

Complementary MOSFET

ELM544599A-N

■ General Description

ELM544599A-N uses advanced trench technology to provide excellent $R_{ds(on)}$ and low gate charge.

■ Features

- N-channel
 $V_{ds}=40V$, $I_d=8.0A$, $R_{ds(on)}=22m\Omega(V_{gs}=10V)$
 $V_{ds}=40V$, $I_d=6.0A$, $R_{ds(on)}=28m\Omega(V_{gs}=4.5V)$
- P-channel
 $V_{ds}=-40V$, $I_d=-7.2A$, $R_{ds(on)}=42m\Omega(V_{gs}=-10V)$
 $V_{ds}=-40V$, $I_d=-6.2A$, $R_{ds(on)}=60m\Omega(V_{gs}=-4.5V)$

■ Maximum Absolute Ratings

$T_a=25^\circ C$. Unless otherwise noted.

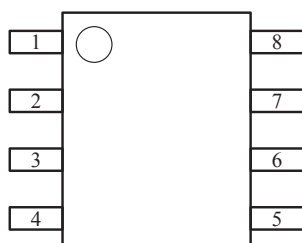
Parameter		Symbol	N-ch (Max.)	P-ch (Max.)	Unit
Drain-source voltage		V_{ds}	40	-40	V
Gate-source voltage		V_{gs}	± 20	± 20	V
Continuous drain current	$T_a=25^\circ C$	I_d	8.0	-7.2	A
	$T_a=70^\circ C$		6.0	-6.2	
Pulsed drain current		I_{dm}	25	-25	A
Power dissipation	$T_c=25^\circ C$	P_d	2.8	2.8	W
	$T_c=70^\circ C$		1.8	1.8	
Junction and storage temperature range		T_j, T_{stg}	-55 to 150	-55 to 150	$^\circ C$

■ Thermal Characteristics

Parameter		Symbol	Device	Typ.	Max.	Unit
Maximum junction-to-ambient	Steady-state	$R\theta_{ja}$	N-ch		62.5	$^\circ C/W$
Maximum junction-to-ambient	Steady-state	$R\theta_{ja}$	P-ch		62.5	$^\circ C/W$

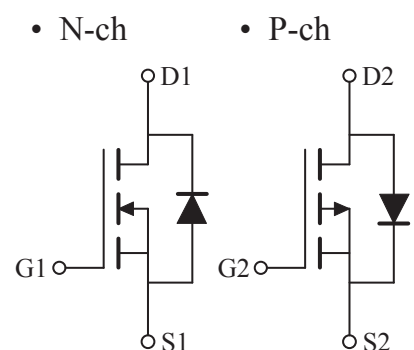
■ Pin configuration

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



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■Electrical Characteristics (N-ch)

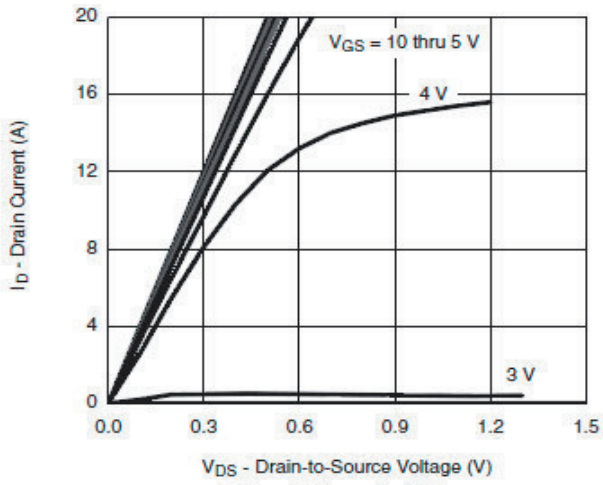
Ta=25°C. Unless otherwise noted.

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 Ta=85°C			1	μA
					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=8.0A		16	22	mΩ
		Vgs=4.5V, Id=6.0A		20	28	
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				1.5	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=5A		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=4Ω, Rgen=1Ω		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

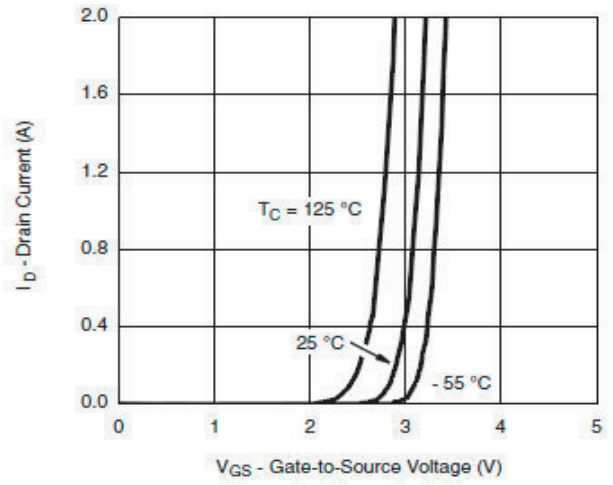
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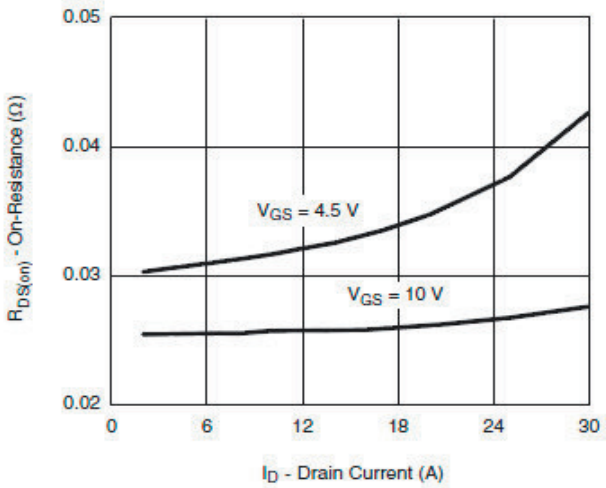
■ Typical Electrical and Thermal Characteristics (N-ch)



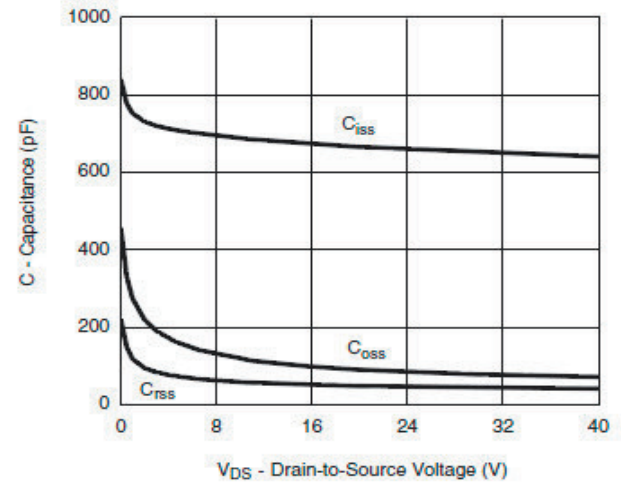
Output Characteristics



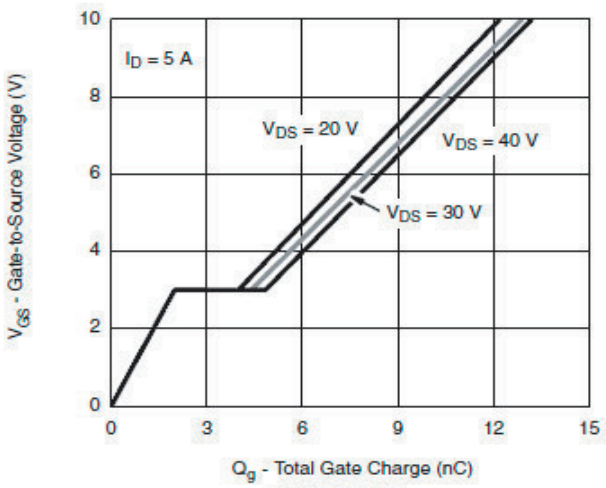
Transfer Characteristics



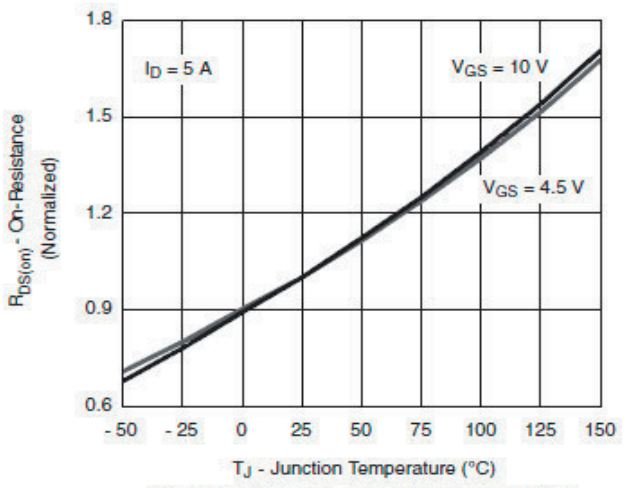
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



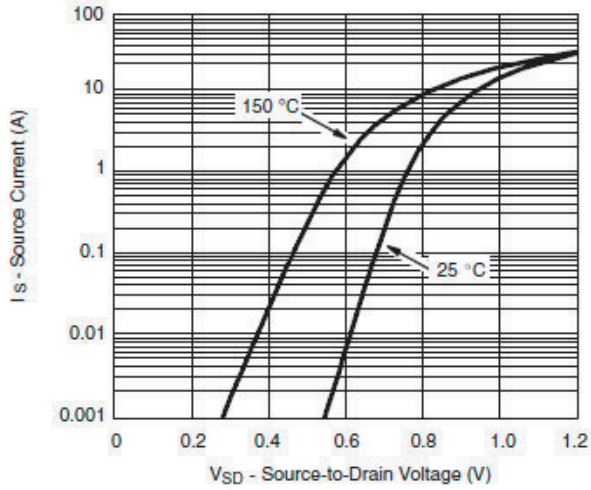
Gate Charge



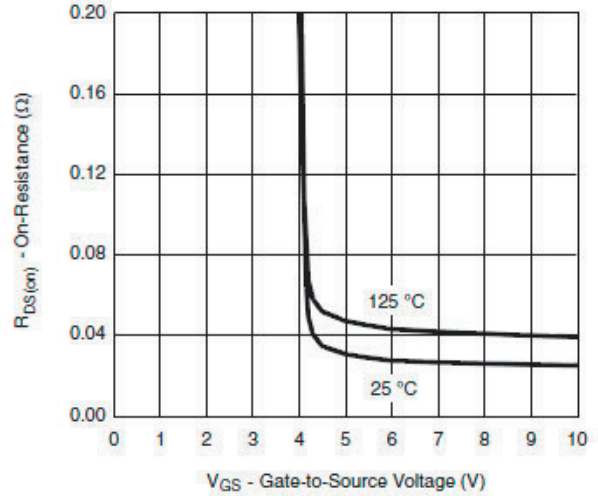
On-Resistance vs. Junction Temperature

Complementary MOSFET

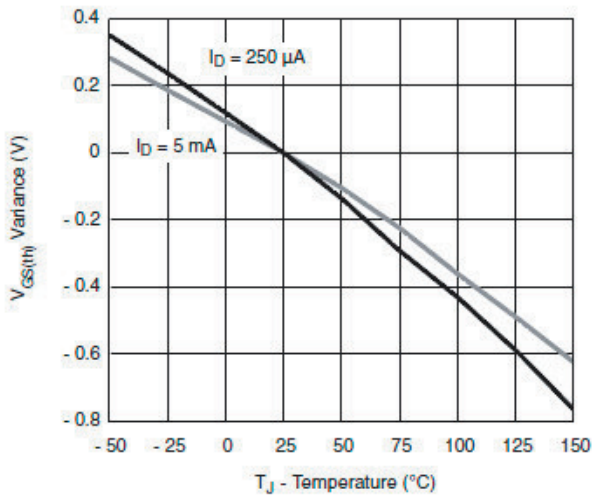
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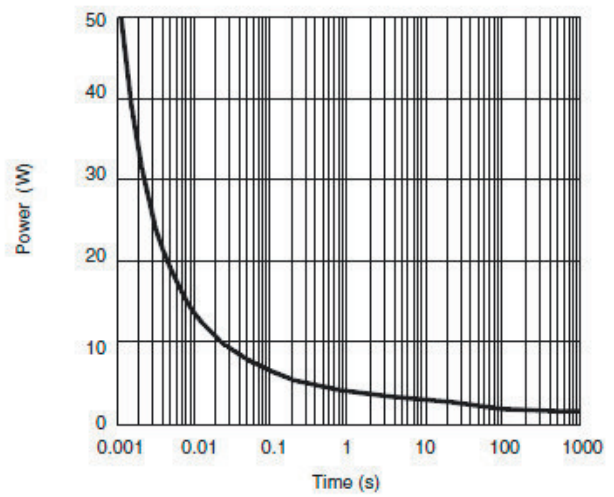
Source-Drain Diode Forward Voltage



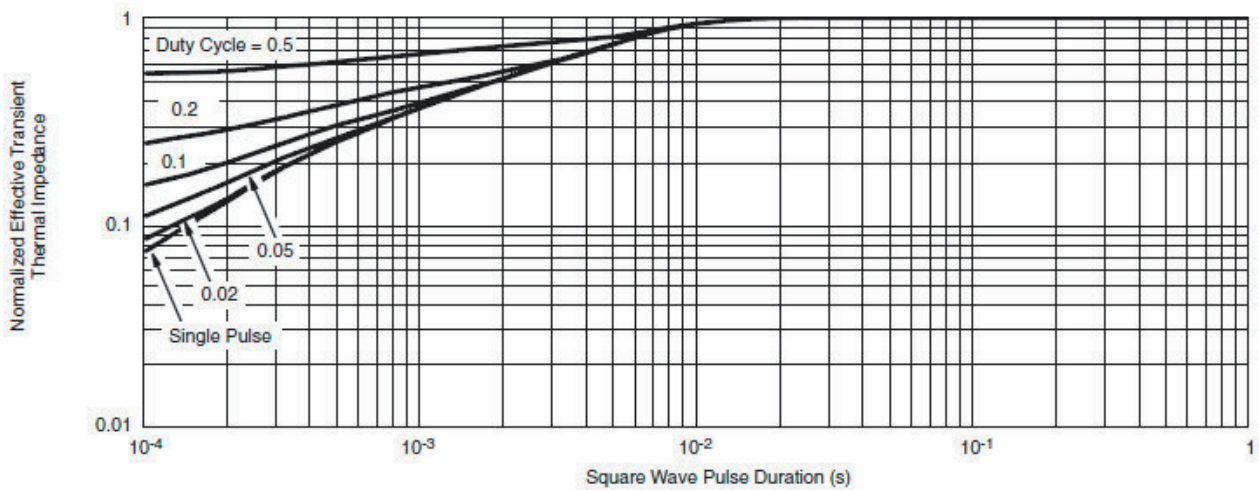
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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■ Electrical Characteristics (P-ch)

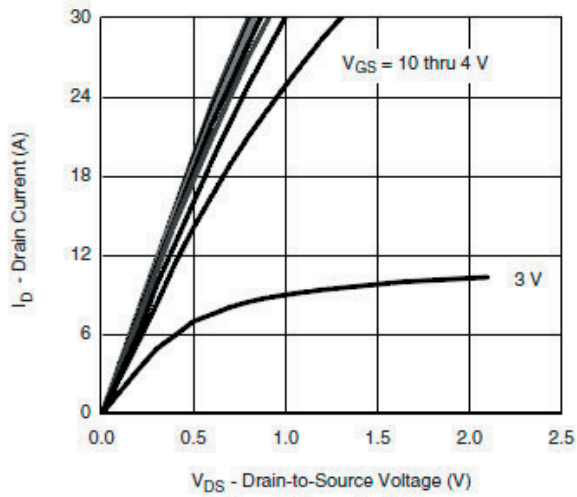
Ta=25°C. Unless otherwise noted.

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 Ta=85°C			-1	μA
					-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=-7.2A		34	42	mΩ
		Vgs=-4.5V, Id=-6.2A		50	60	
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				-1.7	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=-5A		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=-5A, 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

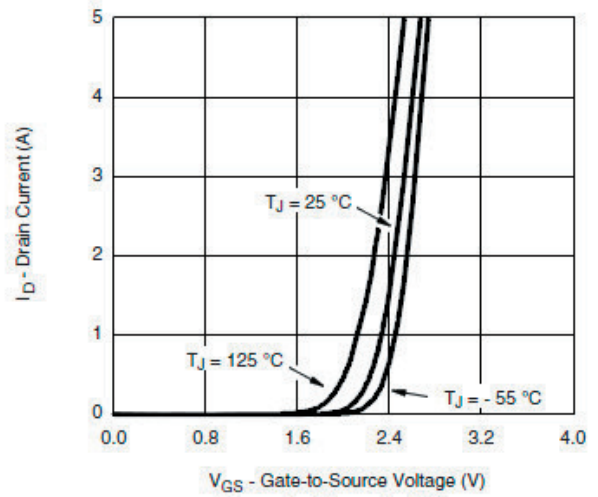
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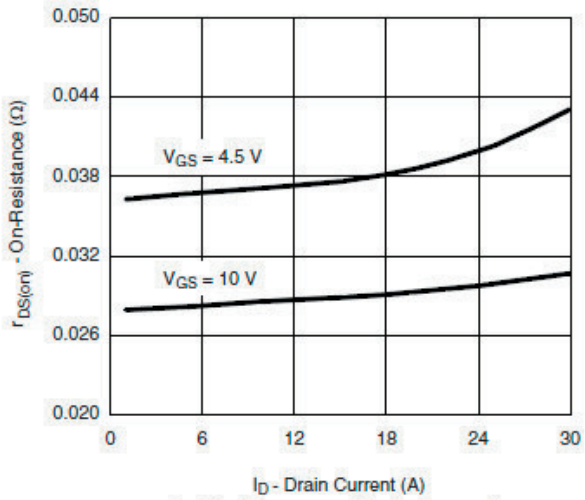
Typical Electrical and Thermal Characteristics (P-ch)



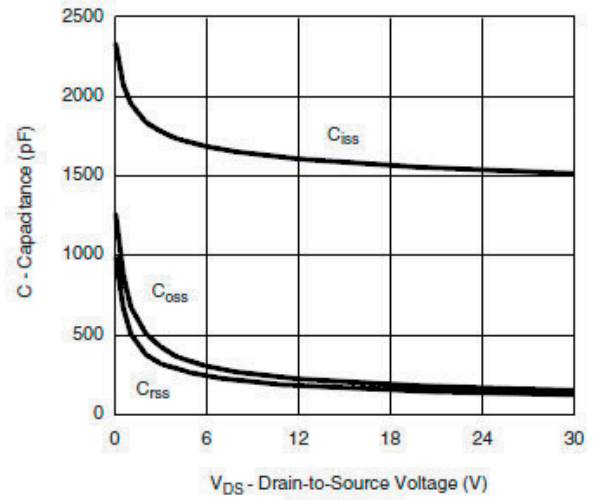
Output Characteristics



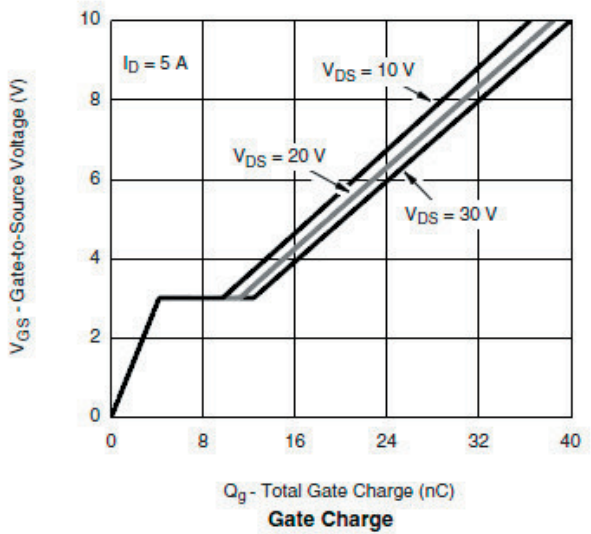
Transfer Characteristics



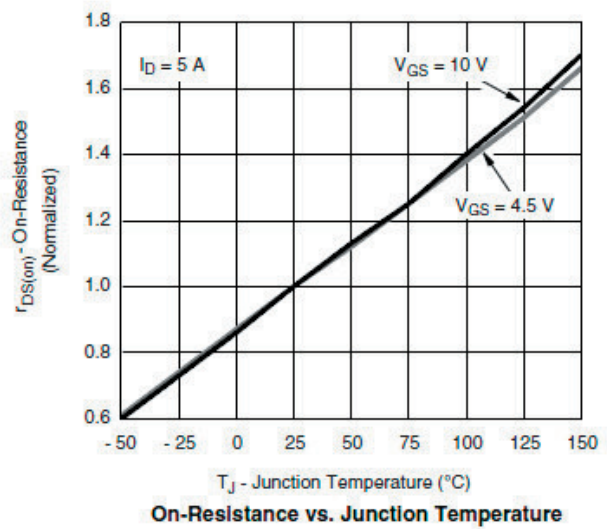
On-Resistance vs. Drain Current



Capacitance



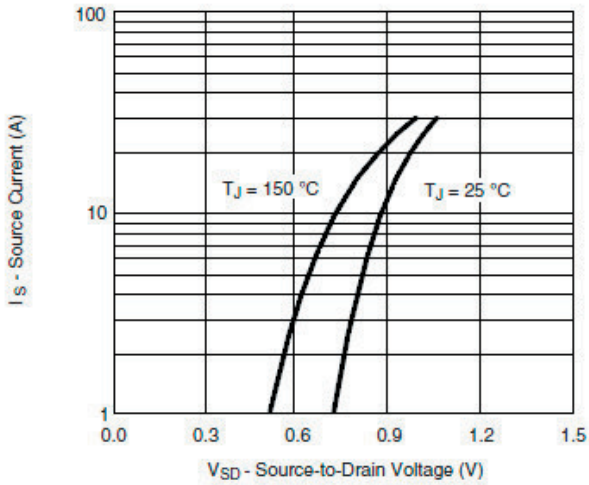
Gate Charge



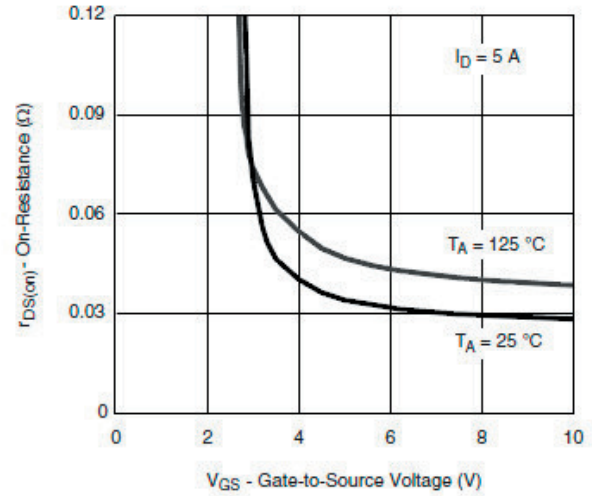
On-Resistance vs. Junction Temperature

Complementary MOSFET

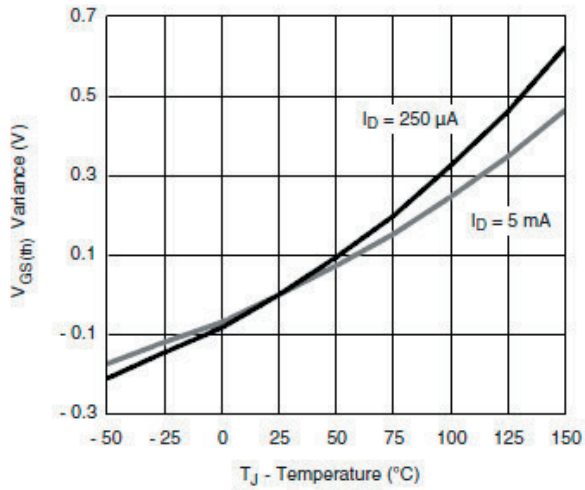
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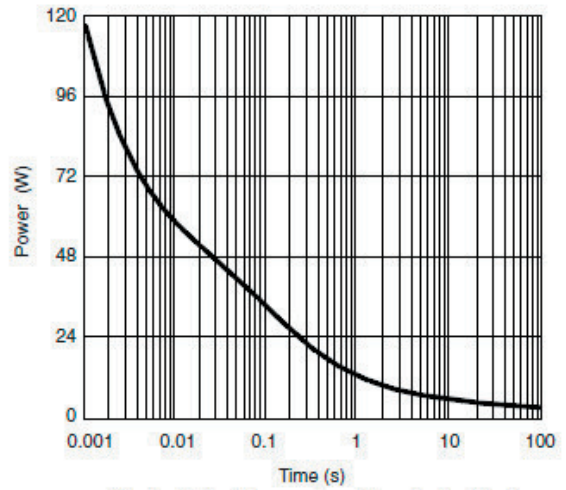
Source-Drain Diode Forward Voltage



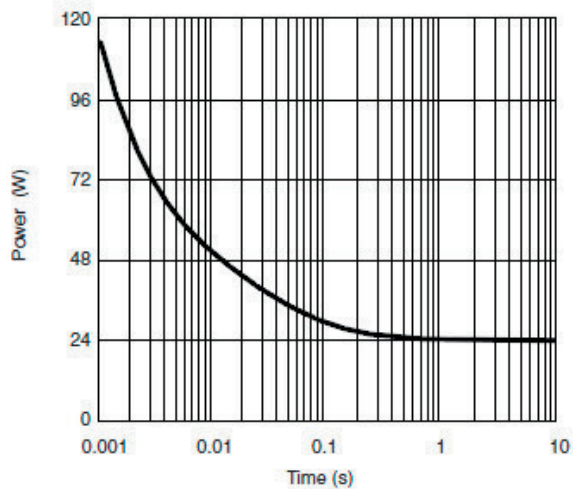
On-Resistance vs. Gate-to-Source Voltage



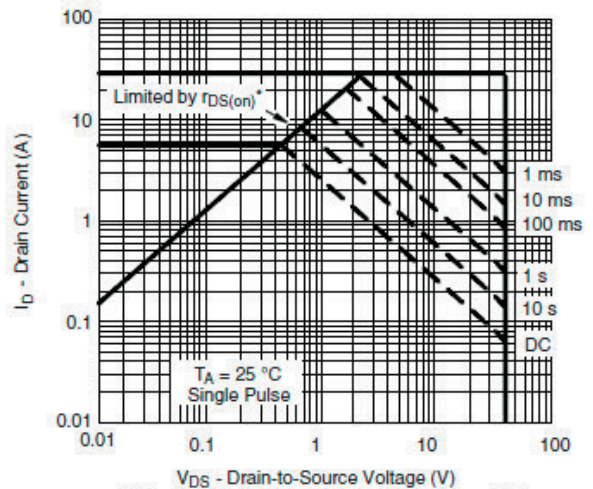
Threshold Voltage



Single Pulse Power, Junction-to-Ambient



Single Pulse Power, Junction-to-Case



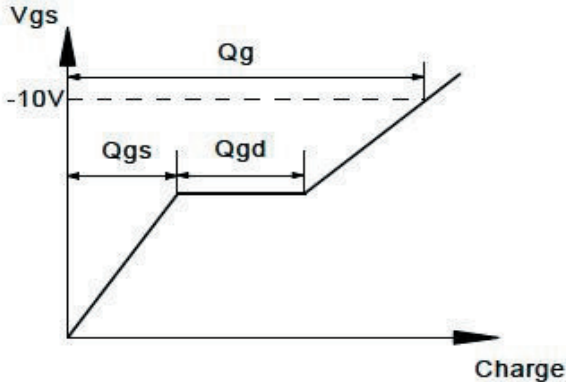
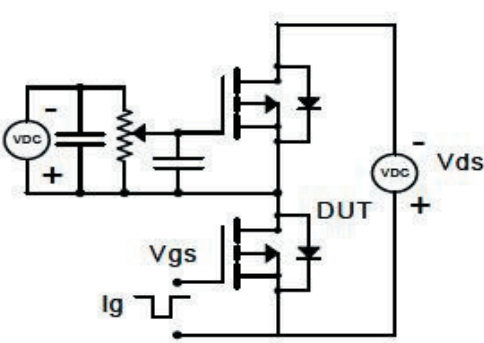
* $V_{GS} >$ minimum V_{GS} at which $r_{DS(on)}$ is specified
Safe Operating Area, Junction-to-Ambient

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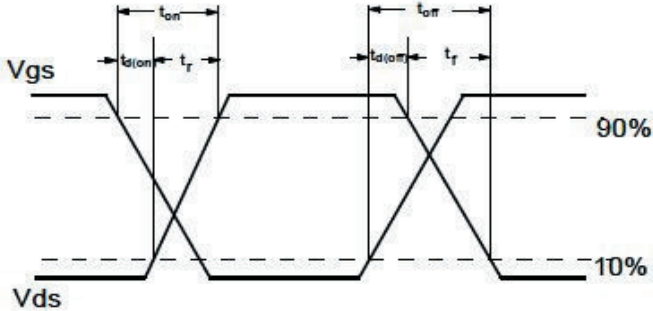
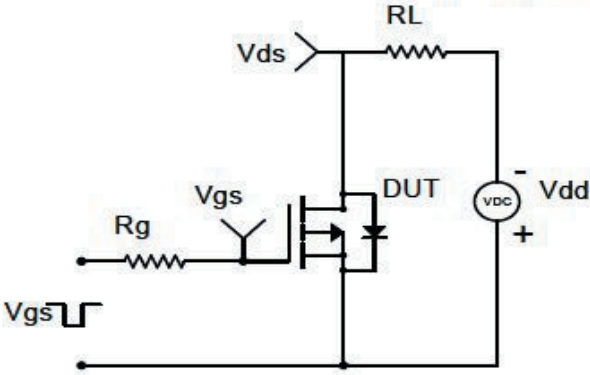
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■ Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

