Complementary MOSFET

ELM53346CWA-N

■General Description

ELM53346CWA-N uses advanced trench technology to provide excellent Rds(on) and low gate charge.

■Features

N-channel

- Vds=40V
- Id=15.0A
- Rds(on)=28mΩ(Vgs=10V)
- Rds(on)=38mΩ(Vgs=4.5V)

P-channel

- Vds=-40V
- Id=-12.0A
- Rds(on)=45mΩ(Vgs=-10V)
- Rds(on)=62mΩ(Vgs=-4.5V)

■Maximum Absolute Ratings

Ta=25°C. Unless otherwise noted.

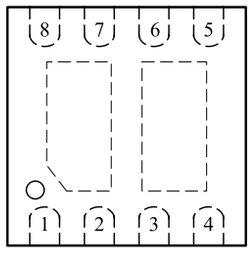
Parameter		Symbol	N-ch (Max.)	P-ch (Max.)	Unit
Drain-source voltage		Vds	40	-40	V
Gate-source voltage		Vgs	±20	±20	V
Continuous drain current(Tj=150°C)	Ta=25°C	Id	15	-12	A
	Ta=70°C		12	-10	
Pulsed drain current		Idm	40	-40	A
Power dissipation	Tc=25°C	Pd	2.0	1.8	W
	Tc=70°C		1.5	1.2	
Operating junction 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		56.0	°C/W
Thermal resistance junction-to-ambient	Rθja	P-ch		62.5	°C/W

■Pin configuration

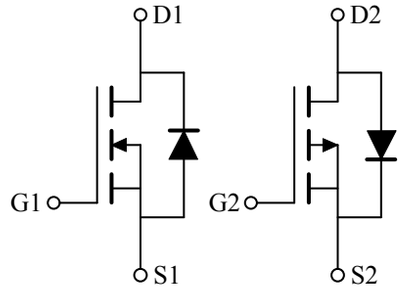
DFN8-3×3(TOP VIEW)



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

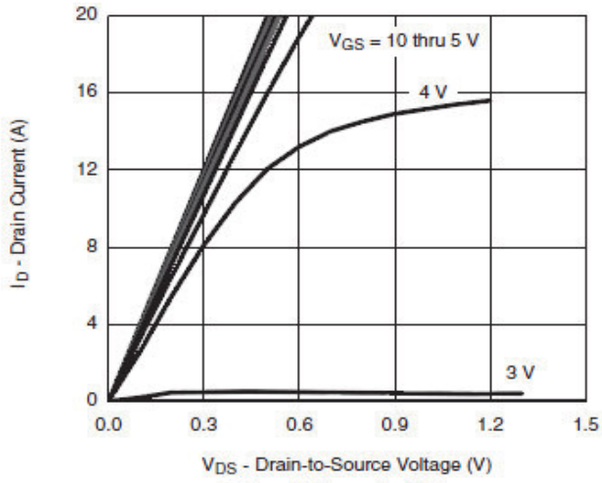


■Electrical Characteristics (N-ch)

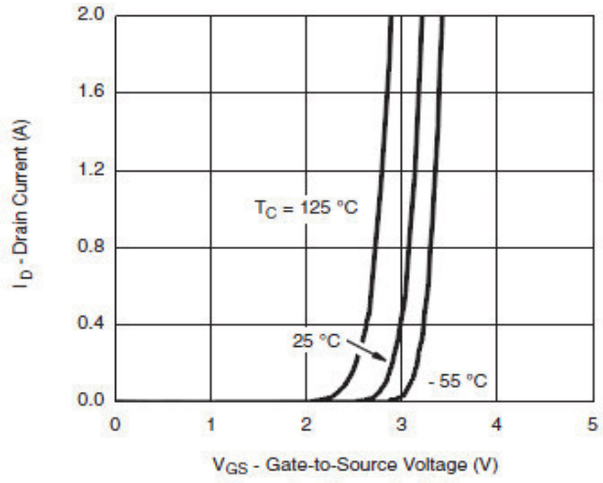
Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V		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		20			A
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=15.0A			20	28	mΩ
		Vgs=4.5V, Id=12.0A			30	38	
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					10	A
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=20V, f=1MHz			850		pF
Output capacitance	Coss				110		pF
Reverse transfer capacitance	Crss				75		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=4.5V, Vds=20V, Id≡5.0A			10.0	14.0	nC
Gate-source charge	Qgs				2.8		nC
Gate-drain charge	Qgd				3.2		nC
Turn-on delay time	td(on)	Vgs=10V, Vds=20V, Id≡5.0A RL=4.0Ω, Rgen=1.0Ω			6	12	ns
Turn-on rise time	tr				10	20	ns
Turn-off delay time	td(off)				20	36	ns
Turn-off fall time	tf				6	12	ns

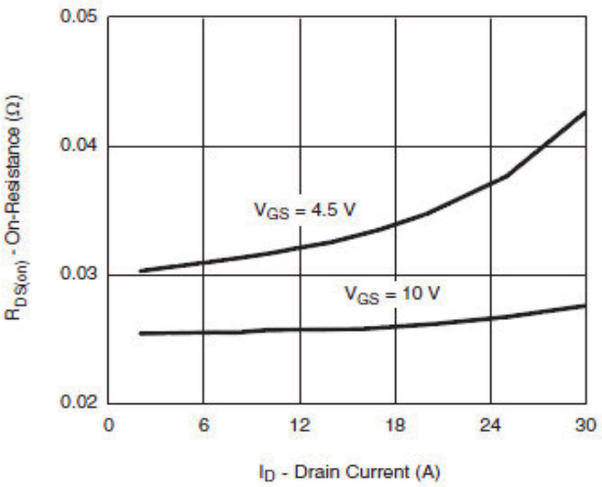
■Typical Electrical and Thermal Characteristics (N-ch)



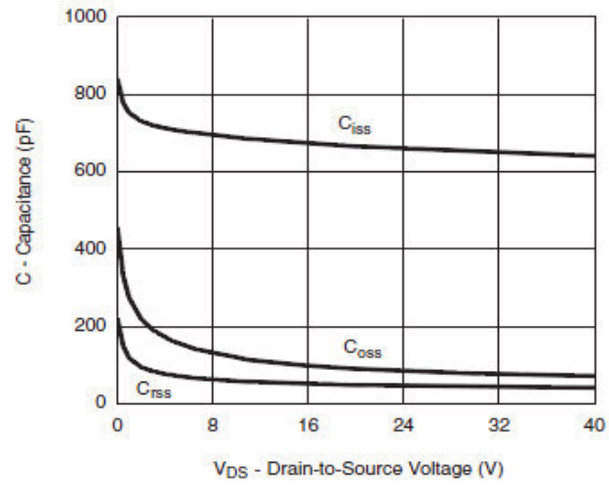
Output Characteristics



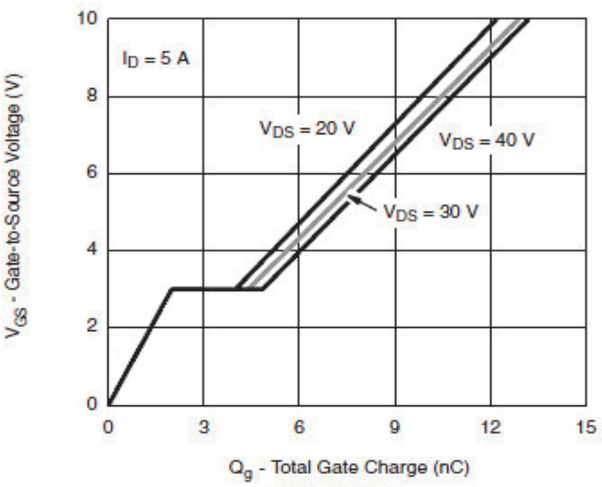
Transfer Characteristics



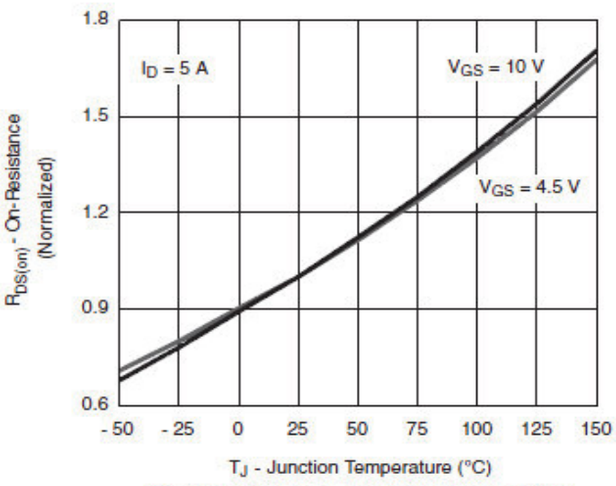
On-Resistance vs. Drain Current and Gate Voltage



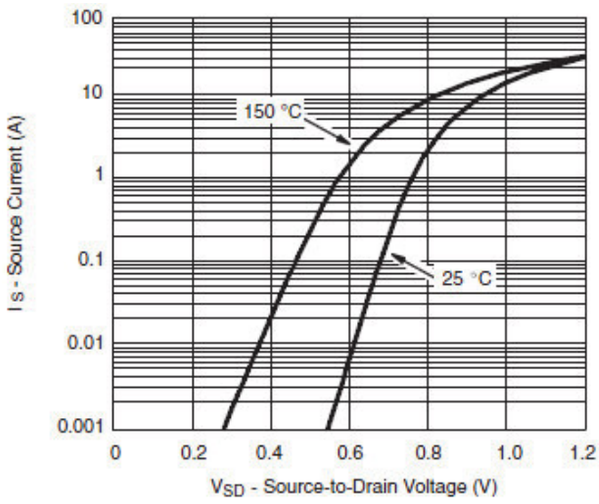
Capacitance



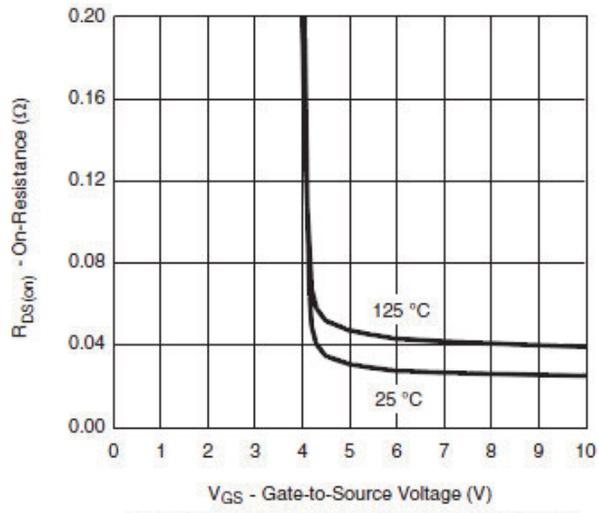
Gate Charge



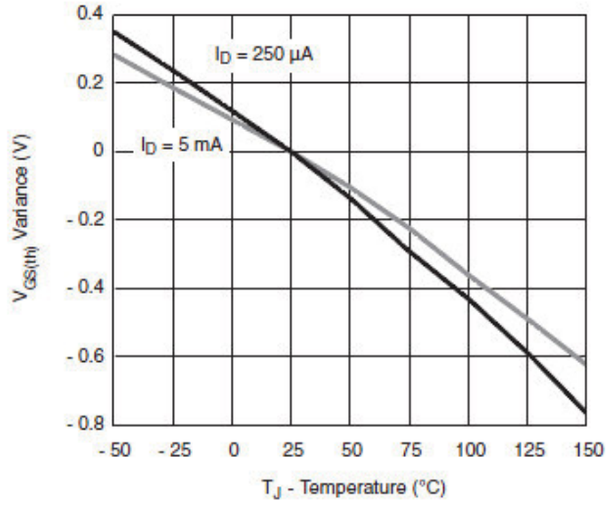
On-Resistance vs. Junction Temperature



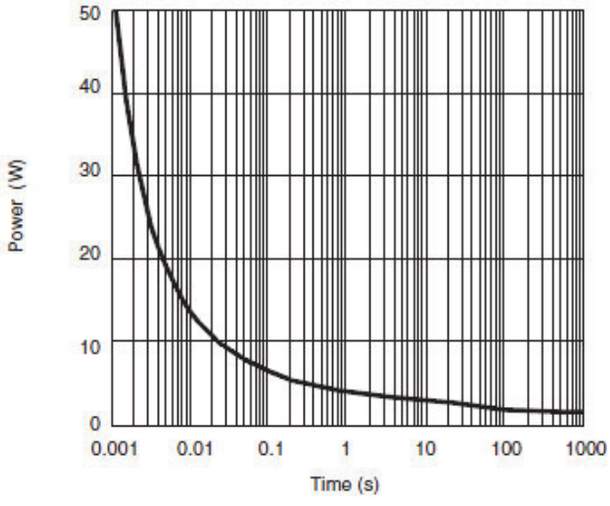
Source-Drain Diode Forward Voltage



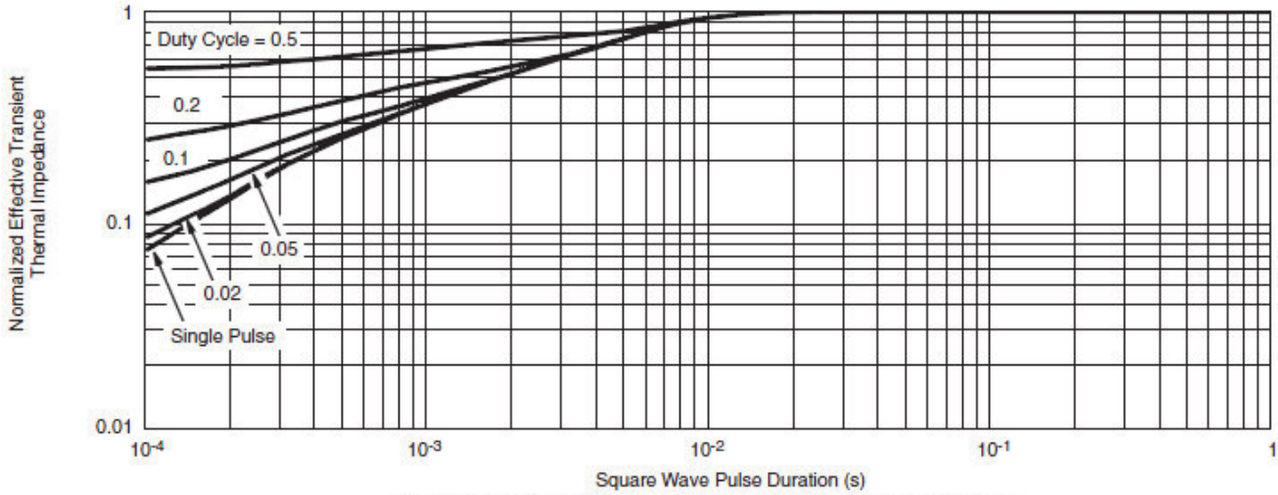
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient



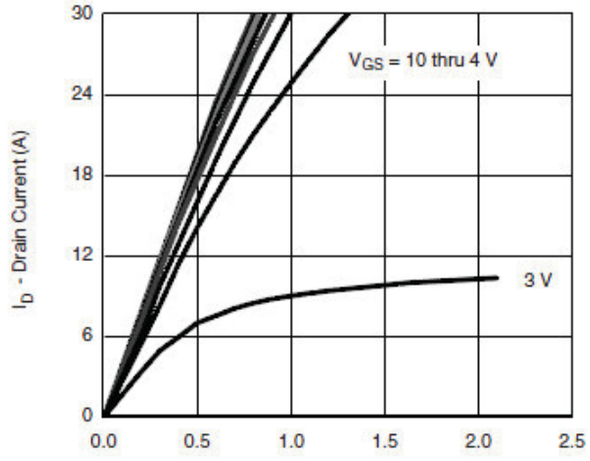
Normalized Thermal Transient Impedance, Junction-to-Case

■Electrical Characteristics (P-ch)

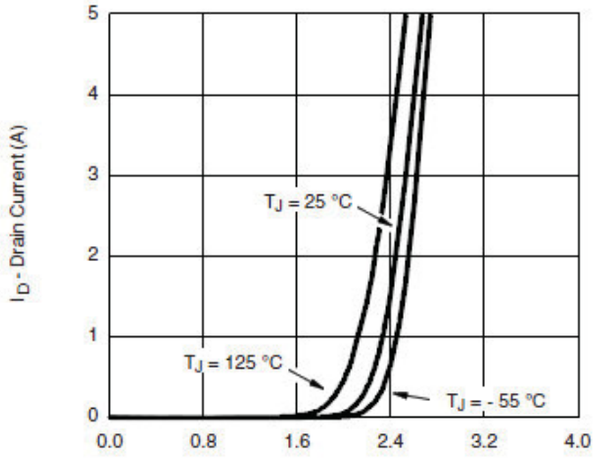
Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V		-40			V
Zero gate voltage drain current	Idss	Vds=-32V, 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		-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=-12.0A			34	45	mΩ
		Vgs=-4.5V, Id=-10.0A			48	62	
Forward transconductance	Gfs	Vds=-15V, Id=-5A			20		S
Diode forward voltage	Vsd	Is=-2A, Vgs=0V			-0.8	-1.2	V
Max. body-diode continuous current	Is					-10	A
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-20V, f=1MHz			1100		pF
Output capacitance	Coss				145		pF
Reverse transfer capacitance	Crss				115		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=-4.5V, Vds=-20V Id≡-5.0A			13.0	20.0	nC
Gate-source charge	Qgs				4.5		nC
Gate-drain charge	Qgd				6.5		nC
Turn-on delay time	td(on)	Vgs=-4.5V, Vds=-20V Id≡-5.0A, RL=4Ω Rgen=1Ω			40	80	ns
Turn-on rise time	tr				55	100	ns
Turn-off delay time	td(off)				30	60	ns
Turn-off fall time	tf				12	20	ns

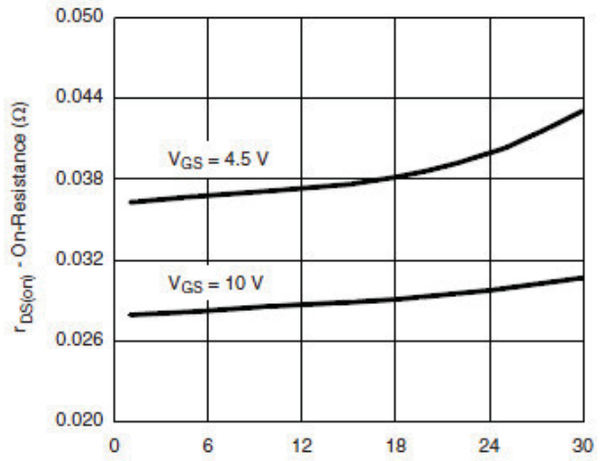
■Typical Electrical and Thermal Characteristics (P-ch)



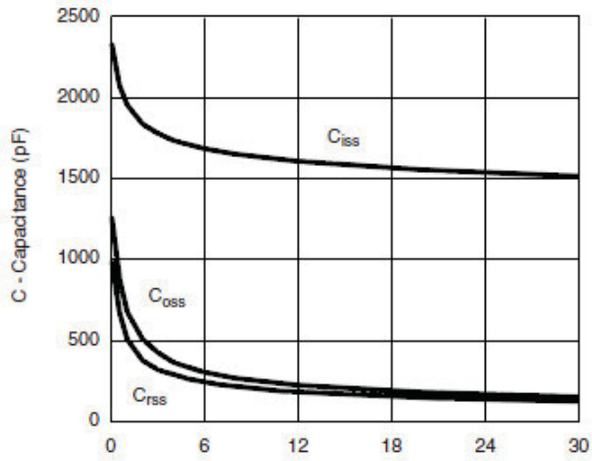
Output Characteristics



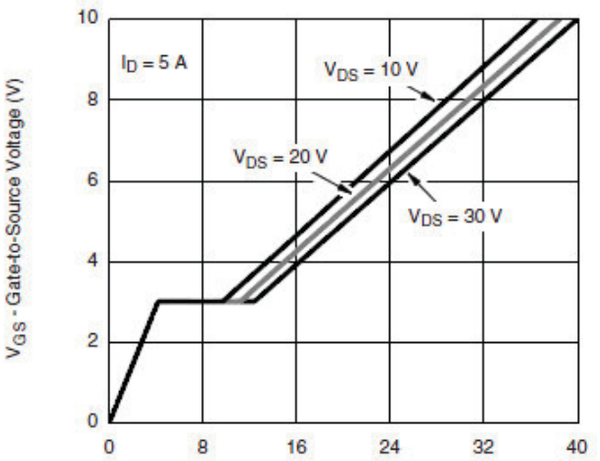
Transfer Characteristics



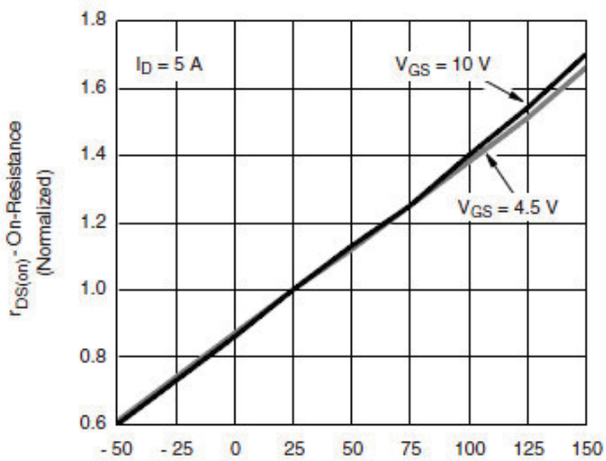
On-Resistance vs. Drain Current



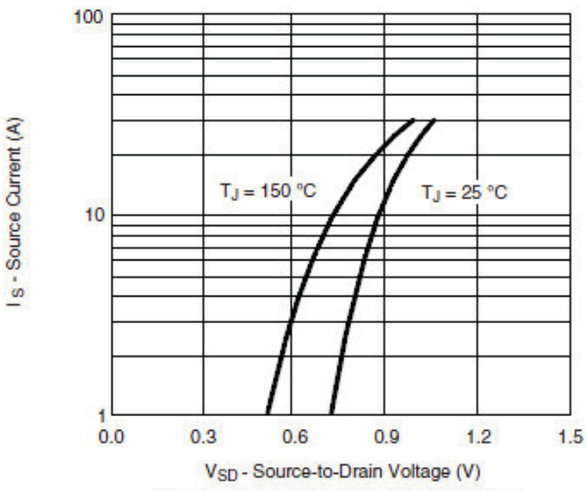
Capacitance



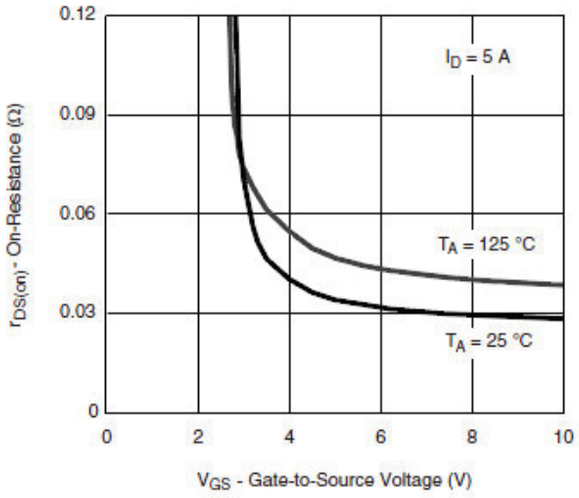
Gate Charge



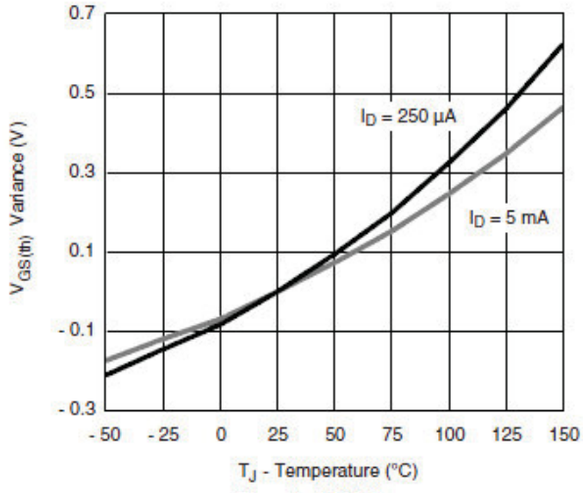
On-Resistance vs. Junction Temperature



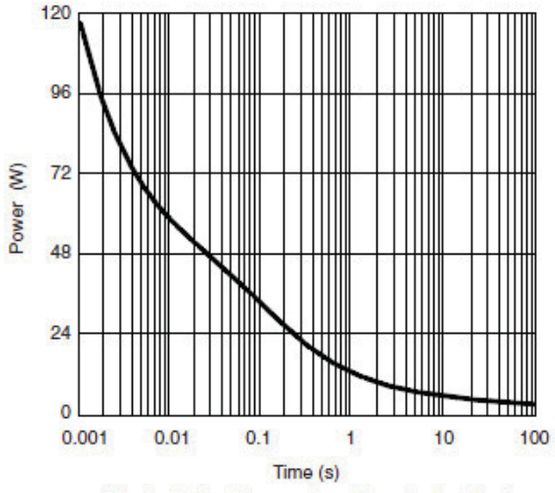
Source-Drain Diode Forward Voltage



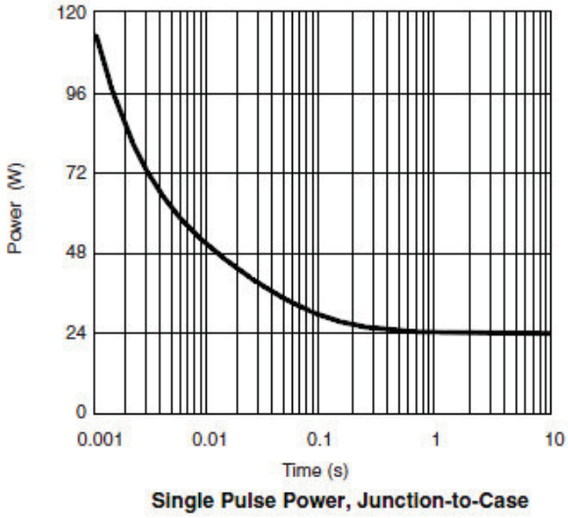
On-Resistance vs. Gate-to-Source Voltage



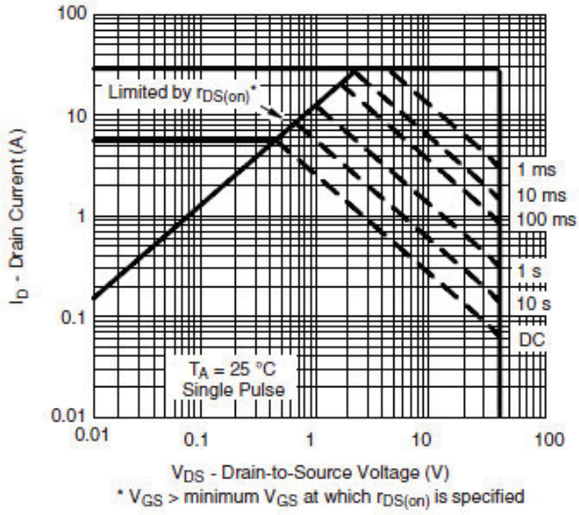
Threshold Voltage



Single Pulse Power, Junction-to-Ambient



Single Pulse Power, Junction-to-Case

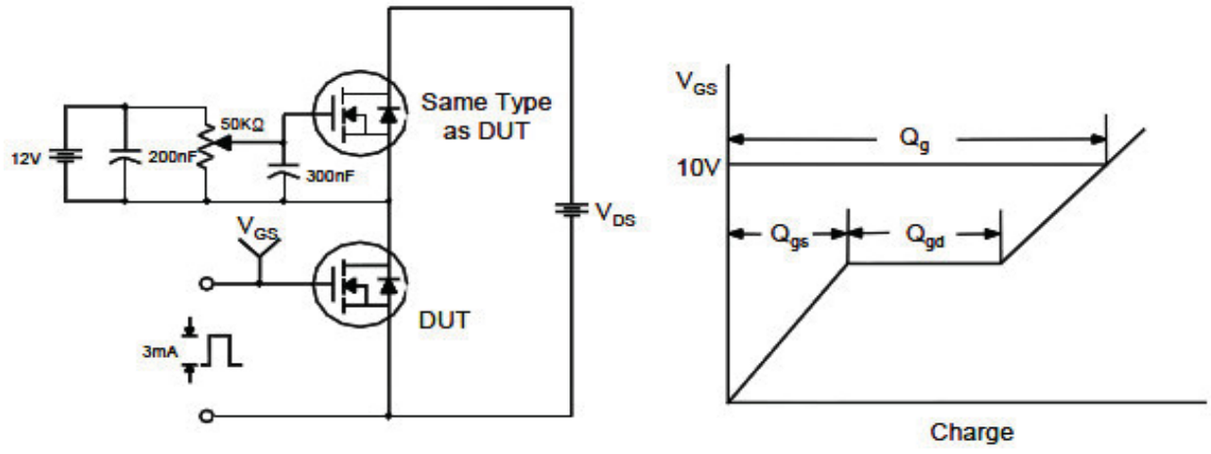


* V_{GS} > minimum V_{GS} at which $r_{DS(on)}$ is specified

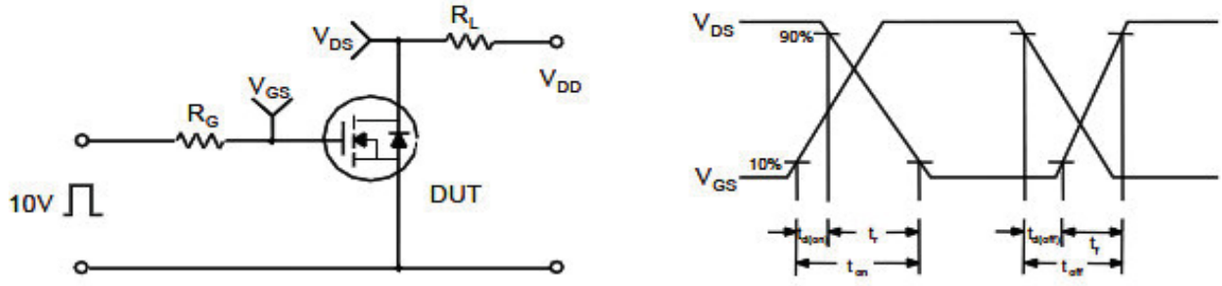
Safe Operating Area, Junction-to-Ambient

■Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms