

Single N-channel MOSFET

ELM33410CA-S

General description

ELM33410CA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate resistance.

Features

- $V_{ds}=20V$
- $I_d=5A$
- $R_{ds(on)} < 32m\Omega$ ($V_{gs}=4.5V$)
- $R_{ds(on)} < 50m\Omega$ ($V_{gs}=2.5V$)
- $R_{ds(on)} < 80m\Omega$ ($V_{gs}=1.8V$)

Maximum absolute ratings

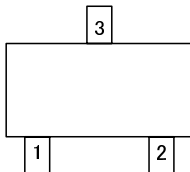
Parameter		Symbol	Limit	Unit	Note
Gate-source voltage		V_{gs}	± 12	V	
Continuous drain current	$T_a=25^{\circ}C$	I_d	5	A	
	$T_a=70^{\circ}C$		4		
Pulsed drain current		I_{dm}	30	A	3
Power dissipation	$T_a=25^{\circ}C$	P_d	1.25	W	
	$T_a=70^{\circ}C$		0.80		
Junction and storage temperature range		T_j, T_{stg}	-55 to 150	$^{\circ}C$	

Thermal characteristics

Parameter		Symbol	Typ.	Max.	Unit	Note
Maximum junction-to-ambient	Steady-state	$R\theta_{ja}$	75	100	$^{\circ}C/W$	

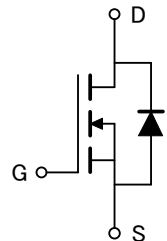
Pin configuration

SOT-23 (TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

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=16V, Vgs=0V, Tj=70°C			10		
Gate-body leakage current	Igss	Vds=0V, Vgs= $\pm$ 12V			$\pm$ 100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250 μ A	0.45	0.75	1.20	V	
On state drain current	Id(on)	Vgs=4.5V, Vds=5V	30			A	1
Static drain-source on-resistance	Rds(on)	Vgs=4.5V, Id=5A		27	32	m Ω	1
		Vgs=2.5V, Id=4A		38	50	m Ω	
		Vgs=1.8V, Id=2A		57	80	m Ω	
Forward transconductance	Gfs	Vds=5V, Id=5A		12		S	1
Diode forward voltage	Vsd	If=Is, Vgs=0V			1.3	V	1
Max. body-diode continuous current	Is				1.3	A	
Pulsed body-diode current	Ism				30	A	3
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=10V, f=1MHz		740		pF	
Output capacitance	Coss			90		pF	
Reverse transfer capacitance	Crss			66		pF	
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=4.5V, Vds=10V, Id=5A		8.0	12.0	nC	2
Gate-source charge	Qgs			3.6		nC	2
Gate-drain charge	Qgd			2.0		nC	2
Turn-on delay time	td(on)	Vgs=4.5V, Vds=10V, Id $\approx$ 1A Rgen=0.2 Ω		8	14	ns	2
Turn-on rise time	tr			6	12	ns	2
Turn-off delay time	td(off)			19	45	ns	2
Turn-off fall time	tf			7	23	ns	2

NOTE :

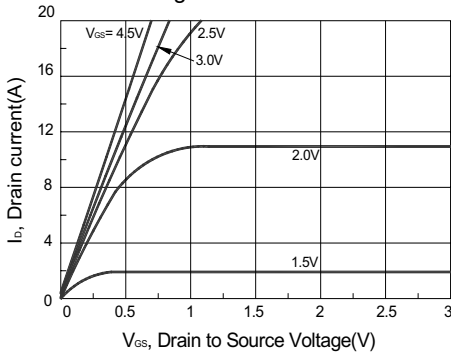
1. Pulse test : Pulsed width $\leq 300\mu$ sec and Duty cycle $\leq 2\%$.
2. Independent of operating temperature.
3. Pulsed width limited by maximum junction temperature.
4. Duty cycle $\leq 1\%$.

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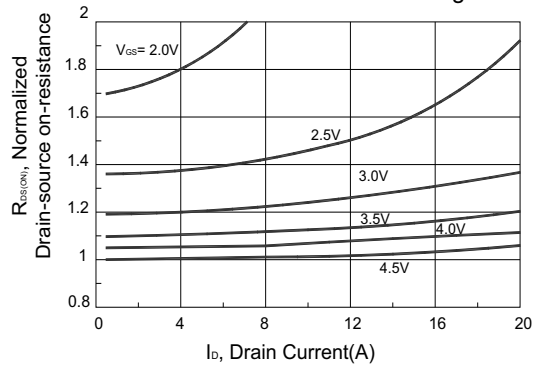
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Typical electrical and thermal characteristics

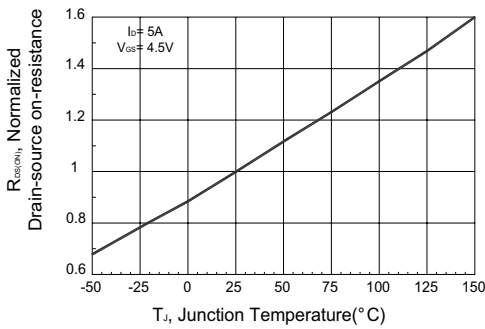
On-Region Characteristics.



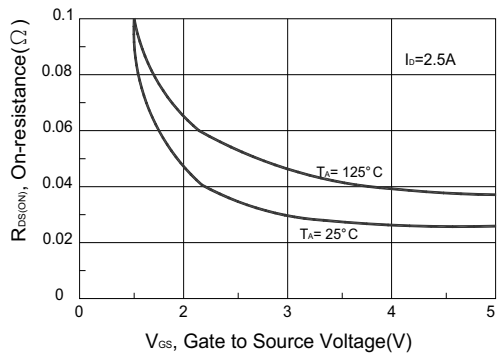
On-Resistance Variation with Drain Current and Gate Voltage.



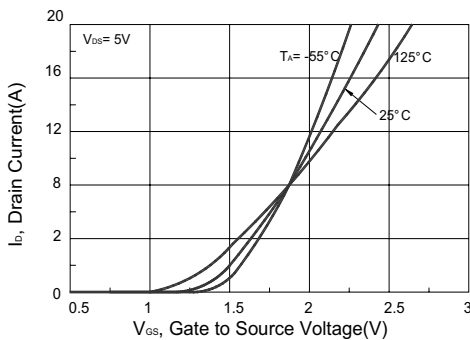
On-Resistance Variation with Temperature.



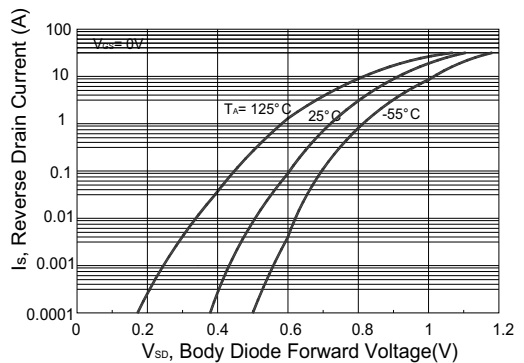
On-Resistance Variation with Gate-to-Source Voltage.



Transfer Characteristics.



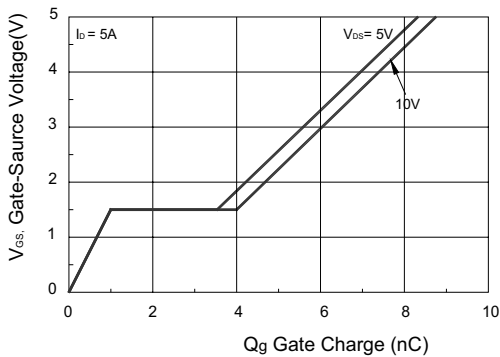
Body Diode Forward Voltage Variation with Source Current and Temperature.



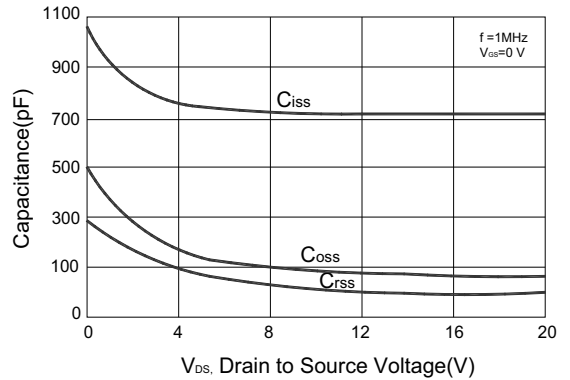
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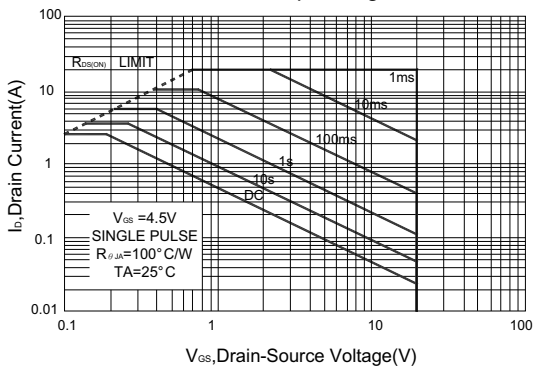
Gate-Charge Characteristics



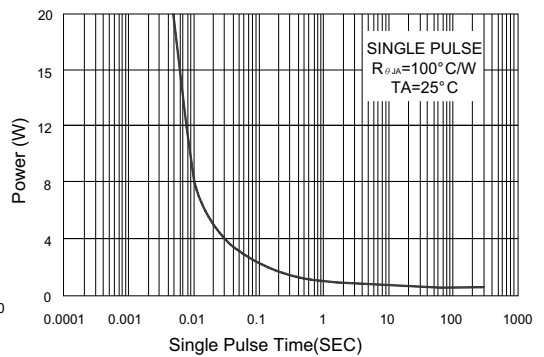
Capacitance Characteristics



Maximum Safe Operating Area.



Single Pulse Maximum Power Dissipation.



Transient Thermal Response Curve.

