复合沟道 MOSFET

ELM52527CWA-N

■概要

ELM52527CWA-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。另外，此芯片还内藏 ESD 保护电路。

■特点

N 沟道	P 沟道
· Vds=20V	· Vds=−20V
· Id=4.5A	· Id=−4.5A
· Rds(on) = 19mΩ(Vgs=4.5V)	· Rds(on) = 42mΩ(Vgs=−4.5V)
· Rds(on) = 23mΩ(Vgs=2.5V)	· Rds(on) = 52mΩ(Vgs=−2.5V)
· Rds(on) = 34mΩ(Vgs=1.8V)	· Rds(on) = 68mΩ(Vgs=−1.8V)
· ESD 保护	· ESD 保护

■绝对最大额定值

如没有特别注明时, Ta=25℃

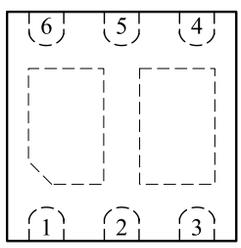
项目		记号	N 沟道 (最大值)	P 沟道 (最大值)	单位
漏极 – 源极电压		Vds	20	−20	V
栅极 – 源极电压		Vgs	± 12	± 12	V
漏极电流（定常）(Tj=150℃)	Ta=25℃	Id	4.5	−4.5	A
	Ta=70℃		4.5	−4.5	
漏极电流（脉冲）		Idm	20	−20	A
容许功耗	Tc=25℃	Pd	7.8	7.8	W
	Tc=70℃		5.0	5.0	
结合部温度		Tj	150	150	℃
保存温度范围		Tstg	−55 ~ 150	−55 ~ 150	℃

■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		52.0	℃/W
最大结合部 – 环境热阻	Rθja	P		52.0	
最大接合部 – 外封装	Rθjc	N		12.5	℃/W
最大接合部 – 外封装	Rθjc	P		12.5	

■引脚配置图

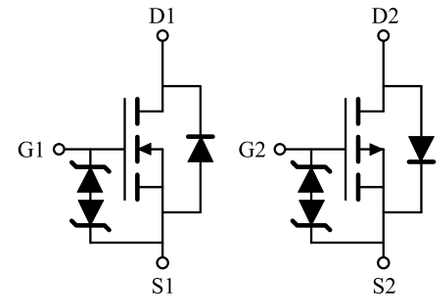
DFN6–2 × 2(俯视图)



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

■电路图

· N 沟道　　· P 沟道

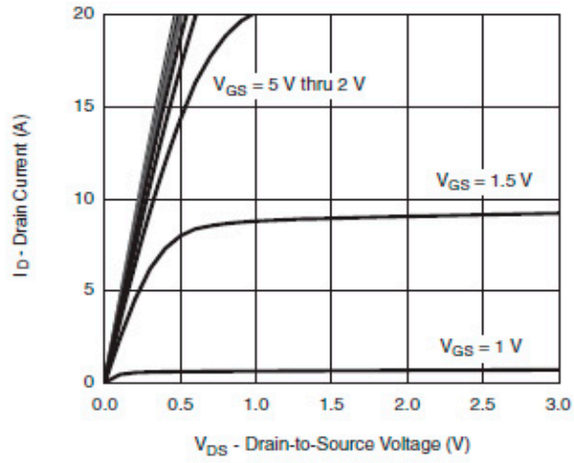


■电特性 (N 沟道)

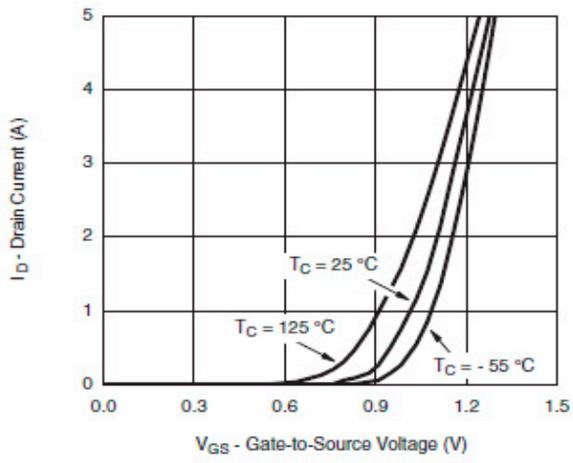
如没有特别注明时, Ta=25℃

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		20			V
栅极接地时漏极电流	Idss	Vds=16V, Vgs=0V				1	μA
			Ta=85℃			10	
栅极漏电电流	Igss	Vds=0V, Vgs= ± 12V				± 10	μA
栅极阈值电压	Vgs(th)	Vds=Vgs, Id=250μA		0.4		1.0	V
导通时漏极电流	Id(on)	Vgs=4.5V, Vds≧5V		15			A
漏极 – 源极导通电阻	Rds(on)	Vgs=4.5V, Id=5.0A			15	19	mΩ
		Vgs=2.5V, Id=4.6A			18	23	
		Vgs=1.8V, Id=4.2A			27	34	
正向跨导	Gfs	Vds=6V, Id=5.0A			28		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=6V, f=1MHz			620		pF
输出电容	Coss				180		pF
反馈电容	Crss				100		pF
开关特性							
总栅极电荷	Qg	Vgs=4.5V, Vds=6V, Id≡5.0A			6.0	12.0	nC
栅极 – 源极电荷	Qgs				0.8		nC
栅极 – 漏极电荷	Qgd				0.8		nC
导通延迟时间	td(on)	Vgs=4.5V, Vds=10V, Id≡3.6A RL=5.5Ω, Rgen=6.0Ω			10	20	ns
导通上升时间	tr				10	20	ns
关闭延迟时间	td(off)				25	40	ns
关闭下降时间	tf				10	20	ns

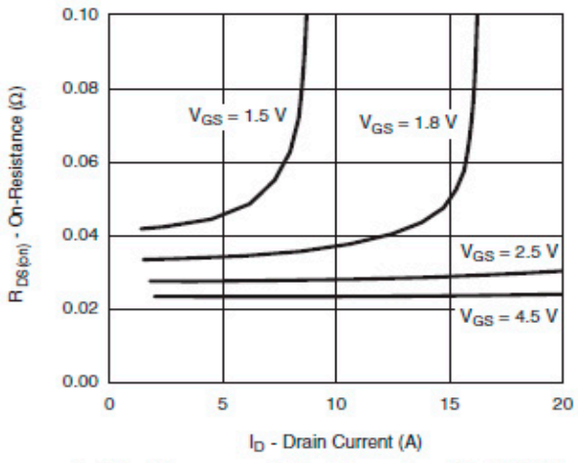
■标准特性曲线 (N 沟道)



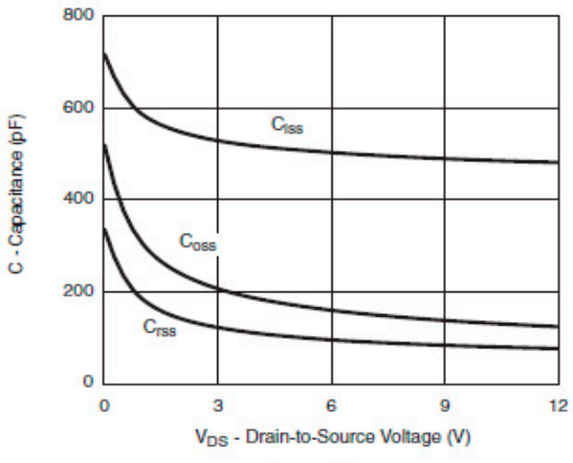
Output Characteristics



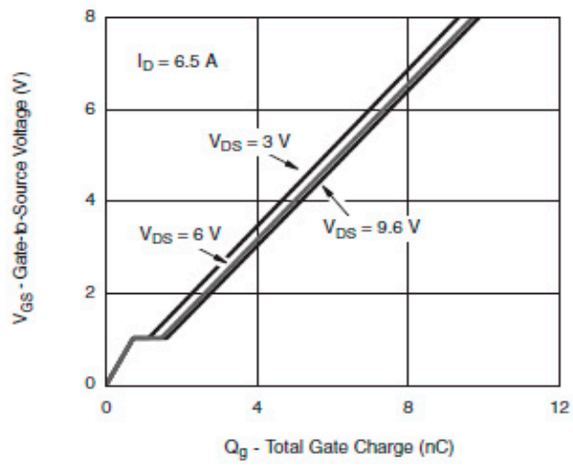
Transfer Characteristics



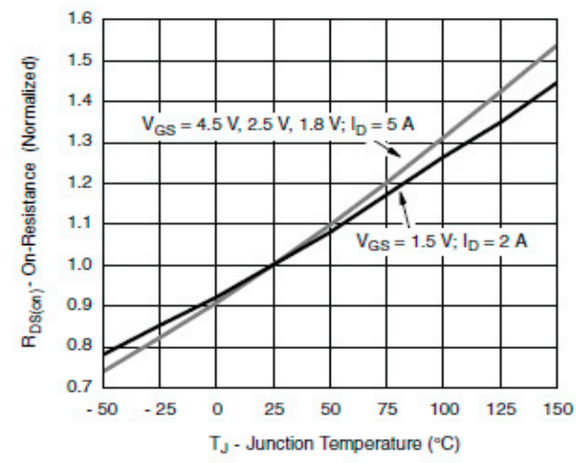
On-Resistance vs. Drain Current and Gate Voltage



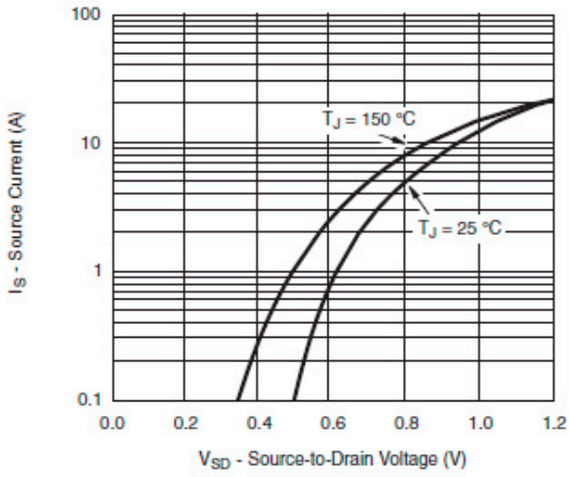
Capacitance



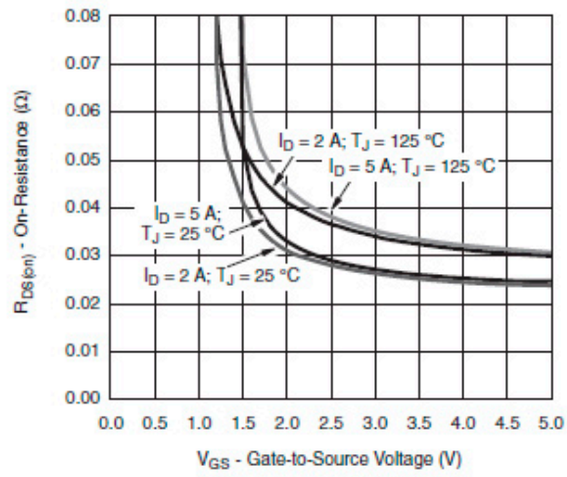
Gate Charge



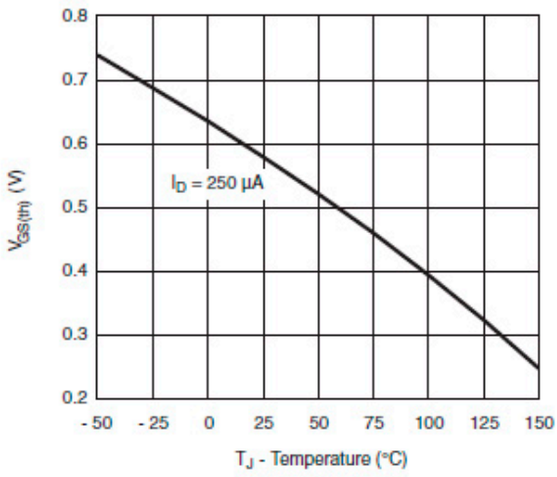
On-Resistance vs. Junction Temperature



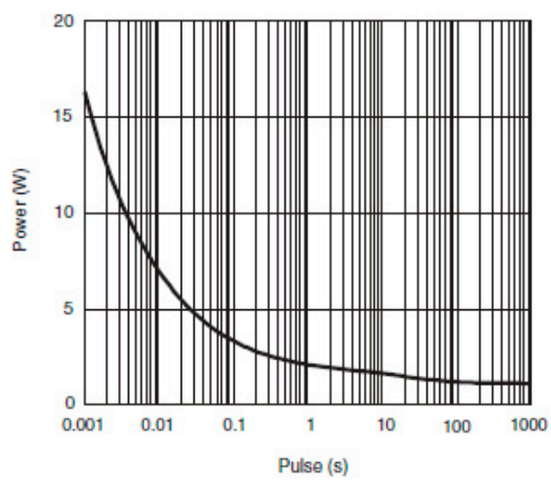
Source-Drain Diode Forward Voltage



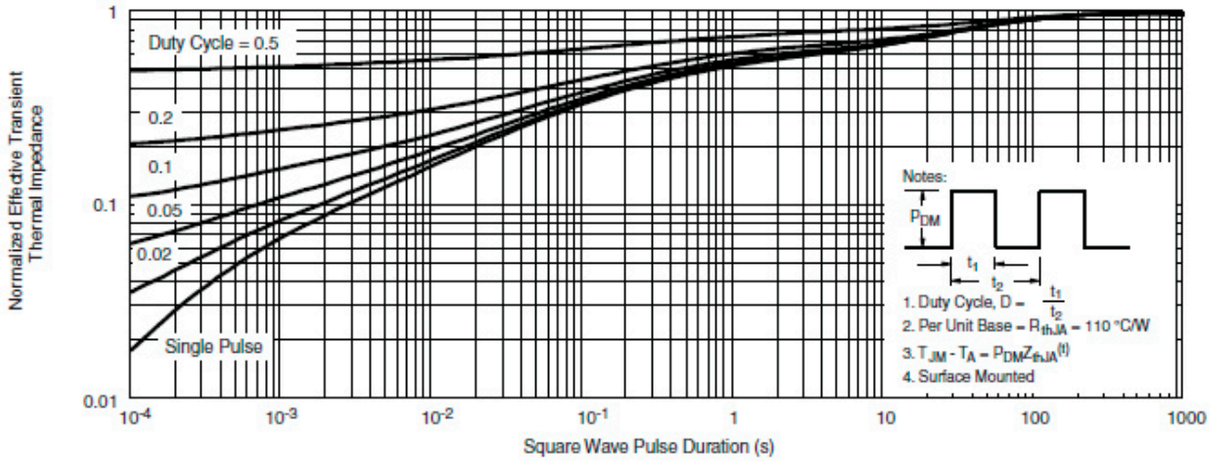
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



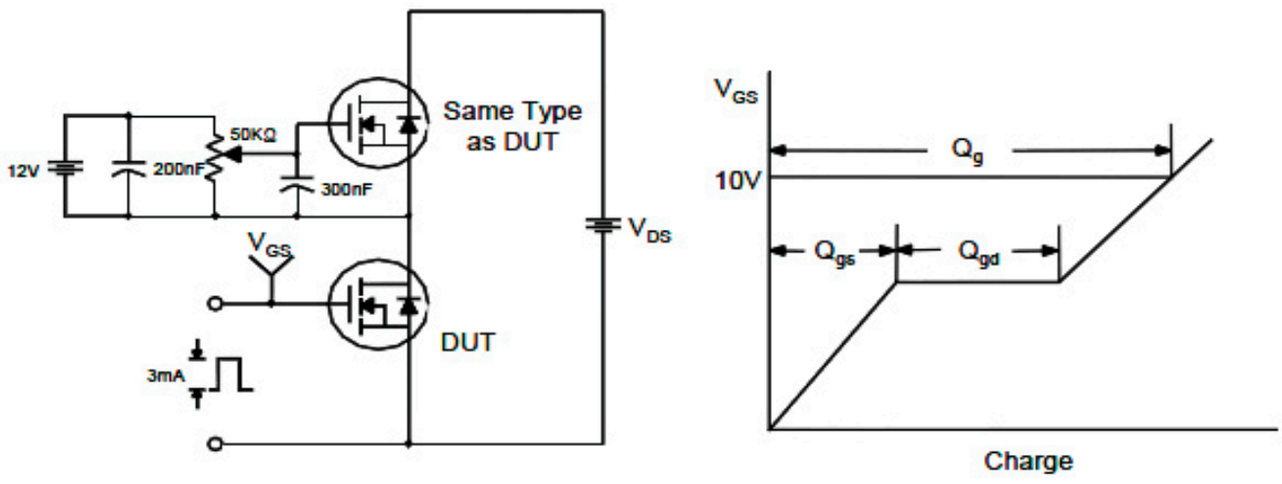
Single Pulse Power (Junction-to-Ambient)



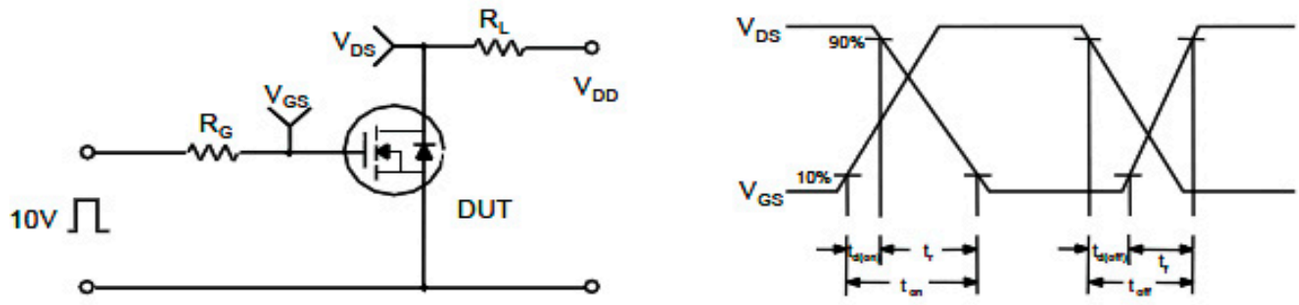
Normalized Thermal Transient Impedance, Junction-to-Ambient

■测试电路和波形 (N 沟道)

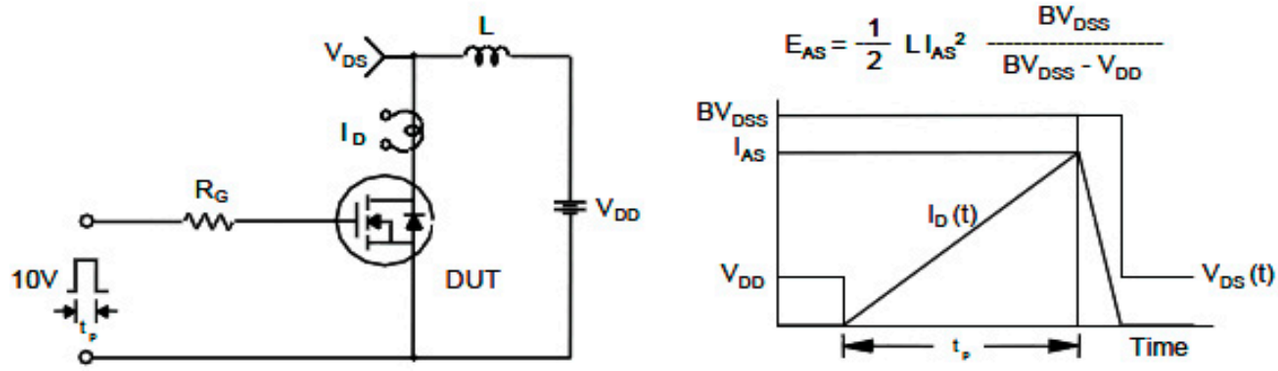
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

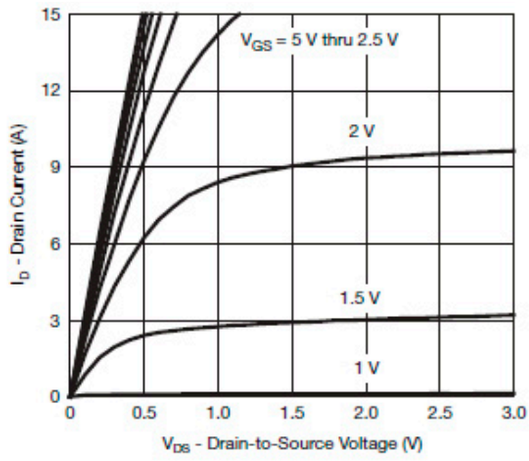


■电特性 (P 沟道)

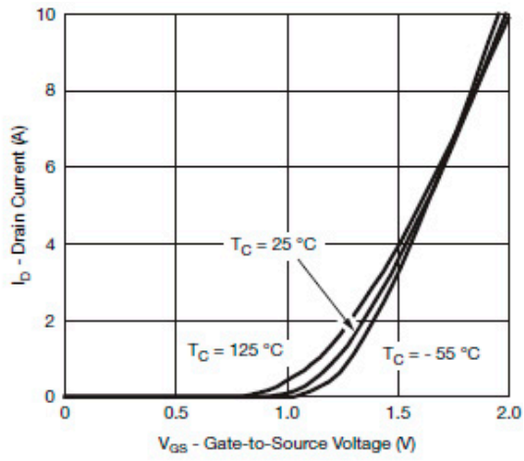
如没有特别注明时, Ta=25℃

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		–20			V
栅极接地时漏极电流	Idss	Vds=–16V, Vgs=0V				–1	μA
			Ta=85℃			–10	
栅极漏电电流	Igss	Vds=0V, Vgs= ± 8V				± 10	μA
栅极阈值电压	Vgs(th)	Vds=Vgs, Id=–250μA		–0.4		–1.0	V
导通时漏极电流	Id(on)	Vgs=–4.5V, Vds≧–5V		–10			A
漏极 – 源极导通电阻	Rds(on)	Vgs=–4.5V, Id=–4.5A			37	42	mΩ
		Vgs=–2.5V, Id=–3.4A			46	52	
		Vgs=–1.8V, Id=–2.4A			59	68	
正向跨导	Gfs	Vds=–6V, Id=–4.6A			12		S
二极管正向压降	Vsd	Is=–1.25A, 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=–6V, f=1MHz			1450		pF
输出电容	Coss				265		pF
反馈电容	Crss				255		pF
开关特性							
总栅极电荷	Qg	Vgs=–4.5V, Vds=–6V, Id≡–5.6A			10.0	18.0	nC
栅极 – 源极电荷	Qgs				2.5		nC
栅极 – 漏极电荷	Qgd				2.8		nC
导通延迟时间	td(on)	Vgs=–4.5V, Vds=–10V Id≡–3.7A, RL=2.7Ω Rgen=1.0Ω			15	25	ns
导通上升时间	tr				25	40	ns
关闭延迟时间	td(off)				40	65	ns
关闭下降时间	tf				15	25	ns

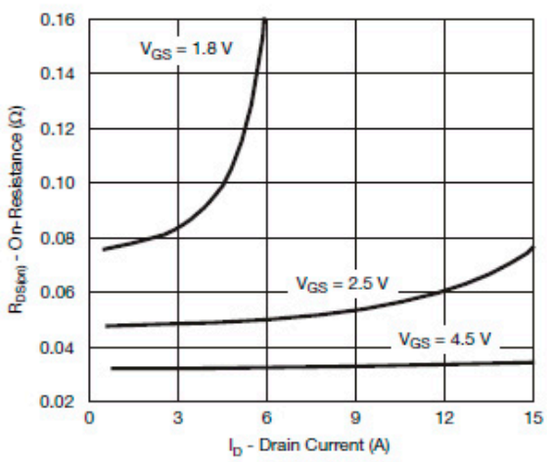
■标准特性曲线 (P 沟道)



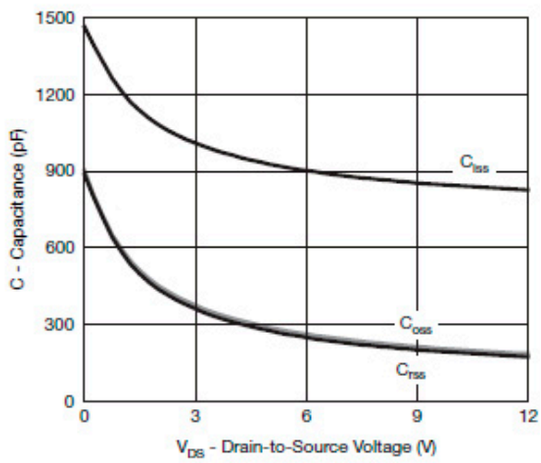
Output Characteristics



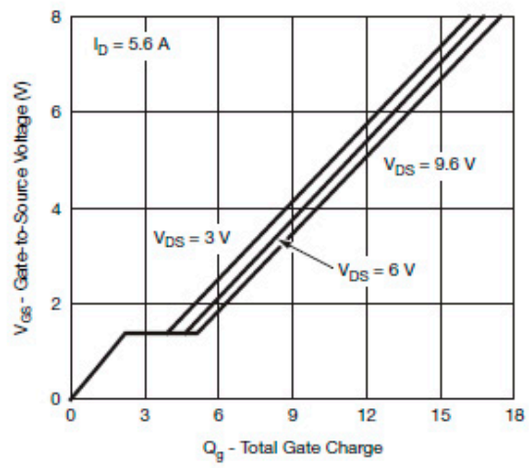
Transfer Characteristics



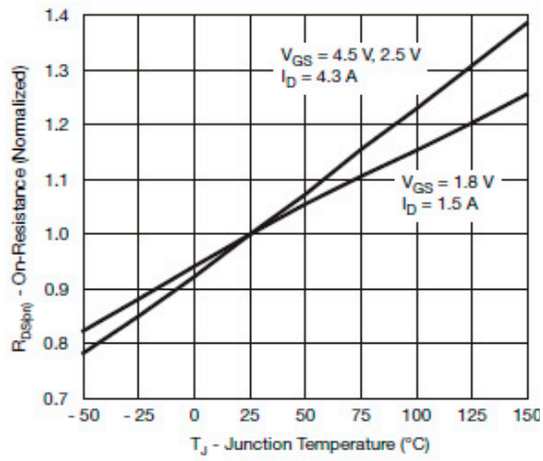
On-Resistance vs. Drain Current and Gate Voltage



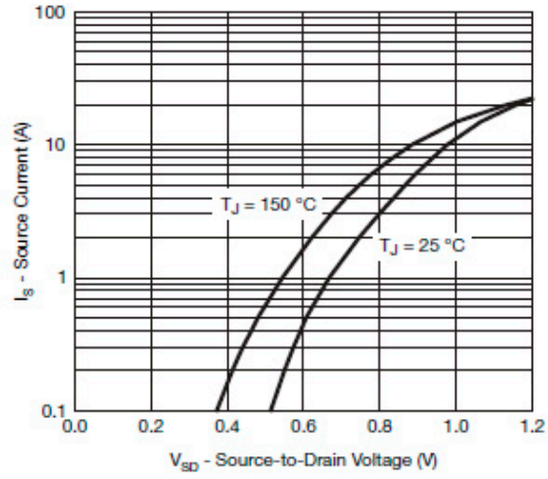
Capacitance



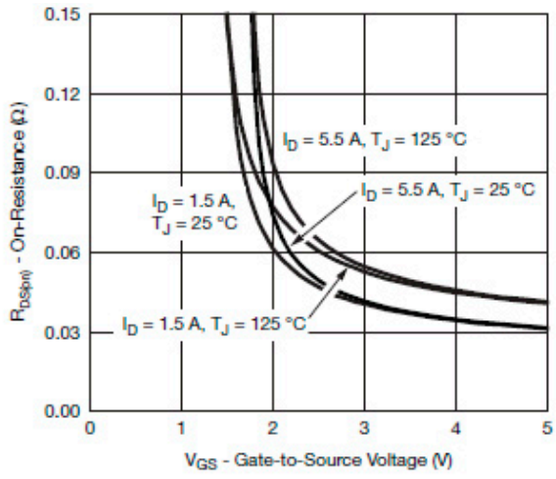
Gate Charge



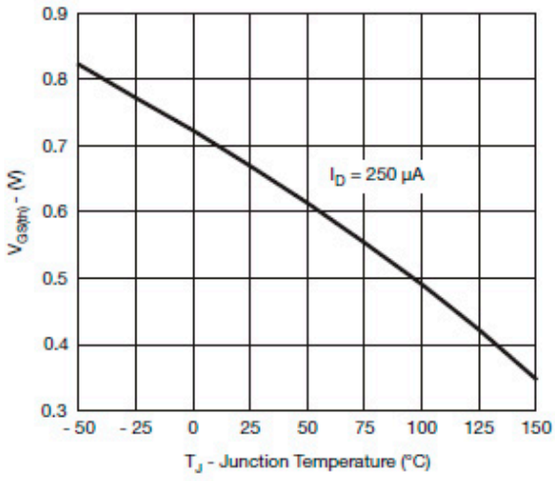
On-Resistance vs. Junction Temperature



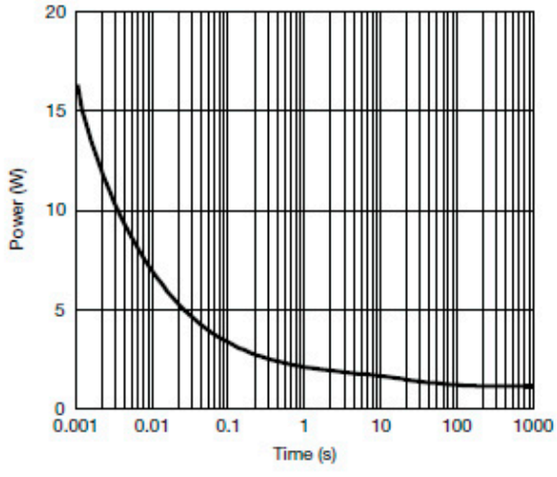
Soure-Drain Diode Forward Voltage



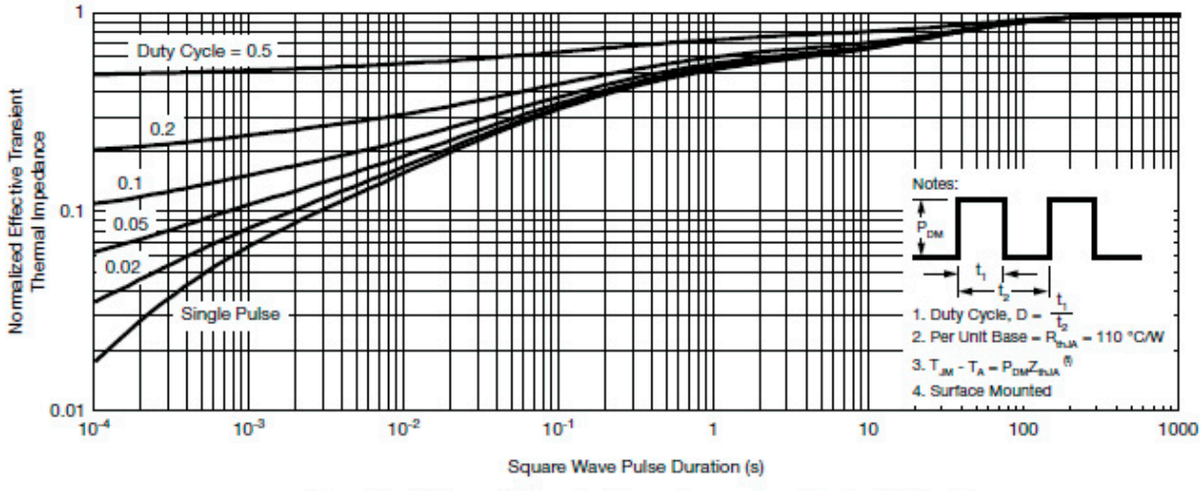
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



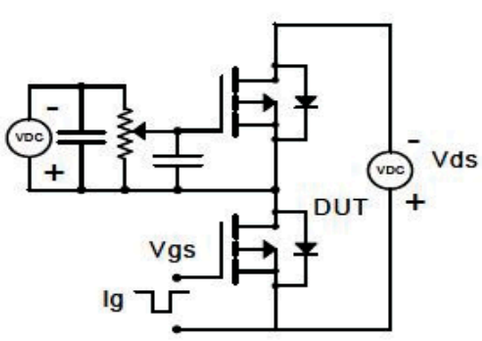
Single Pulse Power, Junction-to-Ambient

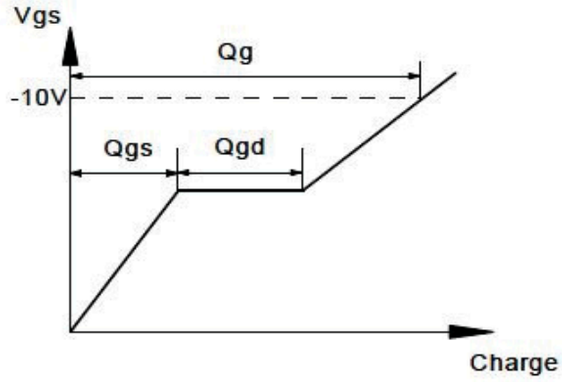


Normalized Thermal Transient Impedance, Junction-to-Ambient

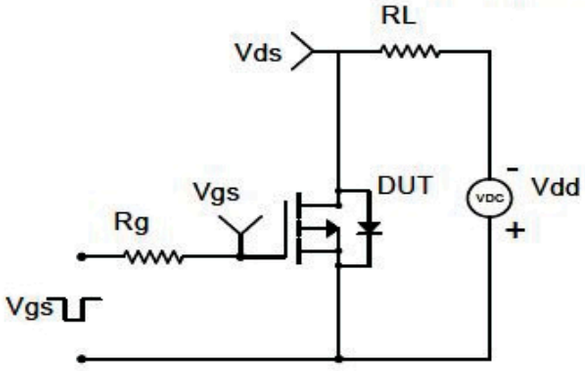
■测试电路和波形 (P 沟道)

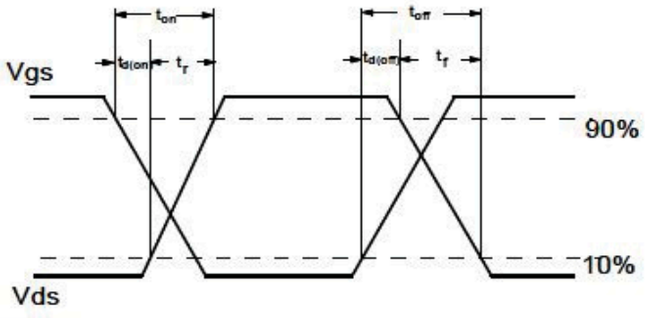
Gate Charge Test Circuit & Waveform





Resistive Switching Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms