复合沟道 MOSFET

ELM54614CWSA-N

■概要

ELM54614CWSA-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=40V	・Vds=−40V
・Id=10.0A	・Id=−10.0A
・Rds(on) = 35mΩ(Vgs=10V)	・Rds(on) = 35mΩ(Vgs=−10V)
・Rds(on) = 45mΩ(Vgs=4.5V)	・Rds(on) = 45mΩ(Vgs=−4.5V)

■绝对最大额定值

如没有特别注明时, Ta=25℃

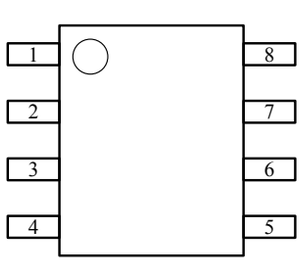
项目		记号	N 沟道 (最大值)	P 沟道 (最大值)	单位
漏极 – 源极电压		Vds	40	−40	V
栅极 – 源极电压		Vgs	± 20	± 20	V
漏极电流 (定常) (Tj=150℃)	Ta=25℃	Id	10.0	−10.0	A
	Ta=70℃		6.0	−6.0	
漏极电流 (脉冲)		Idm	20	−20	A
崩溃电流	L=0.1mH	Ias	8	–	A
崩溃能量		Eas	3.2	–	mJ
容许功耗	Tc=25℃	Pd	2.8	2.8	W
	Tc=70℃		1.8	1.8	
结合部温度		Tj	150	150	℃
保存温度范围		Tstg	−55 ~ 150	−55 ~ 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

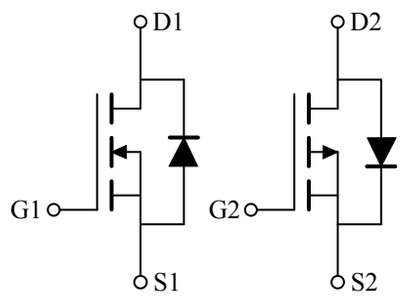
SOP-8(俯视图)



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

・N 沟道　　・P 沟道

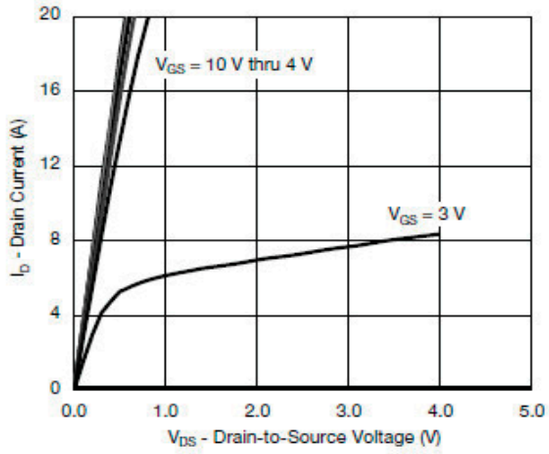


■电特性 (N 沟道)

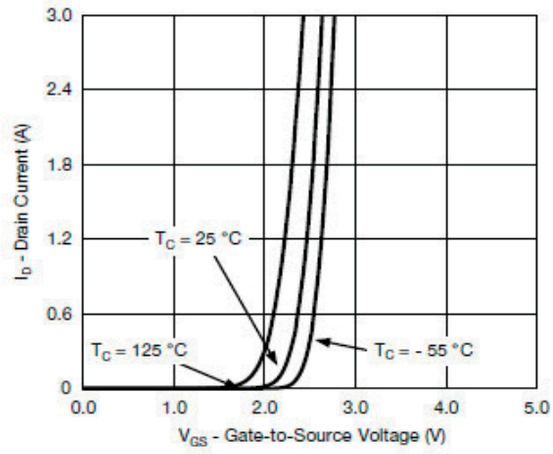
如没有特别注明时, Ta=25℃

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		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		2.5	V
导通时漏极电流	Id(on)	Vgs=10V, Vds≧5V		8			A
漏极 – 源极导通电阻	Rds(on)	Vgs=10V, Id=10.0A			27	35	mΩ
		Vgs=4.5V, Id=6.0A			33	45	
正向跨导	Gfs	Vds=10V, Id=8.0A			27		S
二极管正向压降	Vsd	Is=1.5A, Vgs=0V			0.85	1.20	V
寄生二极管最大连续电流	Is					1.6	A
动态特性							
输入电容	Ciss	Vgs=0V, Vds=20V, f=1MHz			385		pF
输出电容	Coss				68		pF
反馈电容	Crss				30		pF
开关特性							
总栅极电荷	Qg	Vgs=4.5V, Vds=10V, Id≡8.0A			3.3	5.0	nC
栅极 – 源极电荷	Qgs				1.0		nC
栅极 – 漏极电荷	Qgd				1.2		nC
导通延迟时间	td(on)	Vgs=10V, Vds=20V, Id≡8.0A RL=2Ω, Rgen=1Ω			9	18	ns
导通上升时间	tr				11	22	ns
关闭延迟时间	td(off)				10	20	ns
关闭下降时间	tf				7	14	ns

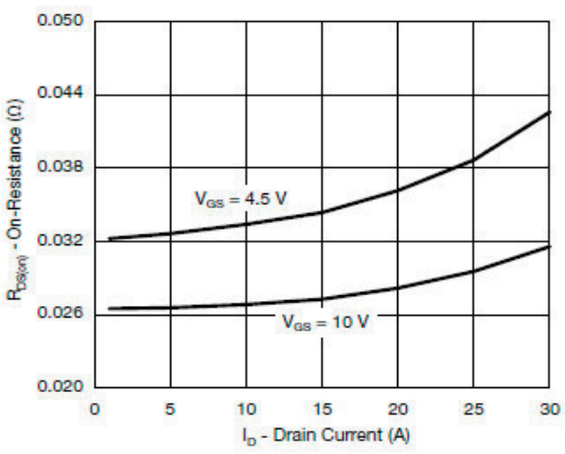
■标准特性曲线 (N 沟道)



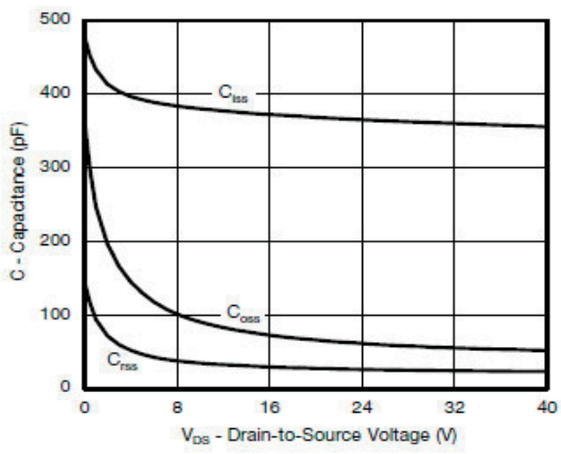
Output Characteristics



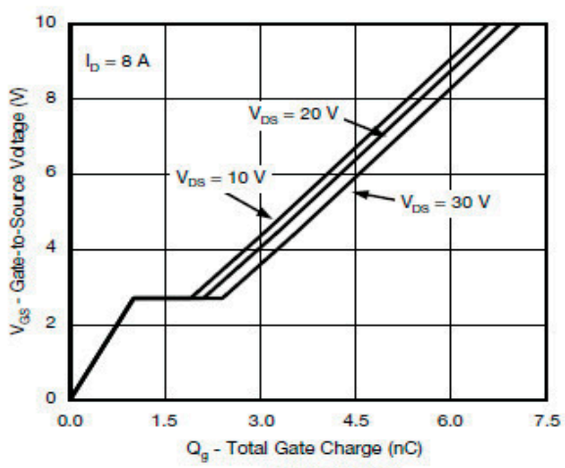
Transfer Characteristics



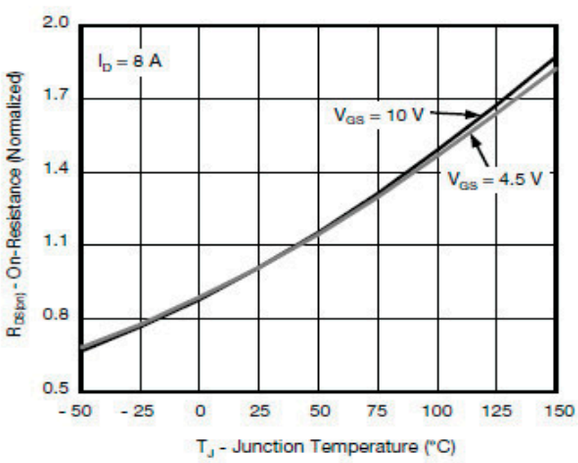
On-Resistance vs. Drain Current



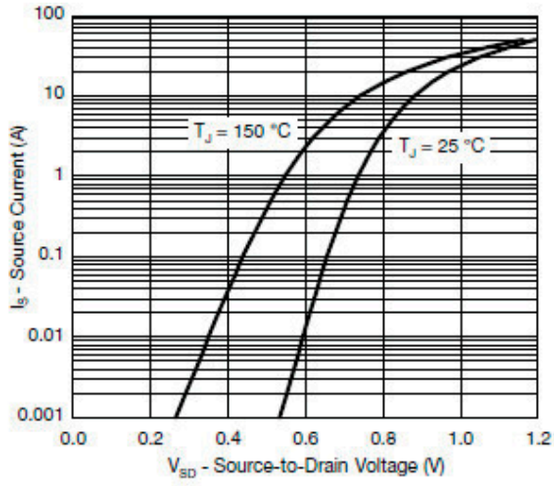
Capacitance



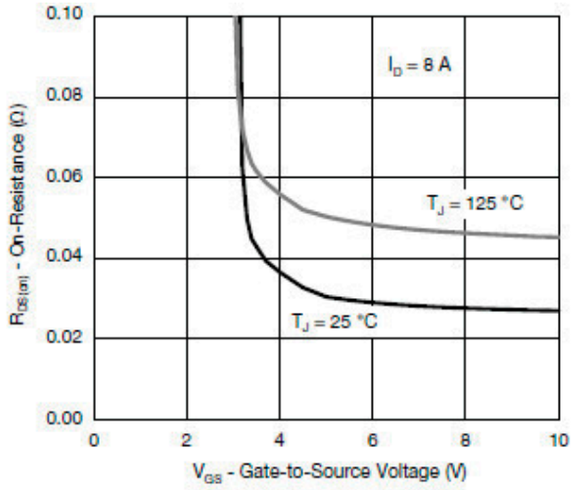
Gate Charge



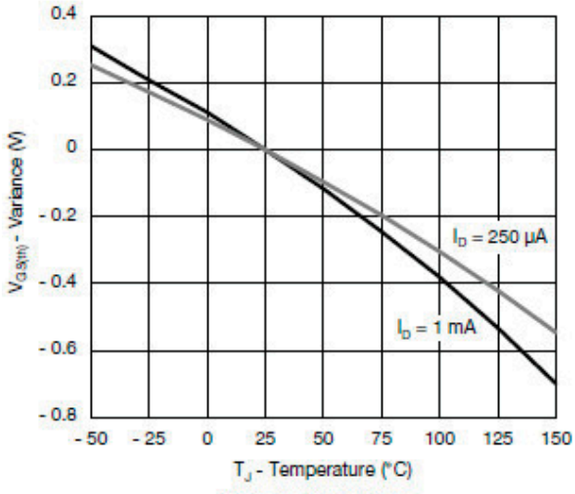
On-Resistance vs. Junction Temperature



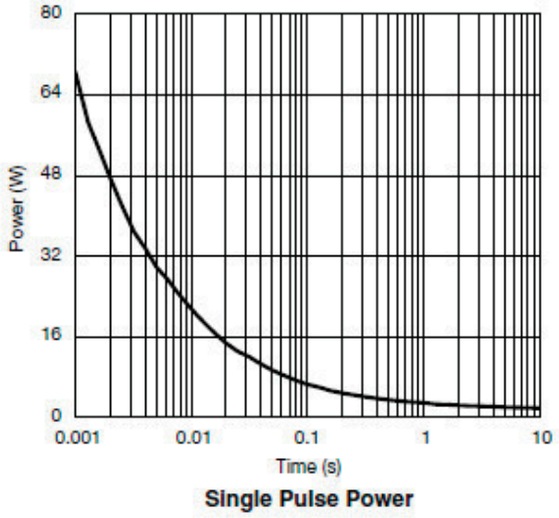
Source-Drain Diode Forward Voltage



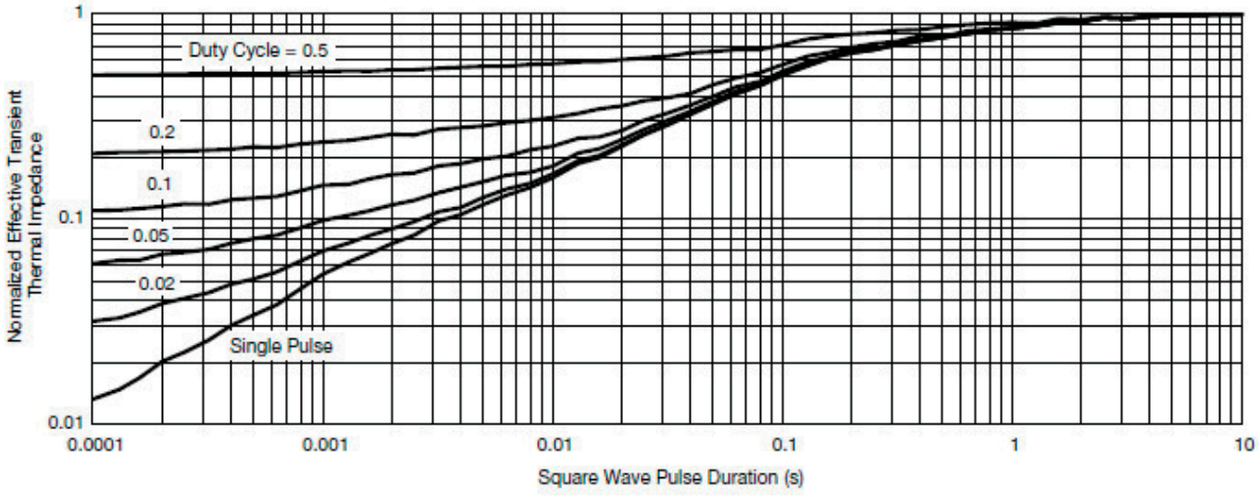
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



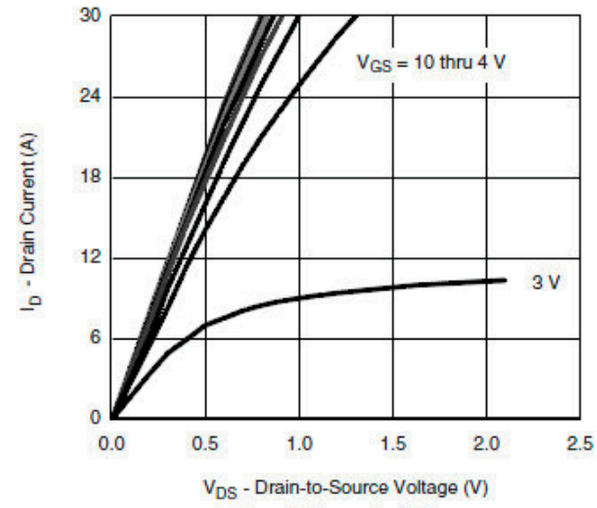
Normalized Thermal Transient Impedance, Junction-to-Foot

■电特性 (P 沟道)

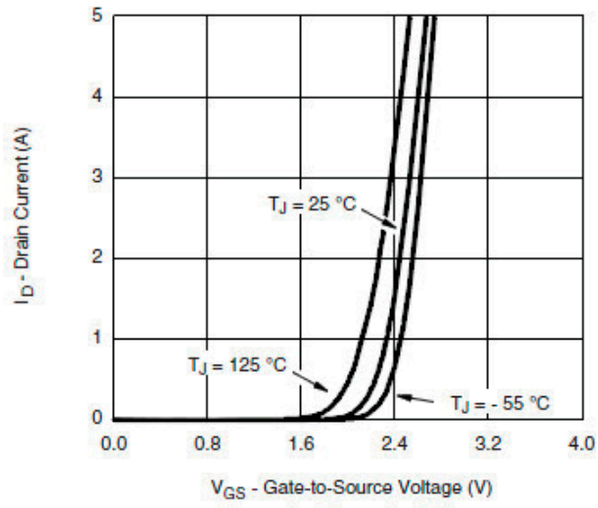
如没有特别注明时, Ta=25℃

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	BVdss	Id=–250μA, Vgs=0V		–40			V
栅极接地时漏极电流	Idss	Vds=–40V, Vgs=0V				–1	μA
			Ta=85℃			–20	
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		–3.0	V
导通时漏极电流	Id(on)	Vgs=–10V, Vds≧–5V		–20			A
漏极 – 源极导通电阻	Rds(on)	Vgs=–10V, Id=–10.0A			28	35	mΩ
		Vgs=–4.5V, Id=–6.0A			36	45	
正向跨导	Gfs	Vds=–15V, Id=–5.0A			20		S
二极管正向压降	Vsd	Is=–2.0A, Vgs=0V			–0.8	–1.2	V
寄生二极管最大连续电流	Is					–1.7	A
动态特性							
输入电容	Ciss	Vgs=0V, Vds=–20V, f=1MHz			1100		pF
输出电容	Coss				145		pF
反馈电容	Crss				115		pF
开关特性							
总栅极电荷	Qg	Vgs=–4.5V, Vds=–20V Id≡–5.0A			13.0	20.0	nC
栅极 – 源极电荷	Qgs				4.5		nC
栅极 – 漏极电荷	Qgd				6.5		nC
导通延迟时间	td(on)	Vgs=–4.5V, Vds=–20V Id≡–5.0A, RL=4Ω Rgen=1Ω			40	80	ns
导通上升时间	tr				55	100	ns
关闭延迟时间	td(off)				30	60	ns
关闭下降时间	tf				12	20	ns

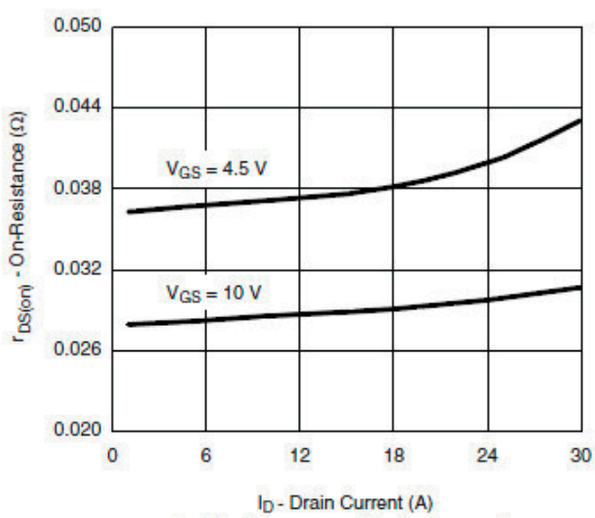
■标准特性曲线 (P 沟道)



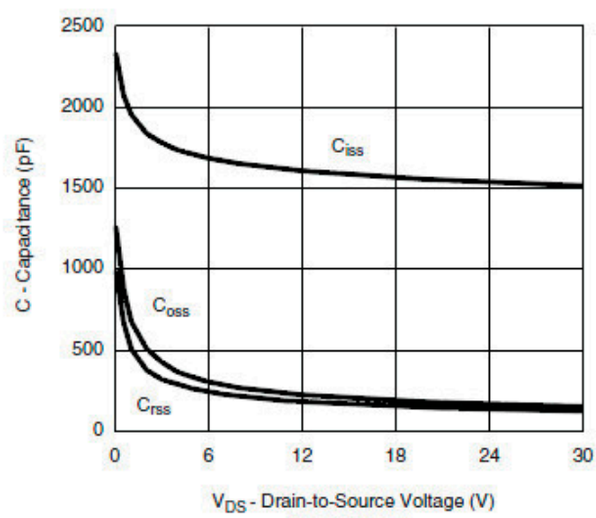
Output Characteristics



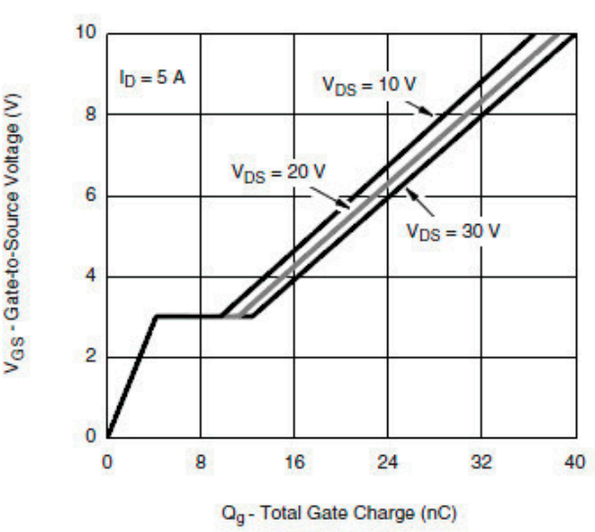
Transfer Characteristics



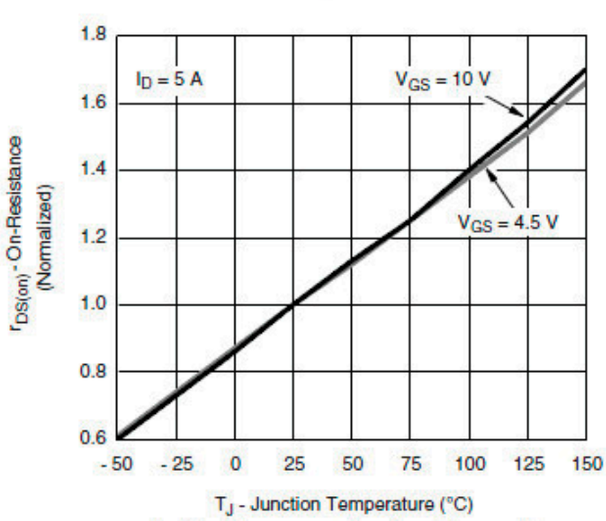
On-Resistance vs. Drain Current



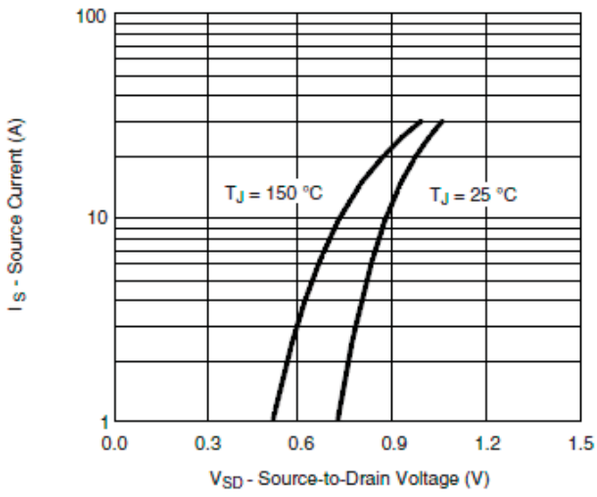
Capacitance



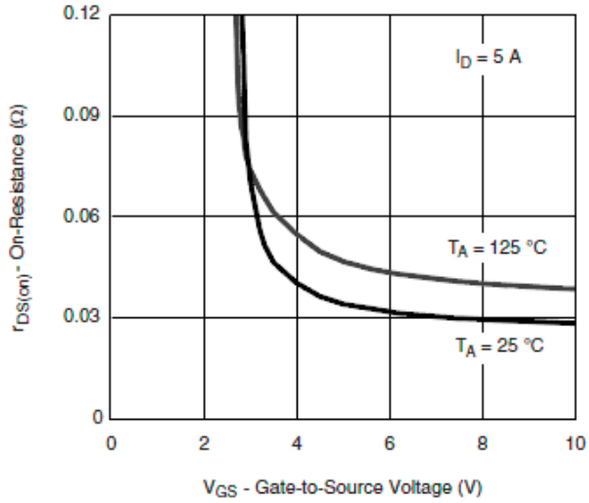
Gate Charge



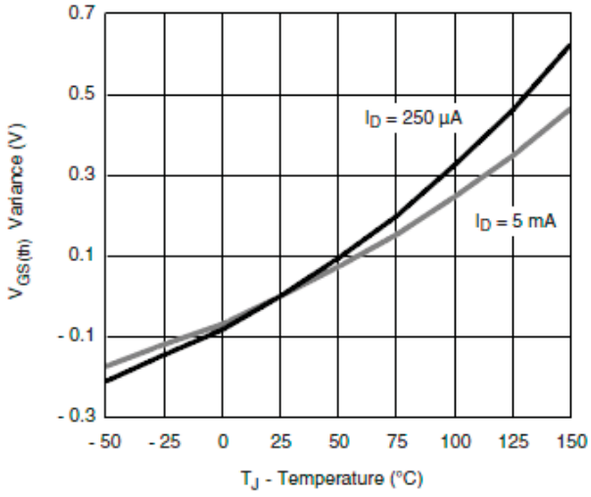
On-Resistance vs. Junction Temperature



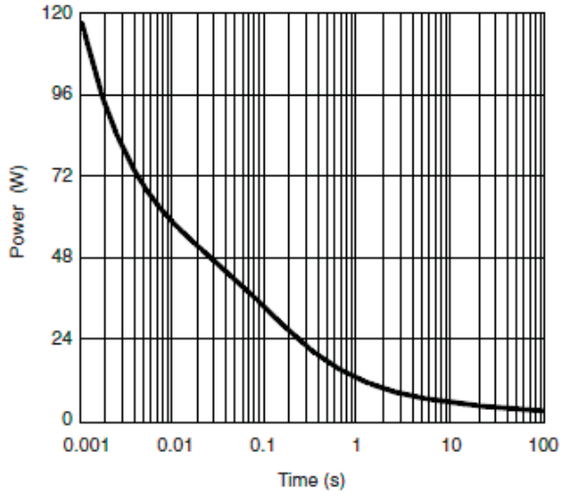
Source-Drain Diode Forward Voltage



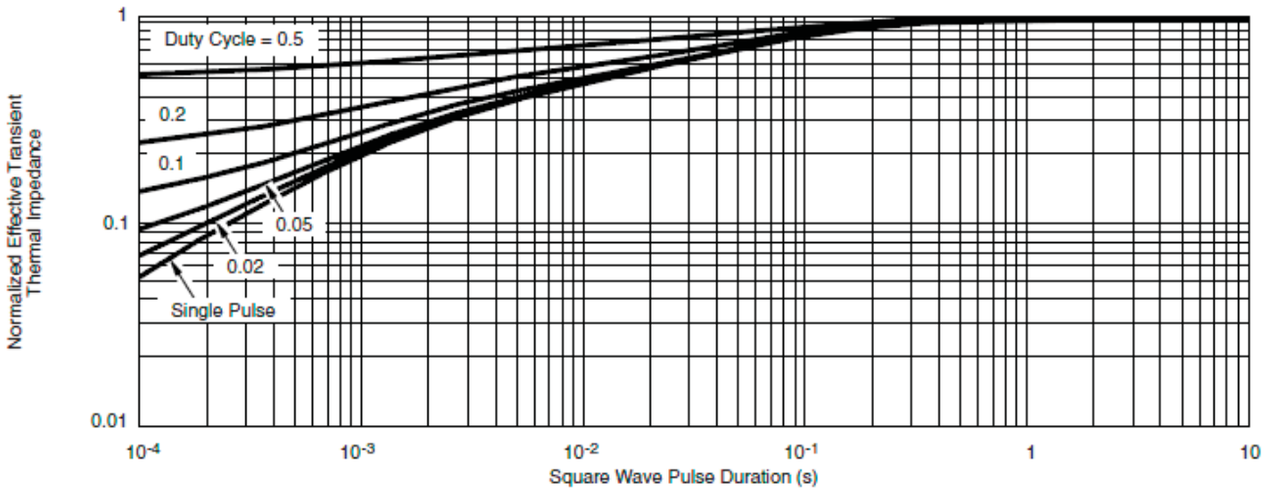
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



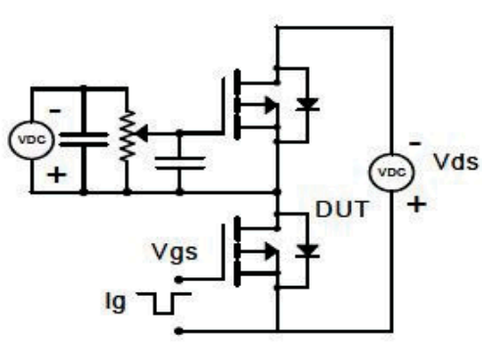
Single Pulse Power, Junction-to-Ambient

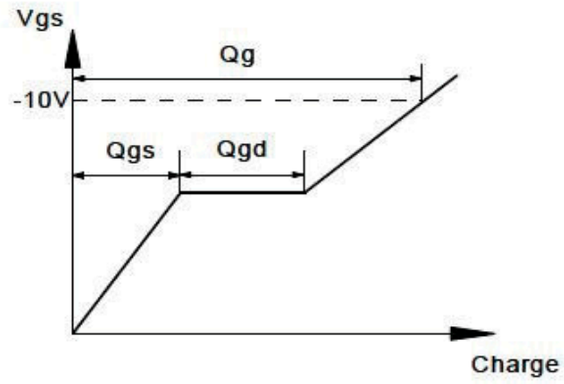


Normalized Thermal Transient Impedance, Junction-to-Case

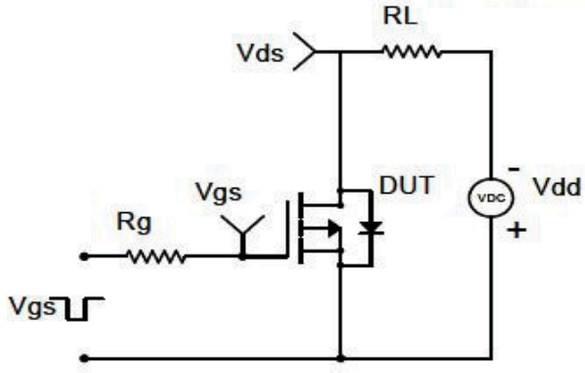
■测试电路和波形

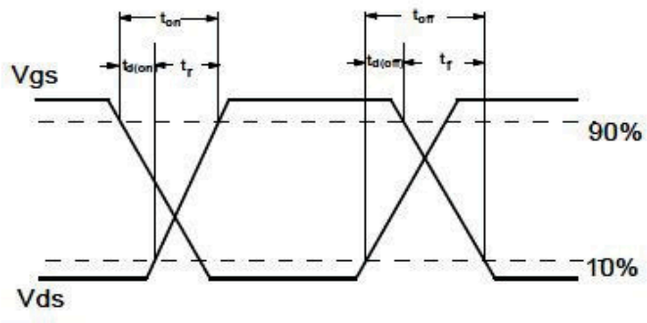
Gate Charge Test Circuit & Waveform





Resistive Switching Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms