Dual N-channel MOSFET

ELM54910WA-N

■General description

ELM54910WA-N uses advanced trench technology to provide excellent Rds(on) and low gate charge.

■Features

N1 channel:
- · Vds=40V
- · Id=10.0A
- · Rds(on) = 19mΩ (Vgs=10V)
- · Rds(on) = 25mΩ (Vgs=4.5V)

N2 channel:
- · Vds=40V
- · Id=10.0A
- · Rds(on) = 10mΩ (Vgs=10V)
- · Rds(on) = 12mΩ (Vgs=4.5V)

■Maximum absolute ratings

Ta=25°C. Unless otherwise noted.

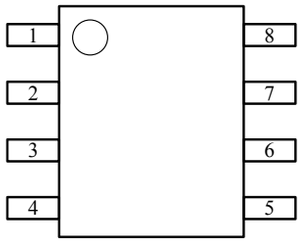
Parameter		Symbol	Limit		Unit
			N1	N2	
Drain-source voltage		Vds	40	40	V
Gate-source voltage		Vgs	±20	±20	V
Continuous drain current(Tj=150°C)	Ta=25°C	Id	10	10	A
	Ta=70°C		8	8	
Pulsed drain current		Idm	20	30	A
Avalanche current	L=0.1mH	Ias	10	20	A
Avalanche energy		Eas	5	10	mJ
Power dissipation	Tc=25°C	Pd	2.8		W
	Tc=70°C		1.8		
Operating junction temperature		Tj	150		°C
Storage temperature range		Tstg	-55 to 150		°C

■Thermal characteristics

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

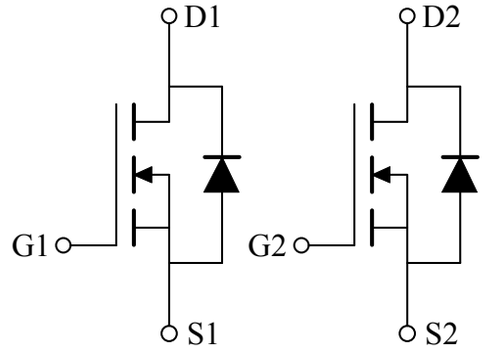
■Pin configuration

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

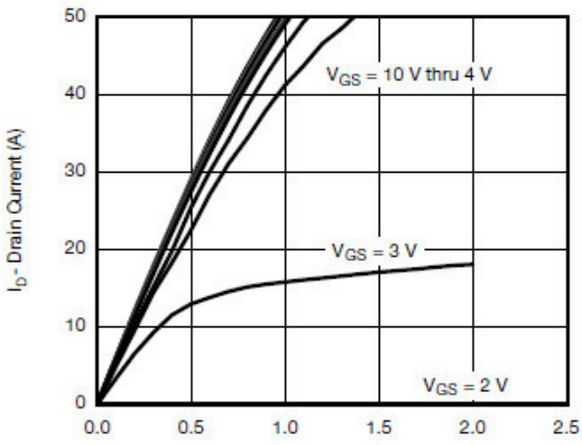


■N1 Electrical characteristics

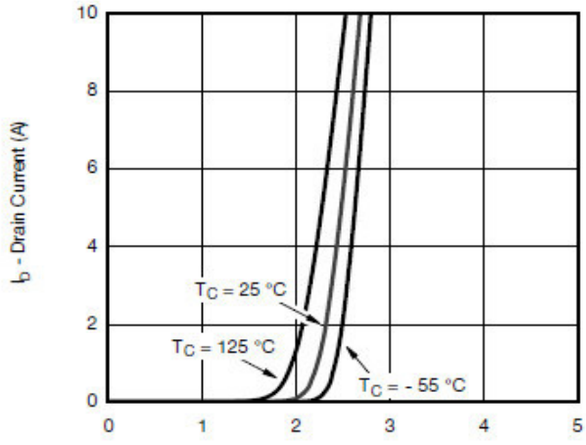
Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Condition		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V		40			V
Zero gate voltage drain current	Idss	Vds=40V Vgs=0V				1	μA
			Ta=85°C			10	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V				±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA		1.0		3.0	V
On state drain current	Id(on)	Vgs=10V, Vds≥5V		20			A
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=10A			15.8	19.0	mΩ
		Vgs=4.5V, Id=8A			21.5	25.0	
Forward transconductance	Gfs	Vds=15V, Id=5.0A			25		S
Diode forward voltage	Vsd	Is=2A, Vgs=0V			0.85	1.20	V
Max. body-diode continuous current	Is					1.8	A
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=20V, f=1MHz			600		pF
Output capacitance	Coss				100		pF
Reverse transfer capacitance	Crss				45		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=4.5V, Vds=20V Id≡10.0A			5.0	10.0	nC
Gate-source charge	Qgs				1.5		nC
Gate-drain charge	Qgd				1.5		nC
Turn-on delay time	td(on)	Vgs=10V, Vds=20V, Id≡10.0A RL=2.0Ω, Rgen=1.0Ω			7	15	ns
Turn-on rise time	tr				9	20	ns
Turn-off delay time	td(off)				16	30	ns
Turn-off fall time	tf				8	18	ns

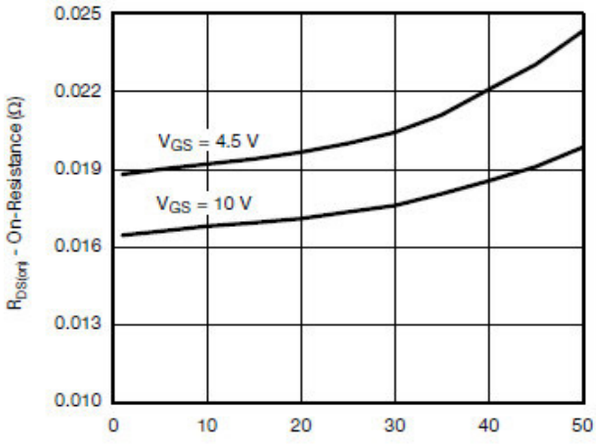
■N1 Typical electrical and thermal characteristics



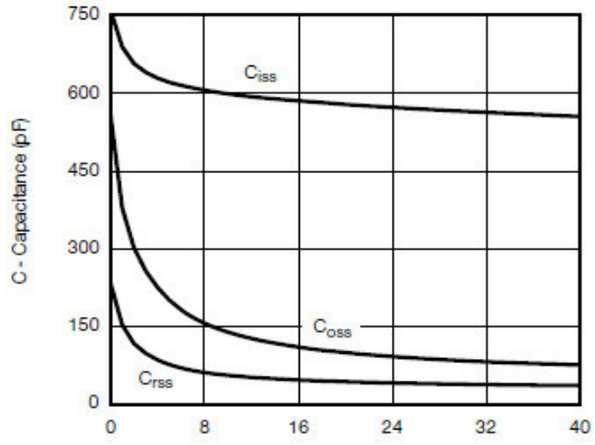
Output Characteristics



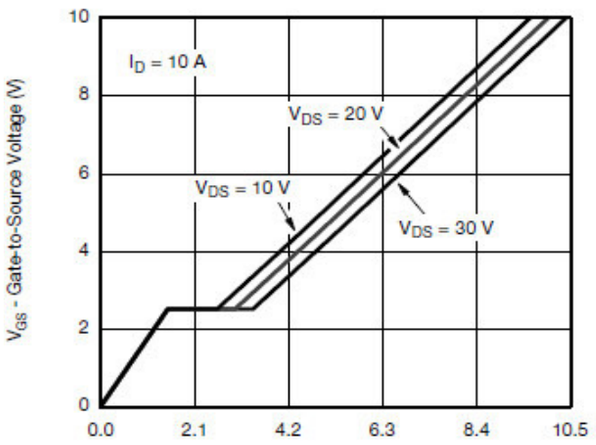
Transfer Characteristics



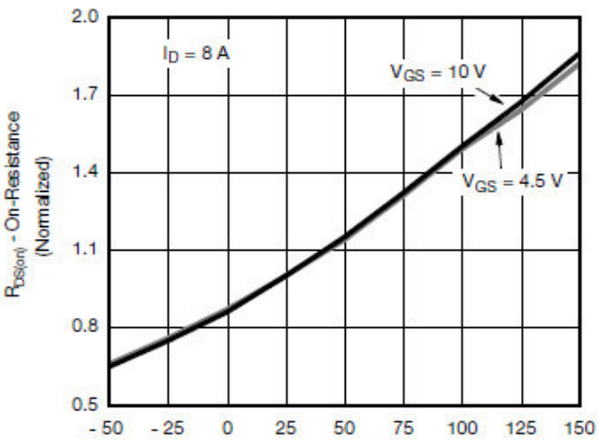
On-Resistance vs. Drain Current



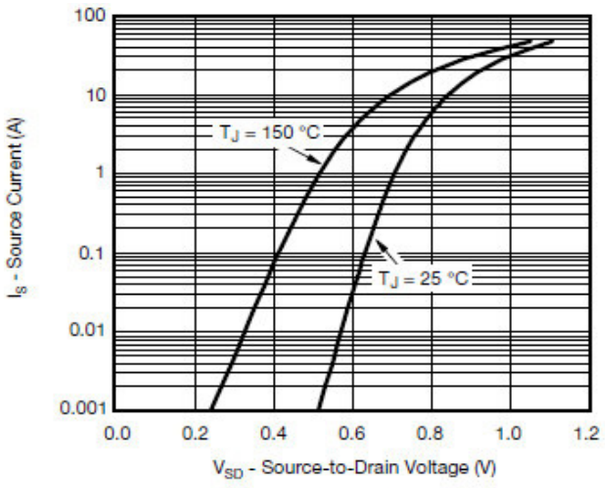
Capacitance



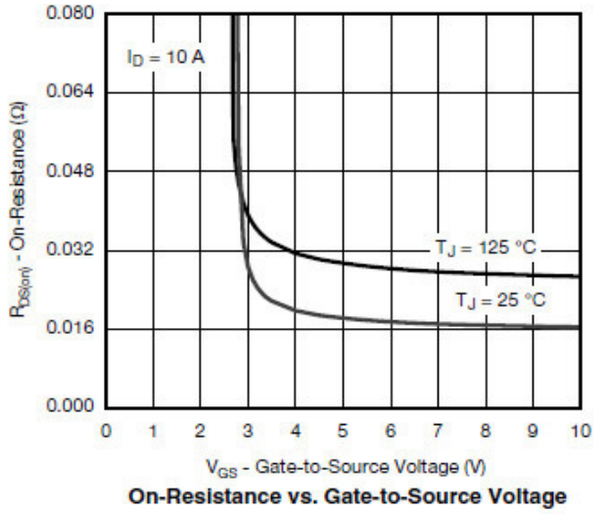
Gate Charge



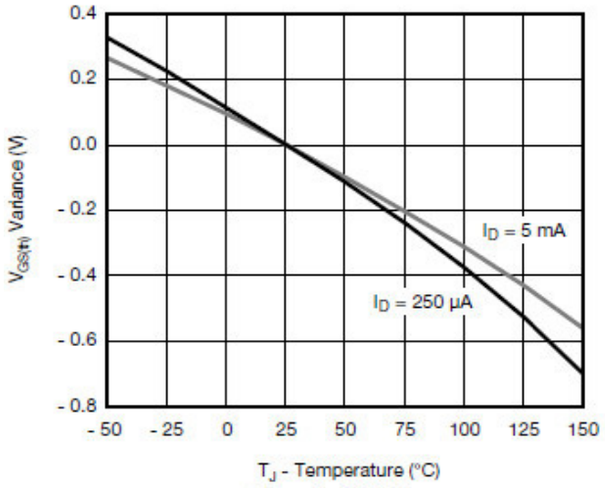
On-Resistance vs. Junction Temperature



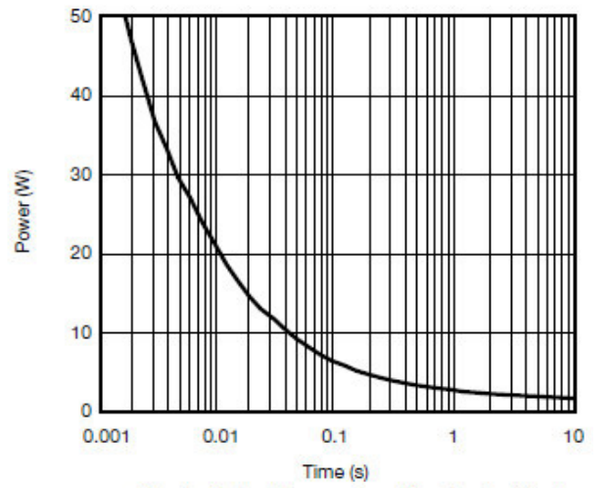
Source-Drain Diode Forward Voltage



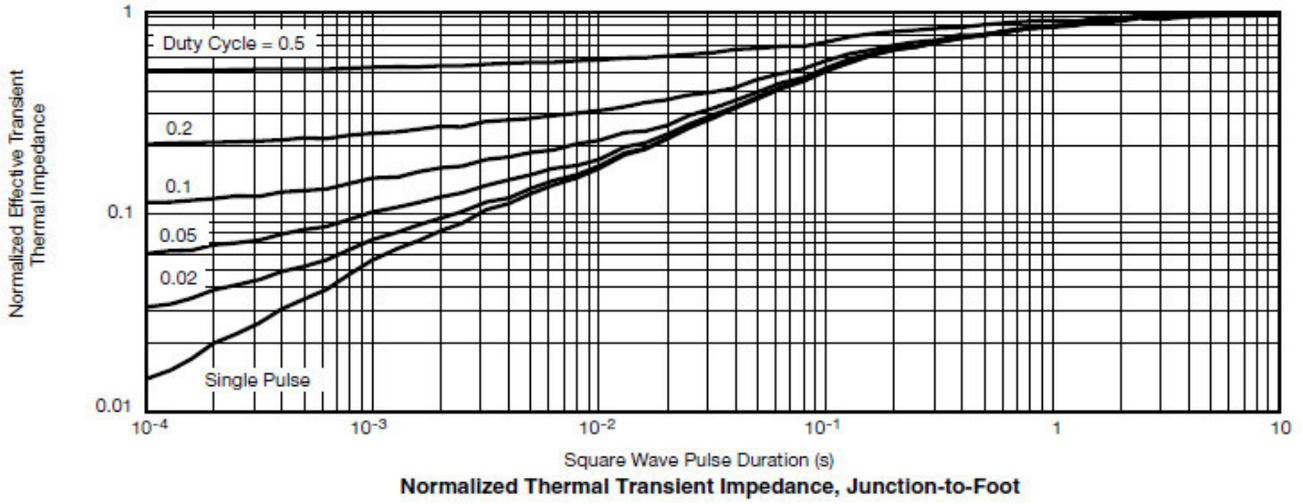
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient



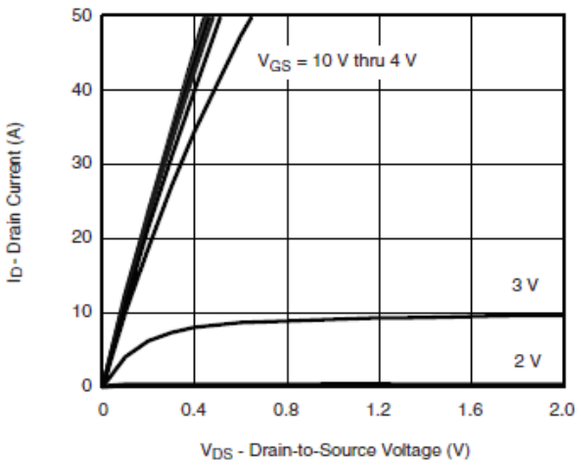
Normalized Thermal Transient Impedance, Junction-to-Foot

■N2 Electrical characteristics

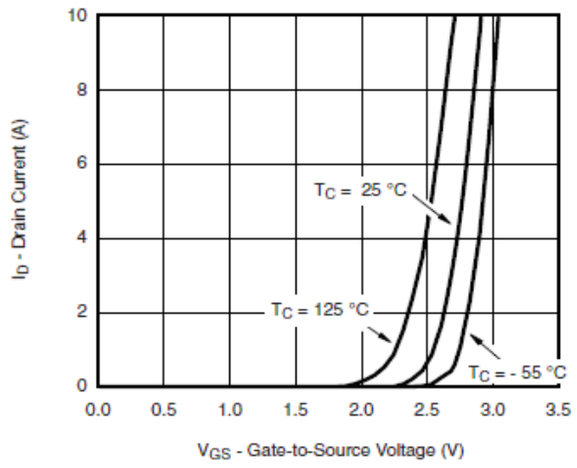
Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Condition		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V		40			V
Zero gate voltage drain current	Idss	Vds=32V, Vgs=0V				1	μA
			Ta=85°C			10	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V				±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA		1.0		3.0	V
On state drain current	Id(on)	Vgs=10V, Vds≥5V		30			A
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=10A			8.8	10.0	mΩ
		Vgs=4.5V, Id=8A			10.2	12.0	
Forward transconductance	Gfs	Vds=15V, Id=12.4A			56		S
Diode forward voltage	Vsd	Is=1.5A, Vgs=0V			0.85	1.20	V
Max. body-diode continuous current	Is					1.8	A
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=20V, f=1MHz			2000		pF
Output capacitance	Coss				260		pF
Reverse transfer capacitance	Crss				150		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=4.5V, Vds=10V, Id≡8.0A			15.0	30.0	nC
Gate-source charge	Qgs				6.8		nC
Gate-drain charge	Qgd				5.2		nC
Turn-on delay time	td(on)	Vgs=10V, Vds=20V, Id≡8.0A, RL=2.0Ω, Rgen=1.0Ω			10	20	ns
Turn-on rise time	tr				15	30	ns
Turn-off delay time	td(off)				30	60	ns
Turn-off fall time	tf				10	20	ns

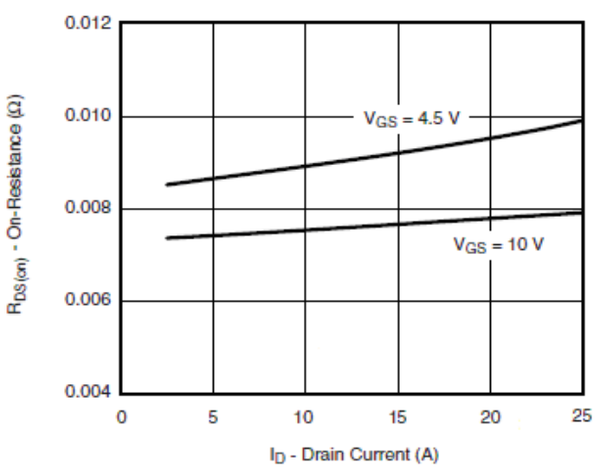
■N2 Typical electrical and thermal characteristics



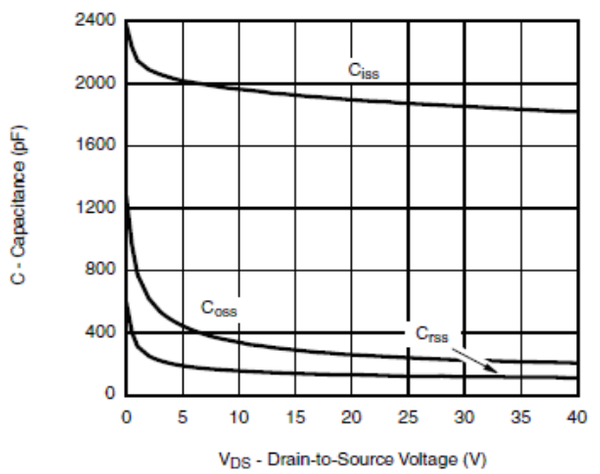
Output Characteristics



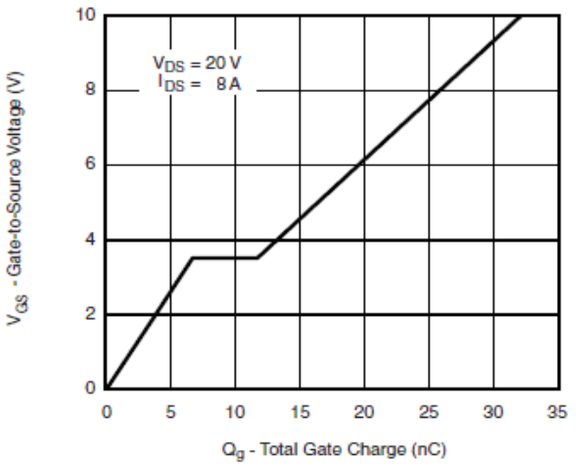
Transfer Characteristics



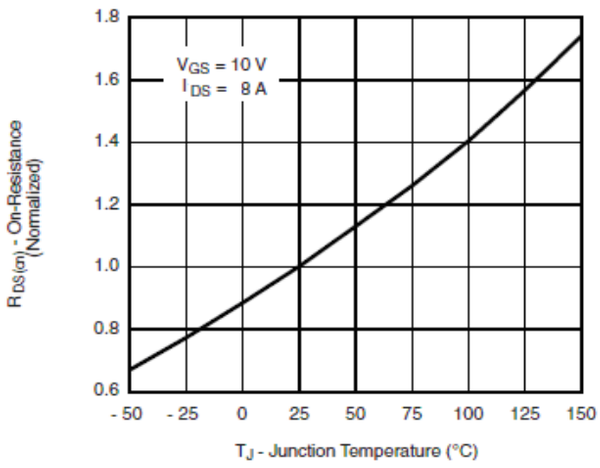
On-Resistance vs. Drain Current and Gate Voltage



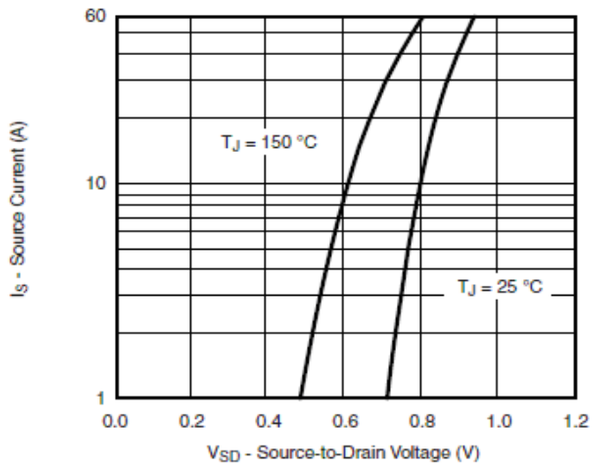
Capacitance



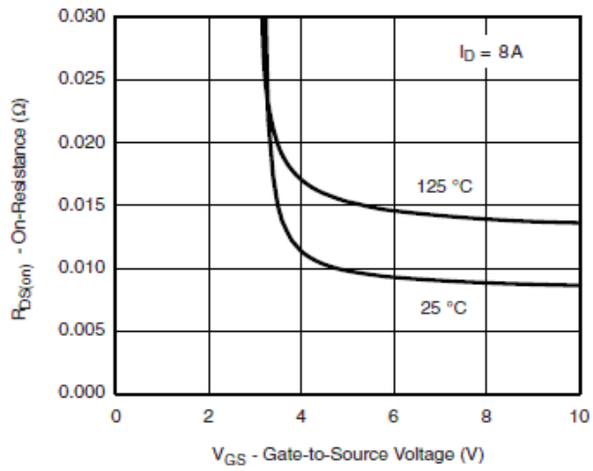
Gate Charge



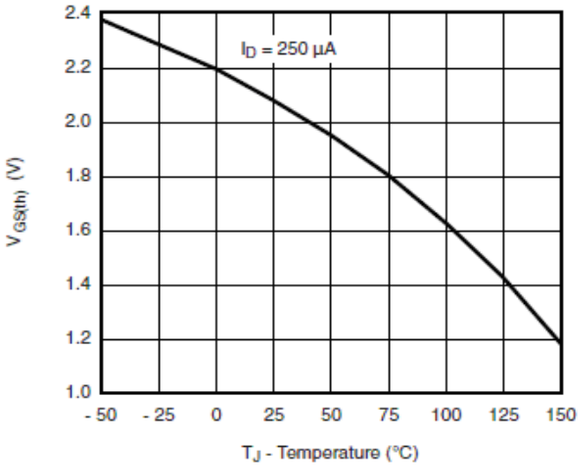
On-Resistance vs. Junction Temperature



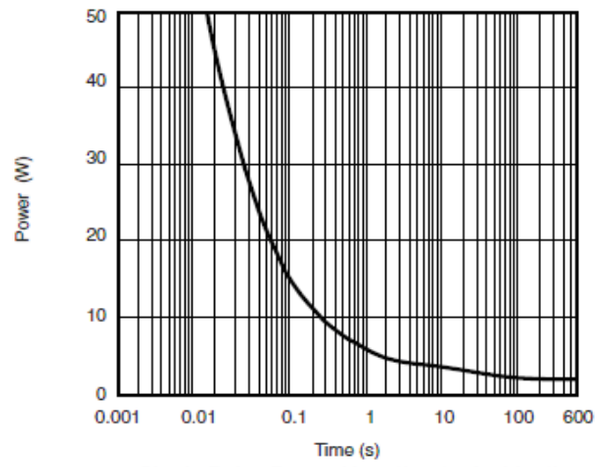
Source-Drain Diode Forward Voltage



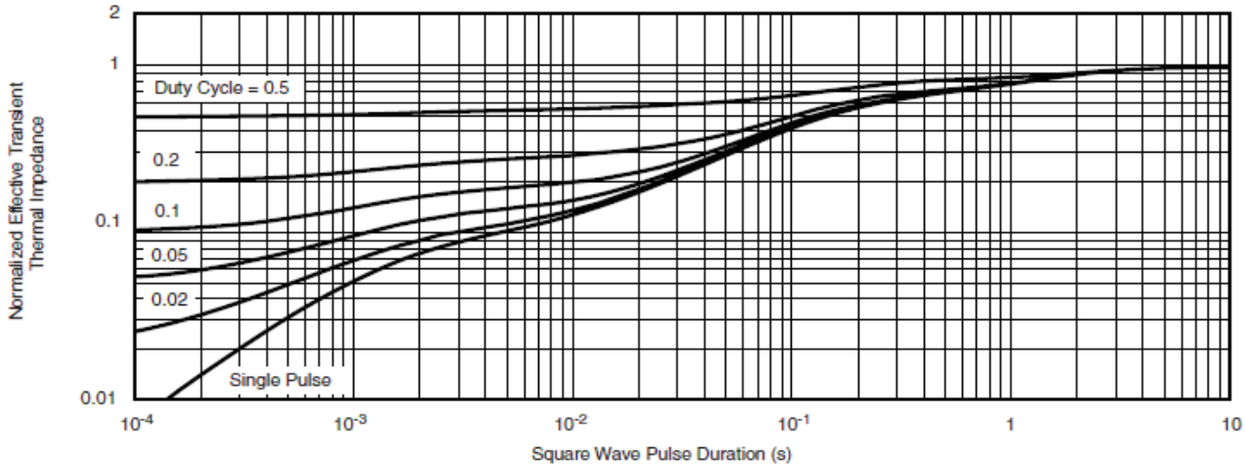
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



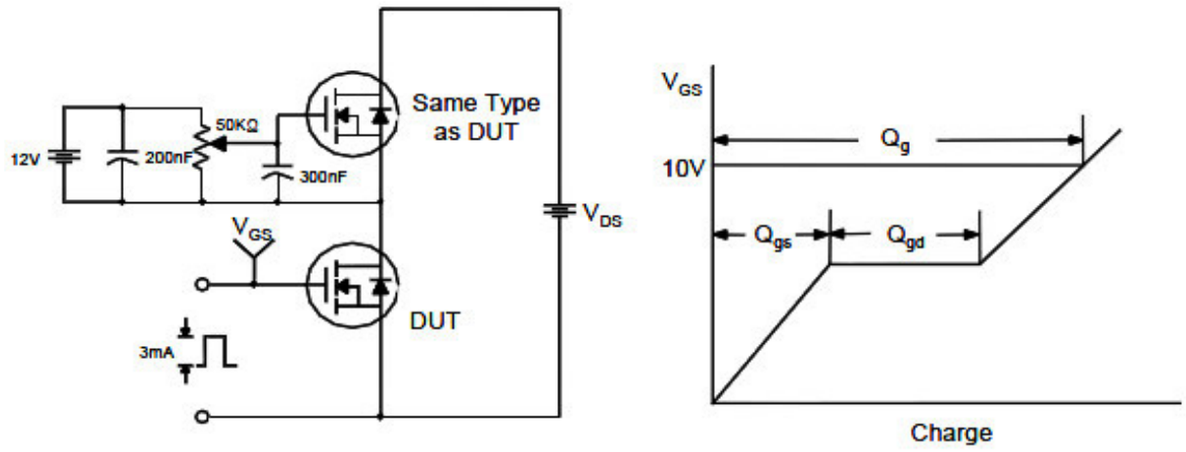
Single Pulse Power (Junction-to-Ambient)



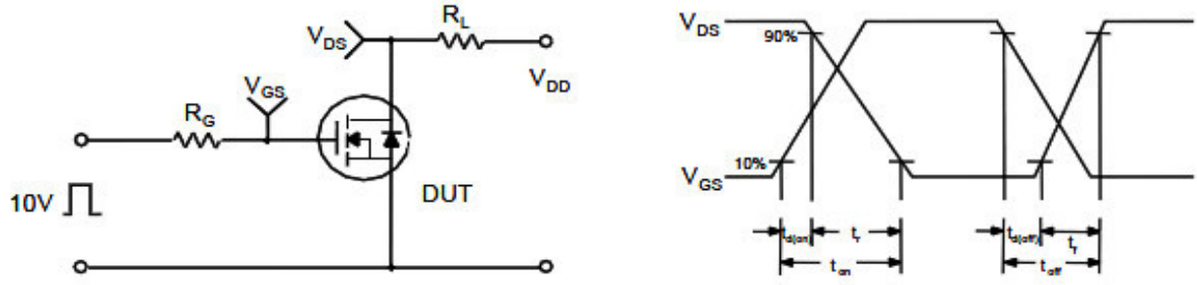
Normalized Thermal Transient Impedance, Junction-to-Foot

■Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms