

# Single P-channel MOSFET

## ELM33401CA-S

### ■ General description

ELM33401CA-S uses advanced trench technology to provide excellent  $R_{ds(on)}$ , low gate charge and low gate resistance.

### ■ Features

- $V_{ds} = -20V$
- $I_d = -3A$
- $R_{ds(on)} < 85m\Omega$  ( $V_{gs} = -10V$ )
- $R_{ds(on)} < 118m\Omega$  ( $V_{gs} = -4.5V$ )
- $R_{ds(on)} < 215m\Omega$  ( $V_{gs} = -2.5V$ )

### ■ Maximum absolute ratings

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

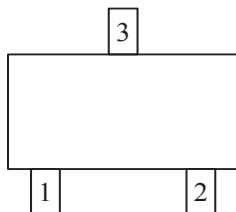
Parameter	Symbol	Limit	Unit	Note
Drain-source voltage	$V_{ds}$	-20	V	
Gate-source voltage	$V_{gs}$	$\pm 12$	V	
Continuous drain current	$I_d$	$T_a = 25^\circ C$	-3.0	A
		$T_a = 70^\circ C$	-1.4	
Pulsed drain current	$I_{dm}$	-10	A	3
Power dissipation	$P_d$	$T_c = 25^\circ C$	1.25	W
		$T_c = 70^\circ C$	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	$R\theta_{ja}$		166	$^\circ C/W$	

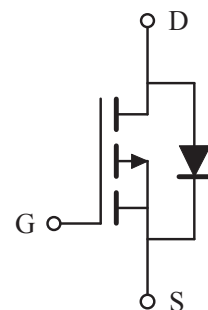
### ■ Pin configuration

SOT-23(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

### ■ Circuit



# Single P-channel MOSFET

## ELM33401CA-S

### ■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=-16V, Vgs=0V, Ta=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	-6			A	1
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-2A		72	85	mΩ	1
		Vgs=-4.5V, Id=-2A		98	118		
		Vgs=-2.5V, Id=-1A		150	215		
Forward transconductance	Gfs	Vds=-5V, Id=-2A		16		S	1
Diode forward voltage	Vsd	Is=-1A, Vgs=0V			-1.2	V	1
Max. body-diode continuous current	Is				-1.6	A	
Pulsed body-diode current	Ism				-3	A	3
<b>DYNAMIC PARAMETERS</b>							
Input capacitance	Ciss	Vgs=0V, Vds=-6V, f=1MHz		430		pF	
Output capacitance	Coss			235		pF	
Reverse transfer capacitance	Crss			95		pF	
<b>SWITCHING PARAMETERS</b>							
Total gate charge	Qg	Vgs=-4.5V, Vds=-10V Id=-2A		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=-4.5V, Vds=-10V Id=-1A, Rgen=6Ω		11	22	ns	2
Turn-on rise time	tr			32	55	ns	2
Turn-off delay time	td(off)			38	68	ns	2
Turn-off fall time	tf			32	55	ns	2

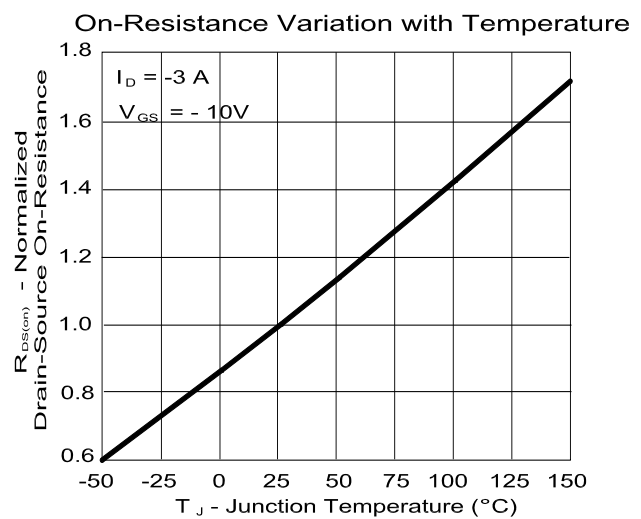
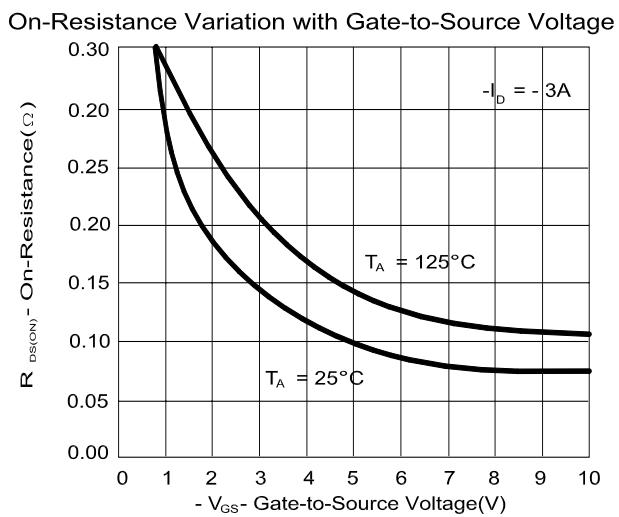
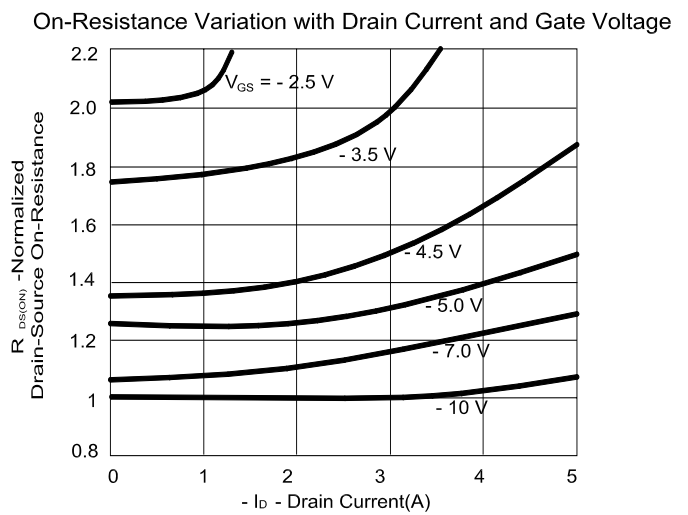
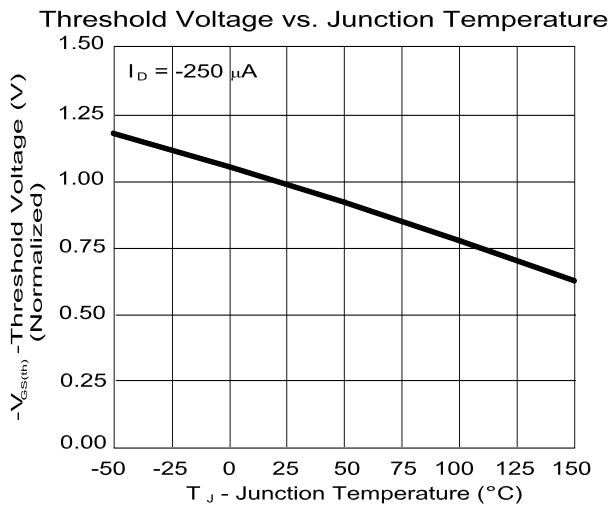
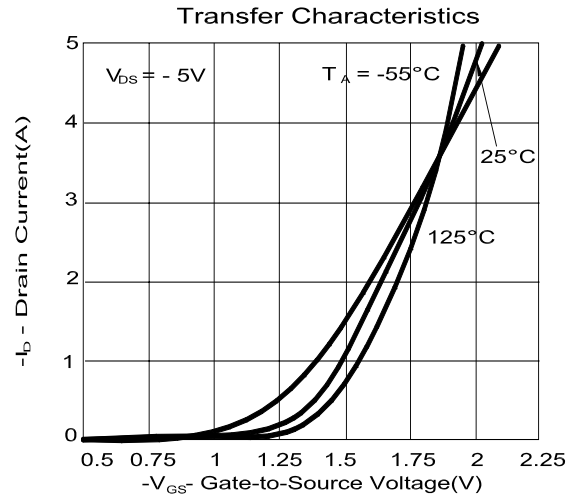
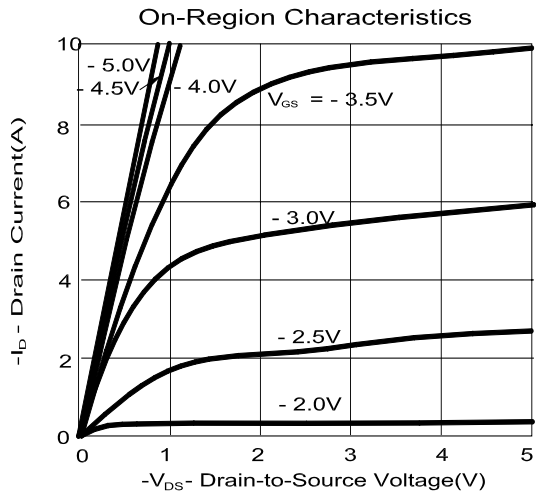
NOTE :

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%.

# Single P-channel MOSFET

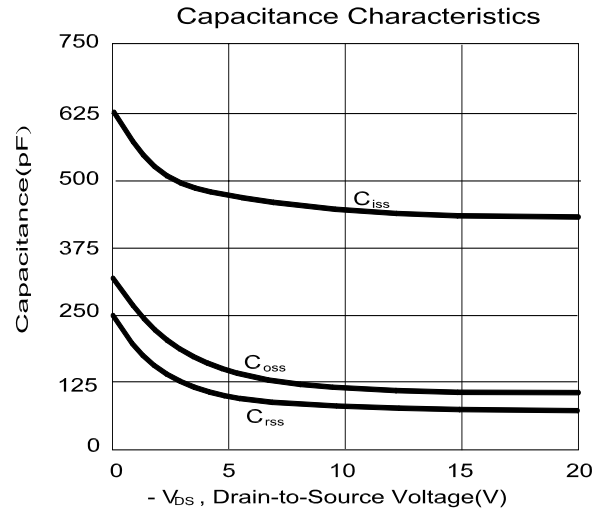
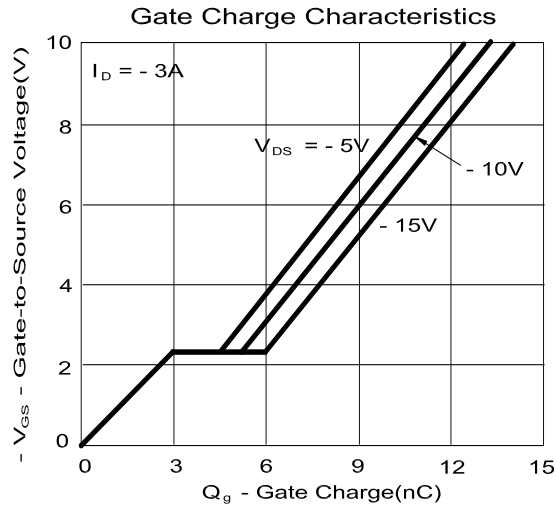
## ELM33401CA-S

### ■ Typical electrical and thermal characteristics

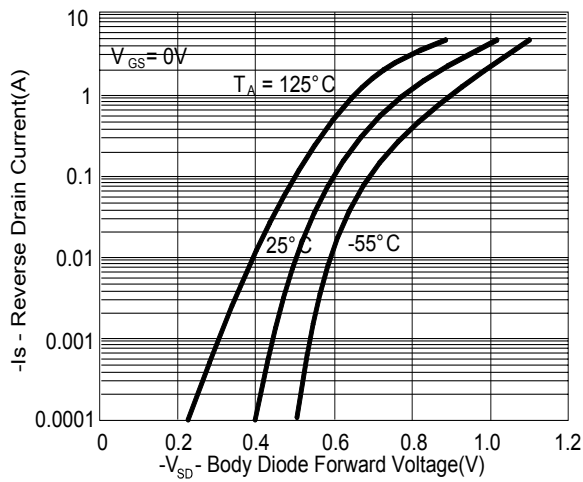


# Single P-channel MOSFET

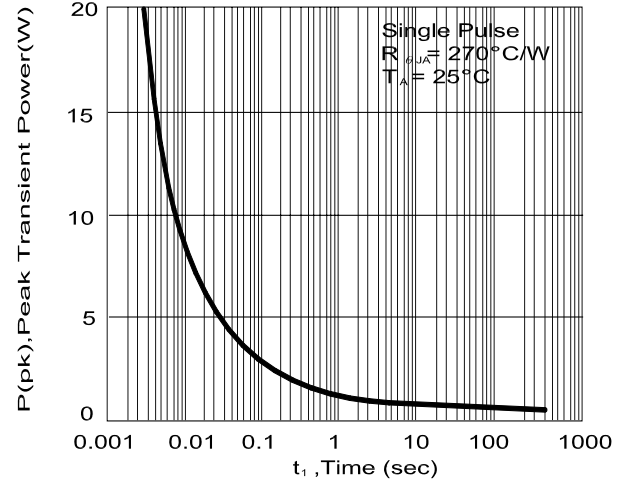
## ELM33401CA-S



Body Diode Forward Voltage Variation with Source Current and Temperature



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve

