Single N-channel MOSFET

ELM43400CB-S

■General description

ELM43400CB-S uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate threshold voltage.

■Features

- Vds=30V
- Id=5.8A
- Rds(on) = 27mΩ (Vgs=10V)
- Rds(on) = 32mΩ (Vgs=4.5V)
- Rds(on) = 40mΩ (Vgs=2.5V)

■Maximum absolute ratings

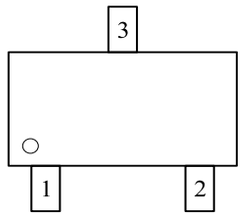
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		Vds	30	V	
Gate-source voltage		Vgs	±12	V	
Continuous drain current	Ta=25°C	Id	5.8	A	
	Ta=70°C		4.9		
Pulsed drain current		Idm	20	A	2
Total power dissipation	Ta=25°C	Pd	1	W	3
Storage temperature range		Tstg	-55 to 150	°C	
Operating junction temperature range		Tj	-55 to 150	°C	

■Thermal characteristics

Parameter		Symbol	Typ.	Max.	Unit	Note
Thermal resistance junction-ambient		Rθja	--	125	°C/W	1
	t ≤ 10s		--	85	°C/W	1

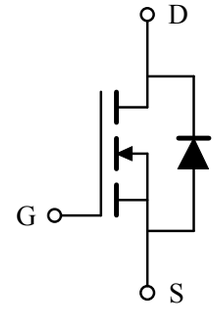
■Pin configuration

SOT-23(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

■Circuit



■Electrical characteristics

Tj=25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Vgs=0V, Id=250μA	30	--	--	V	
BVdss Temperature coefficient	$\frac{\Delta BVdss}{\Delta Tj}$	Reference to 25°C, Id=1mA	--	0.098	--	V/°C	
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		
Gate threshold voltage	Vgs(th)	Vgs=Vds, Id=250μA	0.5	--	1.2	V	
Vgs(th) Temperature coefficient	ΔVgs(th)		--	-2.82	--	mV/°C	
Drain-source leakage current	Idss	Vds=24V, Vgs=0V	--	--	1	μA	
		Vds=24V, Vgs=0V, Tj=55°C	--	--	5		
Gate-source leakage current	Igss	Vgs=±12V, Vds=0V	--	--	±100	nA	
Forward transconductance	Gfs	Vds=5V, Id=5A	--	25	--	S	
Continuous source current	Is	Vgs=Vds=0V, Force current	--	--	5.8	A	1, 4
Diode forward voltage	Vsd	Vgs=0V, Is=1A	--	--	1.2	V	2
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vds=15V, Vgs=0V, 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	Vds=15V, Vgs=4.5V, 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)	Vdd=15V, Vgs=10V Rgen=3Ω, Id=5A	--	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.

■Typical electrical and thermal characteristics

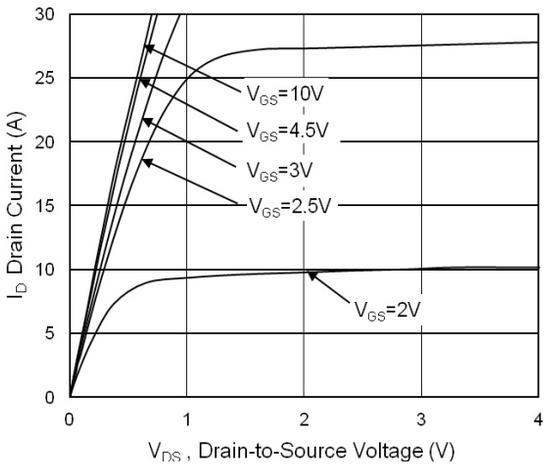


Fig.1 Typical Output Characteristics

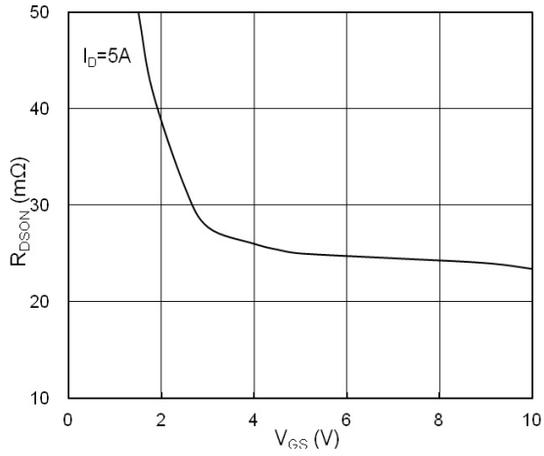


Fig.2 On-Resistance vs. Gate-Source

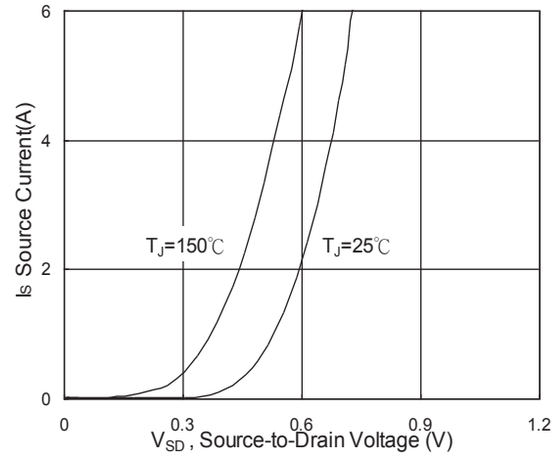


Fig.3 Source Drain Forward Characteristics

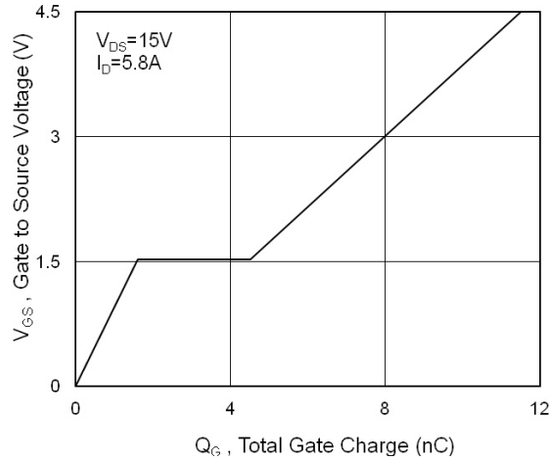


Fig.4 Gate-Charge Characteristics

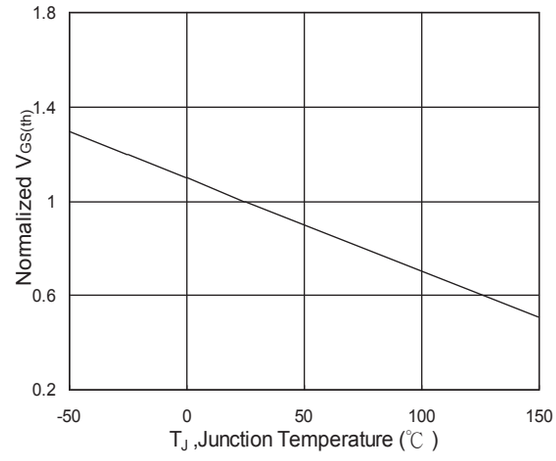


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

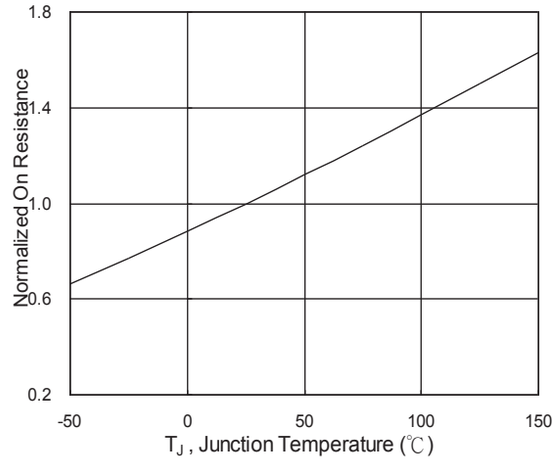


Fig.6 Normalized R_{DSON} vs. T_J

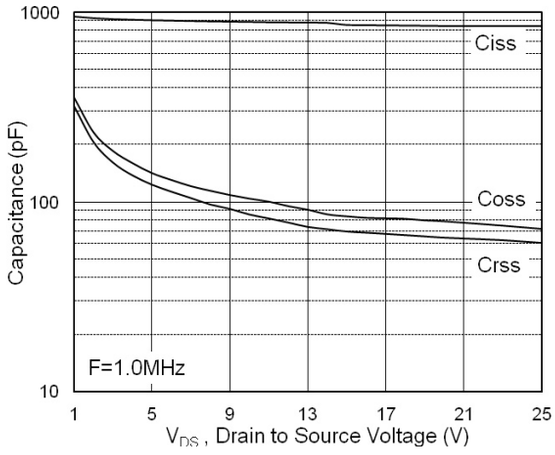


Fig.7 Capacitance

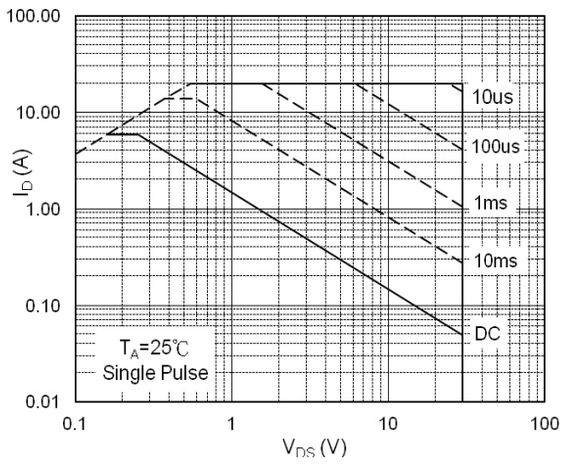


Fig.8 Safe Operating Area

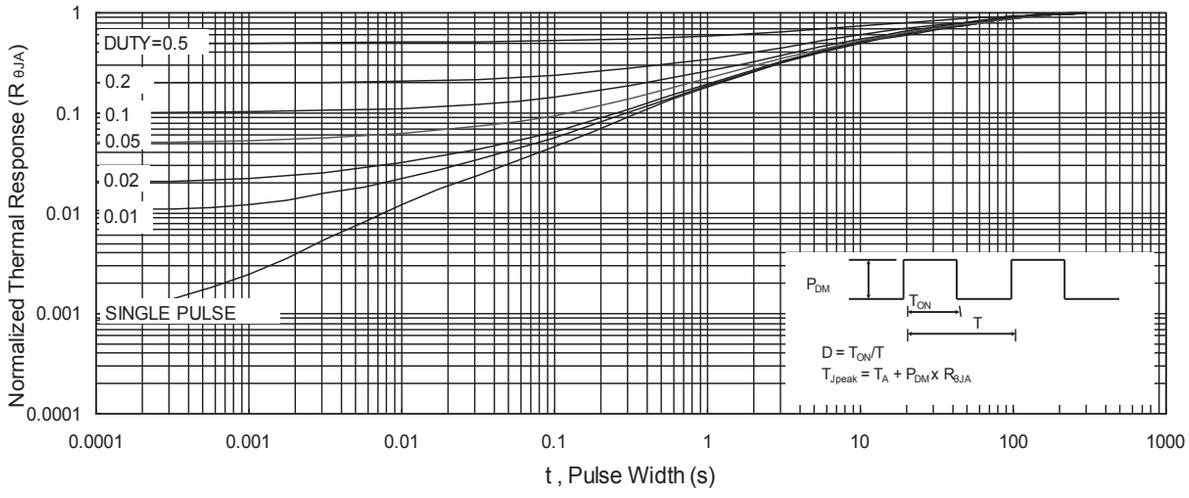


Fig.9 Normalized Maximum Transient Thermal Impedance

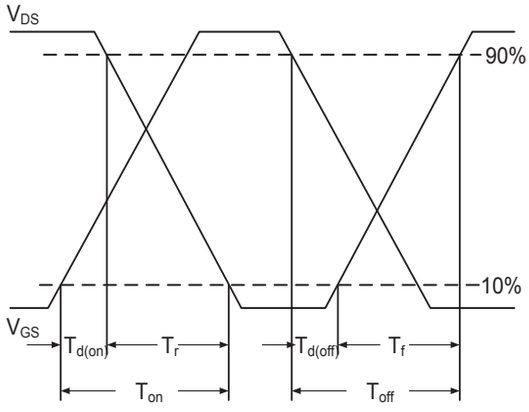


Fig.10 Switching Time Waveform

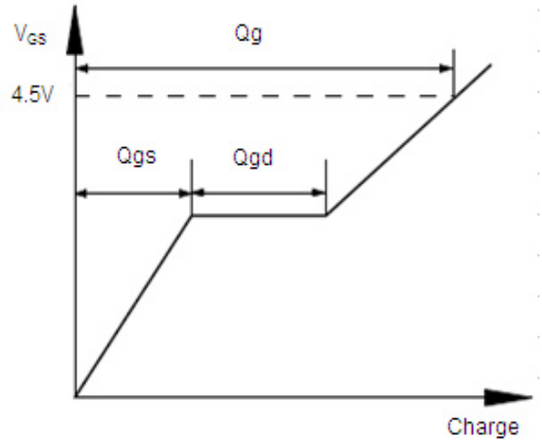
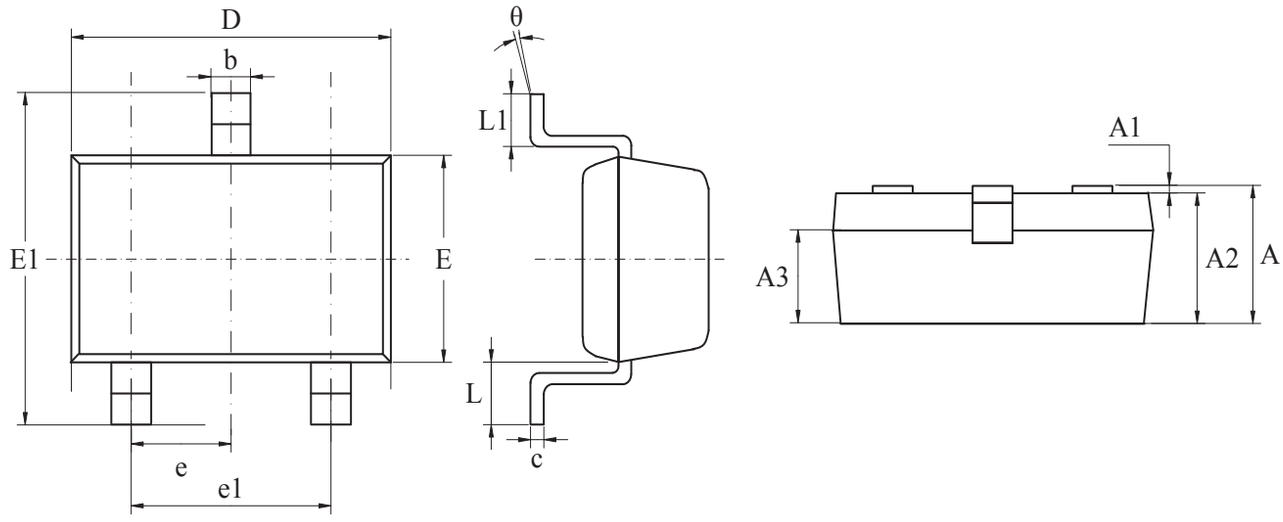


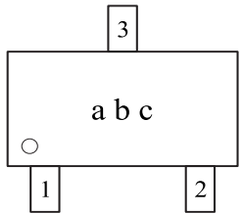
Fig.11 Gate Charge Waveform

■SOT−23 dimension (3,000pcs/reel)



Symbols	Millimeters		Inches		Symbols	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.89	1.12	0.035	0.044	E	1.20	1.40	0.047	0.055
A1	0.01	0.15	0.000	0.006	E1	2.10	2.64	0.083	0.104
A2	0.88	1.05	0.035	0.041	e	0.95 BSC		0.037 BSC	
A3	0.41	0.66	0.016	0.026	e1	1.90 BSC		0.075 BSC	
b	0.30	0.50	0.012	0.020	L	0.54 Ref		0.021 Ref	
c	0.08	0.20	0.003	0.008	L1	0.40	0.60	0.016	0.024
D	2.80	3.04	0.110	0.120	θ	0°	8°	0°	8°

■Marking



Symbols	Content
a	Product code
b	Yearly code：ex 2019=9, 2020=A, 2021=B, 2022=C...
c	Sequence：1 to 9, A to Z