

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.

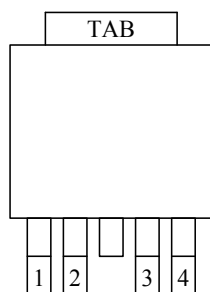
Parameter	Symbol	N-ch (Max.)	P-ch (Max.)	Unit
Drain-source voltage	V_{ds}	100	-100	V
Gate-source voltage	V_{gs}	± 20	± 20	V
Continuous drain current($T_j=150^{\circ}C$)	I_d	5.0	-5.0	A
		3.0	-3.0	
Pulsed drain current	I_{dm}	8	-8	A
Power dissipation	P_d	2.8	2.8	W
		1.8	1.8	
Operating junction temperature	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

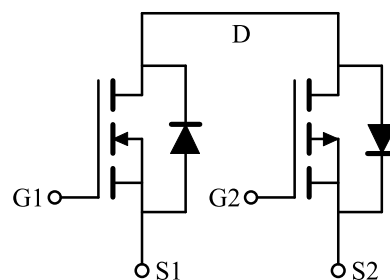
TO-252-4(TOP VIEW)



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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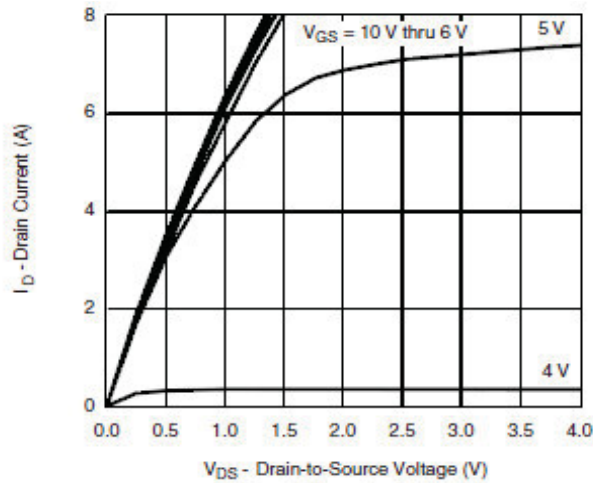
Parameter	Symbol	Condition		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BVdss	Id=250μA, Vgs=0V		100			V
Zero gate voltage drain current	Idss	Vds=80V, Vgs=0V				1	μA
			Ta=85°C			5	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V				±100	nA
Gate threshold voltage	Vgs(th)	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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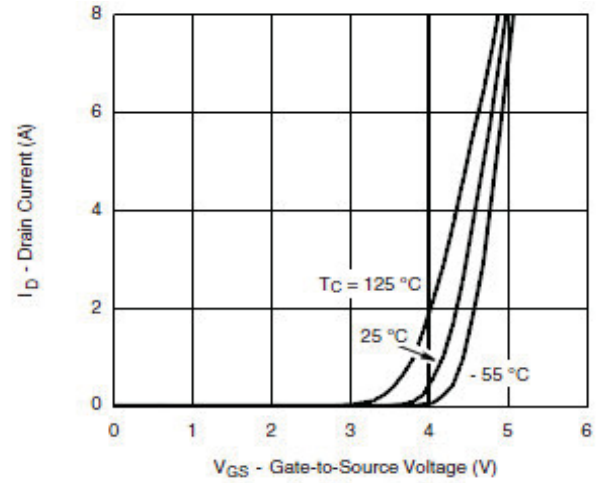
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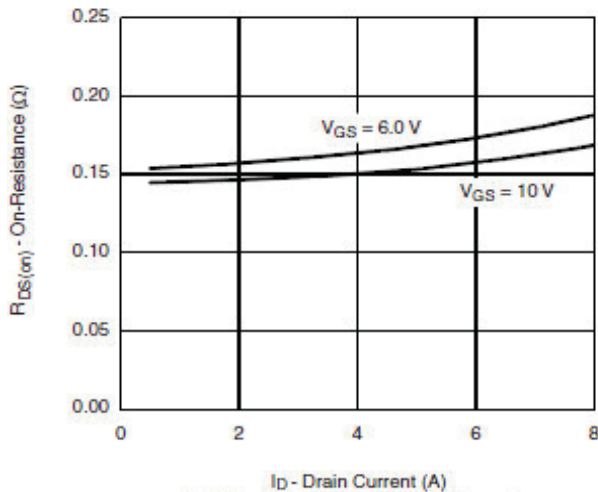
■ Typical electrical and thermal characteristics (N-ch)



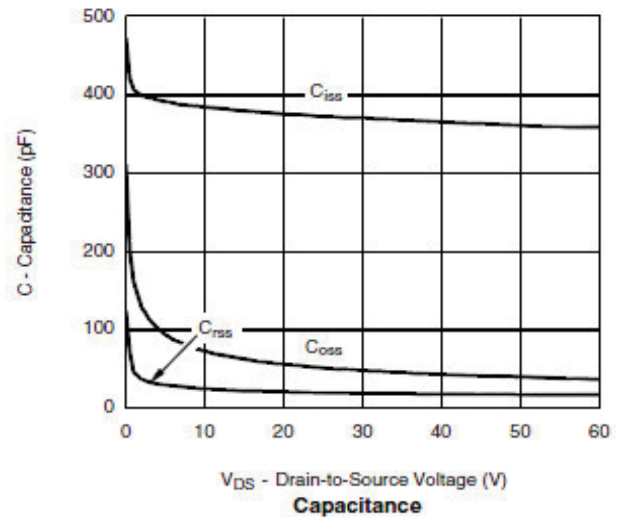
Output Characteristics



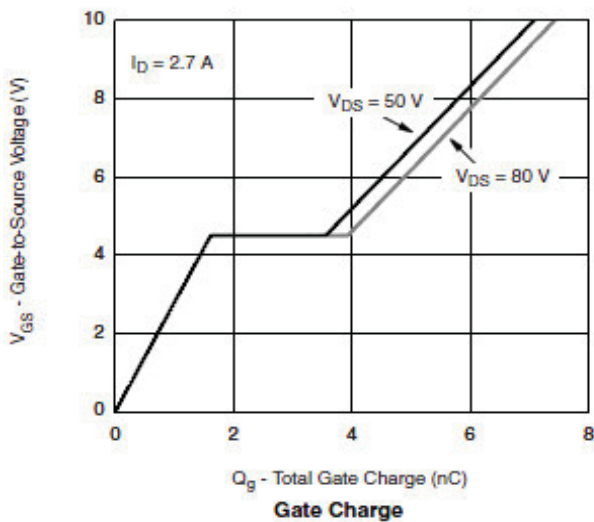
Transfer Characteristics



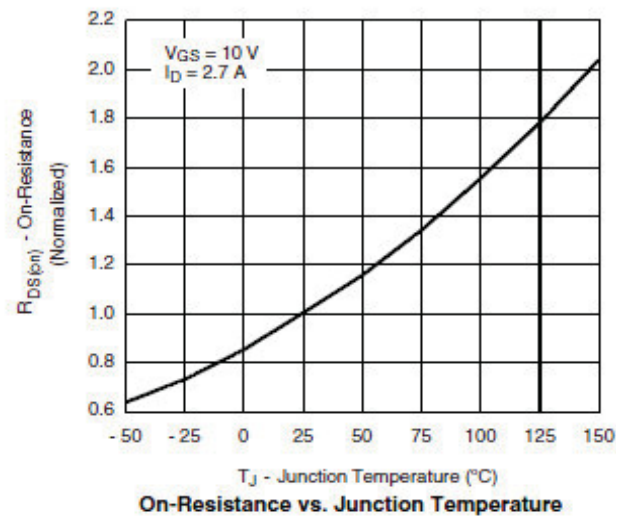
On-Resistance vs. Drain Current



Capacitance



Gate Charge

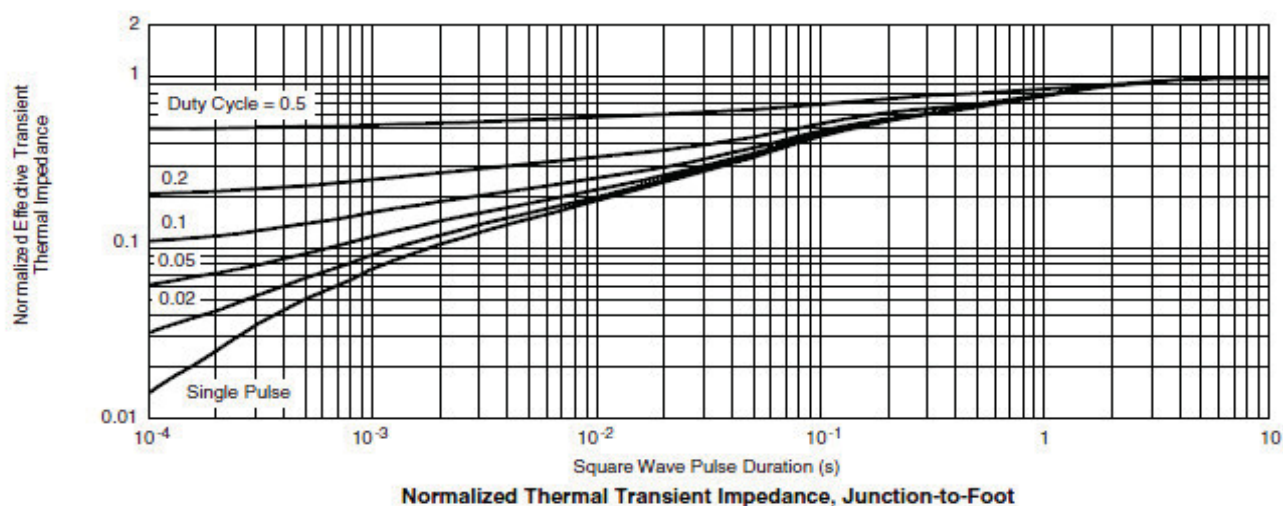
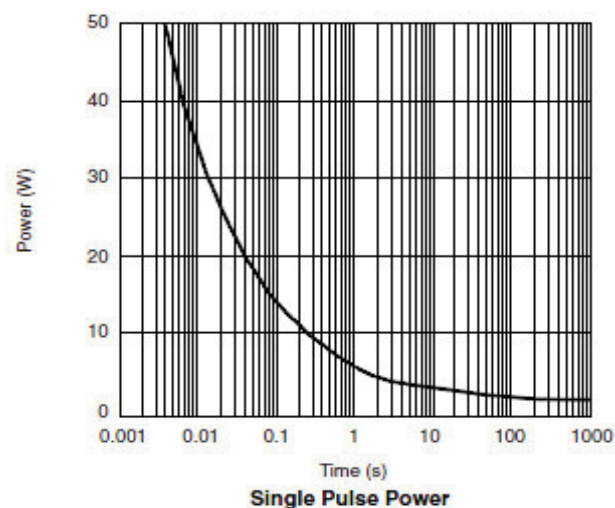
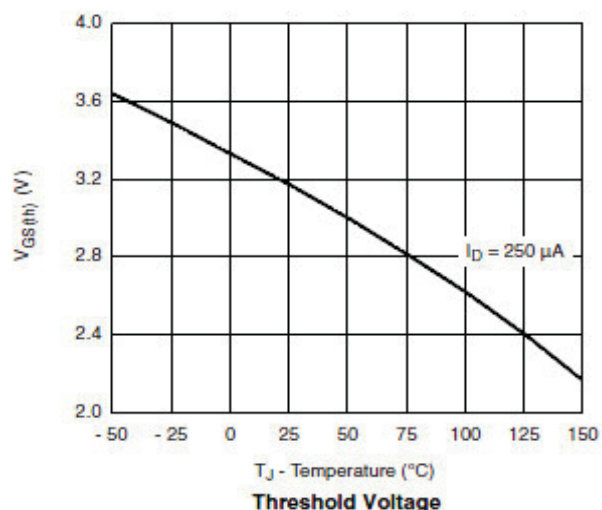
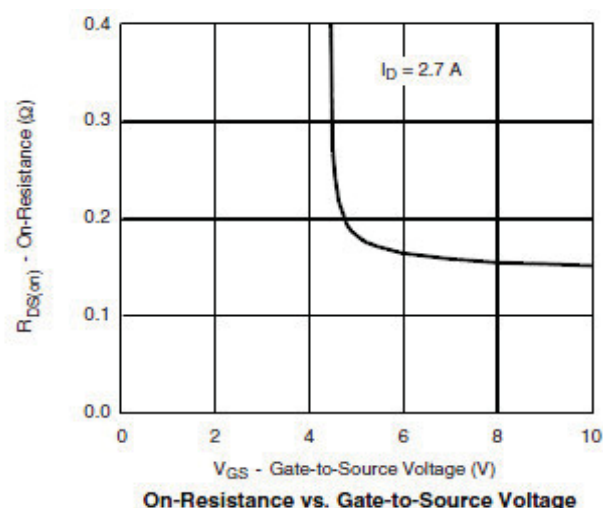
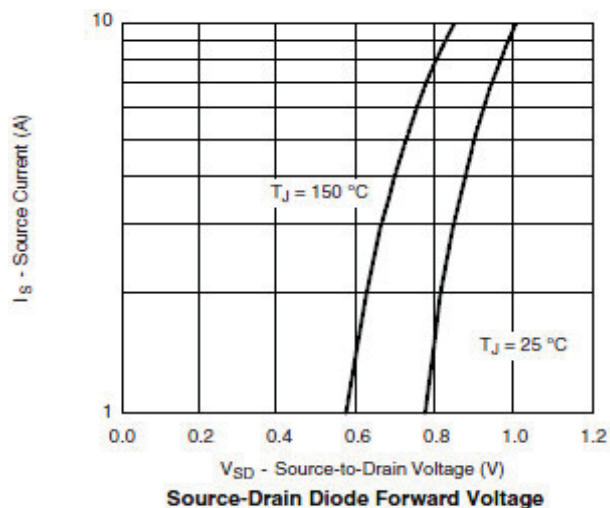


On-Resistance vs. Junction Temperature

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Complementary MOSFET (common drain)

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■Electrical Characteristics (P-ch)

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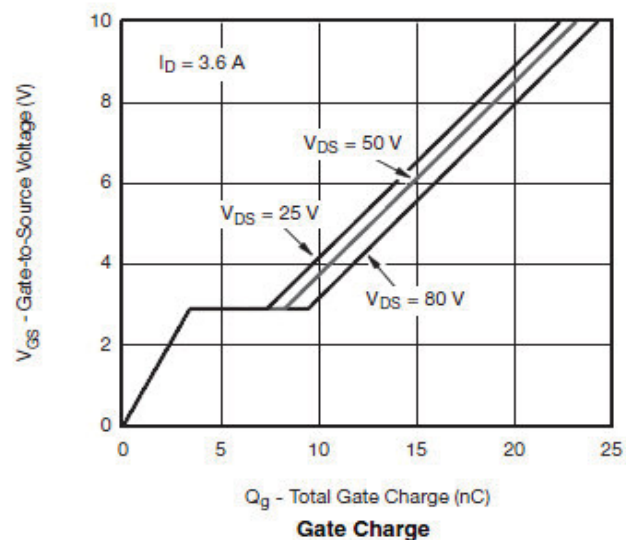
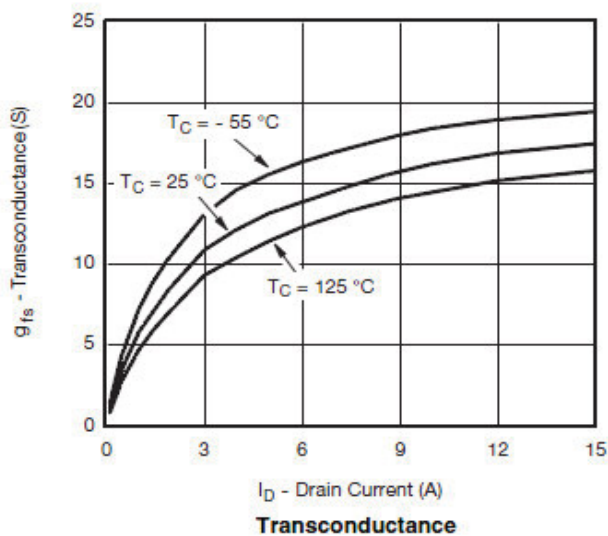
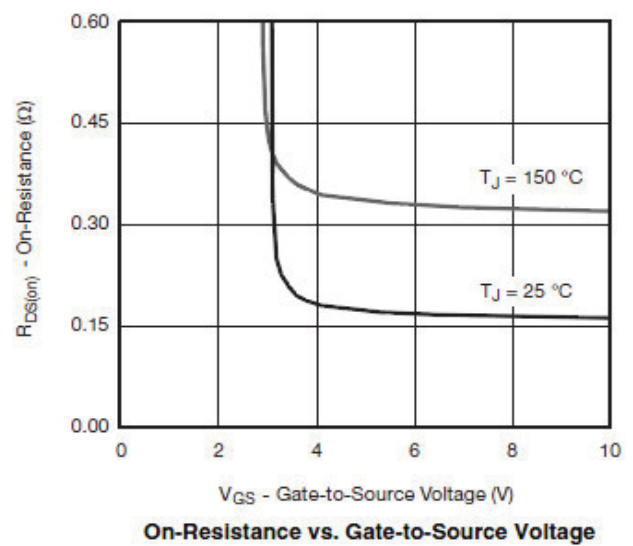
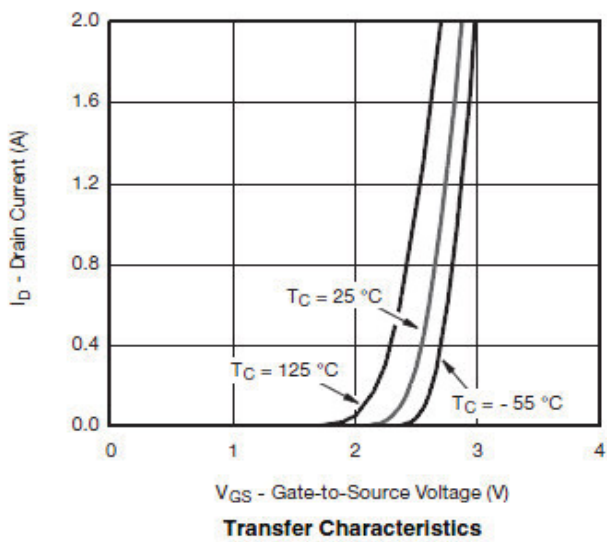
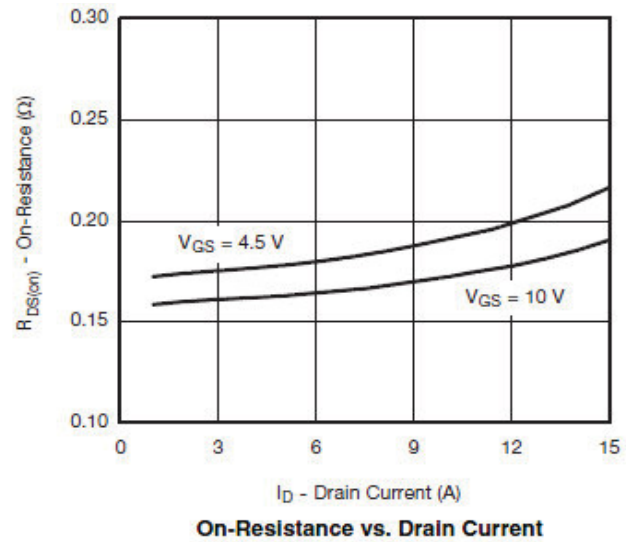
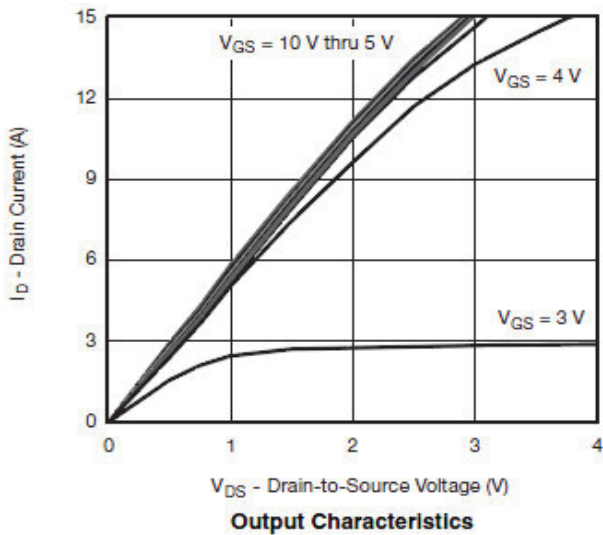
Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
STATIC PARAMETERS							
Drain-source breakdown voltage	BV _{dss}	Id=-250μA, Vgs=0V		-100			V
Zero gate voltage drain current	Idss	Vds=-80V, Vgs=0V				-1	μA
			Ta=85°C				
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V				±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA		-1.0		-2.5	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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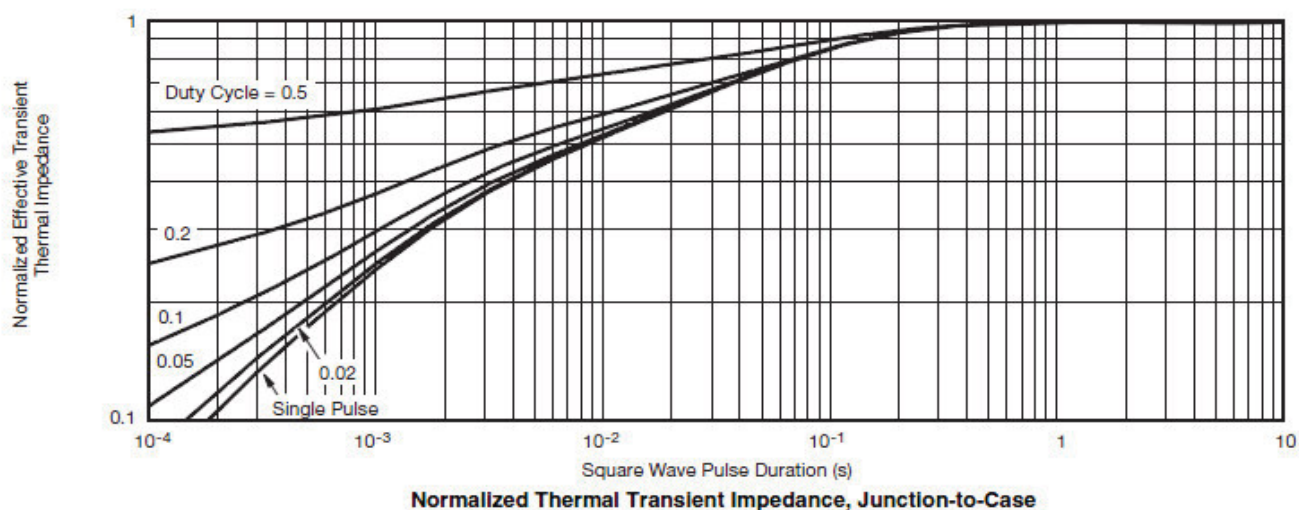
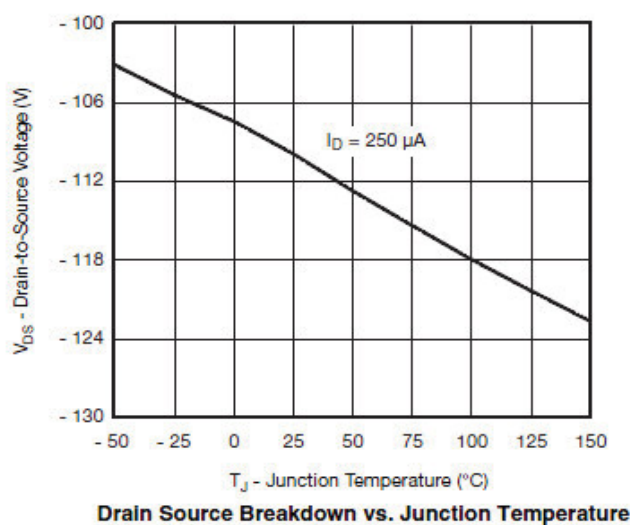
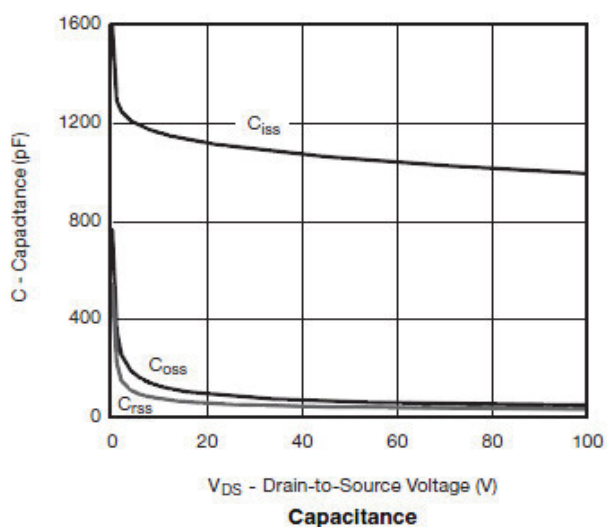
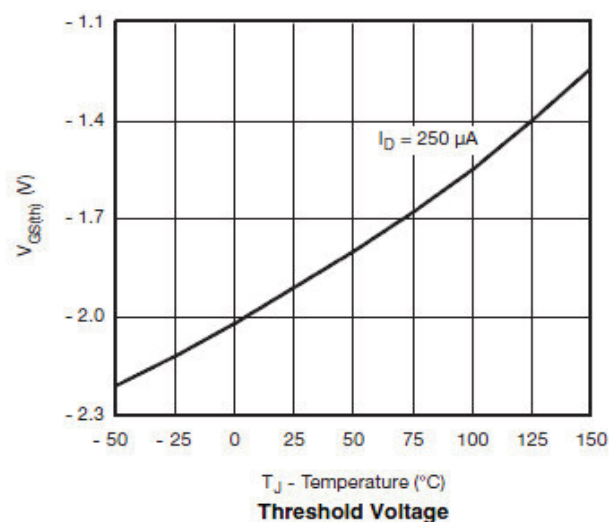
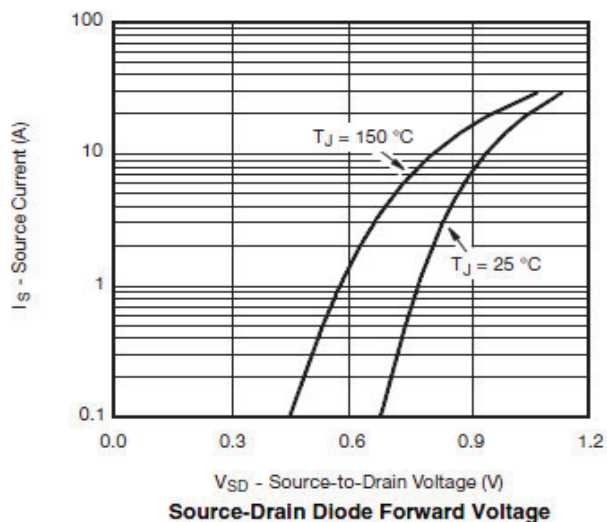
■ Typical electrical and thermal characteristics (P-ch)



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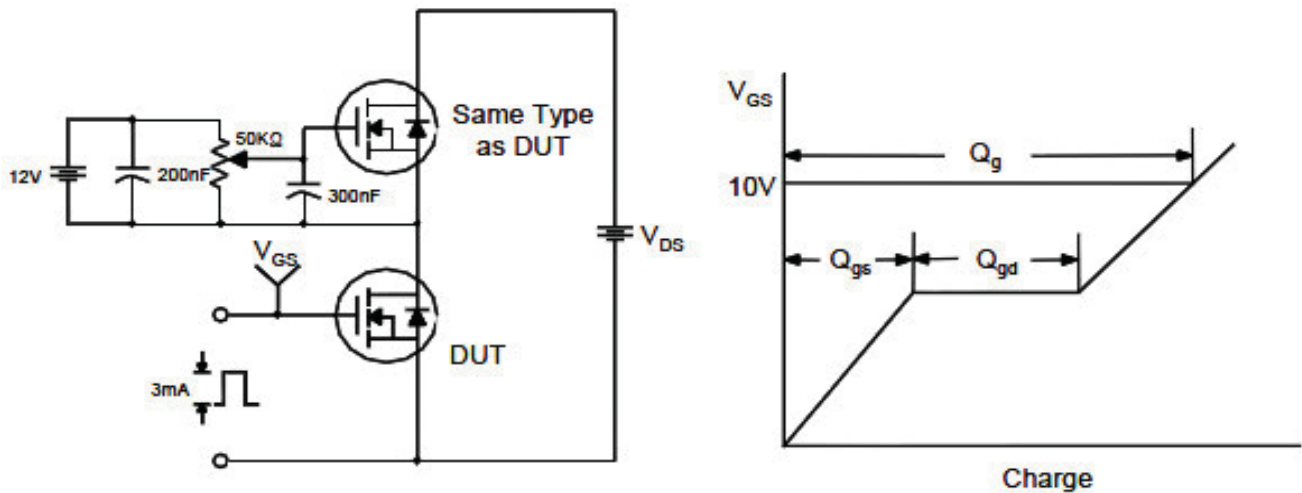
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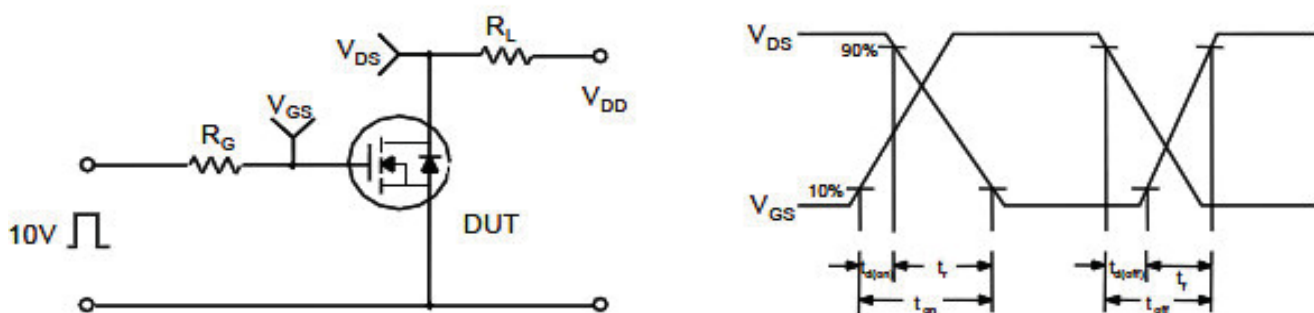
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■ Test circuit and waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

