

Single N-channel MOSFET

ELM43400CB-S

<https://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

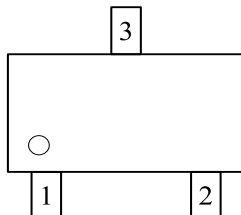
Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		V_{ds}	30	V	
Gate-source voltage		V_{gs}	± 12	V	
Continuous drain current	$T_a=25^{\circ}C$	I_d	5.8	A	
	$T_a=70^{\circ}C$		4.9		
Pulsed drain current		I_{dm}	20	A	2
Total power dissipation	$T_a=25^{\circ}C$	P_d	1	W	3
Storage temperature range		T_{stg}	-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-ambient		$R_{\theta ja}$	-	125	$^{\circ}C/W$	1
	$t \leq 10s$		-	85	$^{\circ}C/W$	1

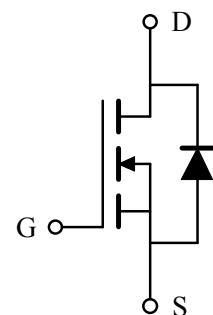
■Pin configuration

SOT-23(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

■Circuit



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■Electrical characteristics

T_j=25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
STATIC PARAMETERS							
Drain-source breakdown voltage	BV _{dss}	V _{gs} =0V, I _d =250μA	30	-	-	V	
BV _{dss} Temperature coefficient	$\frac{\Delta BV_{dss}}{\Delta T_j}$	Reference to 25°C, I _d =1mA	-	0.098	-	V/°C	
Static drain-source on-resistance	R _{ds(on)}	V _{gs} =10V, I _d =5.8A	-	-	27	mΩ	2
		V _{gs} =4.5V, I _d =5.0A	-	-	32		
		V _{gs} =2.5V, I _d =4.0A	-	-	40		
Gate threshold voltage	V _{gs(th)}	V _{gs} =V _{ds} , I _d =250μA	0.5	-	1.2	V	
V _{gs(th)} Temperature coefficient	ΔV _{gs(th)}		-	-2.82	-	mV/°C	
Drain-source leakage current	I _{dss}	V _{ds} =24V, V _{gs} =0V	-	-	1	μA	
		V _{ds} =24V, V _{gs} =0V, T _j =55°C	-	-	5		
Gate-source leakage current	I _{gss}	V _{gs} =±12V, V _{ds} =0V	-	-	±100	nA	
Forward transconductance	G _{fs}	V _{ds} =5V, I _d =5A	-	25	-	S	
Continuous source current	I _s	V _{gs} =V _{ds} =0V, Force current	-	-	5.8	A	1, 4
Diode forward voltage	V _{sd}	V _{gs} =0V, I _s =1A	-	-	1.2	V	2
DYNAMIC PARAMETERS							
Input capacitance	C _{iss}	V _{ds} =15V, V _{gs} =0V, f=1MHz	-	860	-	pF	
Output capacitance	C _{oss}		-	84	-	pF	
Reverse transfer capacitance	C _{rss}		-	70	-	pF	
Gate resistance	R _g	V _{gs} =0V, V _{ds} =0V, f=1MHz	-	1.5	-	Ω	
SWITCHING PARAMETERS							
Total gate charge (4.5V)	Q _g	V _{ds} =15V, V _{gs} =4.5V, I _d =5.8A	-	11.5	-	nC	
Gate-source charge	Q _{gs}		-	1.6	-	nC	
Gate-drain charge	Q _{gd}		-	2.9	-	nC	
Turn-on delay time	t _{d(on)}	V _{dd} =15V, V _{gs} =10V R _{gen} =3Ω, I _d =5A		5		ns	
Turn-on rise time	t _r			47		ns	
Turn-off delay time	t _{d(off)}			26		ns	
Turn-off fall time	t _f			8		ns	

NOTE :

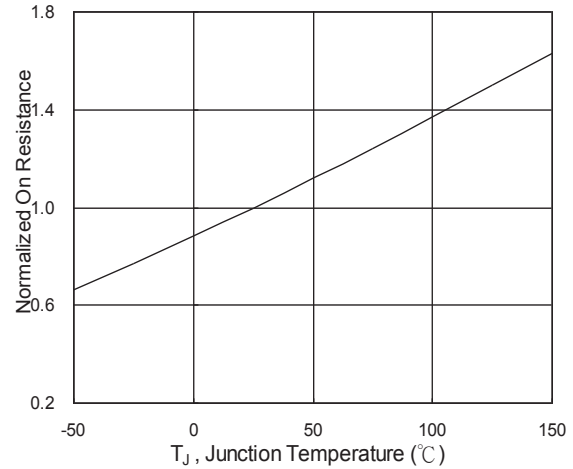
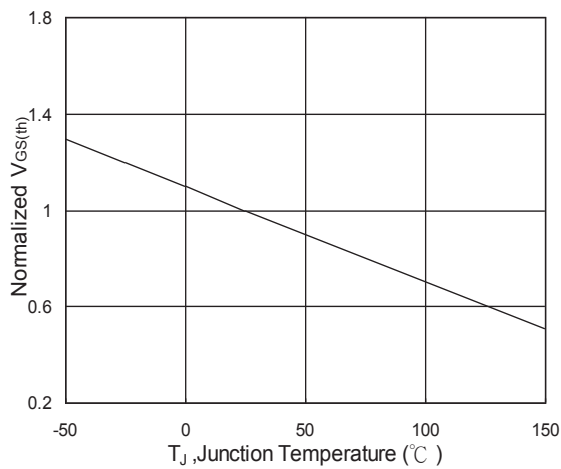
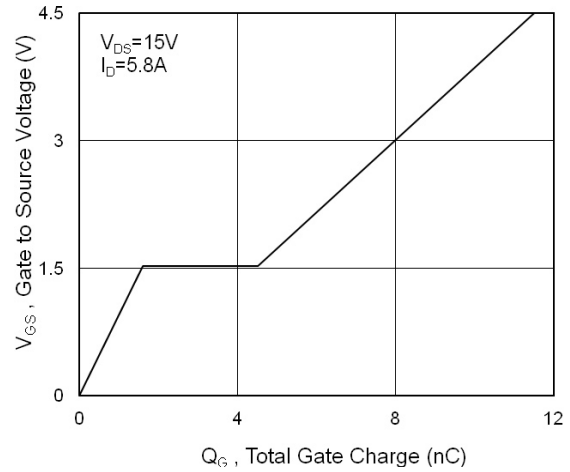
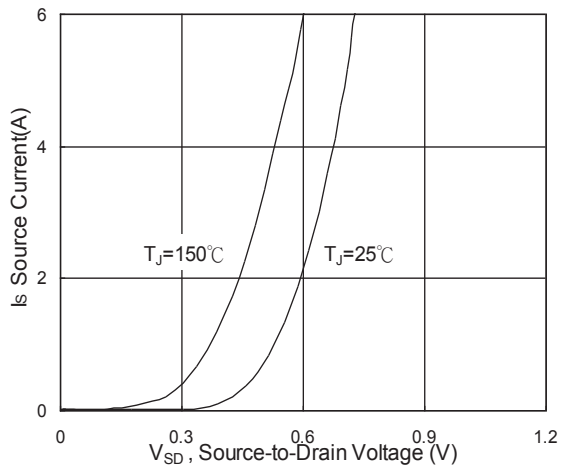
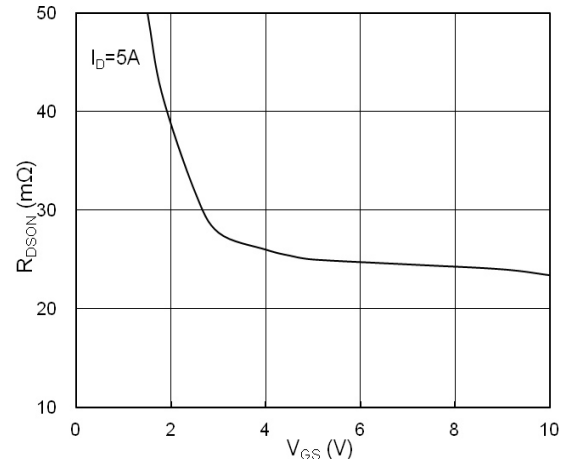
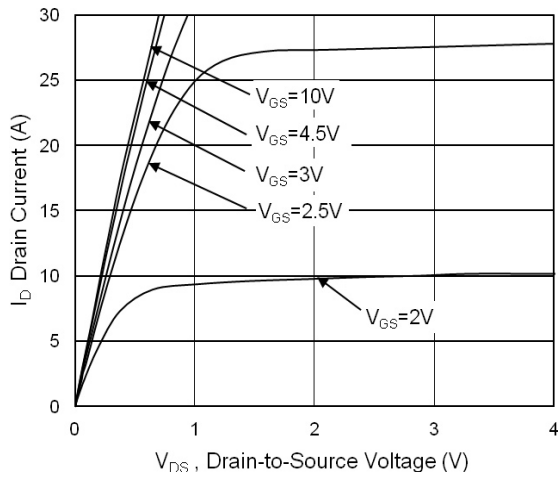
1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%.
3. The power dissipation is limited by 150°C junction temperature.
4. The data is theoretically the same as I_d and I_{dm}, in real applications, should be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

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■ Typical electrical and thermal characteristics



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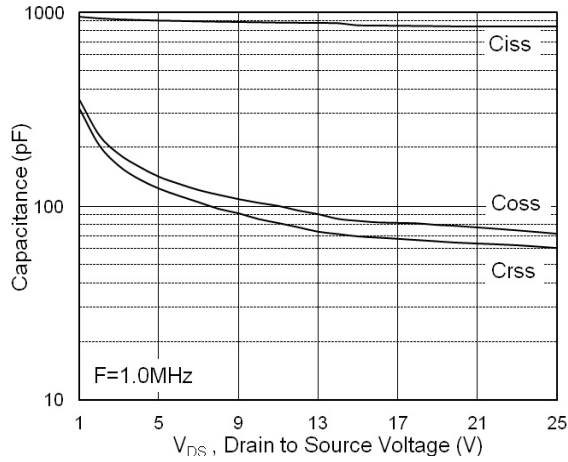


Fig.7 Capacitance

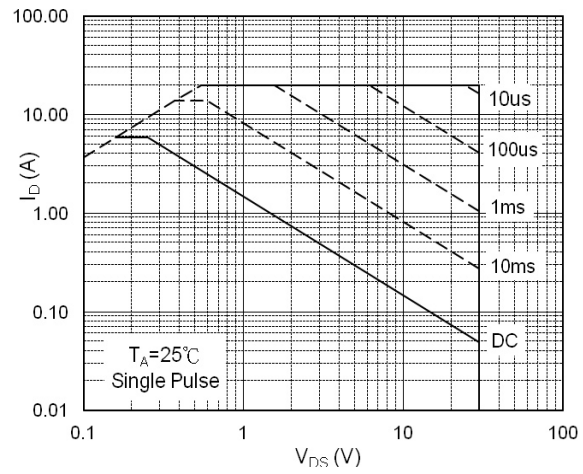


Fig.8 Safe Operating Area

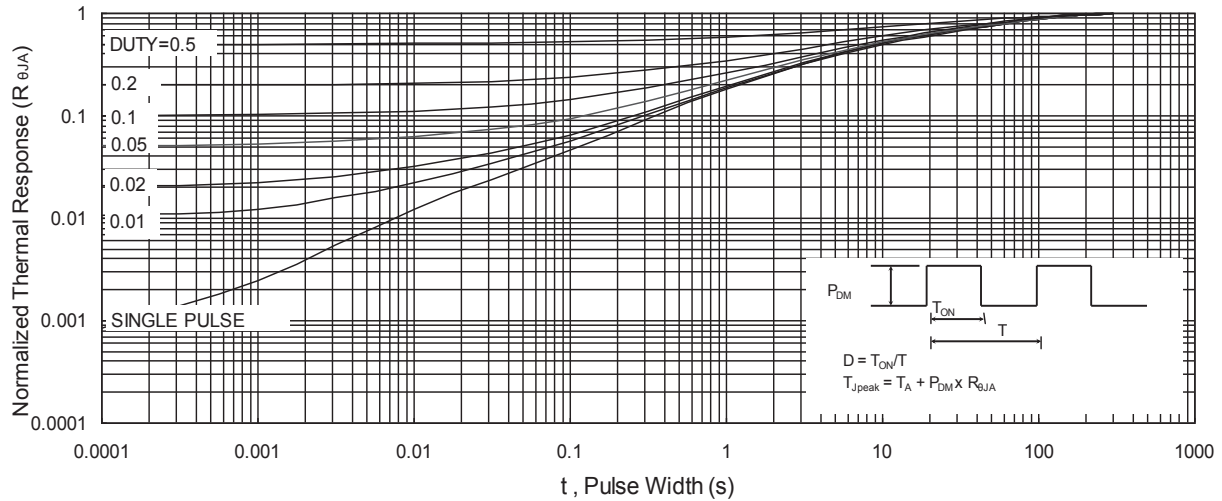


Fig.9 Normalized Maximum Transient Thermal Impedance

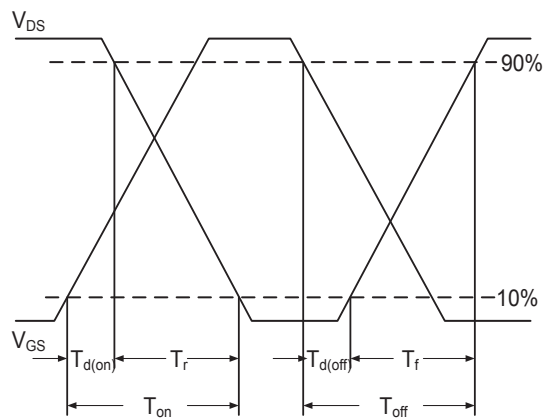


Fig.10 Switching Time Waveform

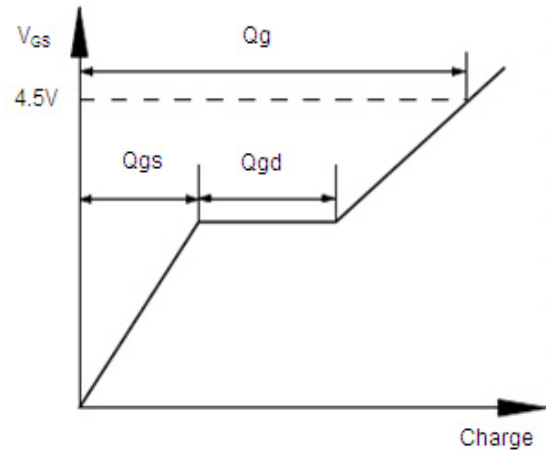


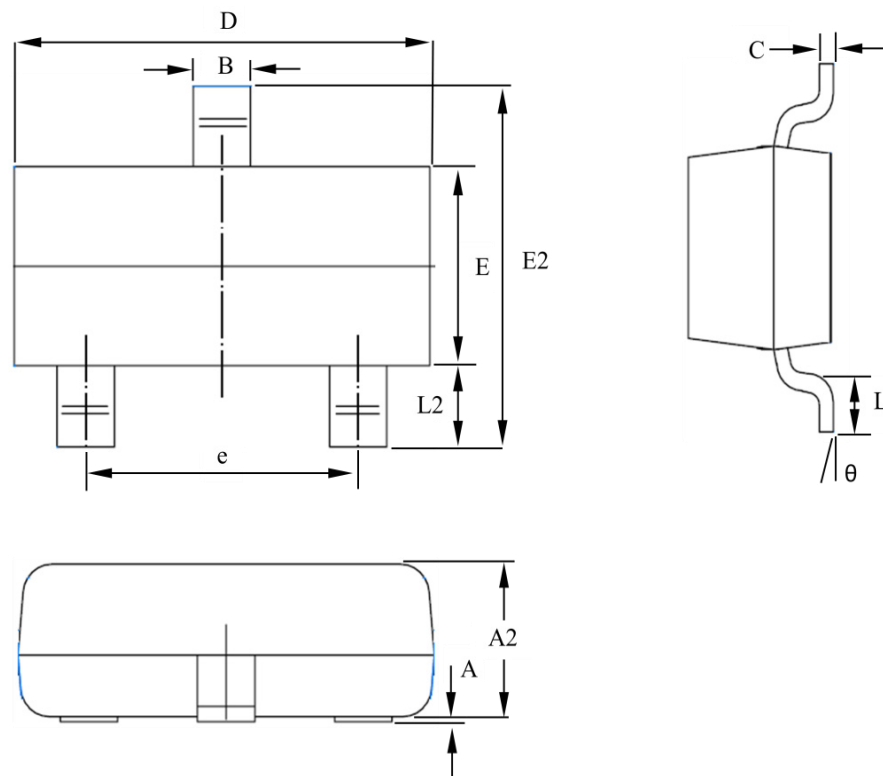
Fig.11 Gate Charge Waveform

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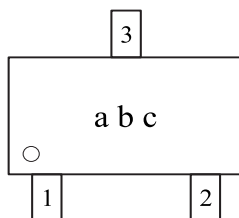
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■ SOT-23 dimension (3,000pcs/reel)



Symbols	Millimeters		Inches		Symbols	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.00	0.10	0.000	0.004	E2	2.25	2.55	0.089	0.100
A2	0.90	1.10	0.035	0.041	L	0.30	0.50	0.012	0.020
B	0.30	0.50	0.012	0.020	L2	0.50	0.60	0.020	0.024
C	0.08	0.15	0.003	0.006	θ	0°	8°	0°	8°
D	2.80	3.00	0.110	0.118	e	1.80	2.00	0.071	0.079
E	1.20	1.40	0.047	0.055					

■ 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