Complementary MOSFET

ELM56606CWA-S

■General Description

ELM56606CWA-S uses advanced trench technology to provide excellent Rds(on) and low gate charge.

■Features

N-channel

- Vds=60V
- Id=2.8A
- Rds(on)=135mΩ(Vgs=10V)
- Rds(on)=145mΩ(Vgs=4.5V)

P-channel

- Vds=-60V
- Id=-1.8A
- Rds(on)=310mΩ(Vgs=-10V)
- Rds(on)=340mΩ(Vgs=-4.5V)

■Maximum Absolute Ratings

Ta=25°C. Unless otherwise noted.

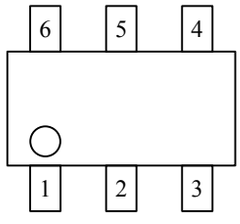
Parameter		Symbol	N-ch (Max.)	P-ch (Max.)	Unit
Drain-source voltage		Vds	60	-60	V
Gate-source voltage		Vgs	±20	±20	V
Continuous drain current(Tj=150°C)	Ta=25°C	Id	2.8	-1.8	A
	Ta=70°C		2.0	-1.4	
Pulsed drain current		Idm	8	-8	A
Power dissipation	Tc=25°C	Pd	2.0	2.0	W
	Tc=70°C		1.3	1.3	
Operating junction temperature		Tj	150	150	°C
Storage temperature range		Tstg	-55 to 150	-55 to 150	°C

■Thermal Characteristics

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

■Pin configuration

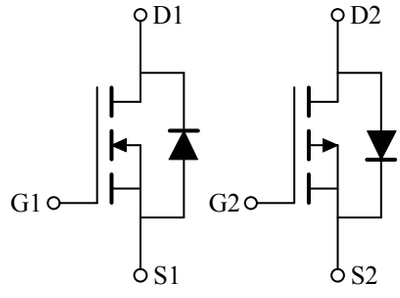
SOT-26(TOP VIEW)



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

■Circuit

- N-ch
- P-ch

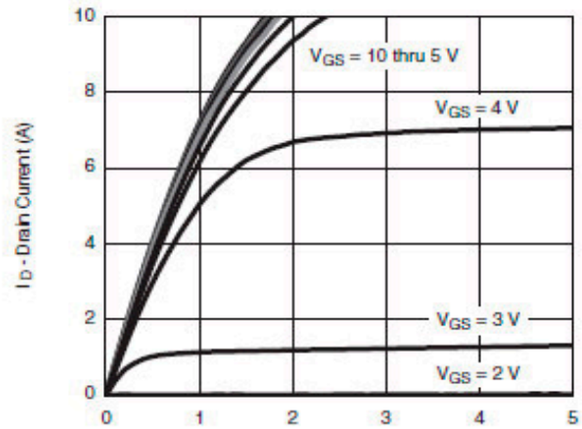


■Electrical Characteristics (N-ch)

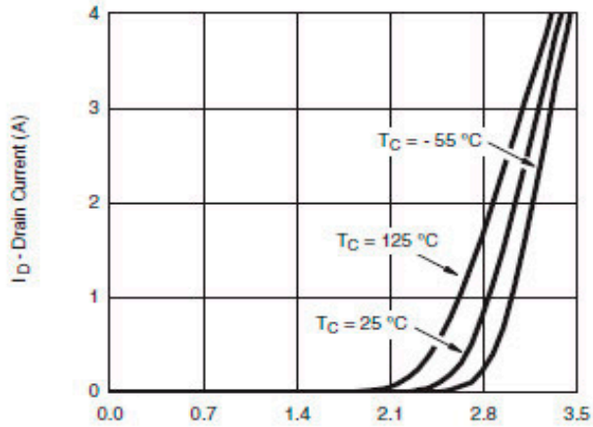
Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V		60			V
Zero gate voltage drain current	Idss	Vds=48V, 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		0.7		2.5	V
On state drain current	Id(on)	Vgs=10V, Vds≥5V		5			A
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=2.8A			115	135	mΩ
		Vgs=4.5V, Id=2.0A			125	145	
Forward transconductance	Gfs	Vds=15V, Id=2.0A			5		S
Diode forward voltage	Vsd	Is=2.5A, Vgs=0V			0.85	1.20	V
Max.body-diode continuous current	Is					1.5	A
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=30V, f=1MHz			200		pF
Output capacitance	Coss				20		pF
Reverse transfer capacitance	Crss				10		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=4.5V, Vds=30V, Id≡2.0A			2.5	3.5	nC
Gate-source charge	Qgs				0.8		nC
Gate-drain charge	Qgd				1.0		nC
Turn-on delay time	td(on)	Vgs=10V, Vds=30V, Id≡1.5A RL=20Ω, Rgen=1Ω			4	8	ns
Turn-on rise time	tr				10	20	ns
Turn-off delay time	td(off)				10	40	ns
Turn-off fall time	tf				6	10	ns

