Single N-channel MOSFET

ELM53402CA-S

■General description

ELM53402CA-S uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate resistance.

■Features

- Vds=20V
- Id=3.6A
- Rds(on) < 70mΩ (Vgs=4.5V)
- Rds(on) < 80mΩ (Vgs=2.5V)
- Rds(on) < 100mΩ (Vgs=1.8V)

■Maximum absolute ratings

Ta=25°C. Unless otherwise noted.

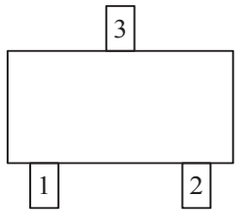
Parameter		Symbol	Limit	Unit
Drain-source voltage		Vds	20	V
Gate-source voltage		Vgs	±12	V
Continuous drain current(Tj=150°C)	Ta=25°C	Id	3.6	A
	Ta=70°C		2.0	
Pulsed drain current		Idm	10	A
Power dissipation	Tc=25°C	Pd	1.25	W
	Tc=70°C		0.80	
Junction and storage temperature range		Tj, Tstg	- 55 to 150	°C

■Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit
Maximum junction-to-ambient	Rθja		120	°C/W

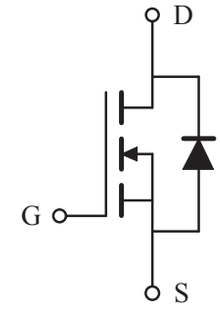
■Pin configuration

SOT-23(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

■Circuit

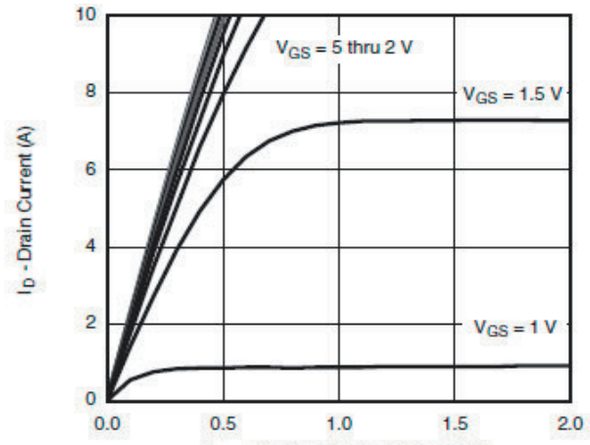


■Electrical characteristics

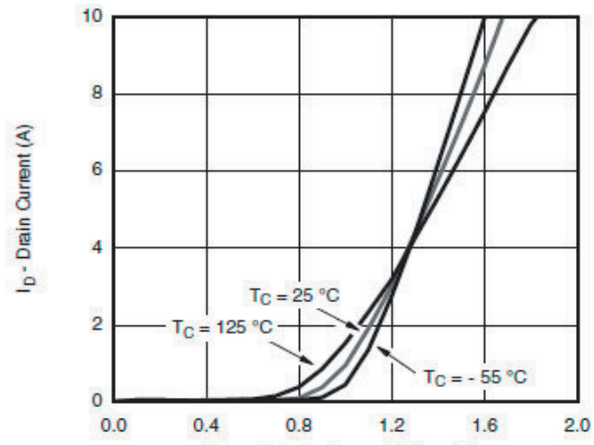
Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Condition		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V		20			V
Zero gate voltage drain current	Idss	Vds=16V, Vgs=0V				1	μA
			Ta=85°C			10	
Gate-body leakage current	Igss	Vds=0V, Vgs=±12V				±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA		0.3		0.8	V
On state drain current	Id(on)	Vgs=4.5V, Vds=5V		6			A
		Vgs=2.5V, Vds=5V		4			
Static drain-source on-resistance	Rds(on)	Vgs=4.5V, Id=2.4A			56	70	mΩ
		Vgs=2.5V, Id=2.0A			66	80	
		Vgs=1.8V, Id=1.8A			86	100	
Forward transconductance	Gfs	Vds=5V, Id=3.6A			10		S
Diode forward voltage	Vsd	Is=1.6A, Vgs=0V			0.85	1.20	V
Max. body-diode continuous current	Is					1.6	A
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=10V, f=1MHz			340		pF
Output capacitance	Coss				115		pF
Reverse transfer capacitance	Crss				33		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=4.5V, Vds=10V Id=3.6A			4.2	5.0	nC
Gate-source charge	Qgs				0.6		nC
Gate-drain charge	Qgd				0.4		nC
Turn-on delay time	td(on)	Vgs=4.5V, Vds=10V RL=2.8Ω, Id=3.6A Rgen=1Ω			8	15	ns
Turn-on rise time	tr				8	15	ns
Turn-off delay time	td(off)				25	40	ns
Turn-off fall time	tf				8	15	ns

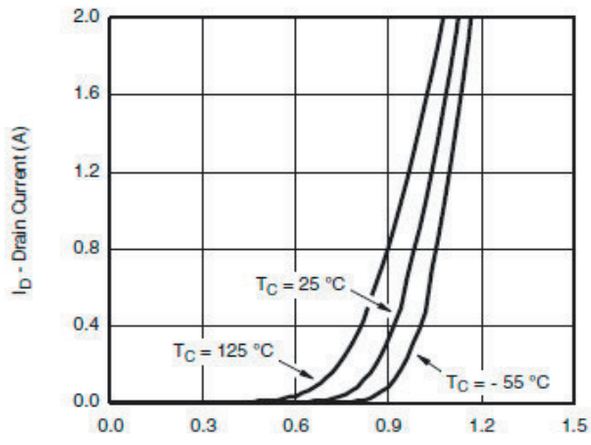
■Typical electrical and thermal characteristics



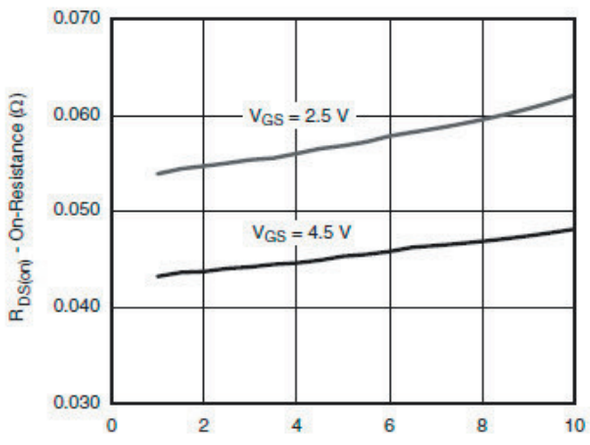
Output Characteristics



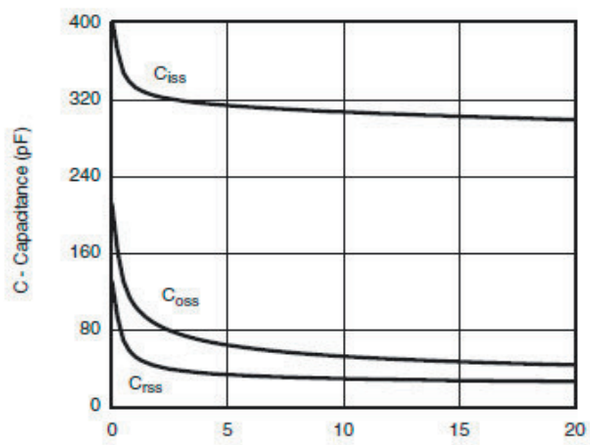
Transfer Characteristics



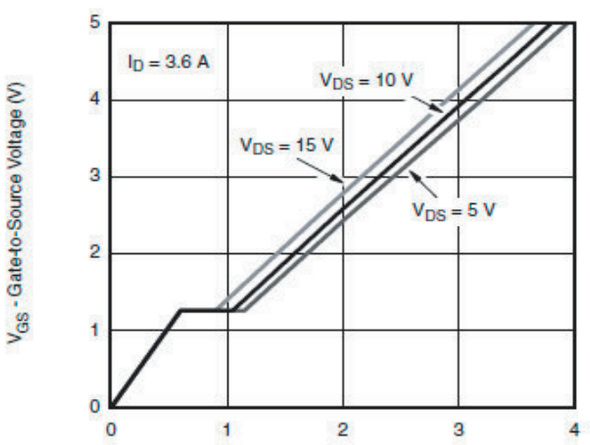
Transfer Characteristics



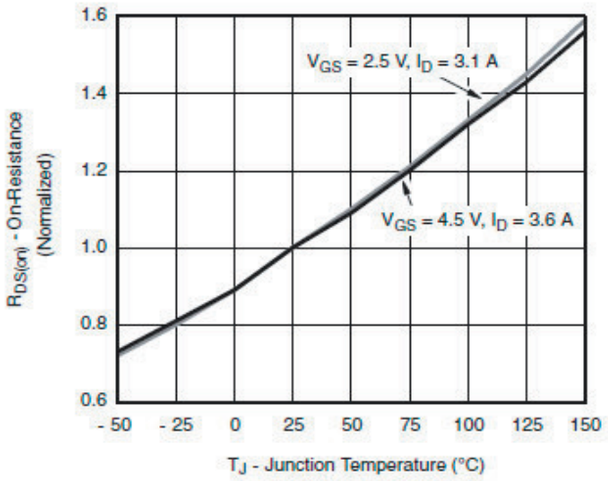
On-Resistance vs. Drain Current



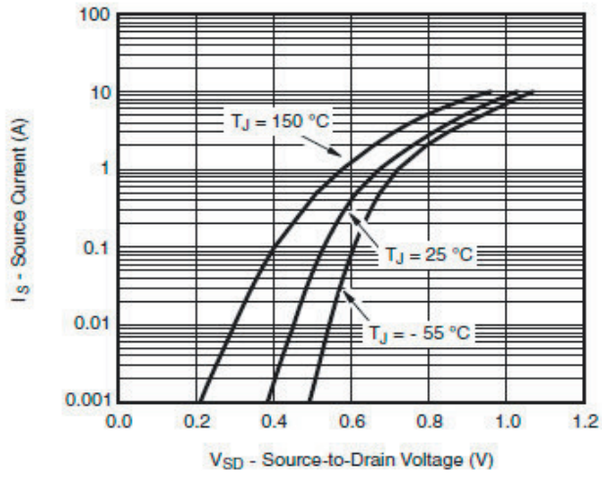
Capacitance



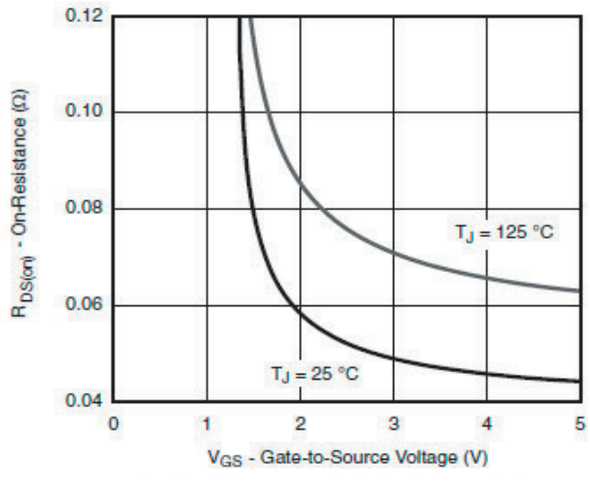
Gate Charge



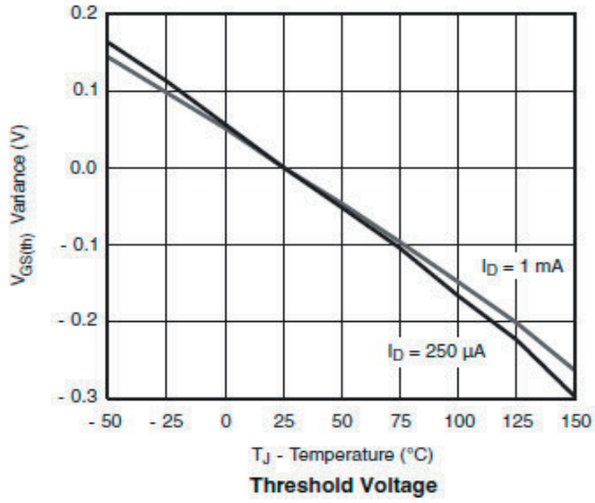
On-Resistance vs. Junction Temperature



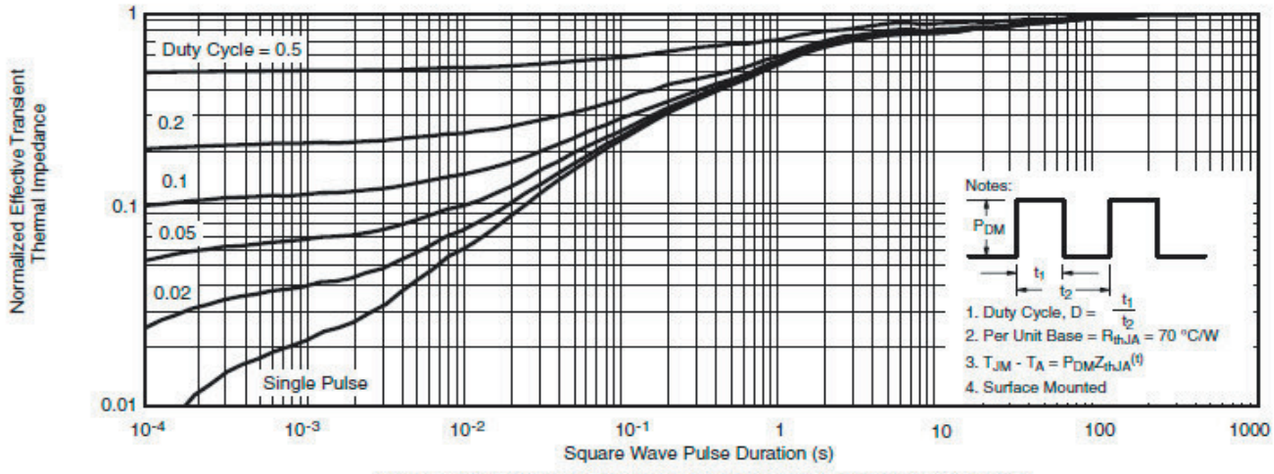
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



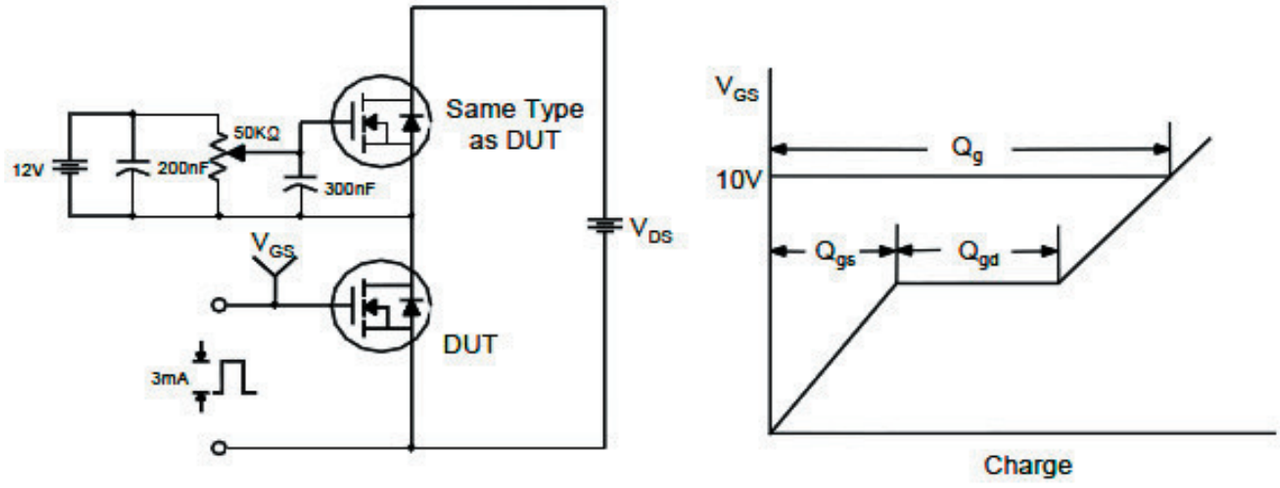
Threshold Voltage



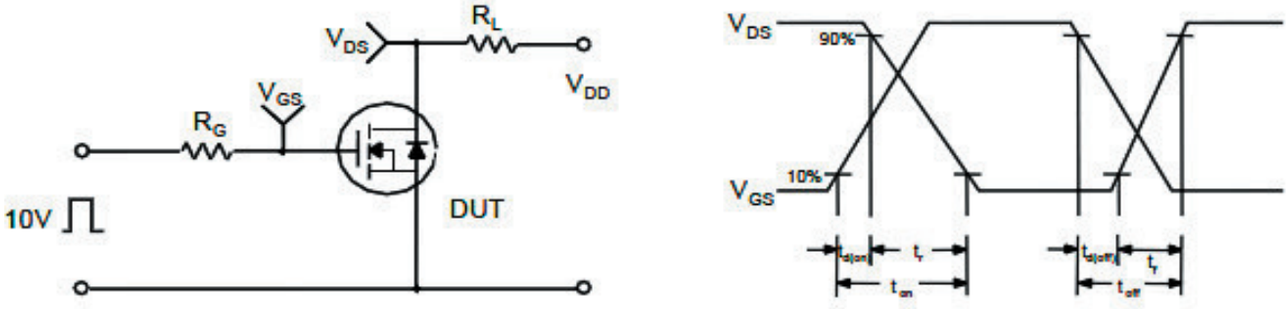
Normalized Thermal Transient Impedance, Junction-to-Ambient

■Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms