

Single N-channel MOSFET

ELM43400CB-S

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

■General description

ELM43400CB-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage.

■Features

- $V_{ds}=30V$
- $I_d=5.8A$
- $R_{ds(on)} = 27m\Omega$ ($V_{gs}=10V$)
- $R_{ds(on)} = 32m\Omega$ ($V_{gs}=4.5V$)
- $R_{ds(on)} = 40m\Omega$ ($V_{gs}=2.5V$)

■Maximum absolute ratings

Ta=25°C. Unless otherwise noted.

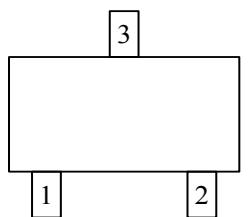
Parameter	Symbol	Limit	Unit	Note
Drain-source voltage	V_{ds}	30	V	
Gate-source voltage	V_{gs}	± 12	V	
Continuous drain current	I_d	5.8	A	
Ta=70°C		4.9		
Pulsed drain current	I_{dm}	20	A	2
Power dissipation	P_d	1	W	3
Storage temperature range	T_{stg}	-55 to 150	°C	
Operating junction temperature range	T_j	-55 to 150	°C	

■Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-to-ambient	$R_{\theta ja}$	-	125	°C/W	1
t ≤ 10s		-	85	°C/W	1

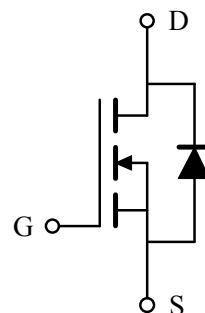
■Pin configuration

SOT-23(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

■Circuit



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■Electrical characteristics

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Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250µA, Vgs=0V	30	-	-	V	
Zero gate voltage drain current	Idss	Vds=24V, Vgs=0V	-	-	1	µA	
		Vds=24V, Vgs=0V, Ta=55°C	-	-	5		
Gate-body leakage current	Igss	Vds=0V, Vgs=±12V	-	-	±100	nA	
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250µA	0.5	-	1.2	V	
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=5.8A	-	-	27	mΩ	2
		Vgs=4.5V, Id=5.0A	-	-	32		
		Vgs=2.5V, Id=4.0A	-	-	40		
Forward transconductance	Gfs	Vds=5V, Id=5A	-	25	-	S	
Diode forward voltage	Vsd	Is=1A, Vgs=0V	-	-	1.2	V	2
Max. body-diode continuous current	Is	Vgs=Vds=0V, Force current	-	-	5.8	A	1, 4
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=15V, f=1MHz	-	860	-	pF	
Output capacitance	Coss		-	84	-	pF	
Reverse transfer capacitance	Crss		-	70	-	pF	
Gate resistance	Rg	Vgs=0V, Vds=0V, f=1MHz	-	1.5	-	Ω	
SWITCHING PARAMETERS							
Total gate charge (4.5V)	Qg	Vgs=4.5V, Vds=15V, Id=5.8A	-	11.5	-	nC	
Gate-source charge	Qgs		-	1.6	-	nC	
Gate-drain charge	Qgd		-	2.9	-	nC	
Turn-on delay time	td(on)	Vgs=10V, Vds=15V, Id=5A Rgen=3Ω		5		ns	
Turn-on rise time	tr			47		ns	
Turn-off delay time	td(off)			26		ns	
Turn-off fall time	tf			8		ns	

NOTE :

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300µs, duty cycle ≤ 2%.
3. The power dissipation is limited by 150°C junction temperature.
4. The data is theoretically the same as Id and Idm, in real applications, should be limited by total power dissipation.

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■ Typical electrical and thermal characteristics

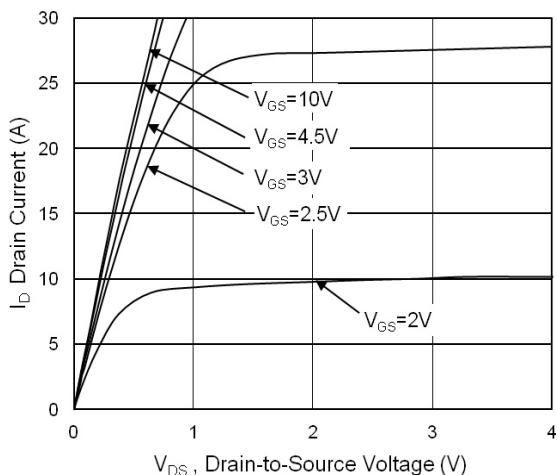


Fig.1 Typical Output Characteristics

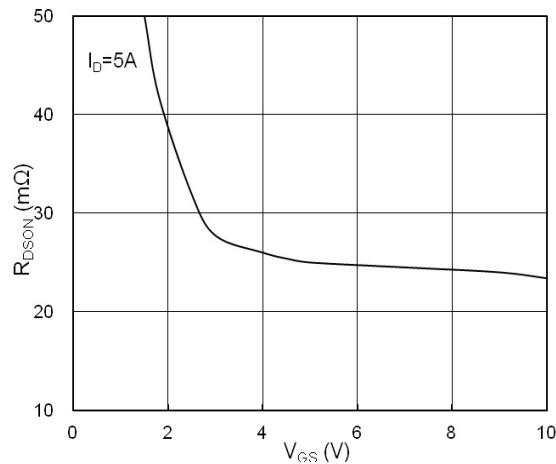


Fig.2 On-Resistance vs. Gate-Source

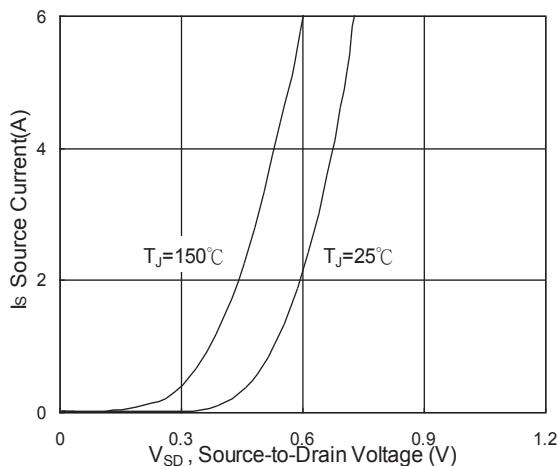


Fig.3 Source Drain Forward Characteristics

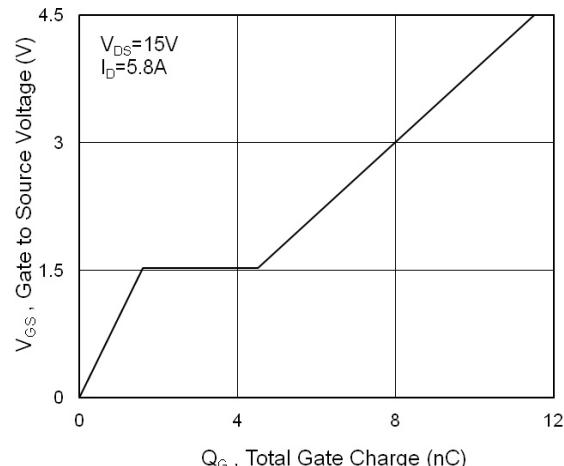


Fig.4 Gate-Charge Characteristics

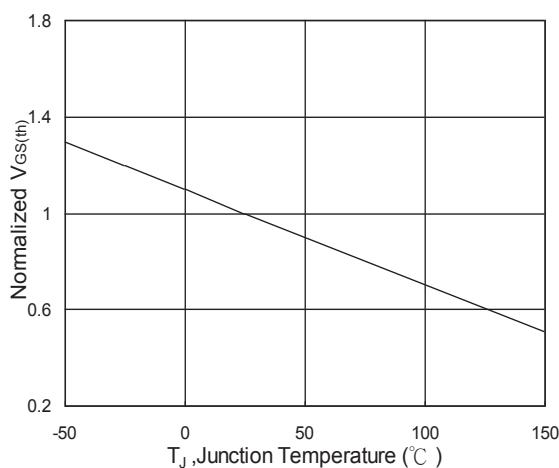


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

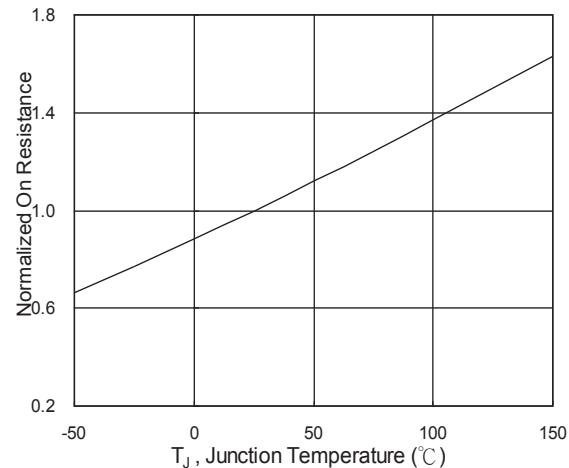


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

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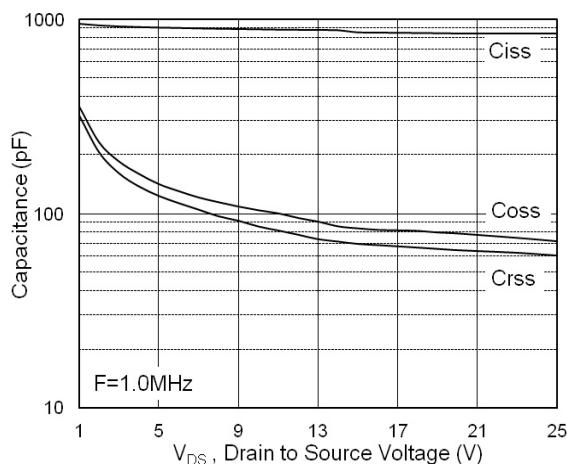


Fig.7 Capacitance

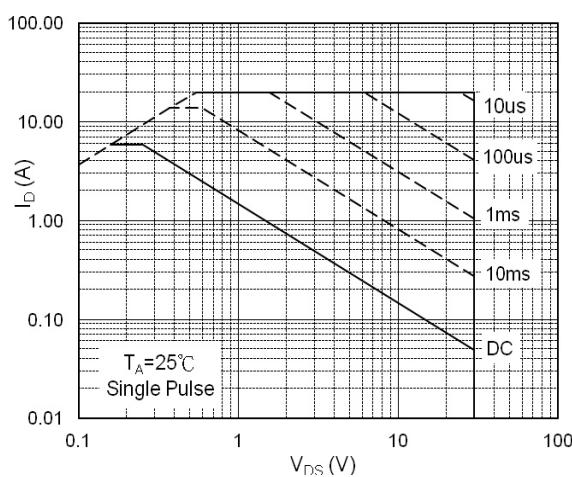


Fig.8 Safe Operating Area

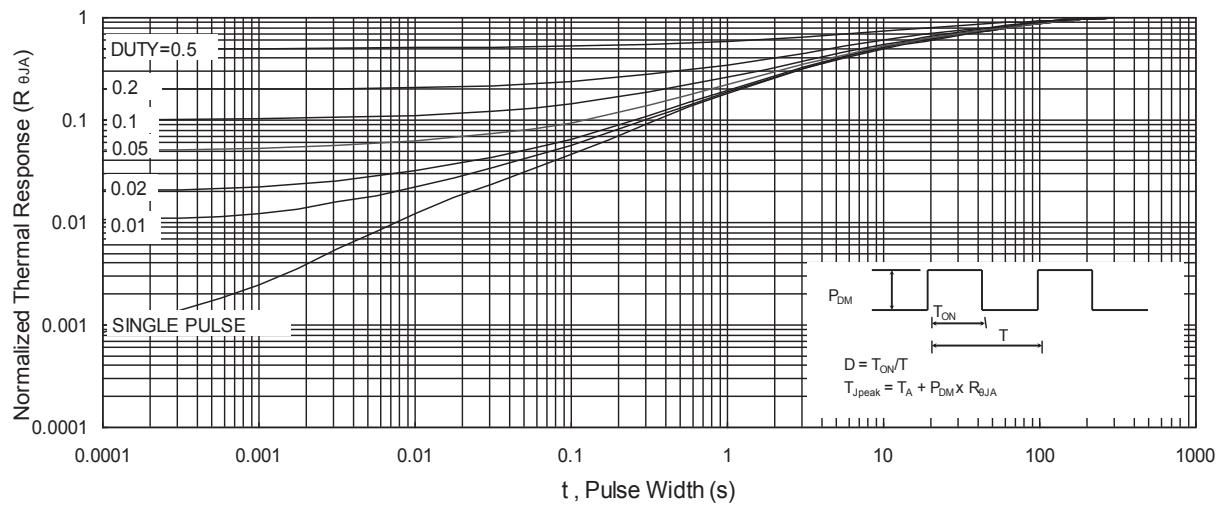


Fig.9 Normalized Maximum Transient Thermal Impedance

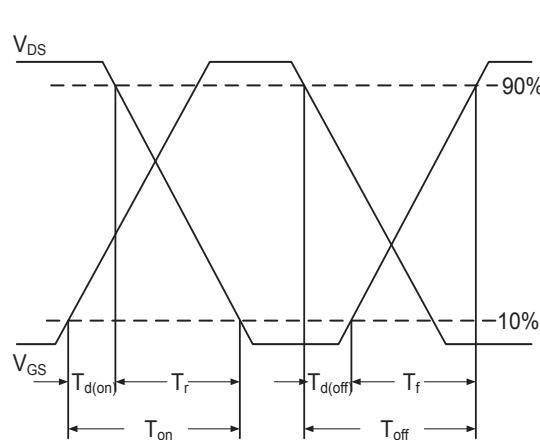


Fig.10 Switching Time Waveform

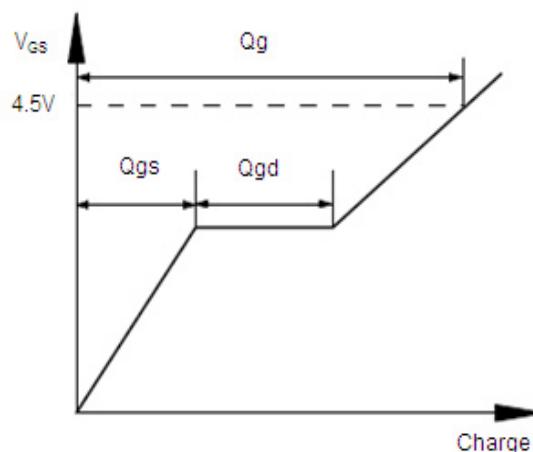


Fig.11 Gate Charge Waveform