

Complementary MOSFET (common drain)

ELM55521CA-S

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

■ General description

ELM55521CA-S uses advanced trench technology to provide excellent $R_{ds(on)}$, low gate charge and low gate threshold voltage.

■ Features

- | | |
|--|---|
| N-channel | P-channel |
| • $V_{ds}=100V$ | • $V_{ds}=-100V$ |
| • $I_d=5.0A$ | • $I_d=-5.0A$ |
| • $R_{ds(on)} = 110m\Omega(V_{gs}=10V)$ | • $R_{ds(on)} = 190m\Omega(V_{gs}=-10V)$ |
| • $R_{ds(on)} = 120m\Omega(V_{gs}=4.5V)$ | • $R_{ds(on)} = 200m\Omega(V_{gs}=-4.5V)$ |

■ Maximum absolute ratings

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

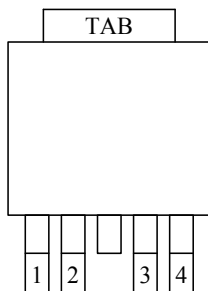
Parameter	Symbol	N-ch (Max.)	P-ch (Max.)	Unit	
Drain-source voltage	V_{ds}	100	-100	V	
Gate-source voltage	V_{gs}	± 20	± 20	V	
Continuous drain current($T_j=150^\circ C$)	I_d	$T_a=25^\circ C$	5.0	-5.0	A
		$T_a=70^\circ C$	3.0	-3.0	
Pulsed drain current	I_{dm}	8	-8	A	
Power dissipation	P_d	$T_c=25^\circ C$	2.8	2.8	W
		$T_c=70^\circ C$	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

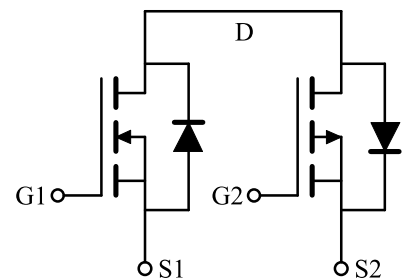
TO-252-4(TOP VIEW)



Pin No.	Pin name
1	SOURCE1
2	GATE1
3	SOURCE2
4	GATE2
TAB	DRAIN1/DRAIN2

■ Circuit

- N-ch
- P-ch



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■Electrical characteristics (N-ch)

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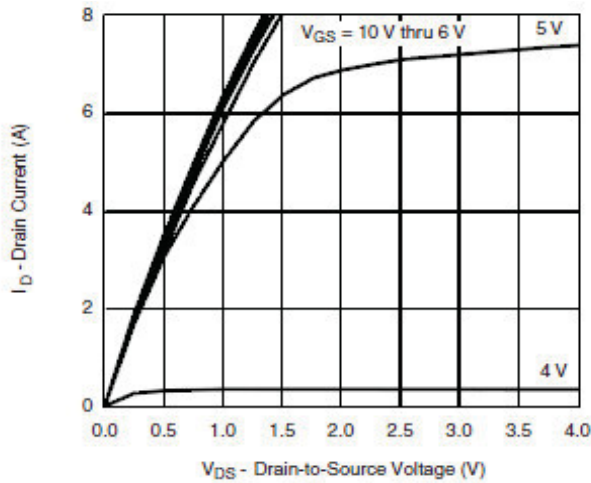
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V	100			V
Zero gate voltage drain current	Idss	Vds=80V, Vgs=0V Ta=85°C			1	μA
					5	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=250μA	1.0	1.8	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=5.0A		86	110	mΩ
		Vgs=4.5V, Id=3.0A		90	120	
Forward transconductance	Gfs	Vds=10V, Id=3.0A		12		S
Diode forward voltage	Vsd	Is=3.0A, Vgs=0V		0.8	1.2	V
Max. body-diode continuous current	Is				2	A
DYNAMIC PARAMETERS						
Input capacitance	Ciss	Vgs=0V, Vds=50V, f=1MHz		415		pF
Output capacitance	Coss			40		pF
Reverse transfer capacitance	Crss			20		pF
SWITCHING PARAMETERS						
Total gate charge	Qg	Vgs=10V, Vds=50V Id≐4.5A		10.0	15.0	nC
Gate-source charge	Qgs			1.7		nC
Gate-drain charge	Qgd			2.0		nC
Turn-on delay time	td(on)	Vgs=10V, Vds=50V RL=23.8Ω, Id≐2.1A Rgen=1.0Ω		10	15	ns
Turn-on rise time	tr			10	15	ns
Turn-off delay time	td(off)			12	20	ns
Turn-off fall time	tf			10	15	ns

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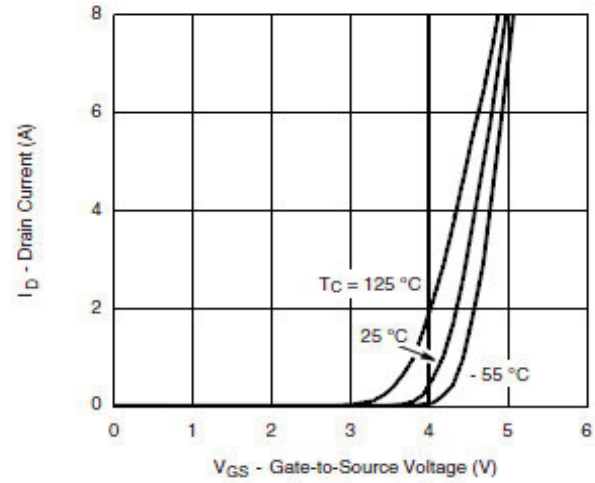
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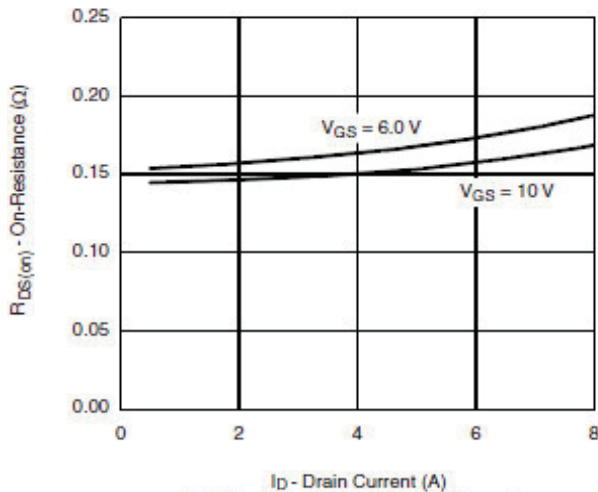
■ Typical electrical and thermal characteristics (N-ch)



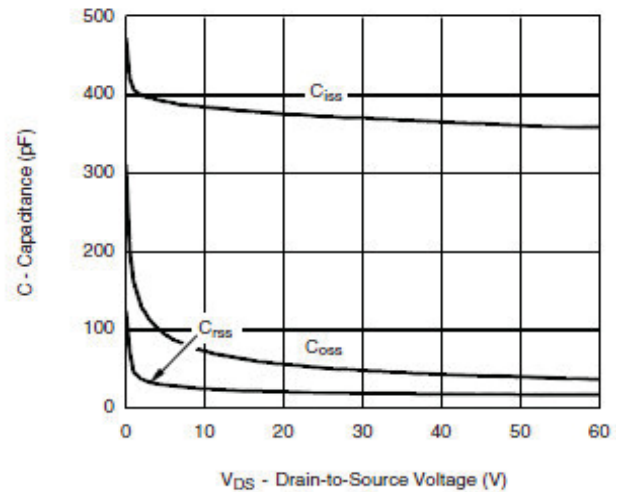
Output Characteristics



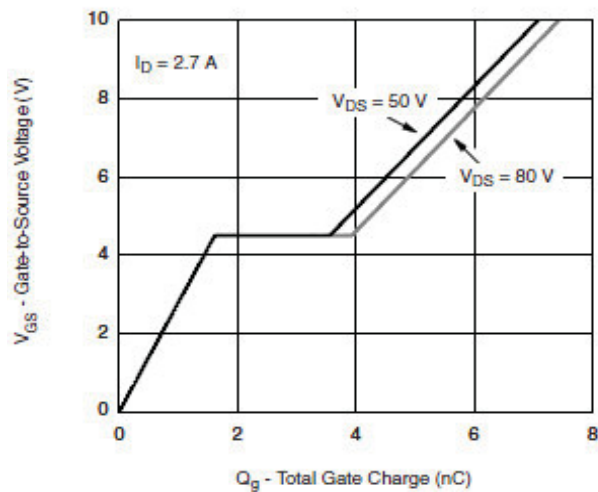
Transfer Characteristics



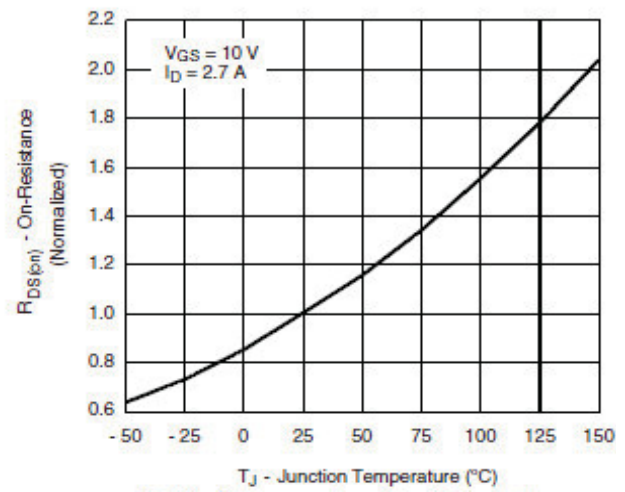
On-Resistance vs. Drain Current



Capacitance



Gate Charge

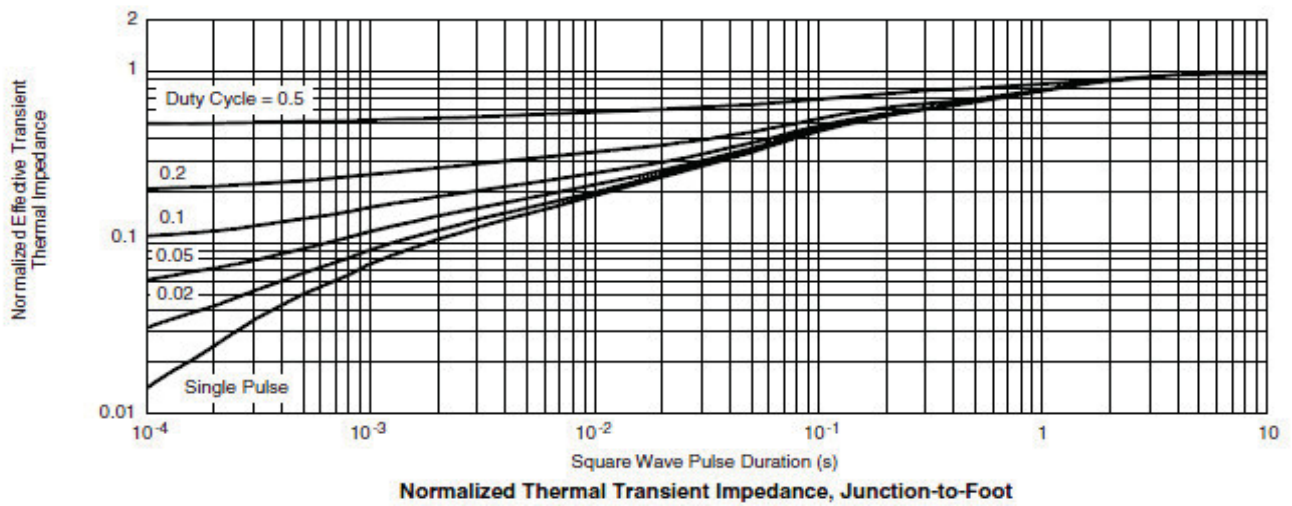
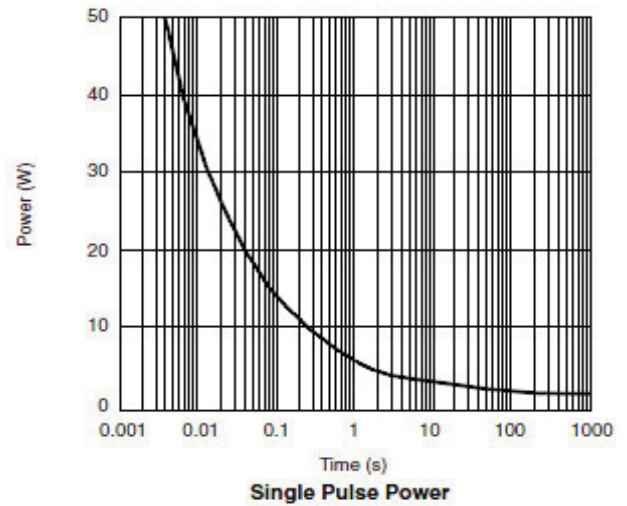
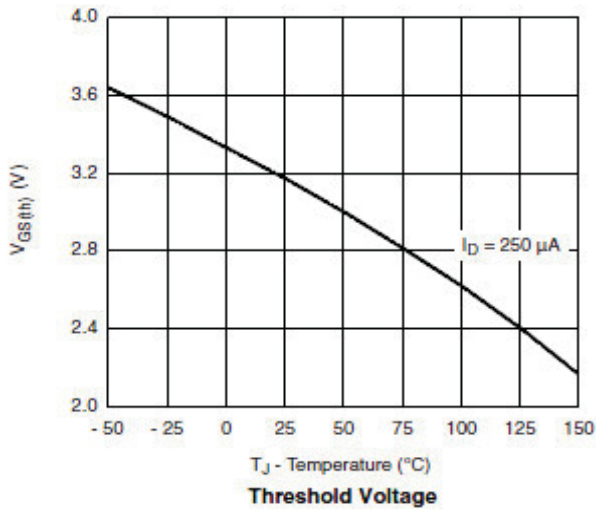
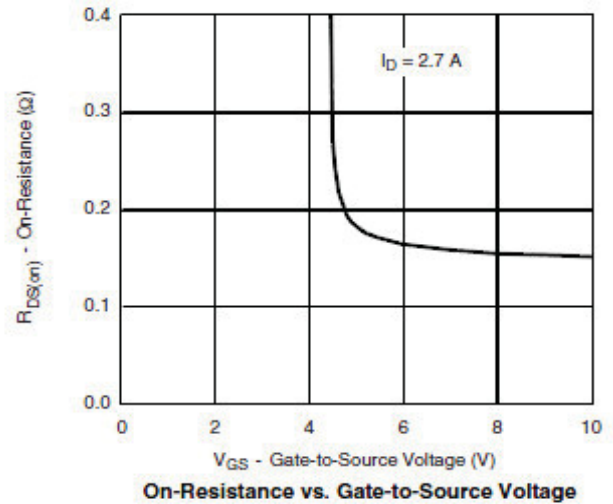
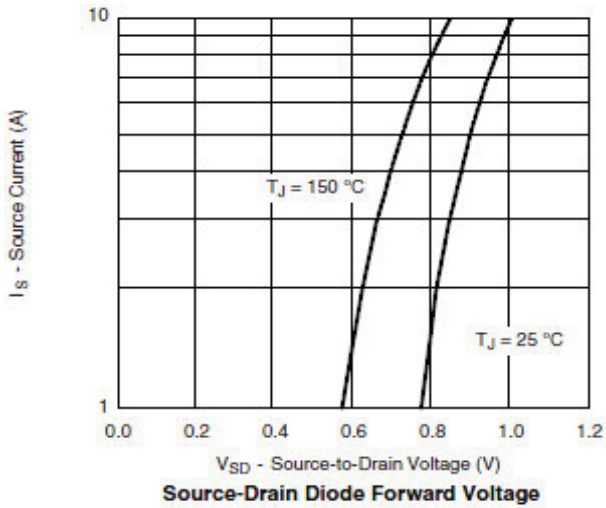


On-Resistance vs. Junction Temperature

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Complementary MOSFET (common drain)

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■Electrical Characteristics (P-ch)

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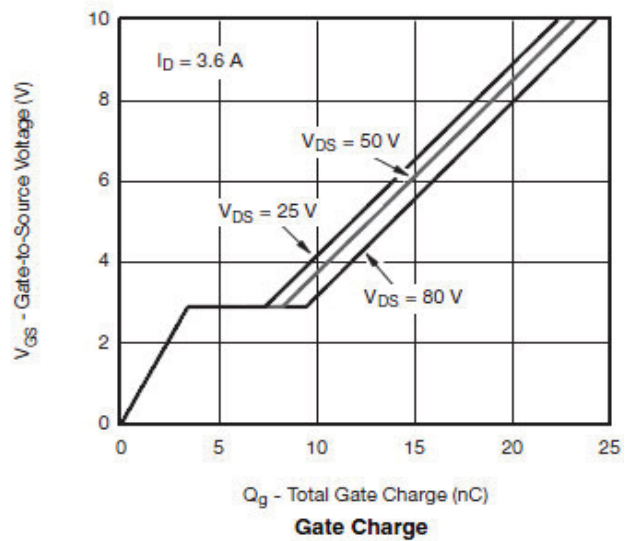
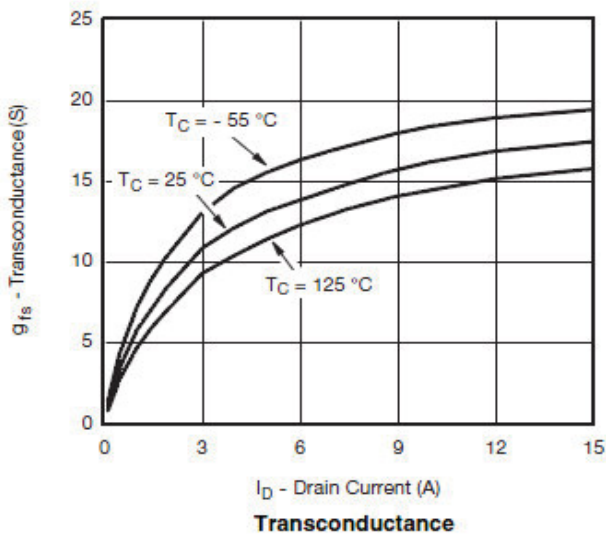
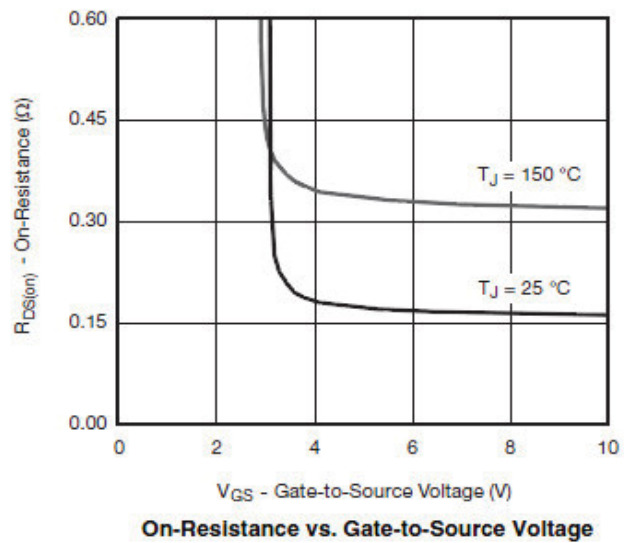
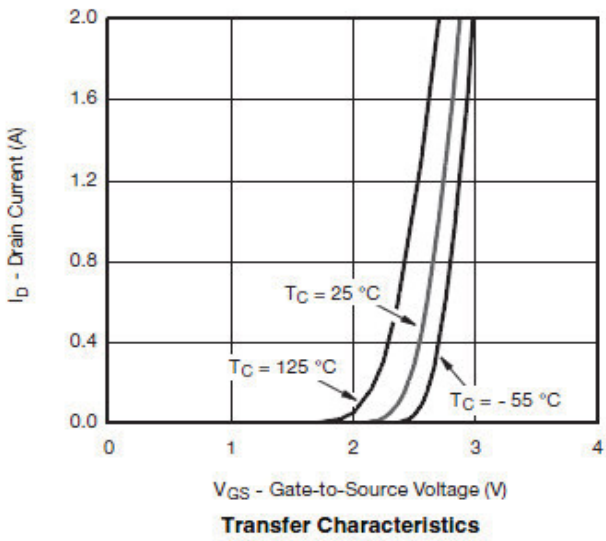
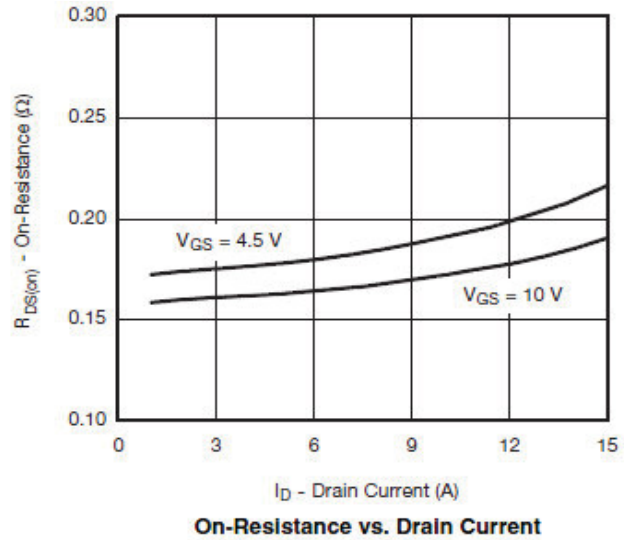
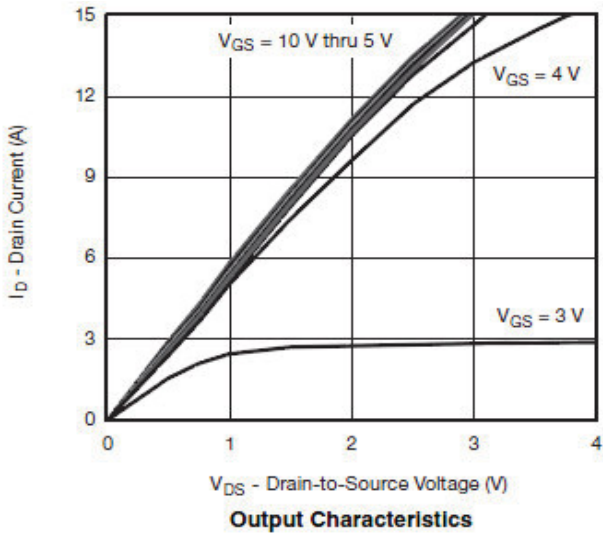
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V	-100			V
Zero gate voltage drain current	Idss	Vds=-80V, Vgs=0V Ta=85°C			-1	μA
					-30	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V			±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-1.0		-2.5	V
On state drain current	Id(on)	Vgs=-10V, Vds≥-10V	-18			A
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-5.0A		167	190	mΩ
		Vgs=-4.5V, Id=-3.0A		177	200	
Forward transconductance	Gfs	Vds=-15V, Id=-3.2A		12		S
Diode forward voltage	Vsd	Is=-2A, Vgs=0V		-0.8	-1.3	V
Max. body-diode continuous current	Is				-2	A
DYNAMIC PARAMETERS						
Input capacitance	Ciss	Vgs=0V, Vds=-50V, f=1MHz		1100		pF
Output capacitance	Coss			70		pF
Reverse transfer capacitance	Crss			45		pF
SWITCHING PARAMETERS						
Total gate charge	Qg	Vgs=-4.5V, Vds=-50V Id=-4.0A		12.0	20.0	nC
Gate-source charge	Qgs			3.0		nC
Gate-drain charge	Qgd			4.5		nC
Turn-on delay time	td(on)	Vgs=-10V, Vds=-50V Id=-2.8A, RL=17Ω Rgen=1Ω		8	15	ns
Turn-on rise time	tr			15	20	ns
Turn-off delay time	td(off)			35	50	ns
Turn-off fall time	tf			10	25	ns

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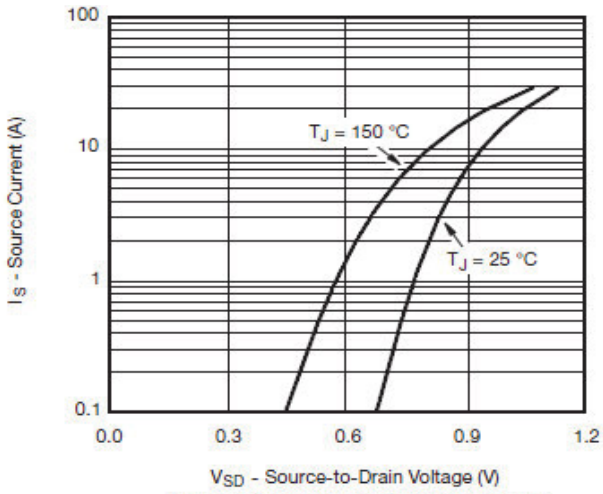
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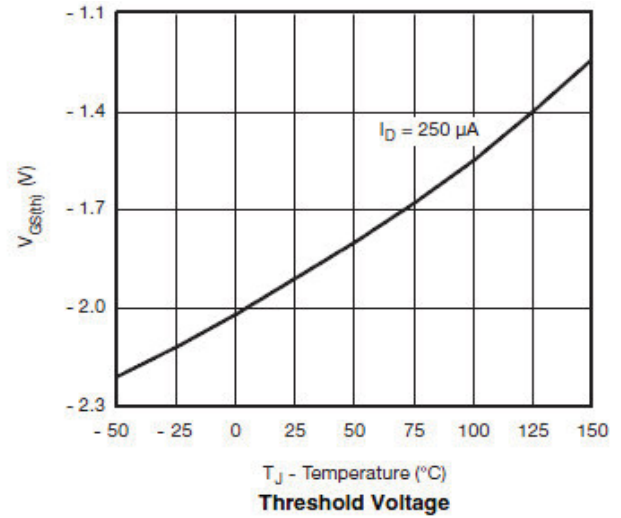
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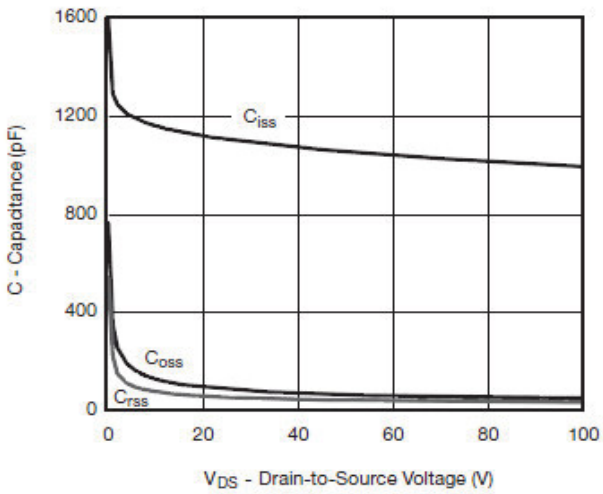
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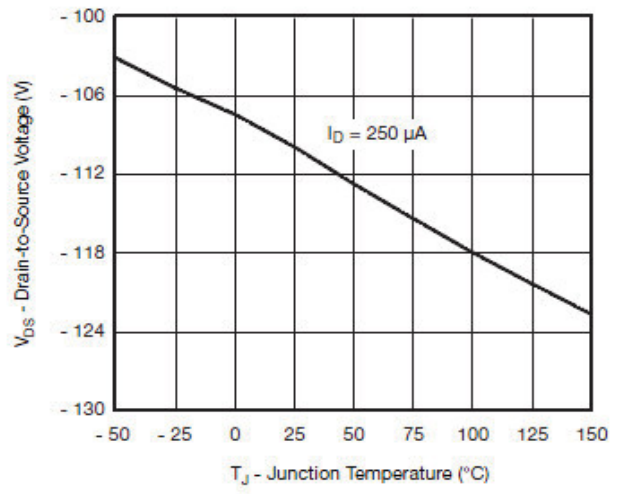
Source-Drain Diode Forward Voltage



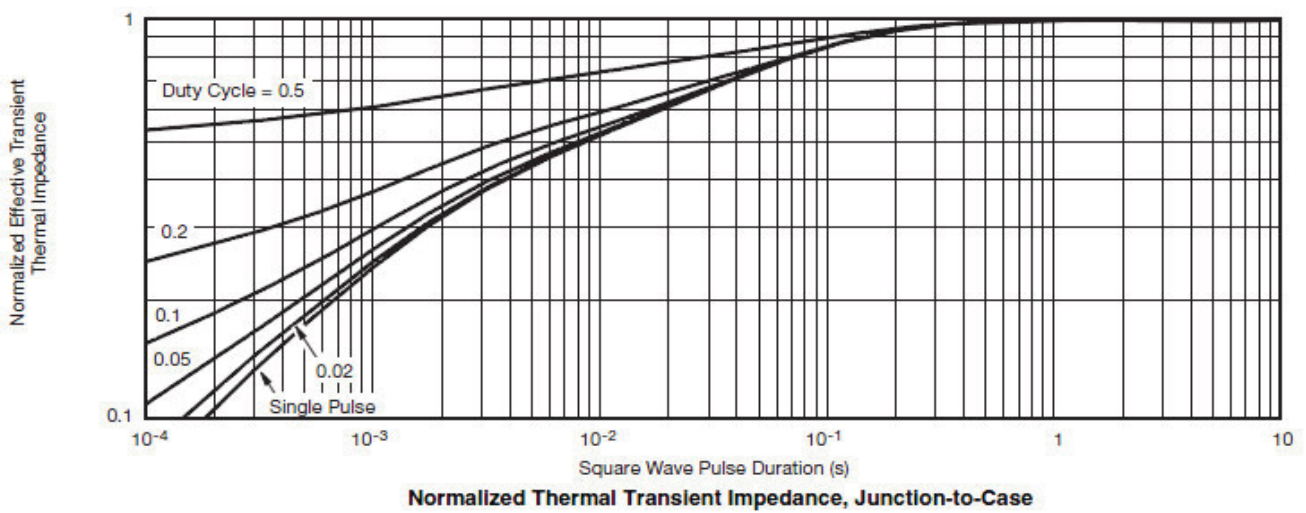
Threshold Voltage



Capacitance



Drain Source Breakdown vs. Junction Temperature



Normalized Thermal Transient Impedance, Junction-to-Case

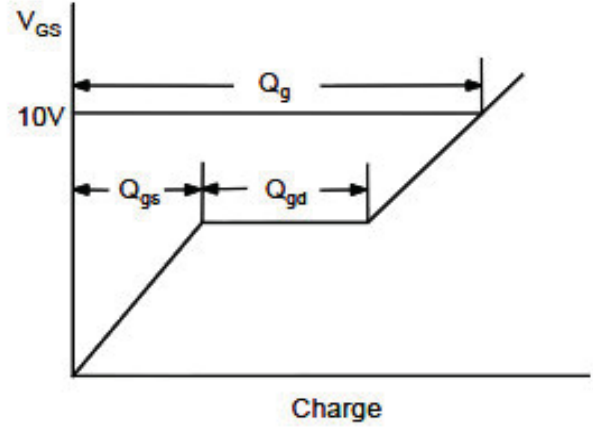
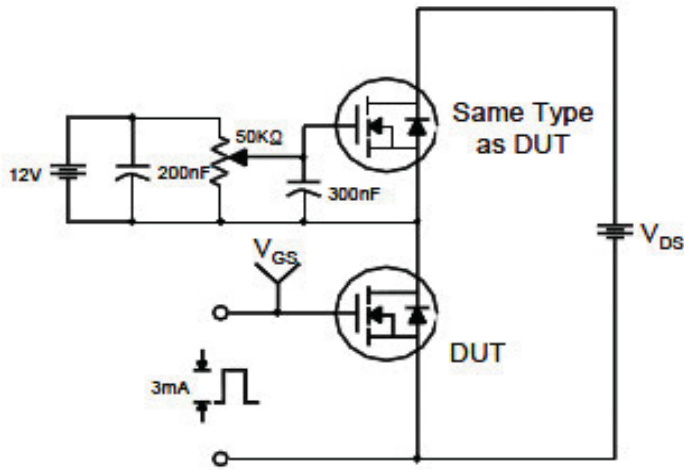
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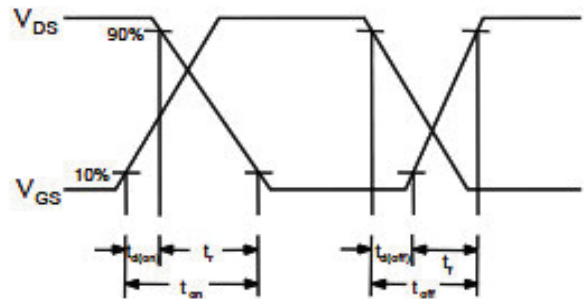
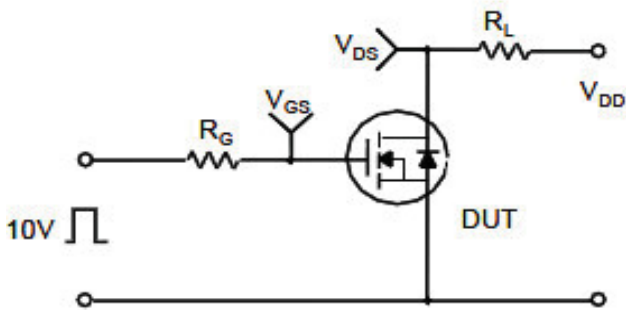
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■ Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

