

# Single P-channel MOSFET

## ELM33417CA-S

### ■ General description

ELM33417CA-S uses advanced trench technology to provide excellent  $R_{ds(on)}$ , low gate charge and low gate resistance.

### ■ Features

- $V_{ds} = -30V$
- $I_d = -4.5A$
- $R_{ds(on)} < 51m\Omega$  ( $V_{gs} = -10V$ )
- $R_{ds(on)} < 85m\Omega$  ( $V_{gs} = -4.5V$ )

### ■ Maximum absolute ratings

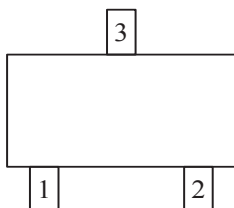
Parameter	Symbol	Limit	Unit	Note
Drain-source voltage	$V_{ds}$	-30	V	
Gate-source voltage	$V_{gs}$	$\pm 20$	V	
Continuous drain current	$I_d$	$T_a = 25^\circ C$	-4.5	A
		$T_a = 70^\circ C$	-3.5	
Pulsed drain current	$I_{dm}$	-20	A	3
Power dissipation	$P_d$	$T_a = 25^\circ C$	1.25	W
		$T_a = 70^\circ C$	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	$t \leq 5s$	$R_{\theta ja}$		90	$^\circ C/W$	
Maximum junction-to-ambient	Steady-state	$R_{\theta ja}$		125	$^\circ C/W$	
Maximum junction-to-lead	Steady-state	$R_{\theta jl}$		60	$^\circ C/W$	

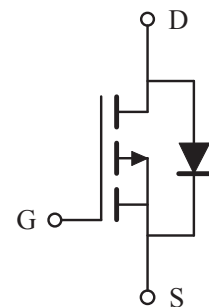
### ■ Pin configuration

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	
<b>STATIC PARAMETERS</b>								
Drain-source breakdown voltage	BV <sub>dss</sub>	V <sub>gs</sub> =0V, I <sub>d</sub> =-250μA	-30			V		
Zero gate voltage drain current	I <sub>dss</sub>	V <sub>ds</sub> =-24V, V <sub>gs</sub> =0V			-1	μA		
		V <sub>ds</sub> =-20V, V <sub>gs</sub> =0V, T <sub>j</sub> =125°C			-10			
Gate-body leakage current	I <sub>gss</sub>	V <sub>ds</sub> =0V, V <sub>gs</sub> =±20V			±100	nA		
Gate threshold voltage	V <sub>gs(th)</sub>	V <sub>ds</sub> =V <sub>gs</sub> , I <sub>d</sub> =-250μA	-1.0	-1.8	-3.0	V		
On state drain current	I <sub>d(on)</sub>	V <sub>gs</sub> =-10V, V <sub>ds</sub> =-5V	-20			A	1	
Static drain-source on-resistance	R <sub>ds(on)</sub>	V <sub>gs</sub> =-10V, I <sub>d</sub> =-4.5A		42	51	mΩ	1	
		V <sub>gs</sub> =-4.5V, I <sub>d</sub> =-3.5A		66	85			
Forward transconductance	G <sub>fs</sub>	V <sub>ds</sub> =-10V, I <sub>d</sub> =-4.5A		10		S	1	
Diode forward voltage	V <sub>sd</sub>	I <sub>f</sub> =-4.5A, V <sub>gs</sub> =0V			-1.1	V	1	
Max. body-diode continuous current	I <sub>s</sub>				-3	A		
Pulsed body-diode current	I <sub>sm</sub>				-6	A	3	
<b>DYNAMIC PARAMETERS</b>								
Input capacitance	C <sub>iss</sub>	V <sub>gs</sub> =0V, V <sub>ds</sub> =-10V, f=1MHz		700		pF		
Output capacitance	C <sub>oss</sub>				120		pF	
Reverse transfer capacitance	C <sub>rss</sub>				75		pF	
<b>SWITCHING PARAMETERS</b>								
Total gate charge	Q <sub>g</sub>	V <sub>gs</sub> =-10V, V <sub>ds</sub> =-15V I <sub>d</sub> =-4.5A		12.5		nC	2	
Gate-source charge	Q <sub>gs</sub>				2.1		nC	2
Gate-drain charge	Q <sub>gd</sub>				3.5		nC	2
Turn-on delay time	t <sub>d(on)</sub>	V <sub>gs</sub> =-10V, V <sub>ds</sub> =-15V I <sub>d</sub> ≈-1A, R <sub>gen</sub> =6Ω		7		ns	2	
Turn-on rise time	t <sub>r</sub>				10		ns	2
Turn-off delay time	t <sub>d(off)</sub>				30		ns	2
Turn-off fall time	t <sub>f</sub>				22		ns	2
Body diode reverse recovery charge	Q <sub>rr</sub>			13.4		nC		

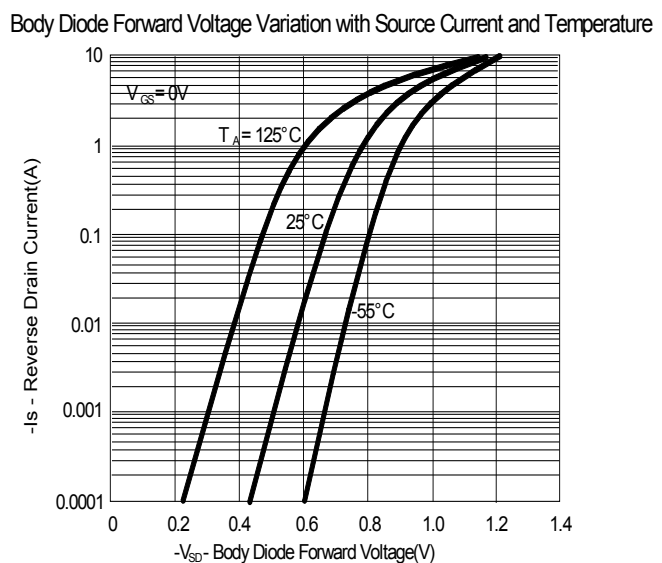
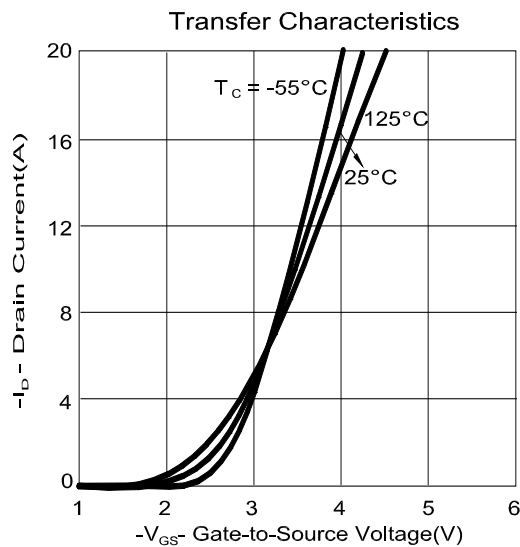
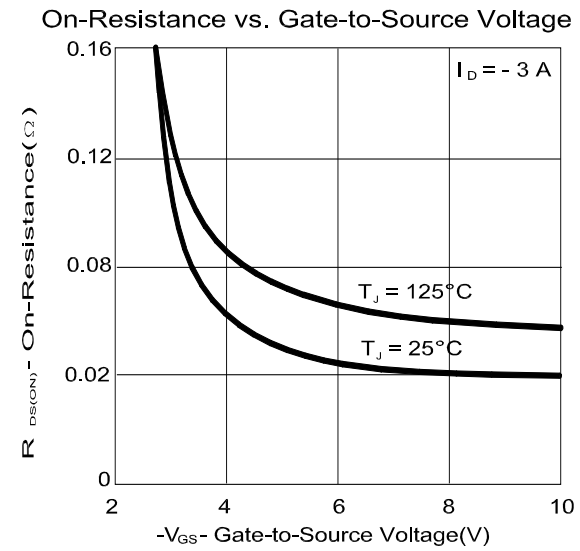
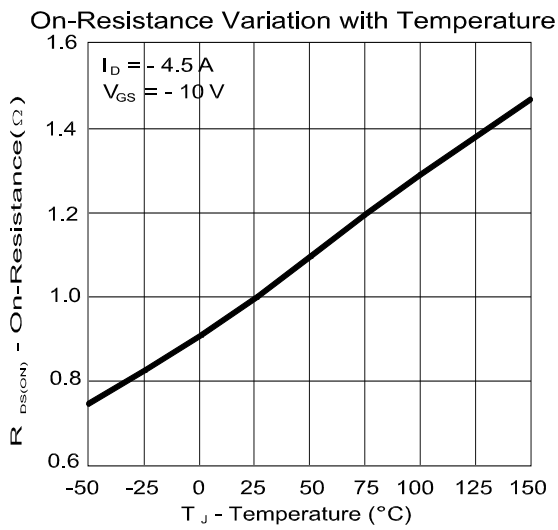
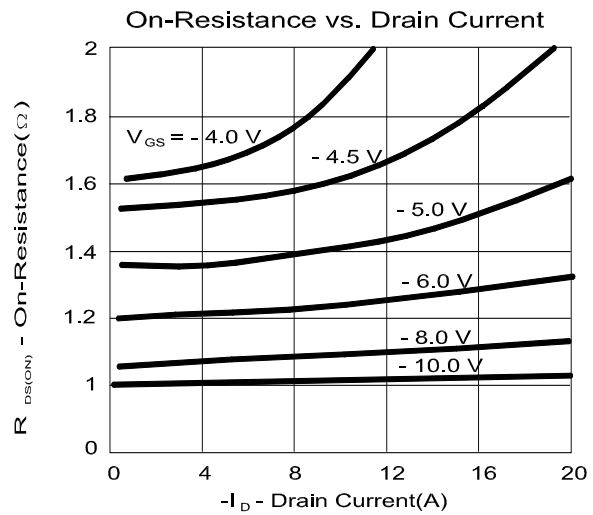
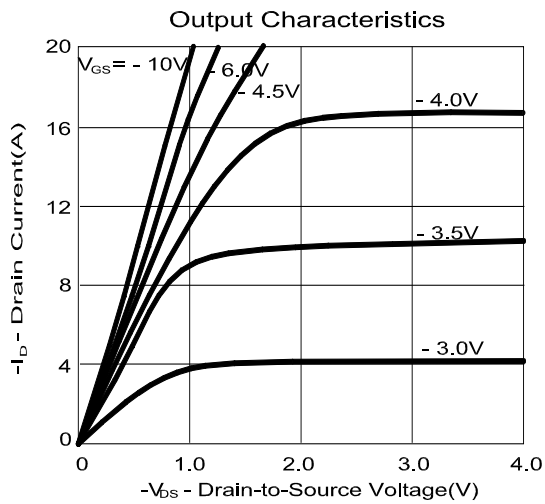
NOTE :

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

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### Typical electrical and thermal characteristics



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