

Complementary MOSFET

ELM54614CWSA-N

<http://www.elm-tech.com>

■General Description

ELM54614CWSA-N uses advanced trench technology to provide excellent $R_{ds(on)}$ and low gate charge.

■Features

- | | |
|---------------------------------------|--|
| N-channel | P-channel |
| • $V_{ds}=40V$ | • $V_{ds}=-40V$ |
| • $I_d=10.0A$ | • $I_d=-10.0A$ |
| • $R_{ds(on)}=35m\Omega(V_{gs}=10V)$ | • $R_{ds(on)}=35m\Omega(V_{gs}=-10V)$ |
| • $R_{ds(on)}=45m\Omega(V_{gs}=4.5V)$ | • $R_{ds(on)}=45m\Omega(V_{gs}=-4.5V)$ |

■Maximum Absolute Ratings

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

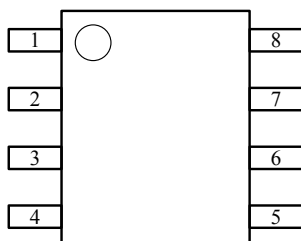
Parameter	Symbol	N-ch (Max.)	P-ch (Max.)	Unit
Drain-source voltage	V_{ds}	40	-40	V
Gate-source voltage	V_{gs}	± 20	± 20	V
Continuous drain current($T_j=150^{\circ}C$)	I_d	10.0	-10.0	A
		6.0	-6.0	
Pulsed drain current	I_{dm}	20	-20	A
Avalanche current	I_{as}	8	-	A
Avalanche energy	E_{as}	3.2	-	mJ
Power dissipation	P_d	2.8	2.8	W
		1.8	1.8	
Operating junction temperature	T_j	150	150	$^{\circ}C$
Storage temperature range	T_{stg}	-55 to 150	-55 to 150	$^{\circ}C$

■Thermal Characteristics

Parameter	Symbol	Device	Typ.	Max.	Unit
Thermal resistance junction-to-ambient	$R_{\theta ja}$	N-ch		62.5	$^{\circ}C/W$
Thermal resistance junction-to-ambient	$R_{\theta ja}$	P-ch		62.5	$^{\circ}C/W$

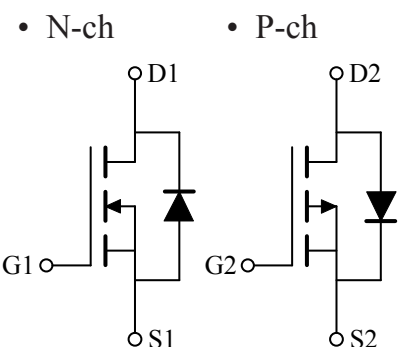
■Pin configuration

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)

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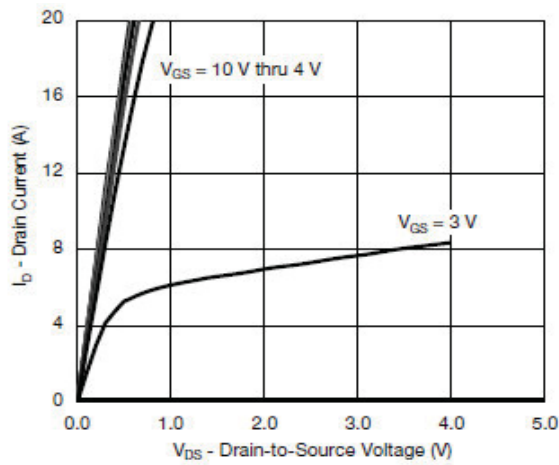
Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V		40			V
Zero gate voltage drain current	Idss	Vds=32V, Vgs=0V				1	μA
			Ta=85°C				
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V				±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA		1.0		2.5	V
On state drain current	Id(on)	Vgs=10V, Vds≥5V		8			A
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=10.0A			27	35	mΩ
		Vgs=4.5V, Id=6.0A			33	45	
Forward transconductance	Gfs	Vds=10V, Id=8.0A			27		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=20V, f=1MHz			385		pF
Output capacitance	Coss				68		pF
Reverse transfer capacitance	Crss				30		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=4.5V, Vds=10V, Id≐8A			3.3	5.0	nC
Gate-source charge	Qgs				1.0		nC
Gate-drain charge	Qgd				1.2		nC
Turn-on delay time	td(on)	Vgs=10V, Vds=20V, Id≐8A RL=2.0Ω, Rgen=1.0Ω			9	18	ns
Turn-on rise time	tr				11	22	ns
Turn-off delay time	td(off)				10	20	ns
Turn-off fall time	tf				7	14	ns

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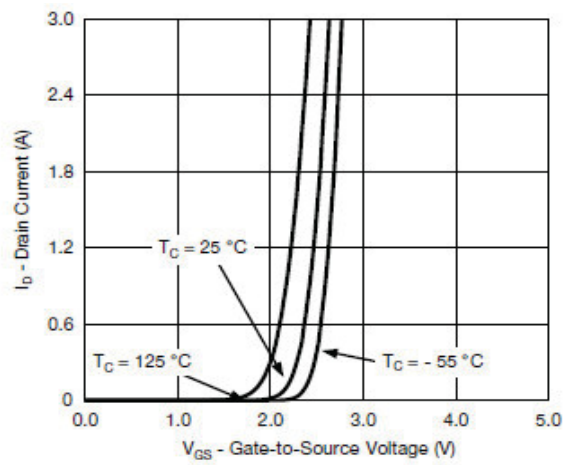
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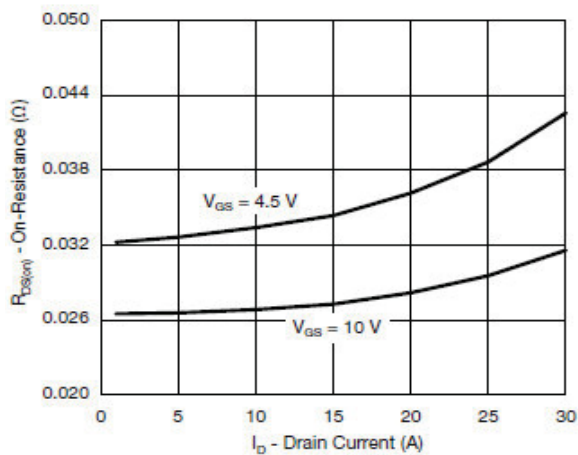
■ Typical Electrical and Thermal Characteristics (N-ch)



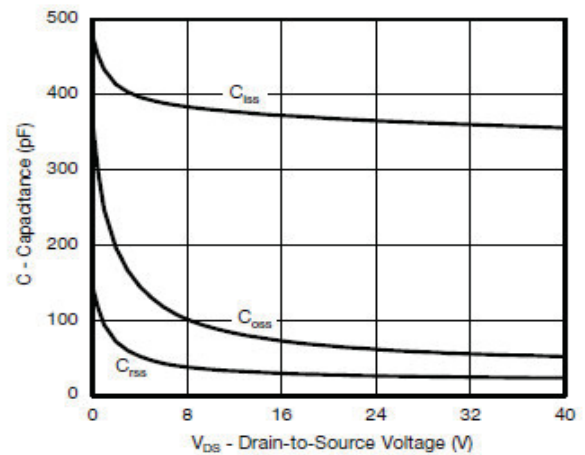
Output Characteristics



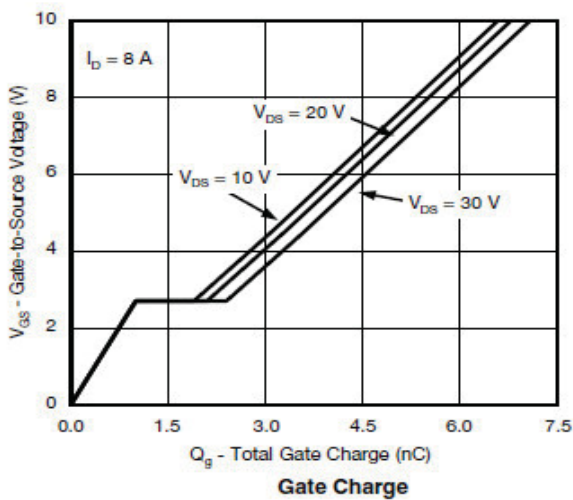
Transfer Characteristics



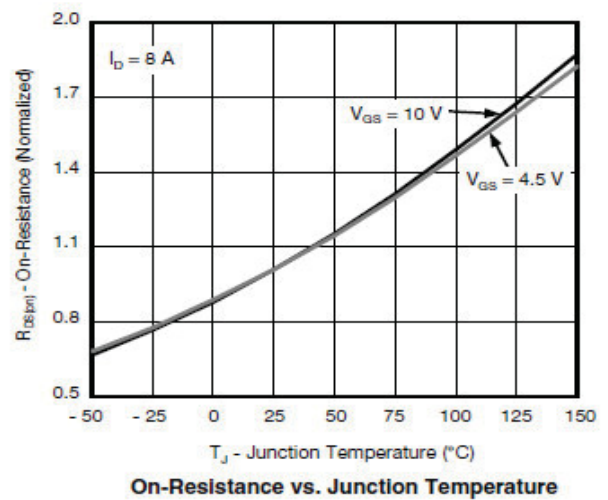
On-Resistance vs. Drain Current



Capacitance



Gate Charge

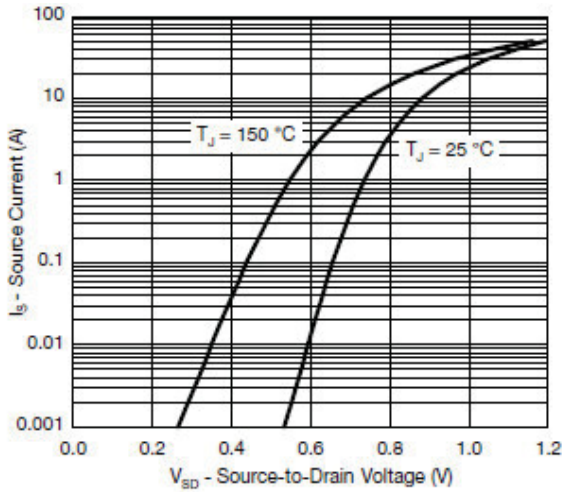


On-Resistance vs. Junction Temperature

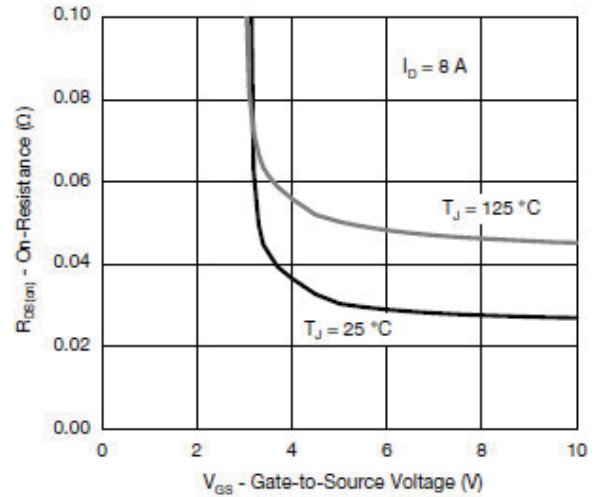
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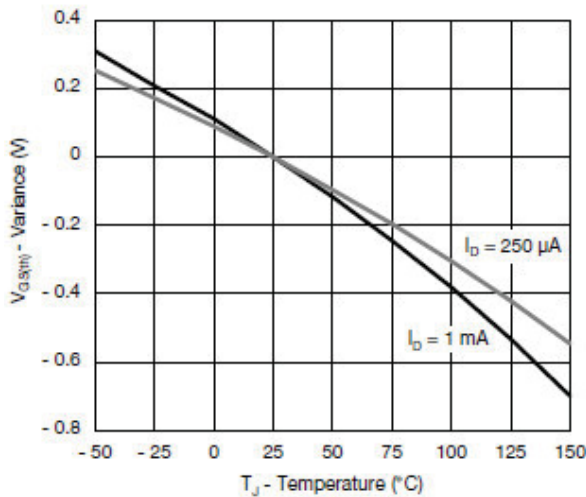
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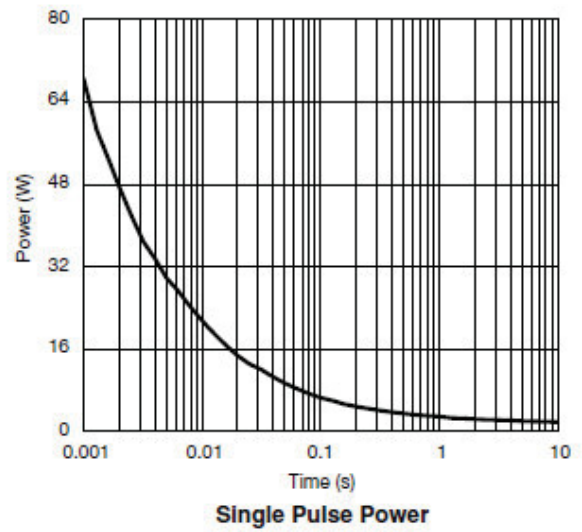
Source-Drain Diode Forward Voltage



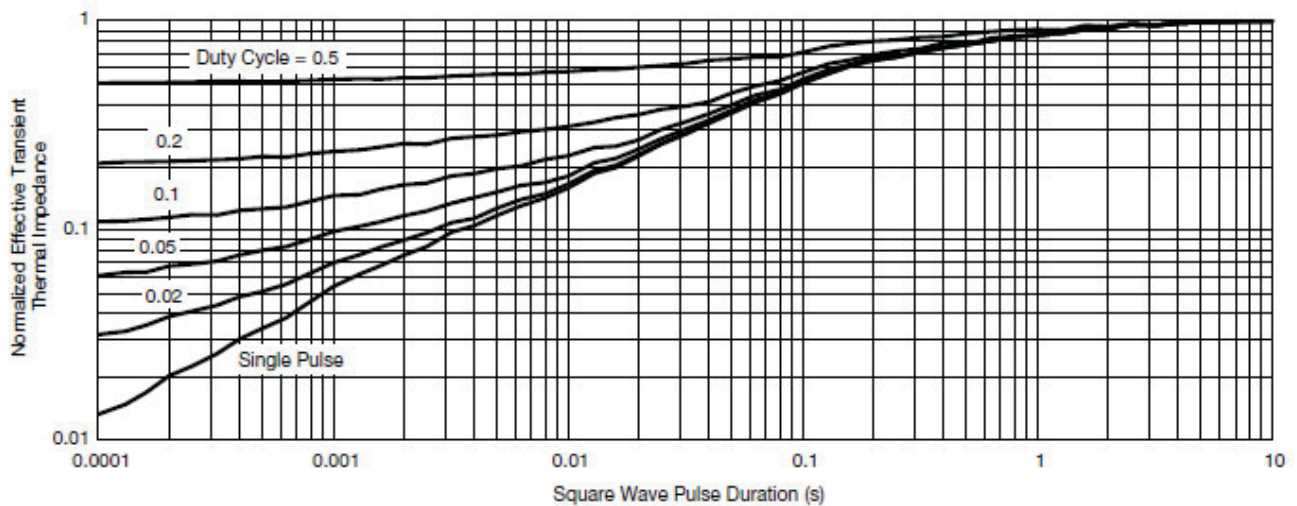
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Foot

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■Electrical Characteristics (P-ch)

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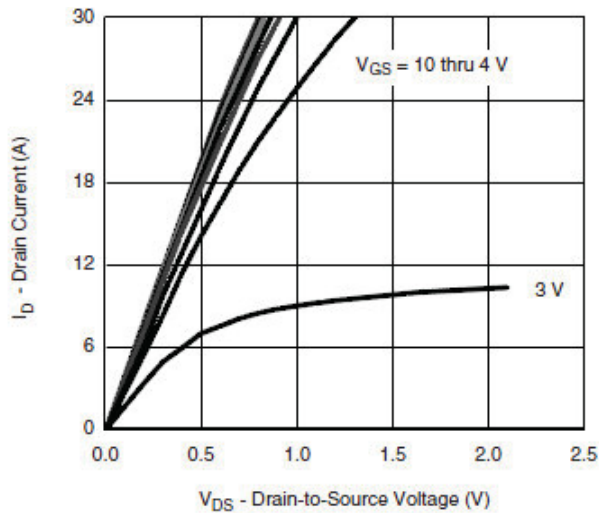
Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V		-40			V
Zero gate voltage drain current	Idss	Vds=-40V, Vgs=0V				-1	μA
			Ta=85°C				
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V				±100	nA
Gate threshold voltage	Vgs(th)	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=-10.0A			28	35	mΩ
		Vgs=-4.5V, Id=-6.0A			36	45	
Forward transconductance	Gfs	Vds=-15V, Id=-5.0A			20		S
Diode forward voltage	Vsd	Is=-2.0A, 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≡-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

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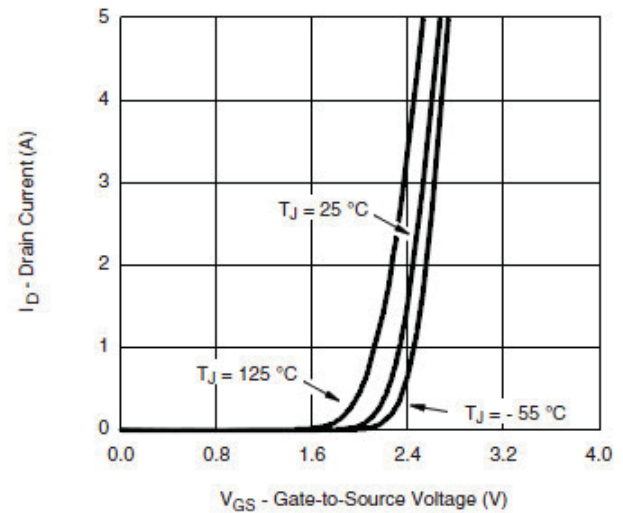
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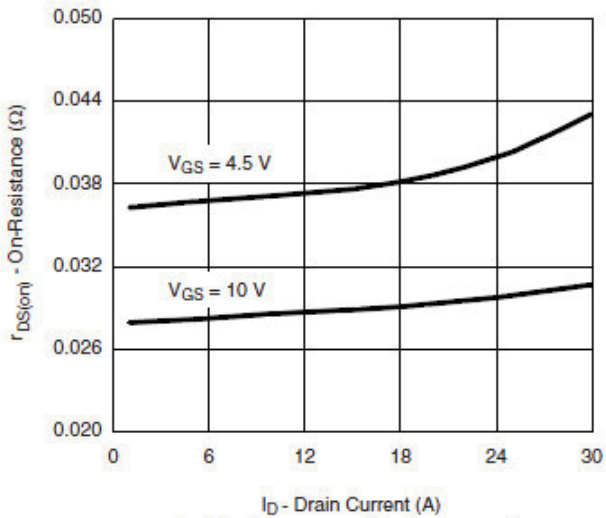
■ Typical Electrical and Thermal Characteristics (P-ch)



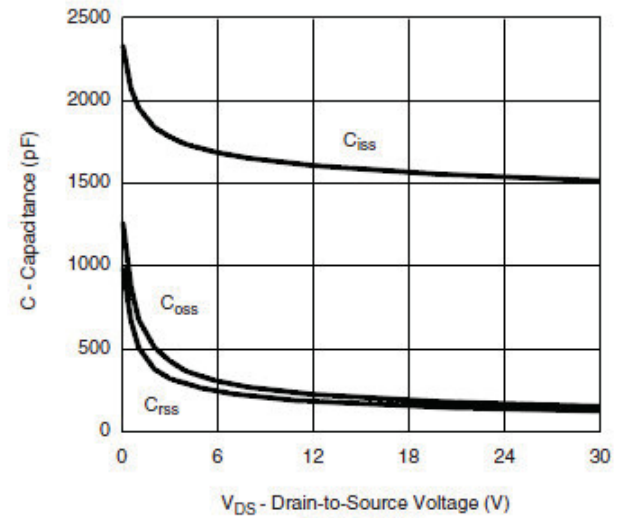
Output Characteristics



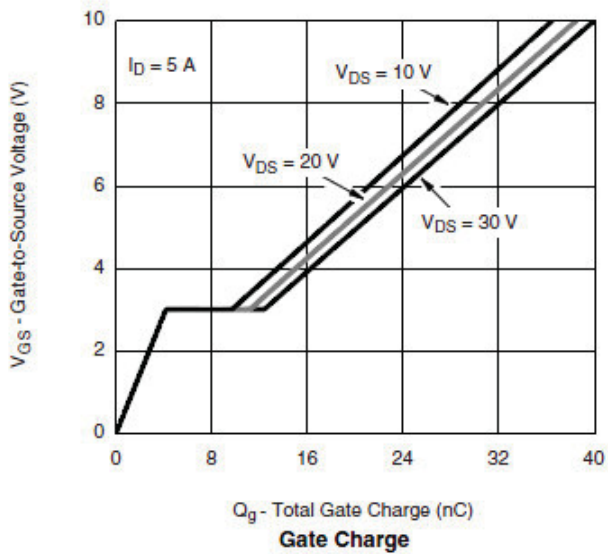
Transfer Characteristics



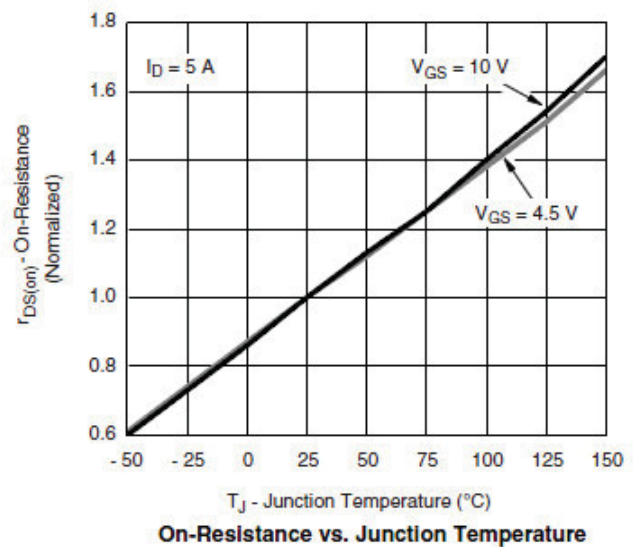
On-Resistance vs. Drain Current



Capacitance



Gate Charge

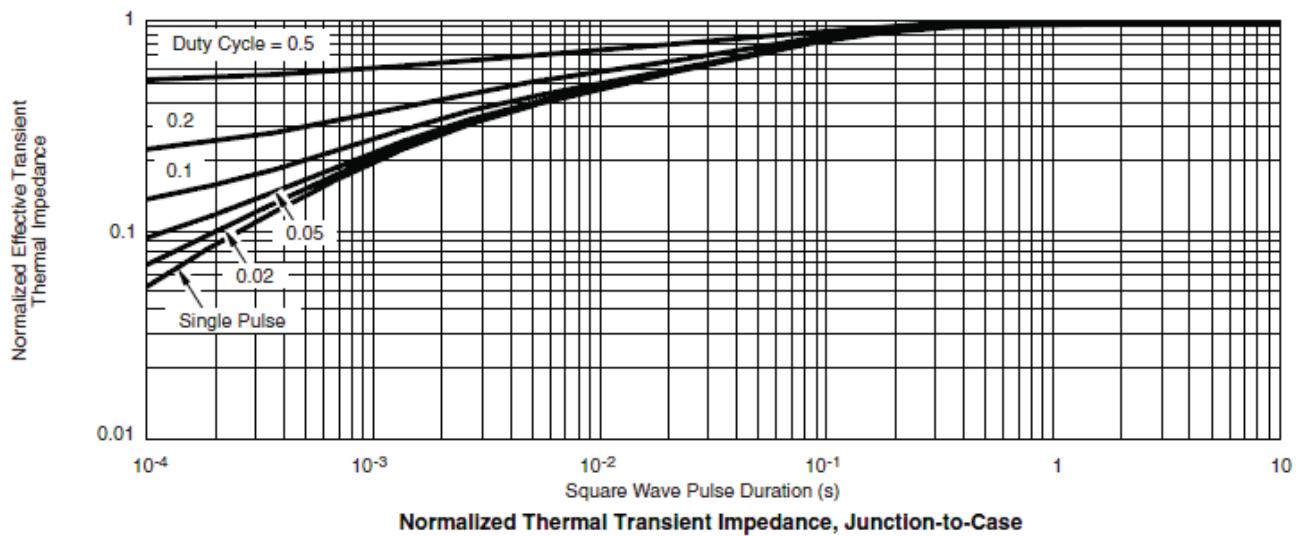
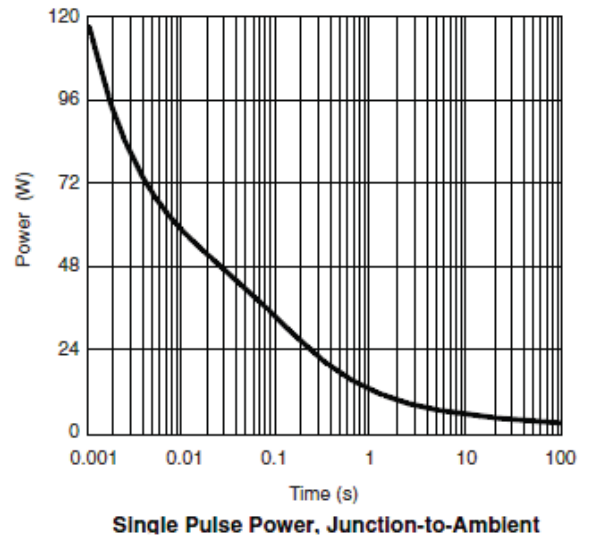
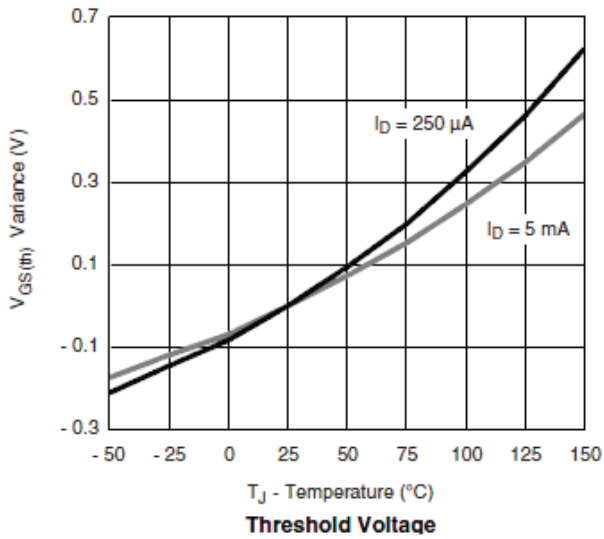
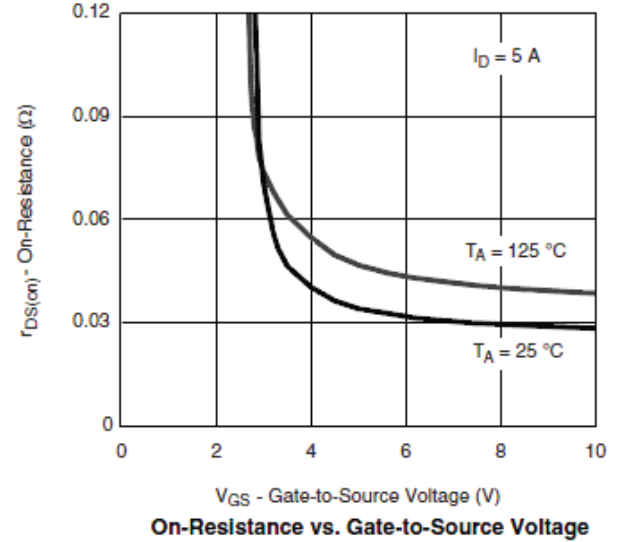
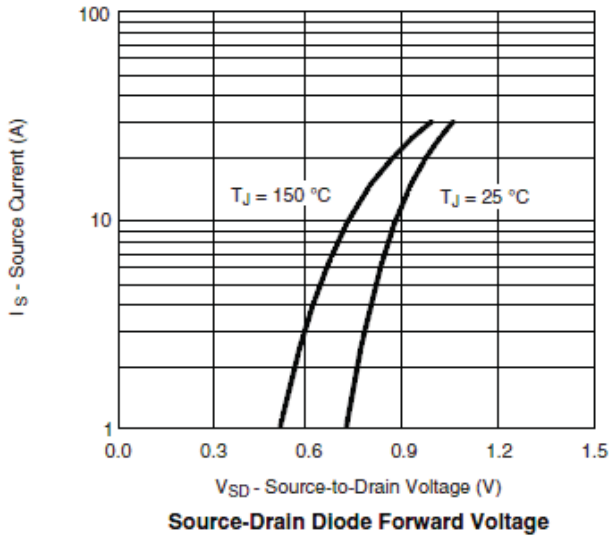


On-Resistance vs. Junction Temperature

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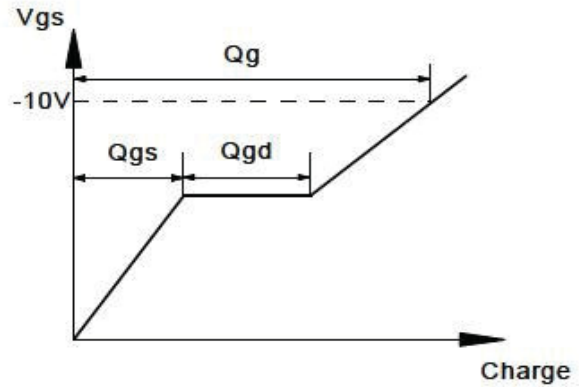
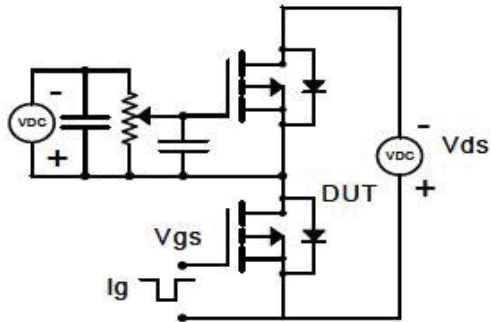
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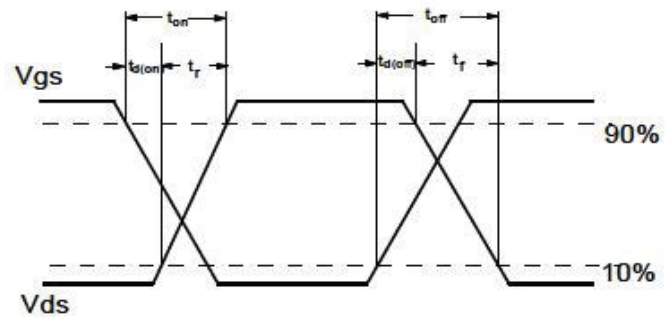
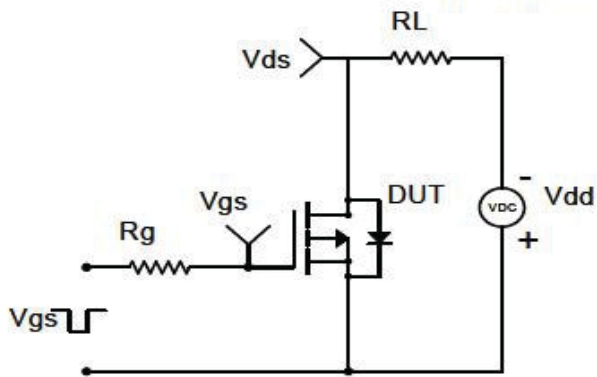
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■ Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

