

# Single N-channel MOSFET

## ELM4N0008FCA-S

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

### ■ General description

ELM4N0008FCA-S uses advanced trench technology to provide excellent  $R_{ds(on)}$ , low gate charge and low gate threshold voltage.

### ■ Features

- $V_{ds}=100V$
- $I_d=1.2A$  ( $V_{gs}=10V$ )
- $R_{ds(on)} = 310m\Omega$  ( $V_{gs}=10V$ )
- $R_{ds(on)} = 320m\Omega$  ( $V_{gs}=4.5V$ )

### ■ Maximum absolute ratings

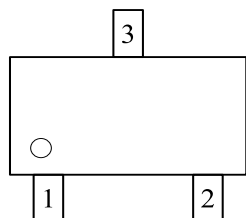
Parameter	Symbol	Limit	Unit	Note	
Drain-source voltage	$V_{ds}$	100	V		
Gate-source voltage	$V_{gs}$	$\pm 20$	V		
Continuous drain current ( $V_{gs}=10V$ )	$I_d$	$T_a=25^\circ C$	1.2	A	1
		$T_a=70^\circ C$	1.0		
Pulsed drain current	$I_{dm}$	5	A	2	
Power dissipation	$P_d$	1	W	3	
Storage temperature range	$T_{stg}$	-55 to 150	$^\circ C$		
Operating junction temperature range	$T_j$	-55 to 150	$^\circ C$		

### ■ Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-to-ambient	$R_{\theta ja}$	-	125	$^\circ C/W$	1
Thermal resistance junction-to-case	$R_{\theta jc}$	-	80	$^\circ C/W$	1

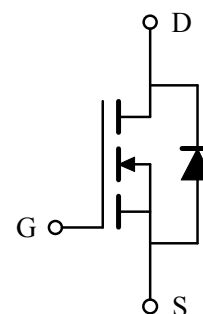
### ■ Pin configuration

SOT-23(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

### ■ Circuit



# Single N-channel MOSFET

## ELM4N0008FCA-S

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

### ■Electrical characteristics

T<sub>j</sub>=25°C. Unless otherwise noted.

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	100	-	-	V	
Drain-source leakage current	I <sub>dss</sub>	V <sub>ds</sub> =80V, V <sub>gs</sub> =0V	-	-	1	μA	
		V <sub>ds</sub> =80V, V <sub>gs</sub> =0V, T <sub>j</sub> =55°C	-	-	5		
Gate-body leakage current	I <sub>gss</sub>	V <sub>gs</sub> =±20V, V <sub>ds</sub> =0V	-	-	±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	1.5	2.5	V	
Static drain-source on-resistance	R <sub>ds(on)</sub>	V <sub>gs</sub> =10V, I <sub>d</sub> =1A	-	260	310	mΩ	2
		V <sub>gs</sub> =4.5V, I <sub>d</sub> =0.5A	-	270	320		
Forward transconductance	G <sub>fs</sub>	V <sub>ds</sub> =5V, I <sub>d</sub> =1A	-	2.4	-	S	
Diode forward voltage	V <sub>sd</sub>	I <sub>s</sub> =1A, V <sub>gs</sub> =0V	-	-	1.2	V	2
Max. body-diode continuous current	I <sub>s</sub>	V <sub>gs</sub> =V <sub>ds</sub> =0V, Force current	-	-	1.2	A	1, 4
Pulsed body-diode current	I <sub>sm</sub>		-	-	5	A	2.4
<b>DYNAMIC PARAMETERS</b>							
Input capacitance	C <sub>iss</sub>	V <sub>ds</sub> =15V, V <sub>gs</sub> =0V, f=1MHz	-	508.0	711.0	pF	
Output capacitance	C <sub>oss</sub>		-	29.0	41.0	pF	
Reverse transfer capacitance	C <sub>rss</sub>		-	16.4	23.0	pF	
Gate resistance	R <sub>g</sub>	V <sub>ds</sub> =0V, V <sub>gs</sub> =0V, f=1MHz	-	2.8	5.6	Ω	
<b>SWITCHING PARAMETERS</b>							
Total gate charge (10V)	Q <sub>g</sub>	V <sub>ds</sub> =80V, V <sub>gs</sub> =10V, I <sub>d</sub> =1A	-	9.7	13.6	nC	
Gate-source charge	Q <sub>gs</sub>		-	1.6	2.2	nC	
Gate-drain charge	Q <sub>gd</sub>		-	1.7	2.4	nC	
Turn-on delay time	t <sub>d(on)</sub>	V <sub>ds</sub> =50V, V <sub>gs</sub> =10V, I <sub>d</sub> =1A R <sub>gen</sub> =3.3Ω	-	1.6	3.2	ns	
Turn-on rise time	t <sub>r</sub>		-	19.0	34.0	ns	
Turn-off delay time	t <sub>d(off)</sub>		-	13.6	27.0	ns	
Turn-off fall time	t <sub>f</sub>		-	19.0	38.0	ns	
Reverse recovery time	t <sub>rr</sub>	I <sub>f</sub> =1A, di/dt=100A/μs	-	14.0	-	ns	
Reverse recovery charge	Q <sub>rr</sub>		-	9.3	-	nC	

NOTE :

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300μs and duty cycle ≤ 2%.
3. The power dissipation is limited by 150°C junction temperature.
4. The data is theoretically the same as I<sub>d</sub> and I<sub>dm</sub>, in real applications, should be limited by total power dissipation.

# Single N-channel MOSFET

ELM4N0008FCA-S

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

## Typical characteristics

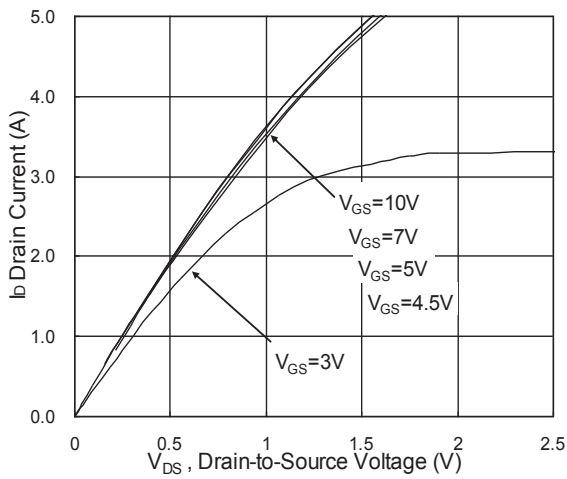


Fig.1 Typical Output Characteristics

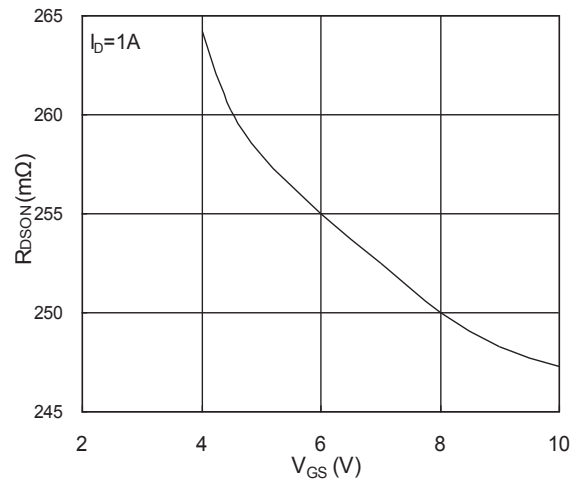


Fig.2 On-Resistance vs. Gate-Source

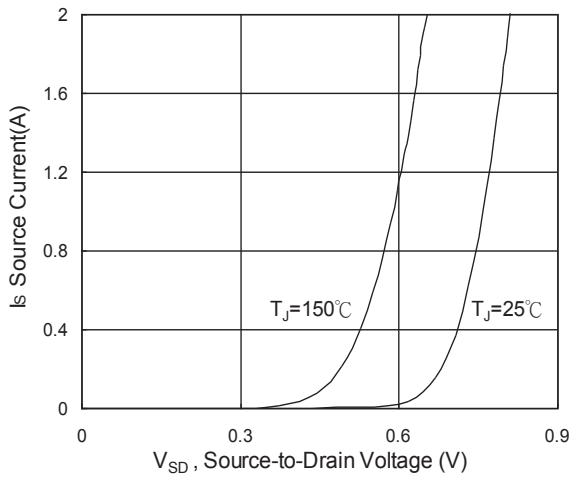


Fig.3 Forward Characteristics of Reverse

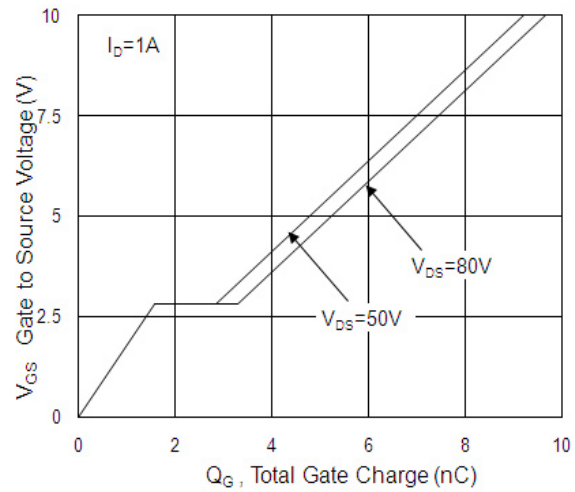


Fig.4 Gate-Charge Characteristics

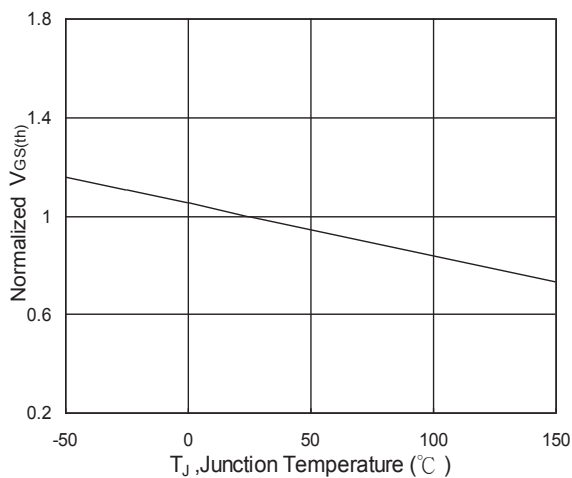


Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$

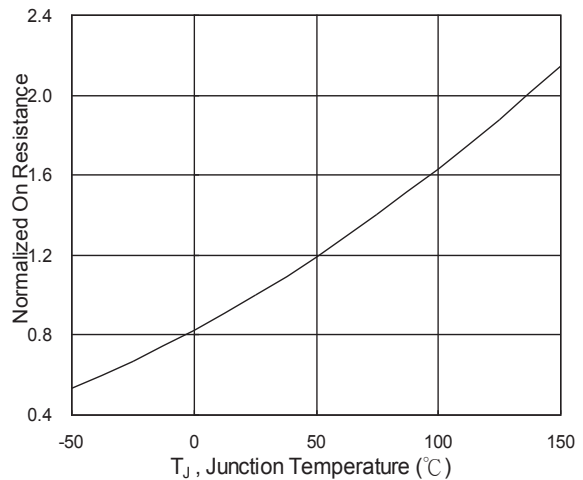
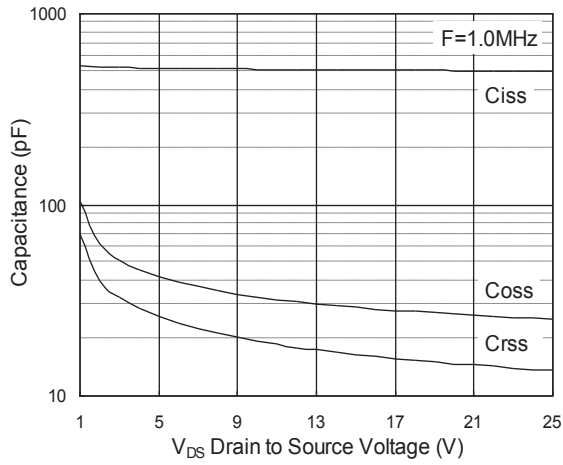


Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$

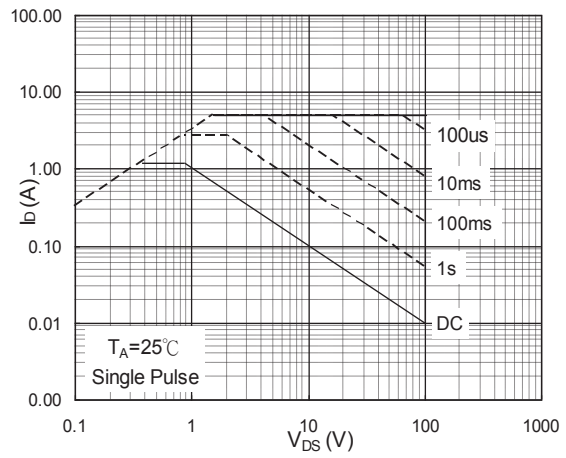
# Single N-channel MOSFET

## ELM4N0008FCA-S

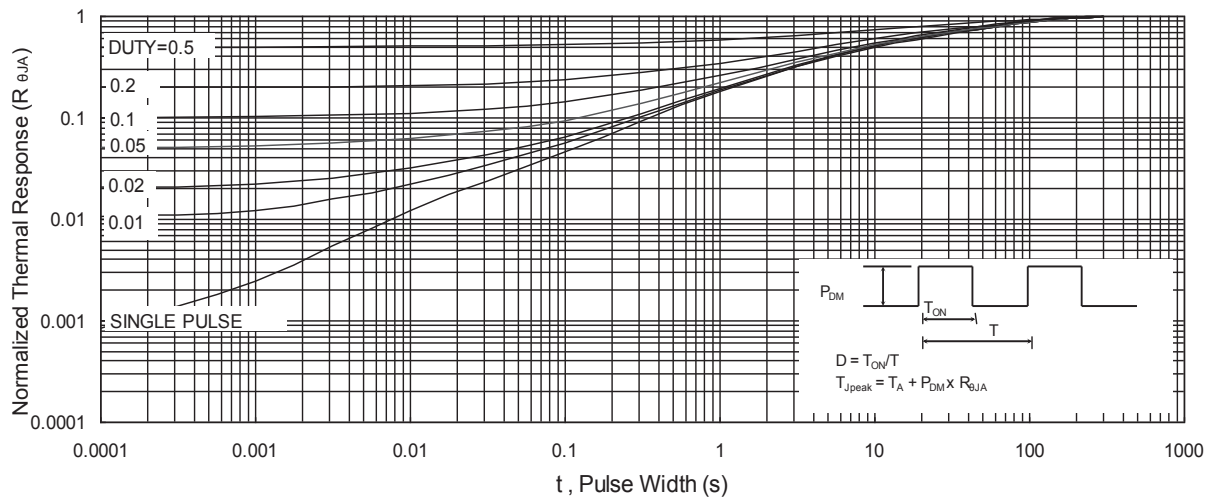
<http://www.elm-tech.com>



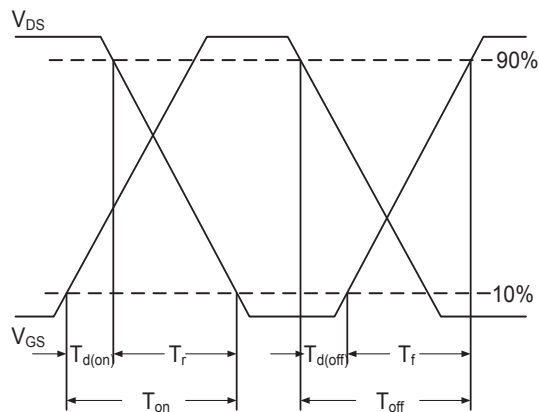
**Fig.7 Capacitance**



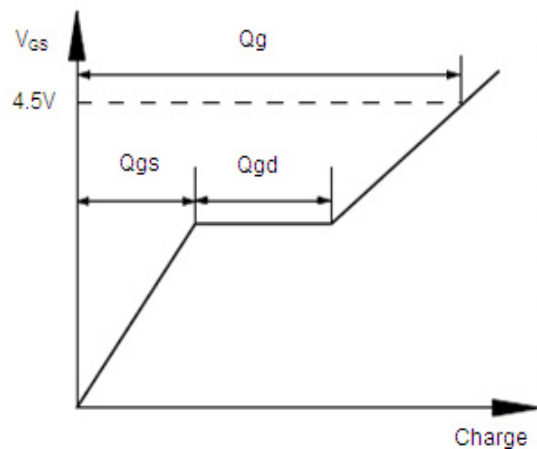
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



**Fig.10 Switching Time Waveform**



**Fig.11 Gate Charge Waveform**