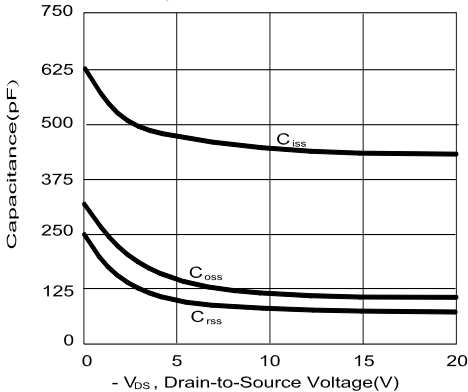
Normalized on-Resistance v.s. Junction Temperature



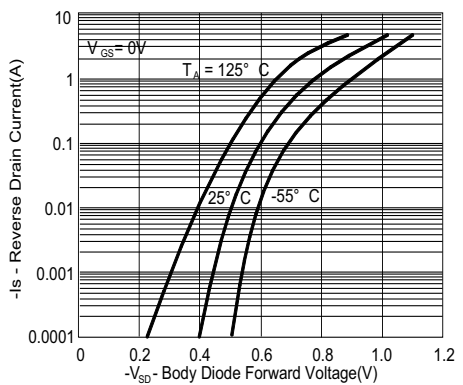
Gate Charge Characteristics



Capacitance Characteristics



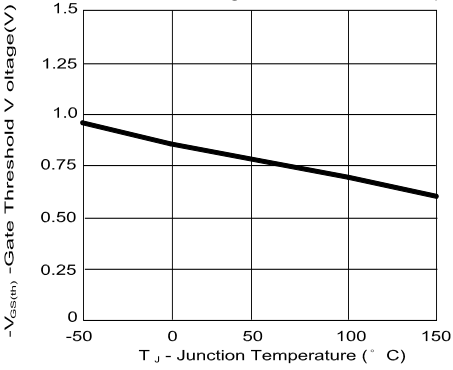
Body Diode Forward Voltage Variation with Source Current and Temperature



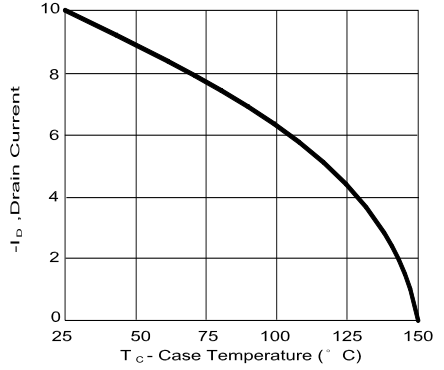
Single P-channel MOSFET

ELM32413LA-S

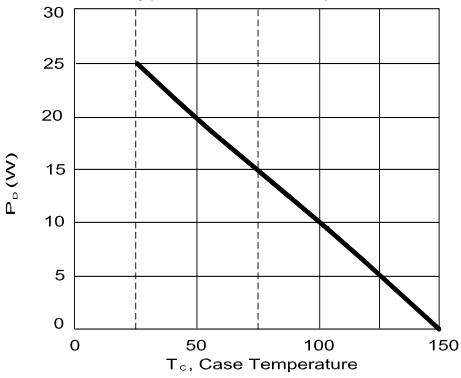
Gate Threshold Voltage v.s. Junction Temperature



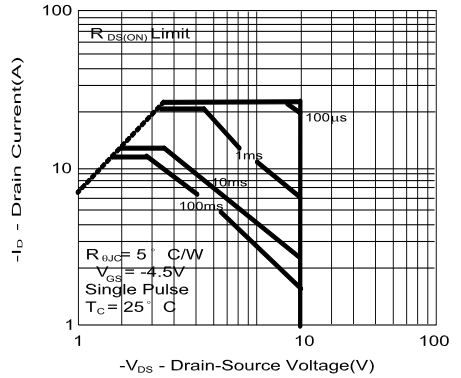
Maximum Drain Current v.s. Case Temperature



Typical Power Dissipation



Maximum Safe Operating Area



Effective Transient Thermal Impedance

