

复合沟道 MOSFET

ELM54590CWSA-N

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概要

ELM54590CWSA-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

• $V_{ds}=100V$

• $I_d=6.2A$

• $R_{ds(on)} = 45m\Omega (V_{gs}=10V)$

• $R_{ds(on)} = 50m\Omega (V_{gs}=4.5V)$

P 沟道

• $V_{ds}=-100V$

• $I_d=-5.2A$

• $R_{ds(on)} = 90m\Omega (V_{gs}=-10V)$

• $R_{ds(on)} = 100m\Omega (V_{gs}=-4.5V)$

绝对最大额定值

如没有特别注明时, $T_a=25^\circ C$

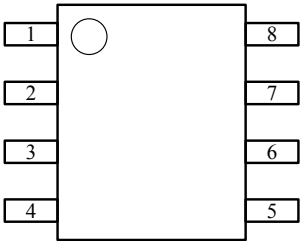
项目	记号	N 沟道 (最大值)	P 沟道 (最大值)	单位
漏极 - 源极电压	V_{ds}	100	-100	V
栅极 - 源极电压	V_{gs}	± 20	± 20	V
漏极电流 (定常) ($T_j=150^\circ C$)	I_d	6.2	-5.2	A
		4.2	-3.4	
漏极电流 (脉冲)	I_{dm}	20	-20	A
容许功耗	P_d	2.8	2.8	W
		1.8	1.8	
结合部温度	T_j	150	150	$^\circ C$
保存温度范围	T_{stg}	-55 ~ 150	-55 ~ 150	$^\circ C$

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)

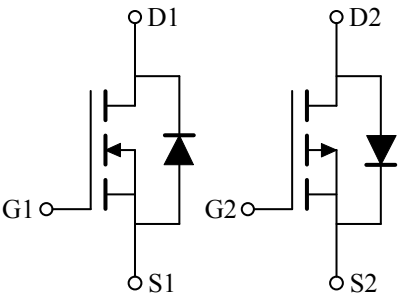


引脚编号	引脚名称
1	SOURCE1
2	GATE1
3	SOURCE2
4	GATE2
5	DRAIN2
6	DRAIN2
7	DRAIN1
8	DRAIN1

电路图

• N 沟道

• P 沟道



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■电特性 (N 沟道)

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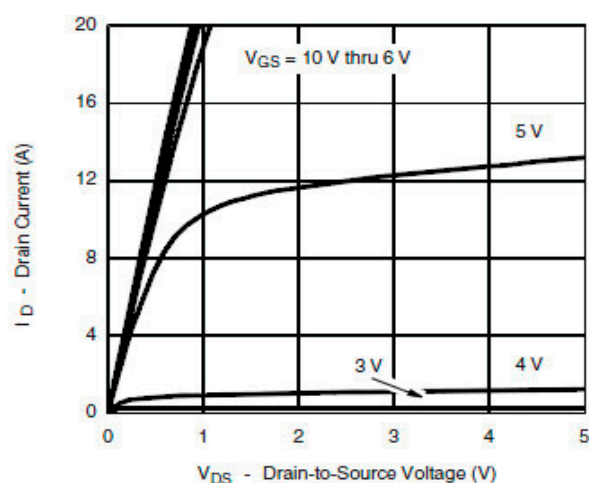
项目	记号	条件	最小值	典型值	最大值	单位	
静态特性							
漏极 – 源极击穿电压	BV _{dss}	Id=250μA, Vgs=0V		100		V	
栅极接地时漏极电流	Idss	Vds=80V, Vgs=0V			1	μA	
		Ta=85℃			5		
栅极漏电电流	Igss	Vds=0V, Vgs= ± 20V			± 100	nA	
栅极阈值电压	Vgs(th)	Vds=Vgs, Id=250μA		1.0	2.0	V	
导通时漏极电流	Id(on)	Vgs=4.5V, Vds≥5V		20		A	
漏极 – 源极导通电阻	Rds(on)	Vgs=10V, Id=6.2A			38	mΩ	
		Vgs=4.5V, Id=4.2A			42		50
正向跨导	Gfs	Vds=15V, Id=6.0A			14	S	
二极管正向压降	Vsd	Is=2.0A, Vgs=0V			0.8	1.3	V
寄生二极管最大连续电流	Is				3	A	
动态特性							
输入电容	Ciss	Vgs=0V, Vds=50V, f=1MHz		850		pF	
输出电容	Coss			90		pF	
反馈电容	Crss			40		pF	
开关特性							
总栅极电荷	Qg	Vgs=10V, Vds=50V, Id≡5.9A		16	24	nC	
栅极 – 源极电荷	Qgs			4		nC	
栅极 – 漏极电荷	Qgd			6		nC	
导通延迟时间	td(on)	Vgs=10V, Vds=50V, Id≡5.9A		15	25	ns	
导通上升时间	tr			15	25	ns	
关闭延迟时间	td(off)		RL=50Ω, Rgen=6.0Ω		35	55	ns
关闭下降时间	tf				20	35	ns

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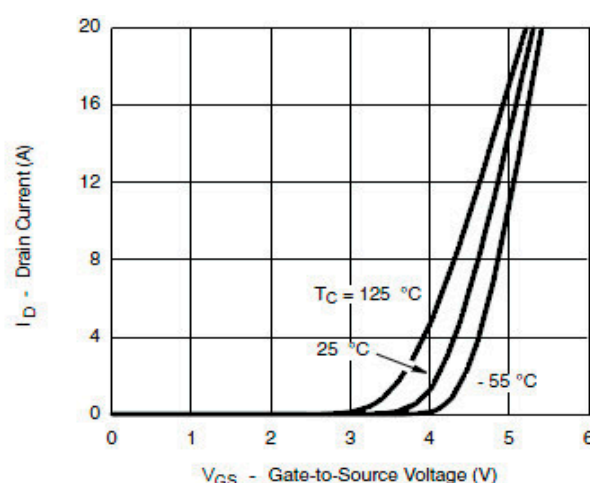
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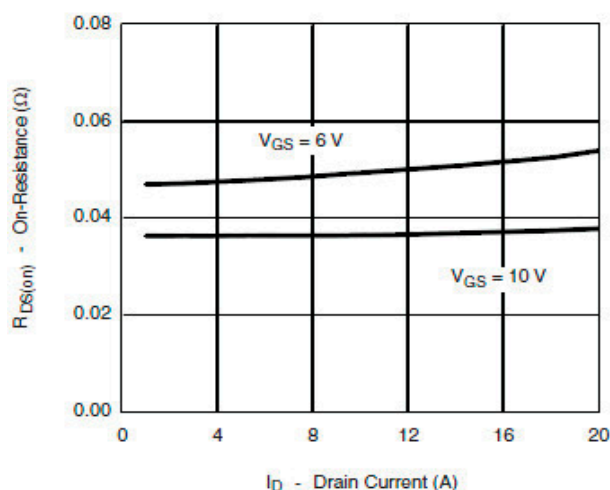
■标准特性曲线 (N 沟道)



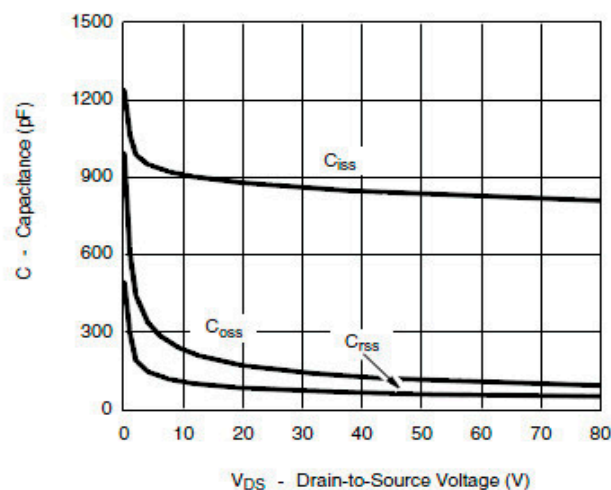
Output Characteristics



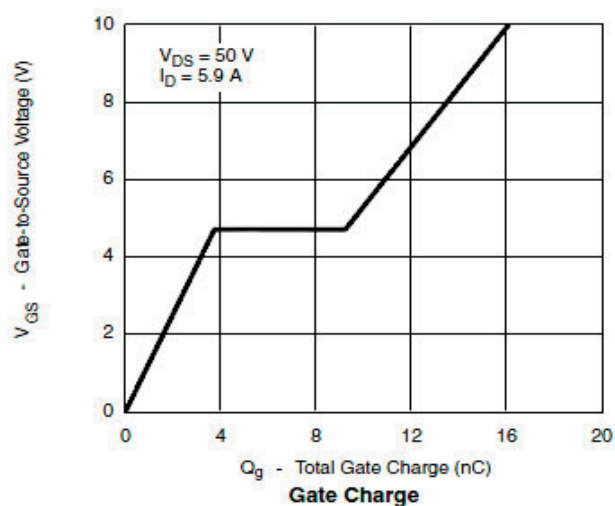
Transfer Characteristics



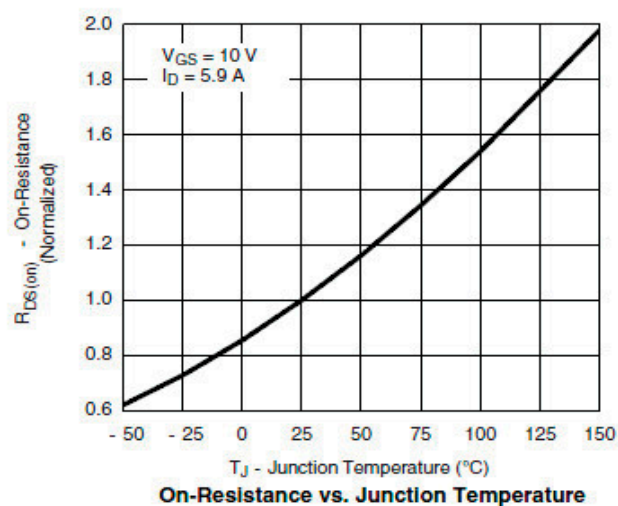
On-Resistance vs. Drain Current



Capacitance



Gate Charge

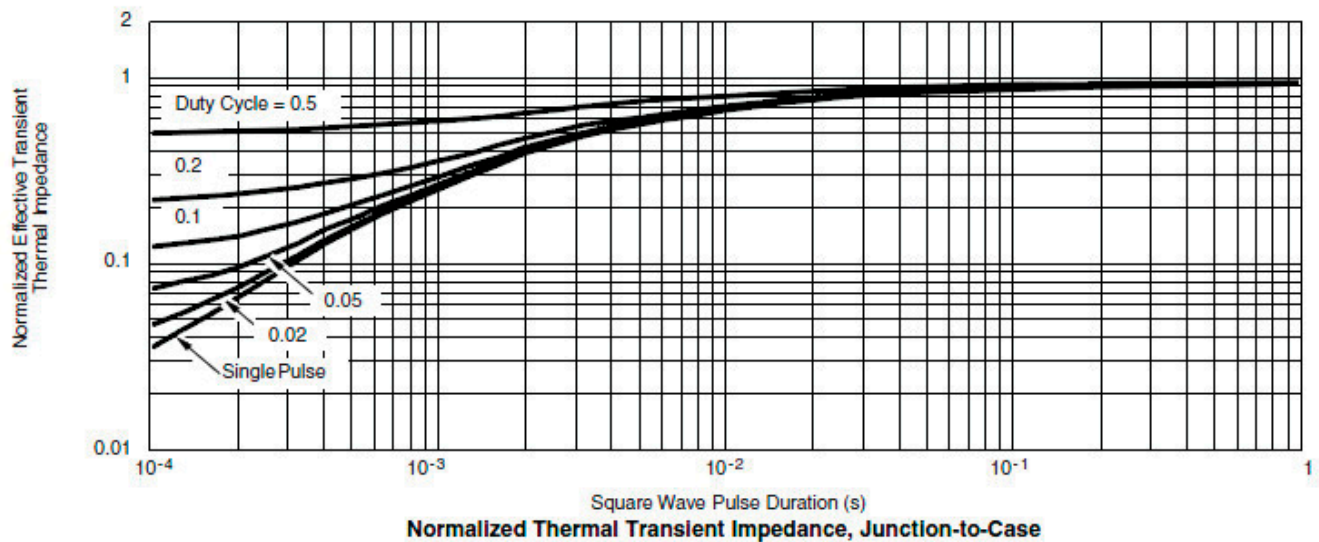
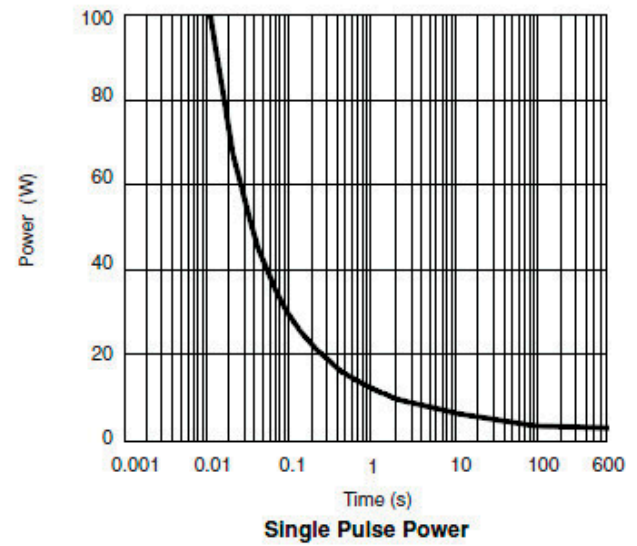
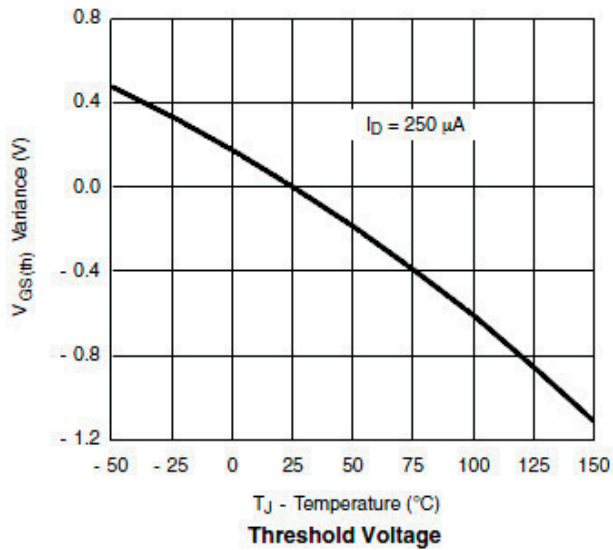
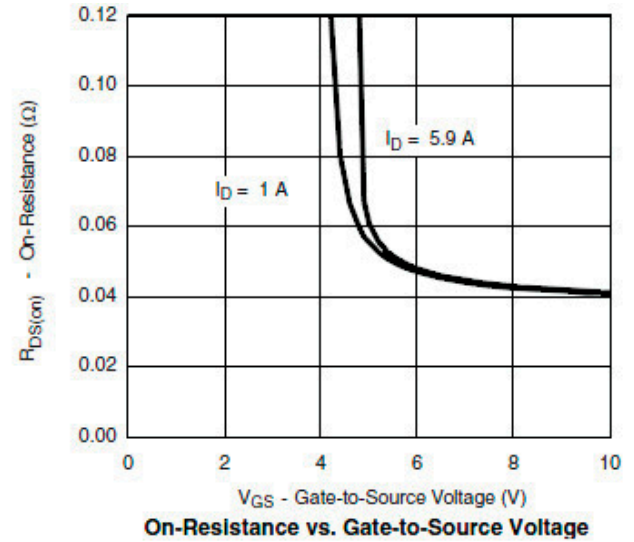
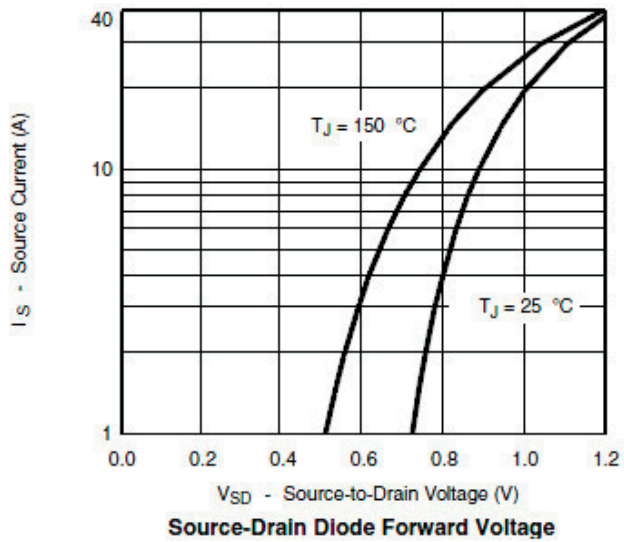


On-Resistance vs. Junction Temperature

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■电特性 (P 沟道)

如没有特别注明时, Ta=25℃

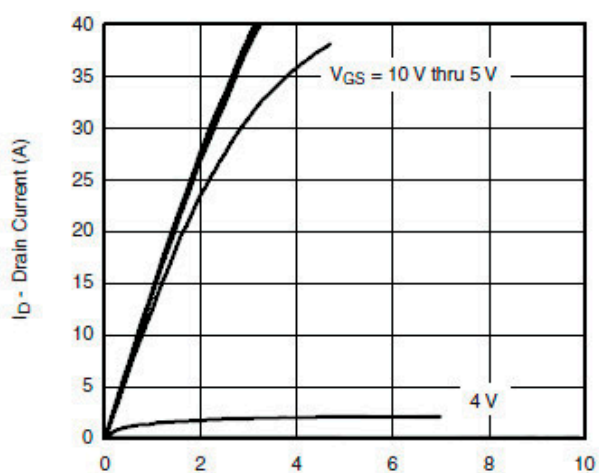
项目	记号	条件	最小值	典型值	最大值	单位	
静态特性							
漏极 - 源极击穿电压	BV _{dss}	Id=-250μA, Vgs=0V		-100		V	
栅极接地时漏极电流	Idss	Vds=-80V, Vgs=0V			-1	μA	
		Ta=85℃			-30		
栅极漏电流	Igss	Vds=0V, Vgs= ± 20V			± 100	nA	
栅极阈值电压	Vgs(th)	Vds=Vgs, Id=-250μA		-1.0	-2.5	V	
导通时漏极电流	Id(on)	Vgs=-10V, Vds≥-10V		-20		A	
漏极 - 源极导通电阻	Rds(on)	Vgs=-10V, Id=-5.2A			80	mΩ	
		Vgs=-4.5V, Id=-3.5A			87		100
正向跨导	Gfs	Vds=-15V, Id=-5A			19	S	
二极管正向压降	Vsd	Is=-2A, Vgs=0V			-0.8	-1.3	V
寄生二极管最大连续电流	Is					-3	A
动态特性							
输入电容	Ciss	Vgs=0V, Vds=-60V, f=1MHz		4300		pF	
输出电容	Coss			280		pF	
反馈电容	Crss			220		pF	
开关特性							
总栅极电荷	Qg	Vgs=-10V, Vds=-75V Id=-5.2A		85	150	nC	
栅极 - 源极电荷	Qgs			18		nC	
栅极 - 漏极电荷	Qgd			28		nC	
导通延迟时间	td(on)	Vgs=-10V, Vds=-75V Id=-5.2A, RL=16.0Ω Rgen=6.0Ω		25	50	ns	
导通上升时间	tr			45	85	ns	
关闭延迟时间	td(off)			115	200	ns	
关闭下降时间	tf			65	130	ns	

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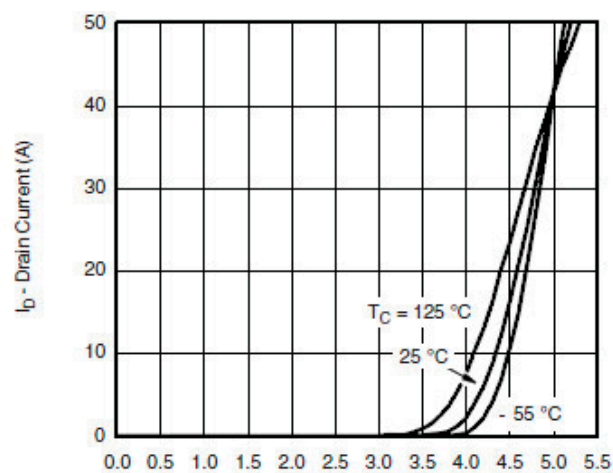
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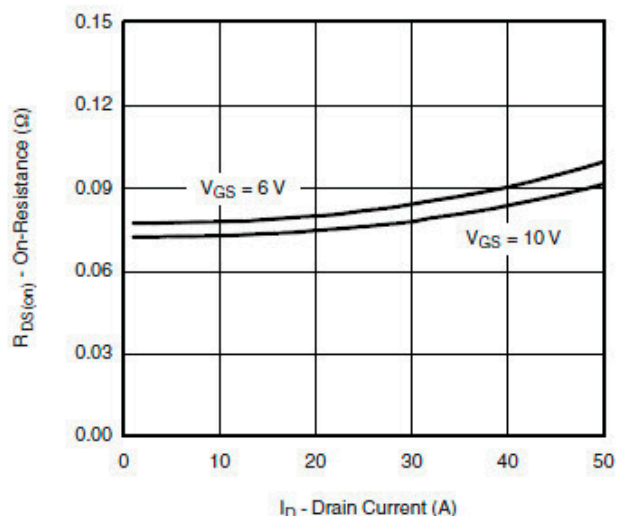
■ 标准特性曲线 (P 沟道)



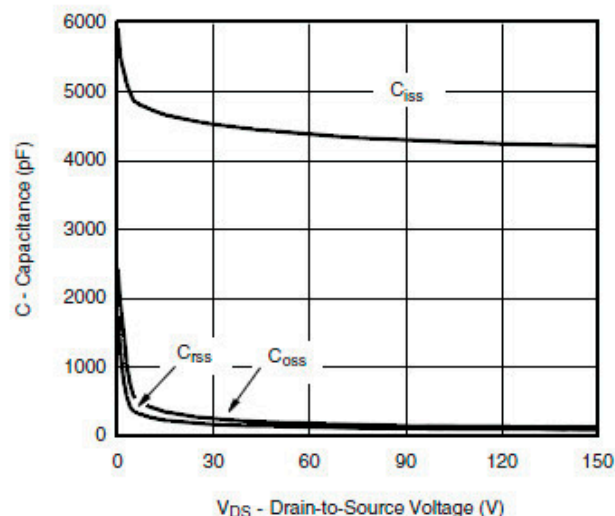
Output Characteristics



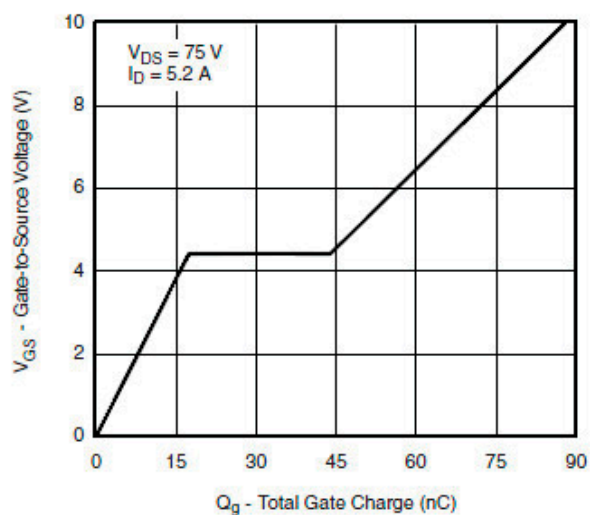
Transfer Characteristics



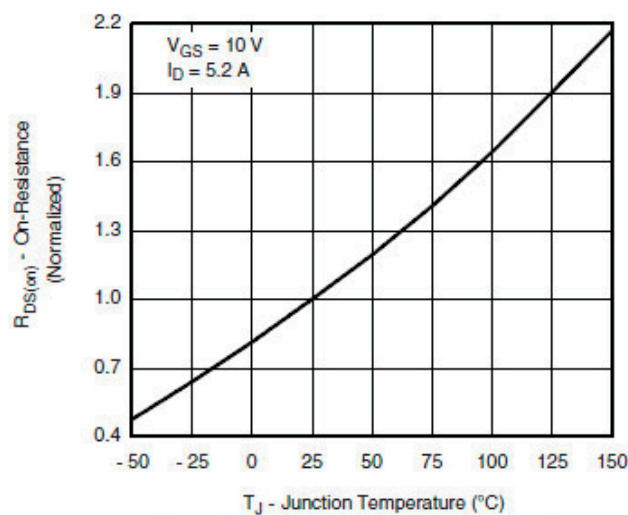
On-Resistance vs. Drain Current



Capacitance



Gate Charge

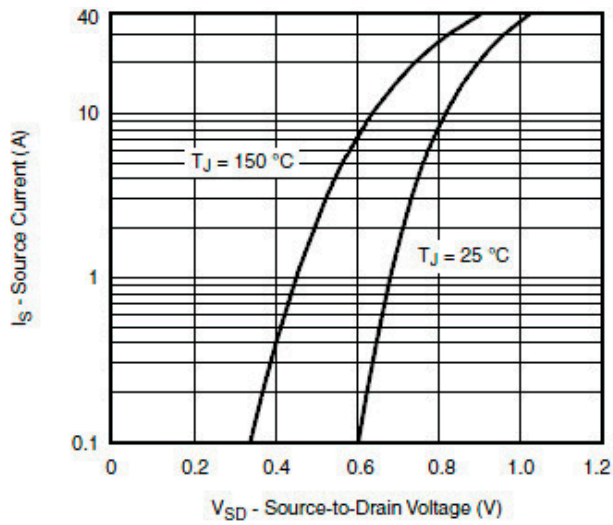


On-Resistance vs. Junction Temperature

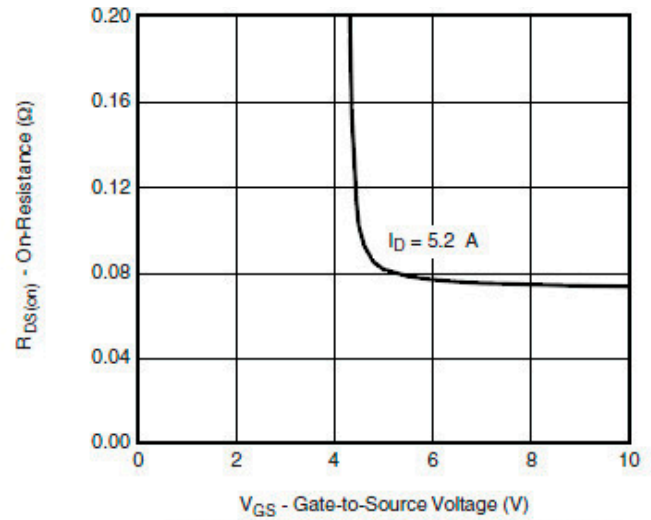
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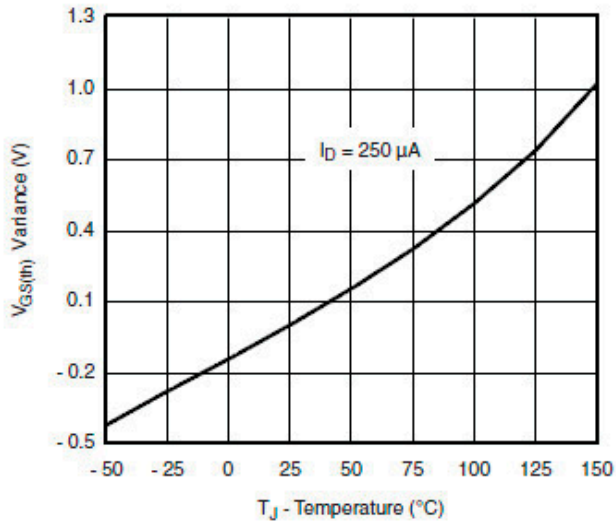
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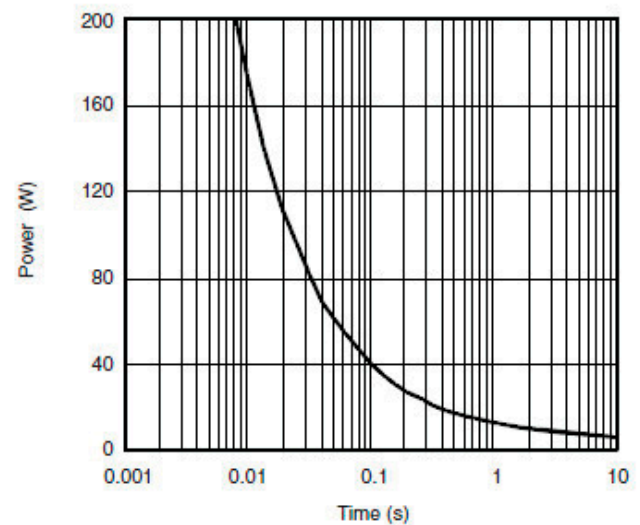
Source-Drain Diode Forward Voltage



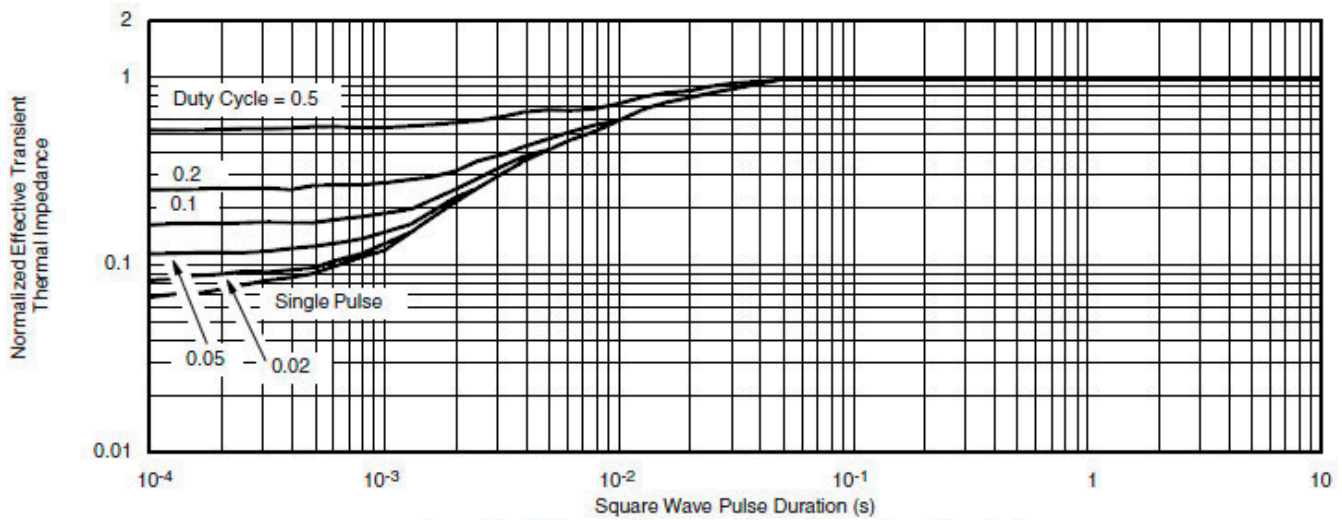
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Case

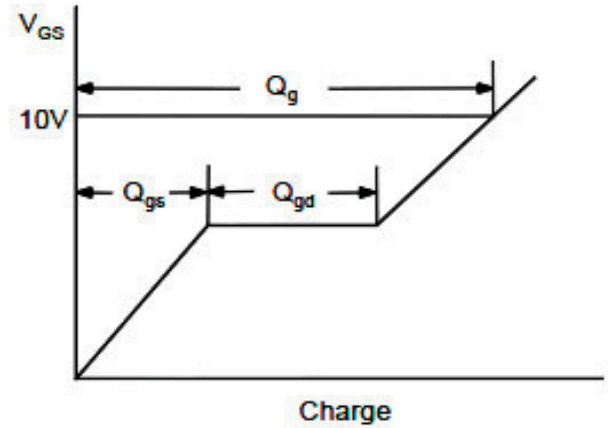
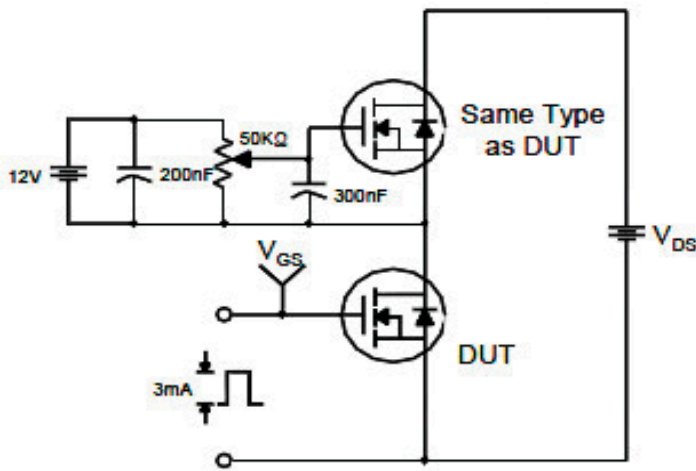
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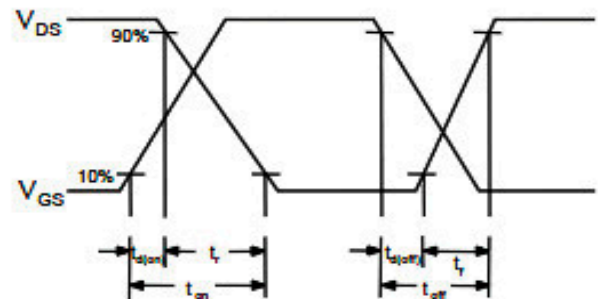
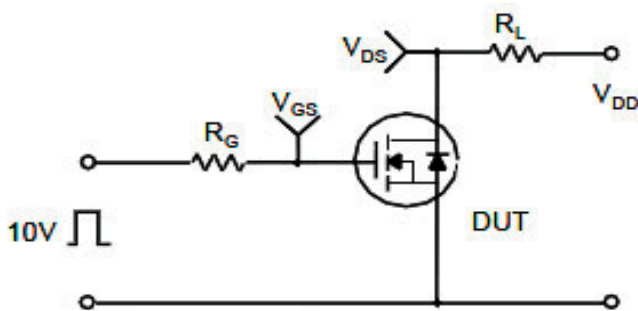
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■测试电路和波形

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

