

Complementary MOSFET

ELM54590CWSA-N

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

■General Description

ELM54590CWSA-N uses advanced trench technology to provide excellent $R_{ds(on)}$ and low gate charge.

■Features

- | | |
|---------------------------------------|---|
| N-channel | P-channel |
| • $V_{ds}=100V$ | • $V_{ds}=-100V$ |
| • $I_d=6.2A$ | • $I_d=-5.2A$ |
| • $R_{ds(on)}=45m\Omega(V_{gs}=10V)$ | • $R_{ds(on)}=90m\Omega(V_{gs}=-10V)$ |
| • $R_{ds(on)}=50m\Omega(V_{gs}=4.5V)$ | • $R_{ds(on)}=100m\Omega(V_{gs}=-4.5V)$ |

■Maximum Absolute Ratings

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

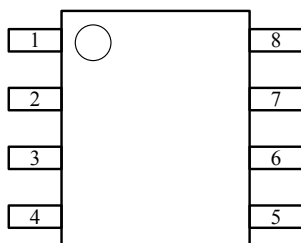
Parameter	Symbol	N-ch (Max.)	P-ch (Max.)	Unit
Drain-source voltage	V_{ds}	100	-100	V
Gate-source voltage	V_{gs}	± 20	± 20	V
Continuous drain current($T_j=150^{\circ}C$)	I_d	6.2	-5.2	A
		4.2	-3.4	
Pulsed drain current	I_{dm}	20	-20	A
Power dissipation	P_d	2.8	2.8	W
		1.8	1.8	
Operating junction temperature	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	$^{\circ}C/W$

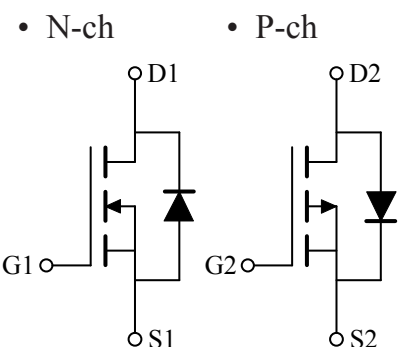
■Pin configuration

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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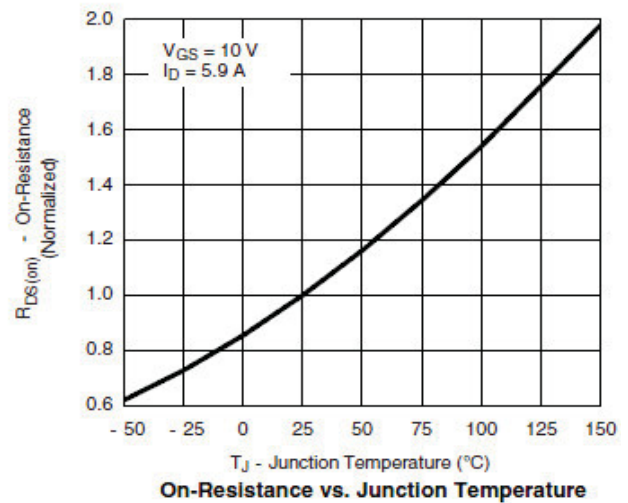
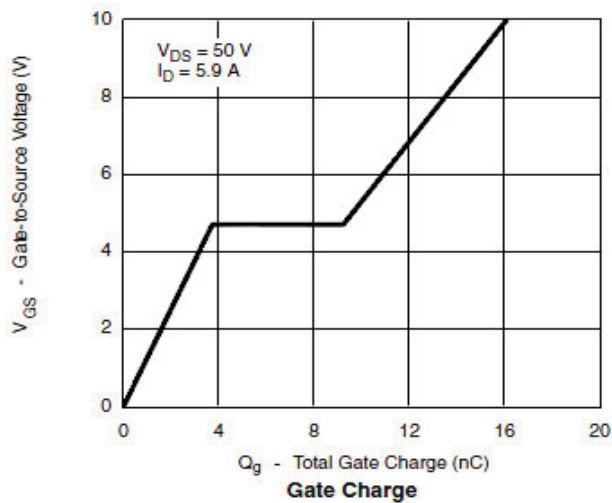
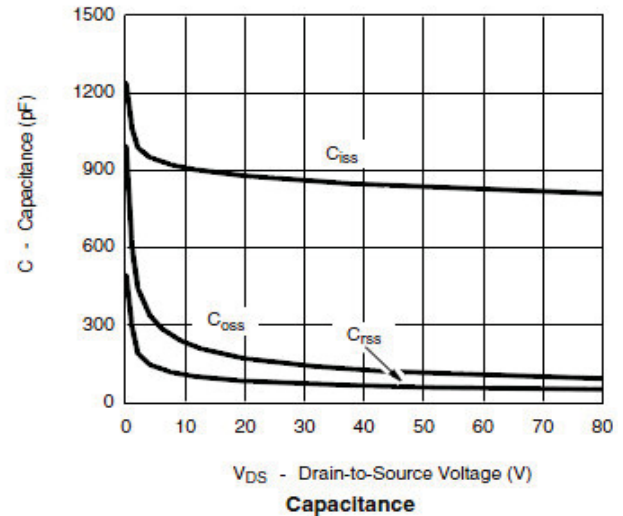
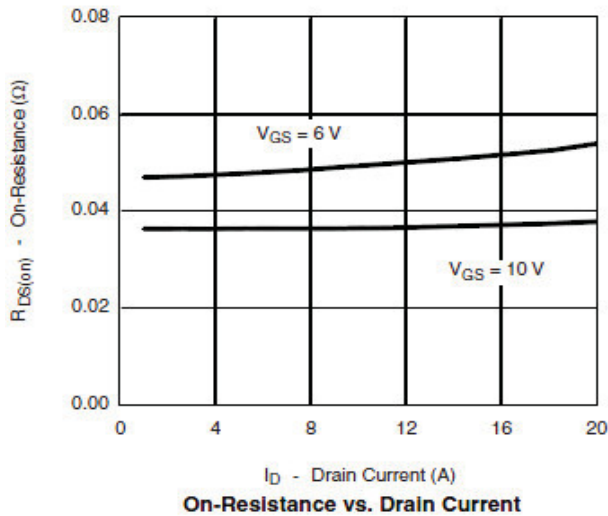
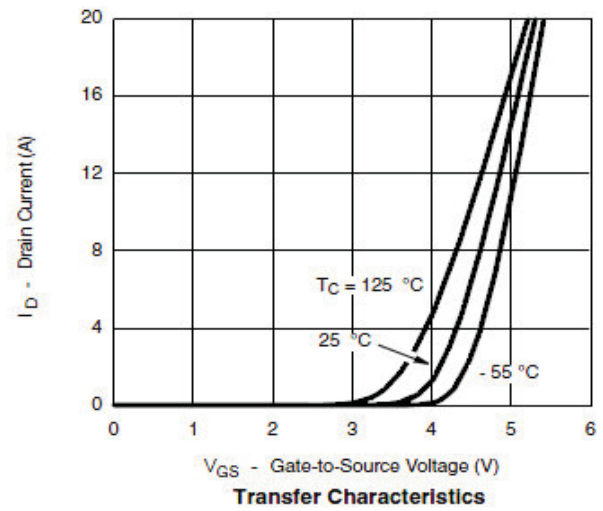
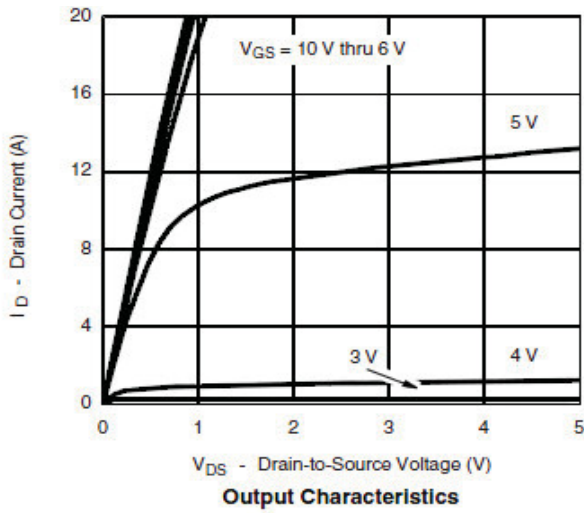
Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V		100			V
Zero gate voltage drain current	Idss	Vds=80V, Vgs=0V				1	μA
			Ta=85°C				
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V				±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA		1.0		2.0	V
On state drain current	Id(on)	Vgs=4.5V, Vds≥5V		20			A
Static drain-source on-resistance	Rds(on)	Vgs=10V, Id=6.2A			38	45	mΩ
		Vgs=4.5V, Id=4.2A			42	50	
Forward transconductance	Gfs	Vds=15V, Id=6.0A			14		S
Diode forward voltage	Vsd	Is=2.0A, Vgs=0V			0.8	1.3	V
Max.body-diode continuous current	Is					3	A
DYNAMIC PARAMETERS							
Input capacitance	Ciss	Vgs=0V, Vds=50V, f=1MHz			850		pF
Output capacitance	Coss				90		pF
Reverse transfer capacitance	Crss				40		pF
SWITCHING PARAMETERS							
Total gate charge	Qg	Vgs=10V, Vds=50V, Id≐5.9A			16	24	nC
Gate-source charge	Qgs				4		nC
Gate-drain charge	Qgd				6		nC
Turn-on delay time	td(on)	Vgs=10V, Vds=50V, Id≐5.9A RL=50Ω, Rgen=6Ω			15	25	ns
Turn-on rise time	tr				15	25	ns
Turn-off delay time	td(off)				35	55	ns
Turn-off fall time	tf				20	35	ns

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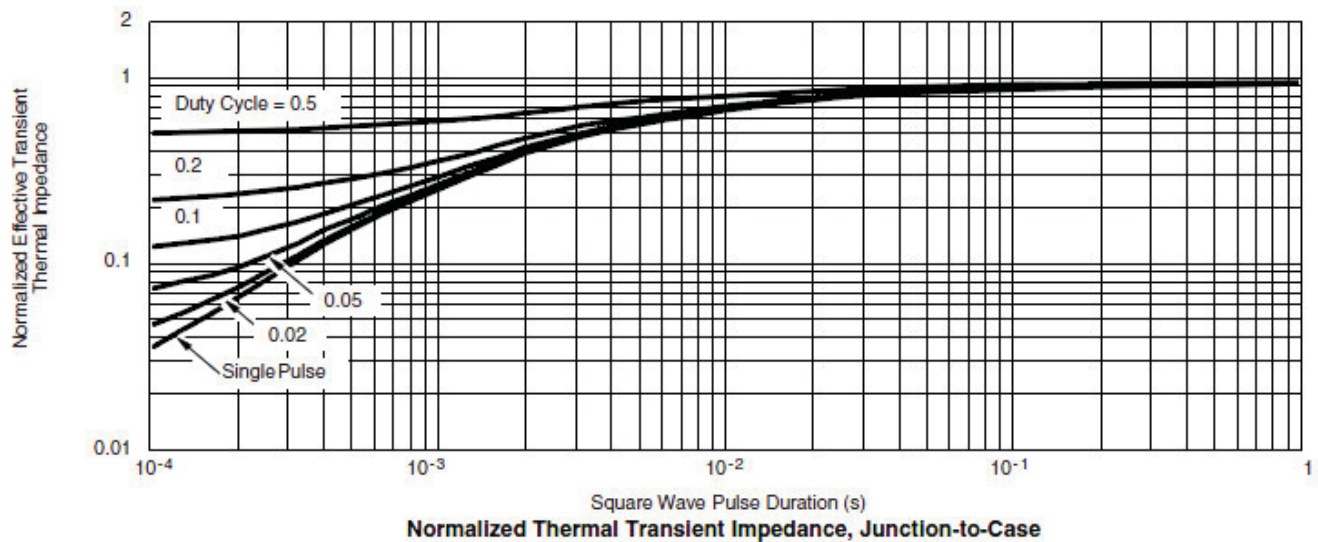
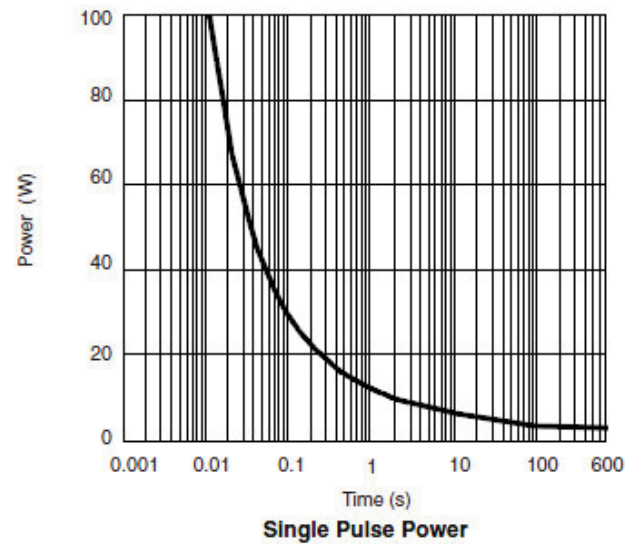
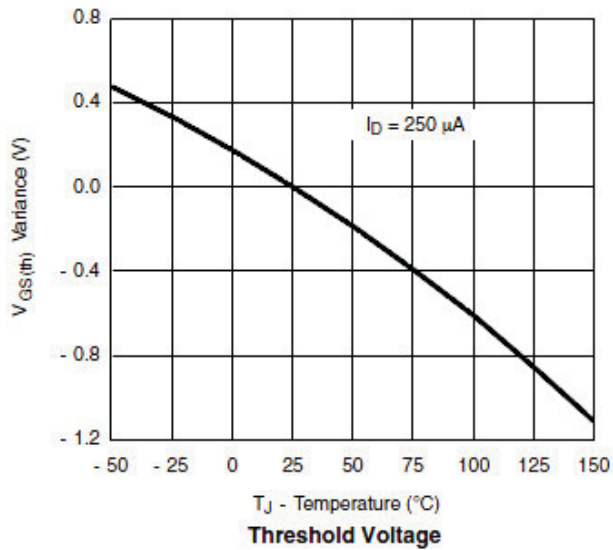
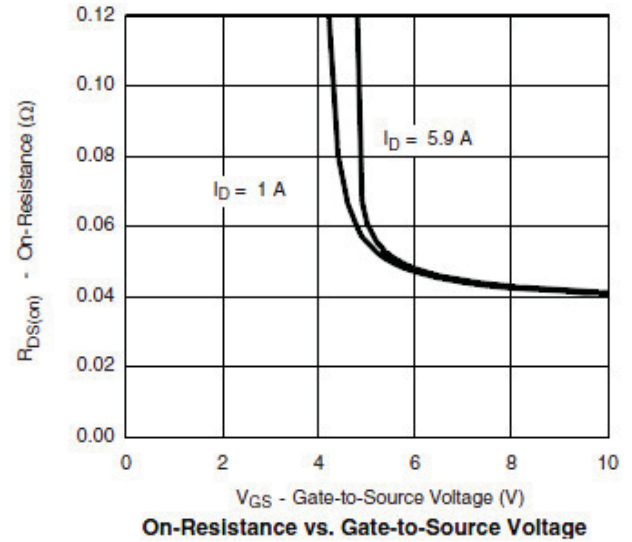
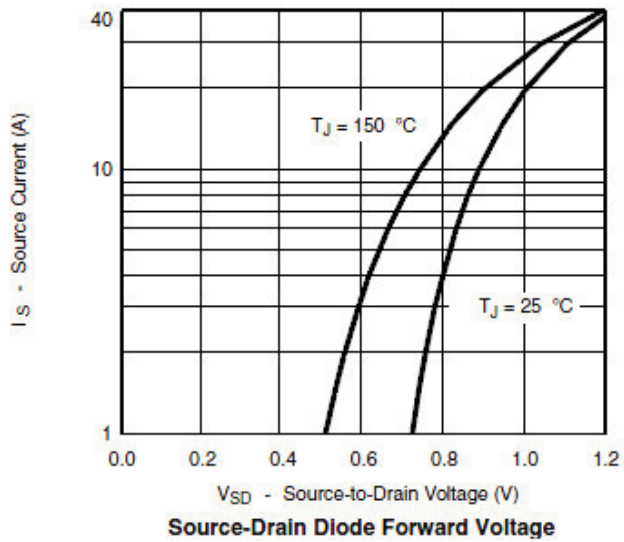
■ Typical Electrical and Thermal Characteristics (N-ch)



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■Electrical Characteristics (P-ch)

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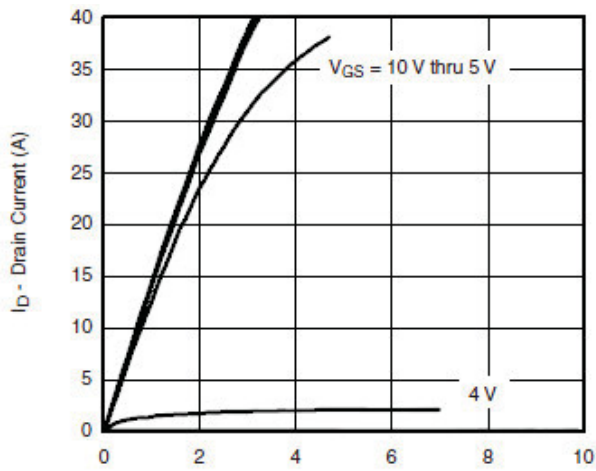
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STATIC PARAMETERS						
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V	-100			V
Zero gate voltage drain current	Idss	Vds=-80V, Vgs=0V			-1	μA
		Ta=85°C			-30	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-1.0		-2.5	V
On state drain current	Id(on)	Vgs=-10V, Vds≥-10V	-20			A
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-5.2A		80	90	mΩ
		Vgs=-4.5V, Id=-3.5A		87	100	
Forward transconductance	Gfs	Vds=-15V, Id=-5A		19		S
Diode forward voltage	Vsd	Is=-2.0A, Vgs=0V		-0.8	-1.3	V
Max. body-diode continuous current	Is				-3	A
DYNAMIC PARAMETERS						
Input capacitance	Ciss	Vgs=0V, Vds=-60V, f=1MHz		4300		pF
Output capacitance	Coss			280		pF
Reverse transfer capacitance	Crss			220		pF
SWITCHING PARAMETERS						
Total gate charge	Qg	Vgs=-10V, Vds=-75V Id≐-5.2A		85	150	nC
Gate-source charge	Qgs			18		nC
Gate-drain charge	Qgd			28		nC
Turn-on delay time	td(on)	Vgs=-10V, Vds=-75V Id≐-5.2A, RL=16Ω Rgen=6Ω		25	50	ns
Turn-on rise time	tr			45	85	ns
Turn-off delay time	td(off)			115	200	ns
Turn-off fall time	tf			65	130	ns

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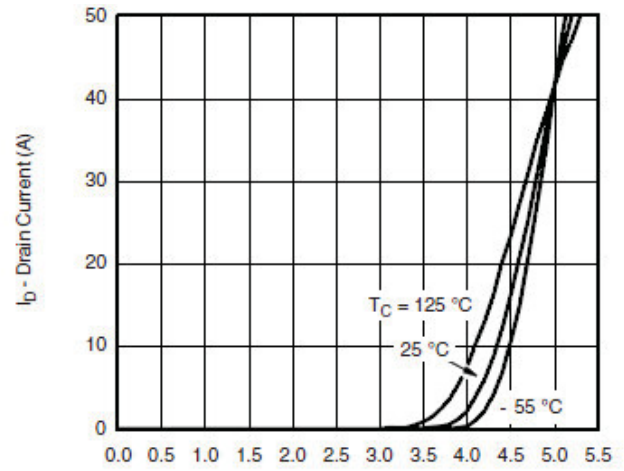
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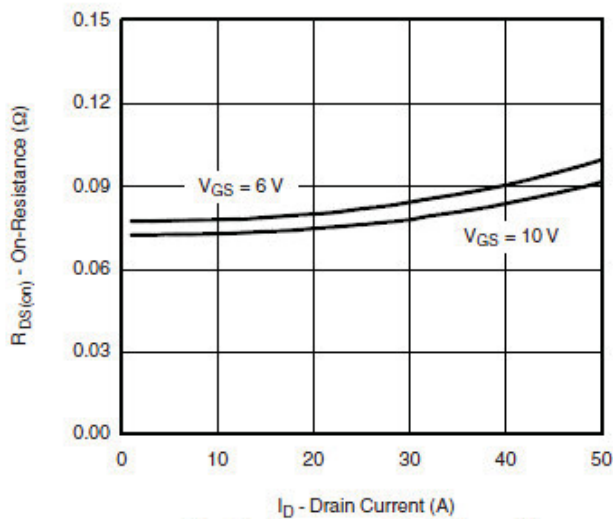
■ Typical Electrical and Thermal Characteristics (P-ch)



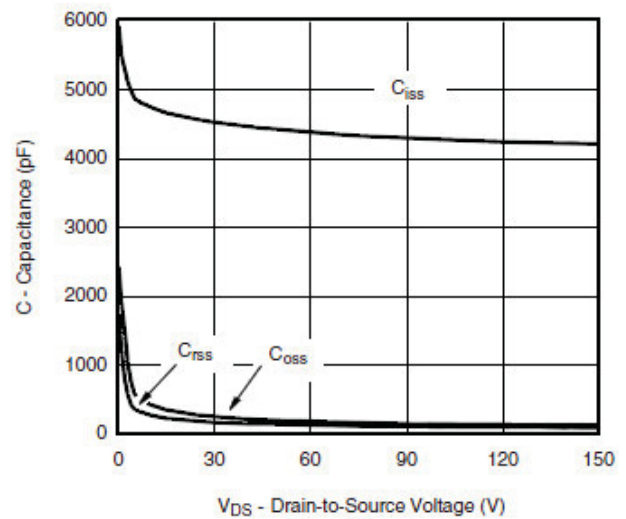
Output Characteristics



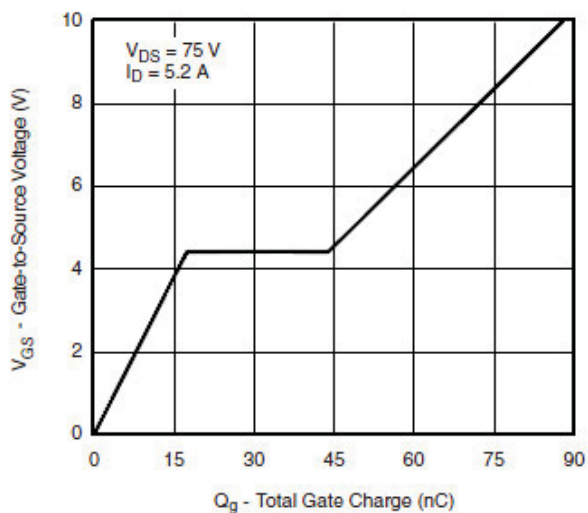
Transfer Characteristics



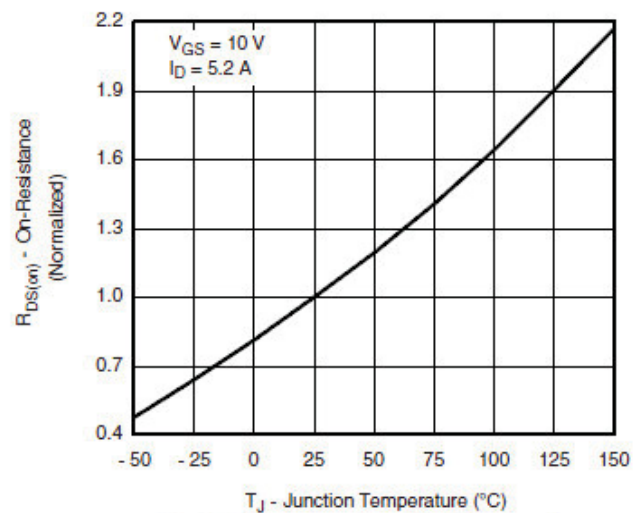
On-Resistance vs. Drain Current



Capacitance



Gate Charge

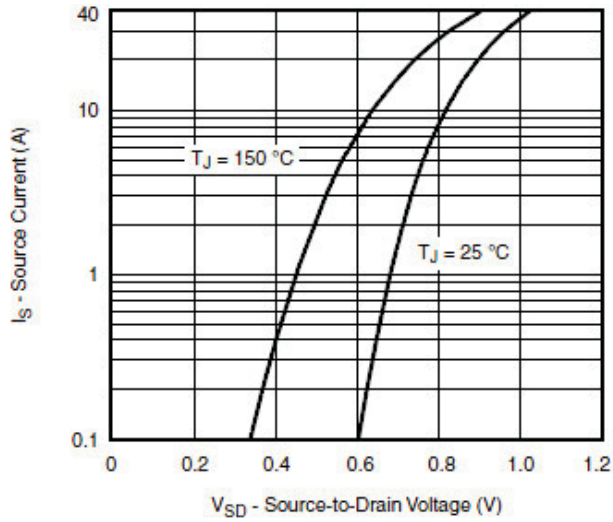


On-Resistance vs. Junction Temperature

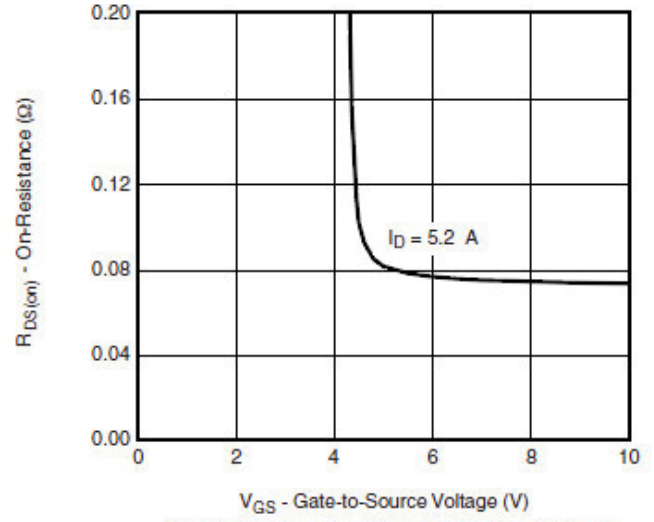
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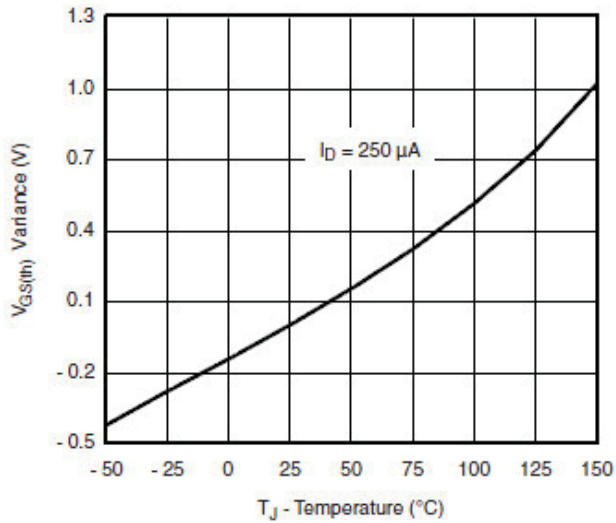
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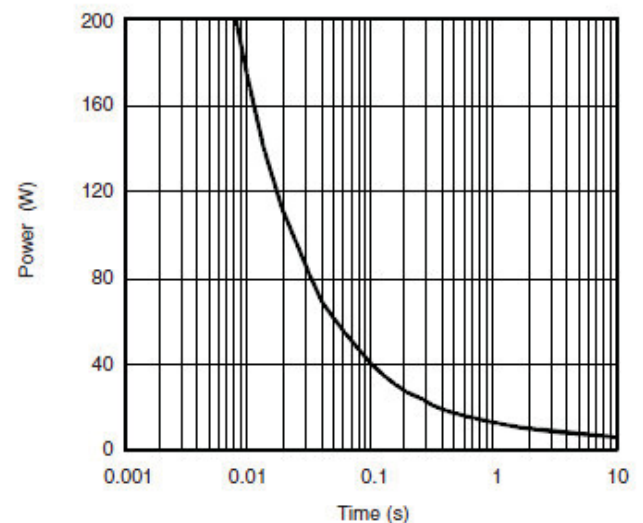
Source-Drain Diode Forward Voltage



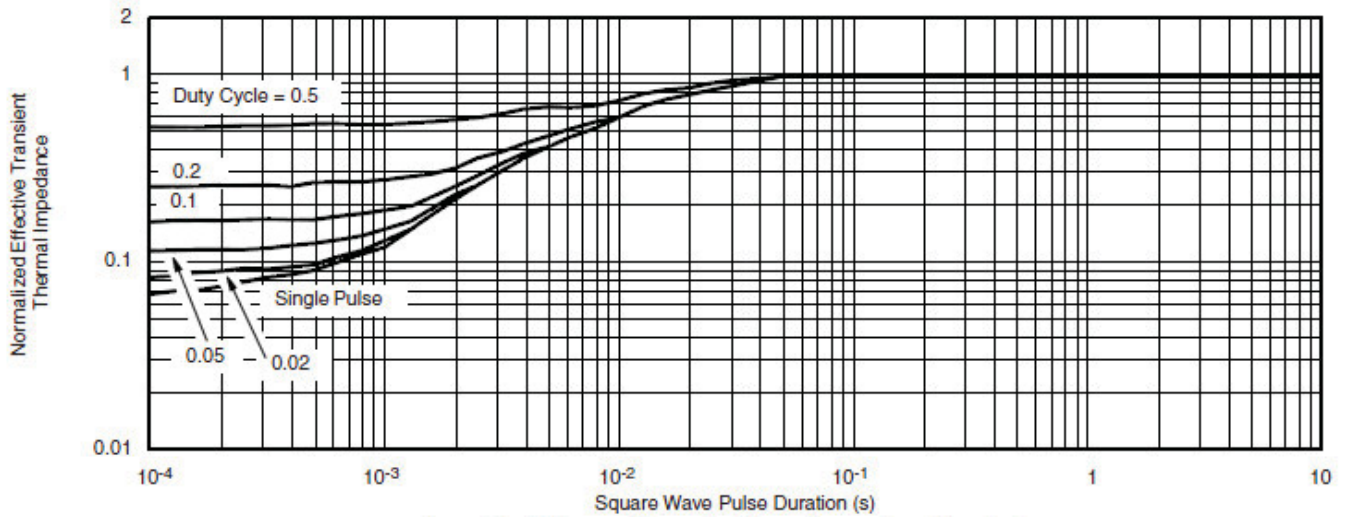
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Case

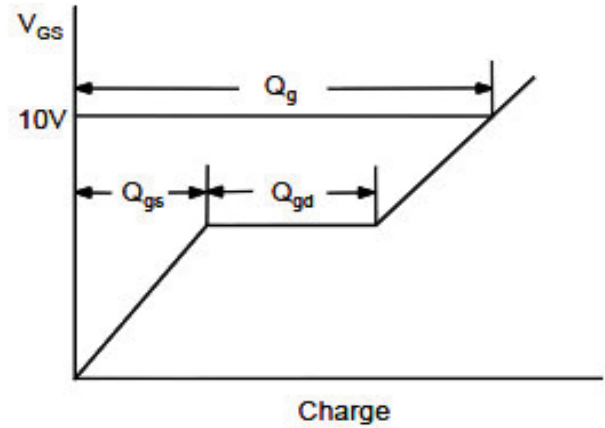
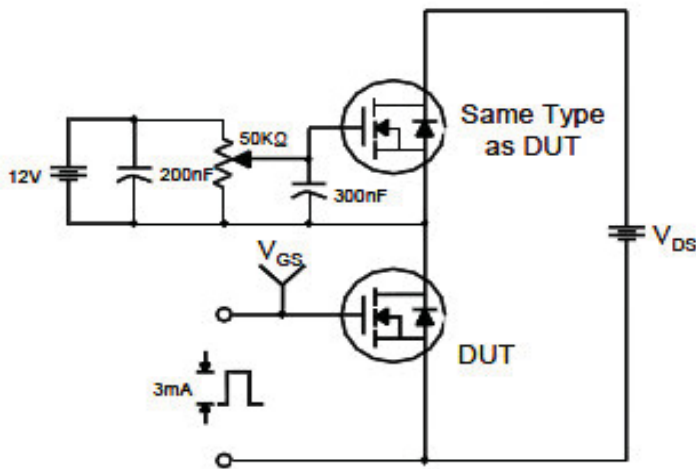
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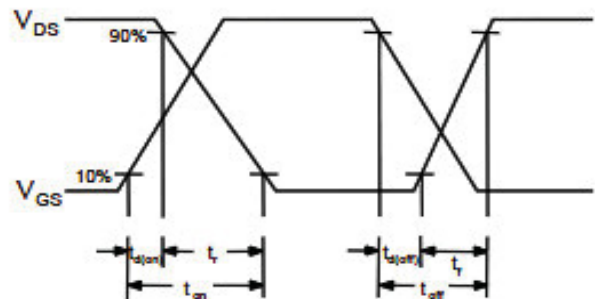
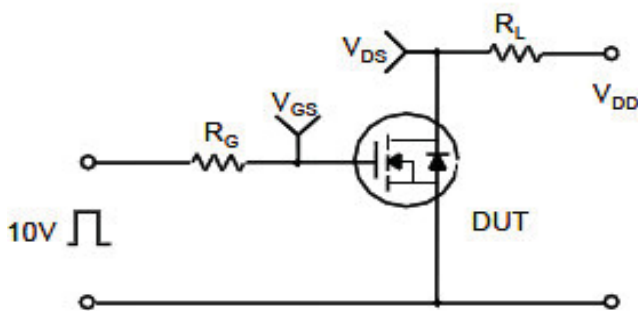
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■ Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