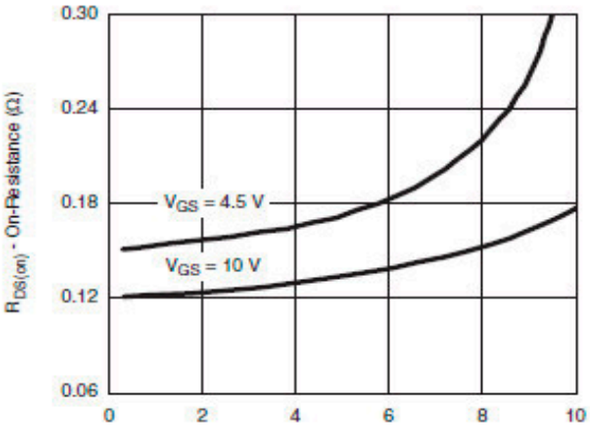
■Typical Electrical and Thermal Characteristics (N-ch)



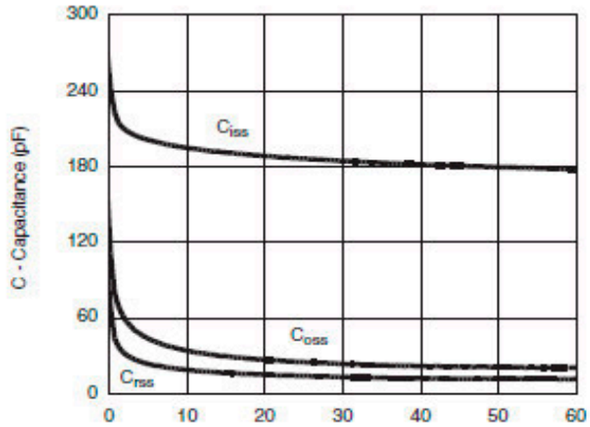
Output Characteristics



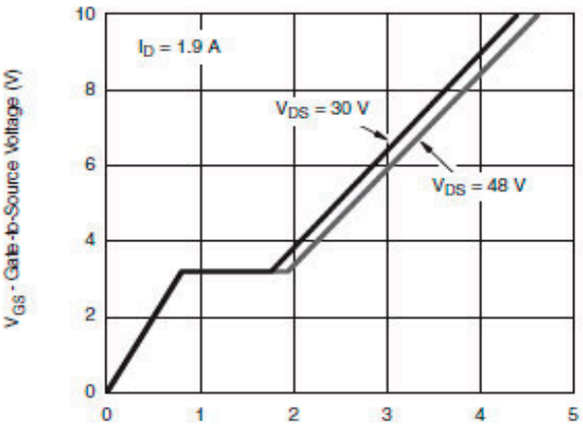
Transfer Characteristics



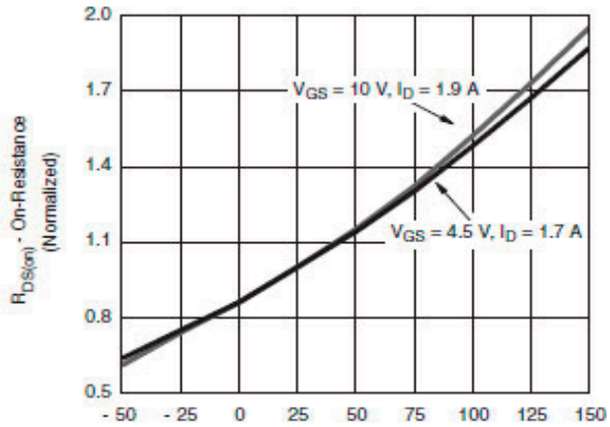
On-Resistance vs. Drain Current and Gate Voltage



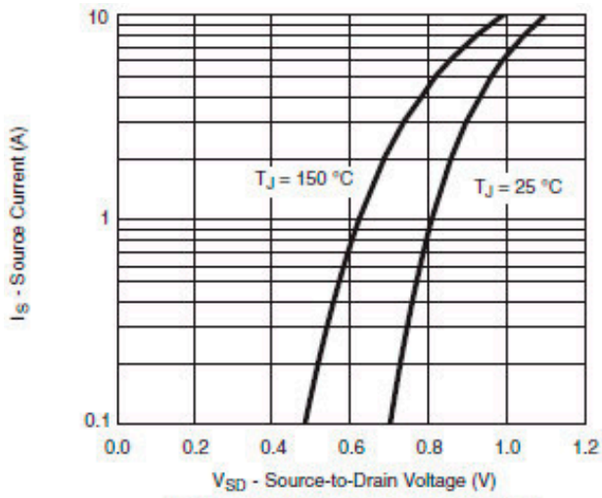
Capacitance



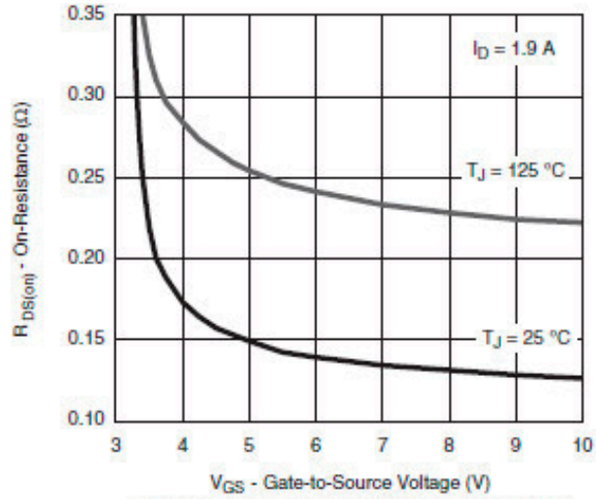
Gate Charge



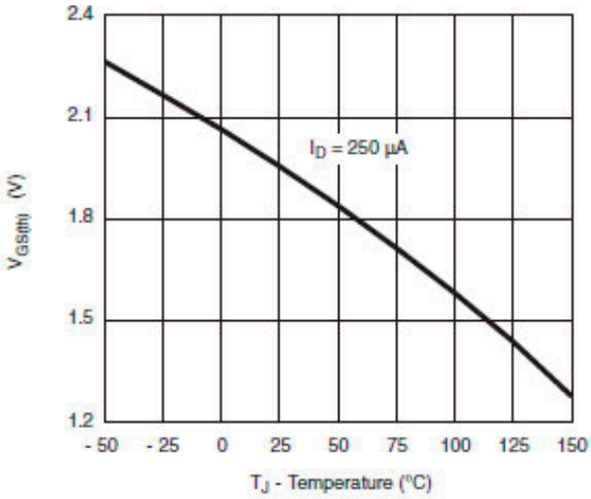
On-Resistance vs. Junction Temperature



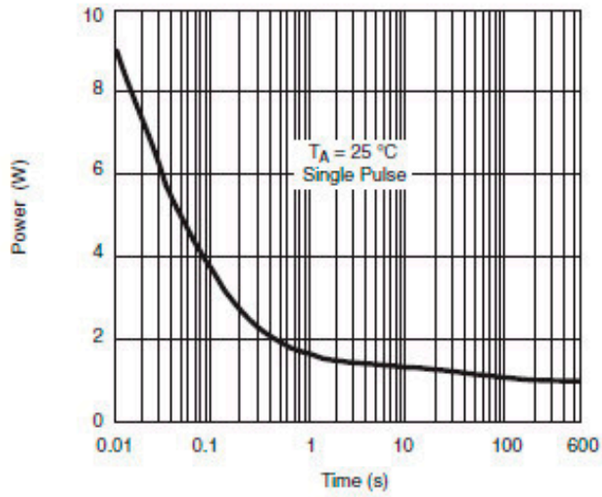
Source-Drain Diode Forward Voltage



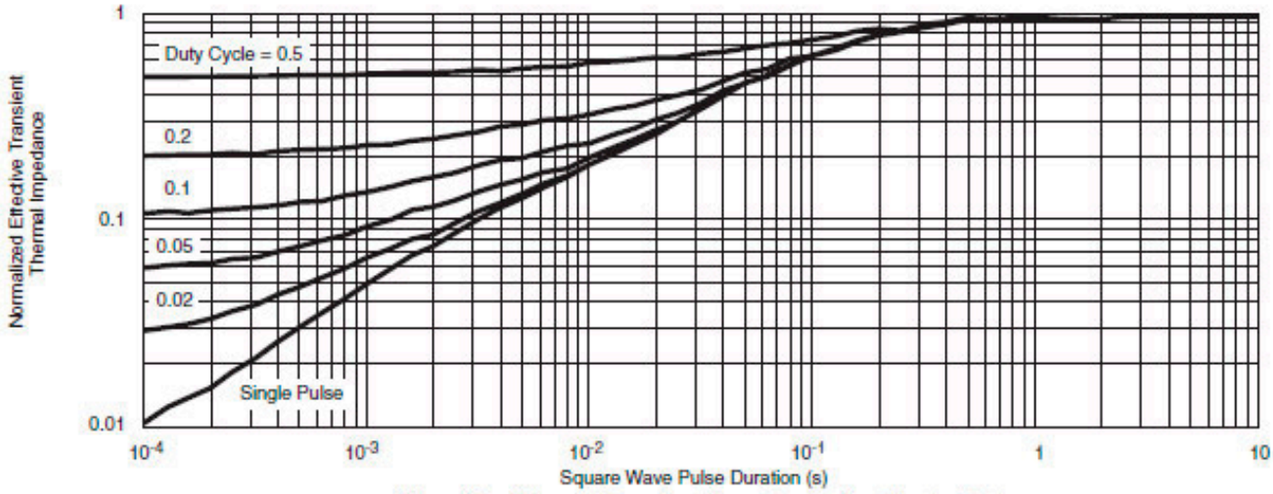
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



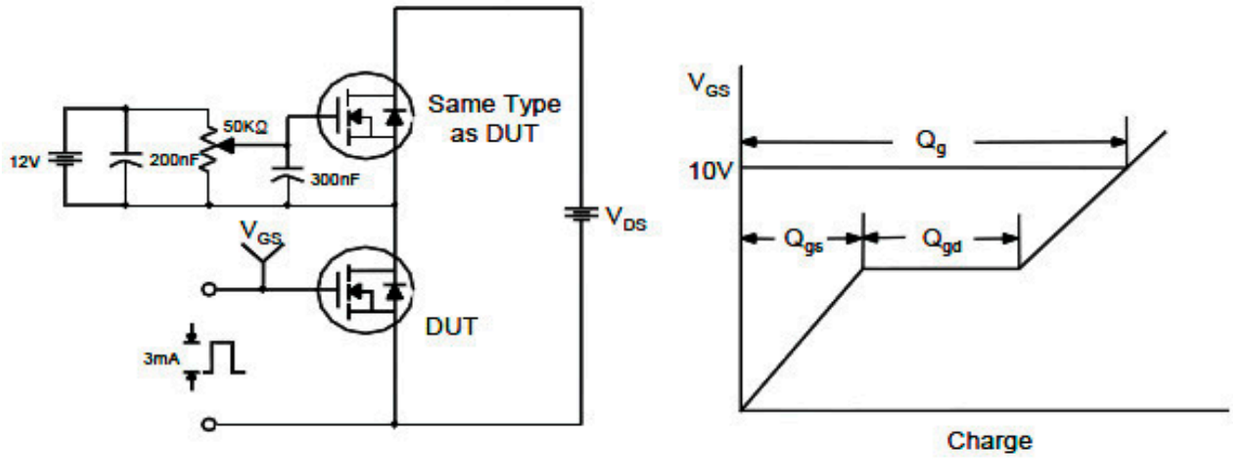
Single Pulse Power



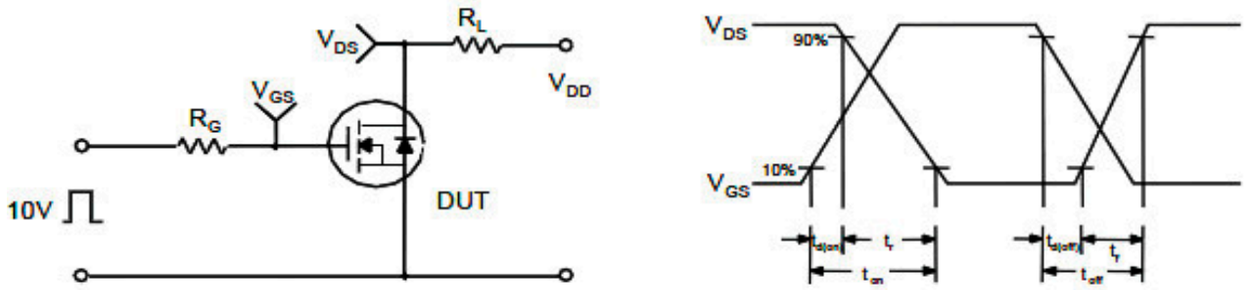
Normalized Thermal Transient Impedance, Junction-to-Foot

■Test circuit and waveform **(N-ch)**

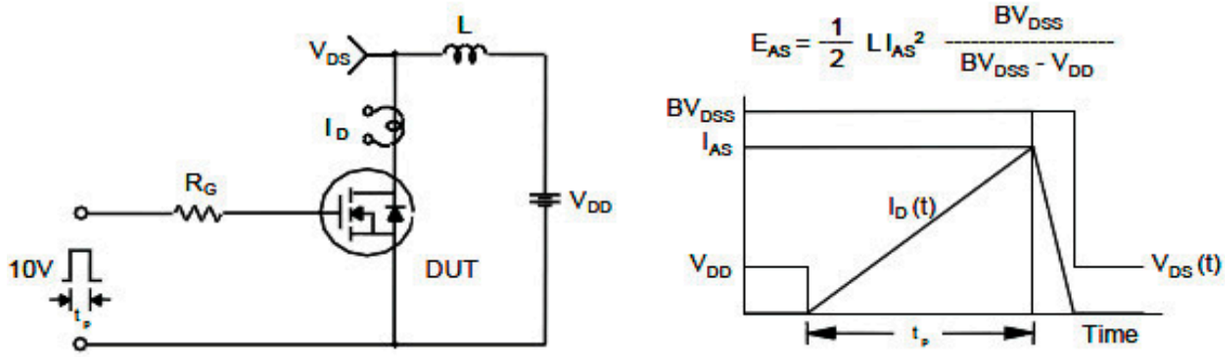
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

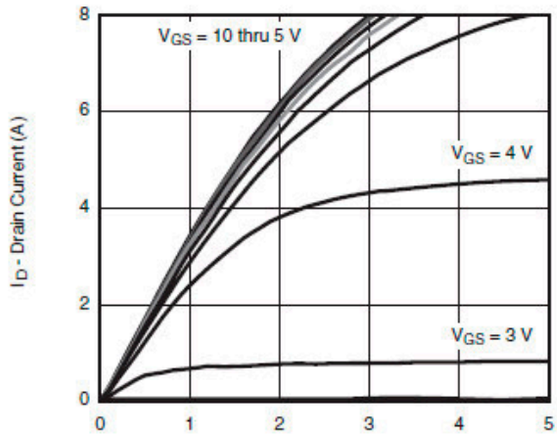


■Electrical Characteristics (P-ch)

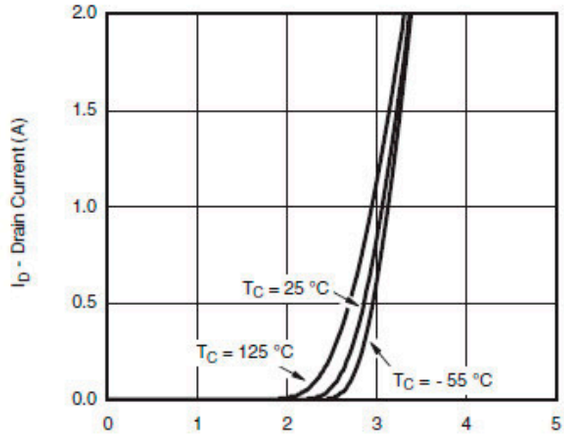
Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V		-60			V
Zero gate voltage drain current	Idss	Vds=-48V, Vgs=0V				-1	μA
			Ta=85°C			-30	
Gate-body leakage current	Igss	Vds=0V, Vgs=±12V				±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA		-1.0		-2.0	V
On state drain current	Id(on)	Vgs=-10V, Vds≥-5V		-6			A
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-1.8A			280	310	mΩ
		Vgs=-4.5V, Id=-1.4A			295	340	
Forward transconductance	Gfs	Vds=-10V, Id=-1.0A			2.8		S
Diode forward voltage	Vsd	Is=-1.0A, Vgs=0V			-0.75	-1.30	V
Max. body-diode continuous current	Is					-1.5	A
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-30V, f=1MHz			210		pF
Output capacitance	Coss				25		pF
Reverse transfer capacitance	Crss				18		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=-4.5V, Vds=-30V Id≡-1.25A			2.7	4.5	nC
Gate-source charge	Qgs				0.7		nC
Gate-drain charge	Qgd				1.2		nC
Turn-on delay time	td(on)	Vgs=-10V, Vds=-30V Id≡-1.0A, RL=30Ω Rgen=1Ω			5	10	ns
Turn-on rise time	tr				10	20	ns
Turn-off delay time	td(off)				15	30	ns
Turn-off fall time	tf				10	20	ns

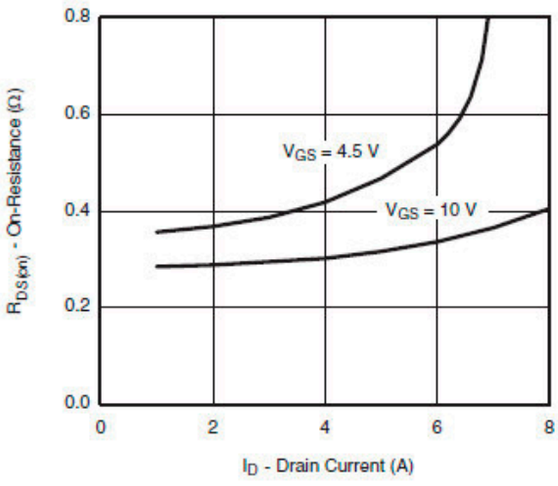
■Typical Electrical and Thermal Characteristics (P-ch)



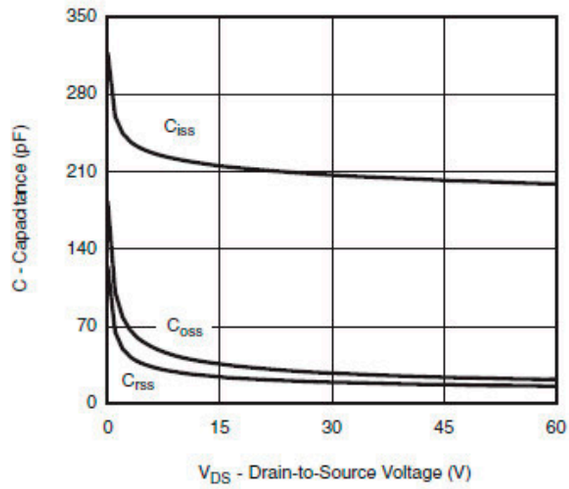
Output Characteristics



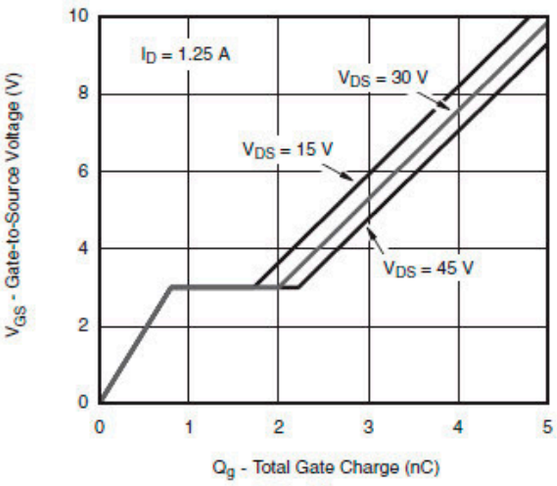
Transfer Characteristics



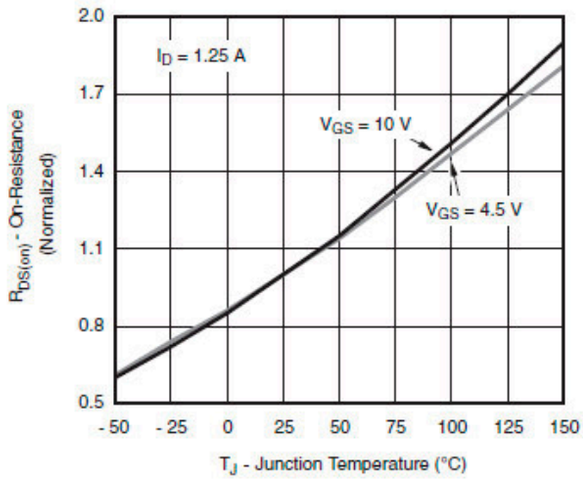
On-Resistance vs. Drain Current and Gate Voltage



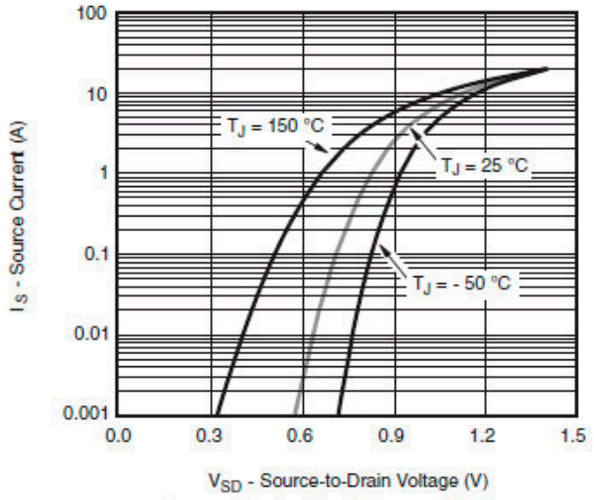
Capacitance



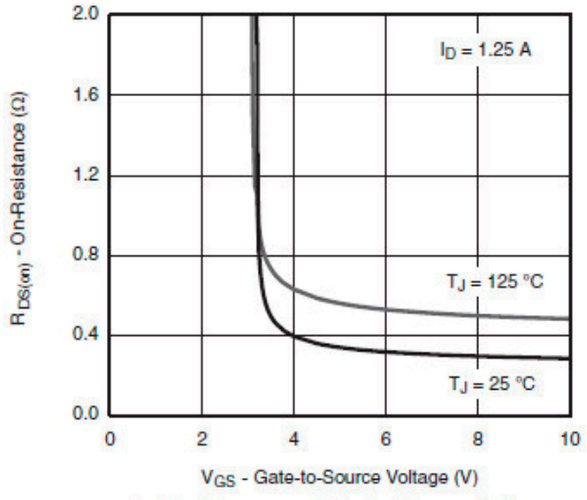
Gate Charge



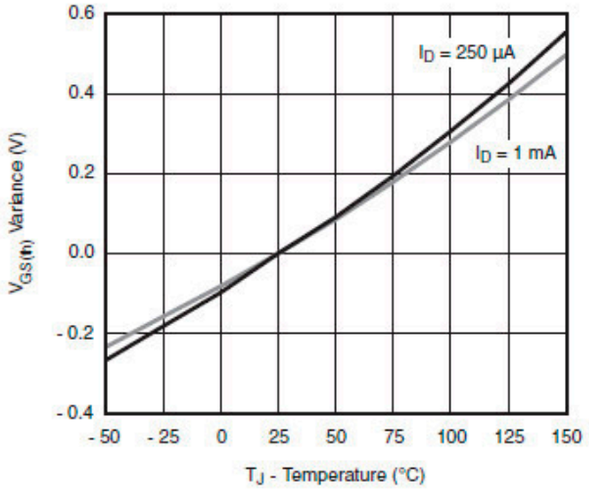
On-Resistance vs. Junction Temperature



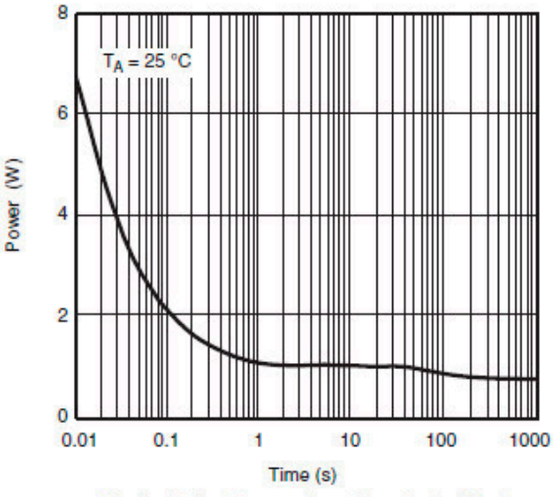
Source-Drain Diode Forward Voltage



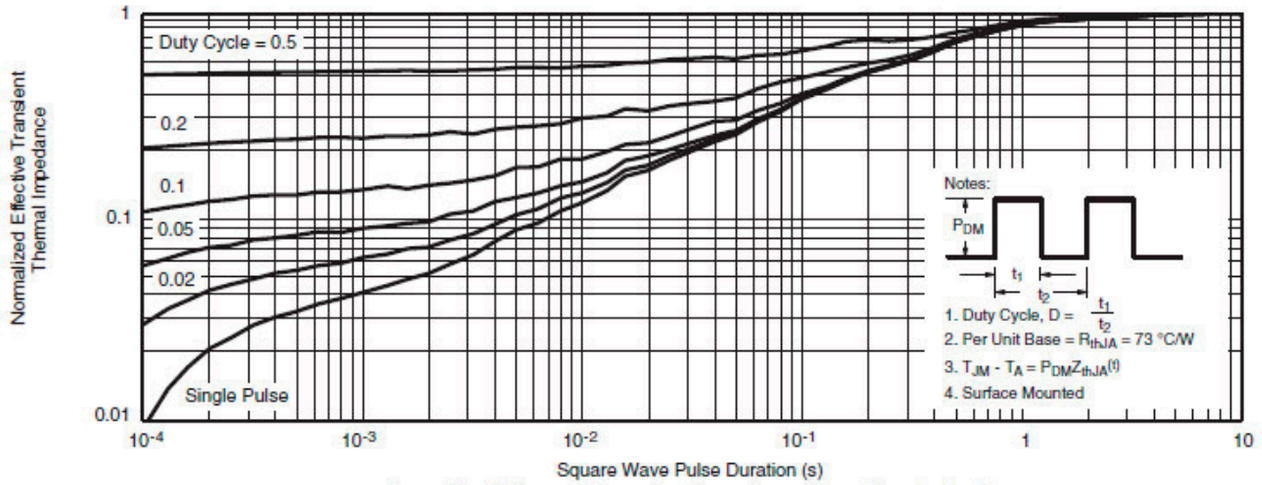
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



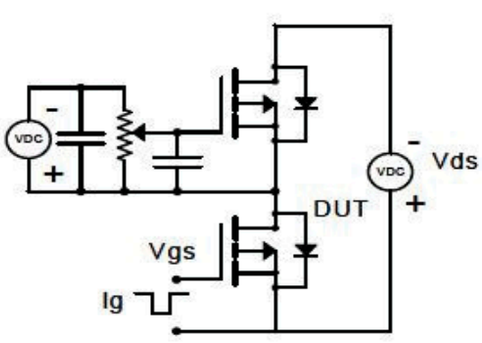
Single Pulse Power, Junction-to-Ambient

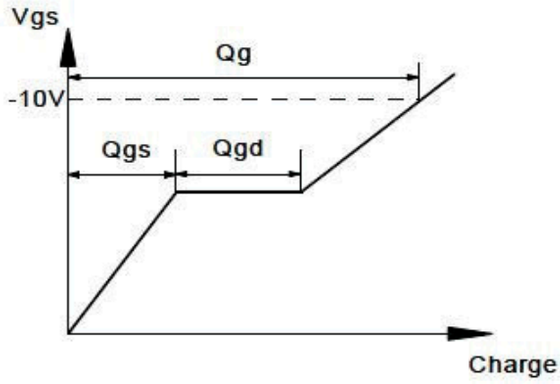


Normalized Thermal Transient Impedance, Junction-to-Foot

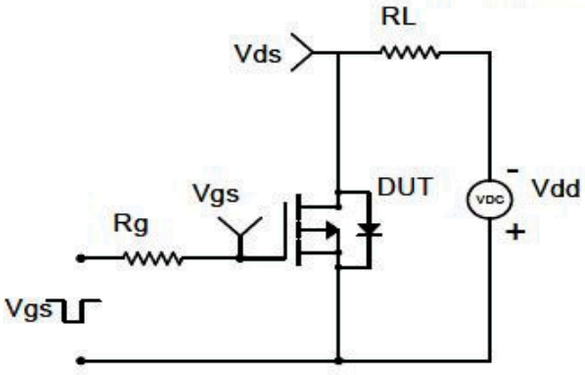
■Test circuit and waveform **(P-ch)**

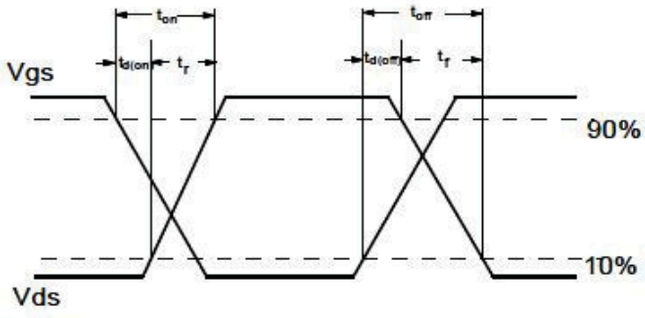
Gate Charge Test Circuit & Waveform





Resistive Switching Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms