

# Single P-channel MOSFET

## ELM33419CA-S

<http://www.elm-tech.com>

### ■ General description

ELM33419CA-S uses advanced trench technology to provide excellent  $R_{ds(on)}$ , low gate charge and low gate resistance.

### ■ Features

- $V_{ds} = -20V$
- $I_d = -3A$
- $R_{ds(on)} < 100m\Omega$  ( $V_{gs} = -4.5V$ )
- $R_{ds(on)} < 130m\Omega$  ( $V_{gs} = -2.5V$ )
- $R_{ds(on)} < 190m\Omega$  ( $V_{gs} = -1.8V$ )

### ■ Maximum absolute ratings

$T_a = 25^\circ C$ . Unless otherwise noted.

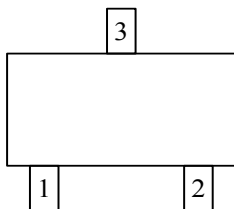
Parameter	Symbol	Limit	Unit	Note
Drain-source voltage	$V_{ds}$	-20	V	
Gate-source voltage	$V_{gs}$	$\pm 8$	V	
Continuous drain current	$I_d$	$T_a = 25^\circ C$	-3.0	A
		$T_a = 70^\circ C$	-2.4	
Pulsed drain current	$I_{dm}$	-20	A	3
Power dissipation	$P_d$	$T_c = 25^\circ C$	0.9	W
		$T_c = 70^\circ C$	0.6	
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-ambient	$R\theta_{ja}$		130	$^\circ C/W$	4

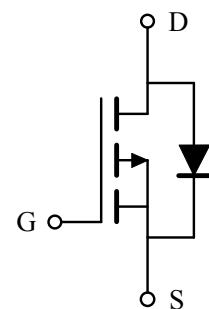
### ■ Pin configuration

SOT-23(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

### ■ Circuit



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### ■Electrical characteristics

Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
<b>STATIC PARAMETERS</b>							
Drain-source breakdown voltage	BVdss	Vgs=0V, Id=-250μA	-20			V	
Zero gate voltage drain current	Idss	Vds=-16V, Vgs=0V			-1	μA	
		Vds=-10V, Vgs=0V, Ta=70°C			-10		
Gate-body leakage current	Igss	Vds=0V, Vgs=±8V			±100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-0.3	-0.5	-1.0	V	
On state drain current	Id(on)	Vgs=-4.5V, Vds=-5V	-20			A	1
Static drain-source on-resistance	Rds(on)	Vgs=-4.5V, Id=-2.5A		80	100	mΩ	1
		Vgs=-2.5V, Id=-2.0A		109	130		
		Vgs=-1.8V, Id=-1.0A		140	190		
Forward transconductance	Gfs	Vds=-5V, Id=-2.5A		8.1		S	1
Diode forward voltage	Vsd	If=-2.5A, Vgs=0V			-1.2	V	1
Max. body-diode continuous current	Is				-3	A	
<b>DYNAMIC PARAMETERS</b>							
Input capacitance	Ciss	Vgs=0V, Vds=-10V, f=1MHz		434		pF	
Output capacitance	Coss			56		pF	
Reverse transfer capacitance	Crss			54		pF	
<b>SWITCHING PARAMETERS</b>							
Total gate charge	Qg	Vgs=-4.5V, Vds=-10V Id=-2.5A		6.3		nC	2
Gate-source charge	Qgs			0.7		nC	2
Gate-drain charge	Qgd			2.0		nC	2
Turn-on delay time	td(on)	Vgs=-4.5V, Vds=-10V Id=-2.5A, Rgen=6Ω		9.4		ns	2
Turn-on rise time	tr			38.0		ns	2
Turn-off delay time	td(off)			60.0		ns	2
Turn-off fall time	tf			66.0		ns	2
Body diode reverse recovery time	trr	If=-2.5A, dIf/dt=100A/μs		11		ns	
Body diode reverse recovery charge	Qrr			3		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. The value of Rθja is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with Ta =25°C.

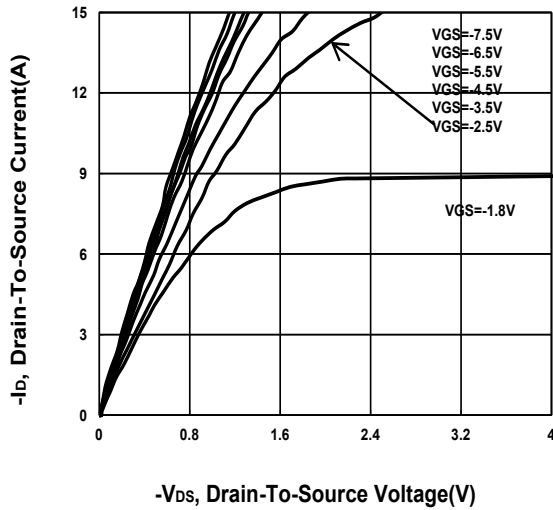
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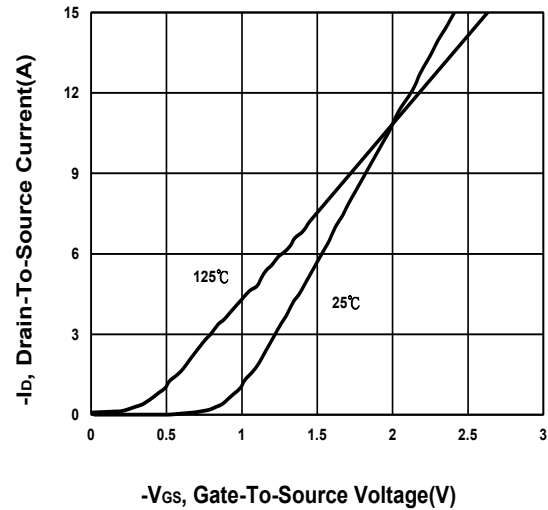
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### Typical electrical and thermal characteristics

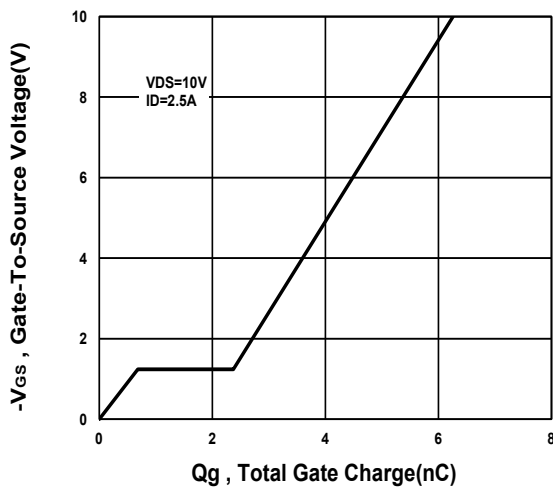
#### Output Characteristics



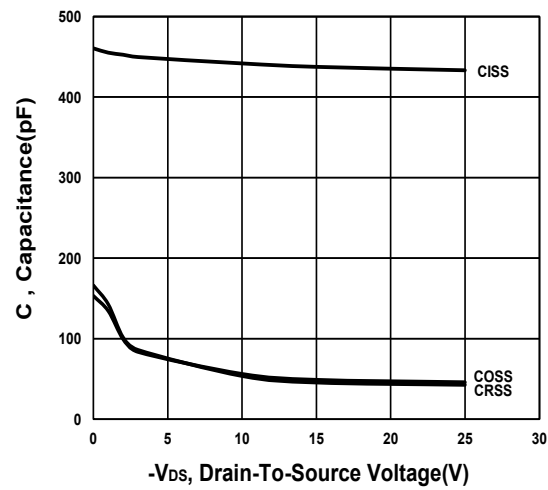
#### Transfer Characteristics



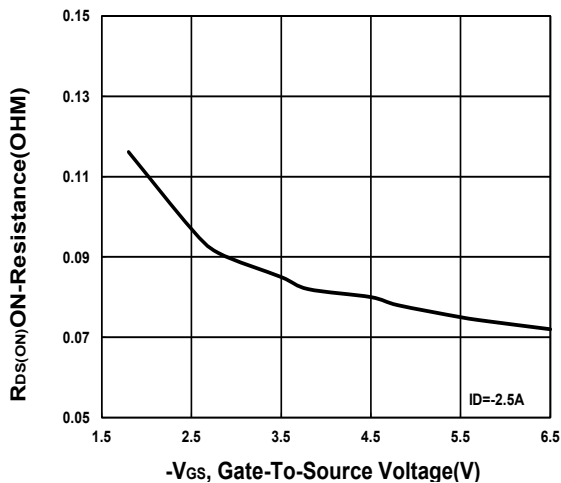
#### Gate charge Characteristics



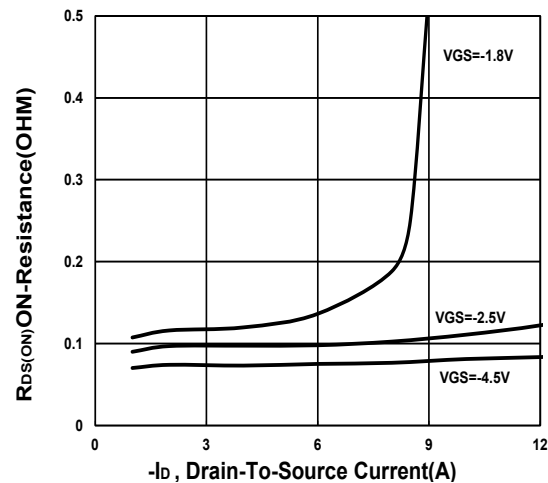
#### Capacitance Characteristic



#### On-Resistance VS Gate-To-Source



#### On-Resistance VS Drain Current



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