

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

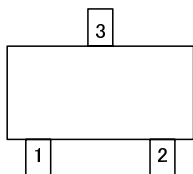
Parameter	Symbol	Limit	Unit	Note	
Drain-source voltage	V_{ds}	-20	V		
Gate-source voltage	V_{gs}	± 12	V		
Continuous drain current	I_d	$T_a = 25^\circ C$	-3.0	A	
		$T_a = 70^\circ C$	-1.4		
Pulsed drain current	I_{dm}	-10	A	3	
Power dissipation	P_d	$T_a = 25^\circ C$	1.25	W	
		$T_a = 70^\circ C$	0.80		
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	Steady-state	$R\theta_{ja}$		166	$^\circ C/W$	

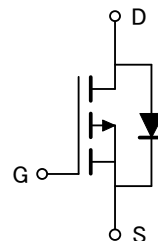
Pin configuration

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

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
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, Tj=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	mΩ	
		Vgs=-2.5V, Id=-1A		150	215	mΩ	
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
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-6V, f=1MHz		430		pF	
Output capacitance	Coss			235		pF	
Reverse transfer capacitance	Crss			95		pF	
SWITCHING PARAMETERS							
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

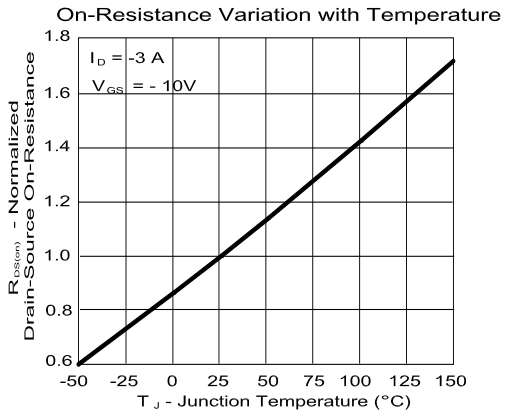
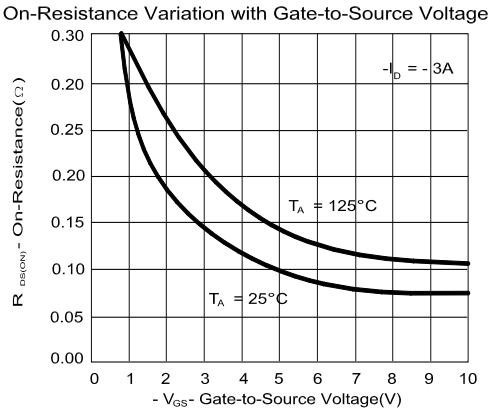
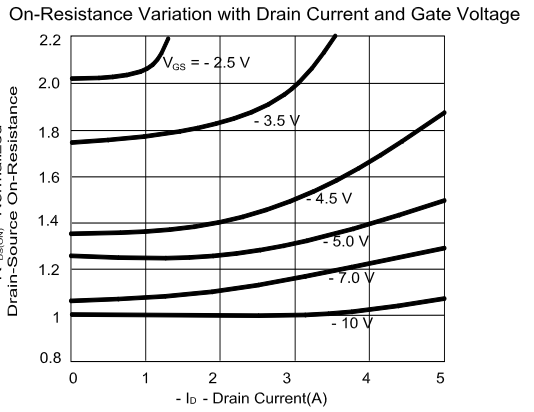
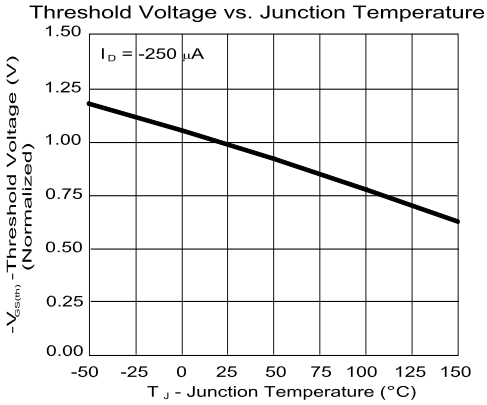
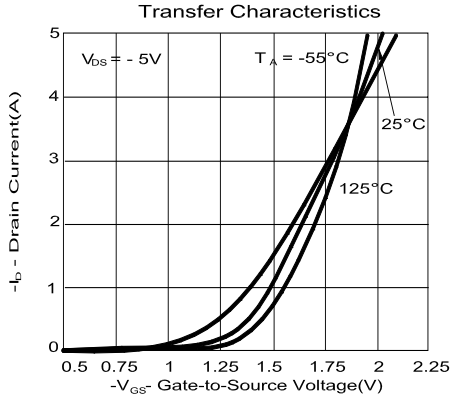
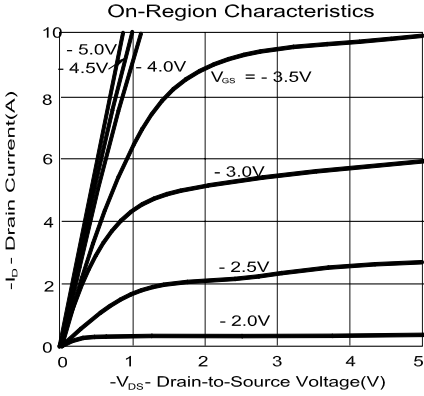
NOTE :

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

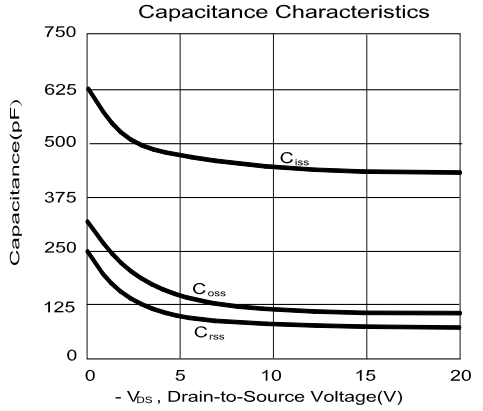
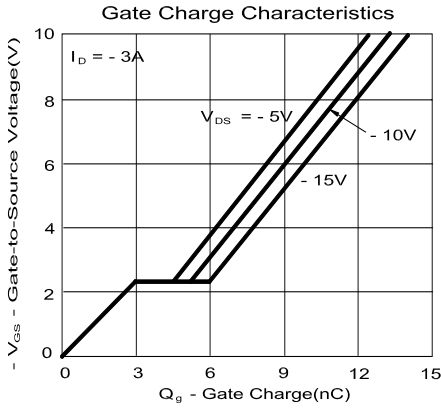
ELM33401CA-S

Typical electrical and thermal characteristics

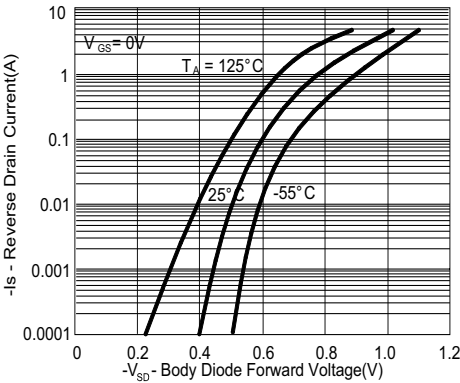


Single P-channel MOSFET

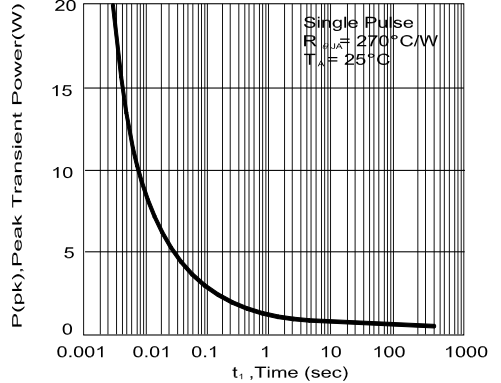
ELM33401CA-S



Body Diode Forward Voltage Variation with Source Current and Temperature



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve

