

N AND P-CHANNEL ENHANCEMENT MODE POWER MOSFET N 加 P 沟道增强型 MOS 管

N-CH $V_{DS}= 60V$

$R_{DS(ON)}$, $V_{GS}@10V$, $I_{DS}@4.5A = 48m\Omega$

$R_{DS(ON)}$, $V_{GS}@4.5V$, $I_{DS}@3A = 60m\Omega$

P-CH $V_{DS}= -60V$

$R_{DS(ON)}$, $V_{GS}@-10V$, $I_{DS}@-3.2A = 110m\Omega$

$R_{DS(ON)}$, $V_{GS}@-4.5V$, $I_{DS}@-2.8A = 140m\Omega$

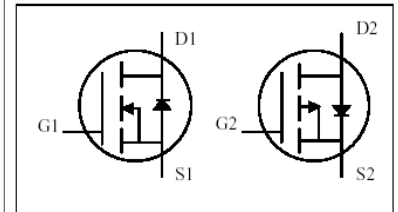
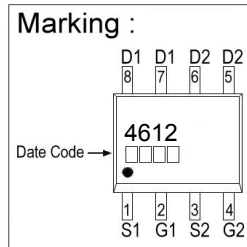
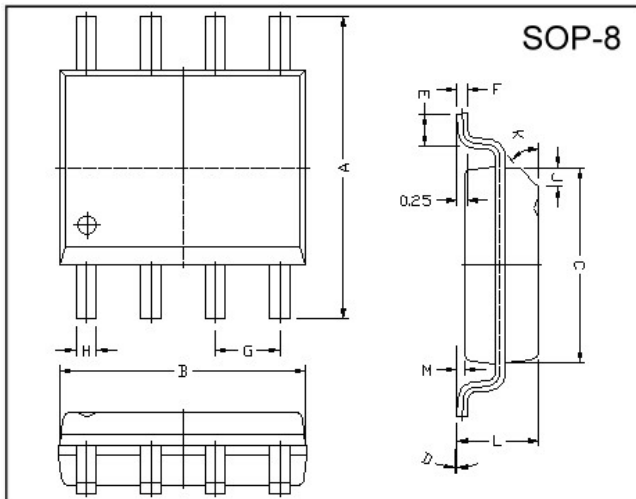
Features 特性

Advanced trench process technology 高级的加工技术

High Density Cell Design For Ultra Low On-Resistance 极低的导通电阻高密度的单元设计

Improved Shoot-Through FOM 改良的成形工艺

Package Dimensions 封装尺寸及外形图



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	5.80	6.20	M	0.10	0.25
B	4.80	5.00	H	0.35	0.49
C	3.80	4.00	L	1.35	1.75
D	0°	8°	J	0.375 REF.	
E	0.40	0.90	K	45°	
F	0.19	0.25	G	1.27 TYP.	

Maximum Ratings and Thermal Characteristics (TA = 25°C unless otherwise noted) 25 °C 极限参数和热特性

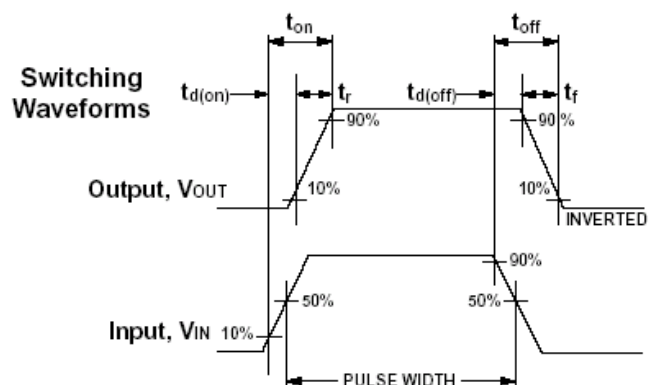
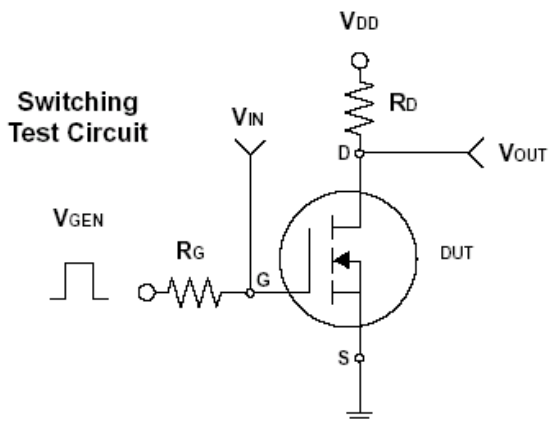
Parameter 极限参数	Symbol 符号	Ratings 等级		Unit 单位
		N-沟道	P-沟道	
Drain-Source Voltage 漏源电压	V_{DS}	60	-60	V
Gate-Source Voltage 栅源电压	V_{GS}	±20	±20	V
Continuous Drain Current 连续漏极电流	$I_D @TA=25^{\circ}C$	4.5	-3.2	A
Continuous Drain Current 连续漏极电流	$I_D @TA=70^{\circ}C$	3.6	-2.6	A
Pulsed Drain Current 脉冲漏极电流	I_{DM}	20	-20	A
Total Power Dissipation 功耗	$P_D @TA=25^{\circ}C$	2.0		W
Linear Derating Factor 线性因子		0.016		W/°C
Operating Junction and Storage Temperature Range 使用及储存温度	T_j, T_{stg}	-55 ~ +150		°C

N-Channel Electrical Characteristics (Tj = 25°C unless otherwise specified)

N 沟道电气特性 25°C

Parameter 参数	符号	Test Condition 测试条件	最小值	典型值	最大值	单位
Static 静态参数						
Drain-Source Breakdown Voltage 漏源击穿电压	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	60			V
Drain-Source On-State Resistance 漏源导通电阻	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 4.5A$		38.0	48.0	mΩ
Drain-Source On-State Resistance 漏源导通电阻	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 3.0A$		42.0	60.0	
Gate Threshold Voltage 开启电压	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.65	3	V
Zero Gate Voltage Drain Current 零栅压漏极电流	I_{DSS}	$V_{DS} = 48V, V_{GS} = 0V$			1	μA
Gate Body Leakage 漏极短路时截止栅电流	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
Forward Transconductance 正向跨导	g_{fs}	$V_{DS} = 5V, I_D = 4.5A$		17		S
Dynamic 动态参数						
Total Gate Charge 栅极总电荷	Q_g	$V_{DS} = 30V, I_D = 4.5A$ $V_{GS} = 10V$		13	25	nC
Gate-Source Charge 栅-源极电荷	Q_{gs}			1.2	2.0	
Gate-Drain Charge 栅-漏极电荷	Q_{gd}			5.8	11	
Turn-On Delay Time 导通延迟时间	$t_{d(on)}$	$V_{DD} = 30V, R_L = 20\Omega$ $V_{GEN} = 10V$ $R_G = 3\Omega$		9.8		ns
Turn-On Rise Time 导通上升时间	t_r			4.4		
Turn-Off Delay Time 关断延迟时间	$t_{d(off)}$			37		
Turn-Off Fall Time 关断下降时间	t_f			5		
Input Capacitance 输入电容	C_{iss}	$V_{DS} = 15V, V_{GS} = 0V$ $f = 1.0\text{ MHz}$		655		pF
Output Capacitance 输出电容	C_{oss}			53		
Reverse Transfer Capacitance 反向传输电容	C_{rss}			28.5		
Source-Drain Diode 源漏二极管参数						
Max. Diode Forward Current 最大正向电流	I_S				3.8	A
Diode Forward Voltage 正向电压	V_{SD}	$I_S = 1A, V_{GS} = 0V$			1	V

Note: Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$ 注意: 脉冲测试: 脉冲宽度 $\leq 300\mu s$ 死区 $\leq 2\%$



N-Channel Characteristics Curve N 沟道电气性能特征曲线

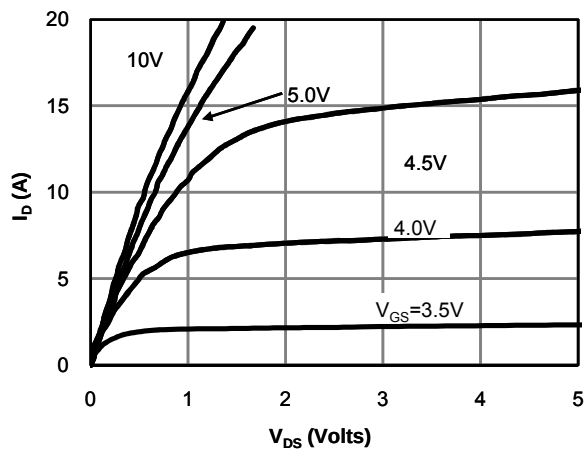


Fig 1: On-Region Characteristics

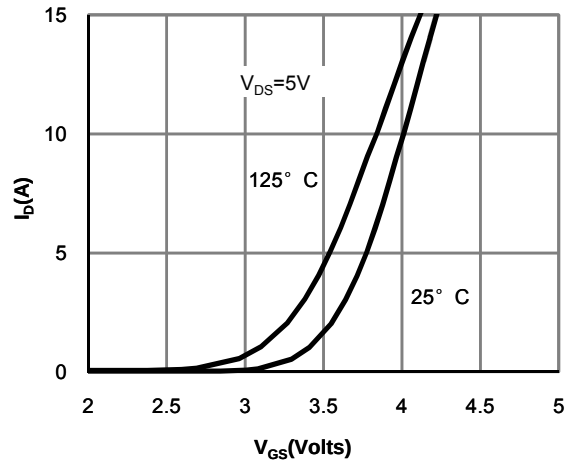


Figure 2: Transfer Characteristics

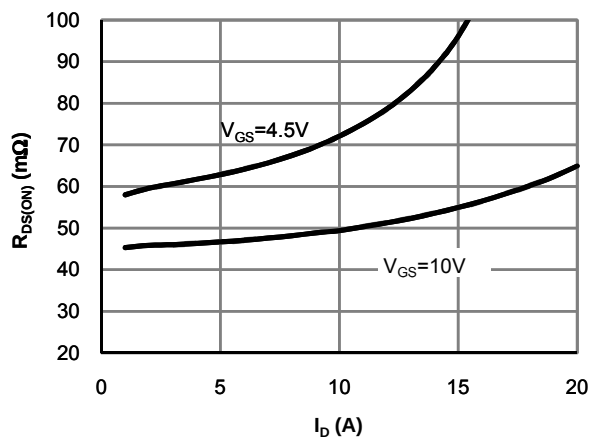


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

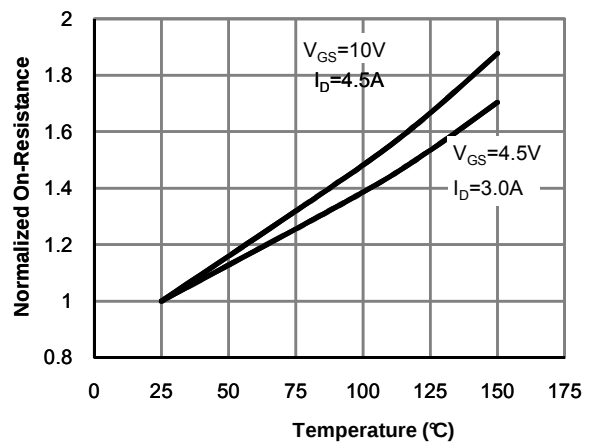


Figure 4: On-Resistance vs. Junction Temperature

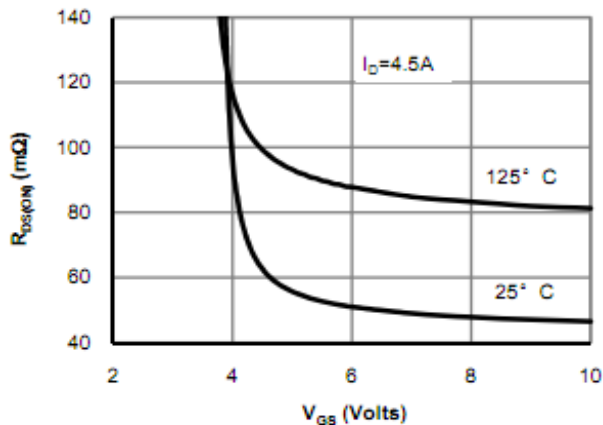


Figure 5: On-Resistance vs. Gate-Source Voltage

P-Channel Electrical Characteristics (T_j = 25°C unless otherwise specified) P 沟道电气特性 25°C

Parameter 参数	符号	Test Condition 测试条件	最小值	典型值	最大值	单位
Static 静态参数						
Drain-Source Breakdown Voltage 漏源击穿电压	BV _{DSS}	V _{GS} = 0V , I _D = -250u A	-60			V
Drain-Source On-State Resistance 漏源导通电阻	R _{DS(on)}	V _{GS} = -10 V ,I _D = - 3.2 A		95	110	mΩ
Drain-Source On-State Resistance 漏源导通电阻	R _{DS(on)}	V _{GS} = -4.5 V, I _D = -2.8 A		125	140	
Gate Threshold Voltage 栅源电压	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250 uA	-1	-2.5	-4	V
Zero Gate Voltage Drain Current 0 栅压漏极电流	I _{DSS}	V _{DS} = -30 V, V _{GS} = 0V			-1	uA
Gate Body Leakage 漏极短路时截止栅电流	I _{GSS}	V _{GS} = ± 20V, V _{DS} = 0V			± 100	nA
Forward Transconductance 正向跨导	g _{fs}	V _{DS} = -5V, I _D = -3.2A		5		S
Dynamic ³⁾ 动态参数						
Total Gate Charge 栅极总电荷	Q _g	V _{DS} = - 30 V, I _D = -3.2 A V _{GS} = -10 V		12.7		nC
Gate-Source Charge 栅-源极电荷	Q _{gs}			2.4		
Gate-Drain Charge 栅-漏极电荷	Q _{gd}			2.65		
Turn-On Delay Time 导通延迟时间	t _{d(on)}	V _{DD} = -30 V, R _L = 10 Ω I _D = -3.2 A, V _{GEN} = -10 V R _G = 3 Ω		16.5		ns
Turn-On Rise Time 导通上升时间	t _r			5.5		
Turn-Off Delay Time 关断延迟时间	t _{d(off)}			31.5		
Turn-Off Fall Time 关断下降时间	t _f			7.9		
Input Capacitance 输入电容	C _{iss}	V _{DS} = - 30 V, V _{GS} = 0V f = 1.0 MHz		737		pF
Output Capacitance 输出电容	C _{oss}			64		
Reverse Transfer Capacitance 反向传输电容	C _{rss}			32		
Source-Drain Diode 源漏二极管参数						
Max. Diode Forward Current 最大正向电流	I _S				-2.3	A
Diode Forward Voltage 正向电压	V _{SD}	I _S = -1.0A, V _{GS} = 0V			-1.2	V

P-Channel

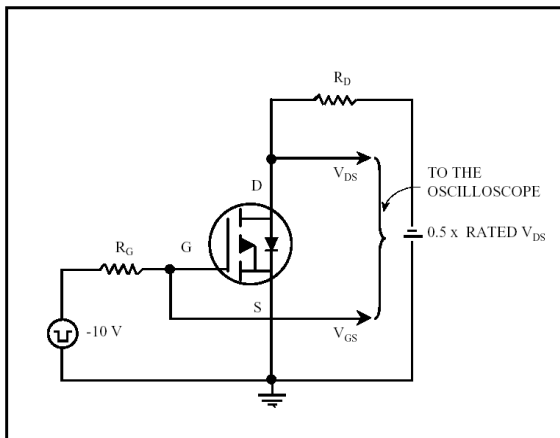


Fig 13. Switching Time Circuit

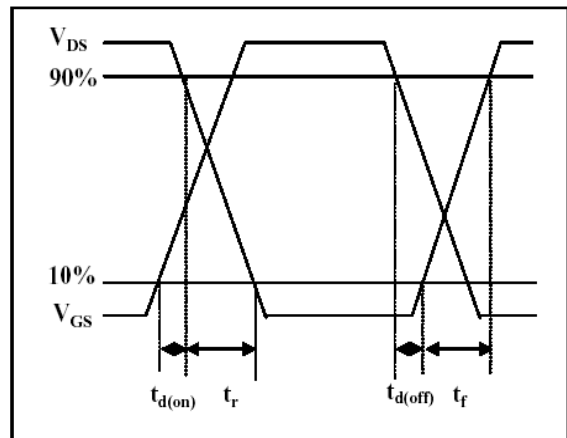


Fig 14. Switching Time Waveform

P-Channel Characteristics Curve P 沟道电气性能特征曲线

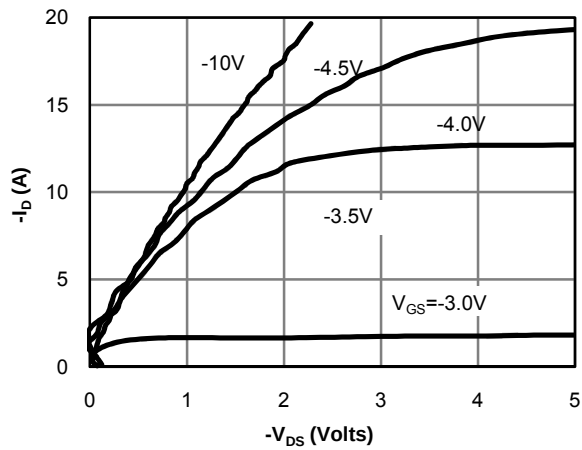


Fig 1: On-Region Characteristics

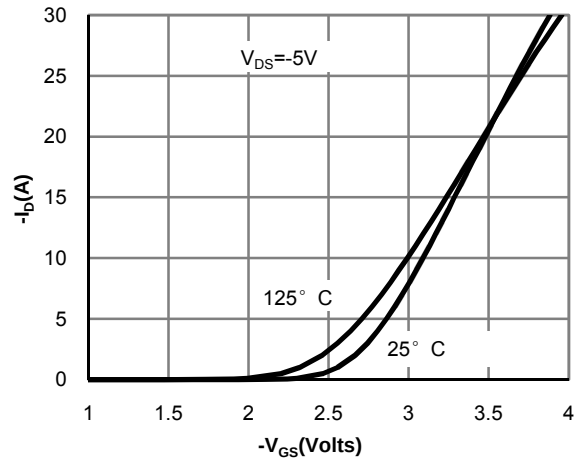


Figure 2: Transfer Characteristics

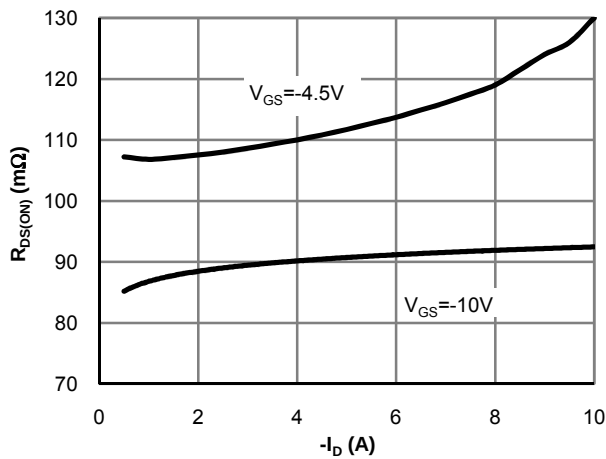


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

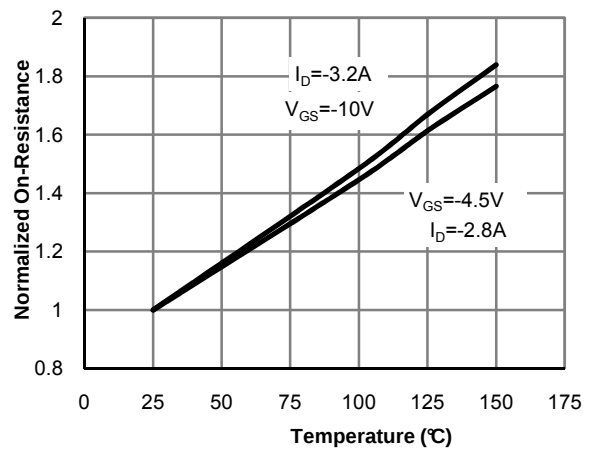


Figure 4: On-Resistance vs. Junction Temperature

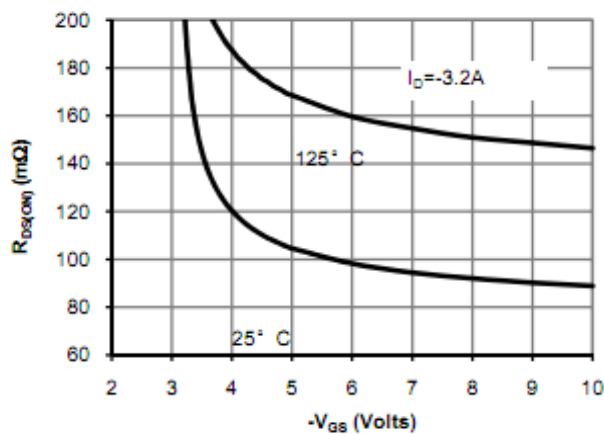


Figure 5: On-Resistance vs. Gate-Source Voltage