

# Single N-channel MOSFET

## ELM13434CA-S

### ■ General description

The ELM13434CA-S uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications. It is ESD protected.

### ■ Features

- Vds=30V
- Id=4.2A (Vgs=10V)
- Rds(on) < 52mΩ (Vgs=10V)
- Rds(on) < 75mΩ (Vgs=4.5V)
- ESD protected

### ■ Maximum absolute ratings

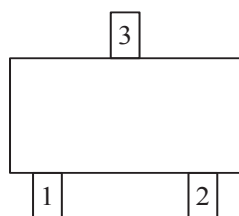
Parameter	Symbol	Limit		Unit	Note	
		10sec	Steady-state			
Drain-source voltage	Vds	30		V		
Gate-source voltage	Vgs	±20		V		
Continuous drain current	Id	Ta=25°C	4.2	3.5	A	1, 6
		Ta=70°C	3.3	2.8		
Pulsed drain current	Idm	30		A	2	
Power dissipation	Pd	Ta=25°C	1.40	1.00	W	
		Ta=70°C	0.90	0.64		
Junction and storage temperature range	Tj, Tstg	-55 to 150		°C		

### ■ Thermal characteristics

Parameter		Symbol	Typ.	Max.	Unit	Note
Maximum junction-to-ambient	t≤10s	Rθja	70	90	°C/W	1
Maximum junction-to-ambient	Steady-state		100	125	°C/W	
Maximum junction-to-lead	Steady-state	Rθjl	63	80	°C/W	3

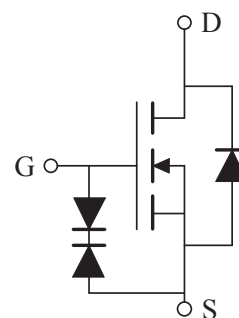
### ■ Pin configuration

SOT-23(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

### ■ Circuit



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### ■ Electrical characteristics

Ta=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V	30			V
Zero gate voltage drain current	Idss	Vds=30V, Vgs=0V Tj=55°C			1	μA
					5	
Gate-body leakage current	Igss	Vds=0V, Vgs=±16V			10	μA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA	1.00	1.32	1.80	V
On state drain current	Id(on)	Vgs=10V, Vds=5V	30			A
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=4.2A Tj=125°C		43	52	mΩ
				58	74	
		Vgs=4.5V, Id=2A		59	75	mΩ
Forward transconductance	Gfs	Vds=5V, Id=4.2A		8.5		S
Diode forward voltage	Vsd	Is=1A, Vgs=0V		0.77	1.00	V
Max. body-diode continuous current	Is				1.8	A
DYNAMIC PARAMETERS						
Input capacitance	Ciss	Vgs=0V, Vds=15V, f=1MHz		269	340	pF
Output capacitance	Coss			65		pF
Reverse transfer capacitance	Crss			41		pF
Gate resistance	Rg	Vgs=0V, Vds=0V, f=1MHz		1.0	1.5	Ω
SWITCHING PARAMETERS						
Total gate charge (10V)	Qg	Vgs=10V, Vds=15V, Id=4.2A		5.70	7.20	nC
Total gate charge (4.5V)	Qg			3.00		nC
Gate-source charge	Qgs			1.37		nC
Gate-drain charge	Qgd			0.65		nC
Turn-on delay time	td(on)	Vgs=10V, Vds=15V Rl=3.6Ω, Rgen=3Ω		2.6	3.8	ns
Turn-on rise time	tr			5.5	8.0	ns
Turn-off delay time	td(off)			15.2	23.0	ns
Turn-off fall time	tf			3.7	5.5	ns
Body diode reverse recovery time	trr	If=4.2A, dl/dt=100A/μs		15.5	21.0	ns
Body diode reverse recovery charge	Qrr	If=4.2A, dl/dt=100A/μs		7.1		nC

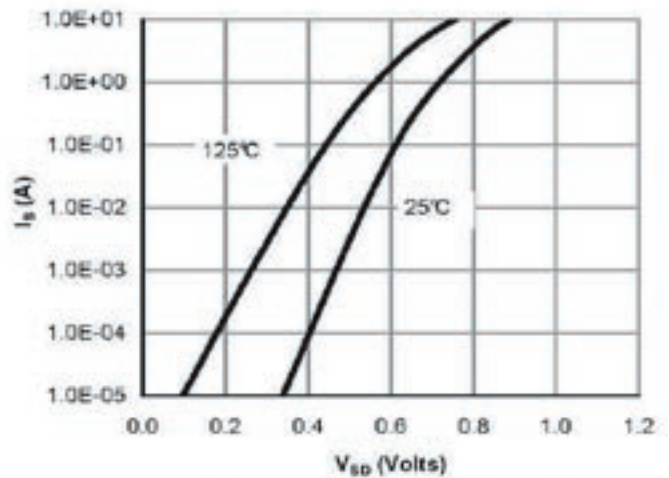
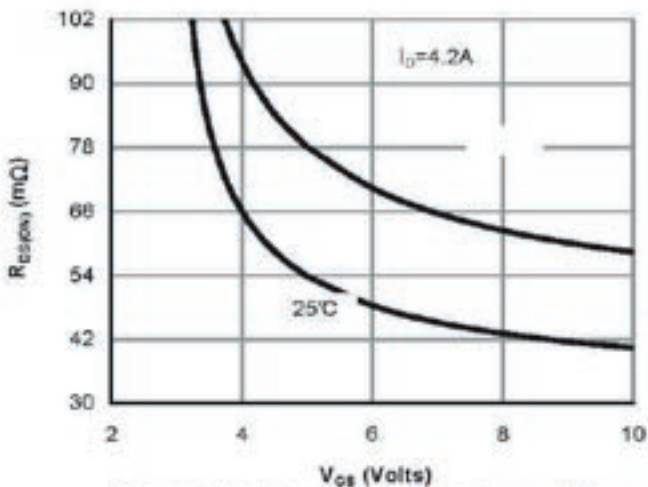
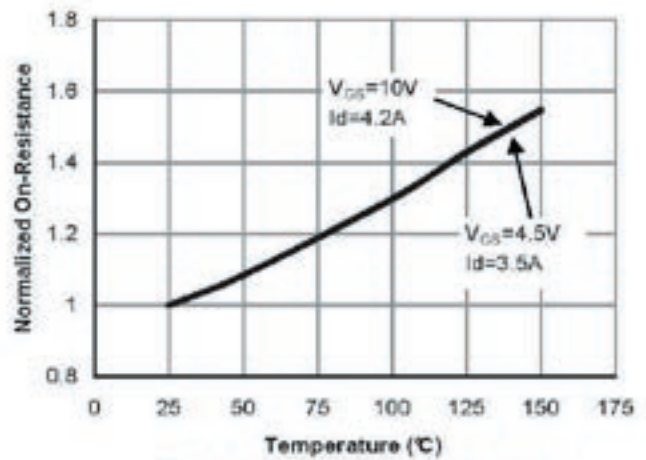
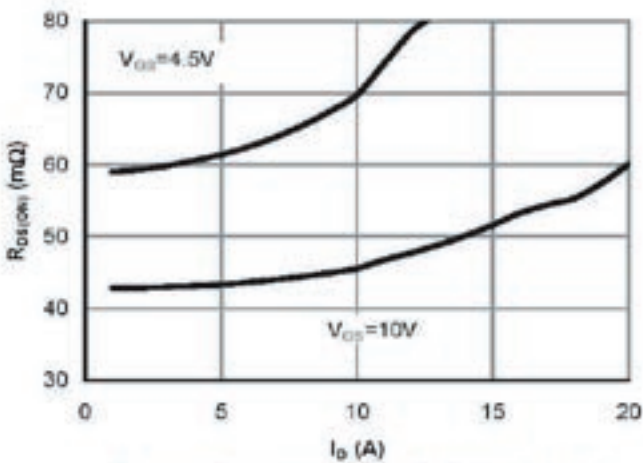
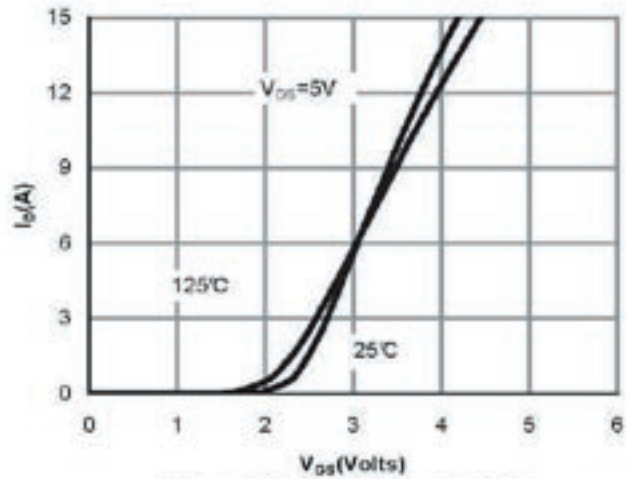
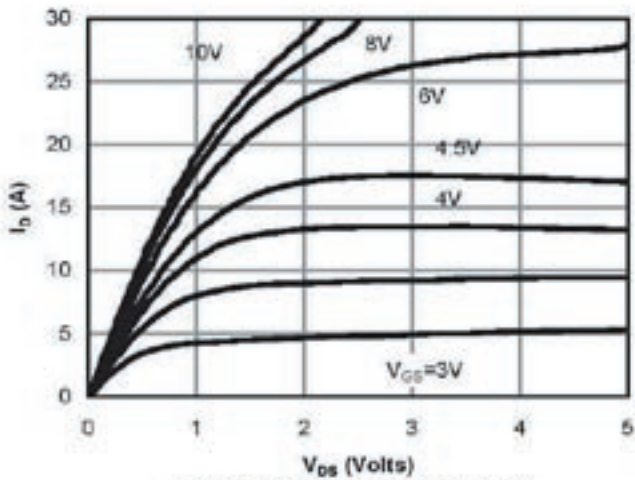
NOTE :

1. The value of Rθja is measured with the device mounted on 1in<sup>2</sup> FR-4 board of 2oz. Copper, in still air environment with Ta=25°C. The value in any given applications depends on the user's specific board design, The current rating is based on the t ≤ 10s thermal resistance rating.
2. Repetitive rating, pulse width limited by junction temperature.
3. The Rθja is the sum of the thermal impedance from junction to lead Rθjl and lead to ambient.
4. The static characteristics in Figures 1 to 6 are obtained using 80μs pulses, duty cycle 0.5%max.
5. These tests are performed with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with Ta=25°C. The SOA curve provides a single pulse rating.
6. The current rating is based on the t≤10s thermal resistance rating.

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### ■ Typical electrical and thermal characteristics



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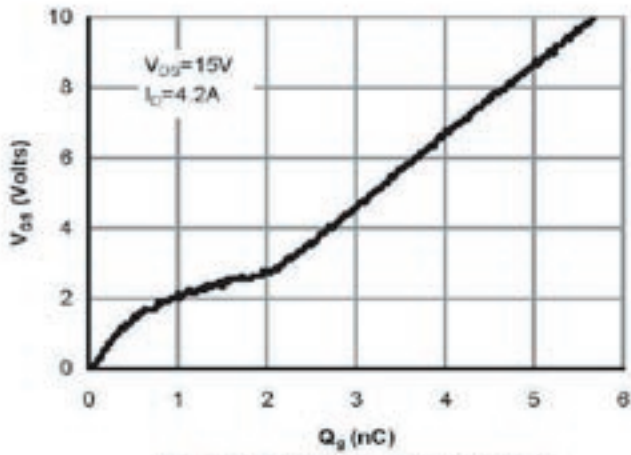


Figure 7: Gate-Charge Characteristics

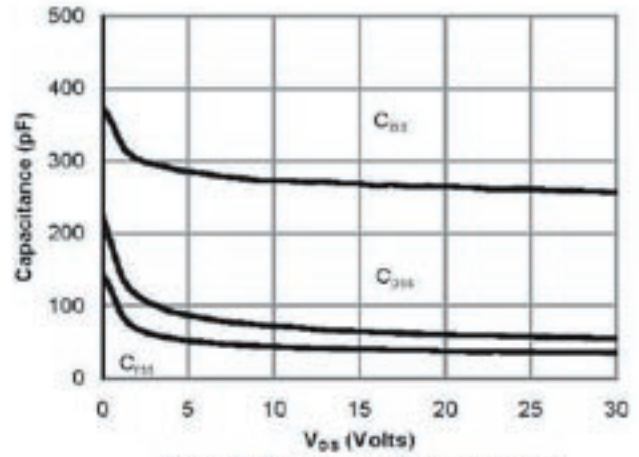


Figure 8: Capacitance Characteristics

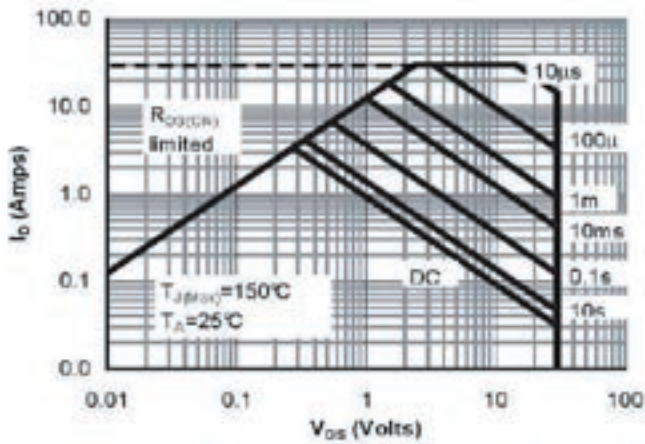


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

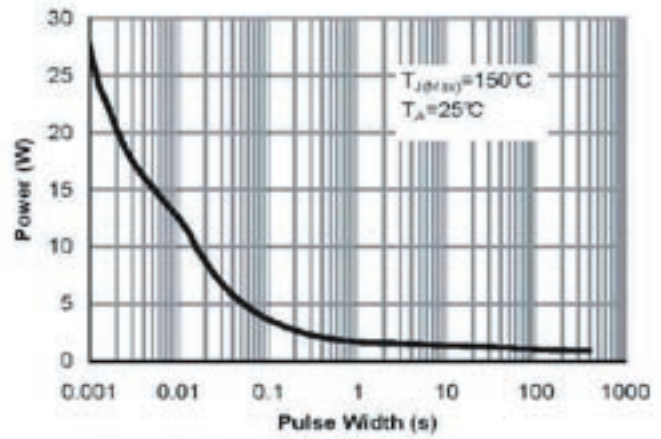


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

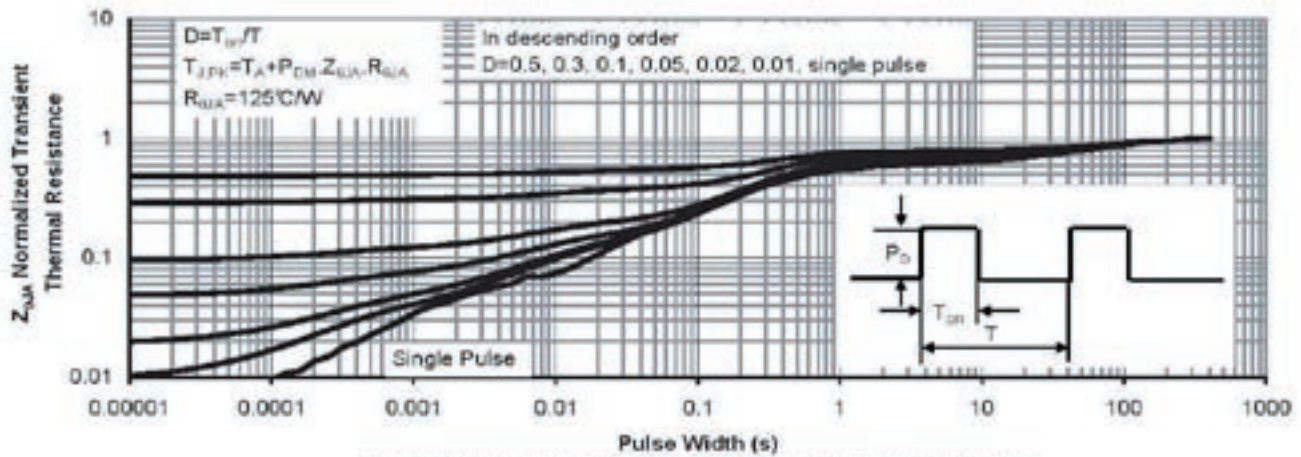


Figure 11: Normalized Maximum Transient Thermal Impedance