Single N-channel MOSFET

ELM32412LA-S

■General description

ELM32412LA-S uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate resistance.

■Features

- Vds=40V
- Id=12A
- Rds(on) < 25mΩ (Vgs=10V)
- Rds(on) < 45mΩ (Vgs=4.5V)

■Maximum absolute ratings

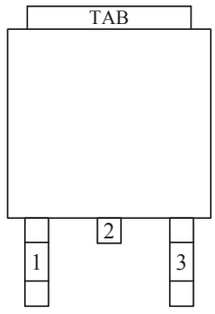
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		Vds	40	V	
Gate-source voltage		Vgs	±20	V	
Continuous drain current	Ta=25°C	Id	12	A	
	Ta=100°C		10		
Pulsed drain current		Idm	45	A	3
Power dissipation	Ta=25°C	Pd	41	W	
	Ta=100°C		32		
Junction and storage temperature range		Tj, Tstg	-55 to 150	°C	

■Thermal characteristics

Parameter		Symbol	Typ.	Max.	Unit	Note
Maximum junction-to-case	Steady-state	Rθjc		3	°C/W	
Maximum junction-to-ambient	Steady-state	Rθja		75	°C/W	

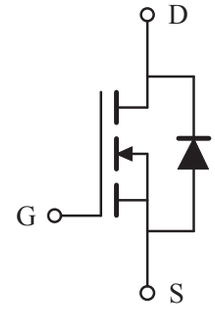
■Pin configuration

TO-252-3(TOP VIEW)



Pin No.	Pin name
1	GATE
2	DRAIN
3	SOURCE

■Circuit



■Electrical characteristics

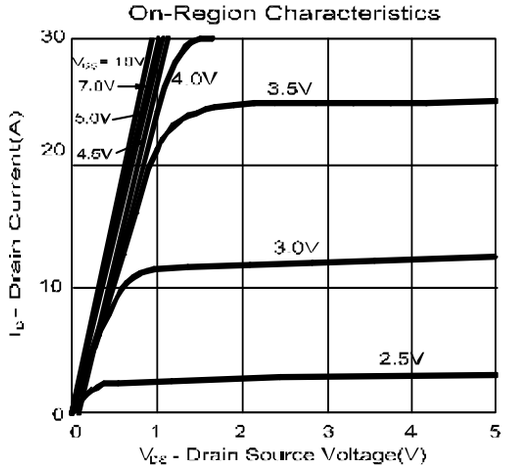
Ta=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V	40			V	
Zero gate voltage drain current	Idss	Vds=32V, Vgs=0V			1	μA	
		Vds=30V, Vgs=0V, Tj=125°C			10		
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±250	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA	1	2	3	V	
On state drain current	Id(on)	Vgs=10V, Vds=10V	45			A	1
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=12A		21	25	mΩ	1
		Vgs=4.5V, Id=10A		35	45	mΩ	
Forward transconductance	Gfs	Vds=10V, Id=12A		18		S	1
Diode forward voltage	Vsd	If=Is, Vgs=0V			1.2	V	1
Max. body-diode continuous current	Is				12	A	
Pulsed body-diode current	Ism				40	A	3
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=10V, f=1MHz		760		pF	
Output capacitance	Coss			165		pF	
Reverse transfer capacitance	Crss			55		pF	
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=10V, Vds=20V, Id=12A		16.0		nC	2
Gate-source charge	Qgs			2.5		nC	2
Gate-drain charge	Qgd			2.1		nC	2
Turn-on delay time	td(on)	Vgs=10V, Vds=20V, Id≈1A Rl=1Ω, Rgen=6Ω		2.1	4.2	ns	2
Turn-on rise time	tr			7.2	14.0	ns	2
Turn-off delay time	td(off)			11.6	21.0	ns	2
Turn-off fall time	tf			3.5	7.2	ns	2
Body diode reverse recovery time	trr	If=5A, dl/dt=100A/μs		14.5		ns	
Body diode reverse recovery charge	Qrr			7.2		nC	

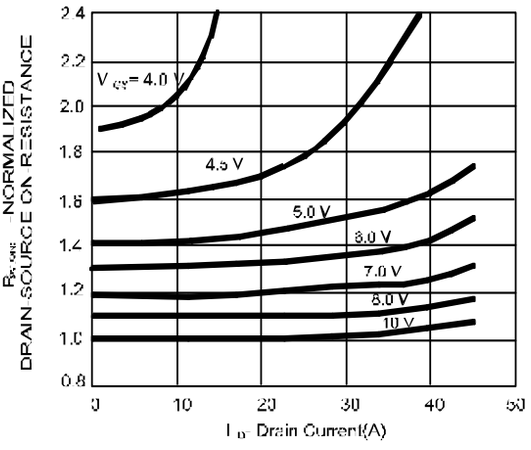
NOTE :
1. Pulse test : Pulsed width ≤ 300μsec and Duty cycle ≤ 2%.
2. Independent of operating temperature.
3. Pulsed width limited by maximum junction temperature.
4. Duty cycle ≤ 1%.

■Typical electrical and thermal characteristics

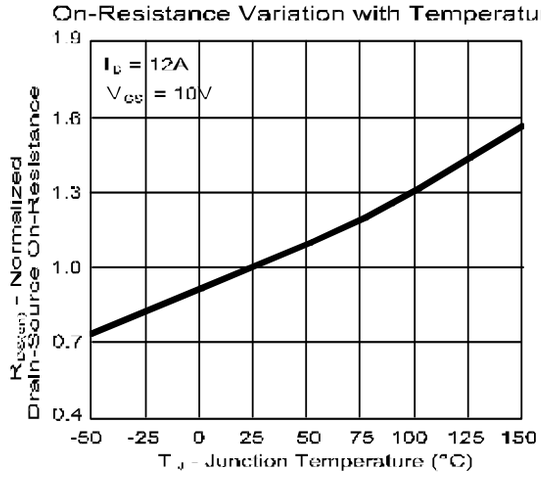
On-Region Characteristics



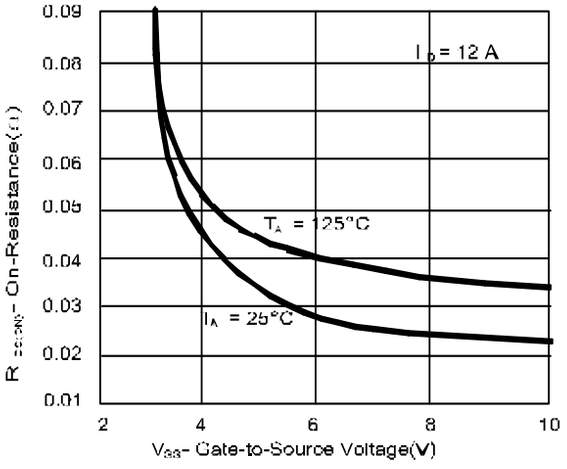
On-Resistance Variation with Drain Current and Gate Voltage



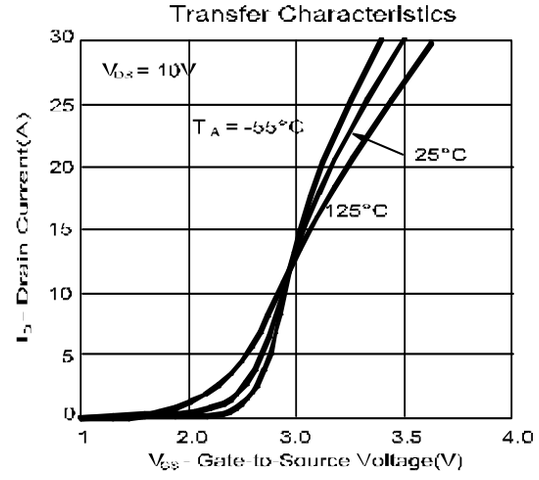
On-Resistance Variation with Temperature



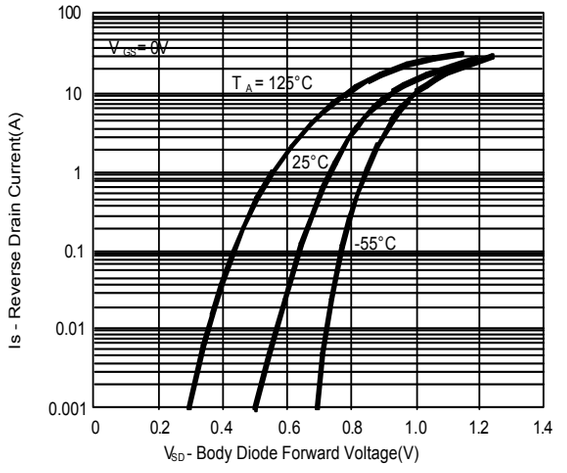
On-Resistance Variation with Gate-to-Source Voltage



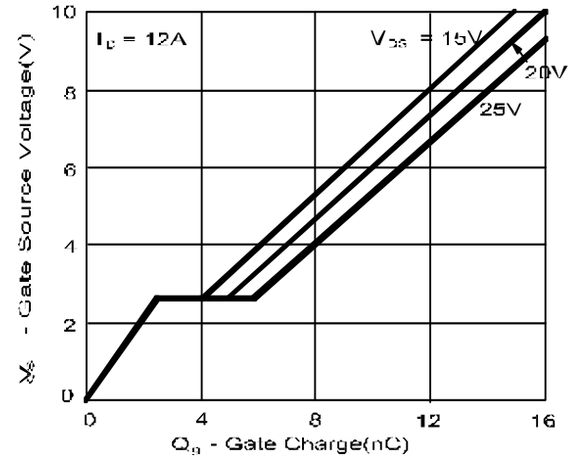
Transfer Characteristics



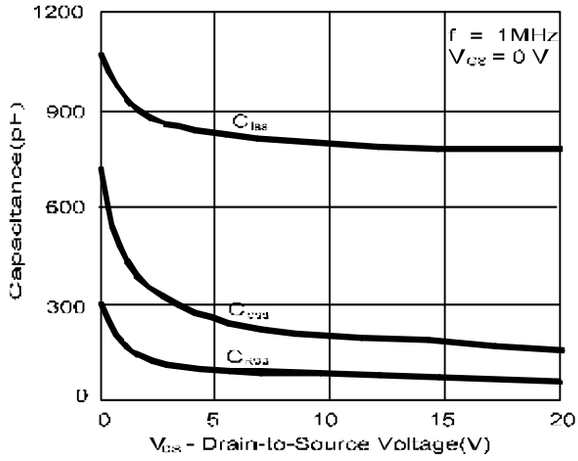
Body Diode Forward Voltage Variation with Source Current and Temperature



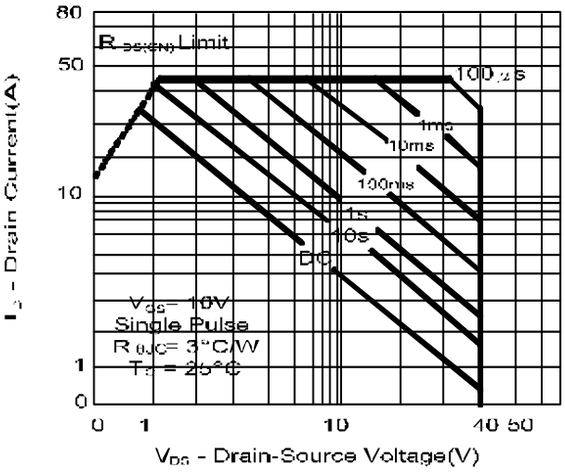
Gate Charge Characteristics



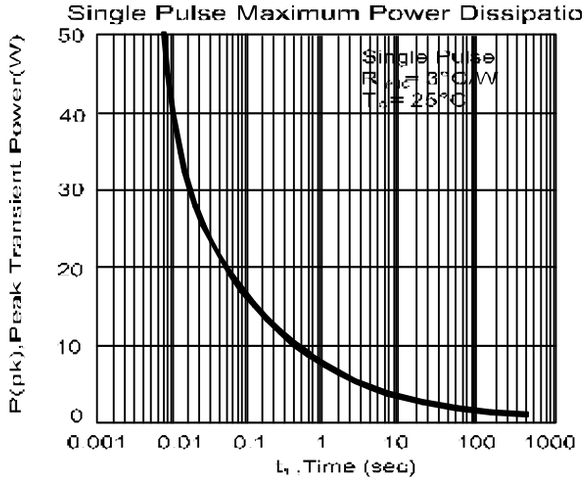
Capacitance Characteristics



Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve