

# 复合沟道 MOSFET

ELM54510CWSA-N

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

## ■概要

ELM54510CWSA-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                         | P 沟道                          |
| • Vds=100V                   | • Vds=-100V                   |
| • Id=3.0A                    | • Id=-2.5A                    |
| • Rds(on) = 140mΩ (Vgs=10V)  | • Rds(on) = 210mΩ (Vgs=-10V)  |
| • Rds(on) = 150mΩ (Vgs=4.5V) | • Rds(on) = 230mΩ (Vgs=-4.5V) |

## ■绝对最大额定值

如没有特别注明时, Ta=25℃

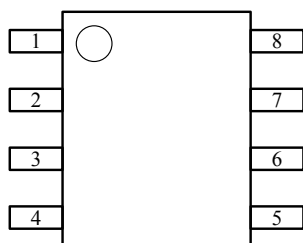
项目	记号	N 沟道 (最大值)	P 沟道 (最大值)	单位	
漏极 - 源极电压	Vds	100	-100	V	
栅极 - 源极电压	Vgs	± 20	± 20	V	
漏极电流 (定常) (Tj=150℃)	Id	Ta=25℃	3.0	-2.5	A
		Ta=70℃	2.5	-1.8	
漏极电流 (脉冲)	Idm	10	-10	A	
容许功耗	Pd	Tc=25℃	2.8	2.8	W
		Tc=70℃	1.8	1.8	
结合部温度	Tj	150	150	℃	
保存温度范围	Tstg	-55 ~ 150	-55 ~ 150	℃	

## ■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	Rθja	N		62.5	℃/W
最大结合部 - 环境热阻	Rθja	P		62.5	℃/W

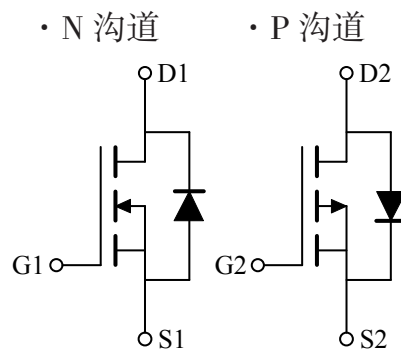
## ■引脚配置图

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



# 复合沟道 MOSFET

ELM54510CWSA-N

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

## ■电特性 (N 沟道)

如没有特别注明时, Ta=25℃

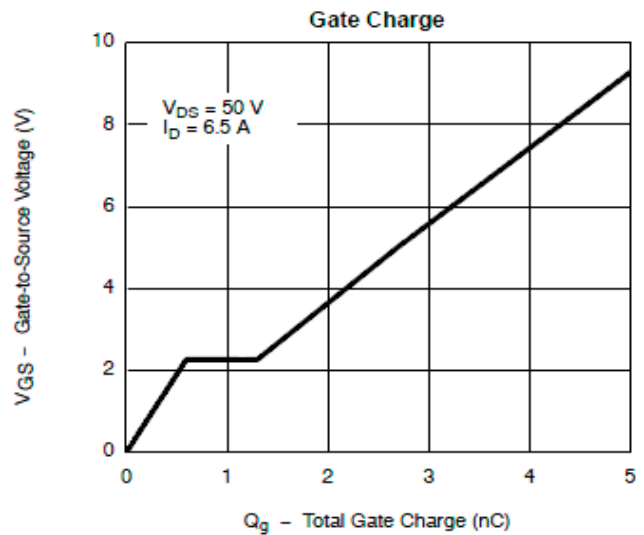
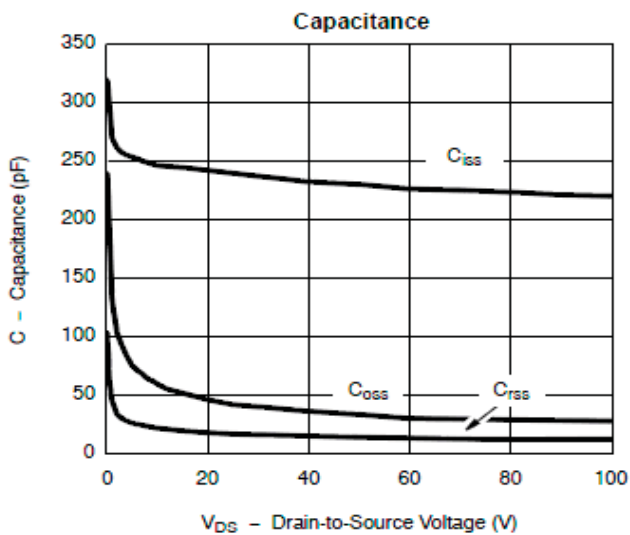
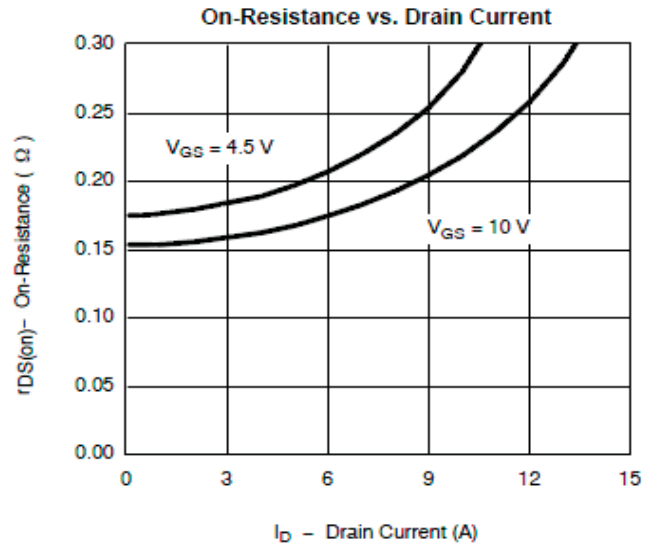
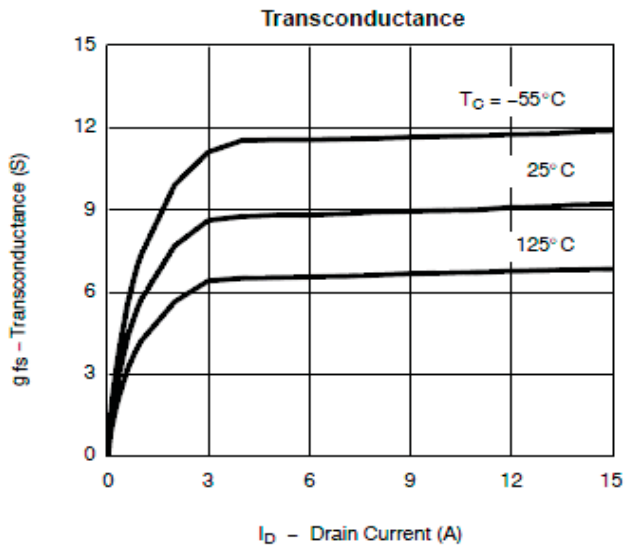
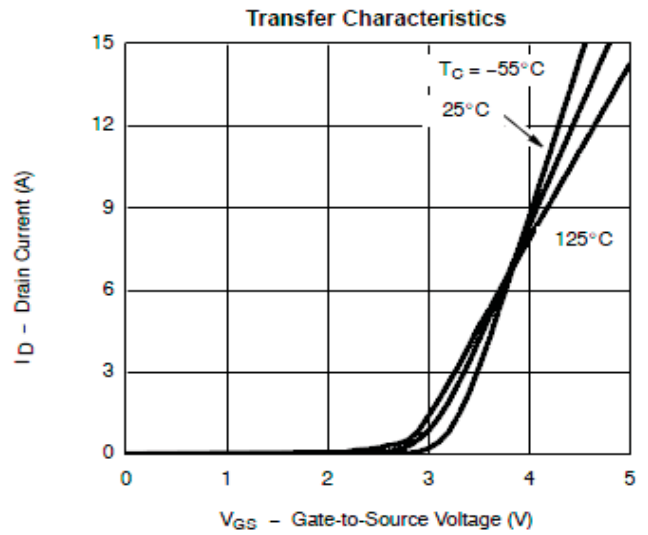
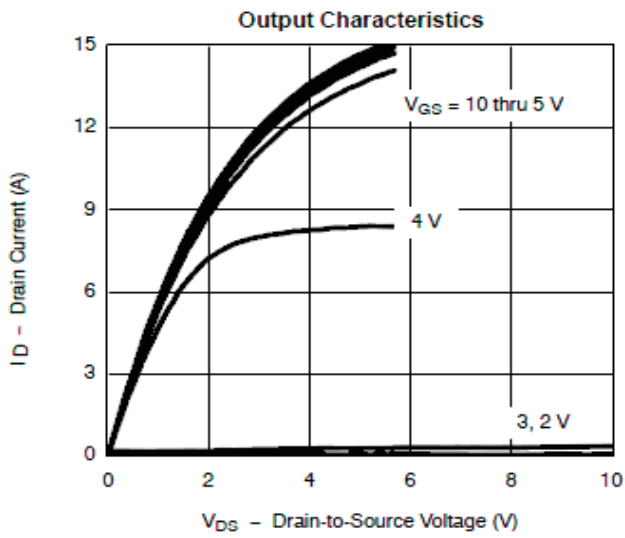
项目	记号	条件	最小值	典型值	最大值	单位
静态特性						
漏极 - 源极击穿电压	BVdss	Id=250μA, Vgs=0V	100	110		V
栅极接地时漏极电流	Idss	Vds=80V, Vgs=0V Ta=85℃			1	μA
					5	
栅极漏电流	Igss	Vds=0V, Vgs=±20V			±100	nA
栅极阈值电压	Vgs(th)	Vds=Vgs, Id=250μA	1.0		2.5	V
导通时漏极电流	Id(on)	Vgs=4.5V, Vds≥5V	8			A
漏极 - 源极导通电阻	Rds(on)	Vgs=10V, Id=3.0A		120	140	mΩ
		Vgs=4.5V, Id=2.5A		125	150	
正向跨导	Gfs	Vds=15V, Id=3.0A		8.5		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				1.5	A
动态特性						
输入电容	Ciss	Vgs=0V, Vds=25V, f=1MHz		250		pF
输出电容	Coss			45		pF
反馈电容	Crss			20		pF
开关特性						
总栅极电荷	Qg	Vgs=5V, Vds=50V, Id≐6.5A		2.8	5.0	nC
栅极 - 源极电荷	Qgs			0.6		nC
栅极 - 漏极电荷	Qgd			0.7		nC
导通延迟时间	td(on)	Vgs=10V, Vds=50V, Id≐6.5A RL=7.5Ω, Rgen=2.5Ω		8	15	ns
导通上升时间	tr			10	20	ns
关闭延迟时间	td(off)			10	20	ns
关闭下降时间	tf			12	25	ns

# 复合沟道 MOSFET

ELM54510CWSA-N

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

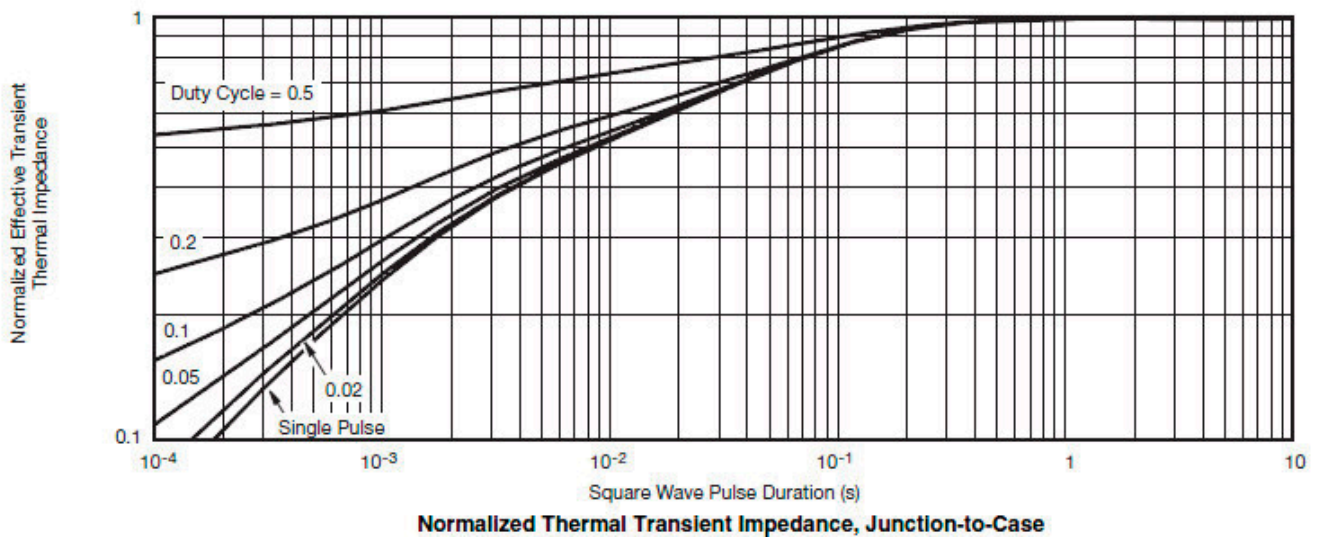
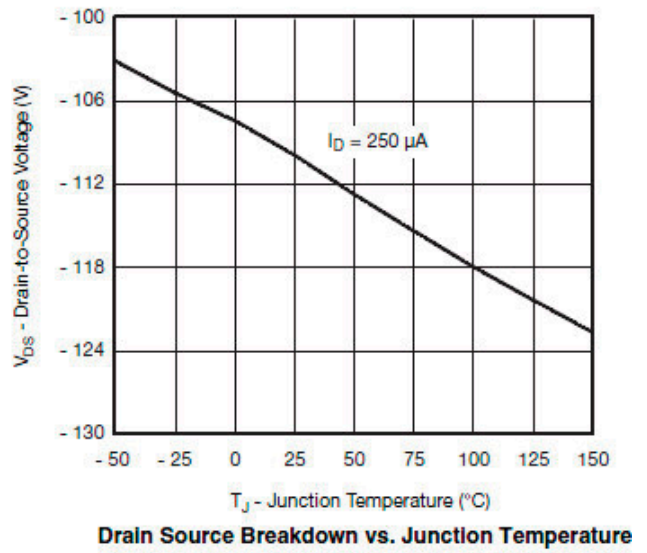
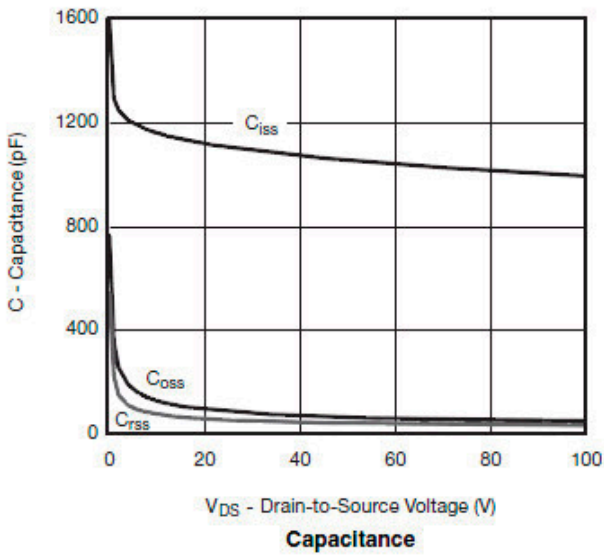
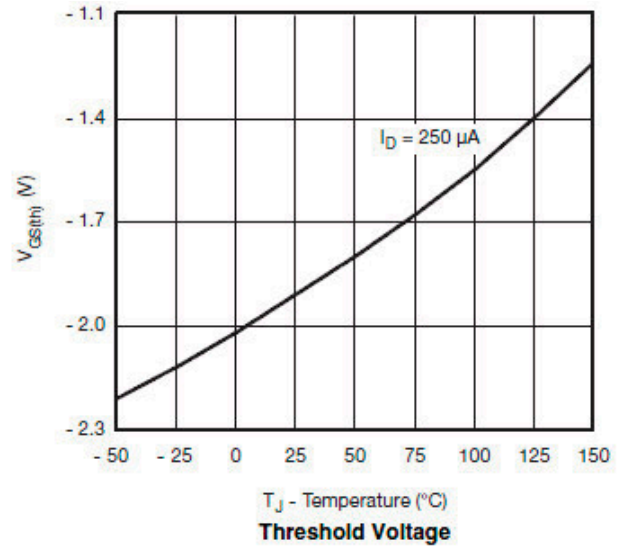
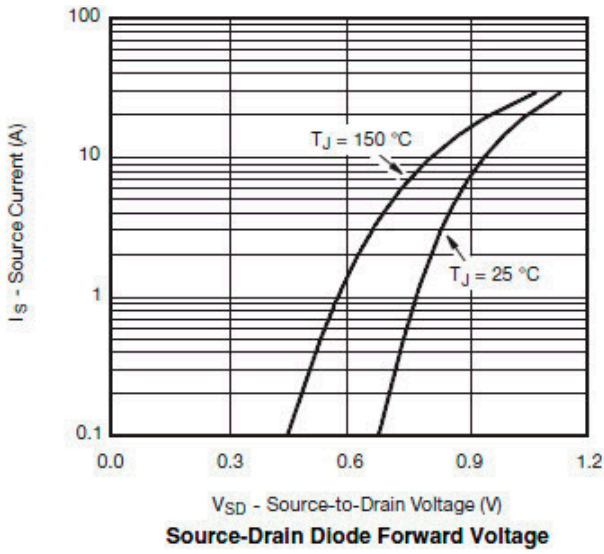
## ■标准特性曲线 (N 沟道)



# 复合沟道 MOSFET

ELM54510CWSA-N

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



# 复合沟道 MOSFET

ELM54510CWSA-N

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

## ■电特性 (P 沟道)

如没有特别注明时,  $T_a=25^\circ\text{C}$

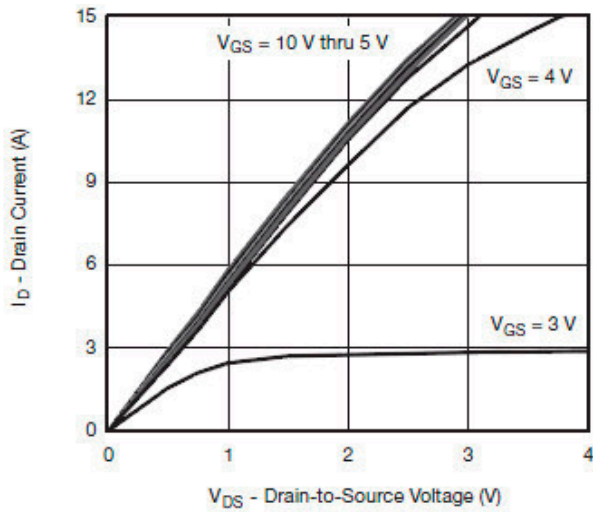
项目	记号	条件	最小值	典型值	最大值	单位
静态特性						
漏极 - 源极击穿电压	BV <sub>dss</sub>	$I_d=-250\mu\text{A}, V_{gs}=0\text{V}$	-100	-110		V
栅极接地时漏极电流	I <sub>dss</sub>	$V_{ds}=-80\text{V}, V_{gs}=0\text{V}$			-1	$\mu\text{A}$
			$T_a=85^\circ\text{C}$		-20	
栅极漏电流	I <sub>gss</sub>	$V_{ds}=0\text{V}, V_{gs}=\pm 20\text{V}$			$\pm 100$	nA
栅极阈值电压	V <sub>gs(th)</sub>	$V_{ds}=V_{gs}, I_d=-250\mu\text{A}$	-1.0		-2.5	V
导通时漏极电流	I <sub>d(on)</sub>	$V_{gs}=-10\text{V}, V_{ds}\geq -5\text{V}$	-8			A
漏极 - 源极导通电阻	R <sub>ds(on)</sub>	$V_{gs}=-10\text{V}, I_d=-2.5\text{A}$		198	210	m $\Omega$
		$V_{gs}=-4.5\text{V}, I_d=-1.8\text{A}$		215	230	
正向跨导	G <sub>fs</sub>	$V_{ds}=-15\text{V}, I_d=-3.6\text{A}$		12		S
二极管正向压降	V <sub>sd</sub>	$I_s=-2.9\text{A}, V_{gs}=0\text{V}$		-0.8	-1.5	V
寄生二极管最大连续电流	I <sub>s</sub>				-1.7	A
动态特性						
输入电容	C <sub>iss</sub>	$V_{gs}=0\text{V}, V_{ds}=-50\text{V}, f=1\text{MHz}$		980		pF
输出电容	C <sub>oss</sub>			100		pF
反馈电容	C <sub>rss</sub>			80		pF
开关特性						
总栅极电荷	Q <sub>g</sub>	$V_{gs}=-4.5\text{V}, V_{ds}=-50\text{V}$ $I_d\equiv -3.6\text{A}$		12	20	nC
栅极 - 源极电荷	Q <sub>gs</sub>			4		nC
栅极 - 漏极电荷	Q <sub>gd</sub>			6		nC
导通延迟时间	t <sub>d(on)</sub>	$V_{gs}=-10\text{V}, V_{ds}=-50\text{V}$ $I_d\equiv -2.9\text{A}, R_L=17.2\Omega$ $R_{gen}=1.0\Omega$		8	15	ns
导通上升时间	t <sub>r</sub>			15	20	ns
关闭延迟时间	t <sub>d(off)</sub>			35	50	ns
关闭下降时间	t <sub>f</sub>			10	20	ns

# 复合沟道 MOSFET

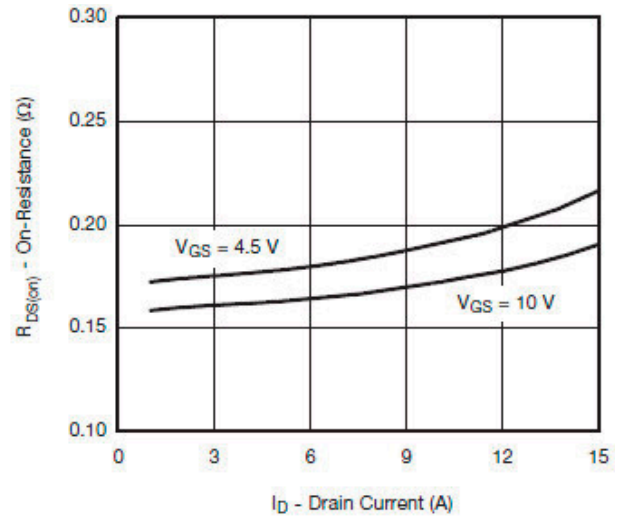
ELM54510CWSA-N

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

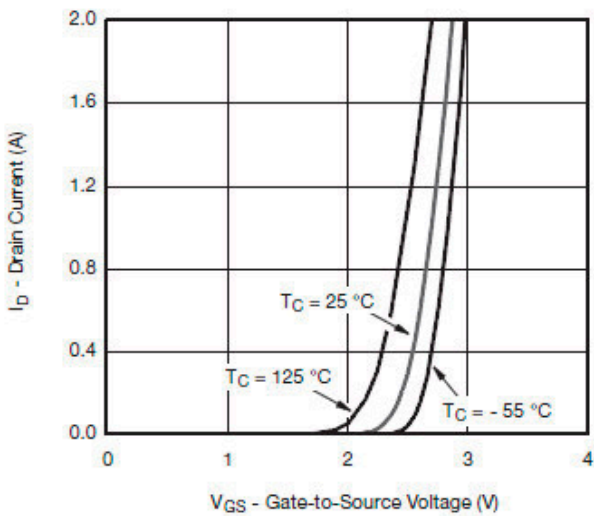
## 标准特性曲线 (P 沟道)



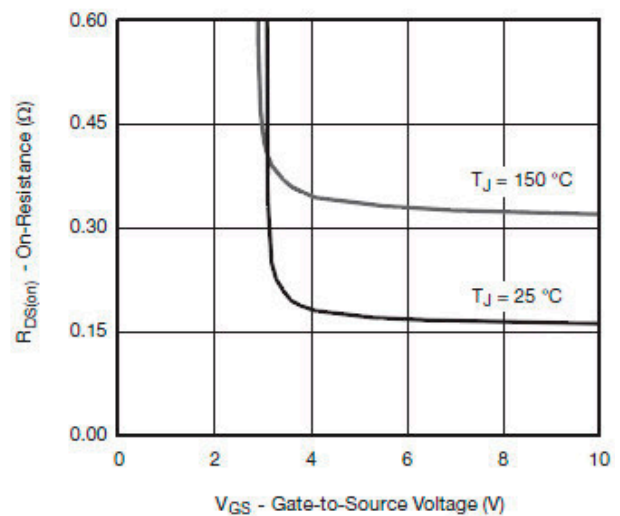
Output Characteristics



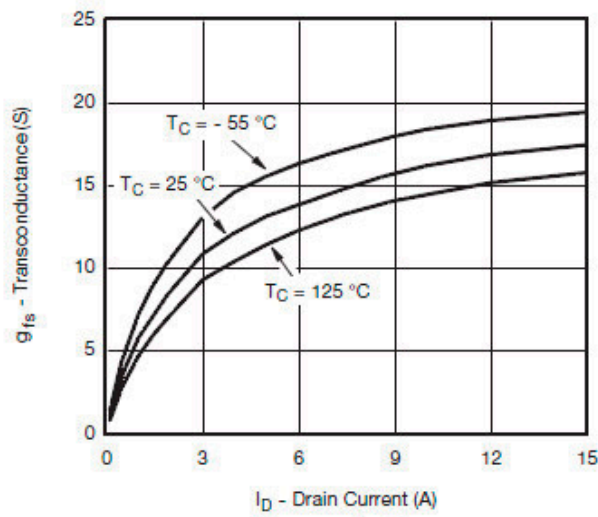
On-Resistance vs. Drain Current



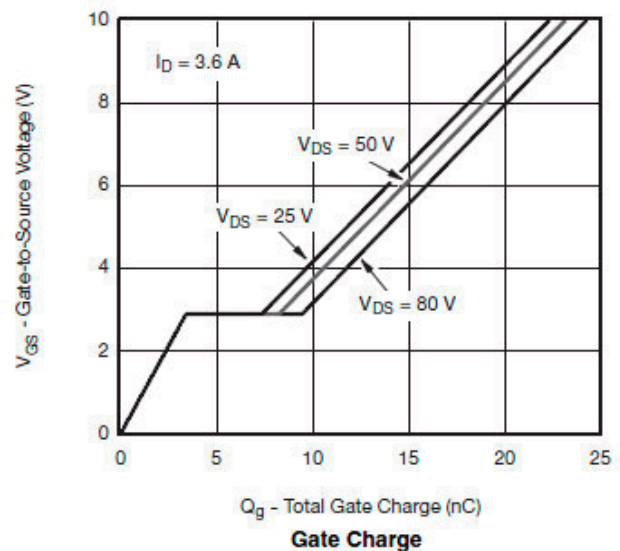
Transfer Characteristics



On-Resistance vs. Gate-to-Source Voltage



Transconductance

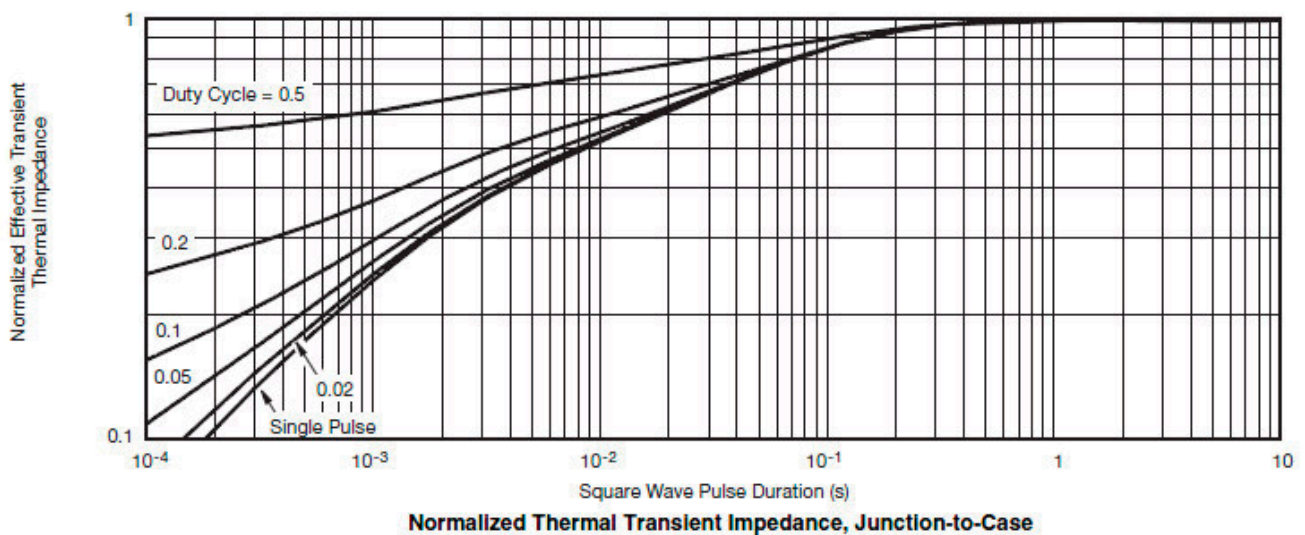
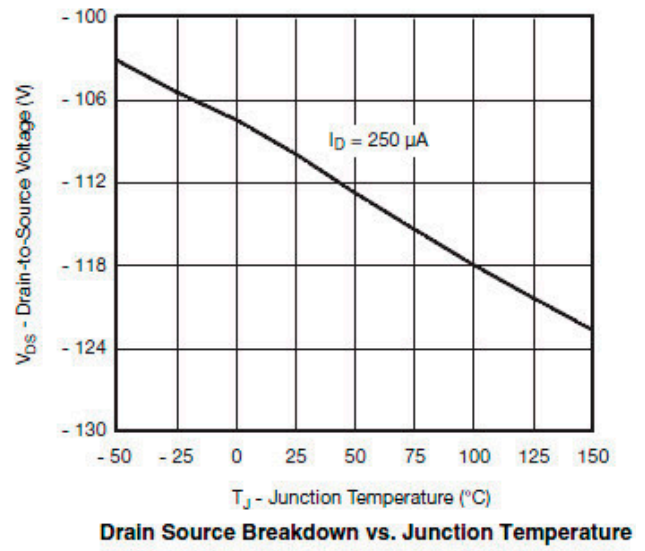
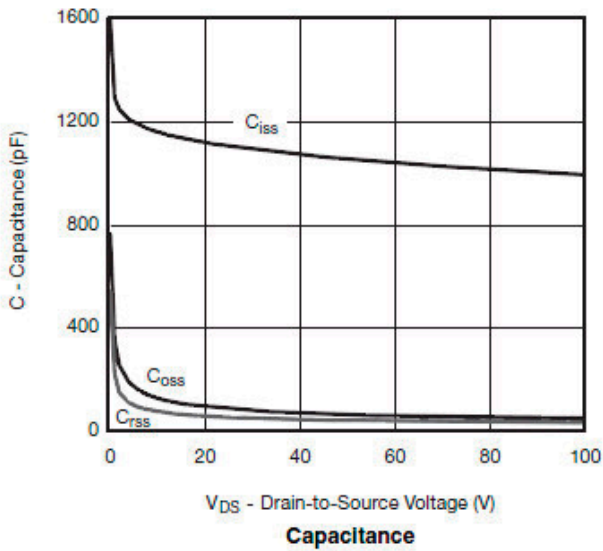
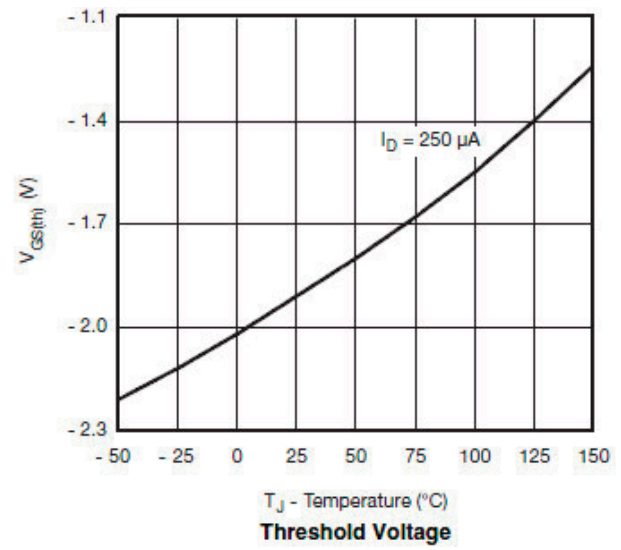
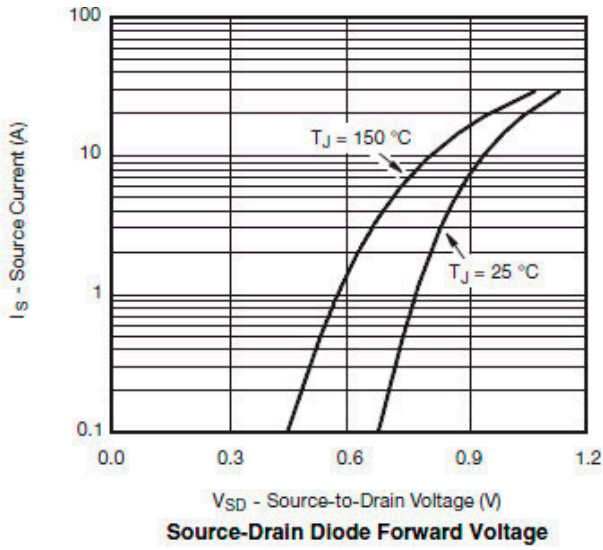


Gate Charge

# 复合沟道 MOSFET

ELM54510CWSA-N

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



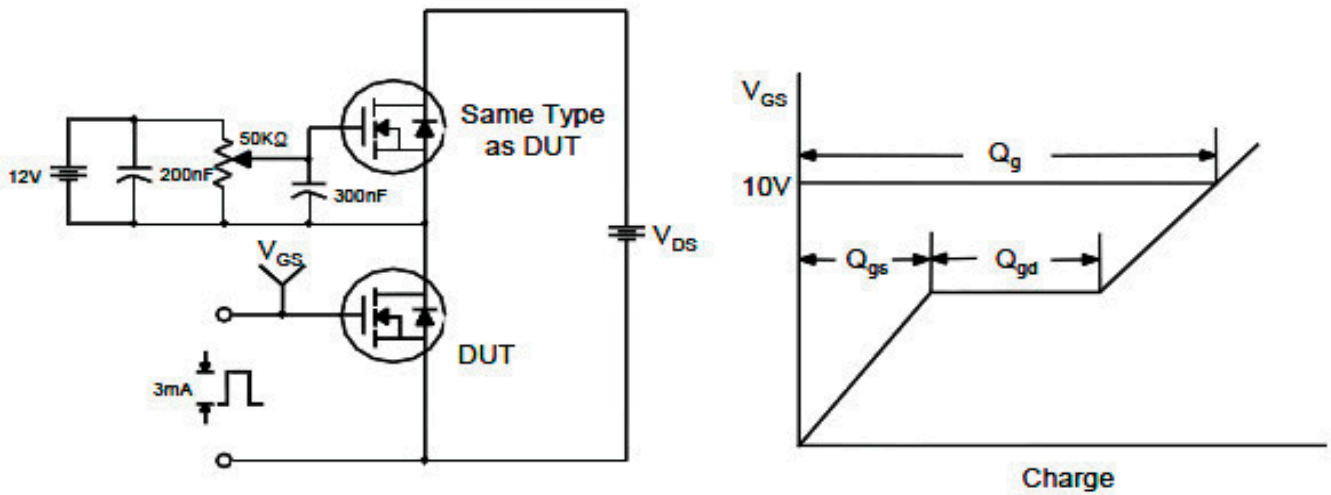
# 复合沟道 MOSFET

ELM54510CWSA-N

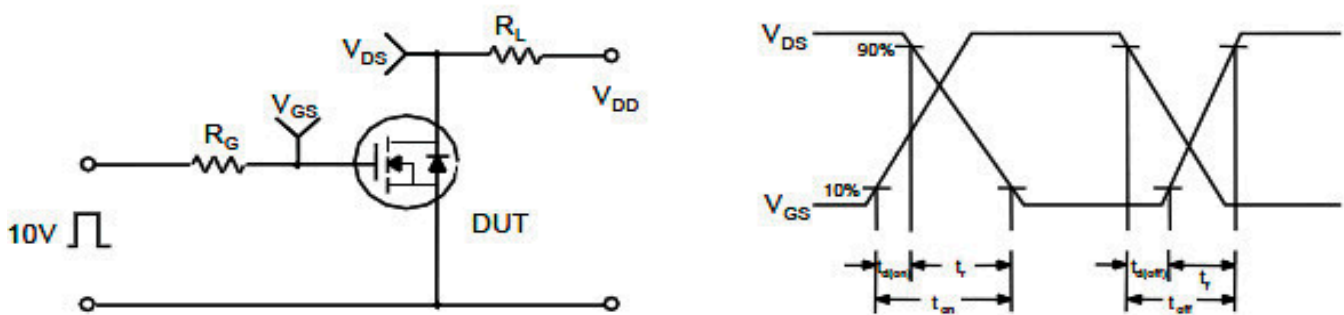
<http://www.elm-tech.com>

## ■测试电路和波形

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

