Complementary MOSFET

ELM52527CWA-N

■General Description

ELM52527CWA-N uses advanced trench technology to provide excellent Rds(on) and low gate charge. ESD protection is included.

■Features

N-channel

- Vds=20V
- Id=4.5A
- Rds(on)=19mΩ(Vgs=4.5V)
- Rds(on)=23mΩ(Vgs=2.5V)
- Rds(on)=34mΩ(Vgs=1.8V)
- ESD protection

P-channel

- Vds=-20V
- Id=-4.5A
- Rds(on)=42mΩ(Vgs=-4.5V)
- Rds(on)=52mΩ(Vgs=-2.5V)
- Rds(on)=68mΩ(Vgs=-1.8V)
- ESD protection

■Maximum Absolute Ratings

Ta=25°C. Unless otherwise noted.

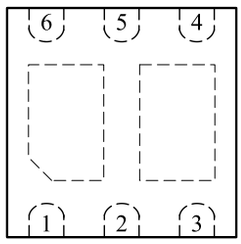
Parameter		Symbol	N-ch (Max.)	P-ch (Max.)	Unit
Drain-source voltage		Vds	20	-20	V
Gate-source voltage		Vgs	±12	±12	V
Continuous drain current(Tj=150°C)	Ta=25°C	Id	4.5	-4.5	A
	Ta=70°C		4.5	-4.5	
Pulsed drain current		Idm	20	-20	A
Power dissipation	Tc=25°C	Pd	7.8	7.8	W
	Tc=70°C		5.0	5.0	
Operating junction 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		52.0	°C/W
Maximum junction-to-ambient	Rθja	P-ch		52.0	
Maximum junction-to-case	Rθjc	N-ch		12.5	°C/W
Maximum junction-to-case	Rθjc	P-ch		12.5	

■Pin configuration

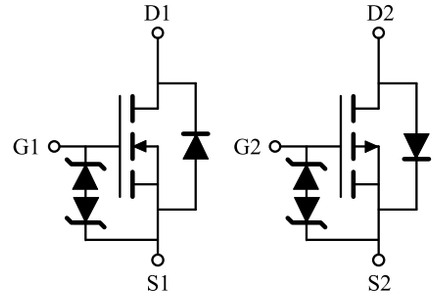
DFN6-2×2(TOP VIEW)



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

■Circuit

- N-ch
- P-ch

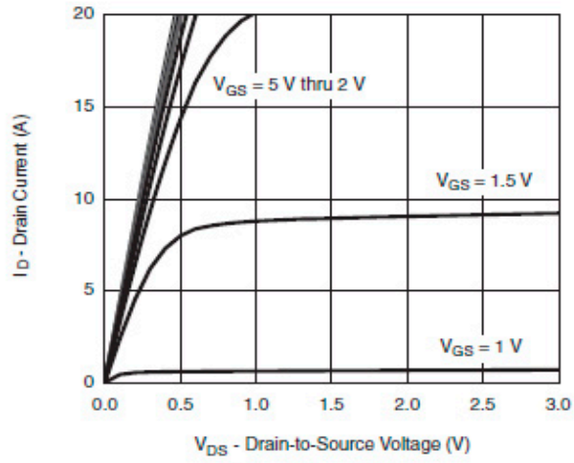


■Electrical Characteristics (N-ch)

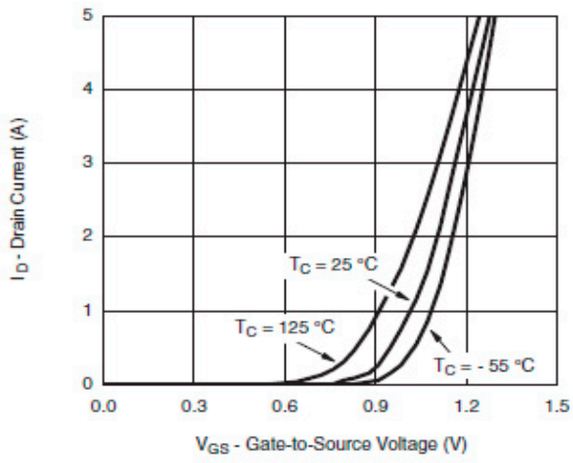
Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V		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				±10	μA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA		0.4		1.0	V
On state drain current	Id(on)	Vgs=4.5V, Vds≥5V		15			A
Static drain-source on-resistance	Rds(on)	Vgs=4.5V, Id=5.0A			15	19	mΩ
		Vgs=2.5V, Id=4.6A			18	23	
		Vgs=1.8V, Id=4.2A			27	34	
Forward transconductance	Gfs	Vds=6V, Id=5.0A			28		S
Diode forward voltage	Vsd	Is=1.5A, Vgs=0V			0.85	1.20	V
Max.body-diode continuous current	Is					1.6	A
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=6V, f=1MHz			620		pF
Output capacitance	Coss				180		pF
Reverse transfer capacitance	Crss				100		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=4.5V, Vds=6V, Id≡5.0A			6.0	12.0	nC
Gate-source charge	Qgs				0.8		nC
Gate-drain charge	Qgd				0.8		nC
Turn-on delay time	td(on)	Vgs=4.5V, Vds=10V, Id≡3.6A RL=5.5Ω, Rgen=6Ω			10	20	ns
Turn-on rise time	tr				10	20	ns
Turn-off delay time	td(off)				25	40	ns
Turn-off fall time	tf				10	20	ns

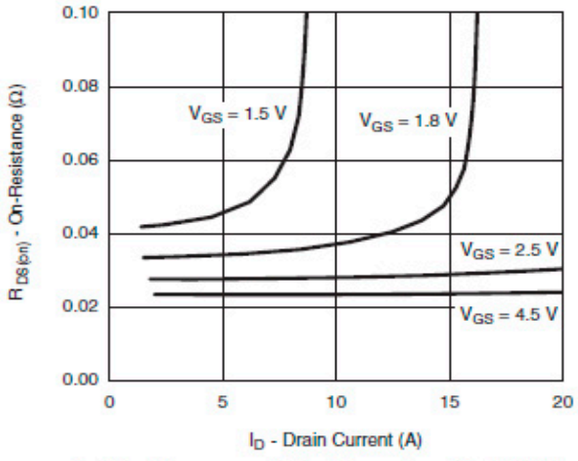
■Typical Electrical and Thermal Characteristics (N-ch)



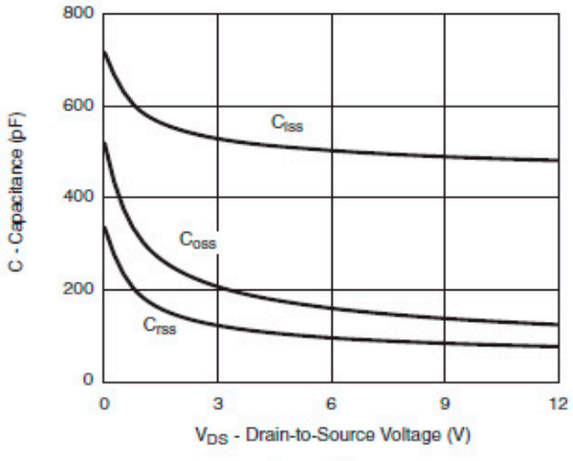
Output Characteristics



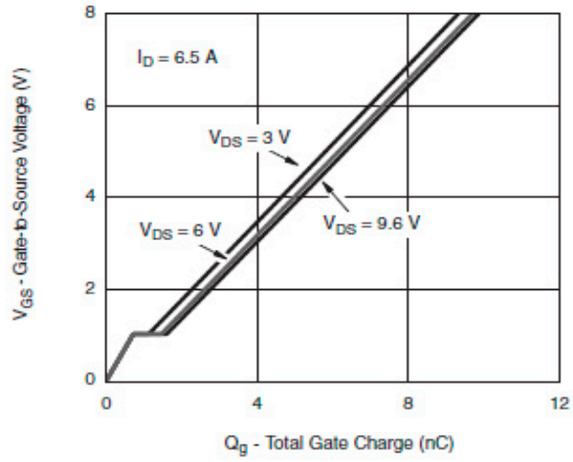
Transfer Characteristics



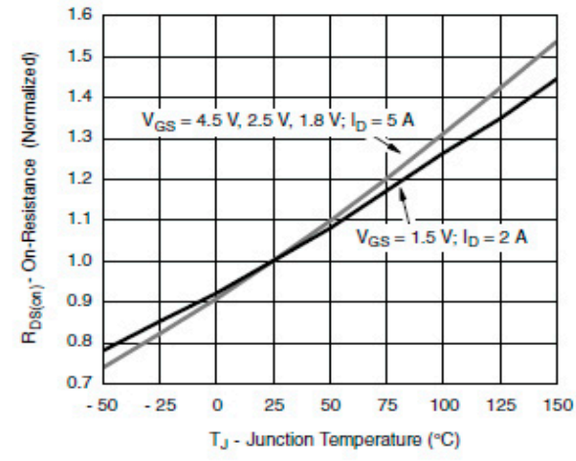
On-Resistance vs. Drain Current and Gate Voltage



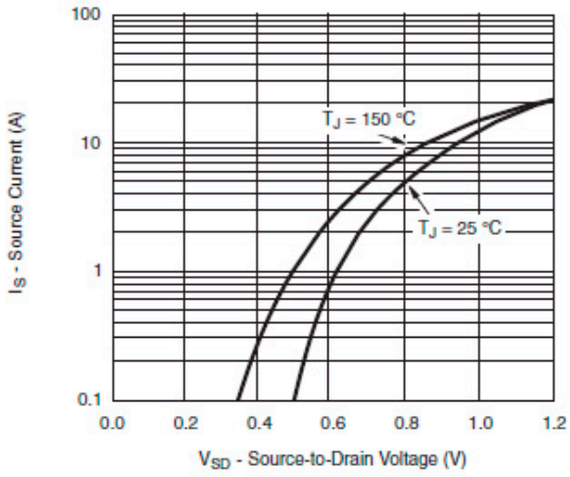
Capacitance



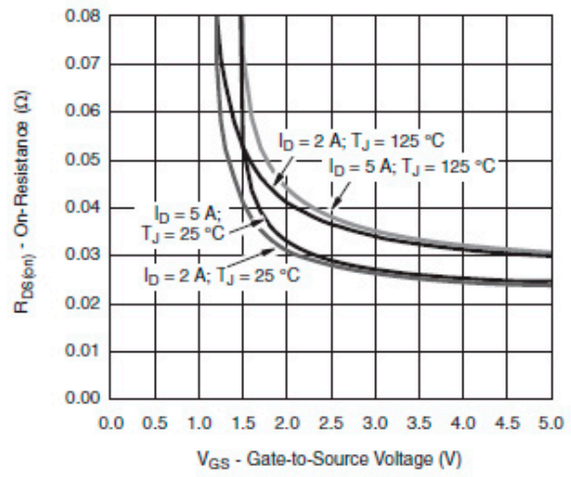
Gate Charge



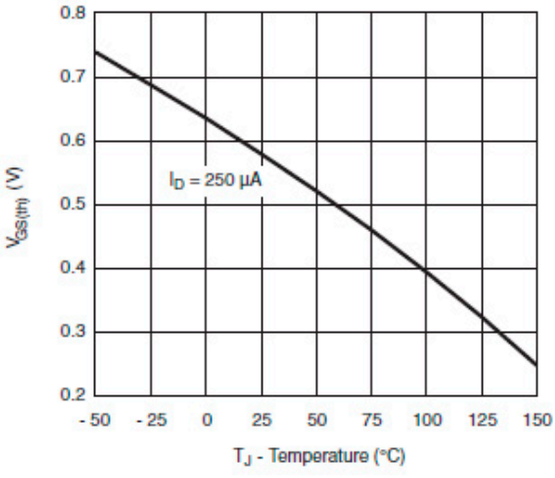
On-Resistance vs. Junction Temperature



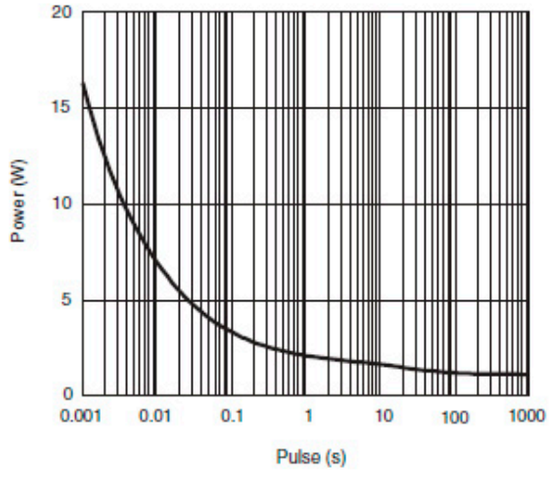
Source-Drain Diode Forward Voltage



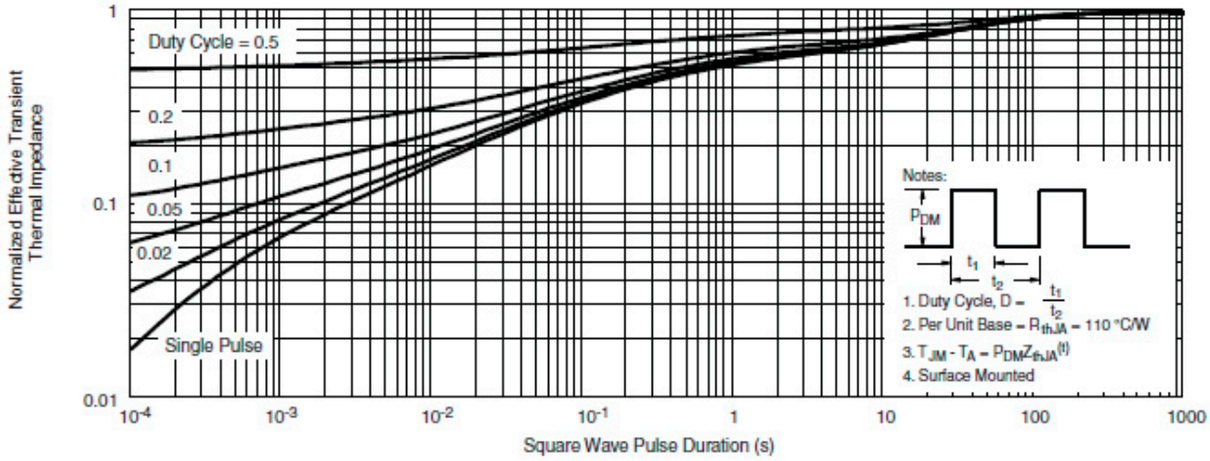
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



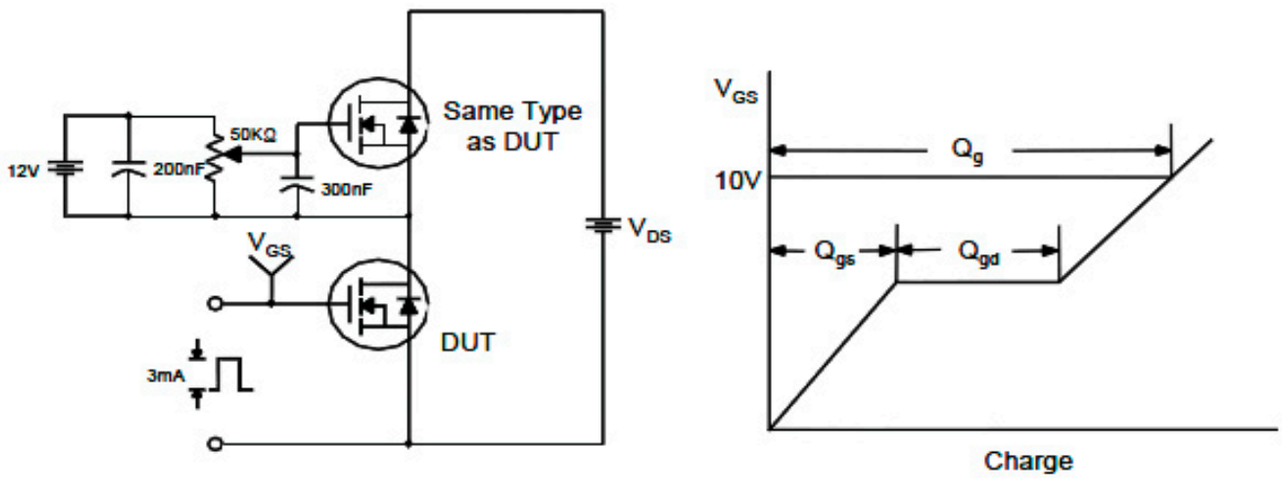
Single Pulse Power (Junction-to-Ambient)



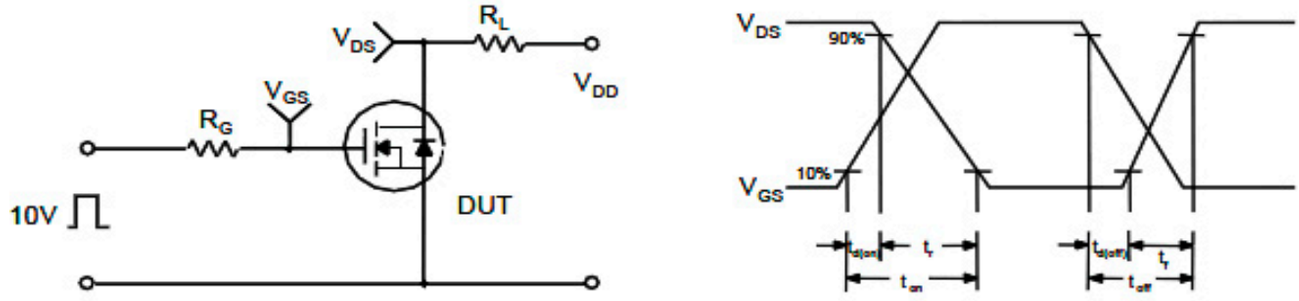
Normalized Thermal Transient Impedance, Junction-to-Ambient

■Test circuit and waveform **(N-ch)**

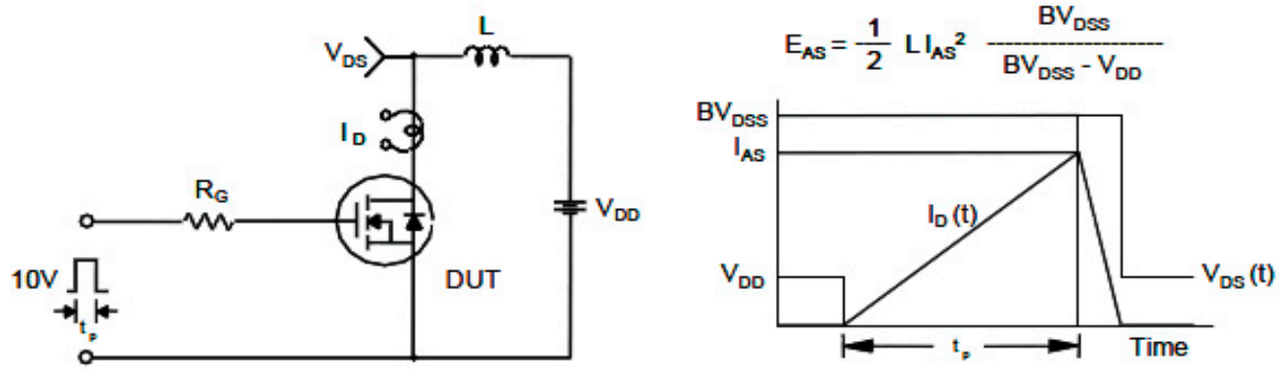
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

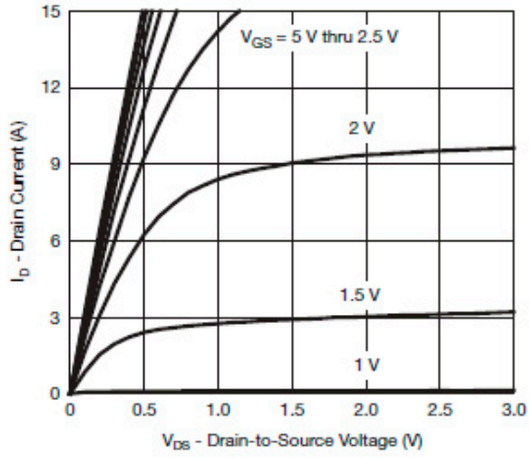


■Electrical Characteristics (P-ch)

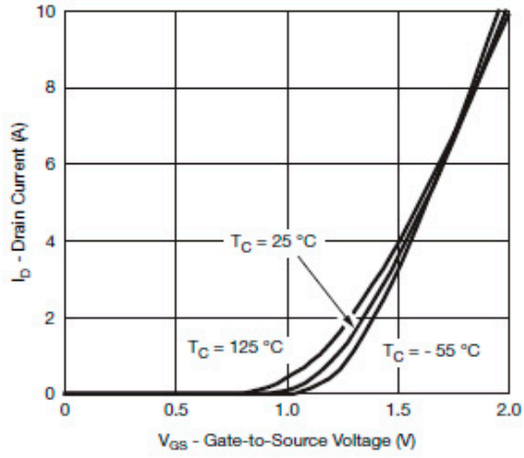
Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V		-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=±8V				±10	μA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA		-0.4		-1.0	V
On state drain current	Id(on)	Vgs=-4.5V, Vds≥-5V		-10			A
Static drain-source on-resistance	Rds(on)	Vgs=-4.5V, Id=-4.5A			37	42	mΩ
		Vgs=-2.5V, Id=-3.4A			46	52	
		Vgs=-1.8V, Id=-2.4A			59	68	
Forward transconductance	Gfs	Vds=-6V, Id=-4.6A			12		S
Diode forward voltage	Vsd	Is=-1.25A, Vgs=0V			-0.85	-1.20	V
Max. body-diode continuous current	Is					-1.6	A
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=-6V, f=1MHz			1450		pF
Output capacitance	Coss				265		pF
Reverse transfer capacitance	Crss				255		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=-4.5V, Vds=-6V Id≡-5.6A			10.0	18.0	nC
Gate-source charge	Qgs				2.5		nC
Gate-drain charge	Qgd				2.8		nC
Turn-on delay time	td(on)	Vgs=-4.5V, Vds=-10V Id≡-3.7A, RL=2.7Ω Rgen=1Ω			15	25	ns
Turn-on rise time	tr				25	40	ns
Turn-off delay time	td(off)				40	65	ns
Turn-off fall time	tf				15	25	ns

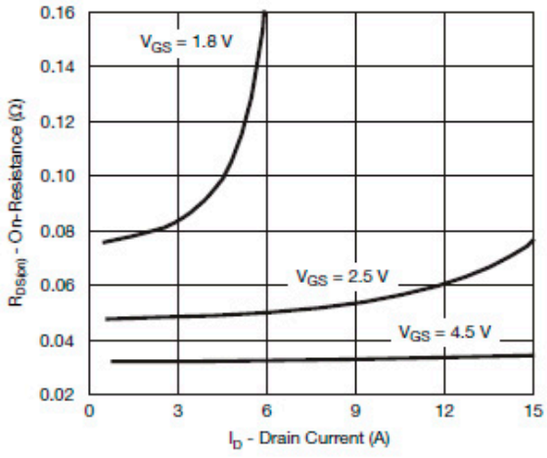
■Typical Electrical and Thermal Characteristics (P-ch)



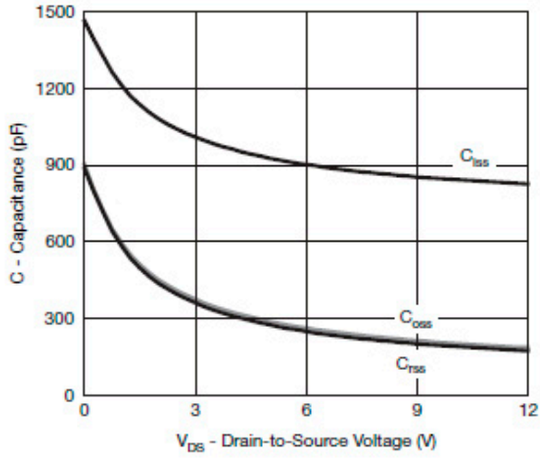
Output Characteristics



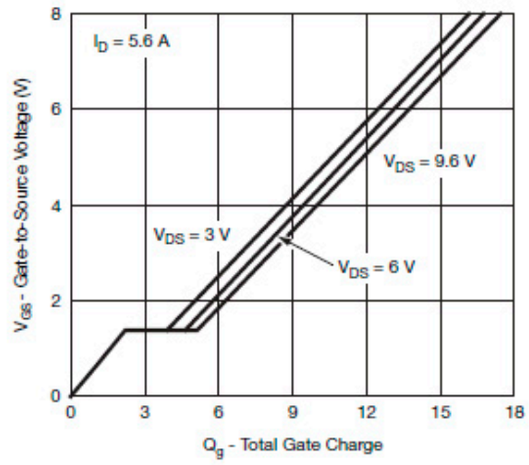
Transfer Characteristics



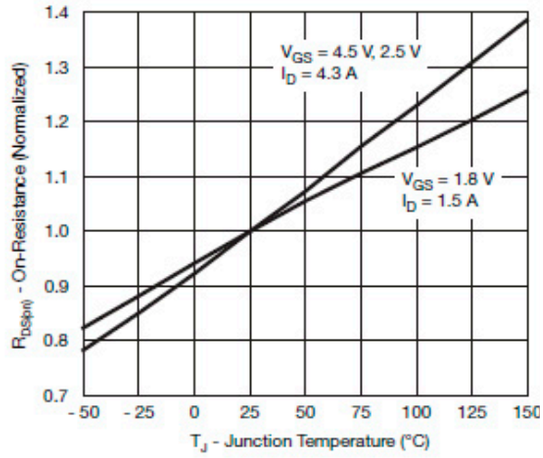
On-Resistance vs. Drain Current and Gate Voltage



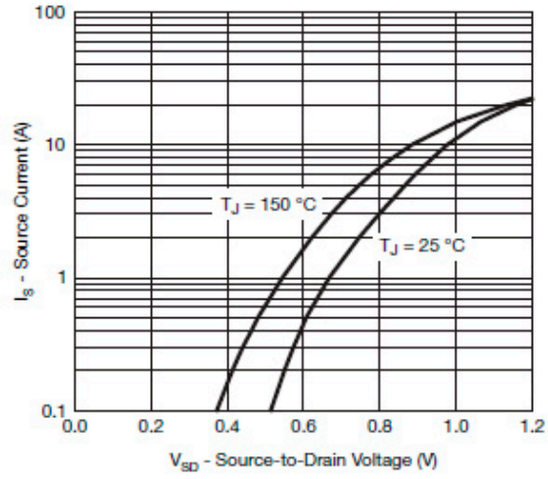
Capacitance



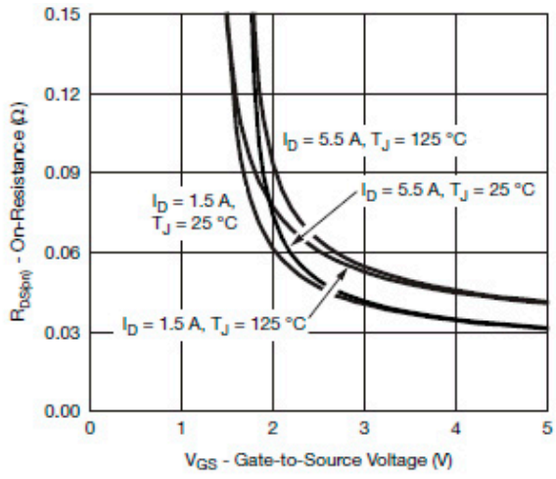
Gate Charge



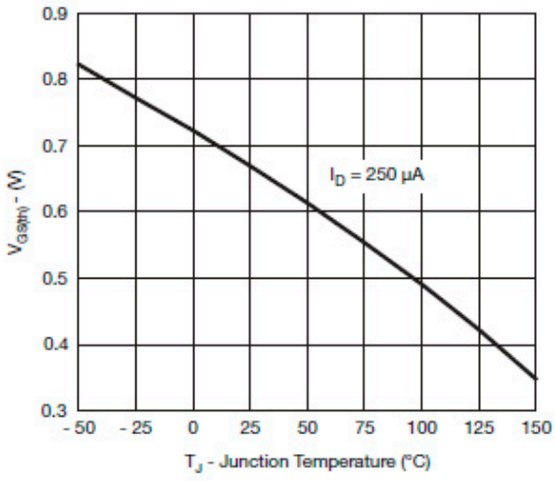
On-Resistance vs. Junction Temperature



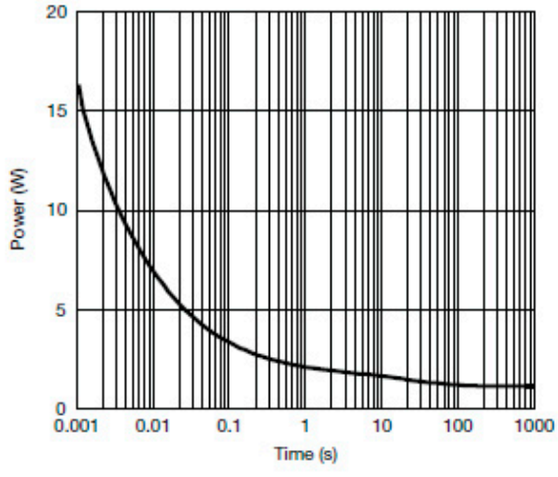
Soure-Drain Diode Forward Voltage



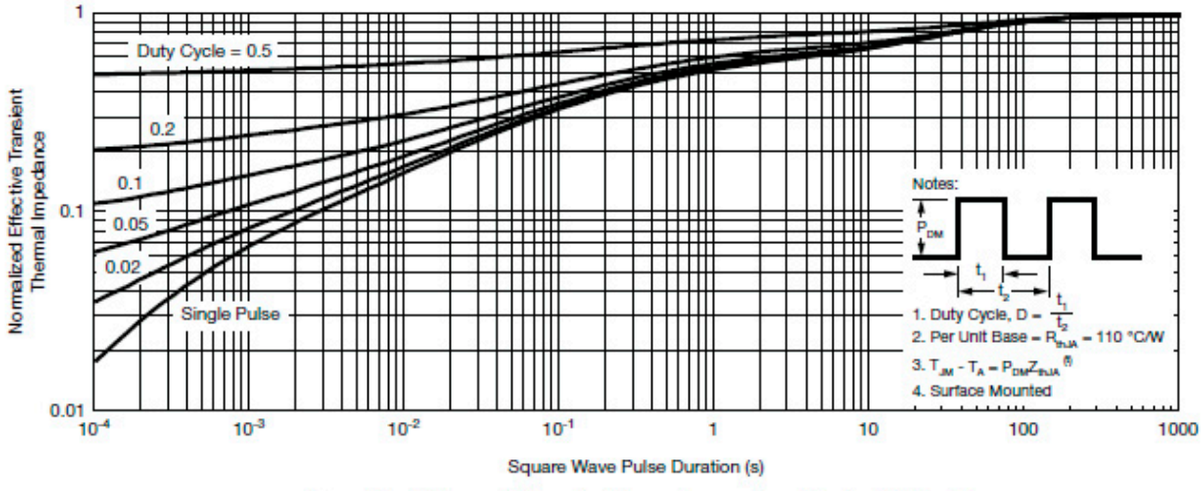
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



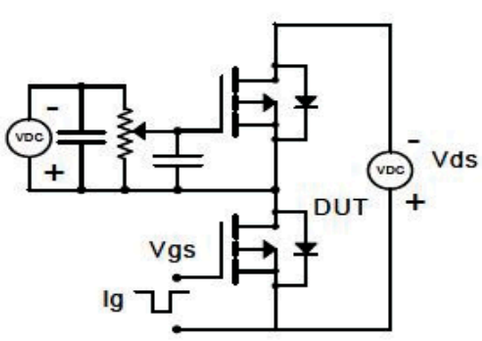
Single Pulse Power, Junction-to-Ambient

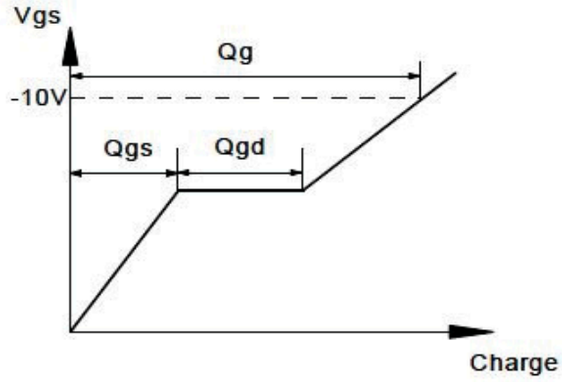


Normalized Thermal Transient Impedance, Junction-to-Ambient

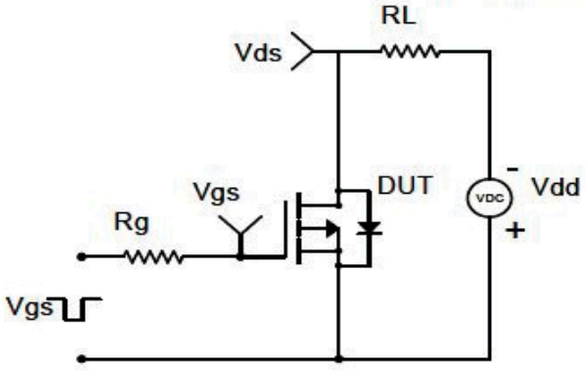
■Test circuit and waveform **(P-ch)**

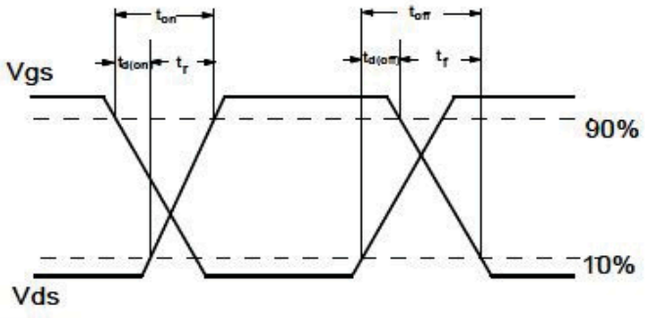
Gate Charge Test Circuit & Waveform





Resistive Switching Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms