

复合沟道 MOSFET

ELM54569CWSA-N

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

■概要

ELM54569CWSA-N 是低输入电容、低工作电压、低导通电阻的大电流 MOSFET。同时内藏有 N 沟道和 P 沟道的复合产品。

■特点

N 沟道

• $V_{ds}=60V$

• $I_d=8.0A$

• $R_{ds(on)} = 36m\Omega (V_{gs}=10V)$

• $R_{ds(on)} = 40m\Omega (V_{gs}=4.5V)$

P 沟道

• $V_{ds}=-60V$

• $I_d=-8.0A$

• $R_{ds(on)} = 60m\Omega (V_{gs}=-10V)$

• $R_{ds(on)} = 72m\Omega (V_{gs}=-4.5V)$

■绝对最大额定值

如没有特别注明时, $T_a=25^\circ C$

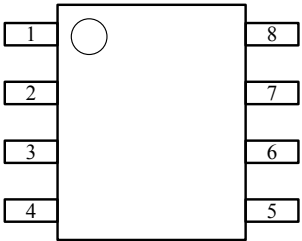
项目	记号	N 沟道 (最大值)	P 沟道 (最大值)	单位
漏极 - 源极电压	V_{ds}	60	-60	V
栅极 - 源极电压	V_{gs}	± 20	± 20	V
漏极电流 (定常) ($T_j=150^\circ C$)	I_d	8.0	-8.0	A
		6.0	-6.0	
漏极电流 (脉冲)	I_{dm}	20	-20	A
容许功耗	P_d	2.8	2.8	W
		1.8	1.8	
结合部温度	T_j	150	150	$^\circ C$
保存温度范围	T_{stg}	-55 ~ 150	-55 ~ 150	$^\circ C$

■热特性

项目	记号	沟道	典型值	最大值	单位
最大结合部 - 环境热阻	$R_{\theta ja}$	N		62.5	$^\circ C/W$
最大结合部 - 环境热阻	$R_{\theta ja}$	P		62.5	$^\circ C/W$

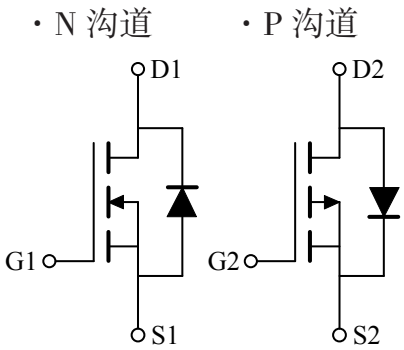
■引脚配置图

SOP-8(俯视图)



引脚编号	引脚名称
1	SOURCE1
2	GATE1
3	SOURCE2
4	GATE2
5	DRAIN2
6	DRAIN2
7	DRAIN1
8	DRAIN1

■电路图



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■电特性 (N 沟道)

如没有特别注明时, Ta=25℃

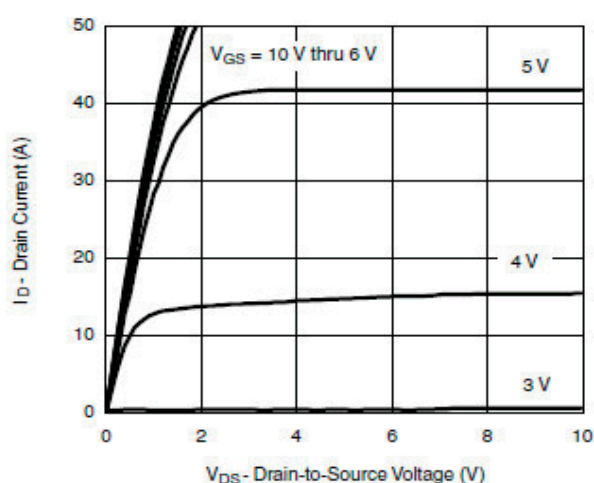
项目	记号	条件	最小值	典型值	最大值	单位
静态特性						
漏极 – 源极击穿电压	BV _{dss}	Id=250μA, V _{gs} =0V	60			V
栅极接地时漏极电流	Id _{ss}	V _{ds} =48V, V _{gs} =0V			1	μA
		Ta=85℃			5	
栅极漏电流	I _{gss}	V _{ds} =0V, V _{gs} = ± 20V			± 100	nA
栅极阈值电压	V _{gs(th)}	V _{ds} =V _{gs} , Id=250μA	1.0		2.0	V
导通时漏极电流	Id(on)	V _{gs} =10V, V _{ds} ≥5V	20			A
漏极 – 源极导通电阻	R _{ds(on)}	V _{gs} =10V, Id=8.0A		28	36	mΩ
		V _{gs} =4.5V, Id=6.0A		32	40	
正向跨导	G _{fs}	V _{ds} =15V, Id=15.0A		20		S
二极管正向压降	V _{sd}	I _s =2.0A, V _{gs} =0V		0.8	1.3	V
寄生二极管最大连续电流	I _s				1.5	A
动态特性						
输入电容	C _{iss}	V _{gs} =0V, V _{ds} =25V, f=1MHz		680		pF
输出电容	C _{oss}			150		pF
反馈电容	C _{rss}			60		pF
开关特性						
总栅极电荷	Q _g	V _{gs} =4.5V, V _{ds} =30V, Id≐8.0A		6.5	13.0	nC
栅极 – 源极电荷	Q _{gs}			3.0		nC
栅极 – 漏极电荷	Q _{gd}			3.0		nC
导通延迟时间	t _{d(on)}	V _{gs} =10V, V _{ds} =30V, Id≐8.0A RL=1.3Ω, R _{gen} =6.0Ω		8	15	ns
导通上升时间	t _r			15	30	ns
关闭延迟时间	t _{d(off)}			30	60	ns
关闭下降时间	t _f			25	50	ns

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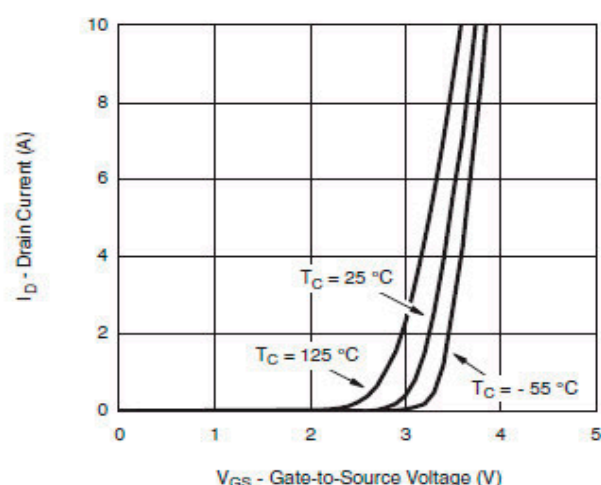
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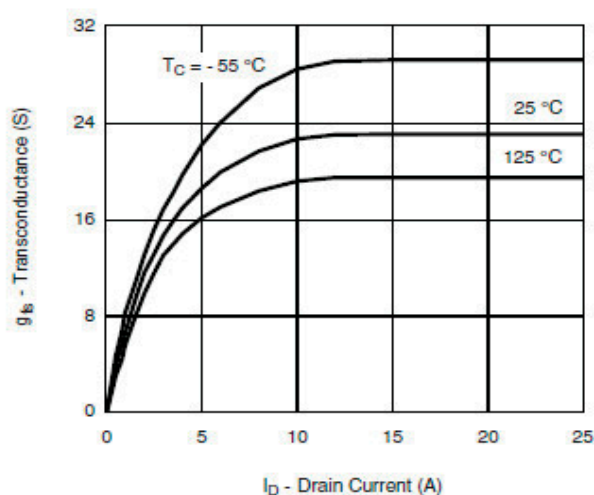
■标准特性曲线 (N 沟道)



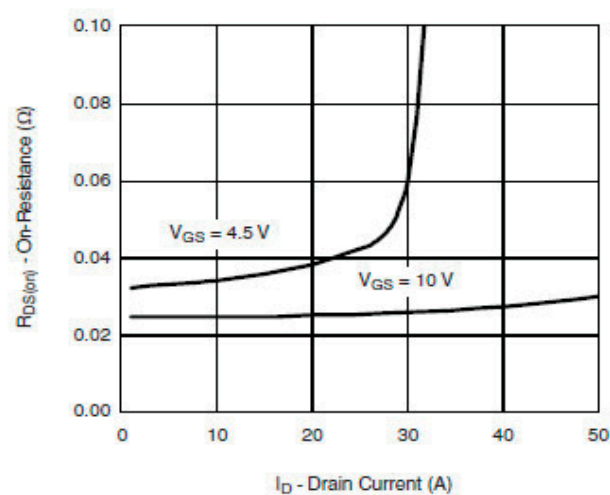
Output Characteristics



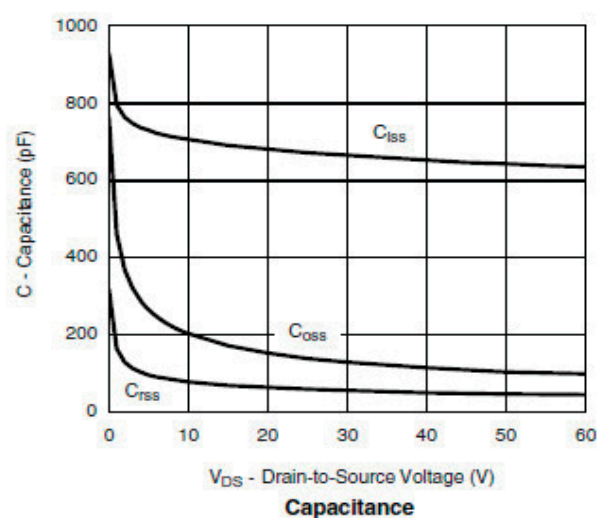
Transfer Characteristics



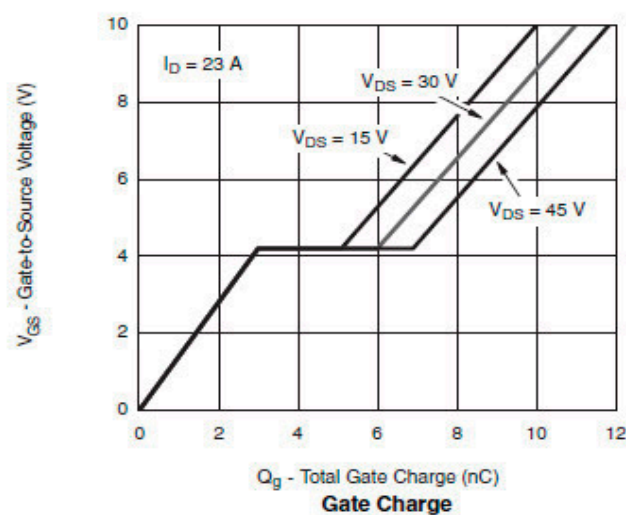
Transconductance



On-Resistance vs. Drain Current



Capacitance

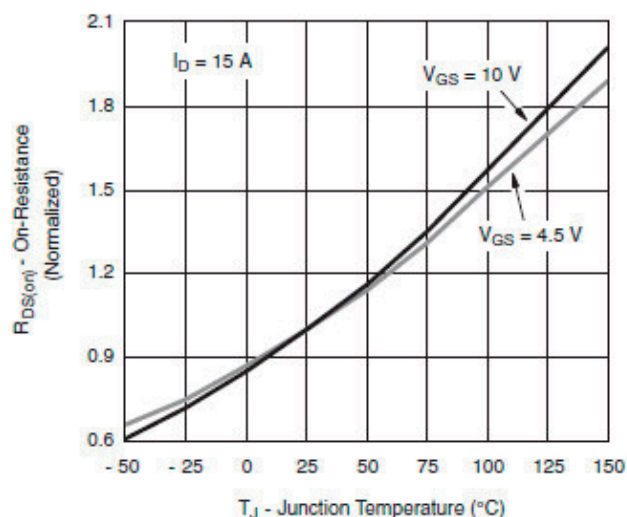


Gate Charge

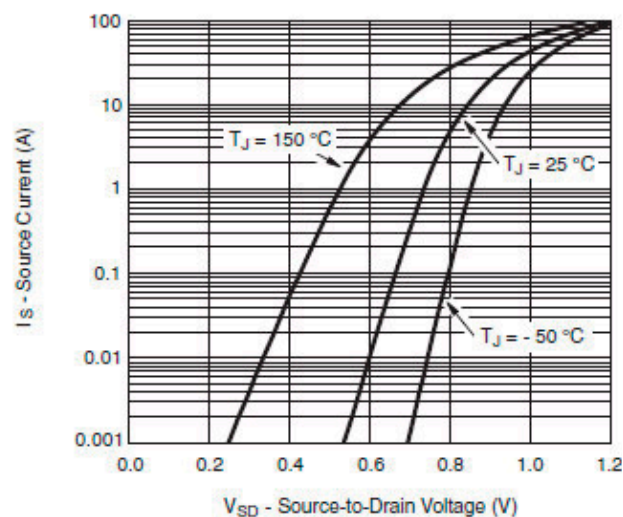
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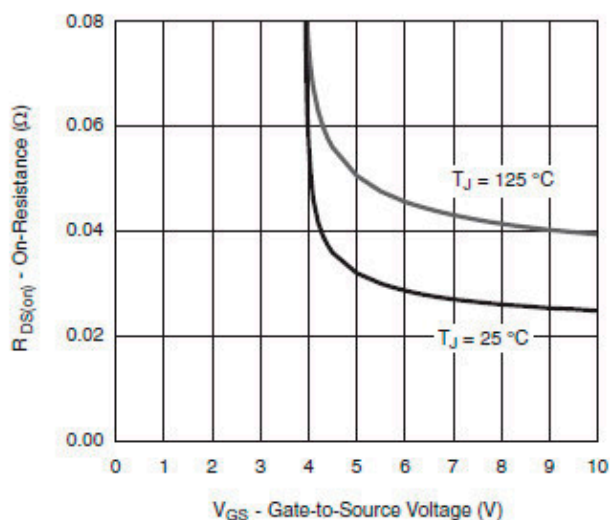
<http://www.elm-tech.com>



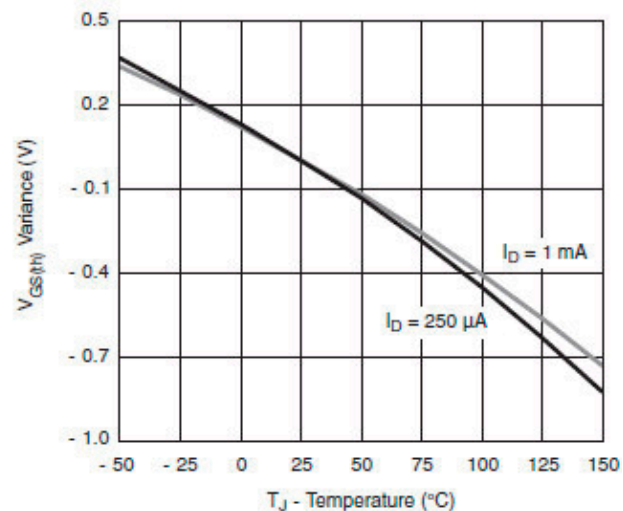
On-Resistance vs. Junction Temperature



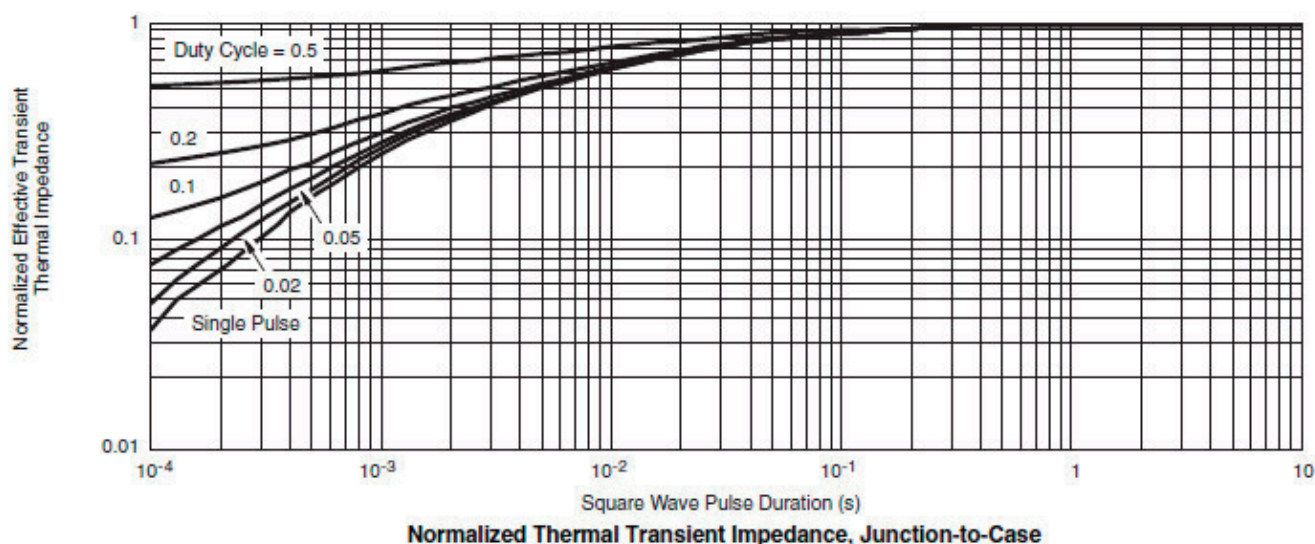
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Normalized Thermal Transient Impedance, Junction-to-Case

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■电特性 (P 沟道)

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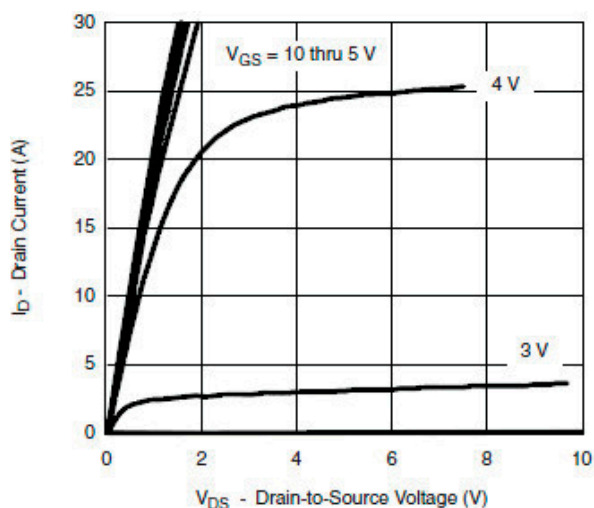
项目	记号	条件	最小值	典型值	最大值	单位
静态特性						
漏极 – 源极击穿电压	BV _{dss}	I _d =-250μA, V _{gs} =0V	-60			V
栅极接地时漏极电流	I _{dss}	V _{ds} =-48V, V _{gs} =0V			-1	μA
		Ta=85℃			-20	
栅极漏电流	I _{gss}	V _{ds} =0V, V _{gs} = ± 20V			± 100	nA
栅极阈值电压	V _{gs(th)}	V _{ds} =V _{gs} , I _d =-250μA	-1.0		-2.5	V
导通时漏极电流	I _{d(on)}	V _{gs} =-10V, V _{ds} ≥-5V	-20			A
漏极 – 源极导通电阻	R _{ds(on)}	V _{gs} =-10V, I _d =-8.0A		52	60	mΩ
		V _{gs} =-4.5V, I _d =-6.0A		61	72	
正向跨导	G _{fs}	V _{ds} =-15V, I _d =-3.2A		12		S
二极管正向压降	V _{sd}	I _s =-3A, V _{gs} =0V		-0.8	-1.3	V
寄生二极管最大连续电流	I _s				-1.7	A
动态特性						
输入电容	C _{iss}	V _{gs} =0V, V _{ds} =-25V, f=1MHz		1200	2000	pF
输出电容	C _{oss}			140		pF
反馈电容	C _{rss}			90		pF
开关特性						
总栅极电荷	Q _g	V _{gs} =-10V, V _{ds} =-30V I _d ≡-8.0A		25	40	nC
栅极 – 源极电荷	Q _{gs}			5		nC
栅极 – 漏极电荷	Q _{gd}			8		nC
导通延迟时间	t _{d(on)}	V _{gs} =-10V, V _{ds} =-30V I _d ≡-8.0A, R _L =3.0Ω R _{gen} =2.5Ω		10	20	ns
导通上升时间	t _r			10	20	ns
关闭延迟时间	t _{d(off)}			45	80	ns
关闭下降时间	t _f			25	40	ns

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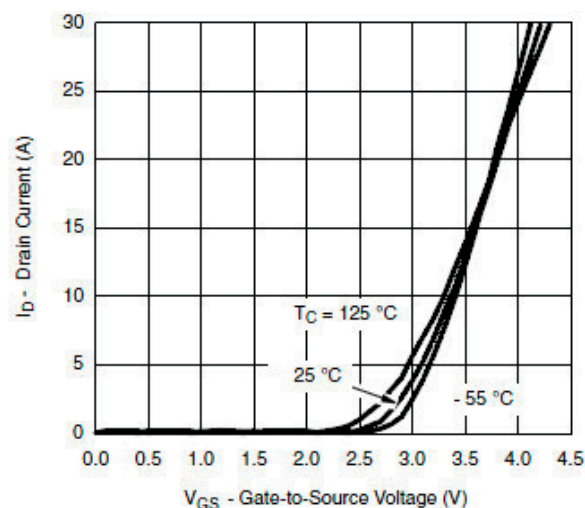
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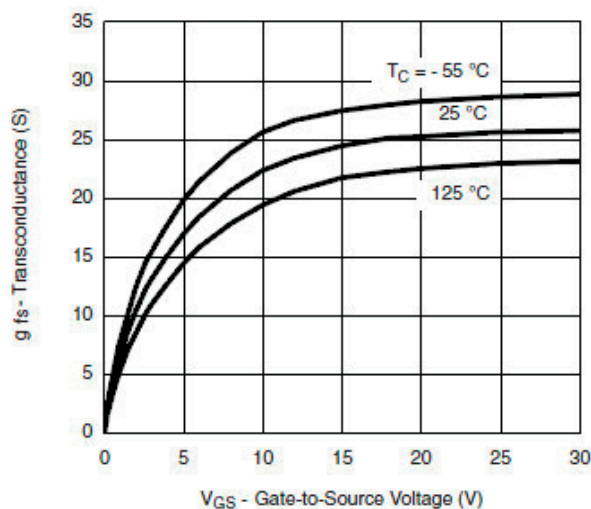
■ 标准特性曲线 (P 沟道)



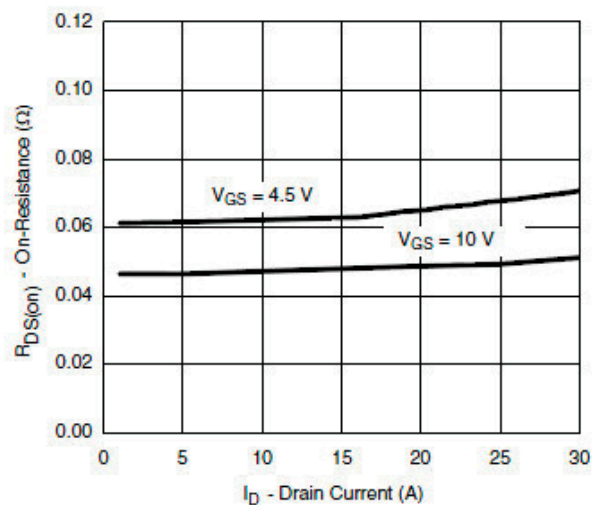
Output Characteristics



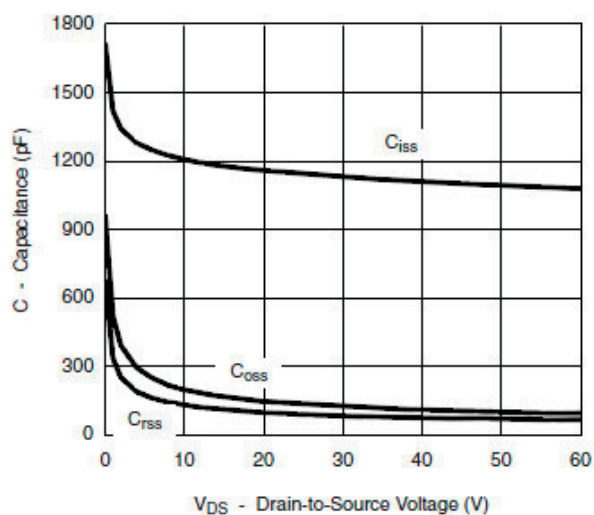
Transfer Characteristics



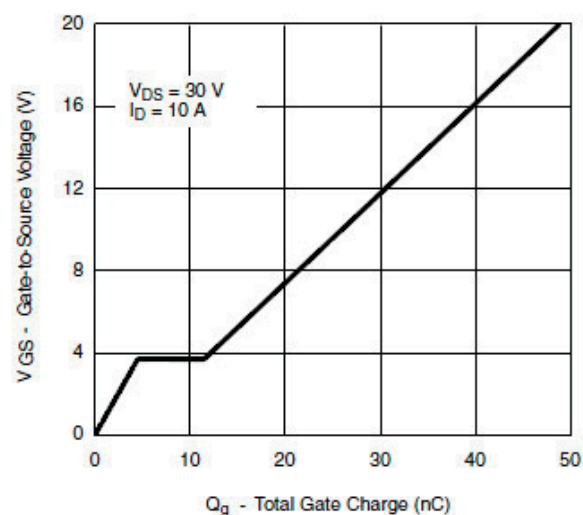
Transconductance



On-Resistance vs. Drain Current



Capacitance

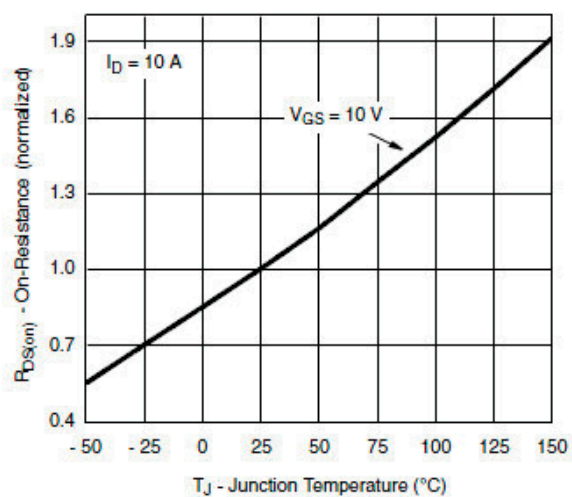


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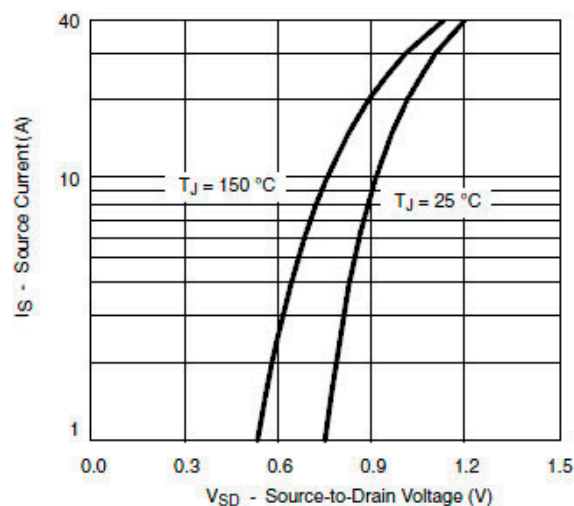
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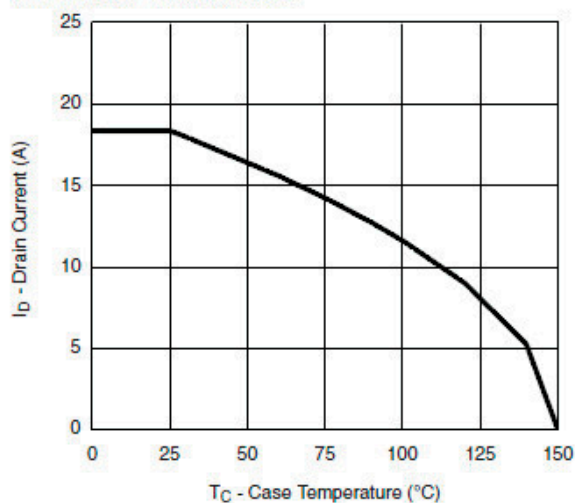


On-Resistance vs. Junction Temperature

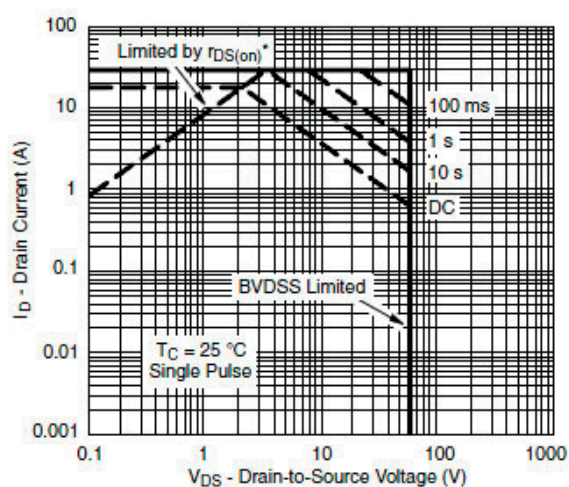


Source-Drain Diode Forward Voltage

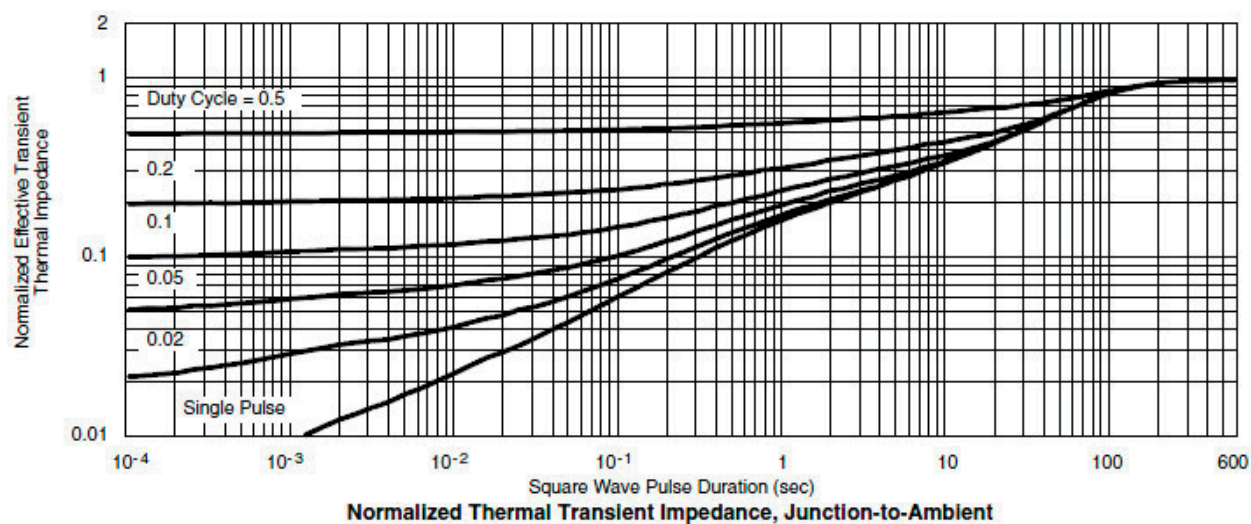
THERMAL RATINGS



Maximum Drain Current vs. Case Temperature



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



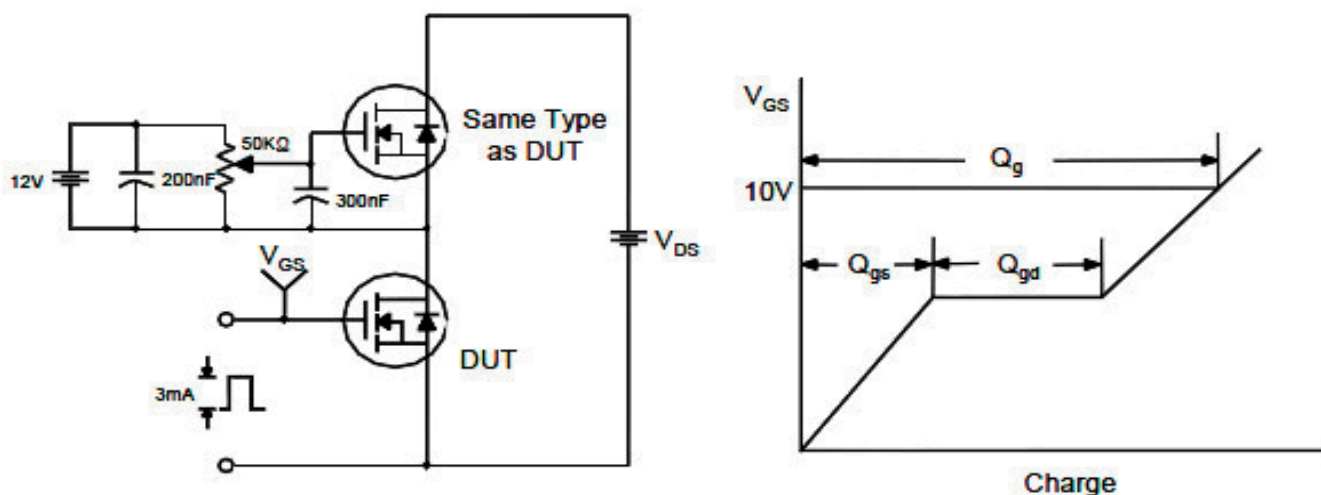
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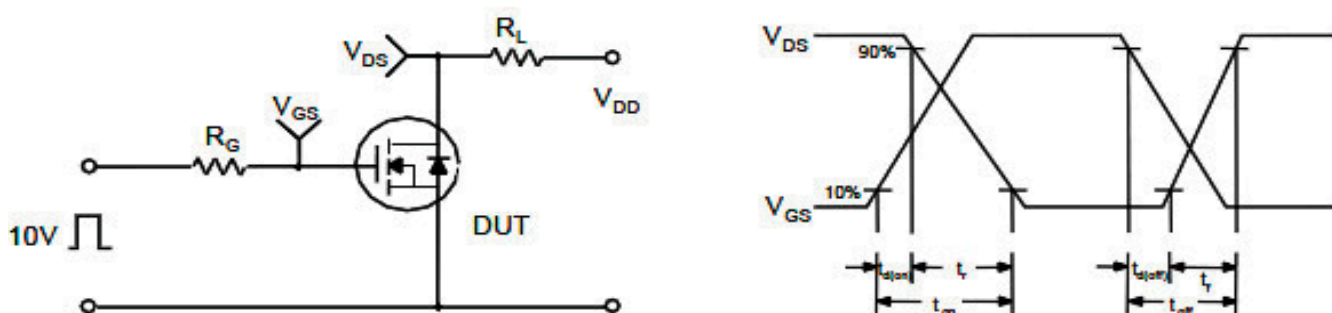
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■测试电路和波形

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

