

# 单 N 沟道 MOSFET

ELM53414AA-S

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

## ■概要

ELM53414AA-S 是 N 沟道低输入电容,低工作电压,低导通电阻的大电流 MOSFET。

## ■特点

- $V_{ds}=20V$
- $I_d=3.6A$
- $R_{ds(on)} < 70m\Omega$  ( $V_{gs}=4.5V$ )
- $R_{ds(on)} < 80m\Omega$  ( $V_{gs}=2.5V$ )
- $R_{ds(on)} < 100m\Omega$  ( $V_{gs}=1.8V$ )

## ■绝对最大额定值

如没有特别注明时,  $T_a=25^\circ C$

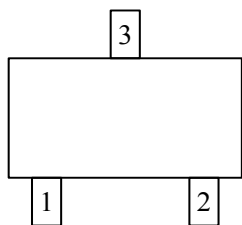
项目	记号	规格范围	单位	
漏极 - 源极电压	$V_{ds}$	20	V	
栅极 - 源极电压	$V_{gs}$	$\pm 12$	V	
漏极电流 ( $T_j=150^\circ C$ )	Id	$T_a=25^\circ C$	3.6	A
		$T_a=70^\circ C$	2.0	
漏极电流 (脉冲)	$I_{dm}$	10	A	
容许功耗	Pd	$T_c=25^\circ C$	1.25	W
		$T_c=70^\circ C$	0.80	
结合部温度及保存温度范围	$T_j, T_{stg}$	- 55 ~ 150	$^\circ C$	

## ■热特性

项目	记号	典型值	最大值	单位
最大结合部 - 环境热阻	$R_{\theta ja}$		120	$^\circ C/W$

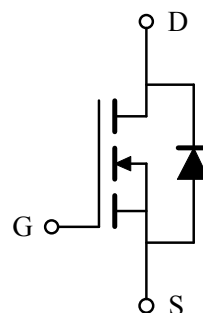
## ■引脚配置图

SOT-23(俯视图)



引脚编号	引脚名称
1	GATE
2	SOURCE
3	DRAIN

## ■电路图



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## ■电特性

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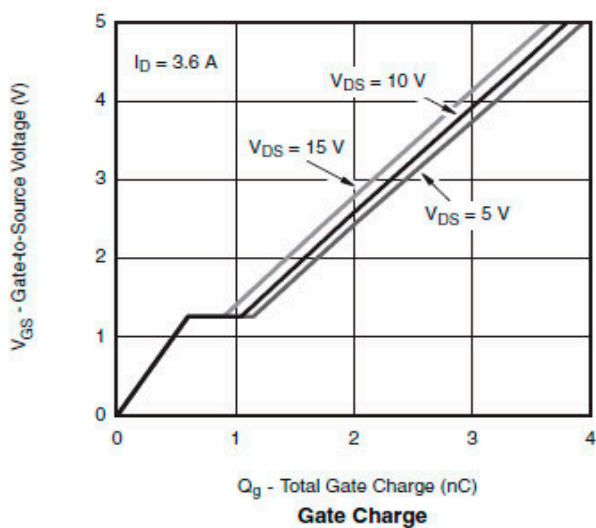
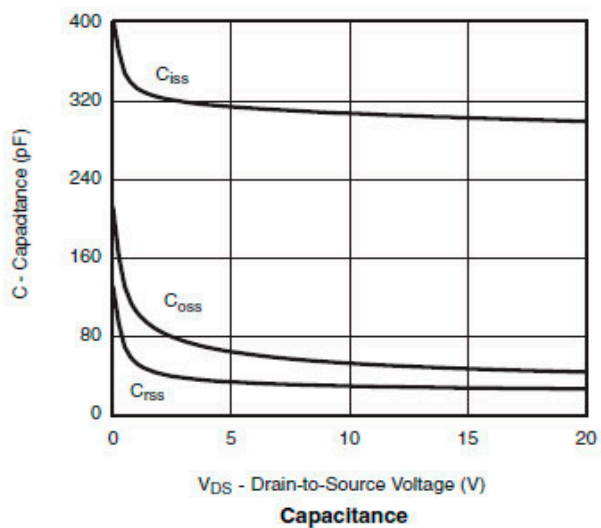
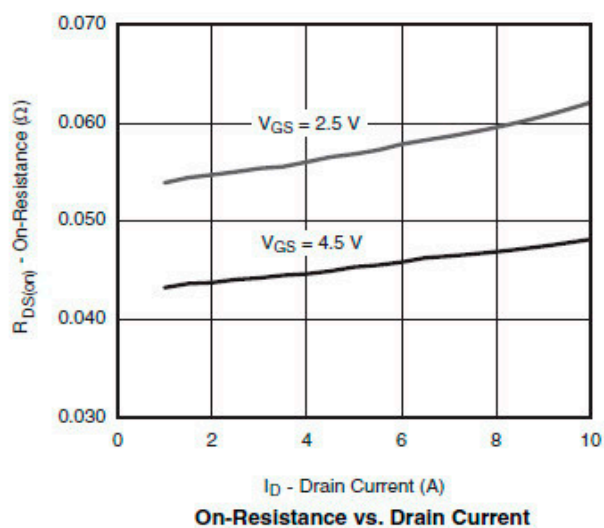
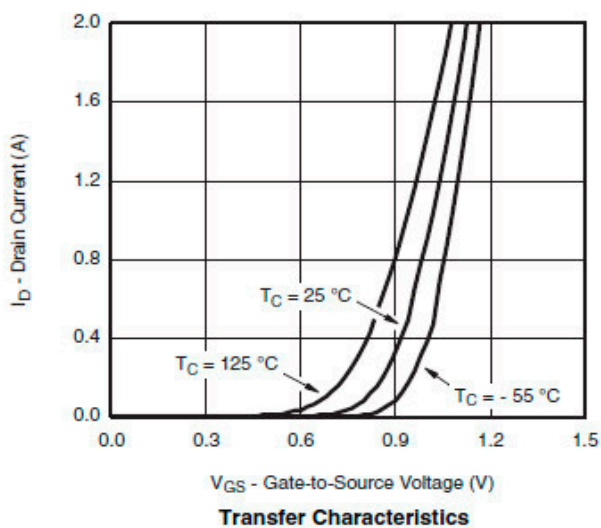
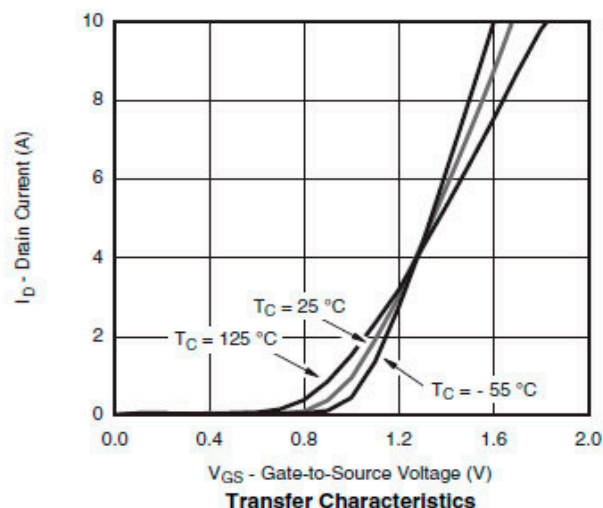
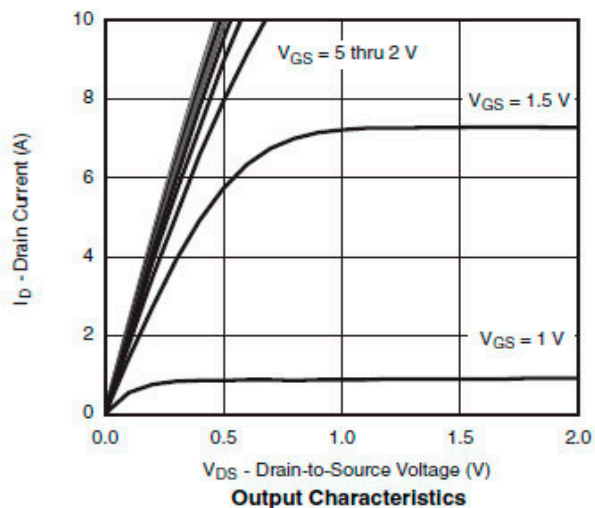
项目	记号	条件	最小值	典型值	最大值	单位
静态特性						
漏极 - 源极击穿电压	BV <sub>dss</sub>	$I_d=250\mu\text{A}, V_{gs}=0\text{V}$	20			V
栅极接地时漏极电流	I <sub>dss</sub>	$V_{ds}=16\text{V}, V_{gs}=0\text{V}$			1	$\mu\text{A}$
		$V_{ds}=16\text{V}, V_{gs}=0\text{V}, T_a=85^\circ\text{C}$			10	
栅极漏电电流	I <sub>gss</sub>	$V_{ds}=0\text{V}, V_{gs}=\pm 12\text{V}$			$\pm 100$	nA
栅极阈值电压	V <sub>gs(th)</sub>	$V_{ds}=V_{gs}, I_d=250\mu\text{A}$	0.3		0.8	V
导通时漏极电流	I <sub>d(on)</sub>	$V_{gs}=4.5\text{V}, V_{ds}=5\text{V}$	6			A
		$V_{gs}=2.5\text{V}, V_{ds}=5\text{V}$	4			
漏极 - 源极导通电阻	R <sub>dson</sub>	$V_{gs}=4.5\text{V}, I_d=2.4\text{A}$		56	70	m $\Omega$
		$V_{gs}=2.5\text{V}, I_d=2.0\text{A}$		66	80	
		$V_{gs}=1.8\text{V}, I_d=1.8\text{A}$		86	100	
正向跨导	G <sub>fs</sub>	$V_{ds}=5\text{V}, I_d=3.6\text{A}$		10		S
二极管正向压降	V <sub>sD</sub>	$I_s=1.6\text{A}, V_{gs}=0\text{V}$		0.85	1.20	V
寄生二极管最大连续电流	I <sub>s</sub>				1.6	A
动态特性						
输入电容	C <sub>iss</sub>	$V_{gs}=0\text{V}, V_{ds}=10\text{V}, f=1\text{MHz}$		340		pF
输出电容	C <sub>oss</sub>			115		pF
反馈电容	C <sub>rss</sub>			33		pF
开关特性						
总栅极电荷	Q <sub>g</sub>	$V_{gs}=4.5\text{V}, V_{ds}=10\text{V}, I_d=3.6\text{A}$		4.2	5.0	nC
栅极 - 源极电荷	Q <sub>gs</sub>			0.6		nC
栅极 - 漏极电荷	Q <sub>gd</sub>			0.4		nC
导通延迟时间	t <sub>d(on)</sub>	$V_{gs}=4.5\text{V}, V_{ds}=10\text{V}$ $R_L=2.8\Omega, I_d=3.6\text{A}$ $R_{gen}=1\Omega$		8	15	ns
导通上升时间	t <sub>r</sub>			8	15	ns
关闭延迟时间	t <sub>d(off)</sub>			25	40	ns
关闭下降时间	t <sub>f</sub>			8	15	ns

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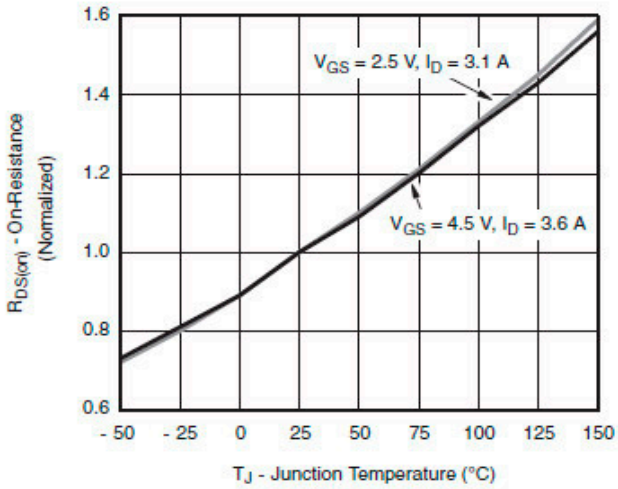
## ■ 标准特性和热特性曲线



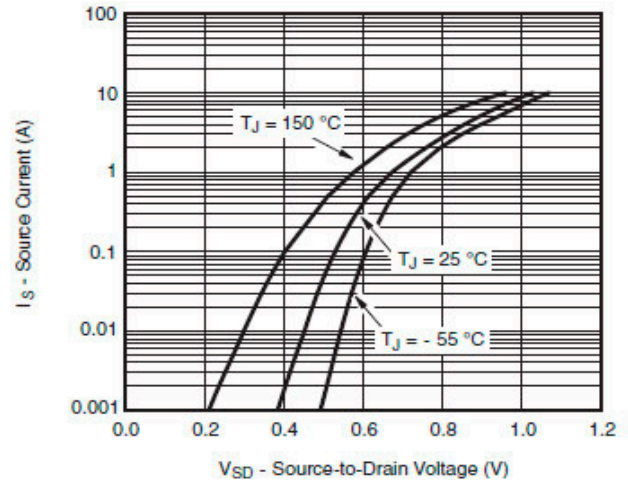
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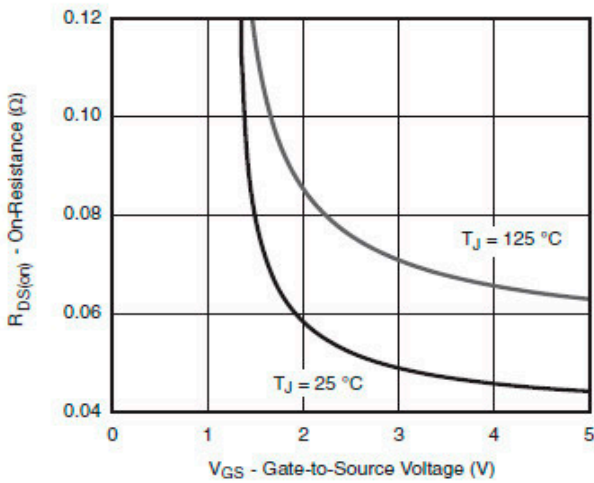
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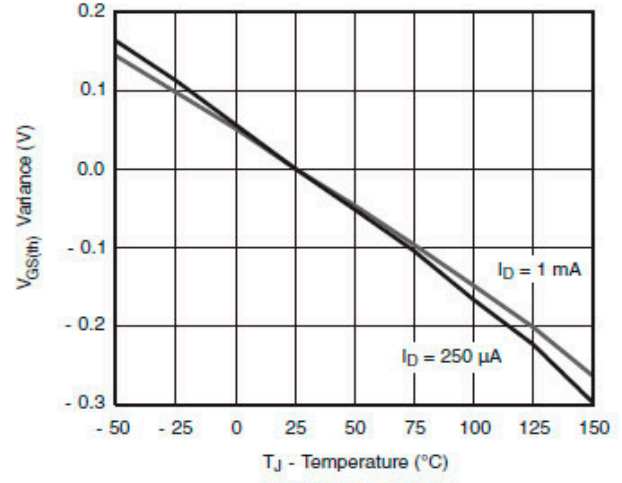
On-Resistance vs. Junction Temperature



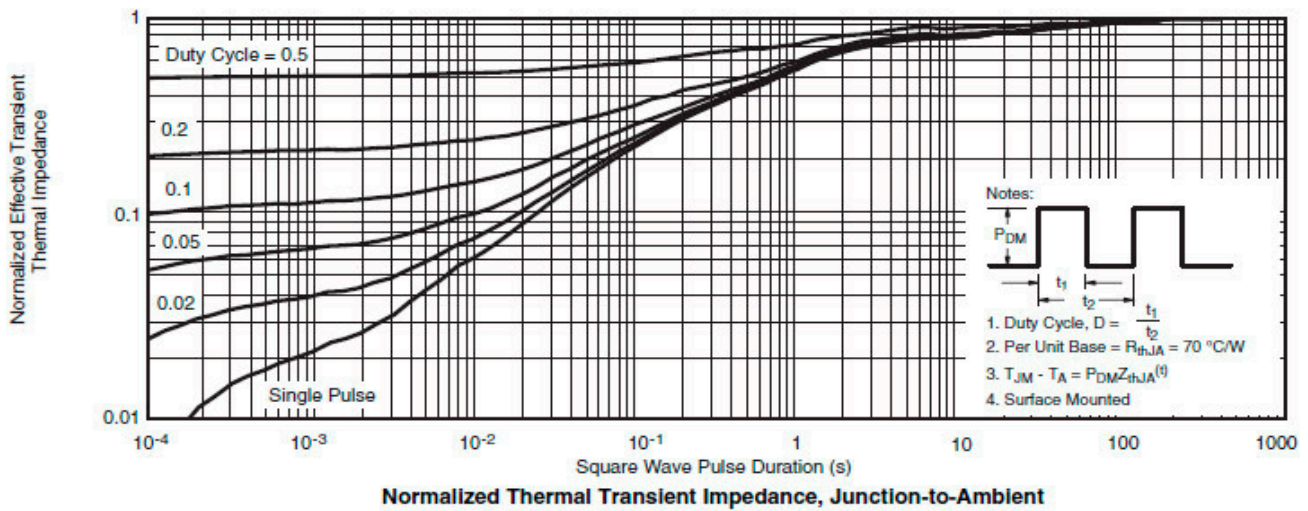
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Normalized Thermal Transient Impedance, Junction-to-Ambient

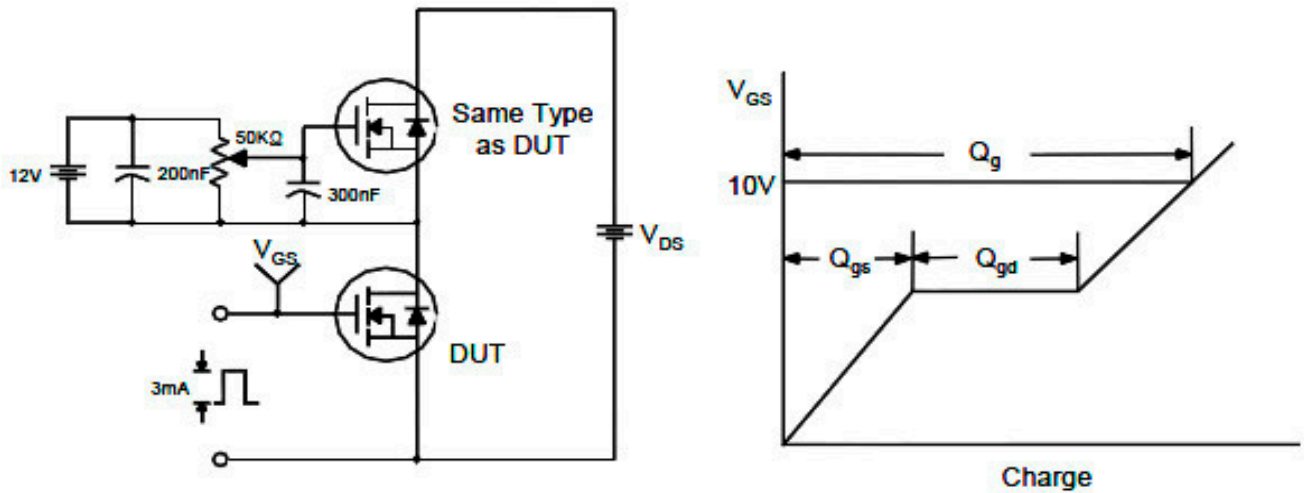
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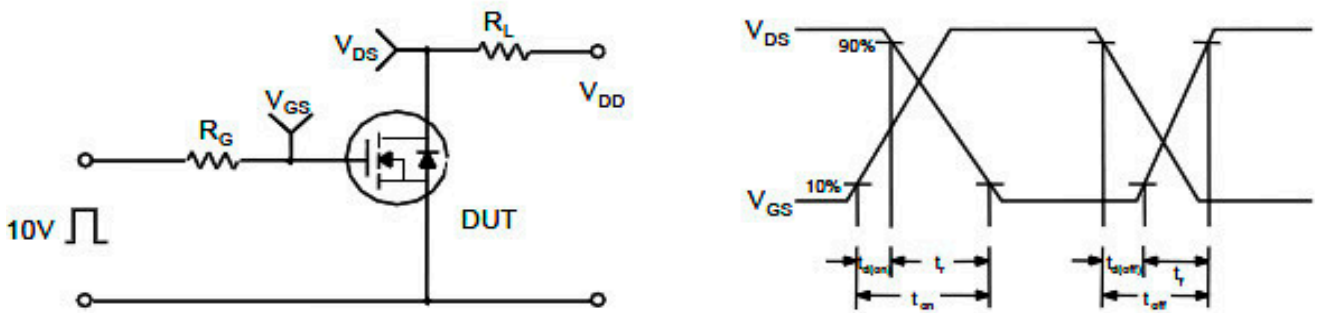
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## ■测试电路和波形

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

