

复合沟道 MOSFET (共漏极)

ELM55614CA-S

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

概要

ELM55614CA-S 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 |
|--|---|
| • $V_{ds}=40V$ | • $V_{ds}=-40V$ |
| • $I_d=12A$ | • $I_d=-12A$ |
| • $R_{ds(on)} = 35m\Omega (V_{gs}=10V)$ | • $R_{ds(on)} = 65m\Omega (V_{gs}=-10V)$ |
| • $R_{ds(on)} = 42m\Omega (V_{gs}=4.5V)$ | • $R_{ds(on)} = 95m\Omega (V_{gs}=-4.5V)$ |

绝对最大额定值

如没有特别注明时, $T_a=25^{\circ}C$

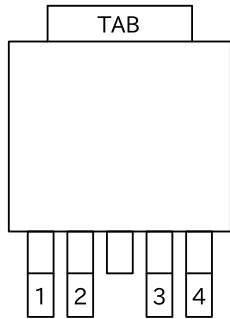
项目	记号	N 沟道 (最大值)	P 沟道 (最大值)	单位
漏极 - 源极电压	V_{ds}	40	-40	V
栅极 - 源极电压	V_{gs}	± 20	± 20	V
漏极电流 (定常) ($T_j=150^{\circ}C$)	I_d	12.0	-12.0	A
		10.0	-10.0	
漏极电流 (脉冲)	I_{dm}	30	-30	A
容许功耗	P_d	22	22	W
		12	12	
结合部温度	T_j	150	150	$^{\circ}C$
保存温度范围	T_{stg}	-55 ~ 150	-55 ~ 150	$^{\circ}C$

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	$^{\circ}C/W$

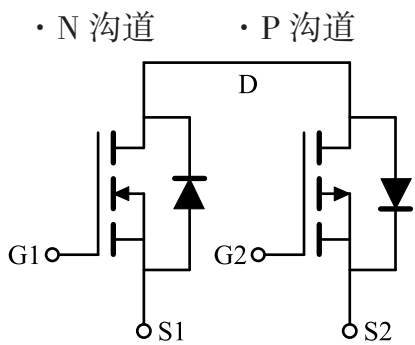
引脚配置图

TO-252-4(俯视图)



引脚编号	引脚名称
1	SOURCE1
2	GATE1
3	SOURCE2
4	GATE2
TAB	DRAIN1/DRAIN2

电路图



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■电特性 (N 沟道)

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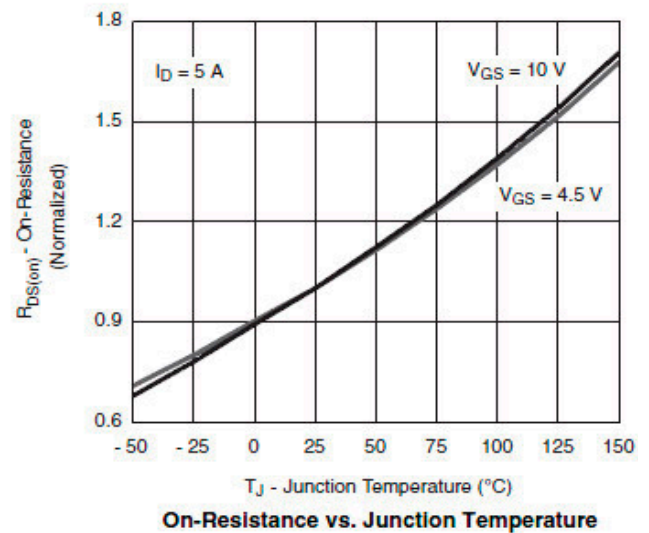
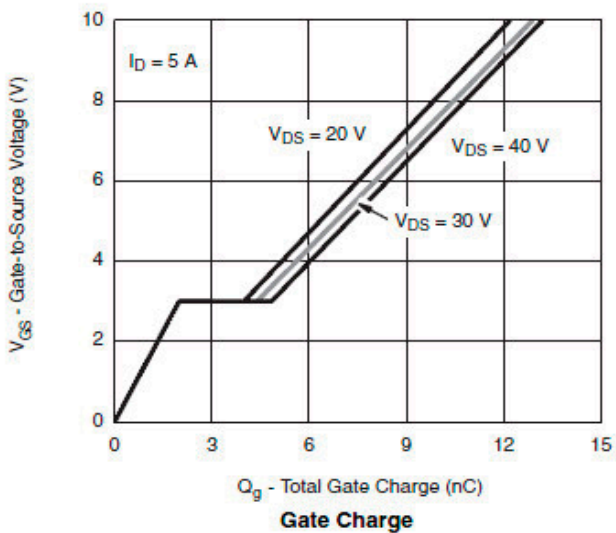
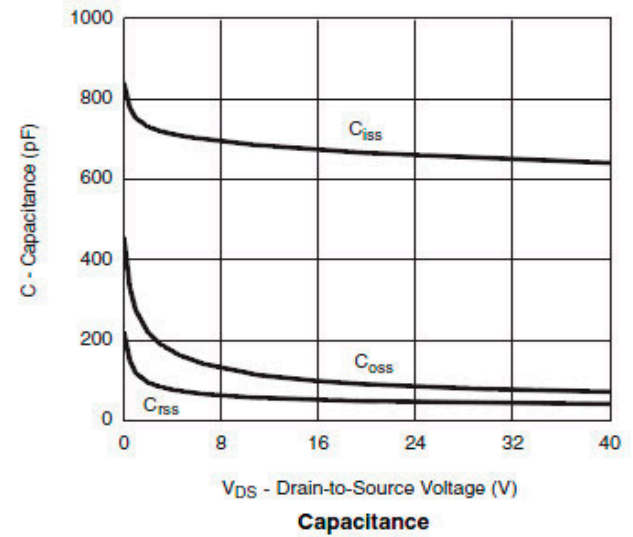
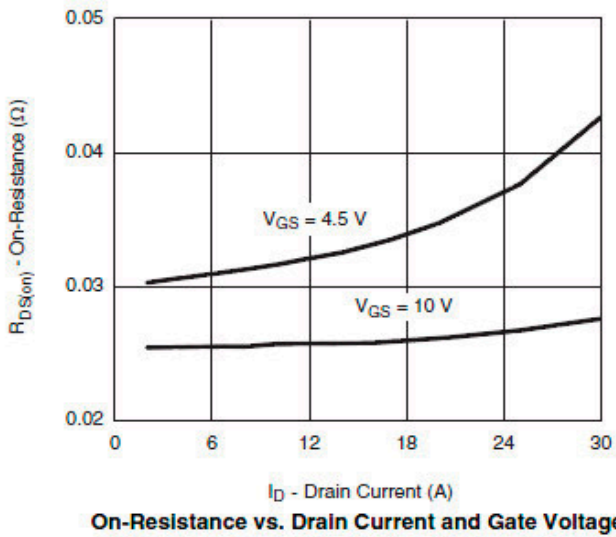
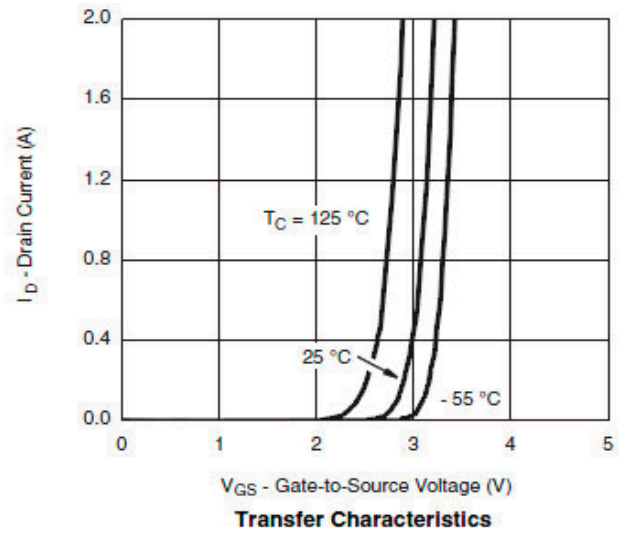
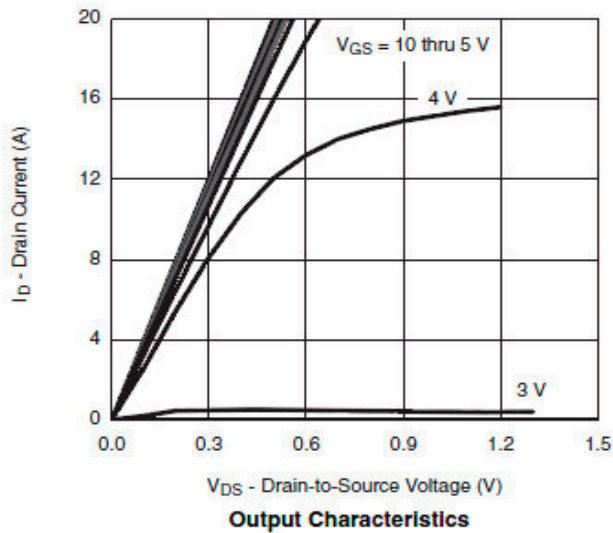
项目	记号	条件	最小值	典型值	最大值	单位	
静态特性							
漏极 – 源极击穿电压	BV _{dss}	Id=250μA, Vgs=0V		40		V	
栅极接地时漏极电流	Idss	Vds=32V, Vgs=0V			1	μA	
		Ta=85℃			10		
栅极漏电电流	Igss	Vds=0V, Vgs= ± 20V			± 100	nA	
栅极阈值电压	Vgs(th)	Vds=Vgs, Id=250μA		1.0	2.0	V	
导通时漏极电流	Id(on)	Vgs=10V, Vds≥5V		30		A	
漏极 – 源极导通电阻	Rds(on)	Vgs=10V, Id=7.0A			26	35	mΩ
		Vgs=4.5V, Id=6.0A			32	42	
正向跨导	Gfs	Vds=5V, Id=12.0A			25	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=20V, f=1MHz			750	pF	
输出电容	Coss				110	pF	
反馈电容	Crss				75	pF	
开关特性							
总栅极电荷	Qg	Vgs=4.5V, Vds=20V, Id≡5.0A			10.0	14.0	nC
栅极 – 源极电荷	Qgs				2.8	nC	
栅极 – 漏极电荷	Qgd				3.2	nC	
导通延迟时间	td(on)	Vgs=10V, Vds=20V, Id≡5.0A RL=4Ω, Rgen=1Ω			6	12	ns
导通上升时间	tr				10	20	ns
关闭延迟时间	td(off)				20	36	ns
关闭下降时间	tf				6	12	ns

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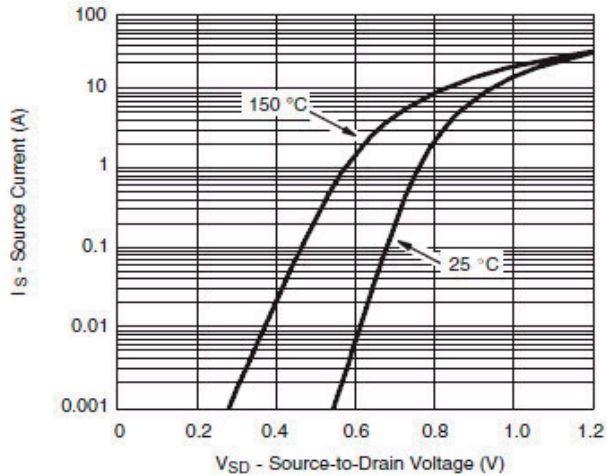
■标准特性曲线 (N 沟道)



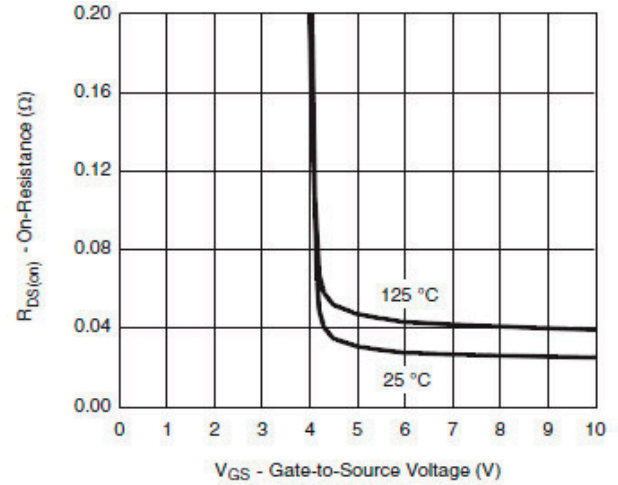
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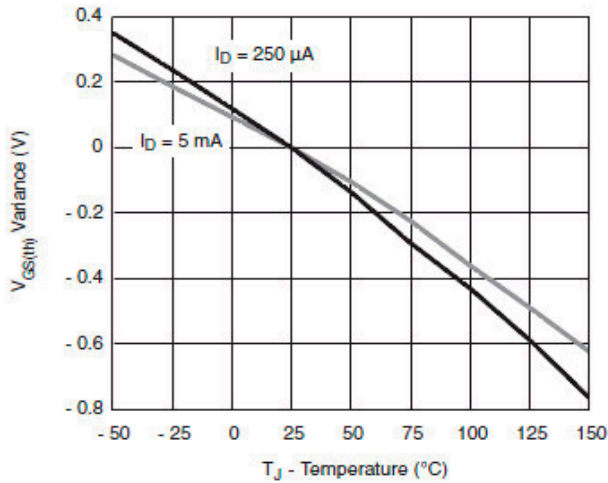
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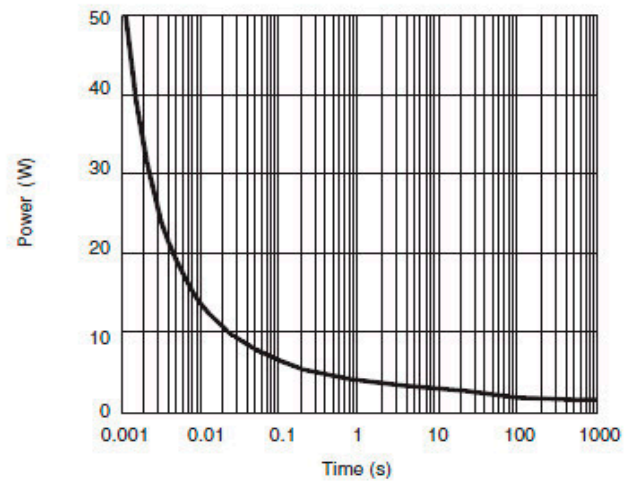
Source-Drain Diode Forward Voltage



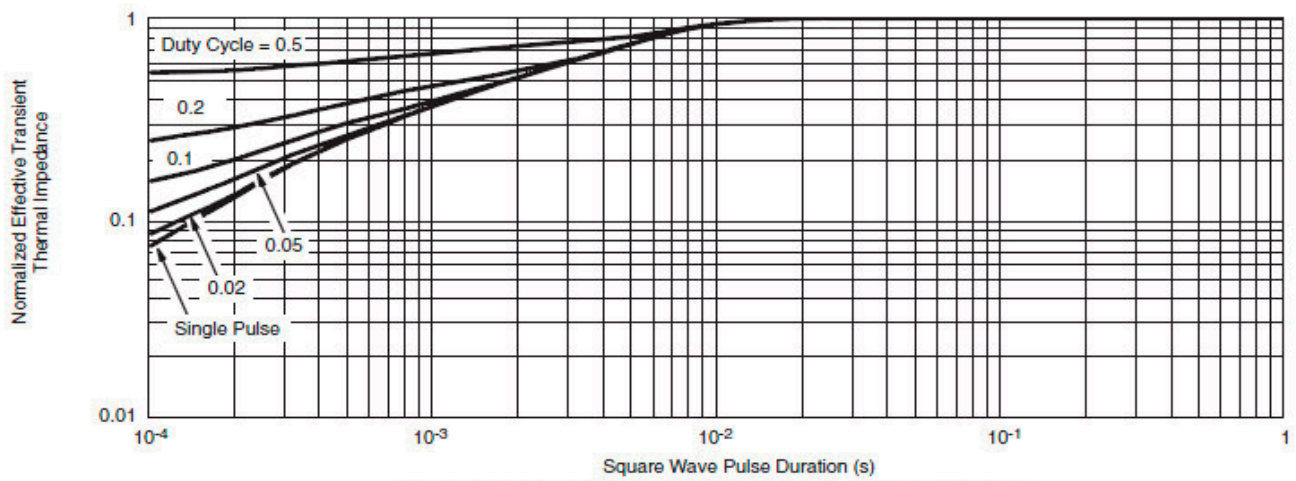
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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■电特性 (P 沟道)

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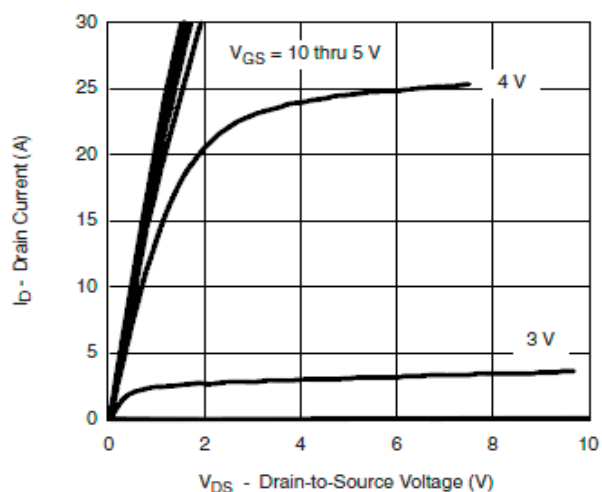
项目	记号	条件	最小值	典型值	最大值	单位
静态特性						
漏极 – 源极击穿电压	BV _{dss}	I _d =-250μA, V _{gs} =0V	-40			V
栅极接地时漏极电流	I _{dss}	V _{ds} =-32V, V _{gs} =0V			-1	μA
		Ta=85℃			-20	
栅极漏电流	I _{gss}	V _{ds} =0V, V _{gs} = ± 20V			± 100	nA
栅极阈值电压	V _{gs(th)}	V _{ds} =V _{gs} , I _d =-250μA	-1.0		-2.0	V
导通时漏极电流	I _{d(on)}	V _{gs} =-10V, V _{ds} ≥-5V	-30			A
漏极 – 源极导通电阻	R _{ds(on)}	V _{gs} =-10V, I _d =-6.0A		60	65	mΩ
		V _{gs} =-4.5V, I _d =-5.0A		85	95	
正向跨导	G _{fs}	V _{ds} =-5V, I _d =-12.0A		25		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				-1.7	A
动态特性						
输入电容	C _{iss}	V _{gs} =0V, V _{ds} =-20V, f=1MHz		1100		pF
输出电容	C _{oss}			195		pF
反馈电容	C _{rss}			105		pF
开关特性						
总栅极电荷	Q _g	V _{gs} =-4.5V, V _{ds} =-20V I _d ≡-5.0A		13.0	20.0	nC
栅极 – 源极电荷	Q _{gs}			4.5		nC
栅极 – 漏极电荷	Q _{gd}			6.5		nC
导通延迟时间	t _{d(on)}	V _{gs} =-4.5V, V _{ds} =-20V I _d ≡-5.0A, R _L =4Ω R _{gen} =1Ω		40	80	ns
导通上升时间	t _r			55	100	ns
关闭延迟时间	t _{d(off)}			30	60	ns
关闭下降时间	t _f			12	20	ns

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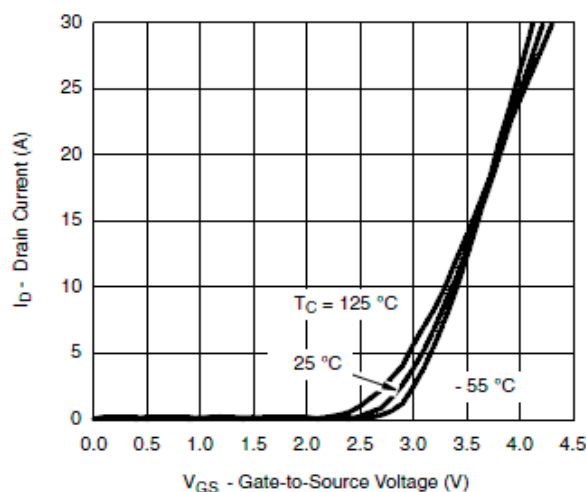
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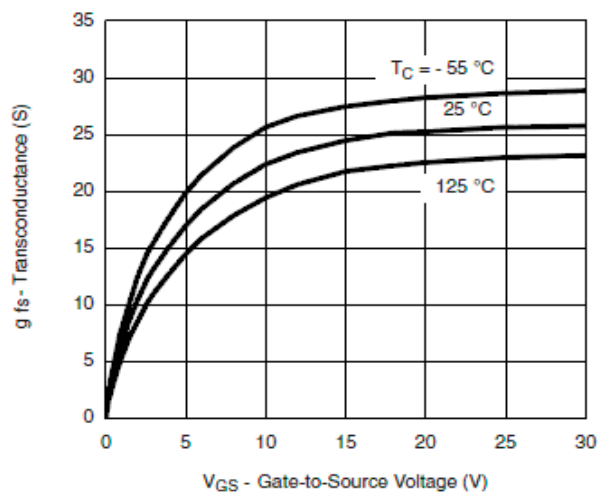
■标准特性曲线 (P 沟道)



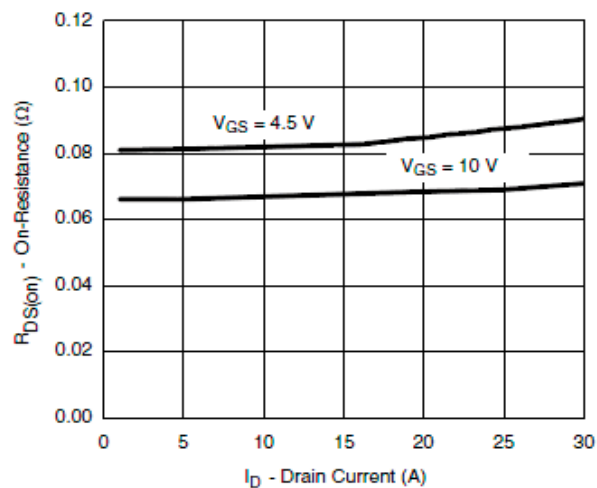
Output Characteristics



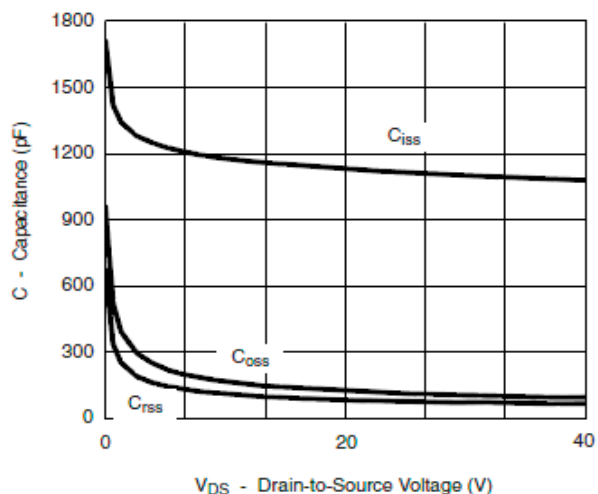
Transfer Characteristics



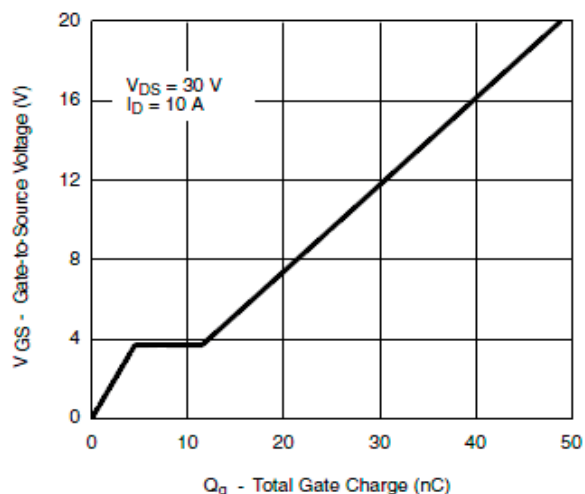
Transconductance



On-Resistance vs. Drain Current



Capacitance

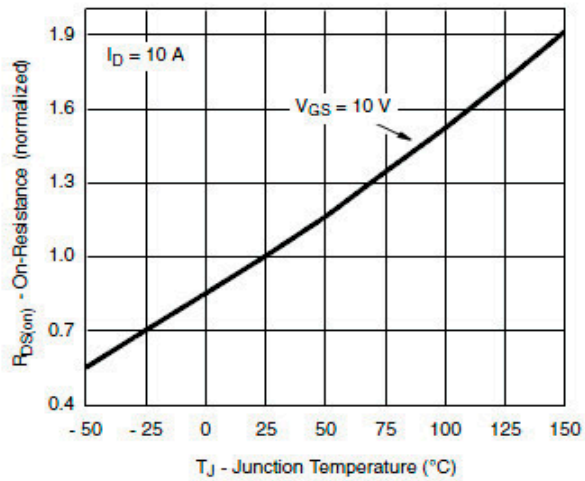


Gate Charge

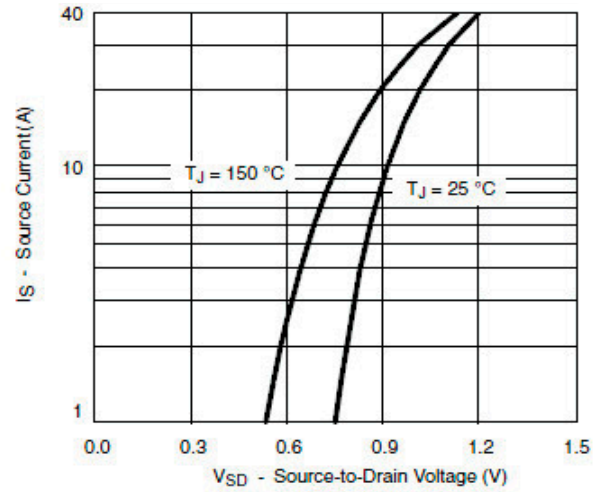
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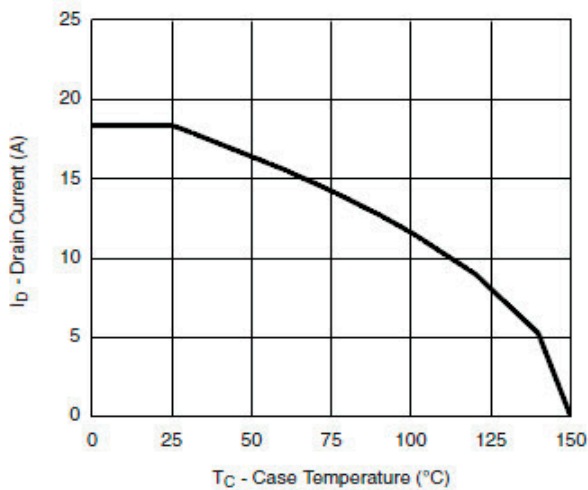
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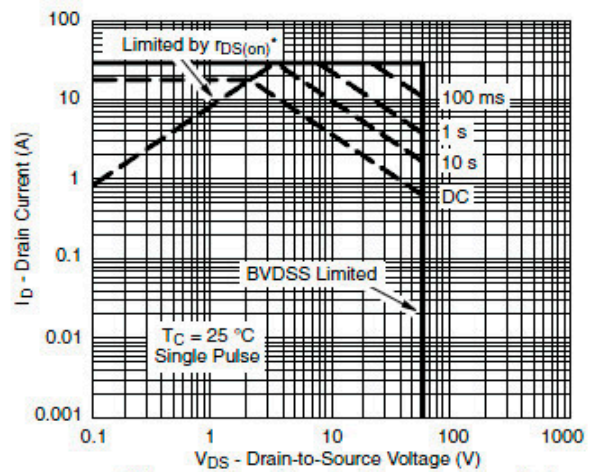
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

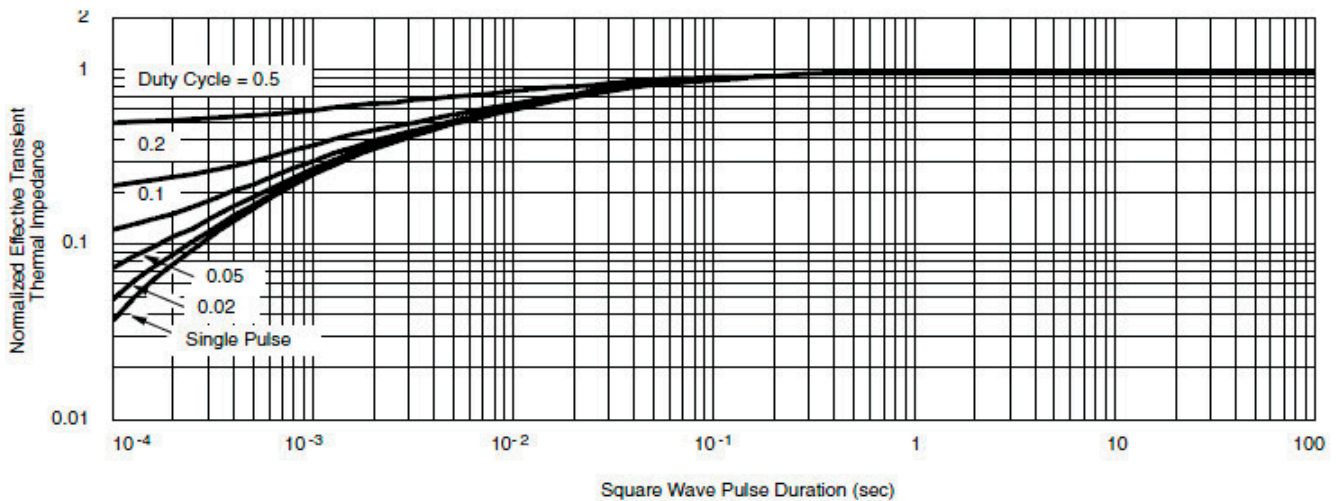


Maximum Drain Current vs. Case Temperature



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

Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

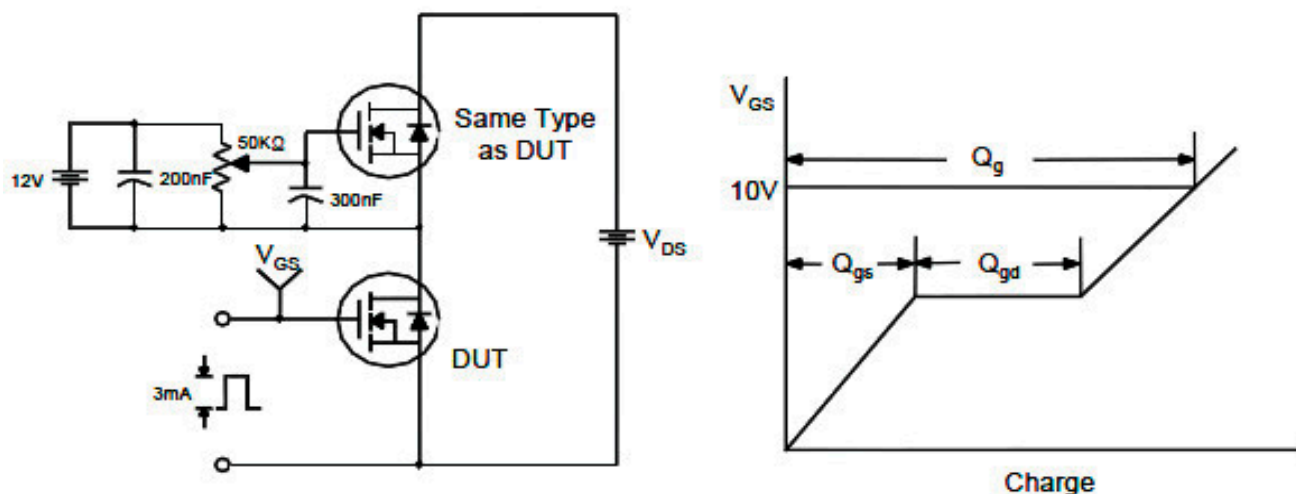
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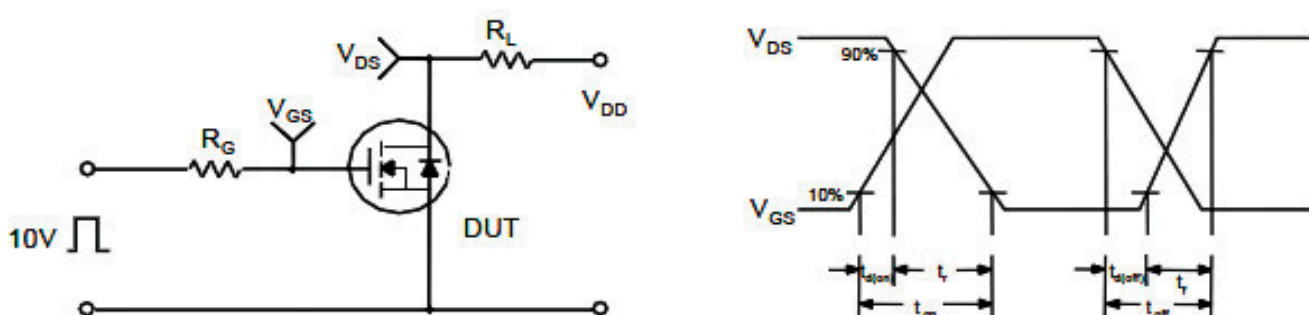
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■测试电路和波形

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

