Complementary MOSFET

ELM54510CWSA-N

■General Description

ELM54510CWSA-N uses advanced trench technology to provide excellent Rds(on) and low gate charge.

■Features

N-channel

- Vds=100V
- Id=3.0A
- Rds(on)=140mΩ(Vgs=10V)
- Rds(on)=150mΩ(Vgs=4.5V)

P-channel

- Vds=-100V
- Id=-2.5A
- Rds(on)=210mΩ(Vgs=-10V)
- Rds(on)=230mΩ(Vgs=-4.5V)

■Maximum Absolute Ratings

Ta=25°C. Unless otherwise noted.

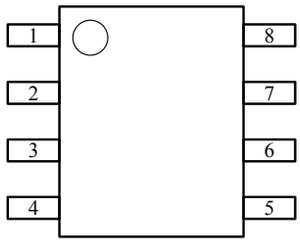
Parameter		Symbol	N-ch (Max.)	P-ch (Max.)	Unit
Drain-source voltage		Vds	100	-100	V
Gate-source voltage		Vgs	±20	±20	V
Continuous drain current(Tj=150°C)	Ta=25°C	Id	3.0	-2.5	A
	Ta=70°C		2.5	-1.8	
Pulsed drain current		Idm	10	-10	A
Power dissipation	Tc=25°C	Pd	2.8	2.8	W
	Tc=70°C		1.8	1.8	
Operating junction temperature		Tj	150	150	°C
Storage temperature range		Tstg	-55 to 150	-55 to 150	°C

■Thermal Characteristics

Parameter	Symbol	Device	Typ.	Max.	Unit
Thermal resistance junction-to-ambient	Rθja	N-ch		62.5	°C/W
Thermal resistance junction-to-ambient	Rθja	P-ch		62.5	°C/W

■Pin configuration

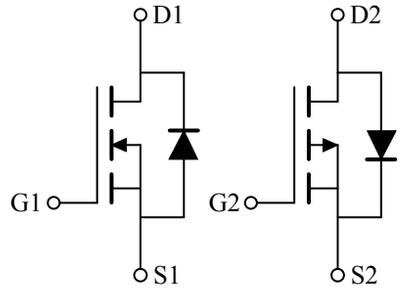
SOP-8(TOP VIEW)



Pin No.	Pin name
1	SOURCE1
2	GATE1
3	SOURCE2
4	GATE2
5	DRAIN2
6	DRAIN2
7	DRAIN1
8	DRAIN1

■Circuit

- N-ch
- P-ch



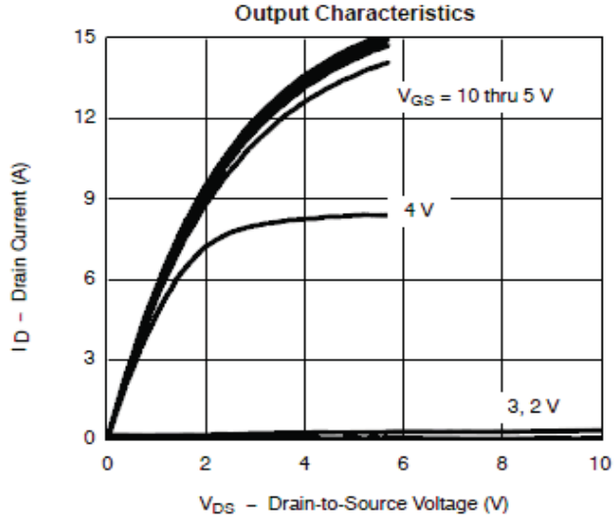
■Electrical Characteristics (N-ch)

Ta=25°C. Unless otherwise noted.

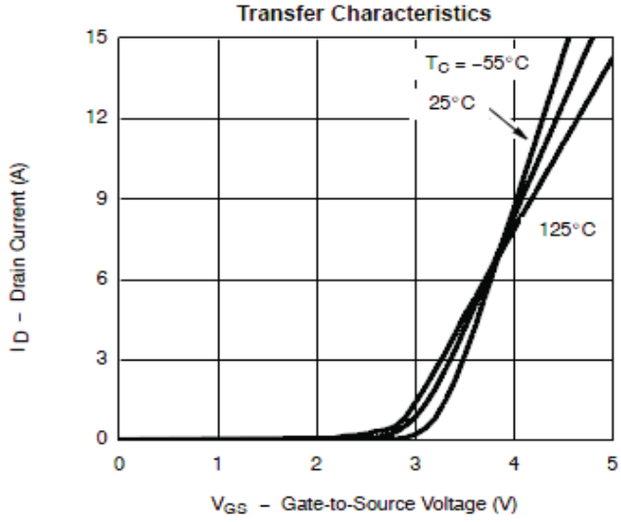
Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V		100	110		V
Zero gate voltage drain current	Idss	Vds=80V, Vgs=0V				1	μA
			Ta=85°C			5	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V				±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA		1.0		2.5	V
On state drain current	Id(on)	Vgs=4.5V, Vds≥5V		8			A
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=3.0A			120	140	mΩ
		Vgs=4.5V, Id=2.5A			125	150	
Forward transconductance	Gfs	Vds=15V, Id=3.0A			8.5		S
Diode forward voltage	Vsd	Is=2.0A, Vgs=0V			0.8	1.3	V
Max.body-diode continuous current	Is					1.5	A
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=25V, f=1MHz			250		pF
Output capacitance	Coss				45		pF
Reverse transfer capacitance	Crss				20		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=5V, Vds=50V, Id≡6.5A			2.8	5.0	nC
Gate-source charge	Qgs				0.6		nC
Gate-drain charge	Qgd				0.7		nC
Turn-on delay time	td(on)	Vgs=10V, Vds=50V, Id≡6.5A RL=7.5Ω, Rgen=2.5Ω			8	15	ns
Turn-on rise time	tr				10	20	ns
Turn-off delay time	td(off)				10	20	ns
Turn-off fall time	tf				12	25	ns

■Typical Electrical and Thermal Characteristics (N-ch)

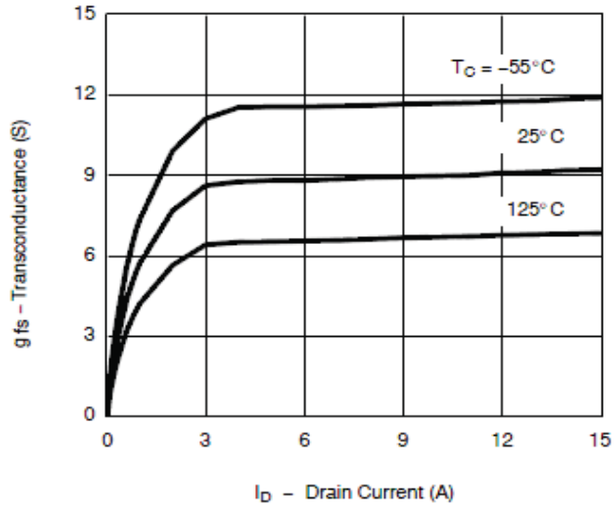
Output Characteristics



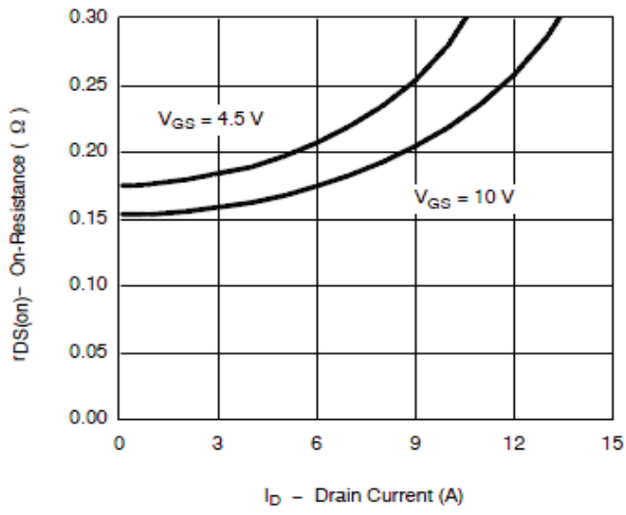
Transfer Characteristics



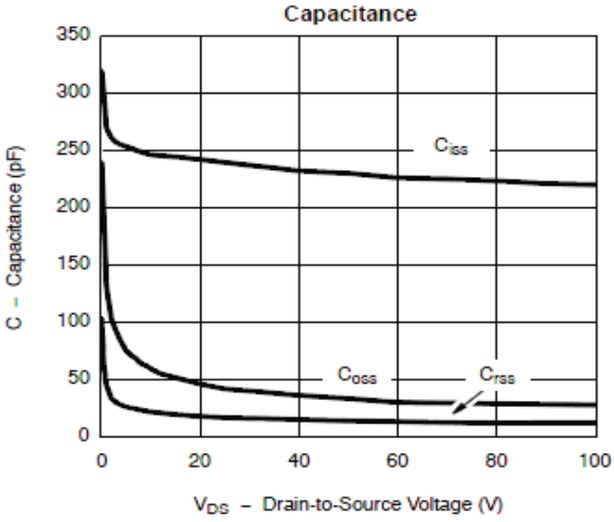
Transconductance



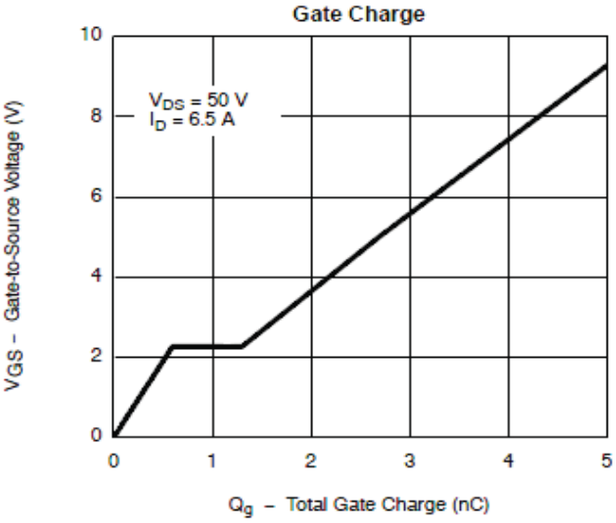
On-Resistance vs. Drain Current

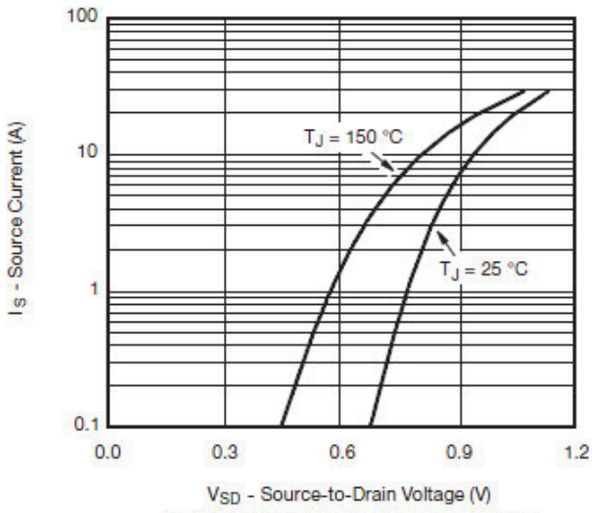


Capacitance

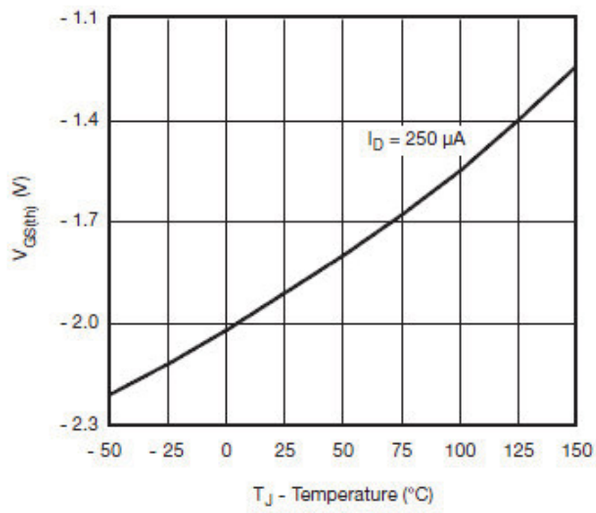


Gate Charge

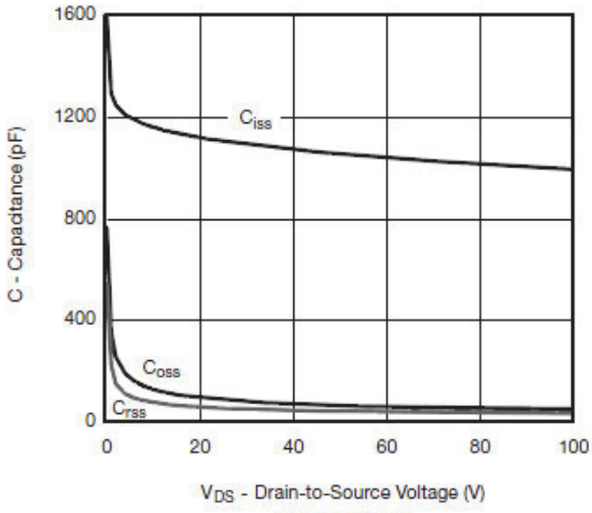




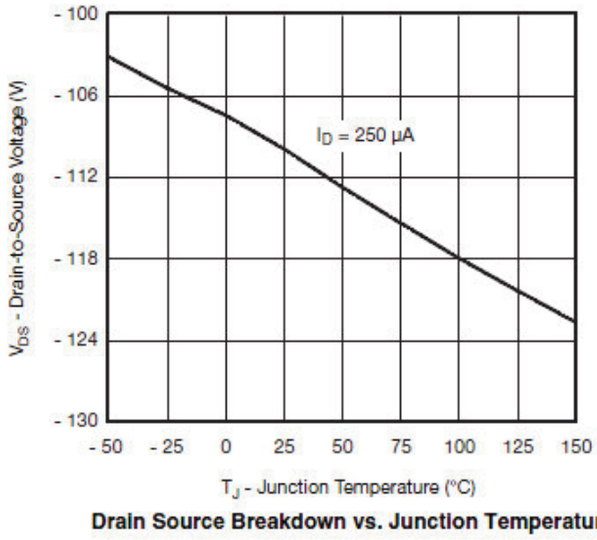
Source-Drain Diode Forward Voltage



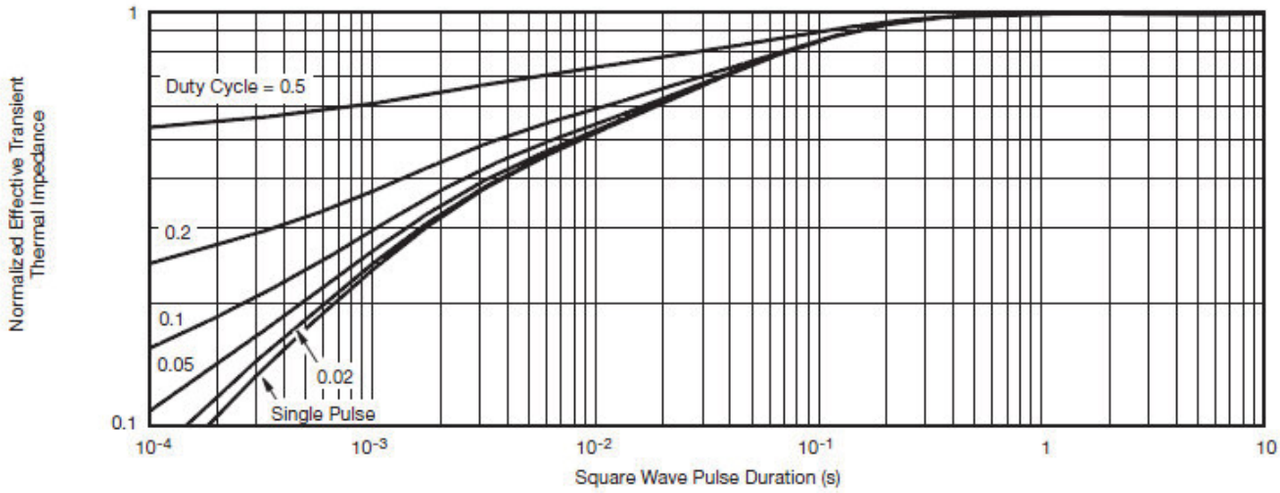
Threshold Voltage



Capacitance



Drain Source Breakdown vs. Junction Temperature



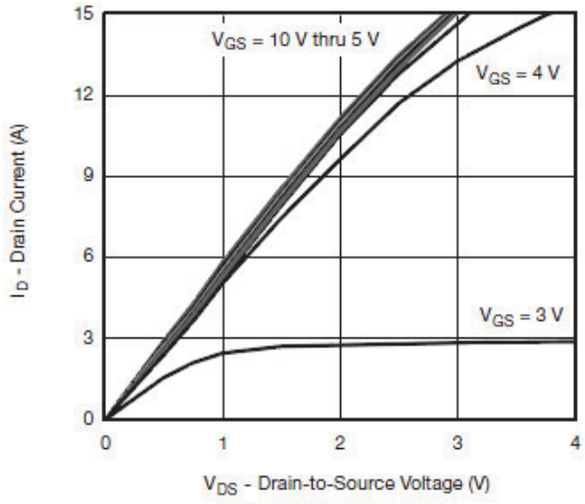
Normalized Thermal Transient Impedance, Junction-to-Case

■Electrical Characteristics (P-ch)

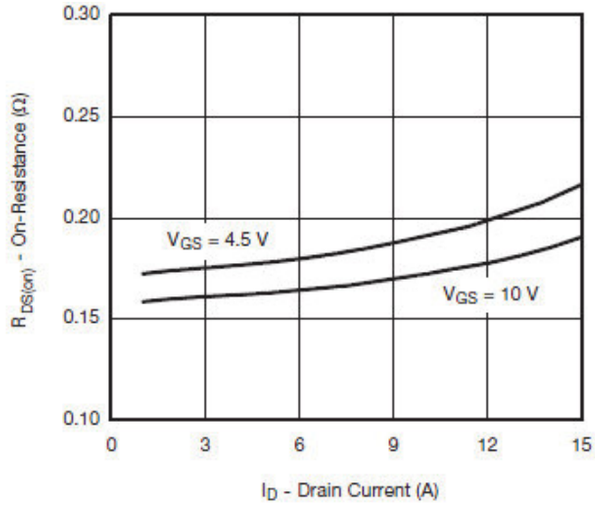
Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V		-100	-110		V
Zero gate voltage drain current	Idss	Vds=-80V, Vgs=0V				-1	μA
			Ta=85°C			-20	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V				±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA		-1.0		-2.5	V
On state drain current	Id(on)	Vgs=-10V, Vds≥-5V		-8			A
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-2.5A			198	210	mΩ
		Vgs=-4.5V, Id=-1.8A			215	230	
Forward transconductance	Gfs	Vds=-15V, Id=-3.6A			12		S
Diode forward voltage	Vsd	Is=-2.9A, Vgs=0V			-0.8	-1.5	V
Max. body-diode continuous current	Is					-1.7	A
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-50V, f=1MHz			980		pF
Output capacitance	Coss				100		pF
Reverse transfer capacitance	Crss				80		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=-4.5V, Vds=-50V Id≡-3.6A			12	20	nC
Gate-source charge	Qgs				4		nC
Gate-drain charge	Qgd				6		nC
Turn-on delay time	td(on)	Vgs=-10V, Vds=-50V Id≡-2.9A, RL=17.2Ω Rgen=1.0Ω			8	15	ns
Turn-on rise time	tr				15	20	ns
Turn-off delay time	td(off)				35	50	ns
Turn-off fall time	tf				10	20	ns

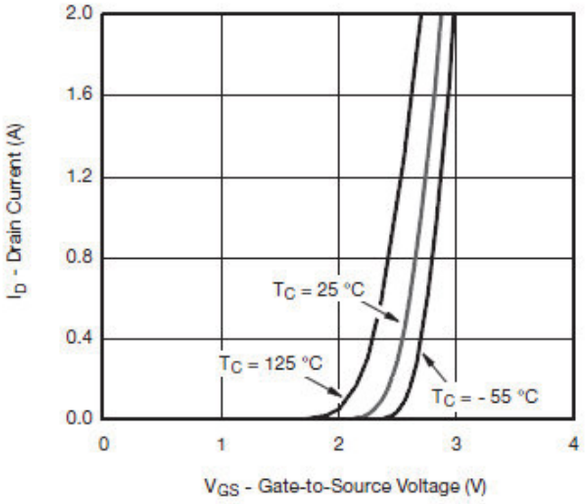
■Typical Electrical and Thermal Characteristics (P-ch)



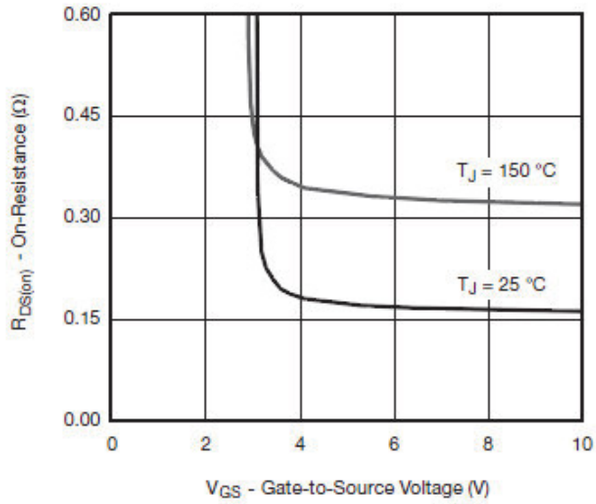
Output Characteristics



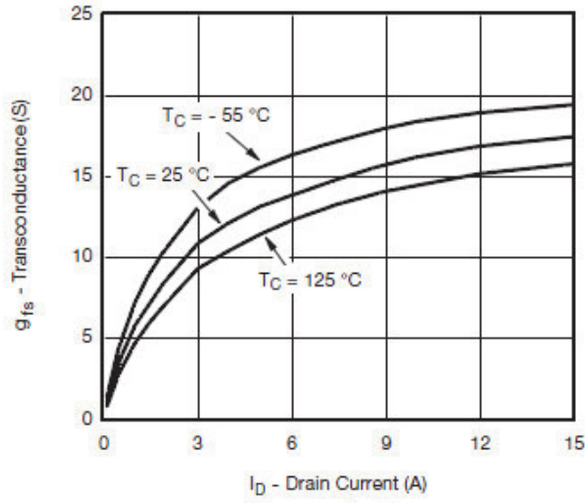
On-Resistance vs. Drain Current



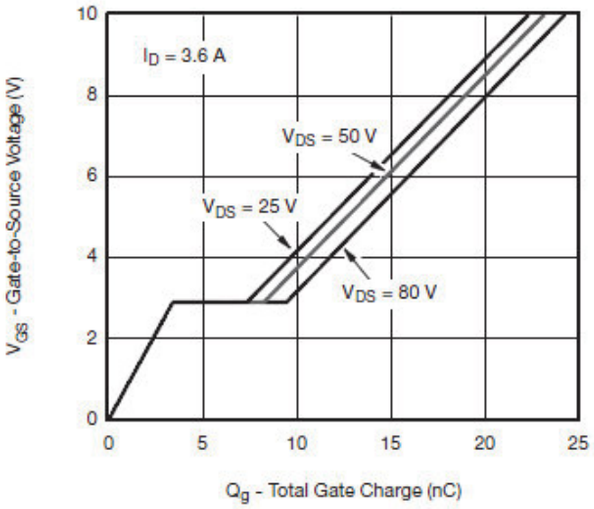
Transfer Characteristics



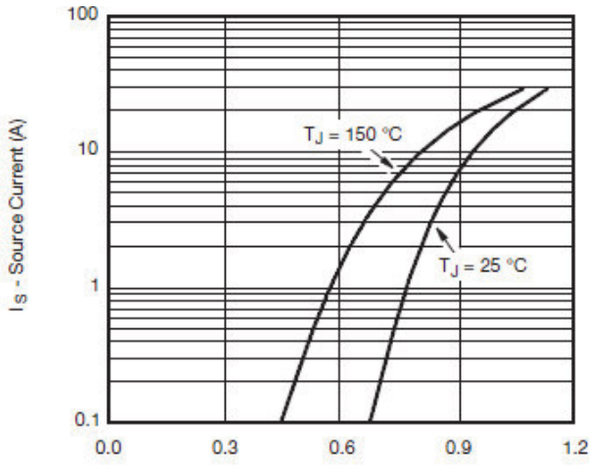
On-Resistance vs. Gate-to-Source Voltage



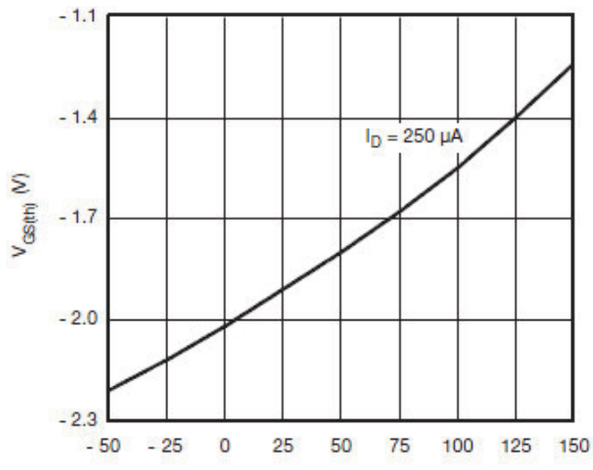
Transconductance



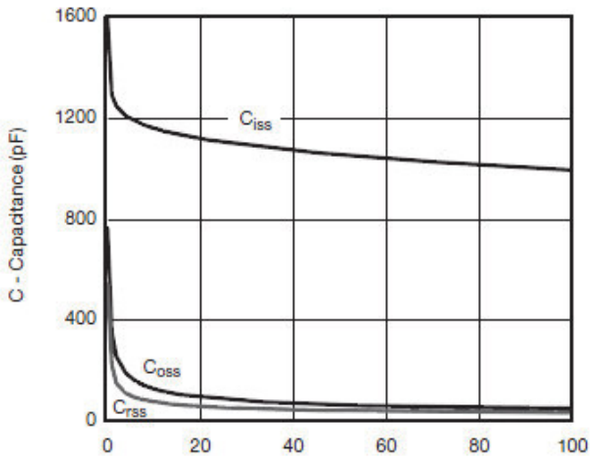
Gate Charge



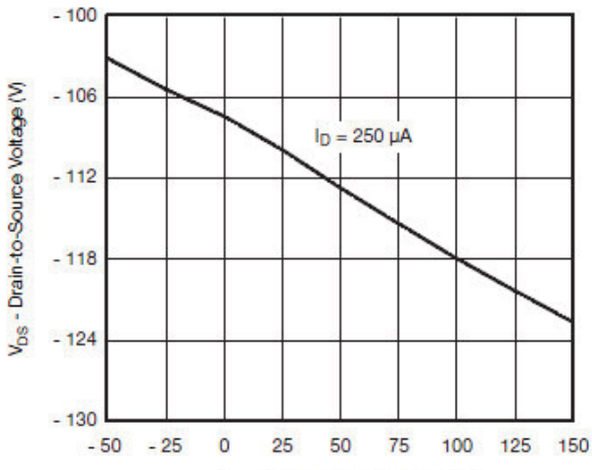
Source-Drain Diode Forward Voltage



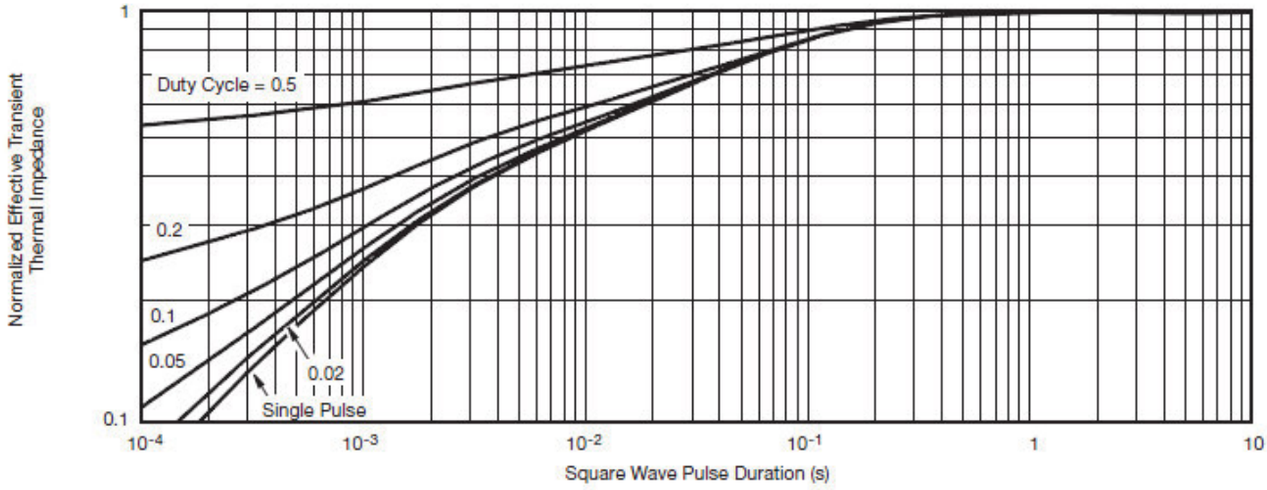
Threshold Voltage



Capacitance



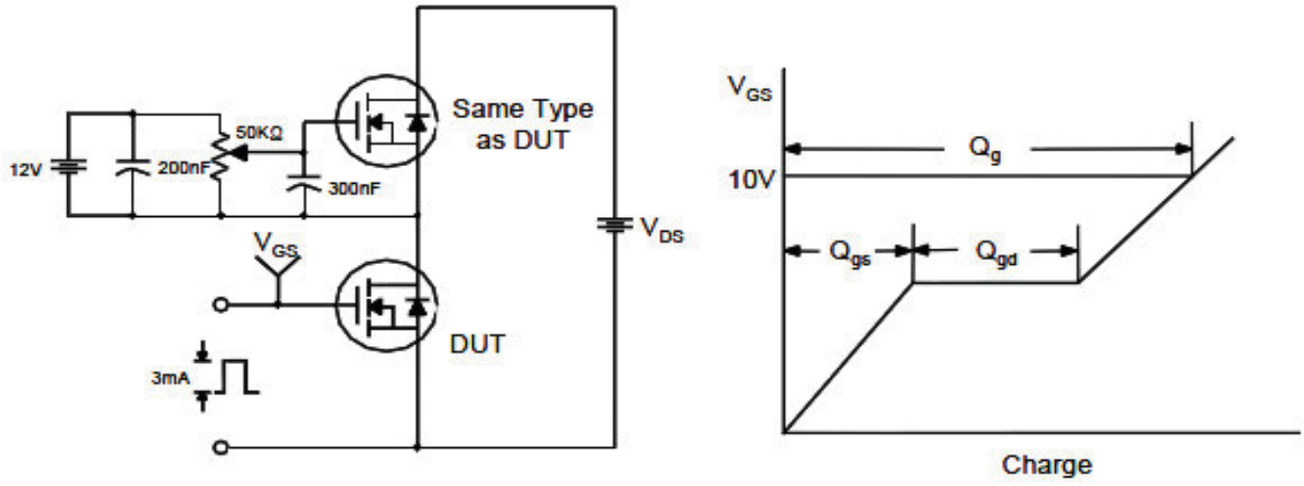
Drain Source Breakdown vs. Junction Temperature



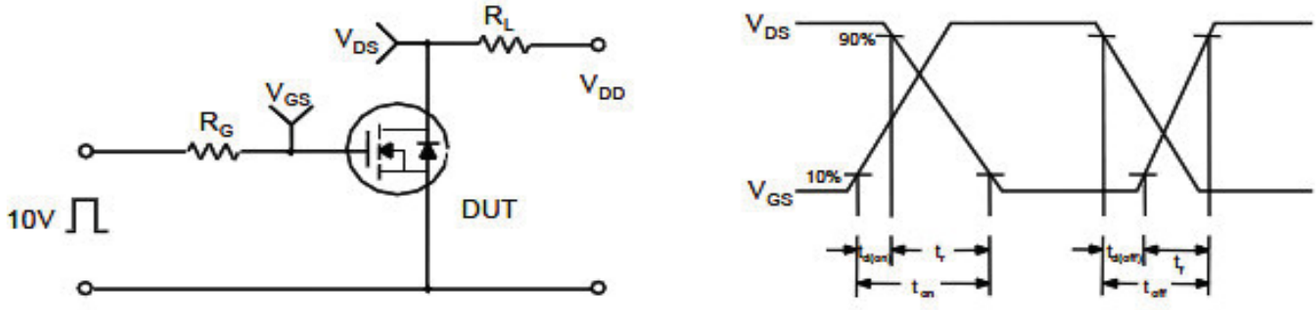
Normalized Thermal Transient Impedance, Junction-to-Case

■Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms